UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

☒ Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended December 31, 2020 or

☐ Transition Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Commission file number 1-8002

THERMO FISHER SCIENTIFIC INC.

(Exact name of Registrant as specified in its charter)

Delaware	04-2209186
(State of incorporation)	*(I.R.S. Employer Identification No.)*

168 Third Avenue
Waltham, Massachusetts 02451
(Address of principal executive offices) (Zip Code)

Registrant's telephone number, including area code: (781) 622-1000

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $1.00 par value	TMO	New York Stock Exchange
2.150% Notes due 2022	TMO 22A	New York Stock Exchange
0.750% Notes due 2024	TMO 24A	New York Stock Exchange
0.125% Notes due 2025	TMO 25B	New York Stock Exchange
2.000% Notes due 2025	TMO 25	New York Stock Exchange
1.400% Notes due 2026	TMO 26A	New York Stock Exchange
1.450% Notes due 2027	TMO 27	New York Stock Exchange
1.750% Notes due 2027	TMO 27B	New York Stock Exchange
0.500% Notes due 2028	TMO 28A	New York Stock Exchange
1.375% Notes due 2028	TMO 28	New York Stock Exchange
1.950% Notes due 2029	TMO 29	New York Stock Exchange
0.875% Notes due 2031	TMO 31	New York Stock Exchange
2.375% Notes due 2032	TMO 32	New York Stock Exchange
2.875% Notes due 2037	TMO 37	New York Stock Exchange
1.500% Notes due 2039	TMO 39	New York Stock Exchange
1.875% Notes due 2049	TMO 49	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the Registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T during the preceding 12 months. Yes ☒ No ☐

Indicate by check mark whether the Registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act. Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐ Emerging growth company ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

As of June 26, 2020, the aggregate market value of the voting stock held by nonaffiliates of the Registrant was approximately $138,639,543,000 (based on the last reported sale of common stock on the New York Stock Exchange Composite Tape reporting system on June 26, 2020).

As of February 6, 2021, the Registrant had 393,793,362 shares of Common Stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Sections of Thermo Fisher's definitive Proxy Statement for the 2021 Annual Meeting of Shareholders are incorporated by reference into Parts II and III of this report.

THERMO FISHER SCIENTIFIC INC.

ANNUAL REPORT ON FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2020
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PART I

Item 1. Business

General Development of Business

Thermo Fisher Scientific Inc. (also referred to in this document as "Thermo Fisher," "we," the "company," or the "registrant") is the world leader in serving science. Our Mission is to enable our customers to make the world healthier, cleaner and safer. We serve more than 400,000 customers working in pharmaceutical and biotech companies, hospitals and clinical diagnostic labs, universities, research institutions and government agencies, as well as environmental, industrial quality and process control settings. Our global team of more than 80,000 colleagues delivers an unrivaled combination of innovative technologies, purchasing convenience and pharmaceutical services through our industry-leading brands, including Thermo Scientific, Applied Biosystems, Invitrogen, Fisher Scientific, Unity Lab Services and Patheon.

We continuously increase our depth of capabilities in technologies, software and services, and leverage our extensive global channels to address our customers' emerging needs. We do this through organic investments in research and development and through acquisitions. Our goal is to make our customers more productive in an increasingly competitive business environment, and enable them to solve their challenges, from complex research to improved patient care, environmental and process monitoring, and consumer safety.

Forward-looking Statements

Forward-looking statements, within the meaning of Section 21E of the Securities Exchange Act of 1934 (the Exchange Act), are made throughout this Annual Report on Form 10-K. Any statements contained herein that are not statements of historical fact may be deemed to be forward-looking statements, including without limitation statements regarding: projections of revenues, expenses, earnings, margins, tax rates, tax provisions, cash flows, pension and benefit obligations and funding requirements, our liquidity position; cost reductions, restructuring activities, new product and service developments, competitive strengths or market position, acquisitions or divestitures; growth, declines and other trends in markets we sell into; new or modified laws, regulations and accounting pronouncements; outstanding claims, legal proceedings, tax audits and assessments and other contingent liabilities; foreign currency exchange rates and fluctuations in those rates; general economic and capital markets conditions; the timing of any of the foregoing; assumptions underlying any of the foregoing; the expected impact of the COVID-19 pandemic on the company's business; and any other statements that address events or developments that Thermo Fisher intends or believes will or may occur in the future. Without limiting the foregoing, the words "believes," "anticipates," "plans," "expects," "seeks," "estimates," and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements are accompanied by such words. While the company may elect to update forward-looking statements in the future, it specifically disclaims any obligation to do so, even if the company's estimates change, and readers should not rely on those forward-looking statements as representing the company's views as of any date subsequent to the date of the filing of this report.

A number of important factors could cause the results of the company to differ materially from those indicated by such forward-looking statements, including those detailed under the heading, "Risk Factors" in Part I, Item 1A.

Business Segments and Products

We report our business in four segments – Life Sciences Solutions, Analytical Instruments, Specialty Diagnostics, and Laboratory Products and Services.

In 2020, we worked with our customers to respond to the COVID-19 pandemic. This important work crossed many of the business segments we describe below. Very early in the year, cryo-electron microscopes made by our Analytical Instruments business were used by researchers to create the first 3D image of the virus. Through our Research and Safety Market Channel and Healthcare Market Channel we were a critical supplier of personal protective equipment (PPE), leveraging our strong relationships to secure these products when supplies were scarce. Through our Life Sciences Solutions, Specialty Diagnostics and Laboratory Products businesses, we enabled widespread COVID-19 testing, creating a leading molecular diagnostic business in just a few months to support hundreds of millions of polymerase chain reaction (PCR) tests around the world. And through our Pharma Services business, we provided our pharma and biotech customers with the set of products and services they needed to develop and produce vaccines and therapies.

Life Sciences Solutions Segment

Through our Life Sciences Solutions segment, we provide an extensive portfolio of reagents, instruments and consumables used in biological and medical research, discovery and production of new drugs and vaccines as well as diagnosis of infection and disease. These products and services are used by customers in pharmaceutical, biotechnology, agricultural, clinical,

healthcare, academic, and government markets. Life Sciences Solutions includes four primary businesses – Biosciences, Genetic Sciences, Clinical Next-Generation Sequencing, and BioProduction.

Biosciences

Our biosciences business includes reagents, instruments and consumables that help our customers conduct biological and medical research, discover new drugs and vaccines, and diagnose infection and disease, such as COVID-19.

Our biosciences offerings include:

- Reagents, instruments, and consumables used for protein biology, molecular biology, sample preparation and cell imaging and analysis. The portfolio includes antibodies and products for protein purification, detection, modification, and analysis; and sequencing, detection and purification products used for high content analysis of nucleic acids. Many of these products are also used in applied markets, including agriculture, forensics, diagnostics product development, toxicology research and diagnostic testing.
- Tools used for genetic engineering, amplification, quantification and analysis as well as RNA isolation, including stem cell reprogramming kits, transfection reagents, RNA interference reagents, along with gene editing tools and gene synthesis products.
- Cell culture media, reagents, and plastics for preserving and growing mammalian cells which are used in many life science research applications.
- Fluorescence-based technologies, which facilitate the labeling of molecules for biological research and drug discovery. These technologies include a wide range of cell analysis instruments, including flow cytometers and imaging platforms that enable fluorescence microscopy.
- Protein analysis products, including pre-cast electrophoresis gels for separating nucleic acids and proteins, and western blotting and staining tools.

Genetic Sciences

Our genetic sciences business combines a wide variety of instruments and related reagents used to provide high-value genomic solutions to assist customer decisions in the research, clinical, healthcare and applied markets.

Our offerings include real-time PCR technology used to identify changes in gene expression, genotyping or proteins on an individual gene-by-gene basis and for diagnostic testing to identify infection and disease such as COVID-19; capillary electrophoresis (CE) sequencing, a core technology used in DNA sequencing and fragment analysis and forensic analysis applications; and microarray technology, used in gene expression, genotyping and reproductive health.

Our genetic analyzers served as the foundational platform used to sequence the first human genome. These systems are used in a variety of basic, commercial and clinical research applications.

Clinical Next-Generation Sequencing

Our clinical next-generation sequencing (NGS) business focuses on delivering simple, fast and cost-effective NGS technology for a range of applications. The business is focused on targeted sequencing solutions for research use, the application of NGS in oncology and companion diagnostics.

BioProduction

Our bioproduction business supports developers and manufacturers of biological-based therapeutics and vaccines with a portfolio of premium solutions and services focused on upstream cell culture, downstream purification, analytics for detection and quantitation of process/product impurities, and a suite of single-use solutions spanning the biologics workflow.

Our bioproduction offerings include:

- Single-use bioproduction solutions that provide our customers with faster turnaround and set-up times, minimal validation requirements, reduced investment and running costs, and increased flexibility of manufacturing capacity.
- Production cell culture media solutions, which are used by leading biotechnology and pharmaceutical companies to grow cells in controlled conditions and enable large scale cGMP (Current Good Manufacturing Practices) manufacturing of drugs and vaccines. We also provide our customers with the associated services to optimize the productivity of these production platforms.

- Chromatography products, which deliver superior capacity and resolution for process-scale bioseparations, and offer a broad set of scalable options for the purification of antibodies, antibody fragments and proteins.
- Rapid molecular products that deliver accurate results in less than four hours for contaminant detection, identification and quantitation.
- Scalable solutions for the manufacture of cell therapy based drugs.

Our Doe & Ingalls offerings include chemical distribution and supply chain services that provide primarily life science manufacturers with reliable, secure supply chains for their chemical raw materials.

Analytical Instruments Segment

Through our Analytical Instruments segment, we provide a broad offering of instruments, consumables, software and services that are used for a range of applications in the laboratory, on the production line and in the field. These products and services are used by customers in pharmaceutical, biotechnology, academic, government, environmental and other research and industrial markets, as well as the clinical laboratory. This segment includes three primary businesses – Chromatography and Mass Spectrometry, Chemical Analysis, and Materials and Structural Analysis.

Chromatography and Mass Spectrometry

Our chromatography and mass spectrometry (MS) business provides analytical instrumentation for organic and inorganic sample analysis across both applied technologies and life science research. These products are complemented by laboratory information management systems (LIMS); chromatography data systems (CDS); database analytical tools; automation systems; a range of consumables, such as a full line of chromatography columns; and a range of sample preparation and separation products including auto-samplers and multiplexing systems.

Chromatography is a technique for separating, identifying and quantifying individual chemical components of substances based on their specific physical and chemical characteristics. Our chromatography product line includes high performance liquid chromatography, ion chromatography and gas chromatography systems, all of which are supported by our Chromeleon chromatography data system software.

- *Liquid Chromatography (LC) Systems* analyze complex sample matrices in liquids. Our high-pressure liquid chromatography (HPLC) and ultrahigh pressure liquid chromatography (UHPLC) systems offer high throughput and sensitivity and are sold either as stand-alone systems or integrated with our mass spectrometers (LC/MS and LC/MS/MS). These systems are used for a range of applications, from complex proteomic analyses to routine industrial quality assurance and quality control (QA/QC).
- *Ion Chromatography (IC) Systems* separate ionic (charged) or highly polar molecules (e.g., sugars and carbohydrates), usually found in water-based solutions, and typically detect them based on their electrical conductivity. Our IC products are used in a wide range of applications, including scientific research, and environmental testing, as well as quality control in pharmaceutical, food and beverage, and other industrial processes.
- *Gas Chromatography (GC) Systems* analyze complex sample matrices in gases, comprising both separation and detection technology. Separation technology is common to all gas chromatography analyzers, and is paired with either a conventional detector (GC) or with different types of mass spectrometers (GC/MS). Our GC/MS offering includes a triple stage quadrupole, a single stage quadrupole, an Orbitrap, and an ion trap, for a range of applications, including food safety testing, quantitative screening of environmental samples, and complex molecular analyses.
- *Elemental Analysis Spectrometers* use atomic spectroscopy techniques to identify trace concentrations of elements in liquid and solid samples primarily in environmental, petrochemical, food safety, metallurgical, geochemical and clinical/toxicology research applications. These products are widely used in growth markets such as China, India and Latin America to support compliance with increasingly stringent international environmental and consumer safety regulations.

Mass spectrometry is a technique for analyzing chemical compounds, individually or in complex mixtures, by forming charged ions that are then analyzed according to their mass-to-charge ratios. In addition to molecular information, each discrete chemical compound generates a pattern that provides structurally identifiable information. Our comprehensive offering includes life sciences mass spectrometry systems; and inorganic mass spectrometry systems; as well as a range of sample preparation and separation products including auto-samplers and multiplexing systems.

- *Life Sciences Mass Spectrometers* include triple quadrupole and Orbitrap technologies. Our triple quadrupole systems provide high performance quantitative analysis of chemicals in biological fluids, environmental samples and food

matrices. They are also used by the pharmaceutical industry for targeted quantitation during drug discovery. Our Orbitrap technologies provide high resolution and accurate mass capabilities for both research and applied markets and are well suited for drug metabolism, proteomics, environmental analysis, food safety, toxicology and clinical research applications. We also offer a comprehensive portfolio of instrument control and data analysis software to help customers simplify their workflows and obtain knowledge from often complex data.

- *Inorganic Mass Spectrometers* include four product lines: isotope ratio mass spectrometry (IRMS); multi-collector isotope ratio mass spectrometry (MC/IRMS); inductively coupled plasma mass spectrometry (ICP/MS); and high resolution trace mass spectrometry (HR Trace/MS). These products are primarily used for qualitative and quantitative analysis of inorganic matter in a range of applications, including environmental analysis, materials science and earth sciences.

Chemical Analysis

Our chemical analysis products fall into three main categories: materials and minerals instruments; field safety instruments; and environmental and process instruments. Customers use these products to quickly and accurately analyze the composition of materials to optimize workflows primarily in industrial applications or to help them comply with governmental regulations and industry safety standards. Our product lines range from those used on production lines to improve quality and efficiency, to portable systems for rapid and real-time chemical identification in the field or to analyze, measure or respond to hazardous situations.

- *Materials and Minerals Instruments* include production line process monitoring, and control systems for a range of industrial applications. For example, we offer on-line instruments that analyze bulk materials non-invasively and in real time to improve quality control and ensure safe operation in a mine or cement manufacturing plant, as well as systems that enable high-speed weighing during bulk materials handling. We also offer gauging systems that employ ionizing and non-ionizing technologies to measure the total thickness, basis weight and coating thickness of flat-sheet materials, such as steel, plastics, foil, rubber and glass. We also offer on-line analyzers based on a variety of technologies such as X-ray imaging and ultra-trace chemical detection, to inspect packaged goods for physical contaminants, validate fill quantities, or check for missing or broken parts on-line and at high speeds in the food and beverage, pharmaceutical production and packaging industries to maintain safety and quality standards.
- *Field Safety Instruments* are rugged handheld products that provide rapid, precise, real-time analysis at the point of need. Our main product categories are elemental analyzers, optical analyzers and radiation detection instruments. Our portable elemental analyzers use X-ray fluorescence (XRF) or Laser-induced breakdown spectroscopy technologies in QA/QC applications, to identify metal alloys in scrap metal recycling; in precious metals analysis; in environmental analysis; and for lead screening in a range of consumer products. Our portable optical analyzers utilize Raman, Fourier transform infrared (FTIR) and near-infrared (NIR) technologies for use in the field by first responders, and law enforcement and military personnel who need to quickly and accurately identify chemicals and explosives in critical safety and security situations. Other applications include QA/QC in pharmaceutical production and identification of counterfeit drugs. Our radiation measurement products are used to monitor, detect and identify specific forms of radiation in nuclear power, environmental, industrial, medical, and security applications. Our primary customers include national, regional, and local government agencies responsible for monitoring cargo, vehicles and people traveling across borders. These products are also used by first-responders in safety and security situations, and for worker safety in the nuclear power and other industrial markets.
- *Environmental and Process Instruments* include fixed and portable instrumentation that help our customers protect people and the environment as well as comply with government regulations and industry safety standards. Our products are used by environmental regulatory agencies and power plant operators to measure ambient air, and stack gas emissions for compliance with regulated emissions standards for criteria pollutant gases. Our products are also used in ambient particulate monitoring applications by customers in mining environments to provide continuous measurements and logging of real-time concentrations and median particle sizes of airborne dust, smoke, mist and fumes to improve efficiency and increase worker safety.

In addition to our broad product offerings, we offer a variety of specialized services to our customers, including equipment servicing, instrument calibration services, asset management and training.

Materials and Structural Analysis

Our materials and structural analysis business includes electron microscopy, molecular spectroscopy and laboratory elemental analysis instruments that are used by customers in life sciences, materials sciences and industrial markets to accelerate breakthrough discoveries.

- *Electron Microscopy Instruments* include transmission electron microscopes which provide imaging and characterization at the atomic scale, with applications in semiconductor development, materials science research and the characterization of protein structure and function. We also offer scanning electron microscopes which resolve features from the optical regime down to the nanometer length scale and are used for a wide variety of applications from materials characterization in science and engineering to applications in natural resources, manufacturing, and biological systems. Our DualBeam focused ion beam-scanning electron microscope systems are used for sample preparation, 3D characterization, nanoprototyping, and industrial failure analysis. Our focused ion beam microscopes are used in a range of process control, failure analysis, and materials research applications. We also offer electrical failure analysis instruments which are used in root cause failure analysis and quality control, microCT instruments which are micro-computed tomography solutions for quantitative analysis of a broad range of materials, providing 3D visualization of large volumes non-destructively and 3D visualization software that turns the data and images generated by a broad range of instruments into 3D visualizations of the microscopic sample, allowing quantitative analysis of material properties.
- *Molecular Spectroscopy Instruments* are divided into four primary techniques: FTIR, Raman, NIR and ultraviolet/visible (UV/Vis) spectroscopy. These technologies are typically used in the laboratory to provide information on the structure of molecules to identify, verify and quantify organic materials in pharmaceutical, biotechnology, polymer, chemical, and forensic sciences. Our material characterization instruments include rheometers and extruders that measure viscosity, elasticity, processability, and temperature-related mechanical changes of various materials. We also provide a range of surface analysis instruments commonly used in the semiconductor, metals, coatings, and polymer industries as a product development and failure analysis tool.
- *Laboratory Elemental Analysis Instruments* and analyzers use X-ray fluorescence (XRF), X-ray diffraction (XRD), and arc spark optical emission (OES) techniques for accurate and precise analysis of bulk materials in the metals, cement, minerals, and petrochemicals industries.

Specialty Diagnostics Segment

Our Specialty Diagnostics segment offers a wide range of diagnostic test kits, reagents, culture media, instruments and associated products in order to serve customers in healthcare, clinical, pharmaceutical, industrial, and food safety laboratories. Our healthcare products are used to increase the speed and accuracy of diagnoses, which improves patient care in a more cost efficient manner. This segment has five primary businesses – Clinical Diagnostics, ImmunoDiagnostics, Microbiology, Transplant Diagnostics and our Healthcare Market Channel.

Clinical Diagnostics

Our clinical diagnostics products include a broad offering of liquid, ready-to-use and lyophilized immunodiagnostic reagent kits, calibrators, controls and calibration verification fluids. In particular, we provide products used for COVID-19 testing, drugs-of-abuse testing; therapeutic drug monitoring, including immunosuppressant drug testing; thyroid hormone testing; serum toxicology; clinical chemistry; immunology; hematology; coagulation; glucose tolerance testing; first trimester screening; tumor markers testing; and biomarkers testing for sepsis, acute myocardial infarction and congestive heart failure. We also private label many of our reagents and controls for major *in vitro* diagnostics companies through OEM arrangements. In many instances, we will work with customers or partners to develop new products and applications for their instrument platforms.

We have developed one of the broadest menus for drugs-of-abuse immunoassays. We also provide a broad offering of immunosuppressant drug immunoassays that can be used on a variety of clinical chemistry analyzers.

Our clinical chemistry systems include analyzers and reagents to analyze and measure routine blood and urine chemistry, such as glucose and cholesterol; and advanced testing for specific proteins, therapeutic drug monitoring and drugs-of-abuse. Our diagnostic test range currently covers approximately 80 different validated methods. We also provide pre- and post-analytical automation for preparation of blood specimens before and after analysis, and specialty diagnostic tests based on patented biomarkers for sepsis, cardiovascular and pulmonary diseases, as well as intensive care treatments and prenatal screening.

ImmunoDiagnostics

Our immunodiagnostics offerings include developing, manufacturing and marketing complete blood-test systems to support the clinical diagnosis and monitoring of allergy, asthma and autoimmune diseases. In addition, we offer antibody tests for approximately 20 indications to help diagnose autoimmune diseases such as rheumatoid arthritis, celiac disease, lupus and scleroderma. Our products include ImmunoCAP for allergy and asthma tests and EliA for autoimmunity tests.

Business (continued)

Microbiology

Our microbiology offerings include dehydrated and prepared culture media, collection and transport systems, instrumentation and consumables to detect pathogens in blood, diagnostic and rapid direct specimen tests, quality-control products and associated products for the microbiology laboratory. Our products help customers worldwide to diagnose infectious disease; determine appropriate antimicrobial therapy; implement effective infection control programs; and detect microbial contamination of their products or manufacturing facilities.

Within the food and pharmaceutical industries, our products are used to assure the safety and quality of consumer products by monitoring production environments; raw materials and end products for bacterial contamination; and animal health in the dairy industry.

Transplant Diagnostics

Our transplant diagnostics products include human leukocyte antigen (HLA) typing and testing for the organ transplant market. Our diagnostic tests are used by transplant centers for tissue typing, primarily to determine the compatibility of donors and recipients pre-transplant, and to detect the presence of antibodies post-transplant that can lead to transplant rejection. These transplant diagnostic tests are widely used across the transplant-testing workflow to improve patient outcomes. Our transplant diagnostic offerings include several lines of HLA typing and antibody detection assays utilizing serological, molecular, enzyme-linked immunosorbent assays (ELISA), flow, and multiplexing technologies.

Healthcare Market Channel

Our healthcare market channel offerings include a broad array of consumables, diagnostic kits and reagents, equipment, instruments, solutions and services for hospitals, clinical laboratories, reference laboratories, physicians' offices and other clinical testing facilities. These products are manufactured by Thermo Fisher and third parties and are primarily used in clinical diagnosis. We go to market through our expert sales force, segment-relevant printed collateral and digital content, and a state-of-the-art website, www.fishersci.com/healthcare, containing full product content for more than 1.5 million products.

Laboratory Products and Services Segment

Our Laboratory Products and Services segment offers virtually everything needed for the laboratory. Our unique combination of self-manufactured and sourced products and extensive service offering, enables our customers to focus on their core activities and helps them to be more efficient, productive and cost effective. The segment also includes a comprehensive offering of outsourced services used by the pharmaceutical and biotech industries for drug development, clinical trials logistics and commercial drug manufacturing. We serve the pharmaceutical, biotechnology, academic, government and other research and industrial markets, as well as the clinical laboratory through four key businesses: Laboratory Products, Laboratory Chemicals, Research and Safety Market Channel, and Pharma Services.

Laboratory Products

Our laboratory products are used primarily by pharmaceutical companies for drug discovery and development and by biotechnology companies and universities for life science research to advance the prevention and cure of diseases and enhance quality of life. This offering consists of equipment, accessories, and services for sample preparation, storage and protection, and analysis:

- *Laboratory Equipment Technologies* includes our leading laboratory refrigerators and freezers, ultralow-temperature freezers and cryopreservation storage tanks for maintaining samples in a cold environment to protect them from degradation. We also offer temperature control products such as heated bath circulators, immersion coolers, recirculating chillers, water baths, and dry baths in a range of sizes, temperatures and configurations for life science, analytical chemistry, manufacturing and quality-control applications. In addition, we offer sample preparation and preservation equipment, which protects our customers' chemical and biological samples and supports the growth of cells and organisms in optimal conditions such as temperature, carbon dioxide and humidity as well as incubators and related products. We also offer centrifugation products, which are used to separate biological matrices and inorganic materials, including microcentrifuges, general use bench-top centrifuges and floor models. Additionally, we offer biological safety cabinets, which enable technicians to handle samples without risk to themselves or their environment and without risk of cross-contamination of samples.
- *Water and Laboratory Products* include water analysis instruments such as meters, electrodes and solutions for the measurement of pH, ions, conductivity, dissolved oxygen, turbidity and other key parameters in the lab and production line. We also offer other laboratory equipment such as water purification systems, shakers, vacuum concentrators, microbiological incubators, ovens, furnaces, hotplates, stirrers, stirring hotplates, and other related products.

- *Laboratory Plastics Essentials* include a leading offering of laboratory pipette tips and a complementary range of handheld and automated pipetting systems, supporting low-through high-throughput activity. These products optimize productivity and ergonomics, and ensure accurate results. We also offer sample preparation and storage products such as centrifugation consumables as well as vials and organization systems for ultralow temperature and cryogenic storage, with specific products designed for low protein binding and low DNA binding and containers for packaging life science and diagnostic reagents as well for the storage and transport of bulk intermediates and active pharmaceutical ingredients. Additionally, our offerings include a complete selection of clinical specimen collection products, drug-of-abuse collection kits and environmental and food-safety glass and plastic vials, bottles and containers, plastic transfer pipettes, general purpose clinical laboratory consumables and containers for breast milk collection, storage and feeding primarily used in neo-natal units and by lactation specialists. We also provide OEM and custom kit assembly services for clinical and drugs-of-abuse test kits.

Laboratory Chemicals

Our laboratory chemicals offering comprises a broad range of chemicals, solvents and reagents supporting virtually every laboratory application – from research to drug discovery and development and manufacturing. This portfolio includes organic chemicals used to synthesize new materials; essential laboratory chemicals used by scientists to purify, extract, separate, identify and manufacture products; high-purity analytical reagents, bioreagents used in many different applications, from cell growth to detailed protein analysis; novel chemical building blocks, reactive intermediates and screening libraries used to accelerate drug discovery; and precious metals, salts and solutions used in a broad range of applications where highly specific reactions are desired. We provide bulk volumes of many products for scale-up from research to development and customized services for chemical procurement, processing, production, testing, and packaging.

Research and Safety Market Channel

Our research and safety market channel serves academic, pharmaceutical, biotechnology, government and industrial customers. We go to market through our expert sales force, segment-relevant printed collateral and digital content in four languages, a state-of-the-art website, www.fishersci.com, containing full product content for more than 1.5 million products, and our global network of resellers and distributors.

We have an international network of warehouses in our primary markets through which we maintain inventory and coordinate product delivery. With specialized product vaults and warehouse management systems, we are able to handle the complete range of products we offer to our customers. Our transportation capabilities include our dedicated fleet of delivery vehicles as well as parcel shipping capabilities that are closely integrated with our third-party parcel carriers. Throughout the product delivery process, we provide our customers with convenient access to comprehensive electronic systems that offer automated catalog search, product order and invoicing, and payment capabilities.

Our channel offers a mix of products that are manufactured by Thermo Fisher, by third parties for us on a private-label basis, and by third parties under their brand but offered for sale exclusively through us. We also offer a broad range of third-party products representing leading industry brand names on a non-exclusive basis.

Our research products include a complete offering of laboratory products, ranging from capital equipment and instruments to chemicals to consumable products. Our safety products include clean-room and controlled-environment supplies, personal protective equipment, firefighting, military, and first responder equipment and supplies, and environmental monitoring and sampling equipment. Our education products include science-related and laboratory products for the K-12 and secondary education markets.

In addition to our broad product offerings, we offer a variety of specialized services to our customers through our Unity Lab Services team, including training, equipment servicing and asset management, and dedicated supply management personnel. We also offer scientific support services including desktop delivery, coordination of instrument calibration and service, and on-site customer service.

Pharma Services

We provide the entire spectrum of development, manufacturing and clinical trials services for both small-molecule and large-molecule pharmaceuticals. This includes i) development of a suitable formulation and manufacturing process for the active pharmaceutical ingredient (API) or biologic; ii) technology transfer to scale up the manufacturing; iii) labeling, packaging, distribution and logistics for clinical trials; and iv) commercial scale manufacturing and packaging.

- *Drug Substance Services* - Our service offerings address small molecules, produced through chemical synthesis, and large molecules such as antibodies and proteins produced through mammalian cell culture. We provide development and manufacturing services for small molecule APIs and the biologically active component of pharmaceutical products

under current good manufacturing practice (cGMP) conditions from early development through commercial production.

- *Drug Product Services* - We manufacture both small-molecule and large-molecule products for customers in conventional and specialized dosage forms. We differentiate ourselves by our breadth of dosage forms and specialized capabilities in both oral solid and sterile dosage forms. We provide a wide spectrum of advanced formulation, production and technical services and scientific expertise and solutions, from the early stages of a product's development to regulatory approval and commercial scale production.
- *Clinical Trials Services* - We provide global services for pharmaceutical and biotechnology companies engaged in clinical trials, including comparator sourcing; specialized packaging; over-encapsulation; multi-lingual and specialized labeling and distribution for phase I through phase IV clinical trials; biological-specimen management and biobanking services; specialty pharmaceutical logistics; and clinical supply-chain planning and management.
- *Viral Vector Services* - We provide a full-range of viral vector development and manufacturing services for customers developing and commercializing gene and cell therapies, including process development, optimization, scale-up, analytical development and qualification of viral vectors for commercial manufacturing. Our breadth of vector platform includes the five most widely used virus types, providing extensive coverage across the gene and cell therapy landscape.

Sales and Marketing

We market and sell our products and services through a direct sales force, customer-service professionals, electronic commerce, third-party distributors and various catalogs.

We offer our products and services through leading brands including:

- The Thermo Scientific brand offers customers in research, diagnostics, industrial, and applied markets a complete range of high-end analytical instruments as well as laboratory equipment, software, services, consumables and reagents. Our portfolio of products includes innovative technologies for mass spectrometry, chromatography, elemental analysis, electron microscopy, molecular spectroscopy, sample preparation, informatics, chemical research and analysis, cell culture, bioprocess production, cellular, protein and molecular biology research, allergy testing, drugs-of-abuse testing, therapeutic drug monitoring testing, microbiology, as well as environmental monitoring and process control.
- The Applied Biosystems brand offers customers in research, clinical and applied markets integrated instrument systems, reagents, and software for genetic analysis. Our portfolio includes innovative technologies for genetic sequencing and real-time, digital and end point PCR, that are used to determine meaningful genetic information in applications such as COVID-19 testing, cancer diagnostics, human identification testing, and animal health, as well as inherited and infectious disease.
- The Invitrogen brand offers life science customers a broad range of consumables and instruments that accelerate research and ensure consistency of results. Our portfolio of products includes innovative solutions for cellular analysis and biology, flow cytometry, cell culture, protein expression, synthetic biology, molecular biology and protein biology.
- Fisher Scientific is our channels brand, offering customers a complete portfolio of laboratory equipment and consumables, chemicals, supplies and services used in scientific research, healthcare, safety, and education markets. These products are offered through an extensive network of direct sales professionals, segment-relevant printed collateral and digital content, a state-of-the-art website, and supply-chain management services.
- Unity Lab Services is our instrument and equipment services brand, offering a complete portfolio of services from enterprise level engagements to individual instruments and laboratory equipment, regardless of the original manufacturer. Through our network of world-class service and support personnel, we provide services that are designed to help our customers improve productivity, reduce costs, and drive decisions with better data.
- Patheon is our contract development and manufacturing brand, representing the comprehensive offering of services that we provide to customers ranging from small biotech to large pharmaceutical companies. We support our customers' development of innovative medicines, including biologics, gene therapies and vaccines. By leveraging our expanding global network of facilities, we deliver high-quality services at all stages of the drug lifecycle, from discovery to development through clinical trials and commercial manufacturing.

Business (continued)

We have approximately 13,000 sales personnel including highly trained technical specialists who enable us to better meet the needs of our more technical end-users. We also provide customers with product standardization and other supply-chain-management services to reduce procurement costs.

New Products and Research and Development

Our business includes the development and introduction of new products and may include entry into new business segments. We anticipate that we will continue to make significant expenditures for research and development as we seek to provide a continuing flow of innovative products to maintain and improve our competitive position.

Resources

Raw Materials

Our management team believes that we have a readily available supply of raw materials for all of our significant products from various sources. We do not anticipate any difficulties obtaining the raw materials essential to our business.

Raw material and fuel prices are subject to fluctuations due to market conditions. We employ many strategies, including the use of alternative materials, to mitigate the effect of these fluctuations on our results.

Patents, Licenses and Trademarks

Patents are important in many aspects of our business. No particular patent, or related group of patents, is so important, however, that its loss would significantly affect our operations as a whole. Where appropriate, we seek patent protection for inventions and developments made by our personnel that are incorporated into our products or otherwise fall within our fields of interest. Patent rights resulting from work sponsored by outside parties do not always accrue exclusively to the company and may be limited by agreements or contracts.

We protect some of our technology as trade secrets and, where appropriate, we use trademarks or register trademarks used in connection with products. We also enter into license agreements with others to grant and/or receive rights to patents and know-how.

Seasonal Influences

Revenues in the fourth quarter are historically stronger than in other quarters due to the capital spending patterns of industrial, pharmaceutical and government customers. Sales of flu tests and related diagnostic products vary quarter to quarter and year to year based on the severity and duration of each period's flu season. Sales of allergy tests vary quarter to quarter and year to year based on the severity and duration of each period's airborne pollen allergens.

Government Contracts

Although the company transacts business with various government agencies, no government contract is of such magnitude that a renegotiation of profits or termination of the contract at the election of the government agency would have a material adverse effect on the company's financial results.

Competition

The company encounters aggressive and able competition in virtually all of the markets we serve. Because of the diversity of our products and services, we face many different types of competitors and competition. Our competitors include a broad range of manufacturers and third-party distributors. Competitive climates in many of the markets we serve are characterized by changing technology and customer demands that require continuing research and development. Our success primarily depends on the following factors:

- technical performance and advances in technology that result in new products and improved price/performance ratios;
- product differentiation, availability and reliability;
- the depth of our capabilities;
- our reputation among customers as a quality provider of products and services;
- customer service and support;
- active research and application-development programs; and
- relative prices of our products and services.

Business (continued)

Government Regulation

Environmental Regulations

We are subject to various laws and governmental regulations concerning environmental matters and employee safety and health in the United States and other countries. U.S. federal environmental legislation that affects us includes the Toxic Substances Control Act, the Resource Conservation and Recovery Act, the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). We are also subject to regulation by the Occupational Safety and Health Administration (OSHA) concerning employee safety and health matters. The United States Environmental Protection Agency (USEPA), OSHA, and other federal agencies have the authority to promulgate regulations that have an effect on our operations.

In addition to these federal activities, various states have been delegated certain authority under the aforementioned federal statutes as well as having authority over these matters under state laws. Many state and local governments have adopted environmental and employee safety and health laws and regulations, some of which are similar to federal requirements.

A number of our operations involve the handling, manufacturing, use or sale of substances that are or could be classified as toxic or hazardous materials within the meaning of applicable laws. Consequently, some risk of environmental harm is inherent in our operations and products, as it is with other companies engaged in similar businesses.

Our expenses for environmental requirements are incurred generally for ongoing compliance and historical remediation matters. Based on current information, we believe that these compliance costs are not material. For historical remediation obligations, our expenditures relate primarily to the cost of permitting, installing, and operating and maintaining groundwater-treatment systems and other remedial measures.

Our Fair Lawn and Somerville, New Jersey facilities entered into administrative consent orders with the New Jersey Department of Environmental Protection in 1984 to maintain groundwater-remediation activities at these sites, and are currently under the State's Licensed Site Remediation Professional Program. As the owner of the Fair Lawn facility, we are listed as a potentially responsible party for remediation within an area called the Fair Lawn Wellfields Superfund Site, and, in 2008, the company and certain other parties entered into a consent order with the USEPA to complete a Remedial Investigation/Feasibility Study. In 2018, the USEPA issued a Record of Decision, setting forth the scope of required remediation work at the site, which includes upgrading a water treatment plant to address constituents such as chlorinated organic compounds, 1,4-dioxane, and perfluorooctanoic acid/perfluorooctane sulfonate (PFOA/PFOS). In 2019, the company and another responsible party signed a proposed consent decree, which the U.S. government entered in 2020, requiring the parties to finance and perform the required remediation work with USEPA oversight. In 2011, our Life Technologies subsidiary entered into a consent decree with the USEPA and other responsible parties to implement a groundwater remedy at the former Davis Landfill Superfund site in Smithfield, Rhode Island.

We record accruals for environmental liabilities based on current interpretations of environmental laws and regulations when it is probable that a liability has been incurred and the amount of such liability can be reasonably estimated. We calculate estimates based upon several factors, including reports prepared by environmental specialists and management's knowledge and experience with these environmental matters. We include in these estimates potential costs for investigation, remediation and operation and maintenance of cleanup sites. Accrued liabilities for environmental matters totaled $71 million at December 31, 2020.

These environmental liabilities do not include third-party recoveries to which we may be entitled. We believe that our accrual is adequate for the environmental liabilities we currently expect to incur. As a result we believe that our ultimate liability with respect to environmental matters will not have a material adverse effect on our financial position, results of operations or cash flows. However, we may be subject to remedial or compliance costs due to future events, such as changes in existing laws and regulations, changes in agency direction or enforcement policies, developments in remediation technologies, changes in the conduct of our operations, and the effect of changes in accounting rules, which could have a material adverse effect on our financial position, results of operations or cash flows.

Other Laws and Regulations

Our operations, and some of the products we offer, are subject to a number of complex and stringent laws and regulations governing the production, handling, transportation and distribution of chemicals, drugs and other similar products, including the operating and security standards of the Food and Drug Administration, the Drug Enforcement Administration, the Bureau of Alcohol, Tobacco, Firearms and Explosives, and various state boards of pharmacy as well as comparable state and foreign agencies. As Thermo Fisher's businesses also include export and import activities, we are subject to pertinent laws enforced by the U.S. Departments of Commerce, State and Treasury. In addition, our logistics activities must comply with the rules and

regulations of the Department of Transportation, the Federal Aviation Administration and similar foreign agencies. While we believe we are in compliance in all material respects with such laws and regulations, any noncompliance could result in substantial fines or otherwise restrict our ability to provide competitive distribution services and thereby have an adverse effect on our financial condition. To date, none has had a material impact on our operations.

We are subject to laws and regulations governing government contracts, and failure to address these laws and regulations or comply with government contracts could harm our business by leading to a reduction in revenues associated with these customers. We have agreements relating to the sale of our products to government entities and, as a result, we are subject to various statutes and regulations that apply to companies doing business with the government. We are also subject to investigation for compliance with the regulations governing government contracts. A failure to comply with these regulations could result in suspension of these contracts, criminal, civil and administrative penalties or debarment.

Human Capital

The success of Thermo Fisher Scientific is fueled by colleagues who are highly engaged and feel empowered to achieve their goals. Everything we do starts with our Mission – to enable our customers to make the world healthier, cleaner and safer. Our colleagues understand the role they play in fulfilling that Mission and that inspires them to bring their best to work each day. Our Mission is not only a differentiator for us externally, but a motivator for us internally.

Our culture is rooted in our 4i Values of Integrity, Intensity, Innovation and Involvement. Within this framework, we strive to create a safe, fair and positive working environment for our colleagues around the world. We want our teams to feel they have a stake in our success, a voice in our direction and to be empowered to make a difference for the key stakeholders we serve.

Every year, we conduct an Employee Involvement Survey to solicit direct feedback from our colleagues on what we're doing well and where we need to improve. We then compile the feedback to measure our progress using three key indices: Leadership, Involvement and Inclusion. In 2020, 84 percent of our workforce completed the survey, and we saw marked improvement in each index and across every survey question, despite the challenges brought on by the pandemic. Our continued focus on enhancing our culture helps position our company to be an even better place to work.

We are committed to building the strongest team in our industry, focusing on developing and retaining our colleagues, while leveraging our leadership to attract new colleagues to our company. Of our more than 80,000 colleagues globally, as of December 31, 2020, approximately 42,000 were based in the Americas region, 12,000 were in the Asia-Pacific region, and 26,000 were in Europe, the Middle East and Africa (EMEA).

Diversity and Inclusion

We recognize that the future aspirations outlined in our Vision for 2030, which serves as our long-term roadmap, will only be achievable if we have a culture that values diversity and inclusion. While diversity of gender and ethnicity are important – and we're focused on continuously improving– for us, diversity of backgrounds, experiences and viewpoints is equally vital to our long-term success. When those differences are welcomed and supported, we create an inclusive workplace that unlocks the true benefits of diversity.

Diversity and Inclusion is not an initiative at Thermo Fisher Scientific. It's woven into the fabric of our culture, and our colleagues are encouraged to openly share the wide range of perspectives they represent. We work together to create an inclusive culture where our colleagues feel they belong and are empowered to contribute, collaborate and innovate. Embracing individual differences is critical to our success. For example, Thermo Fisher was named a Best Place to Work for LGBTQ Equality for the sixth consecutive year in 2020. Establishing this kind of environment is critical in empowering our colleagues so they can contribute their best ideas and bring their true selves to work each day.

Our D&I focus is embedded in every stage of our colleague lifecycle – from recruiting to onboarding, training, development and longer-term career planning. We track our progress on our D&I strategic objectives through a core set of metrics that are reviewed during routine business operating mechanisms, including Quarterly Business Reviews, Human Resource Reviews, Board Reviews and through team dashboards that are shared each month with leaders across the company. This enables frequent, meaningful, data-driven discussions across our businesses and functions on a range of D&I factors, including gender and ethnic representation. This approach also ensures we consistently prioritize our opportunities to improve. We understand the critical role diversity plays in sustained business success, and our teams are empowered to ensure our workforce represents the customers we serve.

We are committed to ensuring our colleagues have access to resources, awareness training and internal networks that offer support and guidance. Our diversity and inclusion strategy is greatly enabled by our Employee Resource Groups (ERGs), which bring together individuals with similar interests to share experiences, learn from each other and collaborate to identify solutions

to business challenges. Our ERGs reinforce that all colleagues can make a difference for our customers, for each other and for our company. As of December 31, 2020, we had 10 ERGs globally, with 220 local ERG chapters.

Talent Development

Our overarching goal from a talent perspective is to create opportunities for our colleagues to achieve their full potential and career aspirations here at Thermo Fisher Scientific. We are committed to creating an exceptional colleague experience from their first day throughout their career with us. We focus on the entire lifecycle of a colleague's career, from their initial recruitment, to onboarding, through ongoing development and training to enhance their skills so they are in the best position to deliver on their goals and achieve their career aspirations.

In today's environment, we know talent is a key competitive advantage, and that building the strongest team in the industry is critical to our future. From our colleague referral program, summer internships, university relations, to our Graduate Leadership Development Program, we continue to build strong internal and external sourcing channels.

Once on board, talent development at Thermo Fisher is a key organizational capability. We continue to make significant investments to support our colleagues along every step of their career journey to help support their success. Our talent development framework incorporates a multi-faceted approach, including formal and self-paced training, networking opportunities, on-the-job stretch learning, coaching, mentoring and manager training utilizing contemporary technology solutions to support the broad needs of our workforce.

We provide multiple programs at all career levels, from online learning for all colleagues through Thermo Fisher University, to focused trainings for managers at various experience levels, to our Global Leadership Program for executives. We also support our colleagues' career advancement through our tuition reimbursement program.

In a company our size, we can also actively manage our talent through rotational opportunities across our businesses, functions and geographies that help our colleagues gain new experiences, share knowledge and broaden their skills. Our executives and leaders participate in frequent talent discussions as well as formal reviews, leveraging workforce data and predictive analytics to better anticipate the talent requirements of our business based on our growth opportunities and market demand.

Thermo Fisher is dedicated to talent development to meet our evolving business needs and to provide our colleagues with opportunities for long and fulfilling careers. Our colleagues are passionate about our company, and their role in our success, and it's our responsibility to help them reach their full potential.

Total Rewards

We offer a comprehensive total rewards package that we regularly evaluate and measure against established benchmarks to ensure its effectiveness in recruiting and retention, and to position Thermo Fisher as an employer of choice.

Our health and wellness programs provide competitive, flexible programs that our global colleagues and their families can count on. For example, for U.S. colleagues, we offer a choice of comprehensive national medical, dental and vision plans; a wellness program, including valuable health incentive opportunities and tax-advantaged savings and spending accounts; as well as commuter benefits, employee assistance programs, optional group legal coverage, and company-paid disability, accident and life insurance. We also offer a company-paid proprietary program for cancer care called the Impact Program, which gives our colleagues and their families access to personalized support and direct lines of communication to experts in cancer genetics and genomics. Similar benefits are available in all countries around the world where we operate.

We also invest in our colleagues' financial health, helping them to grow and protect their savings, plan for the future and share in the success of the company they are helping to build. We deliver comprehensive rewards, including competitive base pay, and also provide a variety of incentive and equity programs that, by design, directly link the impact of colleague contributions to the company's overall success.

Available Information

The company files annual, quarterly and current reports, proxy statements and other documents with the Securities and Exchange Commission (SEC) under the Exchange Act. The SEC maintains a website that contains reports, proxy and information statements and other information that issuers, including the company, file electronically with the SEC. The public can obtain any documents that we file with the SEC at www.sec.gov. We also make available free of charge on or through our own website at www.thermofisher.com our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and, if applicable, amendments to those reports filed or furnished pursuant to Section 13(a) of the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. In addition, paper copies

of these documents may be obtained free of charge by writing to the company care of its Investor Relations Department at our principal executive office located at 168 Third Avenue, Waltham, Massachusetts 02451.

Information about Our Executive Officers

As of February 24, 2021, our executive officers were:

Name	Age	Present Title (Fiscal Year First Became Executive Officer)	Other Positions Held
Marc N. Casper	52	Chairman, President and Chief Executive Officer (2001)	President and Chief Executive Officer (2009-2020) Chief Operating Officer (2008-2009) Executive Vice President (2006-2009)
Mark P. Stevenson	58	Executive Vice President and Chief Operating Officer (2014)	Executive Vice President and President, Life Sciences Solutions (2014-2017) President and Chief Operating Officer, Life Technologies Corporation (2008-2014)
Michel Lagarde	47	Executive Vice President (2017)	Senior Vice President and President, Pharma Services (2017-2019) President and Chief Operating Officer, Patheon N.V. (2016-2017) Managing Director, JLL Partners* (2008-2016)
Michael A. Boxer	59	Senior Vice President and General Counsel (2018)	Executive Vice President and Group General Counsel, Luxottica Group S.p.A. (2011-2017)
Stephen Williamson	54	Senior Vice President and Chief Financial Officer (2015)	Vice President, Financial Operations (2008-2015)
Peter E. Hornstra	61	Vice President and Chief Accounting Officer (2001)	Corporate Controller (1996-2007)

*JLL Partners is a private equity firm focused on healthcare.

Item 1A. Risk Factors

Set forth below are the risks that we believe are material to our investors. This section contains forward-looking statements. You should refer to the explanation of the qualifications and limitations on forward-looking statements in Item 1. Business under the caption “Forward-looking Statements”.

Industry and Economic Risks

Our growth would suffer if the markets into which we sell our products and services decline, do not grow as anticipated or experience cyclicality. Our growth depends in part on the growth of the markets which we serve. Any decline or lower than expected growth in our served markets would diminish demand for our products and services, which would adversely affect our financial statements. Certain of our businesses operate in industries that may experience periodic, cyclical downturns.

We are subject to risks associated with public health crises and epidemics/pandemics, such as the COVID-19 pandemic. Our global operations expose us to risks associated with public health crises and epidemics/pandemics, such as COVID-19. The global spread of COVID-19 has created significant volatility, uncertainty and worldwide economic disruption, resulting in an economic slowdown of potentially extended duration.

COVID-19 has had an adverse impact on certain of our operations, supply chains and distribution systems, including as a result of impacts associated with preventive and precautionary measures that we, other businesses and governments are taking. Due to these impacts and measures, we have experienced significant and unpredictable reductions as well as increases in demand for certain of our products. Many employers in the United States and Europe are continuing to require their employees to work from home or not go into their offices. If the pandemic continues and conditions worsen, we could experience a decline in sales activities and customer orders in certain of our businesses, and it remains uncertain what impact these declines would have on future sales and customer orders once conditions begin to improve. In addition to existing travel restrictions, countries may continue to close or decline to reopen borders, impose prolonged quarantines, and further restrict travel, which would significantly impact our ability to support our sites and customers in those locations and the ability of our employees to get to their places of work to produce products, or significantly hamper our products from moving through the supply chain. As a result, COVID-19 may materially adversely affect revenue growth in certain of our businesses, and it is uncertain how materially COVID-19 will affect our global operations generally if these impacts were to persist or worsen over an extended

period of time. The extent and duration of the impacts are uncertain and dependent in part on customers returning to work and economic activity ramping up.

The company has mobilized to support the COVID-19 response with products and services that help diagnose the virus as well as assisting customers to develop potential therapeutics and vaccines used to protect from the virus. Our ability to continue to manufacture products is highly dependent on our ability to maintain the safety and health of our factory employees. The ability of our employees to work may be significantly impacted by individuals contracting or being exposed to COVID-19. While we are following the requirements of governmental authorities and taking preventative and protective measures to prioritize the safety of our employees, these measures may not be successful, and we may be required to temporarily close facilities or take other measures. While we are staying in close communication with our sites, employees, customers and suppliers and acting to mitigate the impact of this dynamic and evolving situation, the duration and extent of the effect of COVID-19 on the company is not determinable.

In addition, several of the company's businesses have had an increase in revenues due to sales of products addressing diagnosis and treatment of COVID-19. While these positive impacts are expected to continue into 2021, the duration and extent of future revenues from such sales are uncertain and dependent primarily on customer testing demand.

Our business is affected by general economic conditions and related uncertainties affecting markets in which we operate. Our business is affected by general economic conditions, both inside and outside the U.S. If the global economy and financial markets, or economic conditions in Europe, the U.S. or other key markets, continue to be unstable (including as a result of the COVID-19 pandemic), it could adversely affect the business, results of operations and financial condition of the company and its customers, distributors, and suppliers, having the effect of

- reducing demand for some of our products;
- increasing the rate of order cancellations or delays;
- increasing the risk of excess and obsolete inventories;
- increasing pressure on the prices for our products and services;
- causing supply interruptions which could disrupt our ability to produce our products; and
- creating longer sales cycles and greater difficulty in collecting sales proceeds.

Economic, political, foreign currency and other risks associated with international sales and operations could adversely affect our results of operations. International markets contribute a substantial portion of our revenues, and we intend to continue expanding our presence in these regions. The exposure to fluctuations in currency exchange rates takes on different forms. International revenues and costs are subject to the risk that fluctuations in exchange rates could adversely affect our reported revenues and profitability when translated into U.S. dollars for financial reporting purposes. These fluctuations could also adversely affect the demand for products and services provided by us. As a multinational corporation, our businesses occasionally invoice third-party customers in currencies other than the one in which they primarily do business (the "functional currency"). Movements in the invoiced currency relative to the functional currency could adversely impact our cash flows and our results of operations. As our international sales grow, exposure to fluctuations in currency exchange rates could have a larger effect on our financial results. In 2020, currency translation had a favorable effect of $133 million on revenues due to the weakening of the U.S. dollar relative to other currencies in which the company sells products and services.

In addition, many of our employees, contract manufacturers, suppliers, job functions, outsourcing activities and manufacturing facilities are located outside the United States. Accordingly, our future results could be harmed by a variety of factors, including:

- interruption to transportation flows for delivery of parts to us and finished goods to our customers;
- changes in a specific country's or region's political, economic or other conditions;
- changes in diplomatic and trade relationships, including new tariffs, trade protection measures, import or export licensing requirements, trade embargoes and sanctions and other trade barriers;
- tariffs imposed by the U.S. on goods from other countries and tariffs imposed by other countries on U.S. goods, including the tariffs recently adopted by the U.S. government on various imports from China and by the Chinese government on certain U.S. goods;
- the impact of public health epidemics/pandemics on the global economy, such as the COVID-19 pandemic;
- negative consequences from changes in tax laws;

- difficulty in staffing and managing widespread operations;
- differing labor regulations;
- differing protection of intellectual property;
- unexpected changes in regulatory requirements; and
- geopolitical uncertainty or turmoil, including terrorism and war.

For example, on January 31, 2020, the United Kingdom formally withdrew from the European Union, or EU (commonly referred to as "Brexit") and on December 24, 2020, the U.K. and EU announced they had entered into a post-Brexit deal on certain aspects of trade and other strategic and political issues. This withdrawal has created political and economic uncertainty, particularly in the United Kingdom and the EU, and this uncertainty may last for years. Our business could be affected during this period of uncertainty, and perhaps longer, by the impact of the United Kingdom's withdrawal from the EU. In addition, our business could be negatively affected by new trade agreements between the United Kingdom and other countries, including the United States, and by the possible imposition of trade or other regulatory barriers in the United Kingdom. These possible negative impacts, and others resulting from the United Kingdom's withdrawal from the EU, may adversely affect our operating results and our customers' businesses.

Demand for some of our products depends on capital spending policies of our customers and on government funding policies. Our customers include pharmaceutical and chemical companies, laboratories, universities, healthcare providers, government agencies and public and private research institutions. Many factors, including public policy spending priorities, available resources and product and economic cycles, have a significant effect on the capital spending policies of these entities.

Spending by some of these customers fluctuates based on budget allocations and the timely passage of the annual federal budget. An impasse in federal government budget decisions could lead to substantial delays or reductions in federal spending.

Business Risks

We must develop new products, adapt to rapid and significant technological change and respond to introductions of new products by competitors to remain competitive. Our growth strategy includes significant investment in and expenditures for product development. We sell our products in several industries that are characterized by rapid and significant technological changes, frequent new product and service introductions and enhancements and evolving industry standards. Competitive factors include technological innovation, price, service and delivery, breadth of product line, customer support, e-business capabilities and the ability to meet the special requirements of customers. Our competitors may adapt more quickly to new technologies and changes in customers' requirements than we can. Without the timely introduction of new products, services and enhancements, our products and services will likely become technologically obsolete over time, in which case our revenues and operating results would suffer.

Many of our existing products and those under development are technologically innovative and require significant planning, design, development and testing at the technological, product and manufacturing-process levels. Our customers use many of our products to develop, test and manufacture their own products. As a result, we must anticipate industry trends and develop products in advance of the commercialization of our customers' products. If we fail to adequately predict our customers' needs and future activities, we may invest heavily in research and development of products and services that do not lead to significant revenues.

It may be difficult for us to implement our strategies for improving internal growth. Our growth depends in part on the growth of the markets which we serve. Any decline or lower than expected growth in our served markets could diminish demand for our products and services, which would adversely affect our results of operations and financial condition. To address this issue, we are pursuing a number of strategies to improve our internal growth, including:

- strengthening our presence in selected geographic markets;
- allocating research and development funding to products with higher growth prospects;
- developing new applications for our technologies;
- expanding our service offerings;
- continuing key customer initiatives;
- combining sales and marketing operations in appropriate markets to compete more effectively;

- finding new markets for our products; and
- continuing the development of commercial tools and infrastructure to increase and support cross-selling opportunities of products and services to take advantage of our depth in product offerings.

We may not be able to successfully implement these strategies, and these strategies may not result in the expected growth of our business.

Because we compete directly with certain of our larger customers and product suppliers, our results of operations could be adversely affected in the short term if these customers or suppliers abruptly discontinue or significantly modify their relationship with us. Our largest customer in the laboratory products business is also a significant competitor. Our business may be harmed in the short term if our competitive relationship in the marketplace with certain of our large customers results in a discontinuation of their purchases from us. In addition, we manufacture products that compete directly with products that we source from third-party suppliers. We also source competitive products from multiple suppliers. Our business could be adversely affected in the short term if any of our large third-party suppliers abruptly discontinues selling products to us.

Our inability to complete any pending acquisitions or to successfully integrate any new or previous acquisitions could have a material adverse effect on our business. Our business strategy includes the acquisition of technologies and businesses that complement or augment our existing products and services. Certain acquisitions may be difficult to complete for a number of reasons, including the need for antitrust and/or other regulatory approvals. Any acquisition we may complete may be made at a substantial premium over the fair value of the net identifiable assets of the acquired company. Further, we may not be able to integrate acquired businesses successfully into our existing businesses, make such businesses profitable, or realize anticipated cost savings or synergies, if any, from these acquisitions, which could adversely affect our business.

Moreover, we have acquired many companies and businesses. As a result of these acquisitions, we recorded significant goodwill and indefinite-lived intangible assets (primarily tradenames) on our balance sheet, which amount to approximately $26.04 billion and $1.24 billion, respectively, as of December 31, 2020. In addition, we have definite-lived intangible assets totaling $11.45 billion as of December 31, 2020. We assess the realizability of goodwill and indefinite-lived intangible assets annually as well as whenever events or changes in circumstances indicate that these assets may be impaired. We assess the realizability of definite-lived intangible assets whenever events or changes in circumstances indicate that these assets may be impaired. These events or circumstances would generally include operating losses or a significant decline in earnings associated with the acquired business or asset. Our ability to realize the value of the goodwill and intangible assets will depend on the future cash flows of these businesses. These cash flows in turn depend in part on how well we have integrated these businesses. If we are not able to realize the value of the goodwill and intangible assets, we may be required to incur material charges relating to the impairment of those assets.

Operational Risks

Our reliance upon sole or limited sources of supply for certain materials or components could cause production interruptions, delays and inefficiencies. Some of our businesses purchase certain materials from sole or limited source suppliers for reasons of quality assurance, regulatory requirements, cost effectiveness, availability or uniqueness of design. If these or other suppliers encounter financial, operating or other difficulties or if our relationship with them changes, we might not be able to quickly establish or qualify replacement sources of supply. The supply chains for our businesses could also be disrupted by supplier capacity constraints, bankruptcy or exiting of the business for other reasons, decreased availability of key raw materials or commodities and external events such as natural disasters, pandemic health issues such as COVID-19, war, terrorist actions, governmental actions and legislative or regulatory changes. Any of these factors could result in production interruptions, delays, extended lead times and inefficiencies.

A significant disruption in, or breach in security of, our information technology systems or violation of data privacy laws could adversely affect our business. As a part of our ongoing effort to upgrade our current information systems, we periodically implement new enterprise resource planning software and other software applications to manage certain of our business operations. As we implement and add functionality, problems could arise that we have not foreseen. Such problems could disrupt our ability to provide quotes, take customer orders and otherwise run our business in a timely manner. When we upgrade or change systems, we may suffer interruptions in service, loss of data or reduced functionality. In addition, if our new systems fail to provide accurate pricing and cost data our results of operations and cash flows could be adversely affected.

We also rely on our information technology systems to process, transmit and store electronic information (including sensitive data such as confidential business information and personally identifiable data relating to employees, customers and other business partners) and to manage or support a variety of critical business processes and activities (such as interacting with suppliers, selling our products and services, fulfilling orders and billing, collecting and making payments, shipping products,

providing services and support to customers, tracking customer activity, fulfilling contractual obligations and otherwise conducting business). Our systems may be vulnerable to damage or interruption from natural disasters, power loss, telecommunication failures, terrorist attacks, computer hackers, computer viruses, ransomware, phishing, computer denial-of-service attacks, unauthorized access to customer or employee data or company trade secrets, and other attempts to harm our systems. Certain of our systems are not redundant, and our disaster recovery planning is not sufficient for every eventuality. Despite any precautions we may take, such problems could result in, among other consequences, interruptions in our services, which could harm our reputation and financial results. Any of the cyber-attacks, breaches or other disruptions or damage described above, if significant, could materially interrupt our operations, delay production and shipments, result in theft of our and our customers' intellectual property and trade secrets, damage customer, business partner and employee relationships and our reputation or result in defective products or services, legal claims and proceedings, liability and penalties under privacy laws and increased cost for security and remediation, each of which could adversely affect our business and financial results.

If we are unable to maintain reliable information technology systems and appropriate controls with respect to global data privacy and security requirements and prevent data breaches, we may suffer regulatory consequences in addition to business consequences. As a global organization, we are subject to data privacy and security laws, regulations, and customer-imposed controls in numerous jurisdictions as a result of having access to and processing confidential, personal and/or sensitive data in the course of our business. For example, in the United States, individual states regulate data breach and security requirements and multiple governmental bodies assert authority over aspects of the protection of personal privacy. European laws require us to have an approved legal mechanism to transfer personal data out of Europe, and the EU General Data Protection Regulation imposes significantly stricter requirements in how we collect and process personal data. Several countries, such as China and Russia, have passed laws that require personal data relating to their citizens to be maintained on local servers and impose additional data transfer restrictions. Government enforcement actions can be costly and interrupt the regular operation of our business, and data breaches or violations of data privacy laws can result in fines, reputational damage and civil lawsuits, any of which may adversely affect our business, reputation and financial statements.

We may incur unexpected costs from increases in fuel and raw material prices, which could reduce our earnings and cash flows. Our primary commodity exposures are for fuel, petroleum-based resins and steel. While we may seek to minimize the impact of price increases through higher prices to customers and various cost-saving measures, our earnings and cash flows could be adversely affected in the event these measures are insufficient to cover our costs.

Because we rely heavily on third-party package-delivery services, a significant disruption in these services or significant increases in prices may disrupt our ability to ship products, increase our costs and lower our profitability. We ship a significant portion of our products to our customers through independent package delivery companies, such as Federal Express in the U.S. and DHL in Europe. We also maintain a small fleet of vehicles dedicated to the delivery of our products and ship our products through other carriers, including national and regional trucking firms, overnight carrier services and the U.S. Postal Service. If one or more of these third-party package-delivery providers were to experience a major work stoppage, preventing our products from being delivered in a timely fashion or causing us to incur additional shipping costs we could not pass on to our customers, our costs could increase and our relationships with certain of our customers could be adversely affected. In addition, if one or more of these third-party package-delivery providers were to increase prices, and we were not able to find comparable alternatives or make adjustments in our delivery network, our profitability could be adversely affected.

Natural disasters, public health crises, political crises, and other catastrophic events or other events outside of our control may disrupt our facilities or the facilities of third parties on which we depend, and could impact customer spending. We have significant operations in California, near major earthquake faults, which make us susceptible to earthquake risk. An earthquake or other natural disaster such as a fire or hurricane or power shortages or outages could disrupt our operations or impair our critical systems. Any of these disruptions or other events outside of our control, such as strikes or other labor unrest, could have an adverse effect on our results of operations. In addition, if any of our facilities, including our manufacturing or warehouse facilities, or the facilities of our suppliers, third-party service providers, or customers, is affected by natural disasters, such as earthquakes, tsunamis, power shortages or outages, floods or monsoons, public health crises, such as pandemics and epidemics, political crises, such as terrorism, war, political instability or other conflict, or other events outside of our control, such as strikes or other labor unrest, our results of operations could be adversely affected. Moreover, these types of events could negatively impact customer spending in the impacted regions or depending upon the severity, globally, which could also adversely impact our operating results. For example, as described above, the COVID-19 pandemic has impacted and could have a material adverse effect on our business and results of operations.

Risk Factors (continued)

Legal, Quality and Regulatory Risks

Changes in governmental regulations may reduce demand for our products or increase our expenses. We compete in many markets in which we and our customers must comply with federal, state, local and international regulations, such as environmental, health and safety and food and drug regulations. We develop, configure and market our products to meet customer needs created by those regulations. Any significant change in regulations could reduce demand for our products or increase our expenses. For example, we manufacture pharmaceuticals and many of our instruments are marketed to the pharmaceutical industry for use in discovering and developing drugs. Changes in the U.S. Food and Drug Administration's regulation of the drug discovery and development process could have an adverse effect on the demand for these products.

We are subject to laws and regulations governing government contracts, and failure to address these laws and regulations or comply with government contracts could harm our business by leading to a reduction in revenues associated with these customers. We have agreements relating to the sale of our products to government entities and, as a result, we are subject to various statutes and regulations that apply to companies doing business with the government. The laws governing government contracts differ from the laws governing private contracts and government contracts may contain pricing terms and conditions that are not applicable to private contracts. We are also subject to investigation for compliance with the regulations governing government contracts. A failure to comply with these regulations could result in suspension of these contracts, criminal, civil and administrative penalties or debarment.

Our pharma services offerings are highly complex, and if we are unable to provide quality and timely offerings to our customers, our business could suffer. Our pharma services offerings are highly exacting and complex, due in part to strict quality and regulatory requirements. Our operating results in this business depend on our ability to execute and, when necessary, improve our quality management strategy and systems, and our ability to effectively train and maintain our employee base with respect to quality management. A failure of our quality control systems could result in problems with facility operations or preparation or provision of products. In each case, such problems could arise for a variety of reasons, including equipment malfunction, failure to follow specific protocols and procedures, problems with raw materials or environmental factors and damage to, or loss of, manufacturing operations. Such problems could affect production of a particular batch or series of batches of products, requiring the destruction of such products or a halt of facility production altogether.

In addition, our failure to meet required quality standards may result in our failure to timely deliver products to our customers, which in turn could damage our reputation for quality and service. Any such failure could, among other things, lead to increased costs, lost revenues, reimbursement to customers for lost drug product, registered intermediates, registered starting materials, and active pharmaceutical ingredients, other customer claims, damage to and possibly termination of existing customer relationships, time and expense spent investigating the cause and, depending on the cause, similar losses with respect to other batches or products. Production problems in our drug and biologic manufacturing operations could be particularly significant because the cost of raw materials for such manufacturing is often high. If problems in preparation or manufacture of a product or failures to meet required quality standards for that product are not discovered before such product is released to the market, we may be subject to adverse regulatory actions, including product recalls, product seizures, injunctions to halt manufacture and distribution, restrictions on our operations, civil sanctions, including monetary sanctions, and criminal actions. In addition, such problems or failures could subject us to litigation claims, including claims from our customers for reimbursement for the cost of lost or damaged active pharmaceutical ingredients, the cost of which could be significant.

We are subject to product and other liability risks for which we may not have adequate insurance coverage. We may be named as a defendant in product liability lawsuits, which may allege that products or services we have provided from our pharma services offerings have resulted or could result in an unsafe condition or injury to consumers. Additionally, products currently or previously sold by our environmental and process instruments and radiation measurement and security instruments businesses include fixed and portable instruments used for chemical, radiation and trace explosives detection. These products are used in airports, embassies, cargo facilities, border crossings and other high-threat facilities for the detection and prevention of terrorist acts. If any of these products were to malfunction, it is possible that explosive or radioactive material could fail to be detected by our product, which could lead to product liability claims. There are also many other factors beyond our control that could lead to liability claims, such as the reliability and competence of the customers' operators and the training of such operators.

Any such product liability claims brought against us could be significant and any adverse determination may result in liabilities in excess of our insurance coverage. Although we carry product liability insurance, we cannot be certain that our current insurance will be sufficient to cover these claims or that it can be maintained on acceptable terms, if at all.

We are required to comply with a wide variety of laws and regulations, and are subject to regulation by various federal, state and foreign agencies. We are subject to various local, state, federal, foreign and transnational laws and regulations, which include the operating and security standards of the U.S. Federal Drug Administration (the FDA), the U.S.

Drug Enforcement Agency (the DEA), various state boards of pharmacy, state health departments, the U.S. Department of Health and Human Services (the DHHS), the European Medicines Agency (the EMA), in Europe, the EU member states and other comparable agencies and, in the future, any changes to such laws and regulations could adversely affect us. In particular, we are subject to laws and regulations concerning current good manufacturing practices and drug safety. Our subsidiaries may be required to register for permits and/or licenses with, and may be required to comply with the laws and regulations of the DEA, the FDA, the DHHS, foreign agencies including the EMA, and other various state boards of pharmacy, state health departments and/or comparable state agencies as well as certain accrediting bodies depending upon the type of operations and location of product distribution, manufacturing and sale.

The manufacture, distribution and marketing of many of our products and services, including medical devices and pharma services, are subject to extensive ongoing regulation by the FDA, the DEA, the EMA, and other equivalent local, state, federal and non-U.S. regulatory authorities. In addition, we are subject to inspections by these regulatory authorities. Failure by us or by our customers to comply with the requirements of these regulatory authorities, including without limitation, remediating any inspectional observations to the satisfaction of these regulatory authorities, could result in warning letters, product recalls or seizures, monetary sanctions, injunctions to halt manufacture and distribution, restrictions on our operations, civil or criminal sanctions, or withdrawal of existing or denial of pending approvals, including those relating to products or facilities. In addition, such a failure could expose us to contractual or product liability claims, contractual claims from our customers, including claims for reimbursement for lost or damaged active pharmaceutical ingredients, as well as ongoing remediation and increased compliance costs, any or all of which could be significant. We are the sole manufacturer of a number of pharmaceuticals for many of our customers and a negative regulatory event could impact our customers' ability to provide products to their customers.

We are also subject to a variety of federal, state, local and international laws and regulations that govern, among other things, the handling, transportation and manufacture of substances that could be classified as hazardous, and we are required to comply with various import laws and export control and economic sanctions laws, which may affect our transactions with certain customers. In certain circumstances, export control and economic sanctions regulations may prohibit the export of certain products, services and technologies. In other circumstances, we may be required to obtain an export license before exporting the controlled item. Compliance with the various import laws that apply to our businesses can restrict our access to, and increase the cost of obtaining, certain products and at times can interrupt our supply of imported inventory. Any noncompliance by us with applicable laws and regulations or the failure to maintain, renew or obtain necessary permits and licenses could result in criminal, civil and administrative penalties and could have an adverse effect on our results of operations.

Our reputation, ability to do business and financial statements may be impaired by improper conduct by any of our employees, agents or business partners. We have internal controls and compliance systems to protect the company against acts committed by employees, agents or businesses that we acquire that would violate U.S. and/or non-U.S. laws, including the laws governing payments to government officials, bribery, fraud, kickbacks and false claims, pricing, sales and marketing practices, conflicts of interest, competition, employment practices and workplace behavior, export and import compliance, money laundering and data privacy, but we cannot provide assurance that these controls and systems will prevent every such wrongful act. In particular, the U.S. Foreign Corrupt Practices Act, the U.K. Bribery Act and similar anti-bribery laws in other jurisdictions generally prohibit companies and their intermediaries from making improper payments to government officials for the purpose of obtaining or retaining business, and we operate in many parts of the world that have experienced governmental corruption to some degree. Any such improper actions or allegations of such acts could damage our reputation and subject us to civil or criminal investigations in the United States and in other jurisdictions and related shareholder lawsuits, could lead to substantial civil and criminal, monetary and nonmonetary penalties and could cause us to incur significant legal and investigatory fees. In addition, the government may seek to hold us liable for violations committed by companies which we acquire. We also rely on our suppliers to adhere to our supplier standards of conduct, and material violations of such standards of conduct could occur that could have a material effect on our business, reputation and financial statements.

Our inability to protect our intellectual property could have a material adverse effect on our business. In addition, third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result. We place considerable emphasis on obtaining patent and trade secret protection for significant new technologies, products and processes because of the length of time and expense associated with bringing new products through the development process and into the marketplace. Our success depends in part on our ability to develop patentable products and obtain and enforce patent protection for our products both in the United States and in other countries. We own numerous U.S. and foreign patents, and we intend to file additional applications, as appropriate, for patents covering our products. Patents may not be issued for any pending or future patent applications owned by or licensed to us, and the claims allowed under any issued patents may not be sufficiently broad to protect our technology. Any issued patents owned by or licensed to us may be challenged, invalidated or circumvented, and the rights under these patents may not provide us with competitive advantages. In

addition, competitors may design around our technology or develop competing technologies. Intellectual property rights may also be unavailable or limited in some foreign countries, which could make it easier for competitors to capture increased market position. We could incur substantial costs to defend ourselves in suits brought against us or in suits in which we may assert our patent rights against others. An unfavorable outcome of any such litigation could materially adversely affect our business and results of operations.

We also rely on trade secrets and proprietary know-how with which we seek to protect our products, in part, by confidentiality agreements with our collaborators, employees and consultants. These agreements may be breached and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently developed by our competitors.

Third parties may assert claims against us to the effect that we are infringing on their intellectual property rights. In the event that a claim relating to intellectual property is asserted against us, or third parties not affiliated with us hold pending or issued patents that relate to our products or technology, we may seek licenses to such intellectual property or challenge those patents. However, we may be unable to obtain these licenses on commercially reasonable terms, if at all, and our challenge of the patents may be unsuccessful. Our failure to obtain the necessary licenses or other rights could prevent the sale, manufacture, or distribution of our products and, therefore, could have a material adverse effect on our business, financial condition and results of operations.

Risks Relating to Financial Profile

Fluctuations in our effective tax rate may adversely affect our results of operations and cash flows. As a global company, we are subject to taxation in numerous countries, states and other jurisdictions. In preparing our financial statements, we record the amount of tax that is payable in each of the countries, states and other jurisdictions in which we operate. Our future effective tax rate, however, may be lower or higher than experienced in the past due to numerous factors, including a change in the mix of our profitability from country to country, changes in accounting for income taxes and recently enacted and future changes in tax laws in jurisdictions in which we operate. Any of these factors could cause us to experience an effective tax rate significantly different from previous periods or our current expectations, which could have an adverse effect on our business, results of operations and cash flows.

Our existing and future indebtedness may restrict our investment opportunities or limit our activities and negatively impact our credit ratings. As of December 31, 2020, we had approximately $21.74 billion in outstanding indebtedness. In addition, we have availability to borrow under a revolving credit facility that provides for up to $3.00 billion of unsecured multi-currency revolving credit. We may also obtain additional long-term debt and lines of credit to meet future financing needs, which would have the effect of increasing our total leverage.

Our leverage could have negative consequences, including increasing our vulnerability to adverse economic and industry conditions, limiting our ability to obtain additional financing and limiting our ability to acquire new products and technologies through strategic acquisitions.

Our ability to make scheduled payments, refinance our obligations or obtain additional financing will depend on our future operating performance and on economic, financial, competitive and other factors beyond our control. Our business may not generate sufficient cash flow to meet our obligations. If we are unable to service our debt, refinance our existing debt or obtain additional financing, we may be forced to delay strategic acquisitions, capital expenditures or research and development expenditures.

Additionally, the agreements governing our debt require that we maintain certain financial ratios, and contain affirmative and negative covenants that restrict our activities by, among other limitations, limiting our ability to incur additional indebtedness, merge or consolidate with other entities, make investments, create liens, sell assets and enter into transactions with affiliates. The covenants in the Facility include a Consolidated Net Interest Coverage Ratio (Consolidated EBITDA to Consolidated Net Interest Expense), as such terms are defined in the Facility. Specifically, the company has agreed that, so long as any lender has any commitment under the Facility, any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a minimum Consolidated Interest Coverage Ratio of 3.5:1.0 as of the last day of any fiscal quarter.

Our ability to comply with these financial restrictions and covenants is dependent on our future performance, which is subject to prevailing economic conditions and other factors, including factors that are beyond our control such as the impact of public health epidemics/pandemics like COVID-19, foreign exchange rates and interest rates. Our failure to comply with any of these restrictions or covenants may result in an event of default under the applicable debt instrument, which could permit

acceleration of the debt under that instrument and require us to prepay that debt before its scheduled due date. Also, an acceleration of the debt under certain of our debt instruments would trigger an event of default under other of our debt instruments.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

The company owns and leases office, engineering, laboratory, production and warehouse space throughout the world.

Item 3. Legal Proceedings

There are various lawsuits and claims against the company involving product liability, intellectual property, employment and commercial issues. See "Note 12 to our Consolidated Financial Statements – Commitments and Contingencies."

Item 4. Mine Safety Disclosures

Not applicable.

PART II

Item 5. Market for the Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Market Price of Common Stock

Our common stock is traded on the New York Stock Exchange under the symbol TMO.

Holders of Common Stock

As of February 6, 2021, the company had 2,861 holders of record of its common stock. This does not include holdings in street or nominee names.

Issuer Purchases of Equity Securities

There was no share repurchase activity for the company's fourth quarter of 2020. On November 8, 2019, the Board of Directors authorized the repurchase of up to $2.50 billion of the company's common stock. On November 5, 2020, the Board of Directors replaced the existing authorization to repurchase the company's common stock, of which $1.00 billion was remaining, with a new authorization to repurchase up to $2.50 billion of the company's common stock. Early in the first quarter of 2021, the company repurchased $1.50 billion of the company's common stock. At February 24, 2021, $1.00 billion was available for future repurchases of the company's common stock under this authorization.

Item 6. Reserved

Not applicable.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

Reference is made throughout this Management's Discussion and Analysis of Financial Condition and Results of Operations to Notes to the Consolidated Financial Statements, which begin on page F-1 of this report. Management's discussion and analysis of financial condition and results of operations for 2018 is included in Item 7 of the company's 2019 Annual Report on Form 10-K filed with the Securities and Exchange Commission.

Overview

The company develops, manufactures and sells a broad range of products that are sold worldwide. The company expands the product lines and services it offers by developing and commercializing its own technologies and by making strategic acquisitions of complementary businesses. The company's operations fall into four segments (Note 4): Life Sciences Solutions, Analytical Instruments, Specialty Diagnostics and Laboratory Products and Services.

The company mobilized in early 2020 to support the COVID-19 pandemic response with products and services that help analyze, diagnose and protect from the virus. However, the company saw a significant reduction in customer activity in several businesses by late March 2020 that materially adversely affected primarily the 2020 results of the Analytical Instruments segment and, to a lesser extent, some businesses within the company's other three segments. The extent and duration of the negative impacts continuing into 2021 are uncertain and dependent in part on the success of global efforts to control the pandemic and economic activity ramping up. The company believes the impacted businesses' long-term prospects remain excellent given the company's attractive markets served, its industry-leading position and proven growth strategy. Several of the company's businesses have had a significant increase in revenues due to sales of product and services addressing diagnosis and treatment of COVID-19, including test kits and, to a lesser extent, products and services for therapy and vaccine development and manufacturing. While these positive impacts are expected to continue into 2021, the duration and extent of future revenues from such sales are uncertain and dependent primarily on customer testing demand.

Recent Acquisitions and Divestiture

The company's strategy is to augment internal growth at existing businesses with complementary acquisitions. The company's principal recent acquisitions and divestitures are described below.

On April 30, 2019, the company acquired, within the Laboratory Products and Services segment, Brammer Bio for approximately $1.67 billion in cash. Brammer Bio is a leading viral vector contract development and manufacturing organization for gene and cell therapies. The acquisition expanded the segment's contract manufacturing capabilities. Brammer Bio reported revenues of approximately $140 million in 2018.

On June 28, 2019, the company sold its Anatomical Pathology business to PHC Holdings Corporation for $1.13 billion, net of cash divested. The business was part of the Specialty Diagnostics segment. Revenues in 2019, through the date of sale, and the full year 2018 of the business sold were approximately $115 million and $238 million, respectively, net of retained sales through the company's healthcare market and research and safety market channel businesses.

Overview of Results of Operations and Liquidity

(Dollars in millions)	2020		2019	
Revenues				
Life Sciences Solutions	$ 12,168	37.8 %	$ 6,856	26.8 %
Analytical Instruments	5,124	15.9 %	5,522	21.6 %
Specialty Diagnostics	5,343	16.6 %	3,718	14.6 %
Laboratory Products and Services	12,245	38.0 %	10,599	41.5 %
Eliminations	(2,662)	(8.3)%	(1,153)	(4.5)%
	$ 32,218	100 %	$ 25,542	100 %

Sales in 2020 were $32.22 billion, an increase of $6.68 billion from 2019. Sales increased $78 million due to acquisitions, net of a divestiture. The favorable effects of currency translation resulted in an increase in revenues of $133 million in 2020.

Overview of Results of Operations and Liquidity (continued)

Aside from the effects of acquisitions/divestitures and currency translation, revenues increased $6.47 billion (25%) primarily due to increased demand. Sales of products that address COVID-19 testing and treatment totaled $6.63 billion in 2020, and were offset in part by lower revenues in the remainder of the business during the first half of 2020. Sales were particularly strong in diagnostic and healthcare markets, due to demand for products supporting customers diagnosing the COVID-19 virus, offset in part by lower sales of other products due to pandemic-related impacts on customer activity. Sales were also strong to customers in pharma and biotech markets where demand was strong for products and services and pandemic-related demand for therapies and vaccines also contributed to growth. Sales to customers in industrial markets decreased primarily due to lower demand from weakened economic conditions related to COVID-19. Sales to these customers returned to positive growth in the fourth quarter of 2020. Sales to academic and government customers decreased due primarily to closure of academic labs during the global pandemic. Sales to these customers returned to positive growth in the third quarter of 2020. Sales growth was particularly strong in North America and Europe and, to a lesser extent, in the Asia-Pacific region.

In 2020, total company operating income and operating income margin were $7.79 billion and 24.2%, respectively, compared with $4.59 billion and 18.0%, respectively, in 2019. The increase in operating income was primarily due to profit on higher sales and, to a lesser extent, sales mix, offset in part by a gain on the sale of the Anatomical Pathology business included in the 2019 period and strategic growth investments in 2020. The company's references to strategic growth investments generally refer to targeted spending for enhancing commercial capabilities, including expansion of geographic sales reach and e-commerce platforms, marketing initiatives, expanded service and operational infrastructure, focused research and development projects and other expenditures to enhance the customer experience, as well as incentive compensation and recognition for employees. The company's references throughout this discussion to productivity improvements generally refer to improved cost efficiencies from its Practical Process Improvement (PPI) business system, reduced costs resulting from global sourcing initiatives, a lower cost structure following restructuring actions, including headcount reductions and consolidation of facilities, and low cost region manufacturing. Productivity improvements are calculated net of inflationary cost increases.

The company recorded a provision for income taxes of $850 million in 2020 (effective tax rate of 11.8%). In 2020, the company implemented foreign tax credit planning in Sweden which resulted in $96 million of foreign tax credits, with no related incremental U.S. income tax expense and also recorded a net income tax benefit of $51 million from a domestication transaction involving the transfer of non-U.S. subsidiaries to the U.S.; a $47 million income tax benefit related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements; and a $27 million tax benefit from tax audit settlements.

The company recorded a provision for income taxes of $374 million in 2019 (effective tax rate of 9.2%) including $191 million related to the gain on the sale of the Anatomical Pathology business. In 2019, the company recorded a $62 million income tax benefit related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements; implemented foreign tax credit planning in Sweden which resulted in $75 million of foreign tax credits, with no related incremental U.S. income tax expense; and recorded a $79 million income tax benefit related to the deferred tax implications of intra-entity transactions which included a tax benefit to release a valuation allowance against net operating losses previously determined to be unrealizable.

The effective tax rate in both 2020 and 2019 was also affected by relatively significant earnings in lower tax jurisdictions. Due primarily to the non-deductibility of intangible asset amortization for tax purposes, the company's cash payments for income taxes were higher than its income tax expense for financial reporting purposes and totaled $1.32 billion and $0.90 billion in 2020 and 2019, respectively.

The company expects its effective tax rate in 2021 will be between 11% and 13% based on currently forecasted rates of profitability in the countries in which the company conducts business and expected generation of foreign tax credits. The effective tax rate can vary significantly from period to period as a result of discrete income tax factors and events.

Net income increased to $6.38 billion in 2020, from $3.70 billion in 2019 principally due to the increase in operating income in 2020 (discussed above) offset in part by the increase in the income tax provision.

During 2020, the company's cash flow from operations totaled $8.29 billion compared with $4.97 billion for 2019. The increase primarily resulted from higher cash provided by income and, to a lesser extent, lower investment in working capital in 2020.

As of December 31, 2020, the company's short-term debt totaled $2.63 billion, substantially all of which was redeemed in January 2021. The company has a revolving credit facility with a bank group that provides up to $3.00 billion of unsecured multi-currency revolving credit (Note 10). If the company borrows under this facility, it intends to leave undrawn an amount

Overview of Results of Operations and Liquidity (continued)

equivalent to outstanding commercial paper to provide a source of funds in the event that commercial paper markets are not available. As of December 31, 2020, no borrowings were outstanding under the company's revolving credit facility, although available capacity was reduced by approximately $31 million as a result of outstanding letters of credit.

The company believes that its existing cash and cash equivalents of $10.33 billion as of December 31, 2020 and its future cash flow from operations together with available borrowing capacity under its revolving credit agreement will be sufficient to meet the cash requirements of its existing businesses for the foreseeable future, including at least the next 24 months.

Critical Accounting Policies and Estimates

The company's discussion and analysis of its financial condition and results of operations is based upon its financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses and related disclosure of contingent liabilities. On an on-going basis, management evaluates its estimates, including those related to intangible assets and goodwill, income taxes and contingencies and litigation. Management believes the most complex and sensitive judgments, because of their significance to the consolidated financial statements, result primarily from the need to make estimates about the effects of matters that are inherently uncertain. Management bases its estimates on historical experience, current market and economic conditions and other assumptions that management believes are reasonable. The results of these estimates form the basis for judgments about the carrying value of assets and liabilities where the values are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

The company believes the following represent its critical accounting policies and estimates used in the preparation of its financial statements:

(a) *Intangible Assets and Goodwill*

The company uses assumptions and estimates in determining the fair value of assets acquired and liabilities assumed in a business combination. The determination of the fair value of intangible assets, which represent a significant portion of the purchase price in many of the company's acquisitions, requires the use of significant judgment with regard to (i) the fair value; and (ii) whether such intangibles are amortizable or non-amortizable and, if the former, the period and the method by which the intangible asset will be amortized. The company estimates the fair value of acquisition-related intangible assets principally based on projections of cash flows that will arise from identifiable intangible assets of acquired businesses. The projected cash flows are discounted to determine the present value of the assets at the dates of acquisition. Definite-lived intangible assets totaled $11.45 billion at December 31, 2020. The company reviews definite-lived intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. Actual cash flows arising from a particular intangible asset could vary from projected cash flows which could imply different carrying values from those established at the dates of acquisition and which could result in impairment of such asset.

The company evaluates goodwill and indefinite-lived intangible assets for impairment annually and when events occur or circumstances change that would more likely than not reduce the fair value of the asset below its carrying amount. Events or circumstances that might require an interim evaluation include unexpected adverse business conditions, economic factors, unanticipated technological changes or competitive activities, loss of key personnel and acts by governments and courts. Goodwill and indefinite-lived intangible assets totaled $26.04 billion and $1.24 billion, respectively, at December 31, 2020. Estimates of discounted future cash flows require assumptions related to revenue and operating income growth rates, discount rates and other factors. For the goodwill impairment tests, the company considers (i) peer revenues and earnings trading multiples from companies that have operational and financial characteristics that are similar to the respective reporting units and (ii) estimated weighted average costs of capital. Different assumptions from those made in the company's analysis could materially affect projected cash flows and the company's evaluation of goodwill and indefinite-lived intangible assets for impairment.

The company performed the quantitative goodwill impairment test for all of its reporting units and indefinite-lived intangible assets. Indications of fair value based on projections of profitability and on peer revenues and earnings trading multiples were sufficient to conclude that no impairment of goodwill or indefinite-lived intangible assets existed at the end of the tenth fiscal month of 2020, the date of the company's annual impairment testing. There can be no assurance, however, that an economic downturn will not materially adversely affect peer trading multiples and the

Critical Accounting Policies and Estimates (continued)

company's businesses such that they do not achieve their forecasted profitability and these assets become impaired. Should the fair value of the company's goodwill or indefinite-lived intangible assets decline because of reduced operating performance, market declines, or other indicators of impairment, or as a result of changes in the discount rate, charges for impairment may be necessary.

(b) Income Taxes

In the ordinary course of business there is inherent uncertainty in quantifying the company's income tax positions. The company assesses income tax positions and records tax benefits for all years subject to examination based upon management's evaluation of the facts, circumstances and information available at the reporting date. For those tax positions where it is more likely than not that a tax benefit will be sustained, the company has recorded the largest amount of tax benefit with a greater than 50 percent likelihood of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information. For those income tax positions where it is not more likely than not that a tax benefit will be sustained, no tax benefit has been recognized in the financial statements. Should tax return positions that the company expects are sustainable not be sustained upon audit, the company could be required to record an incremental tax provision for such taxes. The company's liability for these unrecognized tax benefits totaled $1.09 billion at December 31, 2020.

The company operates in numerous countries under many legal forms and, as a result, is subject to the jurisdiction of numerous domestic and non-U.S. tax authorities, as well as to tax agreements and treaties among these governments. Determination of taxable income in any jurisdiction requires the company to interpret the related tax laws and regulations and the use of estimates and assumptions regarding significant future events, such as the amount, timing and character of deductions, permissible revenue recognition methods under the tax law and the sources and character of income and tax credits. Changes in tax laws, regulations, agreements and treaties, currency exchange restrictions or the company's level of operations or profitability in each taxing jurisdiction could have an impact upon the amount of current and deferred tax balances and hence the company's net income.

The company estimates the degree to which tax assets will result in a benefit, after consideration of all positive and negative evidence, and provides a valuation allowance for tax assets that it believes will more likely than not go unused. In situations in which the company has been able to determine that its deferred tax assets will be realized, that determination generally relies on future reversals of taxable temporary differences and expected future taxable income. If it becomes more likely than not that a tax asset will be used, the company reverses the related valuation allowance. Any such reversals are recorded as a reduction of the company's tax provision. The company's tax valuation allowance totaled $933 million at December 31, 2020. Should the company's actual future taxable income by tax jurisdiction vary from estimates, additional allowances or reversals thereof may be necessary.

The company has not provided U.S. state income taxes or additional non-U.S. taxes on certain of its non-U.S. subsidiaries' undistributed earnings, as such amounts are intended to be reinvested outside the United States indefinitely in the respective jurisdictions based on specific business plans and tax strategies. These business plans and tax strategies consider: short-term and long-term forecasts and budgets of the U.S. parent and non-U.S. subsidiaries; working capital and other needs in locations where earnings are generated; the company's past practices regarding non-U.S. subsidiary dividends; sources of financing by the U.S. parent, such as issuing debt or equity; and uses of cash by the U.S. parent that are more discretionary in nature, such as business combinations and share repurchase programs. However, should the company change its business plans and tax strategies in the future and decide to repatriate a portion of these earnings to one of its U.S. subsidiaries, including cash maintained by these non-U.S. subsidiaries, the company would recognize additional tax liabilities. It is not practicable to estimate the amount of additional U.S. state income tax and non-U.S. tax liabilities that the company would incur. The company's intent is to only make distributions from non-U.S. subsidiaries in the future when they can be made at no net tax costs.

(c) Contingencies and Litigation

The company records accruals for various contingencies, including legal proceedings, environmental, workers' compensation, product, general and auto liabilities, and other claims that arise in the normal course of business. The accruals are based on management's judgment, historical claims experience, the probability of losses and, where applicable, the consideration of opinions of internal and/or external legal counsel and actuarial estimates. Accruals of acquired businesses, including product liability and environmental accruals, are initially recorded at fair value and discounted to their net present value. Additionally, the company records receivables from third-party insurers when recovery has been determined to be probable.

Results of Operations

2020 Compared With 2019

(In millions)	2020	2019	Total Change	Currency Translation	Acquisitions/Divestitures	Operations
Revenues						
Life Sciences Solutions	$ 12,168	$ 6,856	$ 5,312	$ 29	$ —	$ 5,283
Analytical Instruments	5,124	5,522	(398)	39	—	(437)
Specialty Diagnostics	5,343	3,718	1,625	14	(121)	1,732
Laboratory Products and Services	12,245	10,599	1,646	52	184	1,410
Eliminations	(2,662)	(1,153)	(1,509)	(1)	15	(1,523)
Consolidated Revenues	$ 32,218	$ 25,542	$ 6,676	$ 133	$ 78	$ 6,465

Sales in 2020 were $32.22 billion, an increase of $6.68 billion from 2019. Sales increased $78 million due to acquisitions, net of a divestiture. The favorable effects of currency translation resulted in an increase in revenues of $133 million in 2020. Aside from the effects of acquisitions and currency translation, revenues increased $6.47 billion (25%) primarily due to increased demand. Sales of products that address COVID-19 testing and treatment totaled $6.63 billion in 2020, and were offset in part by lower revenues in the remainder of the business during the first half of 2020. Sales were particularly strong in diagnostic and healthcare markets, due to demand for products supporting customers diagnosing the COVID-19 virus, offset in part by lower sales of other products due to pandemic-related impacts on customer activity. Sales were also strong to customers in pharma and biotech markets where demand was strong for products and services and pandemic-related demand for therapies and vaccines also contributed to growth. Sales to customers in industrial markets decreased primarily due to lower demand from weakened economic conditions related to COVID-19. Sales to these customers returned to positive growth in the fourth quarter of 2020. Sales to academic and government customers decreased due primarily to closure of academic labs during the global pandemic. Sales to these customers returned to positive growth in the third quarter of 2020. Sales growth was particularly strong in North America and Europe and, to a lesser extent, in the Asia-Pacific region.

In 2020, total company operating income and operating income margin were $7.79 billion and 24.2%, respectively, compared with $4.59 billion and 18.0%, respectively, in 2019. The increase in operating income was primarily due to profit on higher sales and, to a lesser extent, sales mix, offset in part by a gain on the sale of the Anatomical Pathology business included in the 2019 period and strategic growth investments in 2020.

In 2020, the company recorded restructuring and other costs, net, of $95 million (Note 16). In 2019, the company recorded restructuring and other income, net, of $334 million, including $482 million of net gains on the sale of businesses, principally the Anatomical Pathology business (Note 2). The restructuring projects for which charges were incurred in 2020 are expected to result in annual cost savings of approximately $55 million beginning in part in 2020 and, to a greater extent, in 2021. The restructuring actions for which charges were incurred in 2019 resulted in annual cost savings of approximately $60 million beginning in part in 2019 and to a greater extent in 2020.

Segment Results

The company’s management evaluates segment operating performance using operating income before certain charges/credits to cost of revenues and selling, general and administrative expenses, principally associated with acquisition-related activities; restructuring and other costs/income including costs arising from facility consolidations such as severance and abandoned lease expense and gains and losses from the sale of real estate and product lines; and amortization of acquisition-related intangible assets. The company uses this measure because it helps management understand and evaluate the segments’ core operating results and facilitate comparison of performance for determining compensation (Note 4). Accordingly, the following segment data is reported on this basis.

Results of Operations (continued)

(Dollars in millions)	2020	2019	Change
Revenues			
Life Sciences Solutions	$ 12,168	$ 6,856	77 %
Analytical Instruments	5,124	5,522	(7) %
Specialty Diagnostics	5,343	3,718	44 %
Laboratory Products and Services	12,245	10,599	16 %
Eliminations	(2,662)	(1,153)	131 %
Consolidated Revenues	$ 32,218	$ 25,542	26 %
Segment Income			
Life Sciences Solutions	$ 6,109	$ 2,446	150 %
Analytical Instruments	808	1,273	(37) %
Specialty Diagnostics	1,368	930	47 %
Laboratory Products and Services	1,271	1,324	(4) %
Subtotal Reportable Segments	9,556	5,973	60 %
Cost of Revenues Charges	(6)	(17)	
Selling, General and Administrative Charges, Net	10	(62)	
Restructuring and Other (Costs) Income, Net	(99)	413	
Amortization of Acquisition-related Intangible Assets	(1,667)	(1,713)	
Consolidated Operating Income	$ 7,794	$ 4,594	70 %
Reportable Segments Income Margin	29.7 %	23.4 %	
Consolidated Operating Income Margin	24.2 %	18.0 %	

Income from the company's reportable segments increased 60% to $9.56 billion in 2020 due primarily to profit on higher sales and, to a lesser extent, sales mix, offset in part by strategic growth investments.

Life Sciences Solutions

(Dollars in millions)	2020	2019	Change
Revenues	$ 12,168	$ 6,856	77 %
Operating Income Margin	50.2 %	35.7 %	14.5 pt

Sales in the Life Sciences Solutions segment increased $5.31 billion to $12.17 billion in 2020. Sales increased $5.28 billion (77%) due to higher revenues at existing businesses. The favorable effects of currency translation resulted in an increase in revenues of $29 million. The increase in revenues at existing businesses was primarily driven by demand for testing to diagnose COVID-19 with higher sales of genetic sciences products and, to a lesser extent, bioscience products. Sales also grew due to higher demand for bioproduction products.

Operating income margin was 50.2% in 2020 compared to 35.7% in 2019. The increase resulted primarily from profit on higher sales and, to a lesser extent, sales mix, offset in part by strategic growth investments.

Analytical Instruments

(Dollars in millions)	2020	2019	Change
Revenues	$ 5,124	$ 5,522	(7) %
Operating Income Margin	15.8 %	23.1 %	-7.3 pt

Results of Operations (continued)

Sales in the Analytical Instruments segment decreased $398 million to $5.12 billion in 2020. Sales decreased $437 million (-8%) due to lower revenues at existing businesses. The favorable effects of currency translation resulted in an increase in revenues of $39 million. The decrease in revenues at existing businesses was primarily the result of reduced demand from industrial customers following business slowing and closures due to COVID-19 and lower sales to academic customers due to pandemic-related closures. The segment returned to positive growth in the fourth quarter of 2020.

Operating income margin was 15.8% in 2020 compared to 23.1% in 2019. The decrease was primarily due to sales mix, the decrease in sales, a $108 million charge related to a long-term supply contract (discussed in Note 12), and, to a lesser extent, strategic growth investments, offset in part by productivity improvements.

Specialty Diagnostics

(Dollars in millions)	2020	2019	Change
Revenues	$ 5,343	$ 3,718	44 %
Operating Income Margin	25.6 %	25.0 %	0.6 pt

Sales in the Specialty Diagnostics segment increased $1.63 billion to $5.34 billion in 2020. Sales increased $1.73 billion (48%) due to higher revenues at existing businesses. The favorable effects of currency translation resulted in an increase in revenues of $14 million and the divestiture of the Anatomical Pathology business in June 2019 decreased revenues by $121 million. The increase in revenues at existing businesses was due to higher demand primarily driven by products addressing treatment of COVID-19, with particular strength in sales of products sold through the segment's healthcare market channel business, and to a lesser extent, microbiology and clinical diagnostics products. These increases were offset in part by lower sales in some of the segment’s businesses due to pandemic-related reductions in demand.

Operating income margin was 25.6% in 2020 and 25.0% in 2019. The increase was primarily due to profit on higher sales, offset in part by sales mix and, to a lesser extent, strategic growth investments.

Laboratory Products and Services

(Dollars in millions)	2020	2019	Change
Revenues	$ 12,245	$ 10,599	16 %
Operating Income Margin	10.4 %	12.5 %	-2.1 pt

Sales in the Laboratory Products and Services segment increased $1.65 billion to $12.25 billion in 2020. Sales increased $1.41 billion (13%) due to higher revenues at existing businesses and $184 million due to acquisitions. The favorable effects of currency translation resulted in an increase in revenues of $52 million. The increase in revenues at existing businesses was primarily due to increased demand for products sold through its research and safety market channel business and, to a lesser extent, service offerings of the segment's pharma services business. The increase in demand was driven by pandemic response as well as the segment’s other products and services.

Operating income margin was 10.4% in 2020 and 12.5% in 2019. The decrease was primarily due to sales mix and strategic growth investments, offset in part by profit on higher sales and, to a lesser extent, productivity improvements.

Other Expense, Net

In 2020, the company recorded $81 million of financing costs for a terminated acquisition, primarily for amortization of loan commitment fees and entering into currency hedging contracts. In 2019, the company recorded $184 million of losses on the early extinguishment of debt, offset in part by $44 million of net gains on investments. The investment gains include a $28 million gain on the sale of a joint venture for net proceeds of $42 million. In the first quarter of 2021, the company recorded approximately $197 million of losses on the early extinguishment of debt (Note 10).

Provision for Income Taxes

The company recorded a provision for income taxes of $850 million in 2020 (effective tax rate of 11.8%). In 2020, the company implemented foreign tax credit planning in Sweden which resulted in $96 million of foreign tax credits, with no related incremental U.S. income tax expense and also recorded a net income tax benefit of $51 million from a domestication

Results of Operations (continued)

transaction involving the transfer of non-U.S. subsidiaries to the U.S.; a $47 million income tax benefit related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements; and a $27 million tax benefit from tax audit settlements.

The company recorded a provision for income taxes of $374 million in 2019 (effective tax rate of 9.2%) including $191 million related to the gain on the sale of the Anatomical Pathology business. In 2019, the company recorded a $62 million income tax benefit related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements; implemented foreign tax credit planning in Sweden which resulted in $75 million of foreign tax credits, with no related incremental U.S. income tax expense; and recorded a $79 million income tax benefit related to the deferred tax implications of intra-entity transactions which included a tax benefit to release a valuation allowance against net operating losses previously determined to be unrealizable.

The effective tax rate in both 2020 and 2019 was also affected by relatively significant earnings in lower tax jurisdictions. Due primarily to the non-deductibility of intangible asset amortization for tax purposes, the company's cash payments for income taxes were higher than its income tax expense for financial reporting purposes and totaled $1.32 billion and $0.90 billion in 2020 and 2019, respectively.

The company expects its effective tax rate in 2021 will be between 11% and 13% based on currently forecasted rates of profitability in the countries in which the company conducts business and expected generation of foreign tax credits. The effective tax rate can vary significantly from period to period as a result of discrete income tax factors and events.

The company has operations and a taxable presence in approximately 50 countries outside the U.S. Some of these countries have lower tax rates than the U.S. The company's ability to obtain a benefit from lower tax rates outside the U.S. is dependent on its relative levels of income in countries outside the U.S. and on the statutory tax rates in those countries. Based on the dispersion of the company's non-U.S. income tax provision among many countries, the company believes that a change in the statutory tax rate in any individual country is not likely to materially affect the company's income tax provision or net income, aside from any resulting one-time adjustment to the company's deferred tax balances to reflect a new rate.

Recent Accounting Pronouncements

A description of recently issued accounting standards is included under the heading "Recent Accounting Pronouncements" in Note 1.

Contingent Liabilities

The company is contingently liable with respect to certain legal proceedings and related matters. An unfavorable outcome that differs materially from current accrual estimates, if any, for one or more of the matters described under the heading "Product Liability, Workers Compensation and Other Personal Injury Matters," in Note 12 could have a material adverse effect on the company's financial position as well as its results of operations and cash flows.

Liquidity and Capital Resources

Consolidated working capital (current assets less current liabilities) was $11.65 billion at December 31, 2020, compared with $5.70 billion at December 31, 2019. Included in working capital were cash and cash equivalents of $10.33 billion at December 31, 2020 and $2.40 billion at December 31, 2019. The increase in cash was primarily due to the issuance of long-term senior notes in March and April 2020 and higher cash flow from operations in 2020.

2020

Cash provided by operating activities was $8.29 billion during 2020. Cash provided by income was offset in part by investments in working capital. Increases in accounts receivable and inventories used cash of $1.30 billion and $508 million, respectively, primarily to support growth in sales. Changes in other assets and liabilities provided cash of $1.45 billion primarily due to the timing of incentive compensation payments and, to a lesser extent, customer billings. Cash payments for income taxes increased to $1.32 billion during 2020, compared with $0.90 billion in 2019.

During 2020, the company's investing activities used $1.51 billion of cash, principally for the purchase of property, plant and equipment. In January and February 2021, the company completed acquisitions for approximately $950 million in cash plus contingent consideration and entered an agreement to acquire another business for $450 million in cash plus contingent consideration (Note 17).

Liquidity and Capital Resources (continued)

The company's financing activities provided $959 million of cash during 2020. Issuance of senior notes provided cash of $3.46 billion. Repayment of senior notes used cash of $713 million. The company's financing activities also included the repurchase of $1.50 billion of the company's common stock and the payment of $337 million in cash dividends, offset in part by $196 million of net proceeds from employee stock option exercises. On November 8, 2019, the Board of Directors authorized the repurchase of up to $2.50 billion of the company's common stock. On November 5, 2020, the Board of Directors replaced the existing authorization to repurchase the company's common stock, of which $1.00 billion was remaining, with a new authorization to repurchase up to $2.50 billion of the company's common stock. Early in the first quarter of 2021, the company repurchased $1.50 billion of the company's common stock. At February 24, 2021, authorization remained for $1.00 billion of future repurchases of the company's common stock.

As of December 31, 2020, the company's short-term debt totaled $2.63 billion, substantially all of which was redeemed in January 2021. The company has a revolving credit facility with a bank group that provides up to $3.00 billion of unsecured multi-currency revolving credit (Note 10). If the company borrows under this facility, it intends to leave undrawn an amount equivalent to outstanding commercial paper to provide a source of funds in the event that commercial paper markets are not available. As of December 31, 2020, no borrowings were outstanding under the company's revolving credit facility, although available capacity was reduced by approximately $31 million as a result of outstanding letters of credit.

Approximately half of the company's cash balances and cash flows from operations are from outside the U.S. The company uses its non-U.S. cash for needs outside of the U.S. including acquisitions and repayment of acquisition-related intercompany debt to the U.S. In addition, the company also transfers cash to the U.S. using non-taxable returns of capital as well as dividends where the related U.S. dividend received deduction or foreign tax credit equals any tax cost arising from the dividends. As a result of using such means of transferring cash to the U.S., the company does not expect any material adverse liquidity effects from its significant non-U.S. cash balances for the foreseeable future.

The company believes that its existing cash and cash equivalents of $10.33 billion as of December 31, 2020 and its future cash flow from operations together with available borrowing capacity under its revolving credit agreement will be sufficient to meet the cash requirements of its existing businesses for the foreseeable future, including at least the next 24 months.

The company expects that for 2021, expenditures for property, plant and equipment, net of disposals, will be between $2.2 and $2.4 billion.

In addition to the obligations on the balance sheet at December 31, 2020, which include debt (Note 10), unrecognized tax benefits (Note 8), operating leases (Note 11) and pension obligations (Note 7), the company has entered into unconditional purchase obligations, in the ordinary course of business, that include agreements to purchase goods, services or fixed assets and to pay royalties (Note 12).

2019

Cash provided by operating activities was $4.97 billion during 2019. Cash provided by income was offset in part by increased investments in working capital. Increases in accounts receivable and inventories used cash of $225 million and $458 million, respectively, primarily to support growth in sales. Changes in other assets and liabilities used cash of $198 million primarily due to the timing of customer billings and tax refunds, offset in part by advanced payments from customers. Cash payments for income taxes increased to $896 million during 2019, compared with $591 million in 2018.

During 2019, the company's investing activities used $1.49 billion of cash. Acquisitions used cash of $1.84 billion. Proceeds from the sale of the Anatomical Pathology business provided $1.13 billion. The company's investing activities also included the purchase of $926 million of property, plant and equipment.

The company's financing activities used $3.12 billion of cash during 2019. Repayment of senior notes used cash of $6.36 billion. New long-term borrowings provided cash of $5.64 billion. A net decrease in commercial paper obligations used cash of $683 million. The company's financing activities also included the repurchase of $1.50 billion of the company's common stock and the payment of $297 million in cash dividends, offset in part by $153 million of net proceeds from employee stock option exercises.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

The company is exposed to market risk from changes in interest rates and currency exchange rates, which could affect its future results of operations and financial condition. The company manages its exposure to these risks through its regular operating and financing activities. The company has periodically hedged interest rate risks of fixed-rate instruments with offsetting interest rate swaps. Additionally, the company uses short-term forward and option contracts primarily to hedge certain balance sheet and operational exposures resulting from changes in currency exchange rates. Such exposures result from purchases, sales, cash and intercompany loans that are denominated in currencies other than the functional currencies of the respective operations. The currency-exchange contracts principally hedge transactions denominated in Swiss franc, euro, British pounds sterling, Canadian dollars, Hong Kong dollars, Japanese yen and Czech koruna. Income and losses arising from these derivative contracts are recognized as offsets to losses and income resulting from the underlying exposure being hedged. The company does not enter into speculative derivative agreements.

Interest Rates

The company is exposed to changes in interest rates while conducting normal business operations as a result of ongoing investing and financing activities, which affect the company's debt as well as cash and cash equivalents. As of December 31, 2020, the company's debt portfolio was comprised primarily of fixed rate borrowings. The fair market value of the company's fixed interest rate debt is subject to interest rate risk. Generally, the fair market value of fixed interest rate debt will increase as interest rates fall and decrease as interest rates rise. The total estimated fair value of the company's debt at December 31, 2020 was $24.67 billion (Note 14). Fair values were determined from available market prices using current interest rates and terms to maturity. If interest rates were to decrease by 100 basis points, the fair value of the company's debt at December 31, 2020 would increase by approximately $1.52 billion. If interest rates were to increase by 100 basis points, the fair value of the company's debt at December 31, 2020 would decrease by approximately $1.92 billion.

In addition, interest rate changes would result in a change in the company's interest expense due to variable-rate debt instruments including swap arrangements. In 2020, a 100 basis point increase in interest rates on the swap arrangements and variable-rate debt would have increased the company's annual pre-tax interest expense by approximately $14 million.

Currency Exchange Rates

The company views its investment in international subsidiaries with a functional currency other than the U.S. dollar as permanent. The company's investment in international subsidiaries is sensitive to fluctuations in currency exchange rates. The functional currencies of the company's international subsidiaries are principally denominated in euro, British pounds sterling, Swedish kronor, Canadian dollars, Swiss franc, Norwegian kroner and Danish kroner. The effect of a change in the period ending currency exchange rates on the company's net investment in international subsidiaries is reflected in the "accumulated other comprehensive items" component of shareholders' equity. The company also uses foreign currency-denominated debt to partially hedge its net investments in foreign operations against adverse movements in exchange rates. A 10% depreciation in year-end 2020 functional currencies, relative to the U.S. dollar, would result in a reduction of shareholders' equity of approximately $1.22 billion.

The fair value of forward currency-exchange contracts is sensitive to changes in currency exchange rates. The fair value of forward currency-exchange contracts is the estimated amount that the company would pay or receive upon termination of the contract, taking into account the change in currency exchange rates. A 10% depreciation in year-end 2020 non-functional currency exchange rates related to the company's contracts would result in an additional unrealized loss on forward currency-exchange contracts of $410 million. A 10% appreciation in year-end 2020 non-functional currency exchange rates related to the company's contracts would result in an unrealized gain on forward currency-exchange contracts of $348 million. The unrealized gains or losses on forward currency-exchange contracts resulting from changes in currency exchange rates are expected to approximately offset losses or gains on the exposures being hedged.

Certain of the company's cash and cash equivalents are denominated in currencies other than the functional currency of the depositor and are sensitive to changes in currency exchange rates. A 10% depreciation in the related year-end 2020 non-functional currency exchange rates applied to such cash balances would result in a negative impact of $18 million on the company's net income.

Item 8. Financial Statements and Supplementary Data

This data is submitted as a separate section to this report. See Item 15 "Exhibits and Financial Statement Schedules."

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

Not applicable.

Item 9A. Controls and Procedures

Management's Evaluation of Disclosure Controls and Procedures

The company's management, with the participation of the company's chief executive officer and chief financial officer, has evaluated the effectiveness of the company's disclosure controls and procedures (as such term is defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this report. Based on such evaluation, the company's chief executive officer and chief financial officer concluded that, as of the end of such period, the company's disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control over Financial Reporting

There have been no changes in the company's internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) during the fiscal quarter ended December 31, 2020, that have materially affected or are reasonably likely to materially affect the company's internal control over financial reporting.

Management's Annual Report on Internal Control Over Financial Reporting

The company's management, including the company's chief executive officer and chief financial officer, is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the company. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. The company's management conducted an assessment of the effectiveness of the company's internal control over financial reporting as of December 31, 2020 based on criteria established in "Internal Control - Integrated Framework" (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, the company's management concluded that, as of December 31, 2020, the company's internal control over financial reporting was effective.

The company's independent registered public accounting firm, PricewaterhouseCoopers LLP, has audited the effectiveness of the company's internal control over financial reporting as of December 31, 2020, as stated in their report that appears on page F-2 of this Annual Report on Form 10-K.

Item 9B. Other Information

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information with respect to directors required by this Item will be contained in our definitive proxy statement to be filed with the SEC not later than 120 days after the close of business of the fiscal year (2021 Definitive Proxy Statement) and is incorporated in this report by reference.

The information with respect to executive officers required by this Item is included in Item 1 of Part I of this report.

The other information required by this Item will be contained in our 2021 Definitive Proxy Statement and is incorporated in this report by reference.

Item 11. Executive Compensation

The information required by this Item will be contained in our 2021 Definitive Proxy Statement and is incorporated in this report by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this Item will be contained in our 2021 Definitive Proxy Statement and is incorporated in this report by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by this Item will be contained in our 2021 Definitive Proxy Statement and is incorporated in this report by reference.

Item 14. Principal Accountant Fees and Services

The information required by this Item will be contained in our 2021 Definitive Proxy Statement and is incorporated in this report by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The following documents are filed as part of this report:

(1) Consolidated Financial Statements (see Index on page F-1 of this report)

Report of Independent Registered Public Accounting Firm

Consolidated Balance Sheet

Consolidated Statement of Income

Consolidated Statement of Comprehensive Income

Consolidated Statement of Cash Flows

Consolidated Statement of Shareholders' Equity

Notes to Consolidated Financial Statements

(2) All schedules are omitted because they are not applicable or not required, or because the required information is included either in the consolidated financial statements or in the notes thereto.

(b) Exhibits

See the Exhibit Index on page 37.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

Date: February 24, 2021

THERMO FISHER SCIENTIFIC INC.

By: /s/ Marc N. Casper
Marc N. Casper
Chairman, President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities indicated, as of February 24, 2021.

By: /s/ Marc N. Casper
Marc N. Casper
Chairman, President and Chief Executive Officer
(Principal Executive Officer)

By: /s/ Thomas J. Lynch
Thomas J. Lynch
Lead Director

By: /s/ Stephen Williamson
Stephen Williamson
Senior Vice President and Chief Financial Officer
(Principal Financial Officer)

By: /s/ Jim P. Manzi
Jim P. Manzi
Director

By: /s/ Peter E. Hornstra
Peter E. Hornstra
Vice President and Chief Accounting Officer
(Principal Accounting Officer)

By: /s/ James C. Mullen
James C. Mullen
Director

By: /s/ Nelson J. Chai
Nelson J. Chai
Director

By: /s/ Lars R. Sørensen
Lars R. Sørensen
Director

By: /s/ C. Martin Harris
C. Martin Harris
Director

By: /s/ Debora L. Spar
Debora L. Spar
Director

By: /s/ Tyler E. Jacks
Tyler E. Jacks
Director

By: /s/ Scott M. Sperling
Scott M. Sperling
Director

By: /s/ R. Alexandra Keith
R. Alexandra Keith
Director

By: /s/ Dion J. Weisler
Dion J. Weisler
Director

By: /s/ Judy C. Lewent
Judy C. Lewent
Director

THERMO FISHER SCIENTIFIC INC.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
3.1	Amended and Restated Certificate of Incorporation of the Registrant (filed as Exhibit 3.1 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2005 [File No. 1-8002] and incorporated in this document by reference).
3.2	Amendment to Thermo Fisher Scientific Inc.'s Third Amended and Restated Certificate of Incorporation (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed November 14, 2006 [File No. 1-8002] and incorporated in this document by reference).
3.3	Certificate of Elimination of the Series B Junior Participating Preferred Stock of the Company, dated November 13, 2015 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed November 16, 2015 [File No. 1-8002] and incorporated in this document by reference).
3.4	Amended and Restated By-Laws of the Registrant, as amended and effective as of February 23, 2021 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed February 24, 2021 [File No. 1-8002] and incorporated in this document by reference).
	The Registrant agrees, pursuant to Item 601(b)(4)(iii)(A) of Regulation S-K, to furnish to the Commission, upon request, a copy of each instrument with respect to long-term debt of the Registrant or its consolidated subsidiaries.
4.1	Indenture dated as of November 20, 2009 between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.1 to the Registrant's Current Report on Form 8-K filed November 20, 2009 [File No. 1-8002] and incorporated in this document by reference).
4.2	Sixth Supplemental Indenture, dated as of December 11, 2013, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 99.2 to the Registrant's Current Report on Form 8-K filed December 11, 2013 [File No. 1-8002] and incorporated in this document by reference).
4.3	Eighth Supplemental Indenture, dated as of November 24, 2014, among the Company, The Bank of New York Mellon Trust Company, N.A., as trustee, and The Bank of New York Mellon, London Branch, as paying agent (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed November 24, 2014 [File No. 1-8002] and incorporated in this document by reference).
4.4	Ninth Supplemental Indenture, dated as of July 21, 2015, among the Company, The Bank of New York Mellon Trust Company, N.A., as trustee, and The Bank of New York Mellon, London Branch, as paying agent (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed July 21, 2015 [File No. 1-8002] and incorporated in this document by reference).
4.5	Eleventh Supplemental Indenture, dated as of December 9, 2015, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed December 9, 2015 [File No. 1-8002] and incorporated in this document by reference).
4.6	Twelfth Supplemental Indenture, dated as of April 13, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed April 13, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.7	Thirteenth Supplemental Indenture, dated as of September 12, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 12, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.8	Fourteenth Supplemental Indenture, dated as of September 19, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 19, 2016 [File No. 1-8002] and incorporated in this document by reference).
4.9	Fifteenth Supplemental Indenture, dated as of March 16, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed March 16, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.10	Sixteenth Supplemental Indenture, dated as of July 24, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed July 24, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.11	Seventeenth Supplemental Indenture, dated as of August 14, 2017, between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed August 14, 2017 [File No. 1-8002] and incorporated in this document by reference).
4.12	Eighteenth Supplemental Indenture, dated as of September 30, 2019, between the Company, as issuer, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed September 30, 2019 [File No. 1-8002] and incorporated in this document by reference).
4.13	Nineteenth Supplemental Indenture, dated as of October 8, 2019, between the Company, as issuer, and the Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed October 8, 2019 [File No. 1-8002] and incorporated in this document by reference).
4.14	Twentieth Supplemental Indenture, dated as of March 25, 2020 between the Company, as issuer, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed March 26, 2020 [File No. 1-8002] and incorporated in this document by reference).
4.15	Twenty-First Supplemental Indenture, dated as of April 2, 2020, between the Company, as issuer, and The Bank of New York Mellon Trust Company, N.A., as trustee (filed as Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed April 2, 2020 [File No. 1-8002] and incorporated in this document by reference).

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Exhibit Number	Description of Exhibit
4.16	Description of the Registrant's Securities (filed as Exhibit 4.16 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).
10.1	Thermo Fisher Scientific Inc. Deferred Compensation Plan for Directors of the Registrant, as amended and restated on September 12, 2007 (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 29, 2007 [File No. 1-8002] and incorporated in this document by reference).*
10.2	Thermo Electron Corporation Deferred Compensation Plan, effective November 1, 2001 (filed as Exhibit 10.13 to the Registrant's Annual Report on Form 10-K for the fiscal year ended December 29, 2001 [File No. 1-8002] and incorporated in this document by reference).*
10.3	Form of Amended and Restated Indemnification Agreement between the Registrant and its directors and officers (filed as Exhibit 10.2 to the Registrant's Registration Statement on Form S-4 [Reg. No. 333-90661] and incorporated in this document by reference).*
10.4	Summary of Thermo Fisher Scientific Inc. Annual Director Compensation (filed as Exhibit 10.4 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.5	Summary of 2019 Annual Cash Incentive Plan Matters (set forth in Item 5.02 to the Registrant's Current Report on Form 8-K filed February 28, 2019 [File No.1-8002] under the heading "Compensatory Arrangements of Certain Officers" and incorporated in this document by reference).*
10.6	Form of Noncompetition Agreement between the Registrant and certain key employees and executive officers (filed as Exhibit 10.25 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.7	Retirement Plan for Non-Employee Directors of Fisher Scientific International Inc. (filed as Exhibit 10.12 to Fisher Scientific International Inc.'s Annual Report on Form 10-K for the year ended December 31, 1992 [File No. 1-10920] and incorporated in this document by reference).*
10.8	First Amendment to the Fisher Scientific International Inc. Retirement Plan for Non-Employee Directors (filed as Exhibit 10.04 to Fisher Scientific International Inc.'s Quarterly Report on Form 10-Q for the quarter ended March 31, 2005 [File No. 1-10920] and incorporated in this document by reference).*
10.9	Amendment to Retirement Plan for Non-Employee Directors of Fisher Scientific International Inc. (filed as Exhibit 10.02 to Fisher Scientific International Inc.'s Current Report on Form 8-K filed March 7, 2006 [File No. 1-10920] and incorporated in this document by reference).*
10.10	Thermo Fisher Scientific Inc. Amended and Restated 2005 Deferred Compensation Plan, effective January 1, 2020 (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 27, 2020 [File No. 1-8002] and incorporated in this document by reference).*
10.11	2009 Restatement of Executive Severance Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.12	Executive Change In Control Retention Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.6 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.13	Noncompetition Agreement, between Marc Casper and the Registrant, dated November 21, 2009 (filed as Exhibit 10.7 to the Registrant's Current Report on Form 8-K filed November 25, 2009 [File No. 1-8002] and incorporated in this document by reference).*
10.14	Amendment No. 1 to 2009 Restatement of Executive Severance Agreement, dated February 25, 2010, between the Registrant and Marc N. Casper (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed February 25, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.15	Amendment No. 2 to 2009 Restatement of Executive Severance Agreement, dated November 30, 2010, between the Registrant and Marc N. Casper (filed as Exhibit 10.55 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.16	Amendment No. 1 to Executive Change In Control Retention Agreement, dated November 30, 2010, between Marc N. Casper and the Registrant (filed as Exhibit 10.56 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 [File No. 1-8002] and incorporated in this document by reference).*
10.17	Amendment No. 2 to Executive Change in Control Retention Agreement, dated March 16, 2018, between Marc N. Casper and the Registrant (filed as Exhibit 10.3 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 [File No. 1-8002] and incorporated in this document by reference).*
10.18	Form of Executive Change in Control Retention Agreement for Officers (other than Marc Casper) (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 [File No. 1-8002] and incorporated in this document by reference).*
10.19	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement for Directors (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended April 2, 2011 [File No. 1-8002] and incorporated in this document by reference).*

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Exhibit Number	Description of Exhibit
10.20	Form of Thermo Fisher Scientific Inc.'s Performance Restricted Stock Unit Agreement (filed as Exhibit 10.4 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.21	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.22	Form of Performance Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.3 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.23	Form of Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.24	Form of Stock Option Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed February 27, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.25	Thermo Fisher Scientific Inc. 2013 Stock Incentive Plan (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed May 23, 2013 [File No. 1-8002] and incorporated in this document by reference).*
10.26	Supplemental Executive Retirement Plan effective as of December 31, 2005, as amended and restated as of August 28, 2006 (filed as Exhibit 10.3 to Applera Corporation's Quarterly Report on Form 10-Q for the quarter ended September 30, 2006 [File No. 1-04389] and incorporated in this document by reference).*
10.27	Amendment to Supplemental Executive Retirement Plan, effective as of January 1, 2010 (filed as Exhibit 10.1 to Life Technologies Corporation's Current Report on Form 8-K filed December 18, 2009 [File No. 000-25317] and incorporated in this document by reference).*
10.28	Noncompetition Agreement between the Registrant and Mark Stevenson, dated September 10, 2015 (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 26, 2015 [File No. 1-8002] and incorporated in this document by reference).*
10.29	Form of Thermo Fisher Scientific Inc.'s Stock Option Agreement for Officers (filed as Exhibit 10.44 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2016 [File No. 1-8002] and incorporated in this document by reference).*
10.30	Patheon N.V. 2016 Omnibus Incentive Plan (filed as Exhibit 10.2 to the Current Report on Form 8-K filed by Patheon N.V. on July 26, 2016 [File No. 001-37837] and incorporated in this document by reference).*
10.31	Amendment to Patheon N.V. 2016 Omnibus Incentive Plan, dated March 7, 2017 (filed as exhibit 4.5 to the Registrant's Registration Statement on Form S-8 filed August 29, 2017 [File No. 1-8002] and incorporated in this document by reference).*
10.32	Amendment to Patheon N.V. 2016 Omnibus Incentive Plan, dated August 23, 2017 (filed as exhibit 4.6 to the Registrant's Registration Statement on Form S-8 filed August 29, 2017 [File No. 1-8002] and incorporated in this document by reference).*
10.33	Credit Agreement, dated December 4, 2020, among Thermo Fisher Scientific Inc., certain Subsidiaries of Thermo Fisher Scientific Inc. from time to time party thereto, Bank of America, N.A., as Administrative Agent and each lender from time to time party thereto (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed December 4, 2020 [File No. 1-8002] and incorporated in this document by reference).
10.34	Form of Performance Restricted Stock Unit Agreement effective February 26, 2019 (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 30, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.35	Form of Performance Restricted Stock Unit Agreement for Marc Casper effective February 26, 2019 (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 30, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.36	Letter Agreement between the Registrant and Michel Lagarde dated August 28, 2017 (filed as Exhibit 10.39 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.37	Option Agreement Under the Patheon N.V. 2016 Omnibus Incentive Plan between Patheon N.V. and Michel Lagarde dated July 20, 2016 (filed as Exhibit 10.40 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.38	Option Agreement Under the Patheon N.V. 2016 Omnibus Incentive Plan between Patheon N.V. and Michel Lagarde dated March 23, 2017 (filed as Exhibit 10.42 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.39	Thermo Fisher Scientific Inc. Executive Severance Policy (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 29, 2019 [File No. 1-8002] and incorporated in this document by reference).*

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Exhibit Number	Description of Exhibit
10.40	Form of Noncompetition Agreement between the Registrant and certain key employees and executive officers (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 29, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.41	Form of Thermo Fisher Scientific Inc.'s Performance Restricted Stock Unit Agreement (filed as Exhibit 10.45 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.42	Form of Thermo Fisher Scientific Inc.'s Restricted Stock Unit Agreement (filed as Exhibit 10.46 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.43	Form of Thermo Fisher Scientific Inc.'s Stock Option Agreement for Officers (filed as Exhibit 10.47 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.44	Form of Performance Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.48 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.45	Form of Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.49 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.46	Form of Stock Option Agreement between Thermo Fisher Scientific Inc. and Marc Casper (filed as Exhibit 10.50 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2019 [File No. 1-8002] and incorporated in this document by reference).*
10.47	Form of Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper*
10.48	Form of Performance Restricted Stock Unit Agreement between Thermo Fisher Scientific Inc. and Marc Casper*
10.49	Form of Thermo Fisher Scientific Inc.'s Performance Restricted Stock Unit Agreement*
21	Subsidiaries of the Registrant.
23.1	Consent of PricewaterhouseCoopers LLP, an Independent Registered Public Accounting Firm.
31.1	Certification of Chief Executive Officer required by Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Chief Financial Officer required by Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Certification of Chief Executive Officer required by Exchange Act Rules 13a-14(b) and 15d-14(b), as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.**
32.2	Certification of Chief Financial Officer required by Exchange Act Rules 13a-14(b) and 15d-14(b), as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.**
101.INS	XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
101.SCH	XBRL Taxonomy Extension Schema Document.
101.CAL	XBRL Taxonomy Calculation Linkbase Document.
101.DEF	XBRL Taxonomy Definition Linkbase Document.
101.LAB	XBRL Taxonomy Label Linkbase Document.
101.PRE	XBRL Taxonomy Presentation Linkbase Document.
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101).

*Indicates management contract or compensatory plan, contract or arrangement.

** Certification is not deemed "filed" for purposes of Section 18 of the Exchange Act or otherwise subject to the liability of that section. Such certification is not deemed to be incorporated by reference into any filing under the Securities Act or the Exchange Act except to the extent that the registrant specifically incorporates it by reference.

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INDEX OF CONSOLIDATED FINANCIAL STATEMENTS

The following Consolidated Financial Statements of the Registrant and its subsidiaries are required to be included in Item 15:

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Consolidated Statement of Income for the years ended December 31, 2020, 2019 and 2018	F-7
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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Thermo Fisher Scientific Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheet of Thermo Fisher Scientific Inc. and its subsidiaries (the "Company") as of December 31, 2020 and 2019, and the related consolidated statements of income, of comprehensive income, of shareholders' equity and of cash flows for each of the three years in the period ended December 31, 2020, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2020, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2020 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2020, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Change in Accounting Principle

As discussed in Note 1 to the consolidated financial statements, the Company changed the manner in which it accounts for leases in 2019.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Annual Report on Internal Control Over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of

internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that (i) relate to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Goodwill impairment assessment

As described in Note 1 to the consolidated financial statements, the Company's consolidated goodwill balance was $26,041 million as of December 31, 2020. Management assesses goodwill for impairment at the reporting unit level annually and whenever events occur or circumstances change that would more likely than not reduce the fair value of the reporting unit below its carrying amount. Management estimates the fair values of its reporting units by using forecasts of discounted future cash flows and peer market multiples. The Company would record an impairment charge based on the excess of a reporting unit's carrying amount over its fair value (limited to the amount of goodwill). As disclosed by management, estimates of discounted future cash flows require management to make assumptions related to revenue and operating income growth rates, discount rates and other factors. Management also considers peer revenues and earnings trading multiples from companies that have operational and financial characteristics that are similar to the respective reporting units and estimates weighted average costs of capital.

The principal considerations for our determination that performing procedures relating to the goodwill impairment assessment is a critical audit matter are (i) the significant judgment by management when estimating the fair value of the reporting units, (ii) a high degree of auditor judgment and effort in performing procedures to evaluate management's significant assumptions related to discount rates and peer market multiples, and (iii) the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the goodwill impairment assessment, including controls over the valuation of the Company's reporting units. These procedures also included, among others, testing management's process for developing the fair value estimates; evaluating the appropriateness of the discounted cash flow and market models; testing the completeness, accuracy, and relevance of underlying data used in the models; and evaluating the significant assumptions used by management related to the discount rates, the terminal growth rates and peer market multiples. Evaluating management's assumptions related to the terminal growth rates involved evaluating whether the assumptions used were reasonable considering the consistency with external market data. Evaluating management's assumptions related to the peer market multiples involved evaluating the population of peer companies used in the analyses and testing selected market data used by management to determine the multiples by comparison to publicly available information. Professionals with specialized skill and knowledge were used to assist in the evaluation of the Company's discounted cash flow models and the discount rate assumptions.

Income taxes

As described in Notes 1 and 8 to the consolidated financial statements, the Company's total income tax expense for the period ended December 31, 2020 was $850 million. The Company has deferred income tax liabilities, net, of $1,105 million (including a valuation allowance of $933 million) and unrecognized income tax benefits of $1,091 million as of December 31, 2020. As disclosed by management, the Company operates in numerous countries under many legal forms and, as a result, is subject to the jurisdiction of numerous domestic and non-U.S. tax authorities, as well as to tax agreements and treaties among these governments. Determination of taxable income in any jurisdiction requires management to interpret the related tax laws and regulations and to use estimates and assumptions regarding significant future events, such as the amount, timing and character of deductions, permissible revenue recognition methods under the tax law and the sources and character of income and tax credits. Management assesses income tax positions and records tax benefits for all years subject to examination based upon evaluation of the facts, circumstances and information available at the reporting date. For those tax positions where it is more likely than not that a tax benefit will be sustained, management has recorded the largest amount of tax benefit with a greater than 50 percent likelihood of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information. For those income tax positions where it is not more likely than not that a tax benefit will be sustained, no tax benefit has been recognized in the financial statements. Management estimates the degree to which tax assets will result in a benefit, after consideration of all positive and negative evidence, and provides a valuation allowance for tax assets that it believes will more likely than not go unused. In situations in which management has been able to determine that the Company's deferred tax assets will be realized, that determination generally relies on future reversals of taxable temporary differences and expected future taxable income. If it becomes more likely than not that a tax asset will be used, management reverses the related valuation allowance.

The principal considerations for our determination that performing procedures relating to income taxes is a critical audit matter are (i) the significant judgment by management when determining the provision for income taxes, deferred tax assets and liabilities, and liabilities for unrecognized tax benefits due to numerous and complex tax laws, the frequency of tax filings, as well as judgments regarding the realizability of deferred tax assets, (ii) a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating audit evidence related to the provision for income taxes, deferred tax assets and liabilities, and liabilities for unrecognized tax benefits, and (iii) the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the provision for income

taxes, deferred tax assets and liabilities, and liabilities for unrecognized tax benefits, including controls over the realizability of deferred tax assets. These procedures also included, among others, (i) testing the accuracy of the income tax provision, including the rate reconciliation and permanent and temporary differences, (ii) evaluating whether the data utilized in the calculation of the provision for income taxes was appropriate and consistent with evidence obtained in other areas of the audit, (iii) evaluating management's assessment of the realizability of deferred tax assets on a jurisdictional basis, (iv) evaluating the identification of reserves for unrecognized tax benefits and the reasonableness of the "more likely than not" determination in consideration of jurisdictions, court decisions, legislative actions, statutes of limitations, and developments in tax examinations, (v) testing the calculation of the liability for unrecognized tax benefits by jurisdiction, including estimates of the amount of tax benefit expected to be sustained, and (vi) evaluating the adequacy of the Company's disclosures. Professionals with specialized skill and knowledge were used to assist in evaluating the reasonableness of management's judgments and estimates related to the application of foreign and domestic tax laws and regulations.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
February 24, 2021

We have served as the Company's auditor since 2002.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED BALANCE SHEET

(In millions except share and per share amounts)	December 31, 2020	December 31, 2019
Assets		
Current Assets:		
Cash and cash equivalents	$ 10,325	$ 2,399
Accounts receivable, less allowances of $135 and $102	5,741	4,349
Inventories	4,029	3,370
Contract assets, net	731	603
Other current assets	1,131	1,172
Total current assets	21,957	11,893
Property, Plant and Equipment, Net	5,912	4,749
Acquisition-related Intangible Assets, Net	12,685	14,014
Other Assets	2,457	2,011
Goodwill	26,041	25,714
Total Assets	$ 69,052	$ 58,381
Liabilities and Shareholders' Equity		
Current Liabilities:		
Short-term obligations and current maturities of long-term obligations	$ 2,628	$ 676
Accounts payable	2,175	1,920
Accrued payroll and employee benefits	1,916	1,010
Contract liabilities	1,271	916
Other accrued expenses	2,314	1,675
Total current liabilities	10,304	6,197
Deferred Income Taxes	1,794	2,192
Other Long-term Liabilities	3,340	3,241
Long-term Obligations	19,107	17,076
Commitments and Contingencies (Note 12)		
Shareholders' Equity:		
Preferred stock, $100 par value, 50,000 shares authorized; none issued		
Common stock, $1 par value, 1,200,000,000 shares authorized; 437,088,297 and 434,416,804 shares issued	437	434
Capital in excess of par value	15,579	15,064
Retained earnings	28,116	22,092
Treasury stock at cost, 40,417,789 and 35,676,421 shares	(6,818)	(5,236)
Accumulated other comprehensive items	(2,807)	(2,679)
Total shareholders' equity	34,507	29,675
Total Liabilities and Shareholders' Equity	$ 69,052	$ 58,381

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF INCOME

(In millions except per share amounts)	Year Ended December 31, 2020	December 31, 2019	December 31, 2018
Revenues			
Product revenues	$ 25,306	$ 19,496	$ 18,868
Service revenues	6,912	6,046	5,490
Total revenues	32,218	25,542	24,358
Costs and Operating Expenses:			
Cost of product revenues	11,407	10,037	9,682
Cost of service revenues	4,807	4,177	3,819
Selling, general and administrative expenses	6,930	6,144	6,057
Research and development expenses	1,181	1,003	967
Restructuring and other costs (income), net	99	(413)	50
Total costs and operating expenses	24,424	20,948	20,575
Operating Income	7,794	4,594	3,783
Interest Income	65	224	137
Interest Expense	(553)	(676)	(667)
Other (Expense) Income, Net	(81)	(72)	9
Income Before Income Taxes	7,225	4,070	3,262
Provision for Income Taxes	(850)	(374)	(324)
Net Income	$ 6,375	$ 3,696	$ 2,938
Earnings per Share			
Basic	$ 16.09	$ 9.24	$ 7.31
Diluted	$ 15.96	$ 9.17	$ 7.24
Weighted Average Shares			
Basic	396	400	402
Diluted	399	403	406

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME

(In millions)	Year Ended December 31, 2020	December 31, 2019	December 31, 2018
Comprehensive Income			
Net Income	$ 6,375	$ 3,696	$ 2,938
Other Comprehensive Items:			
Currency translation adjustment:			
Currency translation adjustment (net of tax (benefit) provision of $(221), $25 and $84)	(118)	(107)	(434)
Reclassification adjustment for losses included in net income	—	30	—
Unrealized gains and losses on hedging instruments:			
Unrealized losses on hedging instruments (net of tax benefit of $20, $12 and $0)	(65)	(38)	—
Reclassification adjustment for losses included in net income (net of tax benefit of $14, $6 and $3)	45	19	9
Pension and other postretirement benefit liability adjustments:			
Pension and other postretirement benefit liability adjustments arising during the period (net of tax (benefit) provision of $(1), $(31) and $2)	(8)	(93)	3
Amortization of net loss and prior service benefit included in net periodic pension cost (net of tax benefit of $4, $2 and $5)	18	8	15
Total other comprehensive items	(128)	(181)	(407)
Comprehensive Income	$ 6,247	$ 3,515	$ 2,531

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF CASH FLOWS

(In millions)	Year Ended December 31, 2020	December 31, 2019	December 31, 2018
Operating Activities			
Net income	$ 6,375	$ 3,696	$ 2,938
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation of property, plant and equipment	658	564	526
Amortization of acquisition-related intangible assets	1,667	1,713	1,741
Change in deferred income taxes	(552)	(302)	(379)
Gain on sales of businesses	—	(482)	—
Stock-based compensation	196	181	181
Loss on early extinguishment of debt	—	184	3
Other non-cash expenses, net	340	84	103
Changes in assets and liabilities, excluding the effects of acquisitions and disposition:			
Accounts receivable	(1,302)	(225)	(366)
Inventories	(508)	(458)	(324)
Accounts payable	59	266	201
Contributions to retirement plans	(96)	(50)	(93)
Other	1,452	(198)	12
Net cash provided by operating activities	8,289	4,973	4,543
Investing Activities			
Acquisitions, net of cash acquired	(38)	(1,843)	(536)
Proceeds from sale of business, net of cash divested	—	1,128	—
Purchase of property, plant and equipment	(1,474)	(926)	(758)
Proceeds from sale of property, plant and equipment	8	36	50
Other investing activities, net	(6)	118	(9)
Net cash used in investing activities	(1,510)	(1,487)	(1,253)
Financing Activities			
Net proceeds from issuance of debt	3,464	5,638	690
Repayment of debt	(713)	(6,360)	(2,052)
Proceeds from issuance of commercial paper	383	2,781	5,060
Repayments of commercial paper	(387)	(3,464)	(5,254)
Purchases of company common stock	(1,500)	(1,500)	(500)
Dividends paid	(337)	(297)	(266)
Net proceeds from issuance of company common stock under employee stock plans	196	153	136
Other financing activities, net	(147)	(69)	(51)
Net cash provided by (used in) financing activities	959	(3,118)	(2,237)
Exchange Rate Effect on Cash	176	(63)	(297)
Increase in Cash, Cash Equivalents and Restricted Cash	7,914	305	756
Cash, Cash Equivalents and Restricted Cash at Beginning of Year	2,422	2,117	1,361
Cash, Cash Equivalents and Restricted Cash at End of Year	$ 10,336	$ 2,422	$ 2,117

The accompanying notes are an integral part of these consolidated financial statements.

THERMO FISHER SCIENTIFIC INC.

CONSOLIDATED STATEMENT OF SHAREHOLDERS' EQUITY

(In millions)	Common Stock Shares	Common Stock Amount	Capital in Excess of Par Value	Retained Earnings	Treasury Stock Shares	Treasury Stock Amount	Accumulated Other Comprehensive Items	Total Shareholders' Equity
Balance at December 31, 2017	428	$ 428	$ 14,177	$ 15,914	27	$ (3,103)	$ (2,003)	$ 25,413
Cumulative effect of accounting changes	—	—	—	118	—	—	(88)	30
Issuance of shares under employees' and directors' stock plans	4	4	236	—	—	(62)	—	178
Stock-based compensation	—	—	181	—	—	—	—	181
Purchases of company common stock	—	—	—	—	2	(500)	—	(500)
Dividends declared ($0.68 per share)	—	—	—	(274)	—	—	—	(274)
Net income	—	—	—	2,938	—	—	—	2,938
Other comprehensive items	—	—	—	—	—	—	(407)	(407)
Other	—	—	27	—	—	—	—	27
Balance at December 31, 2018	432	432	14,621	18,696	29	(3,665)	(2,498)	27,586
Cumulative effect of accounting changes	—	—	—	4	—	—	—	4
Issuance of shares under employees' and directors' stock plans	2	2	262	—	1	(71)	—	193
Stock-based compensation	—	—	181	—	—	—	—	181
Purchases of company common stock	—	—	—	—	6	(1,500)	—	(1,500)
Dividends declared ($0.76 per share)	—	—	—	(304)	—	—	—	(304)
Net income	—	—	—	3,696	—	—	—	3,696
Other comprehensive items	—	—	—	—	—	—	(181)	(181)
Balance at December 31, 2019	434	434	15,064	22,092	36	(5,236)	(2,679)	29,675
Cumulative effect of accounting change	—	—	—	(1)	—	—	—	(1)
Issuance of shares under employees' and directors' stock plans	3	3	319	—	—	(82)	—	240
Stock-based compensation	—	—	196	—	—	—	—	196
Purchases of company common stock	—	—	—	—	4	(1,500)	—	(1,500)
Dividends declared ($0.88 per share)	—	—	—	(350)	—	—	—	(350)
Net income	—	—	—	6,375	—	—	—	6,375
Other comprehensive items	—	—	—	—	—	—	(128)	(128)
Balance at December 31, 2020	437	$ 437	$ 15,579	$ 28,116	40	$ (6,818)	$ (2,807)	$ 34,507

The accompanying notes are an integral part of these consolidated financial statements.

Note 1. Nature of Operations and Summary of Significant Accounting Policies

Nature of Operations

Thermo Fisher Scientific Inc. (the company or Thermo Fisher) enables customers to make the world healthier, cleaner and safer by helping them accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics, deliver medicines to market and increase laboratory productivity. Markets served include pharmaceutical and biotech, academic and government, industrial and applied, as well as healthcare and diagnostics.

Principles of Consolidation

The accompanying financial statements include the accounts of the company and its wholly and majority-owned subsidiaries. All material intercompany accounts and transactions have been eliminated. The company accounts for investments in businesses using the equity method when it has the ability to exercise significant influence but not control (generally between 20% and 50% ownership) and is not the primary beneficiary.

Presentation

Certain reclassifications of prior year amounts have been made to conform to the current year presentation.

Revenue Recognition

Consumables revenues consist of single-use products and are recognized at a point in time following the transfer of control of such products to the customer, which generally occurs upon shipment. Instruments revenues typically consist of longer-lived assets that, for the substantial majority of sales, are recognized at a point in time in a manner similar to consumables. Service revenues (clinical trial logistics, pharmaceutical development and manufacturing services, asset management, diagnostic testing, training, service contracts, and field services including related time and materials) are recognized over time as customers receive and consume the benefits of such services. For revenues recognized over time, the company generally uses costs accumulated relative to total estimated costs to measure progress as this method approximates satisfaction of the performance obligation. For contracts that contain multiple performance obligations, the company allocates the consideration to which it expects to be entitled (i.e., the transaction price) to each performance obligation based on relative standalone selling prices and recognizes the related revenues when or as control of each individual performance obligation is transferred to customers. The company exercises judgment in determining the timing of revenue by analyzing the point in time or the period over which the customer has the ability to direct the use of and obtain substantially all of the remaining benefits of the asset. The company immediately expenses contract costs that would otherwise be capitalized and amortized over a period of less than one year.

Payments from customers for most instruments and consumables are typically due in a fixed number of days after shipment or delivery of the product. Service arrangements commonly call for payments in advance of performing the work (e.g. extended service contracts), upon completion of the service (e.g. pharmaceutical development and manufacturing) or a mix of both. Some arrangements include variable amounts of consideration that arise from discounts, rebates, and other programs and practices. In such arrangements, the company estimates the amount by which to reduce the stated contract amount to reflect the transaction price.

Contract-related Balances

Accounts receivable include amounts that have been billed and are currently due from customers. They are recorded at the invoiced amount and do not bear interest. The company maintains allowances for doubtful accounts for estimates of expected losses resulting from the inability of its customers to pay amounts due. The allowance for doubtful accounts is the company’s best estimate of the amount of probable credit losses in existing accounts receivable. The company determines the allowance based on history of similarly aged receivables, the creditworthiness of the customer, reasons for delinquency, current economic conditions, expectations associated with future events and circumstances where reasonable and supportable forecasts are available and any other information that is relevant to the judgment. Receivables from academic and government customers as well as large, well-capitalized commercial customers have historically experienced less collectability risk. Account balances are charged off against the allowance when the company believes it is probable the receivable will not be recovered. The company does not have any off-balance-sheet credit exposure related to customers.

The changes in the allowance for doubtful accounts are as follows:

(In millions)	Year Ended December 31, 2020	2019	2018
Balance at Beginning of Year	$ 102	$ 117	$ 109
Cumulative effect of accounting change	1	—	—
Provision charged to expense	63	20	18
Accounts written off	(34)	(32)	(12)
Acquisitions, currency translation and other	3	(3)	2
Balance at End of Year	$ 135	$ 102	$ 117

Contract assets include revenues recognized in advance of billings and are recorded net of estimated losses resulting from the inability to invoice customers, which is primarily due to risk associated with the company's performance. Contract assets are classified as current or noncurrent based on the amount of time expected to lapse until the company's right to consideration becomes unconditional. Noncurrent contract assets are included within other assets in the accompanying balance sheet.

Contract liabilities include billings in excess of revenues recognized, such as those resulting from customer advances and deposits and unearned revenues on service contracts. Contract liabilities are classified as current or noncurrent based on the periods over which remaining performance obligations are expected to be transferred to customers. Noncurrent contract liabilities are included within other long-term liabilities in the accompanying balance sheet. Contract assets and liabilities are presented on a net basis in the consolidated balance sheet if they arise from different performance obligations in the same contract. Contract asset and liability balances are as follows:

(In millions)	December 31, 2020	December 31, 2019
Current Contract Assets, Net	$ 731	$ 603
Noncurrent Contract Assets, Net	11	17
Current Contract Liabilities	1,271	916
Noncurrent Contract Liabilities	763	594

Substantially all of the current contract liabilities balance at December 31, 2019 and 2018 was recognized in revenues during 2020 and 2019, respectively.

Warranty Obligations

The company provides for the estimated cost of standard product warranties, primarily from historical information, in cost of product revenues at the time product revenues are recognized. While the company engages in extensive product quality programs and processes, including actively monitoring and evaluating the quality of its component supplies, the company's warranty obligation is affected by product failure rates, utilization levels, material usage, service delivery costs incurred in correcting a product failure and supplier warranties on parts delivered to the company. Should actual product failure rates, utilization levels, material usage, service delivery costs or supplier warranties on parts differ from the company's estimates, revisions to the estimated warranty liability would be required. The liability for warranties is included in other accrued expenses in the accompanying balance sheet. Extended warranty agreements are considered service contracts, which are discussed above. Costs of service contracts are recognized as incurred. The changes in the carrying amount of standard product warranty obligations are as follows:

(In millions)	Year Ended December 31, 2020	Year Ended December 31, 2019
Balance at Beginning of Year	$ 93	$ 92
Provision charged to expense	115	115
Usage	(108)	(112)
Adjustments to previously provided warranties, net	(3)	(2)
Currency translation	3	—
Balance at End of Year	$ 100	$ 93

Leases

Operating leases that have commenced are included in other assets, other accrued expenses and other long-term liabilities in the consolidated balance sheet. Classification of operating lease liabilities as either current or noncurrent is based on the expected timing of payments due under the company's obligations.

Right-of-use (ROU) assets represent the company's right to use an underlying asset for the lease term and lease liabilities represent the company's obligation to make lease payments arising from the lease. Operating lease ROU assets and liabilities are recognized at the lease commencement date based on the present value of lease payments over the lease term. Leases with an initial term of 12 months or less are not recorded on the consolidated balance sheet. The company recognizes lease expense for these leases on a straight-line basis over the lease term.

Because most of the company's leases do not provide an implicit rate, the company estimates incremental borrowing rates based on the information available at the commencement date in determining the present value of lease payments. The company uses the implicit rate when readily determinable. Lease terms include the effect of options to extend or terminate the lease when it is reasonably certain that the company will exercise that option. Operating lease expense is recognized on a straight-line basis over the lease term.

As a lessee, the company accounts for the lease and non-lease components as a single lease component.

Research and Development

The company conducts research and development activities to increase its depth of capabilities in technologies, software and services. Research and development costs include employee compensation and benefits, consultants, facilities related costs, material costs, depreciation and travel. Research and development costs are expensed as incurred.

Restructuring Costs

Accounting for the timing and amount of termination benefits provided by the company to employees is determined based on whether: (a) the company has a substantive plan to provide such benefits, (b) the company has a written employment contract with the affected employees that includes a provision for such benefits, (c) the termination benefits are due to the occurrence of an event specified in an existing plan or agreement, or (d) the termination benefits are a one-time benefit. In certain circumstances, employee termination benefits may meet more than one of the characteristics listed above and therefore, may have individual elements that are subject to different accounting models.

From time to time when executing a restructuring or exit plan, the company also incurs costs other than termination benefits, such as lease termination costs, that are not associated with or will not be incurred to generate revenues. These include costs that represent amounts under contractual obligations that exist prior to the restructuring plan communication date and will either continue after the restructuring plan is completed with no economic benefit or result in a penalty to cancel a contractual obligation. Such costs are recognized when incurred, which generally occurs at the contract termination or over the period from when a plan to abandon a leased facility is approved through the cease-use date but charges may continue over the remainder of the original contractual period.

Income Taxes

The company recognizes deferred income taxes based on the expected future tax consequences of differences between the financial statement basis and the tax basis of assets and liabilities, calculated using enacted tax rates in effect for the year in which the differences are expected to be reflected in the tax return.

The financial statements reflect expected future tax consequences of uncertain tax positions that the company has taken or expects to take on a tax return presuming the taxing authorities' full knowledge of the positions and all relevant facts, but without discounting for the time value of money.

Earnings per Share

Basic earnings per share has been computed by dividing net income by the weighted average number of shares outstanding during the year. Except where the result would be antidilutive to net income, diluted earnings per share has been computed using the treasury stock method for outstanding stock options and restricted units.

Cash and Cash Equivalents

Cash equivalents consists principally of money market funds, commercial paper and other marketable securities purchased with an original maturity of three months or less. These investments are carried at cost, which approximates market value.

Inventories

Inventories are valued at the lower of cost or net realizable value, cost being determined principally by the first-in, first-out (FIFO) method with certain of the company's businesses utilizing the last-in, first-out (LIFO) method. The company periodically reviews quantities of inventories on hand and compares these amounts to the expected use of each product or product line. In addition, the company has certain inventory that is subject to fluctuating market pricing. The company assesses the carrying value of this inventory based on a lower of cost or net realizable value analysis. The company records a charge to cost of sales for the amount required to reduce the carrying value of inventory to net realizable value. Costs associated with the procurement of inventories, such as inbound freight charges, purchasing and receiving costs, and internal transfer costs, are included in cost of revenues in the accompanying statement of income. The components of inventories are as follows:

(In millions)	December 31, 2020	December 31, 2019
Raw Materials	$ 1,305	$ 971
Work in Process	540	517
Finished Goods	2,184	1,882
Inventories	$ 4,029	$ 3,370

The value of inventories maintained using the LIFO method was $274 million and $268 million at December 31, 2020 and 2019, respectively, which was below estimated replacement cost by $49 million and $39 million, respectively. Reductions to cost of revenues as a result of the liquidation of LIFO inventories were nominal during the three years ended December 31, 2020.

Property, Plant and Equipment

Property, plant and equipment are recorded at cost. The costs of additions and improvements are capitalized, while maintenance and repairs are charged to expense as incurred. The company generally provides for depreciation and amortization using the straight-line method over the estimated useful lives of the property as follows: buildings and improvements, 25 to 40 years; machinery and equipment (including software), 3 to 10 years; and leasehold improvements, the shorter of the term of the lease or the life of the asset. When assets are retired or otherwise disposed of, the assets and related accumulated depreciation are eliminated from the accounts and the resulting gain or loss is reflected in the accompanying statement of income. Property, plant and equipment consists of the following:

(In millions)	December 31, 2020	December 31, 2019
Land	$ 410	$ 396
Buildings and Improvements	2,192	1,873
Machinery, Equipment and Leasehold Improvements	6,975	5,495
Property, Plant and Equipment, at Cost	9,577	7,764
Less: Accumulated Depreciation and Amortization	3,665	3,015
Property, Plant and Equipment, Net	$ 5,912	$ 4,749

Acquisition-related Intangible Assets

Acquisition-related intangible assets include the costs of acquired customer relationships, product technology, tradenames and other specifically identifiable intangible assets, and are being amortized using the straight-line method over their estimated useful lives, which range from 2 to 20 years. In addition, the company has tradenames and in-process research and development that have indefinite lives and which are not amortized. The company reviews intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets. Intangible assets with indefinite lives are reviewed for impairment annually or whenever events or changes in circumstances indicate they may be impaired. Acquisition-related intangible assets are as follows:

	Balance at December 31, 2020			Balance at December 31, 2019		
(In millions)	Gross	Accumulated Amortization	Net	Gross	Accumulated Amortization	Net
Definite Lived:						
Customer relationships	$ 16,593	$ (7,450)	$ 9,143	$ 16,906	$ (6,997)	$ 9,909
Product technology	5,523	(3,532)	1,991	5,544	(3,121)	2,423
Tradenames	1,213	(897)	316	1,300	(869)	431
Other	—	—	—	9	(9)	—
	23,329	(11,879)	11,450	23,759	(10,996)	12,763
Indefinite Lived:						
Tradenames	1,235	N/A	1,235	1,235	N/A	1,235
In-process research and development	—	N/A	—	16	N/A	16
	1,235	N/A	1,235	1,251	N/A	1,251
Acquisition-related Intangible Assets	$ 24,564	$ (11,879)	$ 12,685	$ 25,010	$ (10,996)	$ 14,014

The estimated future amortization expense of acquisition-related intangible assets with definite lives is as follows:

(In millions)	
2021	$ 1,591
2022	1,441
2023	1,365
2024	1,201
2025	1,101
2026 and Thereafter	4,751
Estimated Future Amortization Expense of Definite-lived Intangible Assets	$ 11,450

Other Assets

Other assets in the accompanying balance sheet include operating lease right-of-use assets, deferred tax assets, pension assets, cash surrender value of life insurance, insurance recovery receivables related to product liability matters, investments, certain intangible assets and other assets.

At December 31, 2020 and 2019, the company had $43 million and $52 million, respectively, of intangible assets not derived from acquisitions, net of accumulated amortization, which are being amortized using the straight-line method over their estimated useful lives, which range from 2 to 20 years.

Equity investments that do not have readily determinable fair values are measured at cost minus impairment, if any, plus or minus changes resulting from observable price changes in orderly transactions for the identical or similar investments of the same issuer. The company performs qualitative assessments to identify impairments of these investments. At December 31, 2020 and 2019, the company had such investments with carrying amounts of $28 million and $34 million, respectively, which are included in other assets.

Goodwill

The company assesses goodwill for impairment at the reporting unit level annually and whenever events occur or circumstances change that would more likely than not reduce the fair value of a reporting unit below its carrying amount. Such events or circumstances generally include the occurrence of operating losses or a significant decline in earnings associated with one or more of the company's reporting units. The company is permitted to first assess qualitative factors to determine whether the quantitative goodwill impairment test is necessary. If the qualitative assessment results in a determination that the fair value of a reporting unit is more likely than not less than its carrying amount, the company performs a quantitative goodwill impairment test. The company may bypass the qualitative assessment for the reporting unit in any period and proceed directly to the goodwill impairment test. The company estimates the fair value of its reporting units by using forecasts of discounted future cash flows and peer market multiples. The company would record an impairment charge based on the excess of a reporting unit's carrying amount over its fair value (limited to the amount of goodwill). The company determined that no impairments existed in 2020, 2019 or 2018.

The changes in the carrying amount of goodwill by segment are as follows:

(In millions)	Life Sciences Solutions	Analytical Instruments	Specialty Diagnostics	Laboratory Products and Services	Total
Balance at December 31, 2018	$ 8,548	$ 4,950	$ 3,735	$ 8,114	$ 25,347
Acquisitions	—	9	—	938	947
Finalization of purchase price allocations for 2018 acquisitions	(2)	—	—	—	(2)
Sale of a business	—	—	(478)	—	(478)
Currency translation	(3)	(38)	(72)	11	(102)
Other	1	7	(1)	(5)	2
Balance at December 31, 2019	8,544	4,928	3,184	9,058	25,714
Acquisition	35	—	—	—	35
Currency translation	11	151	186	(56)	292
Balance at December 31, 2020	$ 8,590	$ 5,079	$ 3,370	$ 9,002	$ 26,041

Loss Contingencies

Accruals are recorded for various contingencies, including legal proceedings, environmental, workers' compensation, product, general and auto liabilities, self-insurance and other claims that arise in the normal course of business. The accruals are based on management's judgment, historical claims experience, the probability of losses and, where applicable, the consideration of opinions of internal and/or external legal counsel and actuarial estimates. Additionally, the company records receivables from third-party insurers up to the amount of the loss when recovery has been determined to be probable. Liabilities acquired in acquisitions have been recorded at fair value and, as such, were discounted to present value at the dates of acquisition.

Currency Translation

All assets and liabilities of the company's subsidiaries operating in non-U.S. dollar currencies are translated at period-end exchange rates. Resulting translation adjustments are reflected in the "accumulated other comprehensive items" component of shareholders' equity. Revenues and expenses are translated at average exchange rates for the period. Currency transaction gains are included in the accompanying statement of income and in aggregate were $24 million, $52 million and $19 million in 2020, 2019 and 2018, respectively.

Derivative Contracts

The company is exposed to certain risks relating to its ongoing business operations including changes to interest rates and currency exchange rates. The company uses derivative instruments primarily to manage currency exchange and interest rate risks. The company recognizes derivative instruments as either assets or liabilities and measures those instruments at fair value. If a derivative is a hedge, depending on the nature of the hedge, changes in the fair value of the derivative are either offset against the change in fair value of the hedged item through earnings or recognized in other comprehensive items until the hedged item is recognized in earnings. Derivatives that are not designated as hedges are recorded at fair value through earnings.

The company uses short-term forward and option currency exchange contracts primarily to hedge certain balance sheet and operational exposures resulting from changes in currency exchange rates, predominantly intercompany loans and cash balances that are denominated in currencies other than the functional currencies of the respective operations. The currency-exchange contracts principally hedge transactions denominated in Swiss franc, euro, British pounds sterling, Canadian dollars, Hong Kong dollars, Japanese yen and Czech koruna. The company does not hold or engage in transactions involving derivative instruments for purposes other than risk management.

Cash flow hedges. For derivative instruments that are designated and qualify as a cash flow hedge, the gain or loss on the derivative is reported as a component of other comprehensive items and reclassified into earnings in the same period or periods during which the hedged transaction affects earnings and is presented in the same income statement line item as the earnings effect of the hedged item.

Fair value hedges. For derivative instruments that are designated and qualify as a fair value hedge, the gain or loss on the derivative, as well as the offsetting loss or gain on the hedged item attributable to the hedged risk, are recognized in earnings.

Net investment hedges. The company uses foreign currency-denominated debt and cross-currency interest rate swaps to partially hedge its net investments in foreign operations against adverse movements in exchange rates. The majority of the company's euro-denominated senior notes and certain of its cross-currency interest rate swaps have been designated as, and are effective as, economic hedges of part of the net investment in a foreign operation. Accordingly, foreign currency transaction gains or losses due to spot rate fluctuations on the euro-denominated debt instruments and contract fair value changes on the cross-currency interest rate swaps, excluding interest accruals, are included in currency translation adjustment within other comprehensive items and shareholders' equity.

Use of Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period.

The company's estimates include, among others, asset reserve requirements as well as the amounts of future cash flows associated with certain assets and businesses that are used in assessing the risk of impairment. Risks and uncertainties associated with the ongoing COVID-19 global pandemic materially adversely affected certain of the company's businesses in 2020, particularly in the Analytical Instruments segment and, to a lesser extent, some businesses within the other three segments. The extent and duration of negative impacts continuing into 2021 are uncertain and may require changes to estimates. Actual results could differ from those estimates.

Recent Accounting Pronouncements

In January 2020, the FASB issued new guidance to clarify the interaction of the accounting for certain equity securities, equity method investments, and certain forward contracts and purchased options. Among other things, the new guidance clarifies that an entity should consider observable transactions that require it to either apply or discontinue the equity method of accounting for the purposes of applying measurement principles for certain equity securities immediately before applying or discontinuing the equity method. The company adopted this guidance in 2020 using a prospective method. The adoption of this guidance did not have a material impact on the company's consolidated financial statements.

In December 2019, the FASB issued new guidance to simplify the accounting for income taxes. Among other things, the new guidance requires the effects of enacted changes in tax laws or rates to be reflected in the annual effective tax rate computation in the interim period that includes the enactment date. The company expects to adopt this guidance when it is effective in 2021 using a prospective method. The adoption of this guidance is not expected to have a material impact on the company's consolidated financial statements; however, the impact in future periods will be dependent on the extent of future events or conditions that would be affected such as enacted changes in tax laws or rates.

In August 2018, the FASB issued new guidance to modify the disclosure requirements for employers that sponsor defined benefit pension or other postretirement plans. The company adopted the guidance in 2020 using a retrospective method. The adoption of this guidance did not have a material impact on the company's disclosures.

In August 2018, the FASB issued new guidance to modify the disclosure requirements on fair value measurements. The company adopted the guidance in 2020 with some items requiring a prospective method and others requiring a retrospective method. The adoption of this guidance did not have a material impact on the company's disclosures.

In February 2018, the FASB issued new guidance to allow reclassifications from accumulated other comprehensive items (AOCI) to retained earnings for certain tax effects on items within AOCI resulting from the Tax Cuts and Jobs Act of 2017 (the Tax Act). The company adopted this guidance in January 2018 and recorded the reclassifications in the period of adoption. The adoption of this guidance increased retained earnings and reduced accumulated other comprehensive items by $87 million and $89 million, respectively, on January 1, 2018. This guidance only relates to the effects of the Tax Act. For all other tax law changes that have occurred or may occur in the future, the company reclassifies the tax effects to the consolidated statement of income on an item-by-item basis when the pre-tax item in AOCI is reclassified to income.

In December 2017, the SEC staff issued guidance to address the application of accounting guidance in situations when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the Tax Act enacted on December 22, 2017. The company reported provisional amounts in its 2017 financial statements for certain income tax effects of the Tax Act for which a reasonable estimate could be determined. Adjustments to provisional amounts identified during the measurement period, which ended December 22, 2018, are included as adjustments to Provision for Income Taxes in 2018.

In August 2017, the FASB issued new guidance to simplify the application of hedge accounting guidance. Among other things, the new guidance will permit more hedging strategies to qualify for hedge accounting, allow for additional time to perform an initial assessment of a hedge’s effectiveness, and permit a qualitative effectiveness test for certain hedges after initial qualification. The company adopted this guidance in January 2018. The adoption of this guidance increased retained earnings by $3 million on January 1, 2018.

In October 2016, the FASB issued new guidance eliminating the deferral of the tax effects of intra-entity asset transfers. The impact of this guidance in future periods will be dependent on the extent of future asset transfers which usually occur in connection with planning around acquisitions and other business structuring activities. The adoption of this guidance reduced retained earnings by $20 million on January 1, 2018.

In June 2016, the FASB issued new guidance to require a financial asset measured at amortized cost basis, such as accounts receivable, to be presented at the net amount expected to be collected based on relevant information about past events, including historical experience, current conditions, and reasonable and supportable forecasts that affect the collectability of the reported amount. During 2018 and 2019, the FASB issued additional guidance and clarification. The company adopted the guidance in 2020 using a modified retrospective method. The adoption of this guidance reduced accounts receivable and retained earnings by $1 million on January 1, 2020.

In February 2016, the FASB issued new guidance which requires lessees to record most leases on their balance sheets as lease liabilities, initially measured at the present value of the future lease payments, with corresponding right-of-use assets. The new guidance also sets forth new disclosure requirements related to leases. During 2017 - 2019, the FASB issued additional guidance and clarification. The company adopted this guidance in January 2019. The company elected to adopt the guidance using a modified retrospective method, by applying the transition approach as of the beginning of the period of adoption. Comparative periods have not been restated. As permitted upon transition, the company did not reassess whether any expired or existing contracts were or contained embedded leases, the lease classification for any expired or existing leases, initial direct costs for any leases, or whether land easements met the definition of a lease if they were not accounted for as leases under the prior guidance. The adoption of this guidance increased retained earnings by $4 million on January 1, 2019.

In January 2016, the FASB issued new guidance which affects the accounting for equity investments, financial liabilities under the fair value option, and the presentation and disclosure requirements for financial instruments. This guidance requires equity investments to be measured at fair value with subsequent changes recognized in net income, except for those accounted for under the equity method or requiring consolidation. The guidance also changes the accounting for investments without a readily determinable fair value and that do not qualify for the practical expedient permitted by the guidance to estimate fair value. The adoption of this guidance reduced retained earnings and increased accumulated other comprehensive items by $1 million on January 1, 2018.

In May 2014, the FASB issued new revenue recognition guidance which provides a single comprehensive model for entities to use in accounting for revenues arising from contracts with customers and supersedes most previous revenue recognition guidance. The new standard also requires significantly expanded disclosures regarding the qualitative and quantitative information of an entity's nature, amount, timing, and uncertainty of revenues and cash flows arising from contracts with customers. During 2016 and 2017, the FASB issued additional guidance and clarification, including the elimination of certain SEC Staff Guidance. The guidance is effective for the company in 2018. The company elected to adopt this guidance through application of the modified retrospective method by applying it to contracts that were not completed as of December 31, 2017 (in addition to new contracts in 2018 and thereafter). The adoption of this guidance increased retained earnings by $49 million on January 1, 2018.

Note 2. Acquisitions and Dispositions

The company's acquisitions have historically been made at prices above the determined fair value of the acquired identifiable net assets, resulting in goodwill, primarily due to expectations of the synergies that will be realized by combining the businesses. These synergies include the elimination of redundant facilities, functions and staffing; use of the company's existing commercial infrastructure to expand sales of the acquired businesses' products; and use of the commercial infrastructure of the acquired businesses to cost-effectively expand sales of company products.

Acquisitions have been accounted for using the acquisition method of accounting, and the acquired companies' results have been included in the accompanying financial statements from their respective dates of acquisition. Acquisition transaction costs are recorded in selling, general and administrative expenses as incurred.

2020

In 2020, the company acquired, within the Life Sciences Solutions segment, a U.S.-based provider of a spectral dye platform for high-resolution biology applications which will extend the company's existing tools for protein and cell analysis applications, for a total purchase price of $63 million including the fair value of contingent consideration.

2019

On April 30, 2019, the company acquired, within the Laboratory Products and Services segment, Brammer Bio for approximately $1.67 billion in cash. Brammer Bio is a leading viral vector contract development and manufacturing organization for gene and cell therapies. The acquisition expanded the segment's contract manufacturing capabilities. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $938 million was allocated to goodwill, $405 million of which is tax deductible.

In addition, in 2019 the company acquired, within the Analytical Instruments segment, a Slovakia-based provider of mass spectrometry software used for identification of compounds, and, within the Laboratory Products and Services segment, an active pharmaceutical ingredient manufacturing facility in Cork, Ireland, for an aggregate purchase price of $169 million.

The components of the purchase price and net assets acquired for 2019 acquisitions are as follows:

(In millions)	Brammer Bio	Other	Total
Purchase Price			
Cash paid	$ 1,710	$ 169	$ 1,879
Cash acquired	(36)	—	(36)
	$ 1,674	$ 169	$ 1,843
Net Assets Acquired			
Current assets	$ 52	$ 58	$ 110
Property, plant and equipment	147	102	249
Definite-lived intangible assets:			
Customer relationships	744	—	744
Product technology	65	7	72
Tradenames	7	—	7
Goodwill	938	9	947
Other assets	49	—	49
Contract liabilities	(110)	—	(110)
Deferred tax liabilities	(110)	(6)	(116)
Other liabilities assumed	(108)	(1)	(109)
	$ 1,674	$ 169	$ 1,843

The weighted-average amortization periods for definite-lived intangible assets acquired in 2019 are 14 years for customer relationships, 13 years for product technology and 2 years for tradenames. The weighted average amortization period for all definite-lived intangible assets acquired in 2019 is 14 years.

2018

On October 25, 2018, the company acquired, within the Life Sciences Solutions segment, Becton Dickinson and Company's Advanced Bioprocessing business for $477 million in cash. This North America-based business adds complementary cell culture products that expanded the segment's bioproduction offerings to help customers increase yield during production of biologic drugs. The purchase price exceeded the fair value of the identifiable net assets and, accordingly, $146 million was allocated to goodwill, all of which is tax deductible.

In 2018, the company acquired, within the Life Sciences Solutions segment, a North America-based provider of a rapid DNA platform for use in forensics and law enforcement applications, for an aggregate purchase price of $65 million.

The components of the purchase price and net assets acquired for 2018 acquisitions are as follows:

(In millions)	Advanced Bioprocessing business	Other	Total
Purchase Price			
Cash paid	$ 477	$ 55	$ 532
Fair value of contingent consideration	—	11	11
Cash acquired	—	(1)	(1)
	$ 477	$ 65	$ 542
Net Assets Acquired			
Current assets	$ 53	$ 4	$ 57
Property, plant and equipment	42	—	42
Definite-lived intangible assets:			
Customer relationships	108	—	108
Product technology	132	31	163
Tradenames	8	—	8
Indefinite-lived intangible assets:			
In-process research and development	—	10	10
Goodwill	146	15	161
Other assets	—	14	14
Deferred tax liabilities	(7)	—	(7)
Other liabilities assumed	(5)	(9)	(14)
	$ 477	$ 65	$ 542

The weighted-average amortization periods for definite-lived intangible assets acquired in 2018 are 14 years for customer relationships, 13 years for product technology and 6 years for tradenames. The weighted average amortization period for all definite-lived intangible assets acquired in 2018 is 13 years.

Disposition

On June 28, 2019, the company sold its Anatomical Pathology business to PHC Holdings Corporation for $1.13 billion, net of cash divested. The business was part of the Specialty Diagnostics segment. The sale of this business resulted in a pre-tax gain of approximately $478 million, included in restructuring and other (income) costs, net. Revenues in 2019, through the date of sale, and the full year 2018 of the business sold were approximately $115 million and $238 million, respectively, net of retained sales through the company's healthcare market and research and safety market channel businesses.

Note 3. Revenues

Disaggregated Revenues

Revenues by type are as follows:

(In millions)	2020	2019	2018
Revenues			
Consumables	$ 18,527	$ 13,109	$ 12,576
Instruments	6,779	6,387	6,292
Services	6,912	6,046	5,490
Consolidated revenues	$ 32,218	$ 25,542	$ 24,358

Revenues by geographic region based on customer location are as follows:

(In millions)	2020	2019	2018
Revenues			
North America	$ 17,081	$ 12,896	$ 12,143
Europe	8,284	6,358	6,215
Asia-Pacific	5,822	5,524	5,250
Other regions	1,031	764	750
Consolidated revenues	$ 32,218	$ 25,542	$ 24,358

Each reportable segment earns revenues from consumables, instruments and services in North America, Europe, Asia-Pacific and other regions. See Note 4 for revenues by reportable segment and other geographic data.

Remaining Performance Obligations

The aggregate amount of the transaction price allocated to the remaining performance obligations for all open customer contracts as of December 31, 2020 was $12.81 billion. The company will recognize revenues for these performance obligations as they are satisfied, approximately 74% of which is expected to occur within the next twelve months.

Note 4. Business Segment and Geographical Information

The company's financial performance is reported in four segments. A description of each segment follows.

Life Sciences Solutions: provides an extensive portfolio of reagents, instruments and consumables used in biological and medical research, discovery and production of new drugs and vaccines as well as diagnosis of disease (including COVID-19 through its polymerase chain reaction (PCR) testing and sample preparation capabilities). These products and services are used by customers in pharmaceutical, biotechnology, agricultural, clinical, academic, and government markets.

Analytical Instruments: provides a broad offering of instruments, consumables, software and services that are used for a range of applications in the laboratory, on the production line and in the field. These products and services are used by customers in pharmaceutical, biotechnology, academic, government, environmental and other research and industrial markets, as well as the clinical laboratory.

Specialty Diagnostics: provides a wide range of diagnostic test kits, reagents, culture media, instruments and associated products used to increase the speed and accuracy of diagnoses. These products are used by customers in healthcare, clinical, pharmaceutical, industrial and food safety laboratories.

Laboratory Products and Services: provides virtually everything needed for the laboratory, including a combination of self-manufactured and sourced products for customers in research, academic, government, industrial and healthcare settings. The segment also includes a comprehensive offering of outsourced services used by the pharmaceutical and biotech industries for drug development, clinical trials logistics and commercial drug manufacturing.

The company's management evaluates segment operating performance based on operating income before certain charges/credits to cost of revenues and selling, general and administrative expenses, principally associated with acquisition accounting; restructuring and other costs/income including costs arising from facility consolidations such as severance and abandoned lease

expense and gains and losses from the sale of real estate and product lines as well as from significant litigation-related matters; and amortization of acquisition-related intangible assets. The company uses this measure because it helps management understand and evaluate the segments' core operating results and facilitates comparison of performance for determining compensation.

Business Segment Information

(In millions)	2020	2019	2018
Revenues			
Life Sciences Solutions	$ 12,168	$ 6,856	$ 6,269
Analytical Instruments	5,124	5,522	5,469
Specialty Diagnostics	5,343	3,718	3,724
Laboratory Products and Services	12,245	10,599	10,035
Eliminations	(2,662)	(1,153)	(1,139)
Consolidated revenues	32,218	25,542	24,358
Segment Income			
Life Sciences Solutions	6,109	2,446	2,158
Analytical Instruments	808	1,273	1,247
Specialty Diagnostics	1,368	930	952
Laboratory Products and Services	1,271	1,324	1,258
Subtotal reportable segments	9,556	5,973	5,615
Cost of revenues charges, net	(6)	(17)	(12)
Selling, general and administrative credits (charges), net	10	(62)	(29)
Restructuring and other (costs) income, net	(99)	413	(50)
Amortization of acquisition-related intangible assets	(1,667)	(1,713)	(1,741)
Consolidated operating income	7,794	4,594	3,783
Interest income	65	224	137
Interest expense	(553)	(676)	(667)
Other (expense) income, net	(81)	(72)	9
Income Before Income Taxes	$ 7,225	$ 4,070	$ 3,262
Depreciation			
Life Sciences Solutions	$ 140	$ 130	$ 119
Analytical Instruments	76	75	73
Specialty Diagnostics	100	67	76
Laboratory Products and Services	342	292	258
Consolidated depreciation	$ 658	$ 564	$ 526

(In millions)	2020	2019	2018
Total Assets			
Life Sciences Solutions	$ 20,209	$ 18,306	$ 18,774
Analytical Instruments	9,773	9,896	9,907
Specialty Diagnostics	6,534	5,867	6,663
Laboratory Products and Services	22,711	21,761	19,051
Corporate/Other (a)	9,825	2,551	1,837
Consolidated total assets	$ 69,052	$ 58,381	$ 56,232
Capital Expenditures			
Life Sciences Solutions	$ 392	$ 151	$ 107
Analytical Instruments	74	64	85
Specialty Diagnostics	175	83	103
Laboratory Products and Services	772	554	374
Corporate/Other	61	74	89
Consolidated capital expenditures	$ 1,474	$ 926	$ 758

(a) Corporate assets consist primarily of cash and cash equivalents and property and equipment at the company's corporate offices.

Geographical Information

(In millions)	2020	2019	2018
Revenues (b)			
United States	$ 16,435	$ 12,366	$ 11,629
China	2,797	2,752	2,504
Other	12,986	10,424	10,225
Consolidated revenues	$ 32,218	$ 25,542	$ 24,358
Long-lived Assets (c)			
United States	$ 3,686	$ 3,099	$ 2,444
Other	3,001	2,349	1,721
Consolidated long-lived assets	$ 6,687	$ 5,448	$ 4,165

(b) Revenues are attributed to countries based on customer location.
(c) Includes property, plant and equipment, net, and beginning in 2019, operating lease ROU assets.

Note 5. Other Expense/Income, Net

In all periods, other expense/income, net includes currency transaction gains and losses on monetary assets and liabilities and net periodic pension benefit cost/income, excluding the service cost component which is included in operating expenses on the accompanying statement of income. In 2020, other expense, net includes $81 million of financing costs for a terminated acquisition, primarily for loan commitment fees and entering into hedging contracts, offset in part by $10 million of net gains on investments. The company had a cash outlay of $51 million in 2020 associated with obtaining the loan commitments included in other financing activities, net, in the accompanying statement of cash flows.

In 2019, other expense, net includes $184 million of losses on the early extinguishment of debt (Note 10), offset in part by $44 million of net gains on investments. The investment gains include a $28 million gain on the sale of a joint venture for net proceeds of $42 million.

In 2018, other expense, net includes $15 million of net losses on investments.

Note 6. Stock-based Compensation Expense

The company has stock-based compensation plans for its key employees, directors and others. These plans permit the grant of a variety of stock and stock-based awards, including restricted stock units, stock options or performance-based shares, as determined by the compensation committee of the company's Board of Directors or, for certain non-officer grants, by the company's employee equity committee, which consists of its chief executive officer. The company generally issues new shares of its common stock to satisfy option exercises and restricted unit vesting. Grants of stock options and restricted units generally provide that in the event of both a change in control of the company and a qualifying termination of an option or unit holder's employment, all options and service-based restricted unit awards held by the recipient become immediately vested (unless an employment or other agreement with the employee provides for different treatment).

Compensation cost is based on the grant-date fair value and is recognized ratably over the requisite vesting period or to the date based on qualifying retirement eligibility, if earlier, and is primarily included in selling, general and administrative expenses.

Stock Options

The company's practice is to grant stock options at fair market value. Options vest over 3-5 years with terms of 7-10 years, assuming continued employment with certain exceptions. Vesting of the option awards is contingent upon meeting certain service conditions. The fair value of most option grants is estimated using the Black-Scholes option pricing model. For option grants that require the achievement of both service and market conditions, a lattice model is used to estimate fair value. The fair value is then amortized on a straight-line basis over the requisite service periods of the awards, which is generally the vesting period. Use of a valuation model requires management to make certain assumptions with respect to selected model inputs. Expected volatility was calculated based on the historical volatility of the company's stock. Historical data on exercise patterns is the basis for estimating the expected life of an option. The risk-free interest rate is based on U.S. Treasury zero-coupon issues with a remaining term which approximates the expected life assumed at the date of grant. The expected annual dividend rate was calculated by dividing the company's annual dividend, based on the most recent quarterly dividend rate, by the closing stock price on the grant date. The compensation expense recognized for all stock-based awards is net of estimated forfeitures. Forfeitures are estimated based on an analysis of actual option forfeitures.

The weighted average assumptions used in the Black-Scholes option pricing model are as follows:

	2020	2019	2018
Expected Stock Price Volatility	22 %	21 %	20 %
Risk Free Interest Rate	1.1 %	2.4 %	2.6 %
Expected Life of Options (years)	4.3	4.3	4.3
Expected Annual Dividend	0.3 %	0.3 %	0.3 %

The weighted average per share grant-date fair values of options granted during 2020, 2019 and 2018 were $61.19, $53.37 and $43.45, respectively. The total intrinsic value of options exercised during the same periods was $457 million, $320 million and $312 million, respectively. The intrinsic value is the difference between the market value of the shares on the exercise date and the exercise price of the option.

A summary of the company's option activity for the year ended December 31, 2020 is presented below:

	Shares (in millions)	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value (a) (in millions)
Outstanding at December 31, 2019	6.9	$ 176.26		
Granted	1.2	343.18		
Exercised	(2.0)	140.99		
Canceled/Expired	(0.2)	227.67		
Outstanding at December 31, 2020	5.9	$ 221.22	4.3	
Vested and Unvested Expected to Vest at December 31, 2020	5.7	$ 217.96	4.2	$ 1,410
Exercisable at December 31, 2020	2.5	$ 165.71	3.2	$ 741

As of December 31, 2020, there was $107 million of total unrecognized compensation cost related to unvested stock options granted. The cost is expected to be recognized through 2024 with a weighted average amortization period of 2.5 years.

Restricted Share/Unit Awards

Awards of restricted units convert into an equivalent number of shares of common stock. The awards generally vest over 3-4 years, assuming continued employment, with some exceptions. Vesting of the awards is contingent upon meeting certain service conditions and may also be contingent upon meeting certain performance and/or market conditions. The fair market value of the award at the time of the grant is amortized to expense over the requisite service period of the award, which is generally the vesting period. Recipients of restricted units have no voting rights but are entitled to accrue dividend equivalents. The fair value of service- and performance-based restricted unit awards is determined based on the number of units granted and the market value of the company's shares on the grant date. For awards with market-based vesting conditions, the company uses a lattice model to estimate the grant-date fair value of the award.

A summary of the company's restricted unit activity for the year ended December 31, 2020 is presented below:

	Units (in millions)	Weighted Average Grant-Date Fair Value
Unvested at December 31, 2019	1.0	$ 218.34
Granted	0.5	316.10
Vested	(0.6)	215.35
Forfeited	(0.1)	241.26
Unvested at December 31, 2020	0.8	$ 276.74

The total fair value of shares vested during 2020, 2019 and 2018 was $126 million, $118 million and $114 million, respectively.

As of December 31, 2020, there was $151 million of total unrecognized compensation cost related to unvested restricted stock unit awards. The cost is expected to be recognized through 2024 with a weighted average amortization period of 2.0 years.

Employee Stock Purchase Plans

Qualifying employees are eligible to participate in an employee stock purchase plan sponsored by the company. Shares may be purchased under the program at 95% of the fair market value at the end of the purchase period and the shares purchased are not subject to a holding period. Shares are purchased through payroll deductions of up to 10% of each participating employee's qualifying gross wages. The company issued 0.1 million, 0.2 million and 0.1 million shares, respectively, of its common stock in 2020, 2019 and 2018 under the employee stock purchase plan.

Note 7. Pension and Other Postretirement Benefit Plans

401(k) Savings Plan and Other Defined Contribution Plans

The company's 401(k) savings and other defined contribution plans cover the majority of the company's eligible U.S. and certain non-U.S. employees. Contributions to the plans are made by both the employee and the company. Company contributions are based on the level of employee contributions. Company contributions to these plans are based on formulas determined by the company. In 2020, 2019 and 2018, the company charged to expense $254 million, $232 million and $204 million, respectively, related to its defined contribution plans.

Defined Benefit Pension Plans

Employees of a number of the company's non-U.S. and certain U.S. subsidiaries participate in defined benefit pension plans covering substantially all full-time employees at those subsidiaries. Some of the plans are unfunded, as permitted under the plans and applicable laws. The company also maintains postretirement healthcare programs at several acquired businesses where certain employees are eligible to participate. The costs of the postretirement healthcare programs are generally funded on a self-insured and insured-premium basis.

The company recognizes the funded status of defined benefit pension and other postretirement benefit plans as an asset or liability. This amount is defined as the difference between the fair value of plan assets and the benefit obligation. The company is required to recognize as a component of other comprehensive items, net of tax, the actuarial gains/losses and prior service costs/credits that arise but were not previously required to be recognized as components of net periodic benefit cost. Other comprehensive items is adjusted as these amounts are later recognized in income as components of net periodic benefit cost.

When a company with a pension plan is acquired, any excess of projected benefit obligation over the plan assets is recognized as a liability and any excess of plan assets over the projected benefit obligation is recognized as an asset. The recognition of a new liability or a new asset results in the elimination of (a) previously existing unrecognized net gain or loss and (b) unrecognized prior service cost or credits.

The company funds annually, at a minimum, the statutorily required minimum amount as actuarially determined. During 2020, 2019 and 2018, the company made cash contributions of approximately $96 million, $50 million and $93 million, respectively. Contributions to the plans included in the following table are estimated at between $30 and $50 million for 2021.

The following table provides a reconciliation of benefit obligations and plan assets of the company's domestic and non-U.S. pension plans and postretirement benefit plans:

(In millions)	Domestic Pension Benefits		Non-U.S. Pension Benefits		Postretirement Benefits	
	2020	2019	2020	2019	2020	2019
Change in Projected Benefit Obligations						
Benefit Obligation at Beginning of Year	$ 1,302	$ 1,179	$ 1,303	$ 1,193	$ 55	$ 50
Divestiture	—	—	—	(23)	—	—
Service costs	—	—	24	23	1	1
Interest costs	35	45	18	24	1	2
Settlements	—	—	(38)	(34)	—	—
Plan participants' contributions	—	—	5	5	—	—
Actuarial (gains) losses	44	156	119	136	(2)	3
Benefits paid	(79)	(78)	(26)	(27)	(2)	(2)
Currency translation and other	—	—	81	6	1	1
Benefit Obligation at End of Year	$ 1,302	$ 1,302	$ 1,486	$ 1,303	$ 54	$ 55
Change in Fair Value of Plan Assets						
Fair Value of Plan Assets at Beginning of Year	$ 1,201	$ 1,091	$ 986	$ 932	$ 10	$ 8
Divestiture	—	—	—	(15)	—	—
Actual return on plan assets	138	183	92	60	2	2
Employer contribution	7	5	87	43	2	2
Settlements	—	—	(38)	(34)	—	—
Plan participants' contributions	—	—	5	5	—	—
Benefits paid	(79)	(78)	(26)	(27)	(2)	(2)
Currency translation and other	—	—	54	22	—	—
Fair Value of Plan Assets at End of Year	$ 1,267	$ 1,201	$ 1,160	$ 986	$ 12	$ 10
Funded Status	$ (35)	$ (101)	$ (326)	$ (317)	$ (42)	$ (45)
Accumulated Benefit Obligation	$ 1,302	$ 1,302	$ 1,417	$ 1,238		
Amounts Recognized in Balance Sheet						
Noncurrent assets	$ 38	$ —	$ 157	$ 97	$ 11	$ 9
Current liability	(8)	(6)	(9)	(8)	(3)	(3)
Noncurrent liabilities	(65)	(95)	(474)	(406)	(50)	(51)
Net amount recognized	$ (35)	$ (101)	$ (326)	$ (317)	$ (42)	$ (45)
Amounts Recognized in Accumulated Other Comprehensive Items						
Net actuarial loss	$ 142	$ 195	$ 242	$ 200	$ 1	$ 5
Prior service credits	—	—	(2)	(3)	(4)	(5)
Net amount recognized	$ 142	$ 195	$ 240	$ 197	$ (3)	$ —

For both domestic and non-U.S. pension plans, actuarial losses experienced in 2020 and 2019 were principally driven by decreases in the weighted average discount rates that were used to determine the projected benefit obligation. For domestic pension plans, the 2020 actuarial losses were partially offset by gains recognized due to the adoption of an updated mortality assumption.

The actuarial assumptions used to compute the funded status for the plans are based upon information available as of December 31, 2020 and 2019 and are as follows:

	Domestic Pension Benefits		Non-U.S. Pension Benefits		Postretirement Benefits	
	2020	2019	2020	2019	2020	2019
Weighted Average Assumptions Used to Determine Projected Benefit Obligations						
Discount rate for determining benefit obligation	2.33 %	3.12 %	0.95 %	1.60 %	2.20 %	2.86 %
Interest crediting rate for cash balance plans	2.16 %	3.02 %	1.25 %	1.00 %	N/A	N/A
Average rate of increase in employee compensation	N/A	N/A	2.30 %	2.27 %	N/A	N/A
Initial healthcare cost trend rate					5.78 %	5.98 %
Ultimate healthcare cost trend rate					4.39 %	4.48 %

The ultimate healthcare cost trend rates for the postretirement benefit plans are expected to be reached between 2021 and 2040.

The actuarial assumptions used to compute the net periodic pension benefit cost (income) are based upon information available as of the beginning of the year, as presented in the following table:

	Domestic Pension Benefits			Non-U.S. Pension Benefits		
	2020	2019	2018	2020	2019	2018
Weighted Average Assumptions Used to Determine Net Benefit Cost (Income)						
Discount rate - service cost	N/A	N/A	N/A	1.21 %	1.97 %	1.63 %
Discount rate - interest cost	3.13 %	4.22 %	3.54 %	1.44 %	2.06 %	1.84 %
Average rate of increase in employee compensation	N/A	N/A	N/A	2.27 %	2.47 %	2.59 %
Expected long-term rate of return on assets	5.00 %	5.76 %	5.75 %	2.33 %	3.25 %	3.31 %

The discount rate reflects the rate the company would have to pay to purchase high-quality investments that would provide cash sufficient to settle its current pension obligations. The discount rate is determined based on a range of factors, including the rates of return on high-quality, fixed-income corporate bonds and the related expected duration of the obligations or, in certain instances, the company has used a hypothetical portfolio of high quality instruments with maturities that mirror the benefit obligation in order to accurately estimate the discount rate relevant to a particular plan.

The company utilizes a full yield curve approach in the estimation of these components by applying the specific spot-rates along the yield curve used in the determination of the benefit obligation to the relevant projected cash flows.

The expected long-term rate of return on plan assets reflects the average rate of earnings expected on the funds invested, or to be invested, to provide for the benefits included in the projected benefit obligations. In determining the expected long-term rate of return on plan assets, the company considers the relative weighting of plan assets, the historical performance of total plan assets and individual asset classes and economic and other indicators of future performance. In addition, the company may consult with and consider the opinions of financial and other professionals in developing appropriate return benchmarks.

Asset management objectives include maintaining an adequate level of diversification to reduce interest rate and market risk and providing adequate liquidity to meet immediate and future benefit payment requirements.

The expected rate of compensation increase reflects the long-term average rate of salary increases and is based on historic salary increase experience and management’s expectations of future salary increases.

The projected benefit obligation and fair value of plan assets for the company's qualified and non-qualified pension plans with projected benefit obligations in excess of plan assets are as follows:

(In millions)	Pension Plans 2020	2019
Pension Plans with Projected Benefit Obligations in Excess of Plan Assets		
Projected benefit obligation	$ 2,047	$ 2,072
Fair value of plan assets	1,529	1,557

The accumulated benefit obligation and fair value of plan assets for the company's qualified and non-qualified pension plans with accumulated benefit obligations in excess of plan assets are as follows:

(In millions)	Pension Plans 2020	2019
Pension Plans with Accumulated Benefit Obligations in Excess of Plan Assets		
Accumulated benefit obligation	$ 1,976	$ 1,976
Fair value of plan assets	1,526	1,525

The measurement date used to determine benefit information is December 31 for all plan assets and benefit obligations.

The net periodic pension benefit cost (income) includes the following components:

(In millions)	Domestic Pension Benefits 2020	2019	2018	Non-U.S. Pension Benefits 2020	2019	2018
Components of Net Benefit Cost (Income)						
Service cost-benefits earned	$ —	$ —	$ —	$ 24	$ 23	$ 26
Interest cost on benefit obligation	35	45	41	18	24	23
Expected return on plan assets	(47)	(55)	(55)	(19)	(30)	(32)
Amortization of actuarial net loss	6	2	3	10	6	7
Amortization of prior service benefit	—	—	—	(1)	(1)	—
Settlement/curtailment loss	—	—	—	8	4	7
Net periodic benefit cost (income)	$ (6)	$ (8)	$ (11)	$ 40	$ 26	$ 31

The net periodic postretirement benefit cost was not material in 2020, 2019 and 2018.

Expected benefit payments are estimated using the same assumptions used in determining the company's benefit obligation at December 31, 2020. Benefit payments will depend on future employment and compensation levels, average years employed and average life spans, among other factors, and changes in any of these factors could significantly affect these estimated future benefit payments. Estimated future benefit payments during the next five years and in the aggregate for the five fiscal years thereafter, are as follows:

(In millions)	Domestic Pension Benefits	Non-U.S. Pension Benefits	Post-retirement Benefits
Expected Benefit Payments			
2021	$ 93	$ 37	$ 3
2022	88	40	3
2023	86	41	2
2024	85	45	2
2025	83	47	2
2026-2030	373	268	11

Domestic Pension Plan Assets

The company's overall objective is to manage the assets in a liability framework where investments are selected that are expected to have similar changes in fair value as the related liabilities will have upon changes in interest rates. The company invests in a portfolio of both return-seeking and liability-hedging assets, primarily through the use of institutional collective funds, to achieve long-term growth and to insulate the funded position from interest rate volatility. The strategic asset allocation uses a combination of risk controlled and index strategies in fixed income and global equities. The target allocations for the investments are approximately 10% to funds investing in U.S. equities, approximately 10% to funds investing in international equities and approximately 80% to funds investing in fixed income securities. The portfolio maintains enough liquidity at all times to meet the near-term benefit payments.

Non-U.S. Pension Plan Assets

The company maintains specific plan assets for many of the individual pension plans outside the U.S. The investment strategy of each plan has been uniquely established based on the country specific standards and characteristics of the plans. Several of the plans have contracts with insurance companies whereby the market risks of the benefit obligations are borne by the insurance companies. When assets are held directly in investments, generally the objective is to invest in a portfolio of diversified assets with a variety of fund managers. The investments may include equity funds, fixed income funds, hedge funds, multi-asset funds, alternative investments and derivative funds with the target asset allocations ranging from approximately 5% - 25% for equity funds, 40% - 90% for fixed income funds, 0% - 10% for hedge funds, 0% - 5% for multi-asset funds, 0% to 5% for alternative investments and 0% - 20% for funds holding derivatives. The derivatives held by the funds are primarily interest rate swaps intended to match the movements in the plan liabilities as well as equity futures in a synthetic equity fund which provide targeted exposure to equity markets without the fund holding individual equity positions. Each plan maintains enough liquidity at all times to meet the near-term benefit payments.

The fair values of the company's plan assets at December 31, 2020 and 2019, by asset category are as follows:

(In millions)	December 31, 2020	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Not Subject to Leveling (a)
Domestic Pension Plan Assets					
U.S. equity funds	$ 125	$ —	$ —	$ —	$ 125
International equity funds	126	—	—	—	126
Fixed income funds	1,001	—	—	—	1,001
Money market funds	15	—	—	—	15
Total Domestic Pension Plans	$ 1,267	$ —	$ —	$ —	$ 1,267
Non-U.S. Pension Plan Assets					
Equity funds	$ 74	$ —	$ —	$ —	$ 74
Fixed income funds	510	—	—	—	510
Hedge funds	59	—	—	—	59
Multi-asset funds	45	—	—	—	45
Derivative funds	149	—	—	—	149
Alternative investments	6	—	—	—	6
Insurance contracts	262	—	262	—	—
Cash / money market funds	55	7	—	—	48
Total Non-U.S. Pension Plans	$ 1,160	$ 7	$ 262	$ —	$ 891

(a) Investments measured at the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy.

(In millions)	December 31, 2019	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Not Subject to Leveling (a)
Domestic Pension Plan Assets					
U.S. equity funds	$ 122	$ —	$ —	$ —	$ 122
International equity funds	116	—	—	—	116
Fixed income funds	951	—	—	—	951
Money market funds	12	—	—	—	12
Total Domestic Pension Plans	$ 1,201	$ —	$ —	$ —	$ 1,201
Non-U.S. Pension Plan Assets					
Equity funds	$ 37	$ —	$ —	$ —	$ 37
Fixed income funds	430	—	—	—	430
Hedge funds	61	—	—	—	61
Multi-asset funds	76	—	—	—	76
Derivative funds	129	—	—	—	129
Alternative investments	4	—	—	—	4
Insurance contracts	237	—	237	—	—
Cash / money market funds	12	9	—	—	3
Total Non-U.S. Pension Plans	$ 986	$ 9	$ 237	$ —	$ 740

(a) Investments measured at the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy.

The tables above present the fair value of the company's plan assets in accordance with the fair value hierarchy (Note 14). Certain investments that are measured at fair value using the net asset value per share practical expedient have not been classified in the fair value hierarchy. The fair value amounts of these investments presented in the above tables are intended to permit reconciliation of the fair value hierarchy to the amounts presented for the total pension plan assets. These investments were also redeemable at the balance sheet date or within limited time restrictions.

Note 8. Income Taxes

The components of income before provision for income taxes are as follows:

(In millions)	2020	2019	2018
U.S.	$ 4,757	$ 2,278	$ 1,329
Non-U.S.	2,468	1,792	1,933
Income Before Income Taxes	$ 7,225	$ 4,070	$ 3,262

The components of the provision for income taxes are as follows:

(In millions)	2020	2019	2018
Current Income Tax Provision			
Federal	$ 521	$ 267	$ 165
Non-U.S.	423	544	574
State	175	62	59
	1,119	873	798
Deferred Income Tax Provision (Benefit)			
Federal	$ (237)	$ (222)	$ (258)
Non-U.S.	(18)	(252)	(187)
State	(14)	(25)	(29)
	(269)	(499)	(474)
Provision for Income Taxes	$ 850	$ 374	$ 324

The provision for income taxes in the accompanying statement of income differs from the provision calculated by applying the statutory federal income tax rate to income before income taxes due to the following:

(In millions)	2020	2019	2018
Statutory Federal Income Tax Rate	21 %	21 %	21 %
Provision for Income Taxes at Statutory Rate	$ 1,517	$ 855	$ 685
Increases (Decreases) Resulting From:			
Foreign rate differential	(223)	(204)	(375)
Income tax credits	(335)	(213)	(211)
Global intangible low-taxed income	86	92	29
Foreign-derived intangible income	(156)	(111)	(47)
Excess tax benefits from stock options and restricted stock units	(114)	(80)	(77)
Provision for (reversal of) tax reserves, net	(26)	62	(49)
Intra-entity transfers	—	(79)	—
Foreign exchange loss on inter-company debt refinancing	(47)	(62)	—
Domestication transaction	(263)	—	—
Valuation allowance	379	(4)	260
Transition tax and other impacts of U.S. tax reform	—	8	117
Withholding taxes	115	38	31
Basis difference on disposal of business	—	73	—
Tax return reassessments and settlements	(196)	(6)	(26)
State income taxes, net of federal tax	147	22	21
Other, net	(34)	(17)	(34)
Provision for Income Taxes	$ 850	$ 374	$ 324

The company has operations and a taxable presence in approximately 50 countries outside the U.S. The company's effective income tax rate differs from the U.S. federal statutory rate each year due to certain operations that are subject to tax incentives, state and local taxes, and foreign taxes that are different than the U.S. federal statutory rate.

During 2020, the company settled an IRS audit relating to the 2014, 2015, and 2016 tax years. The company recorded a $25 million net tax benefit primarily from this settlement and related impacts, which resulted in a decrease in the company’s unrecognized tax benefits of $378 million, of which $144 million was reclassified to income taxes payable. The company recorded $53 million of charges for expired tax credits and other related components of the settlement. The company recorded a

charge of $156 million to establish a valuation allowance against certain U.S. foreign tax credits which the company believes will more likely than not expire unutilized.

U.S. Tax Cuts and Jobs Act of 2017

On December 22, 2017, the Tax Cuts and Jobs Act of 2017 was enacted. The Tax Act includes significant changes to existing U.S. tax laws that affect the company, including a reduction of the U.S. corporate income tax rate beginning in 2018 and creation of a territorial tax system with a one-time transition tax on deemed repatriated earnings and profits of foreign subsidiaries (transition tax). The company recognized a net charge for certain aspects of the Tax Act in its 2017 financial statements for which the accounting was provisional, but a reasonable estimate could be determined. During 2018, the company completed its accounting for the income tax effects of the Tax Act and recognized net adjustments (detailed below) to the provisional amounts, totaling a net charge of $68 million, as a component of income tax expense.

The transition tax is based on the company's total post-1986 earnings and profits, the tax on which was previously deferred from U.S. income taxes under U.S. law. The company recorded a provisional amount for the transition tax liability for each of the foreign subsidiaries at December 31, 2017. After further analysis of new U.S. Treasury guidance, available tax accounting methods and elections, legislative updates, regulations, earnings and profits computations and foreign taxes, the company finalized the calculations of the transition tax liability during 2018. The increase in the liability for the transition tax in 2018 consisted of an incremental provision of $117 million offset in part by a $49 million reduction of related unrecognized tax benefits established in 2017.

During 2019, the company recorded a net tax provision of $1 million to adjust the impacts of U.S. tax reform based on final regulations issued by the U.S. Treasury in 2019. The income tax provision consists of an incremental charge of $8 million offset by a $7 million reduction of related unrecognized tax benefits.

The Tax Act included a provision for global intangible low-taxed income. The company has adopted a policy to account for this provision as a period cost.

Other Tax Impacts

In 2020, the company recorded a $263 million income tax benefit related to a domestication transaction involving the transfer of certain non-U.S. subsidiaries to the U.S., including interest expense of those subsidiaries. The company also recorded a valuation allowance of $212 million against the amount of interest expense that the company believes will more likely than not go unused. Also in 2020, the company recorded a $47 million income tax benefit, including both U.S. federal and state taxes, related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements.

In 2019, the company recorded a $62 million income tax benefit, including both U.S. federal and state taxes, related to a foreign exchange loss for tax purposes on certain intercompany financing arrangements as well as a tax provision of $191 million related to the gain on the sale of the Anatomical Pathology business. Also in 2019, the company recorded a $79 million benefit related to the deferred tax implications of intra-entity transactions which included a tax benefit to release a valuation allowance against net operating losses previously determined to be unrealizable.

In 2018, the provision for income taxes also included a $71 million charge to establish a valuation allowance against net operating losses that will not be utilized as a result of the 2019 sale of the Anatomical Pathology business (Note 2).

The foreign tax credits discussed below are the result of foreign earnings and profits remitted or deemed remitted to the U.S. during the reporting year and the U.S. treatment of taxes paid in the foreign jurisdictions in the years those profits were originally earned.

In 2020, the company implemented foreign tax credit planning in Sweden which resulted in $96 million of foreign tax credits, with no related incremental U.S. income tax expense.

In 2019, the company implemented foreign tax credit planning in Sweden which resulted in $75 million of foreign tax credits, with no related incremental U.S. income tax expense.

The company generally receives a tax deduction upon the exercise of non-qualified stock options by employees, or the vesting of restricted stock units held by employees, for the difference between the exercise price and the market price of the underlying common stock on the date of exercise. The company uses the incremental tax benefit approach for utilization of tax attributes. These excess tax benefits reduce the tax provision. In 2020, 2019 and 2018, the company's tax provision was reduced by $114 million, $80 million and $77 million, respectively, of such benefits.

Net deferred tax asset (liability) in the accompanying balance sheet consists of the following:

(In millions)	2020	2019
Deferred Tax Asset (Liability)		
Depreciation and amortization	$ (2,962)	$ (3,084)
Net operating loss and credit carryforwards	1,668	1,231
Reserves and accruals	164	144
Accrued compensation	253	261
Inventory basis difference	112	99
Deferred interest	227	18
Other capitalized costs	44	53
Unrealized losses on hedging instruments	242	10
Other, net	80	57
Deferred tax assets (liabilities), net before valuation allowance	(172)	(1,211)
Less: Valuation allowance	933	408
Deferred tax assets (liabilities), net	$ (1,105)	$ (1,619)

The company estimates the degree to which tax assets and loss and credit carryforwards will result in a benefit based on expected profitability by tax jurisdiction and provides a valuation allowance for tax assets and loss and credit carryforwards that it believes will more likely than not expire unutilized. At December 31, 2020, all of the company's valuation allowance relates to deferred tax assets, primarily net operating losses and disallowed interest expense carryforward, for which any subsequently recognized tax benefits will reduce income tax expense.

The changes in the valuation allowance are as follows:

	Year Ended December 31,		
(In millions)	2020	2019	2018
Balance at Beginning of Year	$ 408	$ 471	$ 256
Additions (reductions) charged to income tax provision, net	514	(27)	223
Additions due to acquisitions	—	—	17
Reduction due to a divestiture	—	(33)	—
Deductions	—	—	(15)
Currency translation and other	11	(3)	(10)
Balance at End of Year	$ 933	$ 408	$ 471

At December 31, 2020, the company had federal, state and non-U.S. net operating loss carryforwards of $383 million, $1.69 billion and $5.75 billion, respectively. Use of the carryforwards is limited based on the future income of certain subsidiaries. The federal and state net operating loss carryforwards expire in the years 2021 through 2040. Of the non-U.S. net operating loss carryforwards, $1.62 billion expire in the years 2025 through 2040, and the remainder do not expire.

At December 31, 2020, the company had foreign tax credit carryforwards of $645 million and deferred interest carryforwards of $915 million. The foreign tax credit carryforwards will expire in the years 2022 through 2030 while deferred interest carryforwards do not expire.

As a result of the Tax Act, U.S. federal taxes have been recorded on $18 billion of undistributed foreign earnings as of December 31, 2020. A provision has not been made for certain U.S. state income taxes or additional non-U.S. taxes that would be due when cash is repatriated to the U.S. as the company's undistributed foreign earnings are intended to be reinvested outside of the U.S. indefinitely. The determination of the amount of the unrecognized deferred tax liability related to the undistributed foreign earnings is not practicable due to the uncertainty in the manner in which these earnings will be distributed. The company's intent is to only make distributions from non-U.S. subsidiaries in the future when they can be made at no net tax cost.

Unrecognized Tax Benefits

As of December 31, 2020, the company had $1.09 billion of unrecognized tax benefits substantially all of which, if recognized, would reduce the effective tax rate.

A reconciliation of the beginning and ending amounts of unrecognized tax benefits is as follows:

(In millions)	2020	2019	2018
Balance at Beginning of Year	$ 1,552	$ 1,442	$ 1,409
Reductions due to acquisitions	—	—	(5)
Additions for tax positions of current year	8	53	48
Additions for tax positions of prior years	—	69	82
Reductions for tax positions of prior years	(296)	(7)	—
Closure of tax years	—	—	(5)
Settlements	(173)	(5)	(87)
Balance at End of Year	$ 1,091	$ 1,552	$ 1,442

Substantially all of the unrecognized tax benefits are classified as long-term liabilities. The company does not expect its unrecognized tax benefits to change significantly over the next twelve months.

During 2020, the company's unrecognized tax benefits decreased $51 million as a result of uncertain tax positions relating to foreign tax positions and $410 million relating to U.S. federal and state tax positions which included $378 million from the settlement of the IRS audit of the 2014, 2015 and 2016 tax years.

During 2019, the company's unrecognized tax benefits increased $70 million as a result of uncertain tax positions relating to foreign tax positions and $45 million relating to U.S. federal and state tax positions.

During 2018, the company's unrecognized tax benefits increased $85 million as a result of uncertain tax positions relating to foreign tax positions and $45 million relating to U.S. federal and state tax positions.

The company classified interest and penalties related to unrecognized tax benefits as income tax expense. The total amount of interest and penalties related to uncertain tax positions and recognized in the balance sheet as of December 31, 2020 and 2019 was $78 million and $67 million, respectively.

The company conducts business globally and, as a result, Thermo Fisher or one or more of its subsidiaries files income tax returns in the U.S. federal jurisdiction and various state and foreign jurisdictions. In the normal course of business, the company is subject to examination by taxing authorities throughout the world, including such major jurisdictions as Australia, Canada, China, Denmark, Finland, France, Germany, Japan, Singapore, Sweden, the United Kingdom and the United States. With few exceptions, the company is no longer subject to U.S. state and local or non-U.S. income tax examinations for years before 2012 and no longer subject to U.S. federal income tax examinations for years before 2017.

Note 9. Earnings per Share

(In millions except per share amounts)	2020	2019	2018
Net Income	$ 6,375	$ 3,696	$ 2,938
Basic Weighted Average Shares	396	400	402
Plus Effect of: Stock options and restricted units	3	3	4
Diluted Weighted Average Shares	399	403	406
Basic Earnings per Share	$ 16.09	$ 9.24	$ 7.31
Diluted Earnings per Share	$ 15.96	$ 9.17	$ 7.24
Antidilutive Stock Options Excluded from Diluted Weighted Average Shares	1	1	2

Note 10. Debt and Other Financing Arrangements

(Dollars in millions)	Effective Interest Rate at December 31, 2020	December 31, 2020	December 31, 2019
Floating Rate 2-Year Senior Notes, Due 8/7/2020 (euro-denominated)		$ —	673
2.15% 7-Year Senior Notes, Due 7/21/2022 (euro-denominated)	2.28 %	611	561
3.00% 7-Year Senior Notes, Due 4/15/2023	1.84 %	1,000	1,000
4.15% 10-Year Senior Notes, Due 2/1/2024	4.16 %	1,000	1,000
0.75% 8-Year Senior Notes, Due 9/12/2024 (euro-denominated)	0.95 %	1,222	1,121
0.125% 5.5-Year Senior Notes, Due 3/1/2025 (euro-denominated)	0.42 %	977	897
4.133% 5-Year Senior Notes, Due 3/25/2025	4.32 %	1,100	—
2.00% 10-Year Senior Notes, Due 4/15/2025 (euro-denominated)	2.10 %	782	717
3.65% 10-Year Senior Notes, Due 12/15/2025	3.77 %	350	350
1.40% 8.5-Year Senior Notes, Due 1/23/2026 (euro-denominated)	1.53 %	855	785
2.95% 10-Year Senior Notes, Due 9/19/2026	3.19 %	1,200	1,200
1.45% 10-Year Senior Notes, Due 3/16/2027 (euro-denominated)	1.67 %	611	561
1.75% 7-Year Senior Notes, Due 4/15/2027 (euro-denominated)	1.98 %	733	—
3.20% 10-Year Senior Notes, Due 8/15/2027	3.39 %	750	750
0.50% 8.5-Year Senior Notes, Due 3/1/2028 (euro-denominated)	0.78 %	977	897
1.375% 12-Year Senior Notes, Due 9/12/2028 (euro-denominated)	1.46 %	733	673
1.95% 12-Year Senior Notes, Due 7/24/2029 (euro-denominated)	2.08 %	855	785
2.60% 10-Year Senior Notes, Due 10/1/2029	2.74 %	900	900
4.497% 10-Year Senior Notes, Due 3/25/2030	5.31 %	1,100	—
0.875% 12-Year Senior Notes, Due 10/1/2031 (euro-denominated)	1.14 %	1,099	1,009
2.375% 12-Year Senior Notes, Due 4/15/2032 (euro-denominated)	2.56 %	733	—
2.875% 20-Year Senior Notes, Due 7/24/2037 (euro-denominated)	2.94 %	855	785
1.50% 20-Year Senior Notes, Due 10/1/2039 (euro-denominated)	1.73 %	1,099	1,009
5.30% 30-Year Senior Notes, Due 2/1/2044	5.37 %	400	400
4.10% 30-Year Senior Notes, Due 8/15/2047	4.23 %	750	750
1.875% 30-Year Senior Notes, Due 10/1/2049 (euro-denominated)	1.99 %	1,222	1,121
Other		12	16
Total Borrowings at Par Value		21,926	17,960
Fair Value Hedge Accounting Adjustments		25	(13)
Unamortized Discount		(102)	(94)
Unamortized Debt Issuance Costs		(114)	(101)
Total Borrowings at Carrying Value		21,735	17,752
Less: Short-term Obligations and Current Maturities		2,628	676
Long-term Obligations		$ 19,107	$ 17,076

The effective interest rates for the fixed-rate debt include the stated interest on the notes, the accretion of any discount or amortization of any premium, the amortization of any debt issuance costs and, if applicable, adjustments related to hedging.

See Note 14 for fair value information pertaining to the company's long-term obligations.

As of December 31, 2020, the annual repayment requirements for debt obligations are as follows:

(In millions)	
2021	$ 2,613
2022	2
2023	2
2024	1,223
2025	3,211
2026 and Thereafter	14,875
	$ 21,926

In addition to available borrowings under the company's revolving credit agreements, discussed below, the company had unused lines of credit of $108 million as of December 31, 2020. These unused lines of credit generally provide for short-term unsecured borrowings at various interest rates.

Credit Facilities

The company has a revolving credit facility (the Facility) with a bank group that provides for up to $3.00 billion of unsecured multi-currency revolving credit. The Facility expires on December 4, 2025. The revolving credit agreement calls for interest at either a LIBOR-based rate (or LIBOR successor rate), a EURIBOR-based rate (for funds drawn in euro) or a rate based on the prime lending rate of the agent bank, at the company's option. The agreement contains affirmative, negative and financial covenants, and events of default customary for facilities of this type. The covenants in the Facility include a Consolidated Net Interest Coverage Ratio (Consolidated EBITDA to Consolidated Net Interest Expense), as such terms are defined in the Facility. Specifically, the company has agreed that, so long as any lender has any commitment under the Facility, any letter of credit is outstanding under the Facility, or any loan or other obligation is outstanding under the Facility, it will maintain a minimum Consolidated Interest Coverage Ratio of 3.5:1.0 as of the last day of any fiscal quarter. As of December 31, 2020, no borrowings were outstanding under the Facility, although available capacity was reduced by approximately $31 million as a result of outstanding letters of credit.

Commercial Paper Programs

The company has commercial paper programs pursuant to which it may issue and sell unsecured, short-term promissory notes (CP Notes). Under the U.S. program, a) maturities may not exceed 397 days from the date of issue and b) the CP Notes are issued on a private placement basis under customary terms in the commercial paper market and are not redeemable prior to maturity nor subject to voluntary prepayment. Under the euro program, maturities may not exceed 183 days and may be denominated in euro, U.S. dollars, Japanese yen, British pounds sterling, Swiss franc, Canadian dollars or other currencies. Under both programs, the CP Notes are issued at a discount from par (or premium to par, in the case of negative interest rates), or, alternatively, are sold at par and bear varying interest rates on a fixed or floating basis. As of December 31, 2020, there were no outstanding borrowings under these programs.

Senior Notes

Interest is payable annually on the euro-denominated senior notes and semi-annually on all other senior notes. Each of the notes may be redeemed at a redemption price of 100% of the principal amount plus a specified make-whole premium and accrued interest. The company is subject to certain affirmative and negative covenants under the indentures governing the senior notes, the most restrictive of which limits the ability of the company to pledge principal properties as security under borrowing arrangements. The company was in compliance with all covenants at December 31, 2020.

In 2019, the company refinanced certain of its debt by issuing new senior notes and using the proceeds to redeem some of its existing senior notes. In connection with these redemptions, the company incurred $184 million of losses on the early extinguishment of debt included in Other Expense, Net on the accompanying statement of income. Upon redemption of the senior notes, the company terminated the related fixed to floating rate interest rate swap arrangements and paid $17 million, included in other financing activities, net, in the accompanying statement of cash flows. The company also terminated related cross-currency interest rate swap arrangements and received $44 million, included in other investing activities, net, in the accompanying statement of cash flows.

Interest Rate Swap Arrangements

The company has entered into LIBOR-based interest rate swap arrangements with various banks. The aggregate amounts of the swaps are equal to the principal amount of the notes and the payment dates of the swaps coincide with the interest payment dates of the note. The swap contracts provide for the company to pay a variable interest rate and receive a fixed rate. The variable interest rates reset monthly. The swaps have been accounted for as fair value hedges of the notes. See Note 14 for additional information on the interest rate swap arrangements and related cross-currency interest rate swap arrangements. The following table summarizes the outstanding interest rate swap arrangements on the company's senior notes at December 31, 2020:

(Dollars in millions)	Aggregate Notional Amount	Pay Rate	Pay Rate as of December 31, 2020	Receive Rate
3.00% Senior Notes due 2023 (a)	$ 1,000	1-month LIBOR + 1.7640%	1.9226 %	3.00 %

(a) The payments on $900 million notional value of these interest rate swaps are offset in part by cross-currency interest rate swaps which effectively reduced the pay rate as of December 31, 2020 from 1.92% to a weighted average of 1.05%.

The company has entered into $900 million notional value of cross-currency interest rate swaps, which effectively convert a portion of the semi-annual payments related to the variable rate, U.S. dollar denominated, LIBOR-based interest rate swaps to payments on variable rate, euro denominated, EURIBOR-based cross-currency interest rate swaps.

Debt Redemptions

In December 2020, the company gave notice of its intention to redeem the following senior notes in January 2021:

(In millions)	Principal Value Redeemed
2.15% 7-Year Senior Notes, Due 7/21/2022 (euro-denominated)	€ 500
3.00% 7-Year Senior Notes, Due 4/15/2023	$ 1,000
4.15% 10-Year Senior Notes, Due 2/1/2024	$ 1,000

The redemptions were completed on January 15, 2021. In connection with the redemptions, the company received $22 million upon the termination of the fixed to floating rate swap arrangements on the redeemed senior notes.

The company incurred approximately $197 million of losses on the early extinguishment of debt in January 2021 due to these redemptions.

Note 11. Leases

As a lessee, the company leases certain logistics, office, and manufacturing facilities, as well as vehicles, copiers, and other equipment. These operating leases generally have remaining lease terms between 1 month and 30 years, and some include options to extend (generally for 1 to 10 years) or have options to terminate the arrangement within 1 year. The company’s finance leases are not material.

The company has guaranteed the residual value of three leased operating facilities with lease terms ending in 2023, 2024 and 2025. The company has agreed with the lessor to comply with certain financial covenants consistent with its other debt arrangements (Note 10). The aggregate maximum guarantee under these three lease arrangements is $147 million. Operating lease ROU assets and lease liabilities for these lease arrangements are recorded on the consolidated balance sheet as of December 31, 2020, but exclude any amounts for residual value guarantees.

As a lessee, the consolidated financial statements include the following:

(In millions)	2020	2019
Balance Sheet		
ROU assets	$ 775	$ 699
Operating lease liabilities - current	184	167
Operating lease liabilities - noncurrent	626	571
Statement of Income		
Operating lease costs	$ 224	$ 208
Variable lease costs	49	41
Statement of Cash Flows		
Cash used in operating activities for payments of amounts included in the measurement of operating lease liabilities	$ 222	$ 208
Operating lease ROU assets obtained in exchange for new operating lease liabilities	202	205
Weighted Average at End of Year		
Remaining operating lease term	6.3 years	6.2 years
Discount rate	3.4 %	4.0 %

ROU assets are classified in other assets in the consolidated balance sheet. Operating lease liabilities are classified in other accrued expenses and other long-term liabilities, respectively, in the consolidated balance sheet.

Lease costs arising from finance leases, short-term leases, and sublease income are not material.

As of December 31, 2020, future payments of operating lease liabilities are as follows:

(In millions)	
2021	$ 210
2022	180
2023	141
2024	96
2025	66
2026 and Thereafter	212
Total Lease Payments	905
Less: Imputed Interest	95
Total Operating Lease Liability	$ 810

As a lessor, operating leases, sales-type leases and direct financing leases are not material.

Under previous lease accounting guidance, net income includes expense from operating leases of $211 million in 2018.

Note 12. Commitments and Contingencies

Purchase Obligations

The company has entered into unconditional purchase obligations, in the ordinary course of business, that include agreements to purchase goods, services or fixed assets and to pay royalties that are enforceable and legally binding and that specify all significant terms including: fixed or minimum quantities to be purchased; fixed, minimum or variable price provisions; and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable at any time without penalty. The aggregate amount of the company's unconditional purchase obligations totaled $1.80 billion at December 31, 2020 and the majority of these obligations are expected to be settled during 2021.

The Analytical Instruments segment recorded a charge to cost of product revenues for $108 million in 2020 related to an existing supply contract for components of electron microscopy instruments. The agreement requires the company to make future minimum purchases through 2025. The company has developed and launched an alternative product beginning in 2020 and based on the expected demand for the internally developed product vs. the third-party product, the company does not expect to use all of the product it will be required to buy, resulting in a loss on the purchase commitment.

Letters of Credit, Guarantees and Other Commitments

Outstanding letters of credit and bank guarantees totaled $350 million at December 31, 2020. Substantially all of these letters of credit and guarantees expire before 2026.

Outstanding surety bonds and other guarantees totaled $81 million at December 31, 2020. The expiration of these bonds and guarantees ranges through 2022.

The letters of credit, bank guarantees and surety bonds principally secure performance obligations, and allow the holder to draw funds up to the face amount of the letter of credit, bank guarantee or surety bond if the applicable business unit does not perform as contractually required.

The company is a guarantor of pension plan obligations of a divested business. The purchaser of the divested business has agreed to pay for the pension benefits, however the company was required to guarantee payment of these pension benefits should the purchaser fail to do so. The amount of the guarantee at December 31, 2020 was $42 million.

In connection with the sale of businesses of the company, the buyers have assumed certain contractual obligations of such businesses and have agreed to indemnify the company with respect to those assumed liabilities. In the event a third-party to a transferred contract does not recognize the transfer of obligations or a buyer defaults on its obligations under the transferred contract, the company could be liable to the third-party for such obligations. However, in such event, the company would be entitled to seek indemnification from the buyer.

Indemnifications

In conjunction with certain transactions, primarily divestitures, the company has agreed to indemnify the other parties with respect to certain liabilities related to the businesses that were sold or leased properties that were abandoned (e.g., retention of certain environmental, tax, employee and product liabilities). The scope and duration of such indemnity obligations vary from transaction to transaction. Where probable, an obligation for such indemnifications is recorded as a liability. Generally, a maximum obligation cannot be reasonably estimated. Other than obligations recorded as liabilities at the time of divestiture, historically the company has not made significant payments for these indemnifications.

In connection with the company's efforts to reduce the number of facilities that it occupies, the company has vacated some of its leased facilities or sublet them to third parties. When the company sublets a facility to a third-party, it remains the primary obligor under the master lease agreement with the owner of the facility. As a result, if a third-party vacates the sublet facility, the company would be obligated to make lease or other payments under the master lease agreement. The company believes that the financial risk of default by sublessors is individually and in the aggregate not material to the company's financial position or results of operations.

In connection with the sale of products in the ordinary course of business, the company often makes representations affirming, among other things, that its products do not infringe on the intellectual property rights of others and agrees to indemnify customers against third-party claims for such infringement. The company has not been required to make material payments under such provisions.

Environmental Matters

The company is currently involved in various stages of investigation and remediation related to environmental matters. The company cannot predict all potential costs related to environmental remediation matters and the possible impact on future

operations given the uncertainties regarding the extent of the required cleanup, the complexity and interpretation of applicable laws and regulations, the varying costs of alternative cleanup methods and the extent of the company's responsibility. Expenses for environmental remediation matters related to the costs of installing, operating and maintaining groundwater-treatment systems and other remedial activities related to historical environmental contamination at the company's domestic and international facilities were not material in any period presented. The company records accruals for environmental remediation liabilities, based on current interpretations of environmental laws and regulations, when it is probable that a liability has been incurred and the amount of such liability can be reasonably estimated. The company calculates estimates based upon several factors, including input from environmental specialists and management's knowledge of and experience with these environmental matters. The company includes in these estimates potential costs for investigation, remediation and operation and maintenance of cleanup sites. At December 31, 2020, the company's total environmental liability was approximately $71 million. While management believes the accruals for environmental remediation are adequate based on current estimates of remediation costs, the company may be subject to additional remedial or compliance costs due to future events such as changes in existing laws and regulations, changes in agency direction or enforcement policies, developments in remediation technologies or changes in the conduct of the company's operations, which could have a material adverse effect on the company's financial position, results of operations or cash flows.

Litigation and Related Contingencies

The company is involved in various disputes, governmental and/or regulatory inspections, inquiries, investigations and proceedings, and litigation matters that arise from time to time in the ordinary course of business. The disputes and litigation matters include product liability, intellectual property, employment and commercial issues. The company determines the probability and range of possible loss based on the current status of each of these matters. A liability is recorded in the financial statements if it is believed to be probable that a loss has been incurred and the amount of the loss can be reasonably estimated. The company establishes a liability that is an estimate of amounts expected to be paid in the future for events that have already occurred. The company accrues the most likely amount or at least the minimum of the range of probable loss when a range of probable loss can be estimated. The accrued liabilities are based on management's judgment as to the probability of losses for asserted and unasserted claims and, where applicable, actuarially determined estimates. Accrual estimates are adjusted as additional information becomes known or payments are made. The amount of ultimate loss may differ from these estimates. Due to the inherent uncertainties associated with pending litigation or claims, the company cannot predict the outcome, nor, with respect to certain pending litigation or claims where no liability has been accrued, make a meaningful estimate of the reasonably possible loss or range of loss that could result from an unfavorable outcome. The company has no material accruals for pending litigation or claims for which accrual amounts are not disclosed below, nor are material losses deemed probable for such matters. It is reasonably possible, however, that an unfavorable outcome that exceeds the company's current accrual estimate, if any, for one or more of the matters described below could have a material adverse effect on the company's results of operations, financial position and cash flows.

Product Liability, Workers Compensation and Other Personal Injury Matters

The range of probable loss for product liability, workers compensation and other personal injury matters of the company's continuing operations at December 31, 2020, was approximately $209 million to $354 million on an undiscounted basis. The portion of these liabilities assumed in the 2006 merger with Fisher was recorded at its fair (present) value at the date of merger. The company's accrual for all such matters in total, including the discounted liabilities, was $202 million at December 31, 2020 (or $214 million undiscounted). The accrual includes estimated defense costs and is gross of estimated amounts due from insurers of $94 million at December 31, 2020 (or $103 million undiscounted) that are included in other assets in the accompanying balance sheet. The portion of these insurance assets assumed in the merger with Fisher was also recorded at its fair value at the date of merger. In addition to the above accrual, as of December 31, 2020, the company had a product liability accrual of $10 million (undiscounted) relating to divested businesses.

Although the company believes that the amounts accrued and estimated recoveries are probable and appropriate based on available information, including actuarial studies of loss estimates, the process of estimating losses and insurance recoveries involves a considerable degree of judgment by management and the ultimate amounts could vary materially. Insurance contracts do not relieve the company of its primary obligation with respect to any losses incurred. The collectability of amounts due from its insurers is subject to the solvency and willingness of the insurer to pay, as well as the legal sufficiency of the insurance claims. Management monitors the payment history as well as the financial condition and ratings of its insurers on an ongoing basis.

Note 13. Comprehensive Income and Shareholder's Equity

Comprehensive Income (Loss)

Comprehensive income combines net income and other comprehensive items. Other comprehensive items represent certain amounts that are reported as components of shareholders' equity in the accompanying balance sheet.

Changes in each component of accumulated other comprehensive items, net of tax are as follows:

(In millions)	Currency Translation Adjustment	Unrealized Losses on Hedging Instruments	Pension and Other Postretirement Benefit Liability Adjustment	Total
Balance at December 31, 2019	$ (2,320)	$ (71)	$ (288)	$ (2,679)
Other comprehensive items before reclassifications	(118)	(65)	(8)	(191)
Amounts reclassified from accumulated other comprehensive items	—	45	18	63
Net other comprehensive items	(118)	(20)	10	(128)
Balance at December 31, 2020	$ (2,438)	$ (91)	$ (278)	$ (2,807)

Shareholders' Equity

At December 31, 2020, the company had reserved 22 million unissued shares of its common stock for possible issuance under stock-based compensation plans.

Note 14. Fair Value Measurements and Fair Value of Financial Instruments

Fair Value Measurements

The company uses the market approach technique to value its financial instruments and there were no changes in valuation techniques during 2020. The company's financial assets and liabilities carried at fair value are primarily comprised of insurance contracts, investments in derivative contracts, mutual funds holding publicly traded securities and other investments in unit trusts held as assets to satisfy outstanding deferred compensation and retirement liabilities; and acquisition-related contingent consideration.

Assets and liabilities carried at fair value are classified and disclosed in one of the following three categories:

Level 1: Quoted market prices in active markets for identical assets or liabilities that the company has the ability to access.

Level 2: Observable market based inputs or unobservable inputs that are corroborated by market data such as quoted prices, interest rates and yield curves.

Level 3: Inputs are unobservable data points that are not corroborated by market data.

The following tables present information about the company's financial assets and liabilities measured at fair value on a recurring basis as of December 31, 2020 and December 31, 2019:

(In millions)	December 31, 2020	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Cash equivalents	$ 8,971	$ 8,971	$ —	$ —
Investments in common stock, mutual funds and other similar instruments	21	21	—	—
Warrants	7	—	7	—
Insurance contracts	157	—	157	—
Derivative contracts	28	—	28	—
Total Assets	$ 9,184	$ 8,992	$ 192	$ —
Liabilities				
Derivative contracts	$ 132	$ —	$ 132	$ —
Contingent consideration	70	—	—	70
Total Liabilities	$ 202	$ —	$ 132	$ 70

(In millions)	December 31, 2019	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Cash equivalents	$ 1,280	$ 1,280	$ —	$ —
Investments in common stock, mutual funds and other similar instruments	19	19	—	—
Warrants	6	—	6	—
Insurance contracts	131	—	131	—
Derivative contracts	37	—	37	—
Total Assets	$ 1,473	$ 1,299	$ 174	$ —
Liabilities				
Derivative contracts	$ 24	$ —	$ 24	$ —
Contingent consideration	55	—	—	55
Total Liabilities	$ 79	$ —	$ 24	$ 55

The company uses the Black-Scholes model to value its warrants. The company determines the fair value of its insurance contracts by obtaining the cash surrender value of the contracts from the issuer. The fair value of derivative contracts is the estimated amount that the company would receive/pay upon liquidation of the contracts, taking into account the change in interest rates and currency exchange rates. The company determines the fair value of acquisition-related contingent consideration based on the probability-weighted discounted cash flows associated with such future payments. Changes to the fair value of contingent consideration are recorded in selling, general and administrative expense. The following table provides a rollforward of the fair value, as determined by level 3 inputs, of the contingent consideration.

(In millions)	2020	2019
Contingent Consideration		
Balance at Beginning of Year	$ 55	$ 37
Acquisitions (including assumed balances)	28	24
Payments	(4)	(3)
Changes in fair value included in earnings	(9)	(3)
Balance at End of Year	$ 70	$ 55

Derivative Contracts

The following table provides the aggregate notional value of outstanding derivative contracts.

(In millions)	December 31, 2020	December 31, 2019
Notional Amount		
Interest rate swaps - fair value hedges (described in Note 10)	$ 1,000	$ 1,000
Cross-currency interest rate swaps - designated as net investment hedges	900	900
Currency exchange contracts	5,206	2,846

While certain derivatives are subject to netting arrangements with counterparties, the company does not offset derivative assets and liabilities within the consolidated balance sheet. The following tables present the fair value of derivative instruments in the consolidated balance sheet and statement of income.

	Fair Value – Assets		Fair Value – Liabilities	
(In millions)	December 31, 2020	December 31, 2019	December 31, 2020	December 31, 2019
Derivatives Designated as Hedging Instruments				
Interest rate swaps (a)	$ 25	$ —	$ —	$ 13
Cross-currency interest rate swaps (a)	—	33	46	—
Derivatives Not Designated as Hedging Instruments				
Currency exchange contracts (b)	3	4	86	11
Total Derivatives	$ 28	$ 37	$ 132	$ 24

(a) The fair values of the interest rate swaps and cross-currency interest rate swaps are included in the consolidated balance sheet under the caption other assets or other long-term liabilities.
(b) The fair value of the currency exchange contracts is included in the consolidated balance sheet under the captions other current assets or other accrued expenses.

The following amounts related to cumulative basis adjustments for fair value hedges were included in the consolidated balance sheet under the caption long-term obligations:

	Carrying Amount of the Hedged Liability		Cumulative Amount of Fair Value Hedging Adjustment - Increase (Decrease) Included in Carrying Amount of Liability	
(In millions)	December 31, 2020	December 31, 2019	December 31, 2020	December 31, 2019
Long-term Obligations	$ 1,020	$ 980	$ 25	$ (13)

(In millions)	Gain (Loss) Recognized 2020	2019
Fair Value Hedging Relationships		
Interest rate swaps		
Hedged long-term obligations - included in other expense, net	$ (38)	$ (93)
Derivatives designated as hedging instruments - included in other expense, net	38	97
Derivatives Designated as Cash Flow Hedges		
Interest rate swaps		
Included in unrealized losses on hedging instruments within other comprehensive items	(85)	(50)
Amount reclassified from accumulated other comprehensive items to other expense, net	(59)	(25)
Financial Instruments Designated as Net Investment Hedges		
Foreign currency-denominated debt		
Included in currency translation adjustment within other comprehensive items	(873)	60
Cross-currency interest rate swaps		
Included in currency translation adjustment within other comprehensive items	(79)	49
Included in other expense, net	11	48
Derivatives Not Designated as Hedging Instruments		
Currency exchange contracts		
Included in cost of product revenues	(17)	1
Included in other expense, net	(81)	52
Cross-currency interest rate swaps		
Included in other expense, net	(9)	—

Gains and losses recognized on currency exchange contracts and the interest rate swaps designated as fair value hedges are included in the consolidated statement of income together with the corresponding, offsetting losses and gains on the underlying hedged transactions.

The company uses foreign currency-denominated debt and cross-currency interest rate swaps to partially hedge its net investments in foreign operations against adverse movements in exchange rates. The majority of the company's euro-denominated senior notes and certain of its cross-currency interest rate swaps have been designated as, and are effective as, economic hedges of part of the net investment in a foreign operation. Accordingly, foreign currency transaction gains or losses due to spot rate fluctuations on the euro-denominated debt instruments and contract fair value changes on the cross-currency interest rate swaps, excluding interest accruals, are included in currency translation adjustment within other comprehensive items and shareholders' equity.

In early 2020, the company entered into cross currency swaps in anticipation of using U.S. dollars to partially finance the euro purchase price of a then pending acquisition. The swaps were terminated later in the year in connection with the termination of the acquisition agreement. Gains and losses associated with these swaps were recorded in other expense, net. The company had a cash outflow of $9 million associated with the termination of the swaps, included in other investing activities, net, in the accompany statement of cash flows.

See Note 1 and Note 10 for additional information on the company's risk management objectives and strategies.

Cash Flow Hedge Arrangements

In 2020 and 2019, the company entered into interest rate swap arrangements to mitigate the risk of interest rates rising prior to completion of debt offerings. Based on the company's conclusion that the debt offerings were probable, the swaps hedged the cash flow risk for each of the interest payments on the planned fixed-rate debt issues. The aggregate fair value of the terminated hedges, net of tax, has been classified as a reduction to accumulated other comprehensive items and will be amortized to interest expense over the term of the related debt issuances. The company had cash outlays aggregating $85 million and $50 million in 2020 and 2019, respectively, associated with termination of the arrangements, included in other financing activities, net, in the accompanying statement of cash flows.

In late 2020, the company determined that the previously anticipated debt offerings were probable of not occurring and reclassified $42 million from accumulated other comprehensive items to other expense, net.

Fair Value of Other Financial Instruments

The carrying value and fair value of the company's debt obligations are as follows:

	December 31, 2020		December 31, 2019	
(In millions)	Carrying Value	Fair Value	Carrying Value	Fair Value
Debt Obligations:				
Senior notes	$ 21,723	$ 24,653	$ 17,736	$ 18,650
Other	12	12	16	16
	$ 21,735	$ 24,665	$ 17,752	$ 18,666

The fair value of debt obligations was determined based on quoted market prices and on borrowing rates available to the company at the respective period ends which represent level 2 measurements.

Note 15. Supplemental Cash Flow Information

(In millions)	2020	2019	2018
Cash Paid For:			
Interest	$ 471	$ 790	$ 687
Income Taxes	1,324	896	591
Non-cash Investing and Financing Activities			
Acquired but unpaid property, plant and equipment	347	150	95
Declared but unpaid dividends	89	77	69
Issuance of stock upon vesting of restricted stock units	217	182	170

Cash, cash equivalents and restricted cash is included in the consolidated balance sheet as follows:

(In millions)	December 31, 2020	December 31, 2019
Cash and Cash Equivalents	$ 10,325	$ 2,399
Restricted Cash Included in Other Current Assets	10	21
Restricted Cash Included in Other Assets	1	2
Cash, Cash Equivalents and Restricted Cash	$ 10,336	$ 2,422

Amounts included in restricted cash represent funds held as collateral for bank guarantees and incoming cash in China awaiting government administrative clearance.

Note 16. Restructuring and Other Costs (Income), Net

Restructuring and other costs in 2020 primarily included continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S. and Europe, and charges for the write-off of acquired technology. Restructuring and other costs in 2020 also included transaction/integration costs (including reimbursement thereof) related to recent/terminated acquisitions. In 2020, severance actions associated with facility consolidations and cost reduction measures affected approximately 1% of the company's workforce.

Restructuring and other costs (income), net, in 2019 primarily included the gain on the sale of the company's Anatomical Pathology business, and, to a lesser extent, transaction/integration costs related to acquisitions and a divestiture; sales of inventory revalued at the date of acquisition; and continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S. and Europe. In 2019, severance actions associated with facility consolidations and cost reduction measures affected approximately 1% of the company's workforce.

Restructuring and other costs in 2018 included continuing charges for headcount reductions and facility consolidations in an effort to streamline operations, including the closure and consolidation of operations within several facilities in the U.S. and Europe; third-party transaction/integration costs primarily related to recent acquisitions; sales of inventories revalued at the date of acquisition; and environmental remediation charges. These charges were partially offset by gains on sales of real estate and favorable results of litigation. In 2018, severance actions associated with facility consolidations and cost reduction measures affected approximately 1% of the company's workforce.

As of February 24, 2021, the company has identified restructuring actions that will result in additional charges of approximately $50 million, primarily in 2021, and expects to identify additional actions during 2021 which will be recorded when specified criteria are met, such as communication of benefit arrangements or when the costs have been incurred.

2020

During 2020, the company recorded net restructuring and other costs (income) by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs, Net	Total
Life Sciences Solutions	$ —	$ (8)	$ 34	$ 26
Analytical Instruments	—	—	26	26
Specialty Diagnostics	—	(12)	9	(3)
Laboratory Products and Services	6	5	23	34
Corporate	—	5	7	12
	$ 6	$ (10)	$ 99	$ 95

The principal components of net restructuring and other costs (income) by segment are as follows:

Life Sciences Solutions

In 2020, the Life Sciences Solutions segment recorded $26 million of net restructuring and other charges. The segment recorded $34 million of restructuring and other costs, net, primarily charges for the write-off of acquired technology. The segment also recorded $8 million of credits to selling, general, and administrative expense for changes in estimates of contingent acquisition consideration.

Analytical Instruments

In 2020, the Analytical Instruments segment recorded $26 million of net restructuring and other charges, primarily for employee severance associated with headcount reductions in Europe, China, and the U.S., and, to a lesser extent, abandoned facility costs.

Specialty Diagnostics

In 2020, the Specialty Diagnostics segment recorded $3 million of net restructuring and other income, principally for third-party transaction costs (including reimbursement thereof) for a terminated acquisition, partially offset by charges for employee severance and environmental remediation at previously owned facilities.

Laboratory Products and Services

In 2020, the Laboratory Products and Services segment recorded $34 million of net restructuring and other charges, primarily for employee severance at businesses streamlining operations, write-downs of fixed assets to estimated disposal value in connection with the consolidation of commercial production operations in the U.S, and, to a lesser extent, transaction/acquisition related costs for a pending acquisition.

Corporate

In 2020, the company recorded $12 million of net restructuring and other costs primarily for severance at its corporate operations, and charges to selling, general, and administrative expense for product liability litigation.

2019

During 2019, the company recorded net restructuring and other costs by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs (Income), Net	Total
Life Sciences Solutions	$ 16	$ —	$ 24	$ 40
Analytical Instruments	—	24	14	38
Specialty Diagnostics	—	4	(471)	(467)
Laboratory Products and Services	1	35	17	53
Corporate	—	(1)	3	2
	$ 17	$ 62	$ (413)	$ (334)

The principal components of net restructuring and other costs by segment are as follows:

Life Sciences Solutions

In 2019, the Life Sciences Solutions segment recorded $40 million of net restructuring and other charges, including $16 million of charges to cost of revenues for the sales of inventory revalued at the date of acquisition. The segment also recorded $24 million of net restructuring and other charges for severance and other costs associated with facility consolidations in the U.S and Europe, the impairment of acquired technology in development, and pre-acquisition litigation-related matters.

Analytical Instruments

In 2019, the Analytical Instruments segment recorded $38 million of net restructuring and other charges, including $24 million of charges to selling, general, and administrative expense, principally third-party transaction costs for a terminated acquisition. The segment also recorded $14 million of restructuring and other costs, primarily for employee severance and other costs associated with facility consolidations in the U.S. and Europe.

Specialty Diagnostics

In 2019, the Specialty Diagnostics segment recorded $467 million of net restructuring and other income, primarily a gain on the divestiture of its Anatomical Pathology business (Note 2). The segment also recorded $4 million of charges to selling, general, and administrative expense, principally third-party transaction costs in connection with the sale of the Anatomical Pathology business.

Laboratory Products and Services

In 2019, the Laboratory Products and Services segment recorded $53 million of net restructuring and other charges. The segment recorded $35 million of charges to selling, general, and administrative expenses, principally third-party transaction/integration costs for recently completed acquisitions. The segment also recorded $17 million of restructuring and other costs, primarily charges for severance at businesses streamlining operations and employee compensation due at Brammer Bio on the date of acquisition.

2018

During 2018, the company recorded net restructuring and other costs by segment as follows:

(In millions)	Cost of Revenues	Selling, General and Administrative Expenses	Restructuring and Other Costs, Net	Total
Life Sciences Solutions	$ 4	$ 12	$ (17)	$ (1)
Analytical Instruments	3	8	28	39
Specialty Diagnostics	—	3	(1)	2
Laboratory Products and Services	5	16	31	52
Corporate	—	(10)	9	(1)
	$ 12	$ 29	$ 50	$ 91

The principal components of net restructuring and other costs by segment are as follows:

Life Sciences Solutions

In 2018, the Life Sciences Solutions segment recorded $1 million of net restructuring and other income. The segment recorded charges to cost of revenues of $4 million for the sales of inventory revalued at the date of acquisition, as well as $12 million of charges to selling, general, and administrative expenses, primarily third-party transaction/integration costs related to recent acquisitions. The segment also recorded $17 million of net restructuring and other income, principally for a $46 million net gain on the resolution of litigation, partially offset by charges for severance other costs associated with facility consolidations in the U.S.

Analytical Instruments

In 2018, the Analytical Instruments segment recorded $39 million of net restructuring and other charges. The segment recorded net charges to cost of revenues of $3 million for the sales of inventory revalued at the date of acquisition; $8 million of net charges to selling, general, and administrative expense, principally third-party transaction costs for a pending acquisition; and $28 million of restructuring and other costs, primarily for employee severance and other costs associated with facility consolidations in the U.S. and Europe, as well as abandoned facilities costs associated with the remediation and closure of a manufacturing facility in the U.S.

Specialty Diagnostics

In 2018, the Specialty Diagnostics segment recorded $2 million of net restructuring and other charges, including $3 million of net charges to selling, general, and administrative expense, principally third-party transaction costs in connection with the planned sale of the Anatomical Pathology business. The segment also recorded $1 million of net restructuring and other income, including a $6 million gain on the sale of real estate, mostly offset by cash charges for severance and other costs associated with facility consolidations in the U.S. and Europe.

Laboratory Products and Services

In 2018, the Laboratory Products and Services segment recorded $52 million of net restructuring and other charges. The segment recorded charges to cost of revenues of $5 million, principally for the sales of inventory revalued at the date of acquisition, and $16 million of charges to selling, general, and administrative expenses for third-party transaction/integration costs related to the acquisition of Patheon. The segment also recorded $31 million of restructuring and other costs, primarily charges for environmental remediation associated with a Superfund site in the U.S., employee severance, and, to a lesser extent, hurricane response costs.

The following table summarizes the changes in the company's accrued restructuring balance. Other amounts reported as restructuring and other costs, net, in the accompanying statement of income have been summarized in the notes to the table. Accrued restructuring costs are included in other accrued expenses in the accompanying balance sheet.

(In millions)	Total (a)
Balance at December 31, 2017	$ 76
Net restructuring charges incurred in 2018 (b)	88
Payments	(83)
Currency translation	(1)
Balance at December 31, 2018	80
Cumulative effect of accounting change (c)	(28)
Net restructuring charges incurred in 2019 (d)	52
Payments	(69)
Currency translation	(1)
Balance at December 31, 2019	34
Net restructuring charges incurred in 2020 (e)	51
Payments	(57)
Currency translation and other	(7)
Balance at December 31, 2020	$ 21

(a) The movements in the restructuring liability principally consist of severance and other costs such as relocation and moving expenses associated with facility consolidations, as well as employee retention costs which are accrued ratably over the period through which employees must work to qualify for a payment; and in 2018, abandoned facility costs associated with facility consolidations in the U.S.
(b) Excludes $38 million of income, net, associated with litigation-related matters, gains on sales of real estate, charges for environmental remediation, and hurricane response costs.
(c) Impact of adopting new lease accounting guidance on January 1, 2019.
(d) Excludes $482 million of net gain on the sale of businesses, and $17 million of other restructuring charges, net, primarily for the write-off of acquired technology, pre-acquisition litigation-related matters, and compensation due to employees on the date of acquisition.
(e) Excludes $48 million of other restructuring charges, net, primarily for the write-off of acquired technology, fixed asset writedowns, and costs associated with environmental remediation at abandoned/previously owned facilities.

The company expects to pay accrued restructuring costs primarily through 2021.

Note 17. Subsequent Events

Acquisitions

On January 15, 2021, the company acquired, within the Laboratory Products and Services segment, the Belgium-based European viral vector manufacturing business of Groupe Novasep SAS for approximately $853 million in cash. The European viral vector manufacturing business provides contract manufacturing services for vaccines and therapies to biotechnology companies and large biopharma customers. The acquisition expands the segment's capabilities for cell and gene vaccines and therapies. The initial purchase price allocation for the acquisition is expected to be completed by the end of the first quarter of 2021.

On January 15, 2021, the company entered into a definitive agreement to acquire Mesa Biotech, Inc., a U.S.-based molecular diagnostic company, for approximately $450 million in cash and up to an additional $100 million in cash upon the completion of certain milestones following the close of the transaction. Mesa Biotech has developed and commercialized a PCR-based rapid point-of-care testing platform available for detecting infectious diseases including SARS-CoV-2, Influenza A and B, respiratory syncytial virus and Strep A. The acquisition will enable the company to accelerate the availability of reliable and accurate advanced molecular diagnostics at the point of care. The transaction is expected to be completed in the first quarter of 2021, subject to customary closing conditions. Upon completion, the business will become part of the Life Sciences Solutions segment.

THERMO FISHER SCIENTIFIC INC.

RESTRICTED STOCK UNIT AGREEMENT

Granted Under
the [Name of Equity Incentive Plan]

1. Award of Restricted Stock Units.

This agreement (the "Agreement") sets forth the terms and conditions of an award by Thermo Fisher Scientific Inc., a Delaware corporation, on _____, 20__ (the "Award Date") to Marc N. Casper (the "Participant") of _____ restricted stock units of the Company (individually, an "RSU" and collectively, the "RSUs" or the "Award"). Each RSU represents the right to receive one share of common stock, $1.00 par value, of the Company ("Common Stock") pursuant to the terms, conditions and restrictions set forth in this Agreement and in the Company's [Name of Equity Incentive] (the "Plan"). The shares of Common Stock that are issuable in connection with the RSUs are referred to in this Agreement as Shares. Capitalized terms used in this Agreement and not otherwise defined shall have the same meaning as in the Plan.

2. Time-Based Vesting.

Except as otherwise provided in paragraphs (b) through (f) of Section 3, the RSUs shall vest as to 15% of the original number of RSUs on the date that is six months following the Award Date (the "First Vesting Date"), as to an additional 25% of the original number of RSUs on the first anniversary of the First Vesting Date (the "Second Vesting Date"), as to an additional 30% of the original number of RSUs on the second anniversary of the First Vesting Date (the "Third Vesting Date"), and as to an additional 30% of the original number of RSUs on the third anniversary of the First Vesting Date (the "Final Vesting Date" and each of the First Vesting Date, Second Vesting Date, Third Vesting Date and Final Vesting Date a "Vesting Date") provided that on each such Vesting Date, the Participant is, and has been at all times since the Award Date, an employee, officer or director of, or consultant or advisor to, the Company (an "Eligible Participant").

3. Additional Vesting Provisions.

(a) Termination of Relationship with the Company. In the event that the Participant ceases to be an Eligible Participant for any reason not described in paragraphs (b) through (f) below, RSUs that have not previously vested shall be immediately forfeited to the Company.

(b) Death or Disability. In the event that the Participant's employment with the Company or a Subsidiary is terminated by reason of death or "disability" (as defined below)

prior to the Final Vesting Date, the RSUs that have not previously vested shall vest 100% upon the date of such termination due to death or disability. For the purposes of this Agreement, a Participant shall be deemed to be "disabled" at such time as the Participant is receiving disability benefits under the Company's Long Term Disability Coverage, as then in effect; provided however that the Participant shall not be treated as disabled unless the disability is described under Section 409A.

(c) Discharge without Cause or for Good Reason. In the event that the Participant's employment or service is terminated by the Company or any Subsidiary without "Cause" (as defined in Section 1.2 of the 2009 Restatement of Executive Severance Agreement between the Company and the Participant dated November 21, 2009, as may be amended from time to time (the "Severance Agreement")) or by the Participant for Good Reason (as defined in Section 1.4 of the Severance Agreement), and such termination does not entitle the Participant to severance benefits under the Executive Change in Control Retention Agreement between the Company and the Participant dated November 21, 2009, as may be amended from time to time (the "CIC Agreement"), the RSUs that are scheduled to vest on the next Vesting Date will vest on such Vesting Date (and the Participant shall be deemed to have been an Eligible Participant up through such Vesting Date), and the remaining RSUs shall be forfeited.

(d) Discharge for Cause. In the event that the Participant is discharged by the Company or a Subsidiary for "Cause" (as defined in Section 1.2 of the Severance Agreement), all unvested RSUs and all vested RSUs that have not been delivered in accordance with Section 4 below shall terminate immediately upon the effective date of such discharge. The Participant shall be considered to have been discharged for Cause if the Company determines, within 30 days after the Participant's resignation, that discharge for Cause was warranted.

(e) Termination by Participant without Good Reason. In the event that the Participant terminates his employment with the Company or a Subsidiary without "Good Reason" (as defined in Section 1.4 of the Severance Agreement or Section 1.4 of the CIC Agreement, as applicable), all unvested RSUs shall terminate immediately upon the effective date of such termination and all vested RSUs that have not been delivered in accordance with Section 4 below shall be delivered immediately.

(f) Change in Control Event. In the event that the Participant's employment or service is terminated by the Company or any Subsidiary without "Cause" (as defined in Section 1.3 of the CIC Agreement) or by the Participant for Good Reason (as defined in Section 1.4 of the CIC Agreement) and such termination entitles the Participant to severance benefits under the CIC Agreement, then all unvested RSUs shall vest upon the date of such termination.

4. Delivery of Shares

(a) The Company shall deliver the Shares that become issuable pursuant to an RSU within the sixty (60) day period following the date the RSUs vest pursuant to Section 2 or 3 above.

(b) The Company shall not be obligated to deliver Shares to the Participant unless the issuance and delivery of such Shares shall comply with all relevant provisions of law and other legal requirements including, without limitation, any applicable federal or state securities laws and the requirements of any stock exchange upon which shares of Common Stock may then be listed.

5. Restrictions on Transfer.

The Participant shall not sell, assign, transfer, pledge, hypothecate or otherwise dispose of, by operation of law or otherwise (collectively "transfer") any RSUs, or any interest therein, except by will or the laws of descent and distribution. Upon delivery of Shares pursuant to Section 4 above, the Participant for two years thereafter shall not transfer more than 50% of the actual net Shares delivered (after withholding for the payment of taxes); provided, however, that this restriction shall not apply to a termination of Participant's employment under paragraphs (b), (c), (e) or (f) of Section 3 above. The Participant acknowledges that any stock certificates or other evidence of ownership of RSUs or Shares may bear a restrictive legend evidencing any applicable transfer restrictions.

6. Provisions of the Plan.

This Agreement is subject to the provisions of the Plan, a copy of which is furnished to the Participant with this Agreement.

7. Dividends; Other Corporate Transactions.

(a) If at any time during the period between the Award Date and the date that Shares are delivered after the RSU vests, the Company pays a dividend or other distribution with respect to its Common Stock, including without limitation a distribution of shares of the Company's stock by reason of a stock dividend, stock split or otherwise, then on the date the Shares issuable upon vesting of the RSU are delivered, the Company shall pay the Participant the dividend or other distribution that would have been paid on such Shares if the Participant had owned such Shares during the period beginning on the Award Date and ending on the respective delivery date. No dividend or other distribution shall be paid with respect to RSUs that are forfeited.

(b) In the event of a Reorganization Event, then the rights of the Company under this Agreement and all other terms of this Agreement (including without limitation vesting provisions) shall inure to the benefit of the Company's successor and shall apply to the cash, securities or other property which the Common Stock was converted into or exchanged for pursuant to such Reorganization Event in the same manner and to the same extent as they applied to the Shares. Such cash, securities or other property shall be delivered or paid at the time provided in Section 4.

(c) Except as set forth in Section 7(a) or (b) above and in the Plan, neither the Participant nor any person claiming under or through the Participant shall be, or have any rights

or privileges of, a stockholder of the Company in respect of the Shares issuable pursuant to the RSUs granted hereunder until the Shares have been delivered to the Participant.

8. Withholding Taxes; No Section 83(b) Election.

(a) The Participant expressly acknowledges that the delivery of Shares to the Participant will give rise to "wages" subject to withholding. Unless the Participant provides notice to the Company prior to the delivery of the Shares that the Participant will make payment to the Company on the date of delivery to satisfy all required withholding taxes, the Participant hereby authorizes the Company to hold back from the shares to be delivered pursuant to Section 4 of this Agreement that number of shares calculated to satisfy all such federal, state, local or other applicable taxes required to be withheld in connection with such delivery of Shares; provided, however, that the total tax withholding where Shares are being used to satisfy such tax obligations cannot exceed the Company's minimum statutory withholding obligations (based on minimum statutory withholding rates for federal and state tax purposes, including payroll taxes, that are applicable to such wages).

(b) The Participant acknowledges that no election under Section 83(b) of the Code may be filed with respect to this Award.

9. No Right To Employment or Other Status. The grant of an award of RSUs shall not be construed as giving the Participant the right to continued employment or any other relationship with the Company. The Company expressly reserves the right at any time to dismiss or otherwise terminate its relationship with the Participant free from any liability or claim under the Plan or this Agreement, except as expressly provided herein.

10. Conflicts With Other Agreements. In the event of any conflict or inconsistency between the terms of this Agreement and any employment, severance or other agreement between the Company and the Participant, the terms of this Agreement shall govern.

11. Governing Law. This Agreement shall be governed by and interpreted in accordance with the laws of the State of Delaware without regard to any applicable conflicts of laws and in the event of a dispute related to or arising out of this Agreement, the parties submit to the exclusive jurisdiction and venue of the Delaware federal and Chancery Courts. Notwithstanding the foregoing, for any Termination (defined below), Recapture (defined below), and/or Reimbursement (defined below) that is based, in whole or in part, on the Participant's breach of a noncompete agreement or nonsolicitation obligation, such disputes shall be governed by and interpreted in accordance with the laws of the State of Massachusetts, and any dispute arising out of this Agreement shall be asserted exclusively in the federal or state courts located in or covering the county in which the employee resides within the State of Massachusetts, and the parties hereby submit to the personal jurisdiction and venue of those state and federal courts.

12. Unfunded Rights. The right of the Participant to receive Common Stock pursuant to this Agreement is an unfunded and unsecured obligation of the Company. The Participant shall have

no rights under this Agreement other than those of an unsecured general creditor of the Company.

13. Compliance with Section 409A of the Code. This Agreement is intended to provide for deferred compensation that is exempt from or compliant with Section 409A and shall be interpreted consistently with such intent. Accordingly, a Participant shall have no right to designate the taxable year of payment. Notwithstanding any other provision of this Agreement, if and to the extent any portion of any payment under this Agreement to the Participant is payable upon his or her separation from service and the Participant is a specified employee as defined in Section 409A(a)(2)(B)(i), as determined by the Company in accordance with its procedures, by which determination the Participant (through accepting the Award) agrees that he or she is bound, such portion of the payment, compensation or other benefit shall not be paid before the day that is six months plus one day after the date of "separation from service", except as Section 409A may then permit.

The Company makes no representations or warranty and shall have no liability to the Participant or any other person if any provisions of or payments, compensation or other benefits under this Agreement are determined to constitute nonqualified deferred compensation subject to Section 409A but do not satisfy the conditions of that section.

14. Clawback. In accepting this Award, the Participant expressly agrees to be bound by, and subject to, the following clawback policy and any clawback policy that the Company has in effect or may adopt in the future:

(a) The Award is intended to align the Participant's long-term interests with those of the Company. Accordingly, unless otherwise expressly provided in the Plan or any other applicable agreement, plan, or policy, and to the extent permitted by applicable law, the Company may terminate any unsettled RSUs, whether vested or unvested ("Termination"), recapture any Shares acquired pursuant to the RSUs ("Recapture"), or require the Participant to reimburse the Company for any and all amounts realized from the acquisition or disposition of Shares acquired pursuant to the RSUs ("Reimbursement"), upon the occurrence of any of the following events (collectively, the "Conditions"):

(i) the Participant has engaged in misuse of the Company's confidential information and/or conduct in breach of any (A) confidentiality obligation to the Company under any agreement between the Company and the Participant, or any policy or plan of the Company, including but not limited to, the Company's standard form of Information and Invention Agreement applicable to such Participant, or (B) applicable noncompetition or nonsolicitation obligation to the Company under any applicable agreement between the Company and the Participant, or any policy or plan of the Company, including but not limited to the Company's standard form of Noncompetition Agreement applicable to such Participant;

(ii) the Participant has been discharged by the Company or a Subsidiary for "Cause" (as defined in Section 1.2 of the Severance Agreement); or

(iii) during his or her employment, the Participant (A) has rendered services to or otherwise directly or indirectly engaged in or assisted, any organization or business that, in the judgment of the Company in its sole and absolute discretion, is against the interest of the Company or one of its Affiliates; or (B) has engaged in activities that are materially prejudicial to or in conflict with the interests of the Company, including any breaches of fiduciary duty or the duty of loyalty.

For purposes of this Section 14, "RSU Benefits" shall mean any and all amounts realized from the acquisition or disposition of Shares acquired pursuant to the RSUs, including any sales proceeds, dividends and/or dividend equivalents.

(b) Prior to the issuance of any Shares upon settlement of vested RSUs pursuant to this Agreement, the Participant shall, if requested in writing by the Company, certify on a form acceptable to the Company that the Participant is in compliance with the terms and conditions of this Agreement and with the obligations contained in the Plan, or any other relevant agreement, plan, or contract listed in Section 14(a).

(c) Within ten (10) calendar days after receiving notice from the Company of any such activity described in Section 14(a) of this Agreement, the Participant shall either deliver to the Company the applicable Shares or make a cash payment to the Company equal to the RSU Benefits. For purposes of the Company's exercise of its Recapture and/or Reimbursement rights hereunder, the Participant expressly and explicitly authorizes the Company to issue instructions, on the Participant's behalf, to any brokerage firm and/or third-party administrator engaged by the Company to hold Shares and other amounts acquired under the Plan to re-convey, transfer or otherwise return such Shares and/or other amounts to the Company.

(d) Notwithstanding the foregoing provisions of this Section 14, the Company may, in its sole and absolute discretion, choose to refrain from exercising its rights of Termination, Recapture and/or Reimbursement with respect to any particular act of the Participant or with respect to any other participant in the Plan, and its determination to refrain from exercising such rights shall not in any way reduce or eliminate the Company's authority to exercise its rights of Termination, Recapture and/or Reimbursement with respect to any other act of the Participant. Nothing in this Section 14 shall be construed to impose obligations on the Participant to refrain from engaging in lawful competition with the Company after the termination of employment that does not violate the Conditions, other than any obligations that are part of any applicable separate agreement between the Company and the Participant or that arise under applicable law.

(e) Notwithstanding anything to the contrary in the Plan or this Agreement, the Company shall not seek to exercise its rights of Termination, Recapture or Reimbursement relating to any RSUs that were vested and settled more than twelve (12) months prior to the date of the Participant's act or omission set forth in Section 14(a). All RSUs shall be subject to the Company's rights of Termination, Recapture and/or Reimbursement to the extent required by applicable law, including but not limited to Section 10D of the Securities Exchange Act of 1934.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

THERMO FISHER SCIENTIFIC INC.

By: _____

Name: Michael A. Boxer
Title: Senior Vice President and General Counsel

_____

Marc N. Casper

THERMO FISHER SCIENTIFIC INC.

PERFORMANCE RESTRICTED STOCK UNIT AGREEMENT

Granted Under the [Name of Equity Incentive Plan]

1. Award of Restricted Stock Units.

This agreement (the "Agreement") sets forth the terms and conditions of an award by Thermo Fisher Scientific Inc., a Delaware corporation (the "Company"), on ____, 20__ (the "Award Date") to Marc N. Casper (the "Participant") of ___ restricted stock units of the Company (individually, an "RSU" and collectively, the "RSUs" or the "Award"). Each RSU represents the right to receive one share of common stock, $1.00 par value, of the Company ("Common Stock") pursuant to the terms, conditions and restrictions set forth in this Agreement and in the Company's [Name of Equity Incentive Plan] (the "Plan"). The shares of Common Stock that are issuable upon vesting of the RSUs are referred to in this Agreement as Shares and the number of RSUs shown above is referred to as the "Target Award." Capitalized terms used in this Agreement and not otherwise defined shall have the same meaning as in the Plan.

2. Vesting Schedule.

Except as otherwise provided in paragraphs (b) through (f) of Section 3, the RSUs shall vest in accordance with Schedule A attached hereto and incorporated herein provided that on each Vesting Date (as defined in Schedule A), the Participant is, and has been at all times since the Award Date, an employee, officer or director of, or consultant or advisor to, the Company or any other entity the employees, officers, directors, consultants, or advisors of which are eligible to receive restricted stock awards under the Plan (an "Eligible Participant").

3. Additional Vesting Provisions.

(a) Termination of Relationship with the Company. In the event that the Participant ceases to be an Eligible Participant for any reason other than those set forth in paragraphs (b) through (f) below before the Final Vesting Date (as defined in Schedule A), the RSUs that have not previously vested shall be immediately forfeited to the Company.

(b) Death or Disability. In the event that the Participant's employment with the Company or a Subsidiary is terminated by reason of death or "disability" (as defined below) prior to the Performance Certification Date (as defined in Schedule A), 50% of the Target Award shall vest upon the date of such termination. In the event that such termination occurs on or after the Performance Certification Date but prior to the Final Vesting Date, the RSUs that have not previously vested (based on the number of RSUs determined on the Performance Certification Date to be eligible to be received) shall vest 100% upon the date of such termination due to death or disability. For the purposes of this Agreement, a Participant shall be deemed to be "disabled"

at such time as the Participant is receiving disability benefits under the Company's Long Term Disability Coverage, as then in effect; provided however that the Participant shall not be treated as disabled unless the disability is described under Section 409A.

(c) Discharge without Cause or for Good Reason. In the event that the Participant's employment or service is terminated by the Company or any Subsidiary after the last day of the Company's fiscal quarter in which this Award was granted, and prior to the Performance Certification Date without "Cause" (as defined in Section 1.2 of the 2009 Restatement of Executive Severance Agreement between the Company and the Participant dated November 21, 2009, as may be amended from time to time (the "Severance Agreement")) or by the Participant for Good Reason (as defined in Section 1.4 of the Severance Agreement), and such termination does not entitle the Participant to severance benefits under the Executive Change in Control Retention Agreement between the Company and the Participant dated November 21, 2009, as may be amended from time to time (the "CIC Agreement"), and provided that the performance conditions (assuming the last day of the performance period was the last day of the prior fiscal quarter) are actually achieved and the Compensation Committee has certified the achievement of the performance conditions, then 1/3 of the RSUs shall vest immediately. In the event of such termination on or after the Performance Certification Date but prior to the Final Vesting Date, then the RSUs that are scheduled to vest on the next Vesting Date (based on the number of RSUs determined on the Performance Certification Date to be eligible to be received) shall vest upon the date of such termination, and the remaining RSUs shall be forfeited.

(d) Discharge for Cause. In the event that the Participant is discharged by the Company or a Subsidiary for "Cause" (as defined in Section 1.2 of the Severance Agreement), all unvested RSUs and all vested RSUs that have not been delivered in accordance with Section 4 below shall terminate immediately upon the effective date of such discharge. The Participant shall be considered to have been discharged for Cause if the Company determines, within 30 days after the Participant's resignation, that discharge for Cause was warranted.

(e) Termination by Participant without Good Reason. In the event that the Participant terminates his employment with the Company or a Subsidiary without "Good Reason" (as defined in Section 1.4 of the Severance Agreement or Section 1.4 of the CIC Agreement, as applicable), all unvested RSUs shall terminate immediately upon the effective date of such termination and all vested RSUs that have not been delivered in accordance with Section 4 below shall be delivered immediately.

(f) Change in Control Event. In the event that the Participant's employment or service is terminated by the Company or any Subsidiary without "Cause" (as defined in Section 1.3 of the CIC Agreement) or by the Participant for Good Reason (as defined in Section 1.4 of the CIC Agreement), within 18 months after a Change in Control Event that occurs prior to the Performance Certification Date, and such termination entitles the Participant to severance benefits under the CIC Agreement, then all unvested RSUs shall vest immediately, provided that the performance conditions (assuming the last day of the performance period was the last day of the fiscal quarter immediately prior to the Change in Control Event) are actually achieved (without regard to performance for any periods following the last day of the fiscal quarter

immediately prior to the Change in Control Event) and the Compensation Committee has certified the achievement of the performance conditions. In the event of such termination on or after the Performance Certification Date but before the Final Vesting Date, then all unvested RSUs (based on the number of RSUs determined on the Performance Certification Date to be eligible to be received, as adjusted pursuant to the provisions of Schedule A) shall vest upon the date of such termination.

4. Delivery of Shares

(a) The Company shall deliver the Shares that become issuable upon the vesting of an RSU (i) to the Participant as soon as administratively practicable or (ii) in the event that the Participant's employment with the Company is terminated by reason of death, to the Participant's estate as soon as administratively practicable, but in no event later than the last day of the period specified in Treas. Reg. section 1.409A-1(b)(4)(i)(A).

(b) The Company shall not be obligated to deliver Shares to the Participant unless the issuance and delivery of such Shares shall comply with all relevant provisions of law and other legal requirements including, without limitation, any applicable federal or state securities laws and the requirements of any stock exchange upon which shares of Common Stock may then be listed.

5. Restrictions on Transfer.

The Participant shall not sell, assign, transfer, pledge, hypothecate or otherwise dispose of, by operation of law or otherwise (collectively "transfer") any RSUs, or any interest therein, except by will or the laws of descent and distribution. Upon delivery of Shares pursuant to Section 4 above, the Participant for two years thereafter shall not transfer more than 50% of the actual net Shares delivered (after withholding for the payment of taxes); provided, however, that this restriction shall not apply to a termination of Participant's employment under paragraphs (b), (c), (e) or (f) of Section 3 above. The Participant acknowledges that any stock certificates or other evidence of ownership of RSUs or Shares may bear a restrictive legend evidencing any applicable transfer restrictions.

6. Provisions of the Plan.

This Agreement is subject to the provisions of the Plan, a copy of which is furnished to the Participant with this Agreement.

7. Dividends; Other Corporate Transactions.

(a) If at any time during the period between the Performance Certification Date and the date that Shares are delivered after the RSU vests, the Company pays a dividend or other distribution with respect to its Common Stock, including without limitation a distribution of shares of the Company's stock by reason of a stock dividend, stock split or otherwise, then on the date the Shares issuable upon vesting of the RSU are delivered, the Company shall pay the

Participant the dividend or other distribution that would have been paid on such Shares if the Participant had owned such Shares during the period beginning on the Performance Certification Date and ending on the respective delivery date. No dividend or other distribution shall be paid with respect to RSUs that are forfeited.

(b) In the event of a Reorganization Event, then the rights of the Company under this Agreement and all other terms of this Agreement (including without limitation vesting provisions) shall inure to the benefit of the Company's successor and shall apply to the cash, securities or other property which the Common Stock was converted into or exchanged for pursuant to such Reorganization Event in the same manner and to the same extent as they applied to the Shares. Such cash, securities or other property shall be delivered or paid at the time provided in Section 4.

(c) Except as set forth in Section 7(a) or (b) above and in the Plan, neither the Participant nor any person claiming under or through the Participant shall be, or have any rights or privileges of, a stockholder of the Company in respect of the Shares issuable pursuant to the RSUs granted hereunder until the Shares have been delivered to the Participant.

8. Withholding Taxes; No Section 83(b) Election.

(a) The Participant expressly acknowledges that the delivery of Shares to the Participant will give rise to "wages" subject to withholding. Unless the Participant provides notice to the Company prior to the delivery of the Shares that the Participant will make payment to the Company on the date of delivery to satisfy all required withholding taxes, the Participant hereby authorizes the Company to hold back from the shares to be delivered pursuant to Section 4 of this Agreement of that number of shares calculated to satisfy all such federal, state, local or other applicable taxes required to be withheld in connection with such delivery of Shares; provided, however, that the total tax withholding where Shares are being used to satisfy such tax obligations cannot exceed the Company’s minimum statutory withholding obligations (based on minimum statutory withholding rates for federal and state tax purposes, including payroll taxes, that are applicable to such wages).

(b) The Participant acknowledges that no election under Section 83(b) of the Code may be filed with respect to this Award.

9. No Right To Employment or Other Status. The grant of an award of RSUs shall not be construed as giving the Participant the right to continued employment or any other relationship with the Company. The Company expressly reserves the right at any time to dismiss or otherwise terminate its relationship with the Participant free from any liability or claim under the Plan or this Agreement, except as expressly provided herein.

10. Conflicts With Other Agreements. In the event of any conflict or inconsistency between the terms of this Agreement and any employment, severance or other agreement between the Company and the Participant, the terms of this Agreement shall govern.

11. Governing Law. This Agreement shall be governed by and interpreted in accordance with the laws of the State of Delaware without regard to any applicable conflicts of laws and in the event of a dispute related to or arising out of this Agreement, the parties submit to the exclusive jurisdiction and venue of the Delaware federal and Chancery Courts. Notwithstanding the foregoing, for any Termination (defined below), Recapture (defined below), and/or Reimbursement (defined below) that is based, in whole or in part, on the Participant's breach of a noncompete agreement or nonsolicitation obligation, such disputes shall be governed by and interpreted in accordance with the laws of the State of Massachusetts, and any dispute arising out of this Agreement shall be asserted exclusively in the federal or state courts located in or covering the county in which the employee resides within the State of Massachusetts, and the parties hereby submit to the personal jurisdiction and venue of those state and federal courts.

12. Unfunded Rights. The right of the Participant to receive Common Stock pursuant to this Agreement is an unfunded and unsecured obligation of the Company. The Participant shall have no rights under this Agreement other than those of an unsecured general creditor of the Company.

13. Compliance with Section 409A of the Code. This Agreement is intended to provide for deferred compensation that is exempt from or compliant with Section 409A and shall be interpreted consistently with such intent. Accordingly, a Participant shall have no right to designate the taxable year of payment. Notwithstanding any other provision of this Agreement, if and to the extent any portion of any payment under this Agreement to the Participant is payable upon his or her separation from service and the Participant is a specified employee as defined in Section 409A(a)(2)(B)(i), as determined by the Company in accordance with its procedures, by which determination the Participant (through accepting the Award) agrees that he or she is bound, such portion of the payment, compensation or other benefit shall not be paid before the day that is six months plus one day after the date of "separation from service", except as Section 409A may then permit.

The Company makes no representations or warranty and shall have no liability to the Participant or any other person if any provisions of or payments, compensation or other benefits under this Agreement are determined to constitute nonqualified deferred compensation subject to Section 409A but do not to satisfy the conditions of that section.

14. Clawback. In accepting this Award, the Participant expressly agrees to be bound by, and subject to, the following clawback policy and any clawback policy that the Company has in effect or may adopt in the future:

(a) Award is intended to align the Participant's long-term interests with those of the Company. Accordingly, unless otherwise expressly provided in the Plan or any other applicable agreement, plan, or policy, and to the extent permitted by applicable law, the Company may terminate any unsettled RSUs, whether vested or unvested ("Termination"), recapture any Shares acquired pursuant to the RSUs ("Recapture"), or require the Participant to reimburse the Company for any and all amounts realized from the acquisition or disposition of

Shares acquired pursuant to the RSUs ("Reimbursement"), upon the occurrence of any of the following events (collectively, the "Conditions"):

(i) the Participant has engaged in misuse of the Company's confidential information and/or conduct in breach of any (A) confidentiality obligation to the Company under any agreement between the Company and the Participant, or any policy or plan of the Company, including but not limited to, the Company's standard form of Information and Invention Agreement applicable to such Participant, or (B) applicable noncompetition or nonsolicitation obligation to the Company under any applicable agreement between the Company and the Participant, or any policy or plan of the Company, including but not limited to the Company's standard form of Noncompetition Agreement applicable to such Participant;

(ii) the Participant has been discharged by the Company or a Subsidiary for "Cause" (as defined in Section 1.2 of the Severance Agreement); or

(iii) during his or her employment, the Participant (A) has rendered services to or otherwise directly or indirectly engaged in or assisted, any organization or business that, in the judgment of the Company in its sole and absolute discretion, is against the interest of the Company or one of its Affiliates; or (B) has engaged in activities that are materially prejudicial to or in conflict with the interests of the Company, including any breaches of fiduciary duty or the duty of loyalty.

For purposes of this Section 14, "RSU Benefits" shall mean any and all amounts realized from the acquisition or disposition of Shares acquired pursuant to the RSUs, including any sales proceeds, dividends and/or dividend equivalents.

(b) Prior to the issuance of any Shares upon settlement of vested RSUs pursuant to this Agreement, the Participant shall, if requested in writing by the Company, certify on a form acceptable to the Company that the Participant is in compliance with the terms and conditions of this Agreement and with the obligations contained in the Plan, or any other relevant agreement, plan, or contract listed in Section 14(a).

(c) Within ten (10) calendar days after receiving notice from the Company of any such activity described in Section 14(a) of this Agreement, the Participant shall either deliver to the Company the applicable Shares or make a cash payment to the Company equal to the RSU Benefits. For purposes of the Company's exercise of its Recapture and/or Reimbursement rights hereunder, the Participant expressly and explicitly authorizes the Company to issue instructions, on the Participant's behalf, to any brokerage firm and/or third-party administrator engaged by the Company to hold Shares and other amounts acquired under the Plan to re-convey, transfer or otherwise return such Shares and/or other amounts to the Company.

(d) Notwithstanding the foregoing provisions of this Section 14, the Company may, in its sole and absolute discretion, choose to refrain from exercising its rights of Termination, Recapture and/or Reimbursement with respect to any particular act of the Participant or with respect to any other participant in the Plan, and its determination to refrain from exercising such

rights shall not in any way reduce or eliminate the Company's authority to exercise its rights of Termination, Recapture and/or Reimbursement with respect to any other act of the Participant. Nothing in this Section 14 shall be construed to impose obligations on the Participant to refrain from engaging in lawful competition with the Company after the termination of employment that does not violate the Conditions, other than any obligations that are part of any applicable separate agreement between the Company and the Participant or that arise under applicable law.

(e) Notwithstanding anything to the contrary in the Plan or this Agreement, the Company shall not seek to exercise its rights of Termination, Recapture or Reimbursement relating to any RSUs that were vested and settled more than twelve (12) months prior to the date of the Participant's act or omission set forth in Section 14(a). All RSUs shall be subject to the Company's rights of Termination, Recapture and/or Reimbursement to the extent required by applicable law, including but not limited to Section 10D of the Securities Exchange Act of 1934.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

THERMO FISHER SCIENTIFIC INC.

By: _____

Name: Michael A. Boxer
Title: Senior Vice President and General Counsel

_____

Marc N. Casper

THERMO FISHER SCIENTIFIC INC.

PERFORMANCE RESTRICTED STOCK UNIT AGREEMENT

Granted Under
the [**Name of Equity Incentive Plan**]

1. Award of Restricted Stock Units.

This agreement (the "Agreement") sets forth the terms and conditions of an award by Thermo Fisher Scientific Inc., a Delaware corporation (the "Company"), on _____, 20__ (the "Award Date") to _____ (the "Participant") of _____ restricted stock units of the Company (individually, an "RSU" and collectively, the "RSUs" or the "Award"). Each RSU represents the right to receive one share of common stock, $1.00 par value, of the Company ("Common Stock") pursuant to the terms, conditions and restrictions set forth in this Agreement and in the Company's [**Name of Equity Incentive Plan**] (the "Plan"). The shares of Common Stock that are issuable upon vesting of the RSUs are referred to in this Agreement as Shares and the number of RSUs shown above is referred to as the "Target Award." Capitalized terms used in this Agreement and not otherwise defined shall have the same meaning as in the Plan.

2. Vesting Schedule.

Except as otherwise provided in paragraphs (b) through (d) of Section 3, the RSUs shall vest in accordance with Schedule A attached hereto and incorporated herein provided that on each Vesting Date (as defined in Schedule A), the Participant is, and has been at all times since the Award Date, an employee, officer or director of, or consultant or advisor to, the Company (an "Eligible Participant").

3. Additional Vesting Provisions.

(a) Termination of Relationship with the Company. In the event that the Participant ceases to be an Eligible Participant for any reason other than those set forth in paragraphs (b) through (d) below before the Final Vesting Date (as defined in Schedule A), the RSUs that have not previously vested shall be immediately forfeited to the Company.

(b) Death or Disability. In the event that the Participant's employment with the Company is terminated by reason of death or Disability after the Performance Certification Date (as defined in Schedule A) but prior to the Final Vesting Date, then all unvested RSUs (based on the number of RSUs determined on the Performance Certification Date to be eligible to be received) shall vest 100% upon the date of such termination due to death or Disability.

(c) Change in Control Event. In the event that the Participant's employment or service is terminated by the Company due to a Qualifying Termination (as defined in Section 5(c) below) within 18 months after a Change in Control Event that occurs prior to the

Performance Certification Date, then all unvested RSUs (based on the number of RSUs determined to be eligible to be received assuming the last day of the performance period was the last day of the fiscal quarter immediately prior to the Change in Control Event) shall vest immediately upon such Qualifying Termination (without regard to performance for any periods following the last day of the fiscal quarter immediately prior to the Change in Control Event), provided that the Compensation Committee of the Board of Directors has certified the achievement of the performance conditions. In the event of such termination on or after the Performance Certification Date but before the Final Vesting Date, then all unvested RSUs (based on the number of RSUs determined on the Performance Certification Date to be eligible to be received, as adjusted pursuant to the provisions of Schedule A) shall vest upon the date of such termination.

(d) Retirement. If the Participant Retires from the Company after the later of (i) the Performance Certification Date or (ii) the second anniversary of the Award Date, then nevertheless the Participant shall become vested in the remaining RSUs to be delivered (calculated based on the units earned as of the Performance Certification Date, as adjusted pursuant to the provisions of Schedule A).

(e) Discharge for Cause. In the event that the Participant is discharged by the Company for Cause (as defined below), all unvested RSUs and all vested RSUs that have not been delivered in accordance with Section 4 below shall terminate immediately upon the effective date of such discharge. The Participant shall be considered to have been discharged for Cause if the Company determines, within thirty (30) days after the Participant's resignation, that discharge for Cause was warranted.

4. Delivery of Shares.

(a) Except as provided in (b) below, the Company shall deliver the Shares that become issuable pursuant to an RSU within the sixty (60) day period following the date the RSUs vest pursuant to Sections 2 or 3 above, but in no event later than the last day of the period specified in Treas. Reg. section 1.409A-1(b)(4)(i)(A).

(b) In the event that the Participant Retires under the conditions of Section 3(d) above, the Company shall deliver the Shares that become issuable pursuant to an RSU, to the extent not previously delivered, within the sixty (60) day period following the date such RSUs would have vested had the Participant remained employed with the Company.

(c) The Company shall not be obligated to deliver Shares to the Participant unless the issuance and delivery of such Shares shall comply with all relevant provisions of law and other legal requirements including, without limitation, any applicable federal or state securities laws and the requirements of any stock exchange upon which shares of Common Stock may then be listed.

5. Meaning and Use of Certain Terms.

For purposes of this Agreement,

(a) "Change in Control Event" has the meaning ascribed to it in the Plan, except that for purposes of Section 4, the liquidation of the Company shall not be treated as a Change in Control Event. Payments in connection with the liquidation of the Company shall be made only as permitted under Section 409A of the Treasury Regulations Code ("Section 409A").

(b) "Disability" or "Disabled." A Participant shall be deemed to be disabled at such time as the Participant is receiving disability benefits under the Company's Long Term Disability Coverage, as then in effect; provided however that the Participant shall not be treated as Disabled unless the disability is described under Section 409A.

(c) "Qualifying Termination." A Participant has a Qualifying Termination if the Participant's employment or service is terminated by the Company without Cause or by the Participant for Good Reason and such termination results in a separation from service under Section 409A.

(d) "Retire" or "Retirement." A Participant shall be deemed to have retired from the Company upon his or her resignation from employment with the Company either (i) after the age of fifty-five (55) and the completion of ten (10) continuous years of service to the Company comprising at least twenty (20) hours per week or (ii) after the age of sixty (60) and the completion of five (5) continuous years of service to the Company comprising at least twenty (20) hours per week. For purposes of this Agreement and for the sake of clarity, subject to execution of a release of claims in a form acceptable to the Company, the Participant may seek to re-characterize any termination of employment initiated by the Company, or a subsidiary of the Company, that is not a "termination for Cause" as a voluntary termination by reason of Retirement, in which case the Participant shall not be entitled to receive any severance or other benefits that would have otherwise been provided by the Company to the Participant pursuant to any agreement between the Company and the Participant or any Company policy. Any such determination shall be made by the Committee in its sole discretion.

6. Restrictions on Transfer.

The Participant shall not sell, assign, transfer, pledge, hypothecate, or otherwise dispose of, by operation of law or otherwise (collectively "transfer") any RSUs, or any interest therein, except by will or the laws of descent and distribution.

7. Provisions of the Plan.

This Agreement is subject to the provisions of the Plan, a copy of which is furnished to the Participant with this Agreement.

8. Dividends; Other Corporate Transactions.

(a) If at any time during the period between the Performance Certification Date and the date that Shares are delivered after the RSU vests, the Company pays a dividend or other distribution with respect to its Common Stock, including without limitation a distribution of shares of the Company's stock by reason of a stock dividend, stock split or otherwise, then on the date the Shares issuable upon vesting of the RSU are delivered, the Company shall pay the

Participant, at the time of delivery of Shares pursuant to Section 4, the dividend or other distribution that would have been paid on such Shares if the Participant had owned such Shares during the period beginning on the Performance Certification Date and ending on the respective delivery date. No dividend or other distribution shall be paid with respect to RSUs that are forfeited.

(b) In the event of a Reorganization Event, then the rights of the Company under this Agreement and all other terms of this Agreement (including without limitation vesting provisions) shall inure to the benefit of the Company's successor and shall apply to the cash, securities, or other property which the Common Stock was converted into or exchanged for pursuant to such Reorganization Event in the same manner and to the same extent as they applied to the Shares. Such cash, securities, or other property shall be delivered or paid at the time provided in Section 4.

(c) Except as set forth in Section 8(a) or (b) above and in the Plan, neither the Participant nor any person claiming under or through the Participant shall be, or have any rights or privileges of, a stockholder of the Company in respect of the Shares issuable pursuant to the RSUs granted hereunder until the Shares have been delivered to the Participant.

9. Withholding Taxes; No Section 83(b) Election.

(a) The Participant expressly acknowledges that the delivery of Shares to the Participant will give rise to "wages" subject to withholding. Unless the Participant provides notice to the Company prior to the delivery of the Shares that the Participant will make payment to the Company on the date of delivery to satisfy all required withholding taxes, the Participant hereby authorizes the Company to hold back from the shares to be delivered pursuant to Section 4 of this Agreement that number of shares calculated to satisfy all such federal, state, local, or other applicable taxes required to be withheld in connection with such delivery of Shares; provided, however, that the total tax withholding where Shares are being used to satisfy such tax obligations cannot exceed the Company's minimum statutory withholding obligations (based on minimum statutory withholding rates for federal and state tax purposes, including payroll taxes, that are applicable to such wages).

(b) The Participant acknowledges that no election under Section 83(b) of the Code may be filed with respect to this Award.

10. No Right To Employment or Other Status. The grant of an award of RSUs shall not be construed as giving the Participant the right to continued employment or any other relationship with the Company. The Company expressly reserves the right at any time to dismiss or otherwise terminate its relationship with the Participant free from any liability or claim under the Plan or this Agreement, except as expressly provided herein.

11. Conflicts With Other Agreements. In the event of any conflict or inconsistency between the terms of this Agreement and any employment, severance, or other agreement between the Company and the Participant, the terms of this Agreement shall govern.

12. Governing Law. Except as provided in Addendum A, this Agreement shall be governed by and interpreted in accordance with the laws of the State of Delaware without regard to any applicable conflicts of laws and in the event of a dispute related to or arising out of this Agreement, the parties submit to the exclusive jurisdiction and venue of the Delaware federal and Chancery Courts.

13. Unfunded Rights. The right of the Participant to receive Common Stock pursuant to this Agreement is an unfunded and unsecured obligation of the Company. The Participant shall have no rights under this Agreement other than those of an unsecured general creditor of the Company.

14. Compliance with Section 409A of the Code. This Agreement is intended to provide for deferred compensation that is exempt from or compliant with Section 409A and shall be interpreted consistently with such intent. Accordingly, the Participant shall have no right to designate the taxable year of payment. Notwithstanding any other provision of this Agreement, if and to the extent any portion of any payment under this Agreement to the Participant is payable upon his or her separation from service and the Participant is a specified employee as defined in Section 409A(a)(2)(B)(i), as determined by the Company in accordance with its procedures, by which determination the Participant (through accepting the Award) agrees that he or she is bound, such portion of the payment, compensation or other benefit shall not be paid before the day that is six (6) months plus one (1) day after the date of "separation from service", except as Section 409A may then permit.

The Company makes no representations or warranty and shall have no liability to the Participant or any other person if any provisions of or payments, compensation or other benefits under this Agreement are determined to constitute nonqualified deferred compensation subject to Section 409A but do not satisfy the conditions of that section.

15. Clawback. In accepting this Award, the Participant expressly agrees to be bound by, and subject to, the following clawback policy and any clawback policy that the Company has in effect or may adopt in the future:

(a) The Award is intended to align the Participant's long-term interests with those of the Company. Accordingly, subject to Addendum A and unless otherwise expressly provided in the Plan or any other applicable agreement, plan, or policy, and to the extent permitted by applicable law, the Company may terminate any unsettled RSUs, whether vested or unvested ("Termination"), recapture any Shares acquired pursuant to the RSUs ("Recapture"), or require the Participant to reimburse the Company for any and all amounts realized from the acquisition or disposition of Shares acquired pursuant to the RSUs ("Reimbursement"), upon the occurrence of any of the following events (collectively, the "Conditions"):

(i) the Participant has engaged in misuse of the Company's confidential information and/or conduct in breach of any (A) confidentiality obligation to the Company under any agreement between the Company and the Participant, or any policy or plan of the Company, including but not limited to, the Company's standard form of Information and Invention Agreement applicable to such Participant, or (B) applicable noncompetition or nonsolicitation obligation to the Company under any applicable agreement between the Company and the

Participant, or any policy or plan of the Company, including but not limited to the Company's standard form of Noncompetition Agreement applicable to such Participant;

(ii) the Participant has been terminated for willfully engaging in illegal conduct or gross misconduct which is materially and demonstrably injurious to the Company ("***Cause***"). For purposes of the foregoing, no act or failure to act by the Participant shall be considered "willfull" unless it is done or omitted to be done, in bad faith and without reasonable belief that the Participant's action or omission was in the best interests of the Company; or

(iii) during his or her employment, the Participant (A) has rendered services to or otherwise directly or indirectly engaged in or assisted, any organization or business that, in the judgment of the Company in its sole and absolute discretion, is against the interest of the Company or one of its Affiliates; or (B) has engaged in activities that are materially prejudicial to or in conflict with the interests of the Company, including any breaches of fiduciary duty or the duty of loyalty.

For purposes of this Section 15, "RSU Benefits" shall mean any and all amounts realized from the acquisition or disposition of Shares acquired pursuant to the RSUs, including any sales proceeds, dividends and/or dividend equivalents.

(b) Prior to the issuance of any Shares upon settlement of vested RSUs pursuant to this Agreement, the Participant shall, if requested in writing by the Company, certify on a form acceptable to the Company that the Participant is in compliance with the terms and conditions of this Agreement and with the obligations contained in the Plan, or any other relevant agreement, plan, or contract listed in Section 15(a).

(c) Within ten (10) calendar days after receiving notice from the Company of any such activity described in Section 15(a) of this Agreement, the Participant shall either deliver to the Company the applicable Shares or make a cash payment to the Company equal to the RSU Benefits. For purposes of the Company's exercise of its Recapture and/or Reimbursement rights hereunder, the Participant expressly and explicitly authorizes the Company to issue instructions, on the Participant's behalf, to any brokerage firm and/or third-party administrator engaged by the Company to hold Shares and other amounts acquired under the Plan to re-convey, transfer or otherwise return such Shares and/or other amounts to the Company.

(d) Notwithstanding the foregoing provisions of this Section 15, the Company may, in its sole and absolute discretion, choose to refrain from exercising its rights of Termination, Recapture and/or Reimbursement with respect to any particular act of the Participant or with respect to any other participant in the Plan, and its determination to refrain from exercising such rights shall not in any way reduce or eliminate the Company's authority to exercise its rights of Termination, Recapture and/or Reimbursement with respect to any other act of the Participant. Nothing in this Section 15 shall be construed to impose obligations on the Participant to refrain from engaging in lawful competition with the Company after the termination of employment that does not violate the Conditions, other than any obligations that are part of any applicable separate agreement between the Company and the Participant or that arise under applicable law.

(e) Notwithstanding anything to the contrary in the Plan or this Agreement, the Company shall not seek to exercise its rights of Termination, Recapture or Reimbursement relating to any RSUs that were vested and settled more than twelve (12) months prior to the date of the Participant's act or omission set forth in Section 15(a). All RSUs shall be subject to the Company's rights of Termination, Recapture and/or Reimbursement to the extent required by applicable law, including but not limited to Section 10D of the Securities Exchange Act of 1934.

16. Affirmative Acceptance of Award. As a condition to the grant of this Award, the Participant must affirmatively accept this Award and Agreement by logging onto Fidelity's website at www.netbenefits.fidelity.com and completing the acceptance procedures reflected therein within 364 calendar days of the Award Date (the "Award Acceptance Deadline"). If the Participant fails to accept this Award and Agreement by the Award Acceptance Deadline, this Award automatically will be forfeited and immediately terminate without any further action by the parties.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

THERMO FISHER SCIENTIFIC INC.

By: _____

Title: _____

Address: _____

_____

_____

_____

[Name of Participant]

Address: _____

_____

Addendum A

1. Massachusetts.

For Participants domiciled in the State of Massachusetts, the following language shall be added to Section 15(a)(i) of this Agreement:

Notwithstanding Section 12 of this Agreement, for any Termination, Recapture, and/or Reimbursement that is based, in whole or in part, on the Participant's breach of a noncompete agreement or nonsolicitation obligation, such disputes shall be governed by and interpreted in accordance with the laws of the State of Massachusetts, and any dispute arising out of the Agreement shall be asserted exclusively in the federal or state courts located in or covering the county in which the employee resides within the State of Massachusetts, and the Parties hereby submit to the personal jurisdiction and venue of those state and federal courts.

2. California.

For Participants domiciled in the State of California, Section 15(a)(i)(B) of this Agreement shall not apply except to the extent a noncompetition and/or non-solicitation agreement exists and is subject to California Business & Professions Code section 16601 *et seq*.

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THERMO FISHER SCIENTIFIC INC. SUBSIDIARIES

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Fisher Scientific Operating Company LLC	Delaware	100
Thermo Fisher Scientific Senior Financing LLC	Delaware	100
Thermo Fisher Scientific (DE) Holding S.a.r.l.	Luxembourg	100
Laboratory Management Systems, Inc.	Delaware	100
Thermo Fisher Scientific Peru S.R.L. [1% by Fisher Clinical Services (Peru) LLC]	Peru	99
Thermo Fisher Scientific Malaysia Sdn. Bhd.	Malaysia	100
Thermo Fisher Scientific (Barbados) Holding, Limited	Barbados	100
Fisher Clinical Logistics LLC	Delaware	100
Fisher Clinical Services (Suzhou) Co., Ltd.	China	100
Fisher Clinical Services Limited Liability Company [1% by Thermo Fisher Scientific Inc.]	Russia	99
Fisher Clinical Services Japan K.K.	Japan	100
Fisher Clinical Services (Korea) Co., Ltd	Korea	100
Cohesive Technologies Inc.	Delaware	100
Cohesive Technologies (UK) Limited	England	100
Thermo Hypersil-Keystone LLC	Delaware	100
Thermo Electron A/S	Denmark	100
Phitonex, Inc.	North Carolina	100
TWX, LLC [22.5% by Thermo Scientific Portable Analytical Instruments Inc.]	Massachusetts	77.5
Thermo Fisher GP LLC	Delaware	100
Thermo Fisher Scientific C.V. [1% by TFLP LLC]	Netherlands	99
Phadia GmbH	Germany	100
Thermo Fisher Scientific (Australia) C.V. [.00009% by Thermo Fisher GP LLC]	Netherlands	99.99991
Thermo Dutch Holdings Limited Partnership [1% by Thermo Finland Holdings LLC]	England	99
Fisher Clinical Services Mexico, S. de R.L. de C.V. [1% by Fisher Clinical Services (Mexico) LLC]	Mexico	99
Fisher Clinical Services (Mexico) LLC	Delaware	100
D-finitive Technologies, Inc.	South Carolina	100
Thermo Fisher Scientific Africa Proprietary Ltd	South Africa	100
Thermo Fisher Scientific Middle East Holdings Inc.	Delaware	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Portable Holdings LLC	Delaware	100
TSP Holdings I LLC	Delaware	100
Thermo Scientific Portable Analytical Instruments Inc.	Delaware	100
Thermo Fisher Germany B.V.	Netherlands	100
NovaWave Technologies, Inc.	California	100
Thermo Fisher RE I Corporation [20% by Thermo Fisher Insurance Holdings Inc.]	Delaware	80
Thermo Fisher RE II Corporation	Delaware	100
Thermo Fisher Scientific Re Ltd.	Bermuda	100
Thermo Finland Holdings LLC	Delaware	100
Pelican Acquisition Corporation	Delaware	100
Priority Air Holdings Corp	Delaware	100
Priority Air Express, LLC	Delaware	100
Priority Air Express UK Limited	England	100
Priority Air Express Pte. Ltd.	Singapore	100
PAX – DSI Acquisition LLC	Delaware	100
Distribution Solutions International, Inc.	Michigan	100
Thermo EGS Gauging LLC	Delaware	100
EGS Gauging Technical Services Company	Delaware	100
EGS Gauging Ltd.	England	100
Thermo Asset Management Services Inc.	Delaware	100
Thermo CRS Holdings Ltd.	Canada	100
Thermo CRS Ltd. [Series 1 Preferred Shares held by Oxoid Company, Diagnostix Ltd. and Thermo Fisher Scientific (Mississauga) Inc.]	Canada	100
Robocon Labor- und Industrieroboter Gesellschaft m.b.H	Austria	100
Thermo Fisher Scientific West Palm Holdings LLC	Delaware	100
Thermo Electron North America LLC	Delaware	100
picoSpin, LLC	Colorado	100
Loftus Furnace Company	Pennsylvania	100
NAPCO, Inc.	Connecticut	100
Fisher Clinical Services (Colombia) LLC	Delaware	100
Fisher Clinical Services Colombia S.A.S.	Colombia	100
Fisher Clinical Services (Peru) LLC	Delaware	100
Fisher Clinical Services Peru S.R.L [1% by Thermo Fisher Scientific Inc.]	Peru	99

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Fisher Servicios Clinicos (Chile) LLC	Delaware	100
Fisher Servicios Clinicos Chile Ltda [1% by Thermo Fisher Scientific Inc.]	Chile	99
Staten Island Cogeneration Corporation	New York	100
Doe & Ingalls Investors, Inc.	Delaware	100
Doe & Ingalls Management, LLC [47% by Thermo Fisher Scientific Inc.]	Delaware	53
Doe & Ingalls of California Operating LLC	North Carolina	100
Doe & Ingalls of Florida Operating LLC	Florida	100
Doe & Ingalls of Maryland Operating LLC	North Carolina	100
Doe & Ingalls of Massachusetts Operating LLC	North Carolina	100
Doe & Ingalls of North Carolina Operating LLC	North Carolina	100
Doe & Ingalls Properties II, LLC	North Carolina	100
Doe & Ingalls Properties, LLC	North Carolina	100
Thermo Electron Export Inc.	Barbados	100
Thermo Fisher Scientific (Mexico City) LLC	Delaware	100
Odyssey Luxembourg Holdings S.C.S. [1% by Odyssey Holdings LLC]	Luxembourg	99
Fisher Worldwide Gene Distribution SPV	Cayman Islands	100
Thermo Fisher Scientific Odyssey Financing (Barbados) SRL	Barbados	100
Thermo Fisher Scientific Odyssey Holdings Limited	England	100
Odyssey Venture Corporation	Delaware	100
Odyssey Holdings Corporation	Delaware	100
One Lambda, Inc	California	100
Linkage Biosciences, Inc.	California	100
Odyssey Luxembourg IP Holdings 1 S.à r.l.	Luxembourg	100
Odyssey Luxembourg IP Holdings 2 S.à r.l.	Luxembourg	100
Thermo Foundation, Inc.	Massachusetts	100
Thermo Fisher Financial Services Inc.	Delaware	100
Thermo Fisher Scientific Chemicals Inc.	Delaware	100
Russell pH Limited	Scotland	100
Thermo Keytek LLC	Delaware	100
Thermo Finland Holdings MT2 B.V. [10% by Thermo Finland Holdings LLC]	Netherlands	90

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Cayman Holdings Ltd. [21.26% by Thermo Cambridge Limited]	Cayman Islands	78.73
European Laboratory Holdings Limited	Ireland	100
Thermo Fisher Investments (Cayman) Ltd.	Cayman Islands	100
Thermo Fisher Scientific Investments (Luxembourg) II S.a.r.l.	Luxembourg	100
Thermo Suomi Holding B.V. [33.33% by Life Sciences International Holdings BV]	Netherlands	66.67
Thermo Fisher (Finland Holdings 2) LLC	Delaware	100
Thermo Fisher (Finland Holdings) Limited Partnership [.5% by Thermo Fisher (Finland Holdings 2) LLC]	England	99.5
Thermo Finland Holdings MT1 B.V. [.5% by Thermo Fisher (Finland Holdings 2) LLC]	Netherlands	99.5
Thermo Fisher Scientific Oy	Finland	100
Thermo Electron Manufacturing Limited	England	100
Thermo Finnigan Limited	England	100
Thermo Hypersil Ltd	England	100
G V Instruments Limited	England	100
GV Instruments Inc	Delaware	100
GV Instruments Canada Ltd.	Canada	100
Thermo Fisher India Holding B.V. [6.13% by Thermo Fisher Scientific Inc., .68% by Thermo Gamma-Metrics LLC and 30.74% by Thermo Fisher Scientific (Asheville) LLC]	Netherlands	62.45
Thermo Fisher Scientific India Pvt Ltd [.00161 % by Thermo Fisher Scientific Inc., .00320% by Thermo Electron LED GmbH, 2.66891% by Phadia Holding AB, .00001% by Phadia AB, and 22.23825% by Dionex Corporation]	India	75.08802
JSC “Thermo Fisher Scientific”	Russia	100
Thermedics Detection de Argentina S.R.L [10% by Thermo Ramsey LLC]	Argentina	90
Fisher Clinical Services Latin America S.R.L. [10% by Thermo Ramsey LLC]	Argentina	90
Thermo Detection de Mexico S. de R.L. de C.V. [.00815586% by Thermo Environmental Instruments LLC and .02975898% by Thermo Fisher Scientific (Mexico City) LLC]	Mexico	99.96208516
Thermo Fisher Scientific eCommerce Solutions, LLC	Delaware	100
Goring Kerr Detection Limited	England	100
Thermo Sentron Canada Inc. [10% by Thermo Fisher Scientific Inc.]	Canada	90

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Ramsey S.A.	Spain	100
Thermo Ramsey LLC	Massachusetts	100
Thermo Fisher Project Cyprus LLC	Delaware	100
Thermo Fisher Scientific Brasil Instrumentos de Processo Ltda. [.01% by Thermo Ramsey LLC]	Brazil	99.99
IntegenX, Inc.	California	100
IntegenX Ltd	England	100
Thermo Re, Ltd.	Bermuda	100
Thermo Electron (Proprietary) Limited	South Africa	100
Odyssey Holdings LLC	Delaware	100
TFS Group Holding I LLC [12.51% by Thermo Luxembourg Holding LLC, 4.70% by Molecular BioProducts, Inc., 20.48% by Fisher Scientific Worldwide Inc., .37% by Fisher Clinical Services Inc., 0.70% by Liberty Lane Investment LLC, 0.15% by Fisher Scientific International LLC, 7.40% by Thermo Fisher Scientific Life Investments US Financing II LLC, 13.37% by Erie LP Holding LLC, preferred shares held by Thermo Fisher Scientific Life Investments US Financing I LLC, Fisher Scientific Worldwide Holdings I C.V., and Thermo Fisher Scientific Investments (Sweden) S.a.r.l.]	Delaware	40.32
Thermo Fisher Scientific Luxembourg Sweden Holdings I S.à r.l	Luxembourg	100
TFS Group Holding II LLC [12.39% by Thermo Fisher Scientific Life Investments C.V.]	Delaware	87.61
TFS Life Holding LLC [6.19% by Thermo Fisher Scientific Life Technologies Investment UK I Limited, .02% by Thermo Fisher Scientific Life Investments US Financing II LLC, preferred shares held by Thermo Fisher Scientific Investments (Sweden) S.a.r.l. , Thermo Fisher Scientific Sweden Holdings LLC, and TFS Group Holding II LLC]	Delaware	93.80
FSWH II LLC	Delaware	100
Thermo Patheon Holdings LLC	Delaware	100
FSWH I LLC	Delaware	100
Thermo CIDTEC Inc. [2.01% by Thermo Fisher Scientific Inc. and 1.44% by FSWH II LLC]	New York	96.55
Thermo Fisher Scientific Canada Holdings LLC	Delaware	100
Thermo Fisher Scientific Canada Financing 1 ULC	Canada	100
Thermo Fisher Scientific Senior Holdings US LP [.01% by Thermo Fisher Scientific Canada Financing 3 ULC]	Delaware	99.99
Thermo Fisher Scientific Canada Financing 2 ULC	Canada	100
Thermo Fisher Scientific Senior Holdings LP [.01% held by Thermo Fisher Scientific Canada Financing 2 ULC]	Canada	99.99

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Life Technologies Inc. [109,472 Class B by Thermo Fisher Scientific Life Canada Holding ULC and 690,000 Class A by Fisher Scientific Company]	Canada	100
Thermo Fisher Scientific Canada Financing 3 ULC	Canada	100
Thermo Fisher (CN) Luxembourg Holding S.a.r.l. [19% by TFS Life Holding LLC] [Domesticated in the State of Delaware under the name of Thermo Fisher (CN) Luxembourg Holding S.a.r.l. LLC]	Luxembourg	81
Thermo Fisher Scientific TDI S.a.r.l	Luxembourg	100
TFS Venture Holdings I LLC	Delaware	100
Thermo Fisher Scientific Luxembourg Venture Holdings I S.a.r.l.	Luxembourg	100
Thermo Fisher Scientific Panama I Cayman Ltd	Cayman Islands	100
Thermo Fisher Senior Canada Holdings LLC	Delaware	100
Thermo Fisher (CN-I) Luxembourg LLC	Delaware	100
Thermo Fisher (CN-II) Luxembourg LLC	Delaware	100
Thermo Fisher Scientific (PN-II) SRL	Barbados	100
Fisher Worldwide Distribution SPV	Cayman Islands	100
Thermo Fisher (CN) Luxembourg S.a.r.l.	Luxembourg	100
Thermo Fisher Scientific PN2 C.V [1% by Thermo Fisher Scientific PN2 LLC]	Netherlands	99
Thermo Fisher Scientific PN2 LLC	Delaware	100
Thermo Fisher Scientific (PN) Austria Holding GmbH	Austria	100
Thermo Fisher Scientific PN2 (Malta) Limited [0.0004% by Thermo CN Luxembourg LLC]	Malta	99.96
DPI Newco LLC	Delaware	100
Thermo Cayman USC Ltd.	Cayman Islands	100
Patheon Manufacturing Services LLC	Delaware	100
Patheon Development Services Inc.	Delaware	100
REP GBP I-B Blocker, Inc.	Delaware	100
Patheon Biologics LLC [24% by REP GBP I-B Blocker, Inc.]	Delaware	76
Patheon Biologics (NJ) LLC	Delaware	100
Patheon API Inc.	South Carolina	100
Patheon API Services Inc.	South Carolina	100
Patheon API Manufacturing Inc.	South Carolina	100
Greenville Service Company, Inc. [50% held privately]	Delaware	50

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
DSM Pharmaceutical Products, Inc.	Delaware	100
Percivia LLC [50% held privately]	Delaware	50
Thermo Fisher Scientific (Finance I) S.a.r.l. [1.26% by Thermo Luxembourg Holding S.a.r.l.]	Luxembourg	98.74
Thermo Fisher Insurance Holdings Inc.	Delaware	100
Perbio Science BV	Belgium	100
Thermo Fisher Insurance Holdings LLC [45.62% by Thermo Fisher Scientific Re Ltd.]	Delaware	54.38
Thermo Scientific Microbiology Sdn Bhd	Malaysia	100
Thermo Scientific Microbiology Pte Ltd.	Singapore	100
TFS FEI Holding LLC [12.08% by Thermo Fisher Scientific (Finance I) S.a.r.l., 5.09% by Thermo Fisher (CN) Luxembourg S.a.r.l., and 21.22% Thermo Fisher (CN) Luxembourg Holding S.a.r.l]	Delaware	61.61
Thermo Fisher Scientific (Panama) B.V.	Netherlands	100
Thermo Fisher Scientific (Panama) II B.V.	Netherlands	100
Thermo Fisher Scientific (Panama) Dutch LLC	Delaware	100
Patheon B.V.	Netherlands	100
Patheon Holdings B.V.	Netherlands	100
Patheon Holdings I B.V.	Netherlands	100
Patheon Holdings II B.V.	Netherlands	100
Patheon Biologics Australia Pty Ltd	Australia	100
Patheon Biologics B.V.	Netherlands	100
Patheon Regensburg GmbH	Germany	100
Patheon Life Science Products International GmbH	Austria	100
Patheon I Holding GmbH	Austria	100
Patheon Austria GmbH & Co. KG [0% by Patheon I Holding GmbH]	Austria	100
Thermo CN Luxembourg LLC	Delaware	100
Thermo Fisher Scientific Luxembourg Venture Holdings II S.a.r.l.	Luxembourg	100
Thermo Fisher Scientific (DPI) Limited Partnership [.00000001% by Thermo CN Luxembourg LLC]	Canada	99.99999999
Thermo Fisher Scientific (CP1) Limited	England	100
Thermo Fisher Scientific PN2 (Luxembourg) S.à.r.l	Luxembourg	100
Fisher Canada Holding ULC 1	Canada	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Fisher Canada Holding ULC 2	Canada	100
Fisher CLP Holding Limited Partnership [2.65574447% by Fisher Canada Holding ULC 2]	Canada	97.34425553
Fisher Canada Holding ULC 3	Canada	100
Fisher Scientific Company [.01% by Fisher Canada Holding ULC 3]	Canada	99.99
Thermo Fisher Scientific (CP2) Limited	England	100
Patheon Inc.	Canada	100
Patheon KK	Japan	100
Patheon U.S. Holdings LLC	Delaware	100
Thermo Fisher Scientific PNM Limited Liability Partnership [50% by Patheon Inc.]	England	50
Thermo Fisher Scientific (PN-I) SRL	Barbados	100
Thermo Fisher Scientific PNM S.a.r.l	Luxembourg	100
Patheon I B.V.	Netherlands	100
Patheon Cooperatief U.A. [1% by Patheon Finance LLC]	Netherlands	99
Patheon Softgels B.V.	Netherlands	100
Patheon Finance LLC	Delaware	100
Patheon Holdings SAS	France	100
Patheon France SAS	France	100
Patheon Italia S.p.A.	Italy	100
Thermo Fisher Scientific (PN1) UK Ltd	England	100
Patheon UK Limited	England	100
Patheon Calculus Merger LLC	Delaware	100
Patheon Puerto Rico, Inc.	Puerto Rico	100
Patheon Puerto Rico Acquisitions Corporation	Puerto Rico	100
CEPH International Corporation	Puerto Rico	100
Patheon U.S. Holdings Inc.	Delaware	100
Patheon Pharmaceuticals Services Inc.	Delaware	100
Patheon Pharmaceuticals Inc.	Delaware	100
Patheon Banner U.S. Holdings Inc.	Delaware	100
Patheon Softgels Inc.	Delaware	100
Pharmacaps Mexicana S.A. de C.V. [0.2% by Patheon Banner U.S. Holdings Inc.]	Mexico	99.8

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Fisher Scientific (PN) UK LLC	Delaware	100
Patheon UK Pension Trustees Limited	England	100
Thermo Fisher Scientific (PN) UK Limited Partnership [1% by Thermo Fisher Scientific (PN) UK LLC]	England	99
Thermo Fisher Scientific FSUKHCO Financing (Barbados) SRL	Barbados	100
Diagnostix Ltd.	Canada	100
Fisher Scientific Oxoid Holdings Ltd.	England	100
Oxoid Company	Canada	100
Fisher Scientific Luxembourg S.a.r.l.	Luxembourg	100
Perbio Science (Canada) Company	Canada	100
Fisher Scientific UK Holding Company Limited	England	100
Fisher Scientific Oy	Finland	100
Fisher Scientific Norway AS	Norway	100
Fisher Scientific A/S	Norway	100
Doublecape Holding Limited	England	100
I.Q. (BIO) Limited	England	100
Oxoid (ELY) Limited	England	100
Doublecape Limited	England	100
Fisher Scientific Ireland Limited	Ireland	100
Doe & Ingalls Limited	Ireland	100
Fisher Scientific Holding U.K., Limited	England	100
Fisher Scientific U.K., Limited	England	100
FSUK Holdings Limited	England	100
Sterilin Limited	England	100
Fisher Scientific UK Holding Company 2	England	100
Fisher Clinical Services U.K. Limited	England	100
Fisher Clinical Services Pte Ltd.	Singapore	100
Fisher Clinical Services (Beijing) Co., Ltd.	China	100
Fisher Scientific Europe Holdings B.V.	Netherlands	100
Perbio Science International Netherlands B.V.	Netherlands	100
Fisher Scientific The Hague III B.V. [35.00095% by Fisher Scientific Europe Holdings B.V.]	Netherlands	64.99905
Fisher Scientific The Hague IV B.V. [4.545% by Fisher Scientific The Hague I B.V.]	Netherlands	95.455

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Acros Organics BV [0.3333 by Fisher Scientific The Hague II B.V.]	Belgium	99.6667
Fisher Scientific AG [17.55% by Fisher Scientific S.A.S.]	Switzerland	82.45
Ecochem NV [0.3333% by Fisher Scientific The Hague II B.V.	Belgium	99.6667
Fisher Scientific The Hague V B.V.	Netherlands	100
Fisher Clinical Services GmbH	Switzerland	100
Fisher BioPharma Services (India) Private Limited [.315% by Fisher Clinical Services U.K. Limited]	India	99.685
Fisher Scientific Ireland Investments Unlimited [.10% by Fisher Scientific Europe Holdings B.V.]	Ireland	99.90
Fisher Emergo B.V.	Netherlands	100
Fisher Scientific The Hague II B.V.	Netherlands	100
Fisher Scientific The Hague I B.V.	Netherlands	100
Fisher Scientific Jersey Island Limited	Jersey	100
Fisher Maybridge Holdings Limited	England	100
Maybridge Chemical Holdings Limited	England	100
Maybridge Limited	England	100
Fisher Bioblock Holding II SNC [.99% by Fisher Scientific The Hague II BV]	France	99.01
Thermo Electron Holdings SAS [22.12% by Fisher Scientific Company]	France	77.88
Inel SAS	France	100
Inel Inc.	Delaware	100
Thermo Electron SAS	France	100
Thermo Electron LED S.A.S.	France	100
Jouan Limited	England	100
Thermo Electron Industries	France	100
S.C.I. du 10 rue Dugay Trouin [2% by Thermo Electron Industries]	France	98
Thermo Fisher Scientific Milano Srl [.05% by Thermo Electron Industries]	Italy	99.95
Perbio Science France SAS	France	100
Fisher Scientific S.A.S.	France	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Fisher Scientific SRL [.1% by Fisher Bioblock Holding II SNC]	Belgium	99.9
SCI Inno 92 [.0004% by Fisher Bioblock Holding II SNC]	France	99.9996
Fisher Scientific S.L.	Spain	100
Fisher Scientific, Unipessoal, Lda.	Portugal	100
Bonsai Tecnologies - Sistemas para Biotecnología e Industria, Unipessoal Lda	Portugal	100
Oxoid Holding SAS	France	100
Thermo Fisher Diagnostics SAS	France	100
Oxoid Senior Holdings Limited	England	100
Oxoid UKH LLC	Delaware	100
Oxoid 2000 Limited	England	100
Oxoid Holdings Limited	England	100
Oxoid International Limited	England	100
Oxoid A/S	Denmark	100
Oxoid Australia Pty. Limited	Australia	100
OXOID CZ s.r.o. [1% by Oxoid Limited]	Czech Republic	99
Thermo Fisher Diagnostics AS	Norway	100
Thermo Fisher Diagnostics AB	Sweden	100
Thermo Fisher Diagnostics AG	Switzerland	100
Linkage Biosciences S.a.r.l.	Switzerland	100
Thermo Fisher Diagnostics B.V.	Netherlands	100
Oxoid Inc.	Delaware	100
Oxoid NV [.01% by Oxoid Holdings Limited]	Belgium	99.99
Thermo Fisher Diagnostics S.p.A.	Italy	100
Oxoid Limited	England	100
Thermo Fisher (Heysham) Limited	England	100
Avocado Research Chemicals Limited	England	100
Thermo Fisher (Kandel) GmbH	Germany	100
G & M Procter Limited	Scotland	100
Oxoid Limited	Ireland	100
Oxoid Pension Trustees Limited	England	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Fisher Scientific Beteiligungsverwaltungs GmbH	Germany	100
Thermo Fisher Diagnostics Aps	Denmark	100
Phadia s.r.o. [1% by Phadia AB]	Czech Republic	99
Phadia Taiwan Inc.	Taiwan	100
Thermo Fisher Diagnostics Limited	England	100
Thermo Fisher Diagnostics K.K.	Japan	100
Thermo Fisher Diagnostics Austria GmbH	Austria	100
Thermo Fisher Diagnostics NV [.0016% by Thermo Fisher Diagnostics Limited]	Belgium	99.9984
Thermo Fisher Diagnostics, Sociedade Unipessoal Lda	Portugal	100
Thermo Fisher Diagnostics, S.L.U.	Spain	100
Thermo Fisher Diagnostics Oy	Finland	100
Fiberlite Centrifuge LLC	Delaware	100
Thermo MF Physics LLC [3.02% by Thermo Fisher Scientific Spectra-Physics Holdings Luxembourg II S.à r.l.]	Delaware	96.98
Thermo Fisher Investments (Cayman) LLC [4.37% by Thermo Fisher Scientific Investments (Luxembourg) II S.a.r.l.]	Delaware	95.63
Thermo Fisher Scientific CMN LLC [5.61% by Thermo Fisher Scientific Investments (Luxembourg) S.a.r.l.]	Delaware	94.39
Thermo Fisher Scientific Worldwide Investments LLC [10.10% by Thermo Fisher Scientific Worldwide Investments (Luxembourg) S.a.r.l.]	Delaware	89.90
Thermo USC I LLC [5.69% by Thermo Cayman USC Limited and 2.66% by Thermo Fisher Scientific (IVGN) Limited]	Delaware	91.66
Phadia International LLC [15.28% by Phadia International Holdings C.V.]	Delaware	84.72
Thermo Fisher Scientific Investments (Sweden) II LLC [13.19% by Thermo Fisher Scientific Investments (Sweden) S.a.r.l.]	Delaware	86.81
Thermo Fisher Scientific (Cayman) LLC [14.12% by Thermo Fisher Scientific (Luxembourg) II S.a.r.l.]	Delaware	85.88
Thermo Fisher Scientific Sweden Holdings S.a.r.l [1% by Thermo Fisher Scientific Sweden Holdings LLC]	Luxembourg	99
FSII Sweden Holdings I AB	Sweden	100
FSII Sweden Holdings II AB	Sweden	100
CB Diagnostics I AB	Sweden	100
Power Sweden Holdings I AB	Sweden	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
FSII Sweden Holdings AB	Sweden	100
Thermo Fisher Scientific Life Canada Holding ULC	Canada	100
Life Technologies Japan Ltd.	Japan	100
Pasteur U.S. Corporation	Delaware	100
Phadia US Market Holdings LLC	Delaware	100
Life Technologies GmbH	Germany	100
Fermentas Sweden AB	Sweden	100
Thermo Fisher Scientific GENEART GmbH	Germany	100
LTC Tech South Africa PTY Ltd.	South Africa	100
Power Sweden Holdings II AB	Sweden	100
Perbio Science AB	Sweden	100
Thermo Fisher Scientific PRB S.a.r.l.	Luxembourg	100
Thermo Fisher Scientific Investments (Luxembourg) S.a.r.l. [1% by FSII Sweden Holdings AB]	Luxembourg	99
Thermo Fisher Scientific Life Investments II S.à r.l.	Luxembourg	100
Thermo Fisher Scientific Life Investments US Financing II LLC [1% by Perbio Science Sweden Holdings AB]	Delaware	99
Life Technologies BPD AB	Sweden	100
Perbio Science Sweden Holdings AB	Sweden	100
Phadia Luxembourg Holdings S.a.r.l.	Luxembourg	100
Fisher Scientific GTF AB	Sweden	100
Fisher Scientific Biotech Line ApS	Denmark	100
CB Diagnostics Holding AB	Sweden	100
CB Diagnostics AB	Sweden	100
Sweden DIA (Sweden) AB	Sweden	100
Phadia Sweden AB	Sweden	100
Phadia Holding AB	Sweden	100
Phadia Diagnosticos Ltda [1% by Phadia AB]	Brazil	99
Beijing Phadia Diagnostics Co Ltd	China	100
Allergon AB	Sweden	100
Nanjing WeiKangLe Trading Industrial Co Ltd	China	100
Laboratory Specialties Proprietary Ltd.	South Africa	100
Phadia AB	Sweden	100
Phadia Real Property AB	Sweden	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Phadia US Inc.	Delaware	100
Life Technologies BPD UK Limited	England	100
Perbio Science UK Limited	England	100
Perbio Science Invest AB	Sweden	100
Perbio Science Nederland B.V.	Netherlands	100
Perbio Science Projekt AB	Sweden	100
Thermo Fisher Scientific (Finance III) S.a.r.l.	Luxembourg	100
Thermo Fisher (CN) Malta Holdings Limited [0.0000001% by Thermo Fisher Scientific (Finance III) LLC	Malta	99.9999999
Thermo Fisher Scientific (Finance III) LLC	Delaware	100
Thermo Fisher Scientific (Finance II) S.a.r.l.	Luxembourg	100
Thermo Fisher CM II LLC	Delaware	100
Thermo Fisher Scientific Falcon Senior Holdings Inc.	Delaware	100
FEI Company	Oregon	100
ASPEX Corporation	Pennsylvania	100
FEI Korea Ltd.	Korea	100
FEI Houston, Inc.	Delaware	100
FEI Melbourne Pty Ltd.	Australia	100
FEI Saudi Arabia LLC [10% by FEI Europe B.V.]	Saudi Arabia	90
FEI Technologies, Inc.	Oregon	100
FEI EFA, Inc.	Delaware	100
Thermo Fisher Scientific FLC Hong Kong Limited	Hong Kong	100
DCG Systems GmbH	Germany	100
Thermo Fisher Scientific FLC B.V.	Netherlands	100
Thermo Fisher Scientific B.V.	Netherlands	100
Thermo Optek S.A.	Spain	100
Thermo Fisher Financial Services B.V.	Netherlands	100
Thermo Quest S.A.	Spain	100
Thermo Fisher Scientific FLC II B.V. [Domesticated in the State of Delaware under the name of Thermo Fisher Scientific FLC II B.V.]	Netherlands	100
FEI Global Holdings C.V. [1% by FEI Technologies, Inc.]	Netherlands	99
FEI Electron Optics International B.V.	Netherlands	100
Thermo Fisher (FEI) Ireland Ltd	Ireland	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
FEI Microscopy Solutions Ltd	Israel	100
FEI CPD B.V.	Netherlands	100
FEI EFA International Pte. Ltd.	Singapore	100
DCG Systems G.K.	Japan	100
DCG Systems Korea Ltd.	Korea	100
FEI Company of USA (S.E.A.) Pte Ltd.	Singapore	100
FEI Europe B.V.	Netherlands	100
FEI Electron Optics B.V.	Netherlands	100
FEI Hong Kong Company Limited	Hong Kong	100
FEI Trading (Shanghai) Co., Ltd.	China	100
Thermo Fisher Scientific Brno s.r.o.	Czech Republic	100
FEI Asia Pacific Co., Ltd.	China	100
FEI Technology de Mexico S.A. de C.V. [2% by FEI Company]	Mexico	98
FEI Servicos de Nanotecnologia Ltda. [1% by FEI Europe B.V.]	Brazil	99
FEI UK Ltd.	England	100
FEI France SAS	France	100
FEI Italia Srl	Italy	100
FEI SAS	France	100
FEI Company Japan Ltd.	Japan	100
FEI Norway Holding AS	Norway	100
FEI Australia Pty Ltd	Australia	100
FEI Trondheim AS	Norway	100
Thermo Fisher Scientific Norway US Investments LLC	Delaware	100
Thermo Fisher Scientific Norway Senior Holding AS	Norway	100
Thermo Fisher Scientific Norway Holdings AS	Norway	100
Thermo Fisher Scientific Life Senior Holdings, Inc. [15.37% by Thermo Fisher Scientific Norway Holdings AS]	Delaware	84.63
Erie UK 1 LLC	Delaware	100
Thermo Fisher Scientific Invitrogen Financing (Barbados) SRL	Barbados	100
Invitrogen Holdings Ltd.	Scotland	100
Invitrogen Europe Limited	Scotland	100
Erie N2 LLC	Delaware	100
Erie N10 LLC	Delaware	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Erie UK 4 Limited	England	100
Thermo Fisher Scientific AU II Limited	England	100
Erie Finance LLC	Delaware	100
Applied Biosystems International Inc.	Delaware	100
ABII 2 Limited	England	100
Remel Europe Limited	England	100
Erie N2 UK Limited	England	100
Life Technologies Corporation	Delaware	100
Thermo Fisher Scientific Life Technologies Israel Investment I Limited	England	100
Thermo Fisher Scientific Life Technologies Israel Investment II Limited	England	100
Thermo Fisher Israel Ltd.	Israel	100
STC Bio Manufacturing, Inc.	Illinois	100
Thermo Fisher Scientific Colombia S.A.S.	Colombia	100
HyClone International Trade (Tianjin) Co., Ltd	China	100
Invitrogen Argentina SA	Argentina	100
Invitrogen BioServices India Private Limited [1% by Invitrogen Holdings LLC]	India	99
Invitrogen IP Holdings, Inc.	Delaware	100
Ion Torrent Systems, Inc.	Delaware	100
Molecular Probes, Inc.	Oregon	100
Acoustic Cytometry Systems, Inc.	Delaware	100
Matrix MicroScience Inc.	Delaware	100
Gold Cattle Standard Testing Labs, Inc.	Texas	100
Westover Scientific, Inc.	Washington	100
Kettlebrook Insurance Co. ltd. [32.5% by Invitrogen Europe Limited]	Hawaii	67.5
Invitrogen Finance Corp.	Delaware	100
CellzDirect, Inc.	Delaware	100
Applied Biosystems, LLC	Delaware	100
NewcoGen PE, LLC	Delaware	100
BioTrove Corporation	Delaware	100
BioTrove International, Inc.	Delaware	100
Life Technologies Clinical Services Lab, Inc.	Delaware	100
Compendia Bioscience, Inc.	Michigan	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
AcroMetrix LLC	California	100
Ambion, Inc.	Delaware	100
CHK Holdings Inc.	Delaware	100
Applied Biosystems de Mexico S. de R.L. de C.V. [.002% by Applied Biosystems, LLC]	Mexico	99.998
Thermo Fisher Scientific (IVGN) Limited [.84% by Ambion, Inc.]	Hong Kong	99.16
Applied Biosystems B.V.	Netherlands	100
Invitrogen Hong Kong Limited	Hong Kong	100
Life Technologies Limited [23.5% by Applied Biosystems BV]	Hong Kong	76.5
Life Technologies Holdings PTE Ltd.	Singapore	100
Affymetrix Biotech Shanghai Ltd	China	100
Affymetrix UK Ltd	England	100
Life Technologies Magyarorszag Kft	Hungary	100
Life Technologies Czech Republic s.r.o.	Czech Republic	100
Life Technologies Polska Sp z.o.o. [.08% by Invitrogen Holdings LLC]	Poland	99.92
Life Technologies Europe B.V.	Netherlands	100
Bio-Sciences Ltd.	Ireland	100
Prionics Italia S.r.l.	Italy	100
Prionics USA Inc.	Delaware	100
Prionics Lelystad B.V.	Netherlands	100
Prionics France SAS	France	100
Life Technologies SA	Spain	100
Stokes Bio Ltd.	Ireland	100
Life Technologies s.r.o [2.1% by Applied Biosystems BV]	Slovakia	97.9
Life Technologies AS	Norway	100
Life Technologies Norway Investments US LLC	Delaware	100
Nihon Dynal K.K. [40% held privately]	Japan	60
Dynal Biotech Beijing Limited	China	100
Life Technologies SAS	France	100
Laboratoire Service International - L.S.I	France	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
BAC BV	Netherlands	100
BAC IP BV	Netherlands	100
Thermo Fisher Scientific (IVGN) B.V.	Netherlands	100
Thermo Fisher Scientific Life Tech Korea Holdings LLC	Delaware	100
Life Technologies Brasil Comercio e Industria de Produtos para Biotecnologia Ltda [3.45% by Thermo Fisher CHK Holding LLC]	Brazil	96.55
Thermo Fisher CHK Holding LLC	Delaware	100
Invitrogen Holdings LLC	Delaware	100
Thermo Fisher Bioprocessing Research and Development (Shanghai) Co., Ltd.	China	100
Invitrogen (Shanghai) Investment Co., Ltd.	China	100
Thermo Fisher Scientific (Guangzhou) Co., Ltd	China	100
Thermo Fisher Scientific Life Technologies Luxembourg Holding LLC	Delaware	100
Thermo Fisher Scientific Luxembourg Life Technologies UK Holding S.à r.l	Luxembourg	100
Thermo Fisher Scientific Life Technologies Enterprise Holding Limited	England	100
Thermo Fisher Scientific Luxembourg Enterprise Holdings S.à r.l.	Luxembourg	100
Thermo Fisher Scientific Life Enterprises GP LLC	Delaware	100
Thermo Fisher Scientific Life Enterprises C.V. [.10% by Thermo Fisher Scientific Life Enterprises GP LLC]	Netherlands	99.90
Thermo Fisher Scientific Life International GP Holdings LLC	Delaware	100
Thermo Fisher Scientific Life International Holdings I C.V. [.10% by Thermo Fisher Scientific Life International GP Holdings LLC]	Netherlands	99.90
Thermo Fisher Scientific Life CV GP Holdings II LLC	Delaware	100
Thermo Fisher Scientific Life International Holdings II C.V. [.55383943% by Thermo Fisher Scientific Life Investments IV S.a.r.l. and .00000004% by Thermo Fisher Scientific Life CV GP Holding II LLC]	Netherlands	99.44616054
Thermo Fisher Scientific Life NL Holdings GP LLC	Delaware	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Fisher Scientific Life Netherlands Holding C.V [10% by Thermo Fisher Scientific Life NL Holdings GP LLC]	Netherlands	90
Thermo Fisher Scientific Life Technologies Investment UK I Limited	England	100
Thermo Fisher Scientific Holdings (Cayman) I [37.88% by Thermo Fisher Scientific Life Technologies Investment I LLC and 23.42% by Thermo Fisher Scientific Life Technologies Investments Holding LP]	Cayman Islands	38.70
Thermo Fisher Scientific Holdings (Cayman) II	Cayman Islands	100
Thermo Fisher Scientific Cayman Investments LLC	Delaware	100
Thermo Fisher Scientific (Luxembourg) II S.a.r.l.	Luxembourg	100
Invitrogen Trading (Shanghai) Co., Ltd.	China	100
Life Technologies DaAn Diagnostic (Guangzhou) Co., Ltd. [42.5% held privately]	China	57.5
Life Technologies Finance Ltd.	Scotland	100
Thermo Fisher Scientific (Thailand) Co., Ltd.	Thailand	100
Thermo Fisher Scientific Solutions LLC [20% by Thermo Fisher Scientific Life Tech Korea Holdings LLC]	Korea	80
Applied Biosystems Trading (Shanghai) Company Ltd.	China	100
Shanghai Life Technologies Biotechnology Co. Limited	China	100
Applied Biosystems Taiwan LLC	Delaware	100
Life Technologies Co., Ltd. [42.6% by Applied Biosystems BV]	Taiwan	57.4
Life Technologies Chile SpA	Chile	100
Affymetrix, Inc	Delaware	100
Affymetrix Japan K.K.	Japan	100
Bender MedSystems GmbH	Austria	100
eBioscience, Ltd	England	100
eBioscience SAS	France	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Panomics, L.L.C.	California	100
Panomics S.R.L.	Italy	100
USB Corporation	Ohio	100
Thermo Fisher Scientific Sweden Holdings LLC [.2936% by Thermo Fisher Scientific Investments (Sweden) S.a.r.l.]	Delaware	99.7064
Princeton Gamma-Tech Instruments LLC	Delaware	100
TPI Real Estate Holdings LLC	Delaware	100
Comtest Limited	England	100
Thermo Electron Metallurgical Services, Inc.	Texas	100
ONIX Systems Inc.	Delaware	100
Thermo Process Instruments GP, LLC	Delaware	100
Thermo Process Instruments, L.P. [0.10% by Thermo Process Instruments GP, LLC]	Texas	99.90
Thermo Measuretech Canada Inc.	Canada	100
Onix Holdings Limited	England	100
CAC Limited	England	100
Thermo Measurement Ltd	England	100
Thermo Onix Limited	England	100
Thermo Electron Scientific Instruments LLC	Delaware	100
Thermo Fisher Scientific Japan Holdings I LLC	Delaware	100
Thermo Fisher Scientific Japan Holdings I B.V.	Netherlands	100
Thermo Fisher Scientific Japan Holdings I LP [10% by Thermo Fisher Scientific Japan 1 LLC]	Delaware	90
Thermo Fisher Scientific Japan 1 LLC	Delaware	100
Fuji Partnership [17.8184% by Thermo Fisher Scientific Japan Holdings II B.V. and 10.1634% by Thermo Fisher Scientific Japan Holdings III B.V.]	Japan	72.0182
TK Partnership (aka Silent Partnership) [44.66% by Thermo Fisher Scientific K.K.]	Japan	55.34
Thermo Fisher Scientific (NK) LLC	Delaware	100
Thermo Fisher Eurobonds Ltd.	Cayman Islands	100
Thermo Fisher Scientific LSI Financing (Barbados) SRL	Barbados	100
Thermo Fisher Scientific (Mississauga) Inc. [Thermo Finnigan LLC owns 100 Series A Preferred shares]	Canada	100
Life Sciences International Limited	England	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Hybaid Limited	England	100
Thermo Optek Limited	England	100
Thermo Cambridge Limited	England	100
VG Systems Limited	England	100
Thermo Radiometrie Limited	England	100
Thermo Electron Limited	England	100
Thermo Electron Weighing & Inspection Limited	England	100
Thermo Electron (Management Services) Limited	England	100
Life Sciences International Holdings BV	Netherlands	100
Bioanalysis Labsystems, S.A. [10% by Thermo Fisher Scientific B.V.]	Spain	90
Thermo Ramsey Italia S.r.l.	Italy	100
Helmet Securities Limited	England	100
Life Sciences International LLC	Delaware	100
Thermo Fisher Scientific (Asheville) LLC	Delaware	100
Thermo Fisher Scientific Japan Holdings II LLC	Delaware	100
Thermo Neslab LLC	New Hampshire	100
Thermo Fisher Scientific Japan Holdings II B.V.	Netherlands	100
Thermo Fisher Scientific Japan Holdings II LP [10% by Thermo Fisher Scientific Japan 2 LLC]	Delaware	90
Thermo Fisher Scientific Japan 2 LLC	Delaware	100
Lab-Line Instruments, Inc.	Delaware	100
Thermo Scientific Services, Inc.	California	100
Thermo Fisher Scientific (Fuji) LLC	Delaware	100
Jouan LLC	Delaware	100
Thermo Kevex X-Ray LLC	Delaware	100
Thermo Gamma-Metrics LLC	Delaware	100
ThermoSpectra Limited	England	100
Thermo Fisher Scientific Cork Ltd	Ireland	100
Laser Analytical Systems, Inc.	California	100
Thermo Finnigan LLC	Delaware	100
TMOI Inc.	Delaware	100
Thermo Fisher Scientific (China) Holding Limited	England	100
TFS Singapore HK Limited	Hong Kong	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Fisher Scientific NHK Limited	Hong Kong	100
Thermo Fisher Scientific TR Limited	Hong Kong	100
Thermo Fisher Scientific Baltics UAB [18.24% by Thermo Fisher Scientific (IVGN) Limited and 3.86% by Oxoid Investments GmbH]	Lithuania	77.90
Fermentas China Co., Ltd	China	100
Thermo Fisher Scientific BHK (I) Limited	Hong Kong	100
Thermo Fisher China Business Trust II [1% by Thermo Fisher Scientific BHK (II) Limited]	China	99
Thermo Fisher Scientific BHK (II) Limited	Hong Kong	100
Thermo Fisher Scientific (China-HK) Holding Limited	Hong Kong	100
Alfa Aesar (Hong Kong) Limited	Hong Kong	100
Alfa Aesar (China) Chemical Co. Ltd.	China	100
Thermo Fisher Scientific (Shanghai) Instruments Co., Ltd.	China	100
Thermo Fisher Scientific (Suzhou) Instruments Co., Ltd	China	100
Thermo Fisher Scientific (China) Co., Ltd.	China	100
Thermo Fisher Scientific (Shanghai) Management Co., Ltd.	China	100
Thermo Fisher Scientific (Hong Kong) Limited	Hong Kong	100
Thermo Life Science International Trading (Tianjin) Co., Ltd.	China	100
Thermo Fisher Scientific SL	Spain	100
Thermo Fisher (Cayman) Holdings I Ltd.	Cayman Islands	100
Thermo Fisher (Gibraltar) Limited [50% by Thermo Fisher (Cayman) Holdings II Ltd.]	Gibraltar	50
Thermo Fisher (Gibraltar) II Limited	Gibraltar	100
Navaho Acquisition Corp.	Delaware	100
NanoDrop Technologies LLC	Delaware	100
Thermo Fisher (Cayman) Holdings II Ltd.	Cayman Islands	100
Thermo BioAnalysis LLC [5.1% by Life Sciences International Limited and 9.4% by Life Sciences International LLC]	Delaware	85.5
Thermo Fisher Scientific Senior Holdings Australia LLC	Delaware	100
Thermo LabSystems S.A.	Spain	100
Thermo Fisher German Holdings LLC	Delaware	100
Thermo Holding European Operations LLC	Delaware	100
Thermo DMA Inc.	Texas	100
Thermo BioAnalysis Limited	England	100
Thermo Fast U.K. Limited	England	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Projects Limited	England	100
Thermo LabSystems Inc.	Massachusetts	100
InnaPhase Limited	England	100
Core Informatics, LLC	Connecticut	100
Core Informatics UK Ltd.	England	100
Thermo Environmental Instruments LLC	California	100
27 Forge Parkway LLC	Delaware	100
Thermo Electron (Calgary) Limited	Canada	100
Thermo Orion Inc.	Massachusetts	100
Thermo Fisher Scientific Aquasensors LLC	Delaware	100
Thermo Electron Puerto Rico, Inc.	Puerto Rico	100
Thermo Power Corporation	Massachusetts	100
ACI Holdings Inc.	New York	100
Thermo Securities Corporation	Delaware	100
Thermo Eberline Holdings I LLC [49% by Thermo Fisher Scientific Inc.]	Delaware	51
Thermo Eberline Holdings II LLC	Delaware	100
Thermo Eberline LLC	Delaware	100
Thermo Instrument Controls de Mexico, S.A. de C.V. [2% by Thermo Fisher Scientific Inc.]	Mexico	98
ThermoLase LLC	Delaware	100
Trex Medical Corporation	Delaware	100
Fermentas Inc.	Maryland	100
TFS LLC	Massachusetts	100
Thermo Corporation	Delaware	100
Fisher Scientific GmbH	Germany	100
Fisher Scientific Germany Beteiligungs GmbH	Germany	100
Fisher Scientific, spol. S.r.o	Czech Republic	100
Fisher Scientific (Austria) GmbH	Austria	100
Thermo Fisher Scientific Germany BV & Co. KG [0% by Thermo Fisher Germany B.V.]	Germany	100
Thermo Fisher Scientific C.F. GmbH	Germany	100
Fisher Clinical Services GmbH	Germany	100
Fisher Clinical Services Rheinfelden GmbH	Germany	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Fisher Scientific (Holding II) B.V. & Co. KG [0% by Thermo Fisher Germany B.V.]	Germany	100
FEI Deutschland GmbH	Germany	100
Thermo Fisher Diagnostics GmbH	Germany	100
Microgenics Corporation	Delaware	100
Consolidated Technologies, Inc.	Wisconsin	100
Remel Inc.	Wisconsin	100
Trek Diagnostic Systems LLC	Delaware	100
Trek Holding Company Ltd.	England	100
Trek Holding Company II Ltd.	England	100
Trek Diagnostic Systems Ltd.	England	100
Thermo Luxembourg Holding S.a.r.l. [Domesticated in the State of Delaware under the name of Thermo Luxembourg Holding LLC]	Luxembourg	100
Thermo MT II Limited [0.0000003% by Thermo MT II LLC]	Malta	99.9999997
Thermo MT II LLC	Delaware	100
Thermo Luxembourg U.S. S.a.r.l.	Luxembourg	100
Thermo Fisher Scientific Asset Management 1 GmbH	Germany	100
Thermo Fisher Scientific Asset Management 2 GmbH	Germany	100
Thermo Fisher Scientific Vector Senior Holdings II UAB	Lithuania	100
Thermo Fisher Scientific Vector Senior Holdings I UAB	Lithuania	100
Thermo Fisher Scientific Vector Holdings UAB	Lithuania	100
Thermo Fisher Scientific Vector Holdings LLC	Delaware	100
TFS Brammer Holding Corporation	Delaware	100
FB2 Blocker, LLC	Delaware	100
Brammer Bio Holding Company, LLC [43.18% by Thermo Fisher Scientific Vector Holdings LLC]	Delaware	56.82
Brammer Bio, LLC	Delaware	100
Brammer Bio MA, LLC	Delaware	100
Thermo Fisher Scientific Biosciences Corp.	Canada	100
Oxoid Investments GmbH	Germany	100
B.R.A.H.M.S. GmbH [5.025% by Phadia GmbH]	Germany	94.975
B.R.A.H.M.S. Biotech GmbH [6% held privately]	Germany	94

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Cezanne S.A.S.	France	100
B.R.A.H.M.S. UK Ltd	England	100
Thermo Fisher Scientific Luxembourg German Holdings S.a.r.l.	Luxembourg	100
Dionex (UK) Limited [0.10% by Dionex Corporation]	England	99.90
Thermo Fisher Scientific Chromatography Holdings S.à r.l. [5.28% by Oxoid Investments GmbH]	Luxembourg	94.72
Thermo Fisher Scientific Chromatography Holdings Aps	Denmark	100
Dionex Corporation	Delaware	100
Thermo Fisher Scientific Pte. Ltd.	Singapore	100
Dionex Sweden AB	Sweden	100
Dionex I, LLC	Delaware	100
Dionex (Switzerland) AG	Switzerland	100
Dionex Canada Ltd.	Canada	100
Dionex Austria GmbH	Austria	100
Dionex Benelux B.V.	Netherlands	100
Dionex Holding GmbH	Germany	100
Dionex Softron GmbH	Germany	100
Dionex Singapore Pte Ltd.	Singapore	100
Thermo Fisher Scientific Korea Ltd.	Korea	100
Dionex S.A.	France	100
Thermo Fisher Diagnostics (Ireland) Limited	Ireland	100
Dionex S.p.A. [0.08% held privately]	Italy	99.92
Dionex China Limited	Hong Kong	100
Thermo Fisher (China) Analytical Ltd.	China	100
Thermo Fisher Scientific Taiwan Co., Ltd.	Taiwan	100
Dionex Denmark A/S	Denmark	100
Thermo Fisher Scientific (Breda) Holding BV	Netherlands	100
Thermo Luxembourg S.a.r.l.	Luxembourg	100
Thermo TLH L.P. [0.01% by Thermo TLH (U.K.) Limited]	Delaware	99.99
Thermo TLH (UK) Limited	England	100
Thermo TLH (MT) Limited [.000003% by Thermo TLH L.P.]	Malta	99.999997

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo TLH Luxembourg S.a.r.l.	Luxembourg	100
Thermo Fisher Scientific IT Services GmbH	Germany	100
Thermo Fisher Scientific GmbH	Germany	100
BmT GmbH Laborprodukte	Germany	100
Thermo Fisher Scientific (Real Estate 1) S.a.r.l.	Luxembourg	100
Thermo Fisher Scientific Messtechnik GmbH [10.04% by Thermo Fisher Scientific (Real Estate 1) GmbH & Co. KG]	Germany	89.96
Thermo Electron (Karlsruhe) GmbH [10% by Thermo Fisher Scientific (Real Estate 1) GmbH & Co. KG]	Germany	90
Thermo Electron Pension Trust GmbH	Germany	100
Thermo Fisher Scientific (Real Estate 1) GmbH & Co. KG [0% by Fisher Scientific Germany Beteiligungs GmbH as the General Partner]	Germany	100
Thermo Fisher Scientific (Bremen) GmbH [10% by Thermo Fisher Scientific (Real Estate 1) GmbH & Co. KG]	Germany	90
La-Pha-Pack GmbH	Germany	100
Thermo Electron LED GmbH [10% by Thermo Fisher Scientific (Real Estate 1) GmbH & Co. KG]	Germany	90
Thermo Electron LED GmbH	Austria	100
Oxoid Deutschland GmbH	Germany	100
Microgenics B.V. & Co. KG [.01% by Thermo Fisher Germany B.V.]	Germany	99.9
ILS Laboratories Scandinavia, AB	Sweden	100
Advanced Scientifics International, Inc.	Pennsylvania	100
Advanced Scientifics, Inc.	Pennsylvania	100
Avances Cientificos de Mexico, S. de R.L. de C.V. [1.005% by Advanced Scientifics International, Inc.]	Mexico	98.995
Barnstead Thermolyne LLC	Delaware	100
Thermo Fisher Scientific China Holdings I B.V.	Netherlands	100
Thermo Fisher Scientific China Holdings II B.V.	Netherlands	100
Thermo Fisher Scientific China Holdings III B.V.	Netherlands	100
Thermo Fisher China Business Trust [1% by Thermo Fisher Scientific China Holdings IV B.V.]	China	99
Thermo Fisher Scientific China Holdings IV B.V.	Netherlands	100
Fisher Scientific International LLC	Delaware	100
NERL Diagnostics LLC	Wisconsin	100
FHP LLC	Delaware	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Alchematrix, Inc.	Delaware	100
Fisher Internet Minority Holdings L.L.C.	Delaware	100
Alchematrix LLC	Delaware	100
Apogent Technologies Inc.	Wisconsin	100
Apogent Holding Company	Delaware	100
Niton Asia Limited	Hong Kong	100
Matrix Technologies LLC	Delaware	100
Molecular BioProducts, Inc.	California	100
Intrinsic BioProbes, Inc.	Arizona	100
Labomex MBP, S. de R. L. De C.V. [.04% by Apogent Technologies Inc.]	Mexico	99.96
National Scientific Company	Wisconsin	100
Lab-Chrom-Pack LLC	New York	100
Robbins Scientific LLC	California	100
Apogent Transition Corp.	Delaware	100
Erie Scientific LLC	Delaware	100
Thermo Fisher TDI Holding LLC	Delaware	100
Lab Vision (UK) Limited [0.05% by Erie U.K. Limited]	England	99.95
Microm Laborgerate S.L.	Spain	100
TFLP LLC [0.061140% by Thermo Fisher Scientific Inc., .000001% by Apogent Technologies Inc., .000060% by Fisher Scientific Worldwide Inc., and 9.993898% by Fisher WWD Holding L.L.C.]	Delaware	89.944901
Thermo Fisher Scientific AL-1 LLC	Delaware	100
Thermo Fisher Scientific Life Holdings III C.V. [33.19378799% by Erie Scientific LLC, 20.30539491% by Thermo Fisher Scientific Inc., 2.01316373% by Thermo BioAnalysis LLC, and .00000002% by Thermo Fisher Scientific AL-1 LLC] [Domesticated in the State of Delaware under the name of Thermo Fisher Scientific Life Holdings III C.V. LLC]	Netherlands	44.48765335
Thermo Fisher Scientific Life Investments GP LLC	Delaware	100
Thermo Fisher Scientific Life Investments C.V. [.00000002% by Thermo Fisher Scientific Life Investments GP LLC]	Netherlands	99.99999998
Thermo Fisher Scientific Life Senior GP Holdings II LLC	Delaware	100
Thermo Fisher Scientific Life Senior GP Holdings LLC	Delaware	100
Thermo Fisher Scientific Life Senior Holdings II C.V. [.01% by Thermo Fisher Scientific Life Senior GP Holdings II LLC]	Netherlands	99.99
TFSL Senior GP Holdings 2 LLC	Delaware	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Fisher Scientific Life Senior Holdings C.V. [.01% by TFSL Senior GP Holdings 2 LLC]	Netherlands	99.99
TFSL Financing GP LLC	Delaware	100
Thermo Fisher Scientific Life CV GP Holdings LLC	Delaware	100
Thermo Fisher Scientific Life Holdings I C.V. [.01% by Thermo Fisher Scientific Life CV GP Holdings LLC]	Netherlands	99.99
Thermo Fisher Scientific Life Switzerland Holdings GP LLC	Delaware	100
Thermo Fisher Scientific Switzerland Holdings C.V. [.01% by Thermo Fisher Scientific Life Switzerland Holdings GP LLC]	Netherlands	99.99
Thermo Fisher Scientific Dutch Holdings B.V.	Netherlands	100
Thermo Fisher Scientific Dutch Holdings II B.V.	Netherlands	100
Thermo Fisher Scientific AU LLC	Delaware	100
Thermo Fisher Scientific AU C.V. [1% by Thermo Fisher Scientific AU LLC]	Netherlands	99
Thermo Fisher Scientific Life Technologies Investment I LLC	Delaware	100
Thermo Fisher Scientific Life Technologies Investment II LLC	Delaware	100
Thermo Fisher Scientific Life Technologies Investments Holding LP [.10% by Thermo Fisher Scientific Life Technologies Investment I LLC]	England	99.90
Thermo Electron Australia Pty Limited	Australia	100
Thermo Trace Pty Ltd.	Australia	100
Thermo Fisher Scientific Australia Pty Ltd	Australia	100
Dionex Pty Limited	Australia	100
Life Technologies Australia PTY Ltd.	Australia	100
Microgenics Diagnostics Pty Limited	Australia	100
Lomb Scientific (Aust) Pty Limited	Australia	100
Technology Design Solutions Pty Ltd	Australia	100
App-Tek International Pty Ltd	Australia	100
Thermo Fisher Scientific New Zealand Holdings	New Zealand	100
Thermo Fisher Scientific New Zealand Limited	New Zealand	100
Thermo Gamma-Metrics Holdings Pty Ltd.	Australia	100
Thermo Gamma-Metrics Pty Ltd	Australia	100
Thermo Electron (Chile) S.p.A.	Chile	100
Thermo Fisher Scientific Life Financing (Cayman)	Cayman Islands	100
Thermo Fisher Scientific Life Financing (Barbados) SRL	Barbados	100
Thermo Fisher Scientific Life Technologies Investment UK II Limited	England	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Fisher Scientific Life Holdings Limited	England	100
Thermo Fisher Scientific Life Financing Limited	England	100
Thermo Fisher Scientific AU Limited	England	100
Life Technologies Limited	Scotland	100
Matrix MicroScience Ltd.	England	100
Thermo Fisher Scientific Luxembourg Sweden Holdings II S.à r.l.	Luxembourg	100
Thermo Fisher Scientific Switzerland B.V.	Netherlands	100
SwissAnalytic Group GmbH	Switzerland	100
Thermo Fisher Scientific (Ecublens) SARL	Switzerland	100
Thermo Fisher Scientific Holdings Europe Limited	England	100
Thermo Fisher Scientific SpA	Italy	100
Fisher Luxembourg Danish Holdings SARL	Luxembourg	100
Fisher Holdings ApS	Denmark	100
Apogent Denmark ApS	Denmark	100
Fisher BioImage ApS	Denmark	100
Nunc A/S	Denmark	100
Proxeon Biosystems ApS	Denmark	100
Kendro Laboratory Products Ltd	England	100
Kendro Containment & Services Limited	England	100
Thermo Fisher Scientific (Johannesburg) (Proprietary) Limited	South Africa	100
Thermo Fisher Scientific (Schweiz) AG	Switzerland	100
Thermo Fisher Scientific Wissenschaftliche Geräte GmbH	Austria	100
Thermo Fisher Scientific (Praha) s.r.o.	Czech Republic	100
Thermo Electron Sweden Forvaltning AB [10.08% by Dionex Corporation]	Sweden	89.92
Spectra-Physics AB	Sweden	100
Thermo Fisher Scientific Spectra S.a.r.l.	Luxembourg	100
Thermo Fisher Scientific Spectra-Physics Holdings Luxembourg II S.à r.l.	Luxembourg	100
Thermo Fisher Scientific Spectra-Physics Holdings Luxembourg I S.à r.l.	Luxembourg	100
Spectra-Physics Holdings Limited	England	100
Thermo Fisher Scientific Japan Holdings III B.V.	Netherlands	100
Thermo Fisher Scientific K.K. [0% by TFS Breda B.V. – preferred shares]	Japan	100
Saroph Sweden AB	Sweden	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Electron Sweden AB	Sweden	100
Thermo Life Sciences AB	Sweden	100
TFS Breda B.V. [.25% by Thermo Fisher Scientific C.V.]	Netherlands	99.75
Thermo Fisher Scientific Life Financing C.V. [38.65428508% by Thermo Fisher Scientific Life Holdings I C.V. and 0.00000003% by TFSL Financing GP LLC]	Netherlands	61.34571489
Metavac LLC	Delaware	100
Abgene Inc.	Delaware	100
Apogent Finance Company	Delaware	100
Capitol Vial, Inc.	Alabama	100
Capitol Scientific Products, Inc.	New York	100
Chase Scientific Glass, Inc. [50% by Apogent Holding Company]	Wisconsin	50
EP Scientific Products LLC	Delaware	100
Erie Scientific Company of Puerto Rico	Delaware	100
Erie Scientific Hungary Ipari és Szolgáltató Kft	Hungary	100
Erie UK Holding Company	Delaware	100
Erie LP Holding LLC	Delaware	100
Fisher Scientific Investments (Cayman), Ltd.	Cayman Islands	100
Thermo Fisher Scientific Erie Financing (Barbados) SRL	Barbados	100
Erie U.K. Limited	England	100
Nalge Nunc International Corporation	Delaware	100
Epsom Glass Industries Limited	England	100
Thermo Fisher Scientific (Monterrey), S. De R.L. De C.V. [1% by Nalge Nunc International (Monterrey) LLC]	Mexico	99
236 Perinton Parkway, LLC	New York	100
ARG Services LLC	Delaware	100
Owl Separation Systems LLC	Wisconsin	100
Nalge Nunc International (Monterrey) LLC	Delaware	100
Erie UK Senior Holding Limited [1.01% by Erie LP Holding LLC]	England	98.99
LambTrack Limited	England	100
Erie UK 2 Limited	England	100
Thermo BioSciences Holdings LLC	Delaware	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Pierce Biotechnology, Inc.	Delaware	100
Perbio Science, Inc.	Delaware	100
Pierce Milwaukee, Inc.	Delaware	100
Pierce Milwaukee Holding Corp.	Delaware	100
Thermo Fisher Scientific (Milwaukee) LLC [1% by Pierce Milwaukee, Inc.]	Delaware	99
Advanced Biotechnologies Limited	England	100
Abgene Limited	England	100
Apogent U.K. Limited	England	100
Matrix Technologies Corporation Limited	England	100
Nalge (Europe) Limited	England	100
Chromacol Limited	England	100
Ever Ready Thermometer Co., Inc.	Wisconsin	100
Samco Scientific LLC	Delaware	100
Samco Scientific (Monterrey) LLC	Delaware	100
Seradyn Inc.	Delaware	100
Applied Scientific Corporation	California	100
Cellomics, Inc.	Delaware	100
Fisher BioSciences Japan G.K.	Japan	100
CTPS LLC	Delaware	100
Clintrak Pharmaceutical Services, LLC	Delaware	100
Fisher Clinical Services (Bristol), LLC	Delaware	100
Clintrak Clinical Labeling Services, LLC	Delaware	100
Columbia Diagnostics, Inc.	Delaware	100
Drakeside Real Estate Holding Company LLC	Delaware	100
Duke Scientific Corporation	California	100
Fisher Clinical Services Inc.	Pennsylvania	100
Eutech Instruments Pte Ltd.	Singapore	100
Eutech Instruments Europe B.V.	Netherlands	100
Thermo Fisher Scientific Brasil Serviços de Logística Ltda [.001% by Fisher BioServices Inc.]	Brazil	99.999
Fisher BioServices Inc.	Virginia	100
Southern Trials (Pty) Ltd.	South Africa	100
Schantz Road LLC	Pennsylvania	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Specialty (SMI) Inc.	California	100
Fisher Germany Holdings GmbH	Germany	100
Fisher Hamilton China Inc.	Delaware	100
Fisher Scientific Brazil Inc.	Delaware	100
Systems Manufacturing Corporation	Delaware	100
Fisher Scientific Central America Inc.	Delaware	100
Fisher Scientific Chile Inc.	Delaware	100
Consultores Fisher Scientific Chile Ltd [50% by Fisher Scientific Worldwide Inc.]	Chile	50
Fisher Scientific Colombia Inc.	Delaware	100
Fisher Scientific Company L.L.C.	Delaware	100
Fisher Scientific Costa Rica Sociedad de Responsabilidad Limitada	Costa Rica	100
Thermo Fisher Scientific Brahms LLC	Delaware	100
Biochemical Sciences LLC	Delaware	100
Fisher Scientific de Mexico S.A.	Mexico	100
Medical Analysis Systems, Inc.	Delaware	100
Medical Analysis Systems International, Inc.	California	100
Medical Diagnostics Systems, Inc.	California	100
United Diagnostics, Inc.	Delaware	100
Fisher Scientific Latin America Inc.	Delaware	100
Fisher Scientific Mexico Inc.	Delaware	100
FS Mexicana Holdings LLC [.01% by Fisher Scientific Mexicana, S. de R.L. de C.V]	Delaware	99.99
Fisher Alder S. de R.L. de C.V. [.0020% by Fisher Scientific International LLC]	Mexico	99.9980
Fisher Hamilton Mexico LLC	Delaware	100
Fisher Scientific Mexicana, S. de R.L. de C.V. [.01% by Fisher Scientific Worldwide Inc.]	Mexico	99.99
FS Casa Rocas Holdings LLC [1% by Fisher Mexico, S. de R.L. de C.V]	Delaware	99
Fisher Mexico, S. de R.L. de C.V. [.0000269% by FS Casa Rocas Holdings LLC]	Mexico	99.9999731
Fisher Scientific Middle East and Africa Inc.	Delaware	100
Fisher Scientific Operating Company	Delaware	100
Fisher Scientific Venezuela Inc.	Delaware	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Fisher Scientific Worldwide (Shanghai) Co., Ltd.	China	100
FRC Holding Inc., V	Delaware	100
Golden West Indemnity Company Limited	Bermuda	100
Liberty Lane Real Estate Holding Company LLC	Delaware	100
New FS Holdings Inc.	Delaware	100
Hangar 215, Inc.	Delaware	100
Fisher Scientific Worldwide Inc.	Delaware	100
FSIR Holdings (US) Inc. [1.265% by Fisher Clinical Services Inc.]	Delaware	98.735
Liberty Lane Investment LLC	Delaware	100
Fisher Scientific Holding Company LLC	Delaware	100
Fisher Scientific Holdings (M) Sdn Bhd	Malaysia	100
Fisher Manufacturing (Malaysia) Sdn Bhd	Malaysia	100
Bumi-Sans Sendirian Berhad	Malaysia	100
Fisher Scientific (M) Sdn Bhd	Malaysia	100
General Scientific Company Sdn Bhd (M)	Malaysia	100
Fisher Scientific Holdings (S) Pte Ltd	Singapore	100
Fisher Scientific Pte. Ltd. [16.57% by Fisher Scientific International LLC]	Singapore	83.43
Fisher Scientific (SEA) Pte. Ltd.	Singapore	100
Fisher Scientific Australia Pty Limited	Australia	100
FSIR Holdings (UK) Limited	England	100
FSWH Company LLC	Delaware	100
FSI Receivables Company LLC	Delaware	100
Fisher Bermuda Holdings Limited	Bermuda	100
Thermo Fisher Scientific FSIR Financing (Barbados) SRL	Barbados	100
Thermo Fisher Scientific FSIR Financing S.a.r.l.	Luxembourg	100
Fisher Scientific Worldwide Holdings I C.V. [12% by Fisher Scientific Worldwide Inc.]	Netherlands	88
Finesse Solutions, Inc.	Delaware	100
Finesse Scientific Equipment (Shanghai) Co., Ltd.	China	100
FSWH International Holdings LLC	Delaware	100
Thermo Fisher Scientific Life Investments US Financing I LLC [1% by FSIR Holdings (US) Inc.]	Delaware	99

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Phadia International Holdings C.V. [10% by FSIR Holdings (US) Inc.]	Netherlands	90
Power Sweden Holdings III Aktiebolag	Sweden	100
Thermo Fisher Scientific BV	Belgium	100
Thermo Fisher Scientific Worldwide Investments (Cayman)	Cayman Islands	100
Thermo Fisher Scientific Worldwide Investments (Luxembourg) S.a.r.l.	Luxembourg	100
Thermo Fisher Scientific Investments (Sweden) S.a.r.l. [16.086% by CHK Holdings Inc.]	Luxembourg	83.914
Thermo Fisher Scientific Denmark Senior Holdings ApS	Denmark	100
Fisher Scientific Holding HK Limited [.01% by Fisher Scientific Holding Company LLC]	Hong Kong	99.99
Fisher Scientific (Hong Kong) Limited [.022% Fisher Scientific Holding Company LLC]	Hong Kong	99.978
Fisher Scientific Japan, Ltd.	Japan	100
Fisher Scientific Korea Ltd	Korea	100
Fisher WWD Holding L.L.C.	Delaware	100
Kyle Jordan Investments LLC	Delaware	100
Pacific Rim Far East Industries LLC	Delaware	100
Pacific Rim Investment, LLC	Delaware	100
Marketbase International Limited	Hong Kong	100
Thermo-Fisher Biochemical Product (Beijing) Co., Ltd.	China	100
HighChem s.r.o.	Slovakia	100
Thermo Fisher Scientific HR Services Mexico, S. de R.L. de C.V. [1% by Fisher Clinical Services (Mexico) LLC]	Mexico	99
Thermo Fisher Scientific China (C-I) LLC	Delaware	100
Shanghai Thermo Fisher (C-I) Trading Co. Ltd	China	100
Pasteur Acquisition SRL	Barbados	100
Thermo Fisher Scientific China (S) LLC	Delaware	100
Shanghai Thermo Fisher (S) Trading Co. Ltd	China	100
Molecular Transfer, Inc.	Delaware	100
Thermo Fisher Scientific Cyprus I Ltd	Cayman Islands	100
Thermo Fisher Scientific Cyprus II Ltd	Cayman Islands	100
Thermo Fisher Scientific India Holding LLC	Delaware	100
Thermo Fisher Scientific Cyprus III Ltd	Cayman Islands	100
Thermo Fisher Scientific PSG Corporation	Delaware	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Thermo Fisher Detection Mexico LLC	Delaware	100
Thermo Fisher Costa Rica Sociedad de Responsabilidad Limitada [1% by Fisher Scientific Company L.L.C.]	Costa Rica	99
Thermo Fisher Scientific South Africa Proprietary Ltd	South Africa	100
TFS Third Avenue (Barbados) I Srl	Barbados	100
TFS (Barbados) I Srl	Barbados	100
Thermo Fisher Biopharma Services Pte. Ltd.	Singapore	100
Thermo Services (Hungary) Kft	Hungary	100
Thermo Fisher Scientific One Limited	England	100
Erie UK 1 Limited	England	100
Erie UK 5 Limited	England	100
Erie US II LLC	Delaware	100
Erie Finance Holding Limited	England	100
Erie Finance Limited	England	100
Erie Finance 2 Limited	England	100
Thermo Fisher Scientific (Finance I) B.V.	Netherlands	100
Life Technologies Finland Oy	Finland	100
Erie Finance 1 Limited	England	100
Erie (GC) Holding Limited [1% by Erie US III LLC]	England	99
Erie UK 3 Limited	England	100
Erie GC Holding LLC	Delaware	100
Erie GC Limited	England	100
Erie US III LLC	Delaware	100
Thermo Fisher Scientific Erie Financing S.a r.l	Luxembourg	100
Erie Luxembourg LLC	Delaware	100
Thermo Fisher Scientific Erie 1 Financing (Barbados) SRL	Barbados	100
Thermo Fisher Scientific EMEA Limited	Ireland	100
Quebec B.V.	Netherlands	100
Quebec Court B.V.	Netherlands	100
Oncomine Molecular Inc.	Delaware	100
Oncomine LLC	Delaware	100
Oncomine India Private Limited [.01% by Oncomine Molecular Inc.	India	99.99
Oncomine	France	100

NAME	STATE OR JURISDICTION OF INCORPORATION	PERCENT OF OWNERSHIP
Oncomine Limited	England	100
Oncomine ULC	Canada	100
Oncomine Pte. Ltd	Singapore	100
Oncomine Molecular, S.L	Spain	100
Oncomine S.r.l	Italy	100
Oncomine K.K.	Japan	100
Thermo Fisher Scientific FLC LLC	Delaware	100
Thermo FLC LP [10% BY Thermo Fisher Scientific FLC LLC]	Delaware	90
Thermo Fisher Scientific Life Sciences COE Corporation	Delaware	100
Phadia Malta Holdings Limited	Malta	100
Thermo Fisher Scientific Life Investments IV S.a.r.l	Luxembourg	100
Thermo Fisher Scientific Life Investments Malta II Limited [0.00001% by Thermo Fisher Scientific Life Investments Malta Holding I LLC]	Malta	99.99999
Thermo Fisher Scientific Life Investments Malta Holding I LLC	Delaware	100
Henogen SA	Belgium	100
Thermo Fisher Scientific Investments (Malta) Limited [.00000066% by Thermo Fisher Scientific Malta Holdings LLC]	Malta	99.99999934
Thermo Fisher Scientific Malta Holdings LLC	Delaware	100
Thermo Fisher Scientific PRB Malta Limited [.03997% by Thermo Fisher Scientific PRB LLC]	Malta	99.96003
Thermo Fisher Scientific PRB LLC	Delaware	100
Thermo Fisher Scientific Spectra Malta Limited [.03997% by Thermo Fisher Scientific Spectra LLC]	Malta	99.96003
Thermo Fisher Scientific Spectra LLC	Delaware	100
Thermo Fisher Scientific Spectra-Physics Investments Malta Limited [.0000011% by Spectra-Physics Holdings USA, LLC]	Malta	99.9999989
Spectra-Physics Holdings USA, LLC	Delaware	100
Thermo Fisher Scientific Investments Malta (Sweden Financing) Limited [.00000002% by Thermo Fisher Scientific Investments (Sweden) LLC and 26.76040344% by Thermo Fisher Scientific Life Investments I S.a.r.l]	Malta	73.23959654
Thermo Fisher Scientific Life Investments I S.a.r.l.	Luxembourg	100
Thermo Fisher Scientific Investments (Sweden) LLC	Delaware	100
Tuya Merger Co.	Delaware	100

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-3 (No. 333-229951) and Form S-8 (Nos. 33-51189, 33-54347, 333-146068, 333-152344, 333-161939, 333-188846 and 333-220231) of Thermo Fisher Scientific Inc. of our report dated February 24, 2021 relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts
February 24, 2021

Exhibit 31.1

THERMO FISHER SCIENTIFIC INC.

CERTIFICATION REQUIRED BY EXCHANGE ACT RULES 13a-14(a) and 15d-14(a),
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Marc N. Casper, certify that:

1. I have reviewed this Annual Report on Form 10-K of Thermo Fisher Scientific Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 24, 2021

/s/ Marc N. Casper
Marc N. Casper
Chairman, President and Chief Executive Officer

Exhibit 31.2

THERMO FISHER SCIENTIFIC INC.

CERTIFICATION REQUIRED BY EXCHANGE ACT RULES 13a-14(a) and 15d-14(a),
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Stephen Williamson, certify that:

1. I have reviewed this Annual Report on Form 10-K of Thermo Fisher Scientific Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 24, 2021

/s/ Stephen Williamson
Stephen Williamson
Senior Vice President and Chief Financial Officer

Exhibit 32.1

THERMO FISHER SCIENTIFIC INC.

CERTIFICATION REQUIRED BY EXCHANGE ACT RULES 13a-14(b) and 15d-14(b),
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report on Form 10-K of Thermo Fisher Scientific Inc. (the "Company") for the period ended December 31, 2020 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Marc N. Casper, Chairman, President and Chief Executive Officer of the Company, hereby certifies, pursuant to Securities Exchange Act of 1934 Rules 13a-14(b) and 15d-14(b), that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: February 24, 2021

/s/ Marc N. Casper
Marc N. Casper
Chairman, President and Chief Executive Officer

A signed original of this written statement required by Section 906, or other document authenticating, acknowledging, or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to Thermo Fisher Scientific Inc. and will be retained by Thermo Fisher Scientific Inc. and furnished to the Securities and Exchange Commission or its staff upon request.

Exhibit 32.2

THERMO FISHER SCIENTIFIC INC.

CERTIFICATION REQUIRED BY EXCHANGE ACT RULES 13a-14(b) and 15d-14(b),
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report on Form 10-K of Thermo Fisher Scientific Inc. (the "Company") for the period ended December 31, 2020 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Stephen Williamson, Senior Vice President and Chief Financial Officer of the Company, hereby certifies, pursuant to Securities Exchange Act of 1934 Rules 13a-14(b) and 15d-14(b), that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: February 24, 2021

/s/ Stephen Williamson
Stephen Williamson
Senior Vice President and Chief Financial Officer

A signed original of this written statement required by Section 906, or other document authenticating, acknowledging, or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to Thermo Fisher Scientific Inc. and will be retained by Thermo Fisher Scientific Inc. and furnished to the Securities and Exchange Commission or its staff upon request.