

## Nondestructive testing equipment and services

By BCC Publishing Staff

The global market for nondestructive testing equipment and services was valued at \$28.6 billion in 2022 and is expected to grow at a compound annual growth rate (CAGR) of 10.1% to reach \$50.7 billion by 2028.

Nondestructive testing involves analyzing materials, components, or assemblies for differences in characteristics or discontinuities without destroying the part or system. Because it allows for inspection without interfering with a product's final use, nondestructive testing provides an excellent balance between quality control and cost-effectiveness.

Visual inspection of materials and surfaces with the human eye is the most basic nondestructive testing method. However, computerization and automation advancements in the past 20 years have led to the development of new techniques and increased usefulness of existing methods.

Established nondestructive testing methods, as recognized by the American Society of Nondestructive Testing, include

- **Ultrasonic testing:** High-frequency sound waves travel through the test object and are reflected when they encounter defects in testing.
- **Radiography testing:** X-rays or gamma-rays are used to produce an image of the test object on film.
- **Visual inspection:** A person with special training, such as knowledge of the product and process, inspects the test object using their eyesight.
- **Eddy current testing:** A localized electric current is induced within the test object. Discontinuities in the object, such as a void or deep crack

in the surface, will interrupt or reduce the current's flow.

- **Magnetic particle inspection:** Finely divided magnetic particles, either in powder form or in a liquid suspension, are applied to the surface of a magnetized test object, and the particles accumulate at the site of any flaws.
- **Acoustic emission testing:** Detects elastic waves generated within a test object by such mechanisms as plastic deformation, fatigue, and fracture.
- **Liquid penetrant inspection:** Reveals surface-breaking flaws by bleed out of a colored or fluorescent dye from the flaw.
- **Infrared thermography testing:** Converts radiated or reflected heat into real-time pictures or images.

The oil and gas sector drives demand in the nondestructive testing market as crucial infrastructure ages and operations become more complicated. Also, demand for equipment and services is rising in the aerospace industry, which requires novel techniques for inspecting new composite materials.

Nondestructive testing equipment and services are governed by various rules and regulations adopted by different governments and authorities. For example, in the U.S., several federal and state agencies regulate these products, including

- **The American Society for Nondestructive Testing (ASNT):** The ASNT develops and publishes standards for nondestructive testing practices and procedures. These standards are used by nondestructive testing professionals and organizations worldwide.
- **The American Society of Mechanical Engineers (ASME):** The ASME publishes standards for the design, construction, and testing of pressure vessels and other equipment. These standards often include requirements for nondestructive testing.

Table 1. Global market for nondestructive testing equipment and services, by type, through 2028 (\$ millions)

Type	2022	2023	2028	CAGR % (2023–2028)
Equipment	19,336.2	20,813.4	31,796.0	10.3
Services	9,250.2	10,534.2	18,875.2	12.4
Total	28,586.4	31,347.6	50,671.2	10.1

- **The Federal Aviation Administration (FAA):** The FAA requires nondestructive testing for various aircraft components, including fuselages, wings, and engines.
- **The Department of Defense (DoD):** The DoD has a set of nondestructive testing requirements for military equipment.
- **State and local regulations:** Besides federal laws, some states and local jurisdictions have their own nondestructive testing requirements.

The Asia-Pacific region is expected to be the fastest-growing market for nondestructive testing equipment and services, followed by North America and Europe. This growth is driven by the increasing demand for nondestructive testing in emerging economies, such as China and India, as well as the growing focus on safety and quality assurance in these countries.

### About the author

BCC Publishing Staff provides comprehensive analyses of global market sizing, forecasting, and industry intelligence, covering markets where advances in science and technology are improving the quality, standard, and sustainability of businesses, economies, and lives. Contact the staff at Helia.Jalili@bccresearch.com.

### Resource

BCC Publishing Staff, "Nondestructive testing equipment and services: Ultrasonic, radiographic, eddy current and others" BCC Research Report MFG016J, December 2023. <https://bit.ly/BCC-December-2023-nondestructive-testing> ■