ISO 604 Compressive Properties of Plastics

TEST METHOD SUMMARY

ISO 604 examines the compressive properties of reinforced and unreinforced rigid plastics, including high-modulus composites, through a process of straining and loading the plastic at relatively low rates of strain. It enables replication of application-specific conditions. The compressive property information provides a standard and consistent means to compare materials for research and development, quality control, acceptance or rejection under specifications, and other material evaluation processes.

Critical compressive properties include modulus of elasticity, yield stress, deformation beyond yield point, and compressive strength (unless the material merely flattens but does not fracture). According to ISO 604, the specimen is placed between compressive plates parallel to the specimen surface, and compressed along its major axis at constant rate of displacement until the specimen fractures or until the load or the decrease in length reaches a predetermined value. An extensometer attached to the fixture is used to determine the modulus of elasticity. When performing compression testing, it has been found that specimen alignment plays an important role in achieving even load distribution, which contributes to the consistency of the results.

Solutions for ISO 604 typically include these types of components;

MTS Criterion®
Electromechanical Universal Test Systems

MTS Exceed®
Electromechanical Universal Test Systems

LOAD FRAME OPTIONS*

Both the premium MTS Criterion® and the economical MTS Exceed® universal testing machines are ideal for determining the compressive properties of plastics per ISO 604. These test systems come in a variety of force capacities and frame styles, ranging from 1-column tabletops to larger 2-column floor -standing models. The 30kN and 100kN models also have dual-zone test spaces to reduce set-up times if you frequently change test requirements. And as an alternative to a new load frame, you can modernize the software and controls of your old test system with an MTS ReNew™ upgrade.

COMPRESSION PLATEN OPTIONS*

		
Room Temperature Testing		**Temperature Testing**
Compression platens are generally selected based on the required compression of the test specimen. As examples, these compression platens are designed for up to 20kN of force		Compression platens for temperature testing between -70°C to 350°C (-94°F to 662°F) are available as a one fixed / one spherically seated platen combination.

EXTENSOMETRY OPTIONS*

Platen-to-platen Displacement	Non-contact Video Strain	
		Simple platen-to-platen measurement is often sufficient for most tests. MTS can also offer advanced non-contact strain measurement using the Advantage Video Extensometer.

CHAMBER OPTIONS*

	
Advantage Environmental Chamber	**FEC 1200 or 1300**
The Advantage™ Environmental Chamber designed for Criterion load frames is ideal for testing of elastomeric components, tire cords, plastics, composites, and laminates. It has a temperature range from -129° C to 315° C (-200°F to 600°F), and is compatible with either video or laser extensometers.	The Fundamental™ Environmental Chamber designed for Exceed load frames is also ideal for testing these same thermoplastic and composite materials. It has a temperature range from -70°C to 350°C (-94°F to 662°F) and is likewise compatible with either video or laser extensometers.

SOFTWARE OPTIONS*

ISO 604 Compressive Properties Test Template	About TestSuite™ TW
To simplify testing to ISO 604, MTS has developed a TestSuite™ TW test template that will set-up and run the recommended compression tests. After the test data has been collected, reports can display all of the required calculations including compressive strength, compressive yield strength, offset yield strength, modulus of elasticity, and more. MTS consultants are also available to support any of your plastic and composite compression test applications, test method set-up, and data collection and integration requirements.	This flexible and versatile software package comes in three versions so that you can choose exactly which one best fits your requirements. Lab managers and test creators like TW Elite since it includes all the test definition capacity and flexibility needed to create and edit custom test sequences while accommodating the specific runtime needs of lab personnel. Test operators prefer the simplicity and intuitive nature of TW Express. This software allows operators to easily execute tests and monitor data or calculate values in runtime views. For QA/QC labs that prefer the Exceed universal test machine, TW Essential will provide both the test creation and test operation capabilities, combining efficiency and productivity in one software application.

*NOTE: This technical note is intended to show some of the popular and more common solutions used for this particular application. Most of the time, additional options are available and necessary to accomplish your more comprehensive test objectives.

APPENDIX - TEST SPECIMEN DETAIL

Standard Sizes	Distance between Platens (mm)	Width (mm)	Thickness (mm)
Type A Modulus	50	10	4
Type B Strength	10	10	4
Type 1 Small Specimen	6	5	3
Type 2 Small Specimen Modulus	35	5	3

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