

Compression Testing for Powders, Fibers and Micro Materials

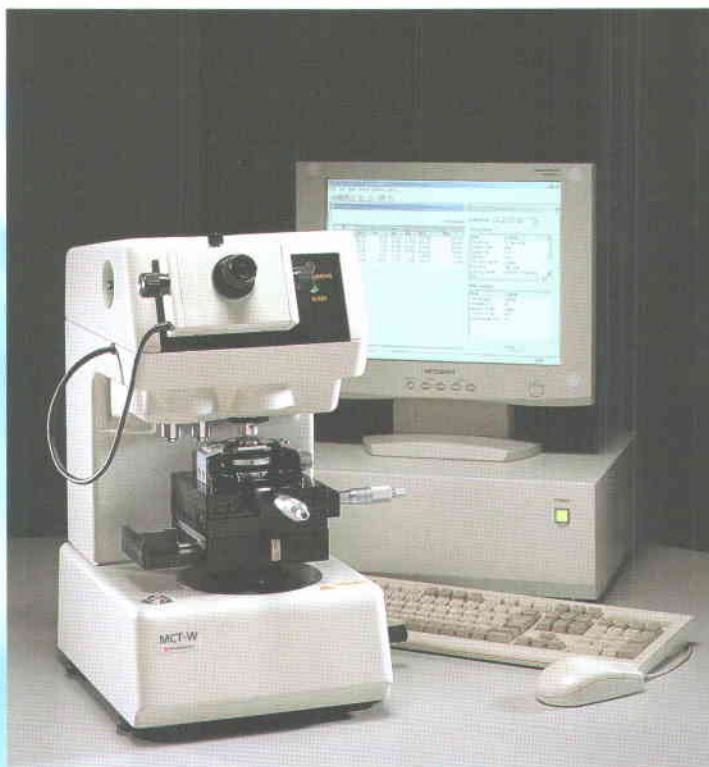
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# Shimadzu Micro Compression Testing Machine

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# MCT-W Series

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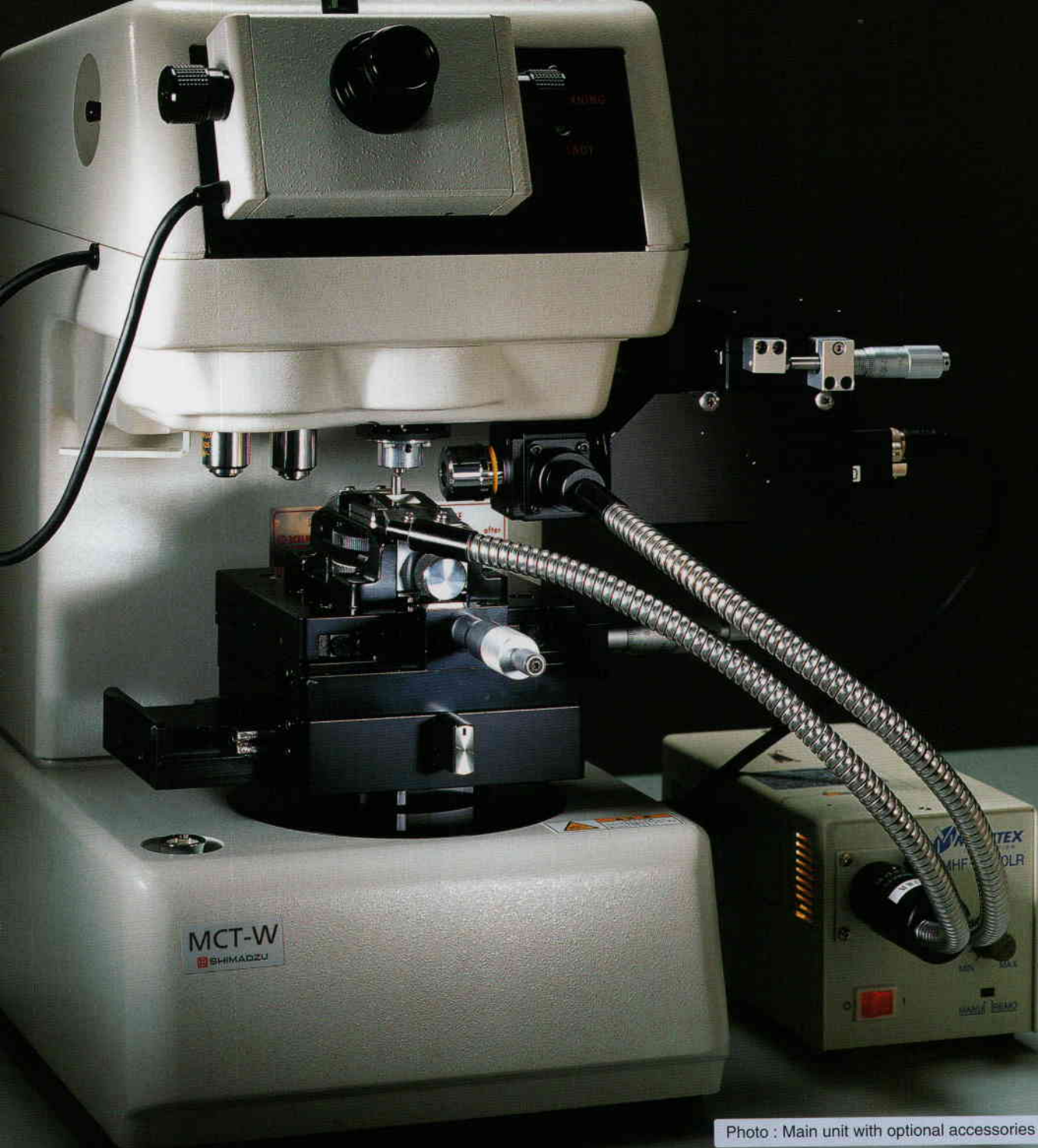


Photo : Main unit with optional accessories

# MCT-W Series

## Evaluates Compression Strength of Various of Micro Specimens

The Shimadzu micro compression testers MCT-W Series evaluate the strength of micro components, micro particles generated in powder processing and fine fibers used in new materials.

As production of spherical micro powder particles with diameters from several microns to several 100 $\mu$ m becomes possible with the advancements in metal and ceramic powder manufacturing technologies, it has become necessary to evaluate their characteristics. Fine fibers used in composite materials, as well as various other micro materials, also need to be evaluated for their compression characteristics.

The Shimadzu MCT-W Series is just the right micro compression tester to meet strength-evaluation needs in the fields of micro particles and fine fibers.



### Evaluates the compression strength of micro substances.

- Variety of micro components
- Ceramic particles
- Fine metallic powder
- Resin particles
- Pigments
- Food source powders
- Pharmaceuticals (micro capsules)
- Fine fibers
- Powders, which easily condense and lose fluidity due to their lack of momentum and also disperse easily, are extremely difficult to handle. Particle size enlargement to increase the apparent momentum is a common method to combat this problem. The enlarged particles should not break apart during transportation but have to be easily decomposed to the original particles when, for example, mixed into polymer materials. In other words, they have to be processed to break under a specific load.
- The MCT-W Series, capable of compression characteristics evaluation for each particle, is also ideal for the evaluation of enlarged particles.

# A New-Concept Compression Testing Machine for Evaluating the Strength of Micro Materials

## Micro Compression Displacement Measurement

To enable evaluation of compression characteristics of various micro materials, the MCT-W series provides models with two different resolution and measurement ranges:

- measurement range up to 100 $\mu$ m and resolution of 0.01 $\mu$ m.
- measurement range up to 10 $\mu$ m and resolution of 0.001 $\mu$ m.

## Wide Load Range

The MCT-W series is available in two different test forces: maximum test forces of 4900mN and 1960mN.

## Highly Accurate Measurement

Test force are applied at an accuracy of less than  $\pm 1\%$  of the set or displayed test force (whichever is greater).

## Measurement of Specimen Dimension Provided as Standard

The specimen dimension measurement function that uses an overhead image (provided as standard) enables determination of the geometrical mean diameter and length of the specimen.

## Length Measurement on PC Screen and Saving of Images (optional)

Use the optional length measurement kit (color or monochrome) to display the overhead image on the PC screen to measure the length of the specimen. The image can also be saved as digital data.

## Main Testing Sequence

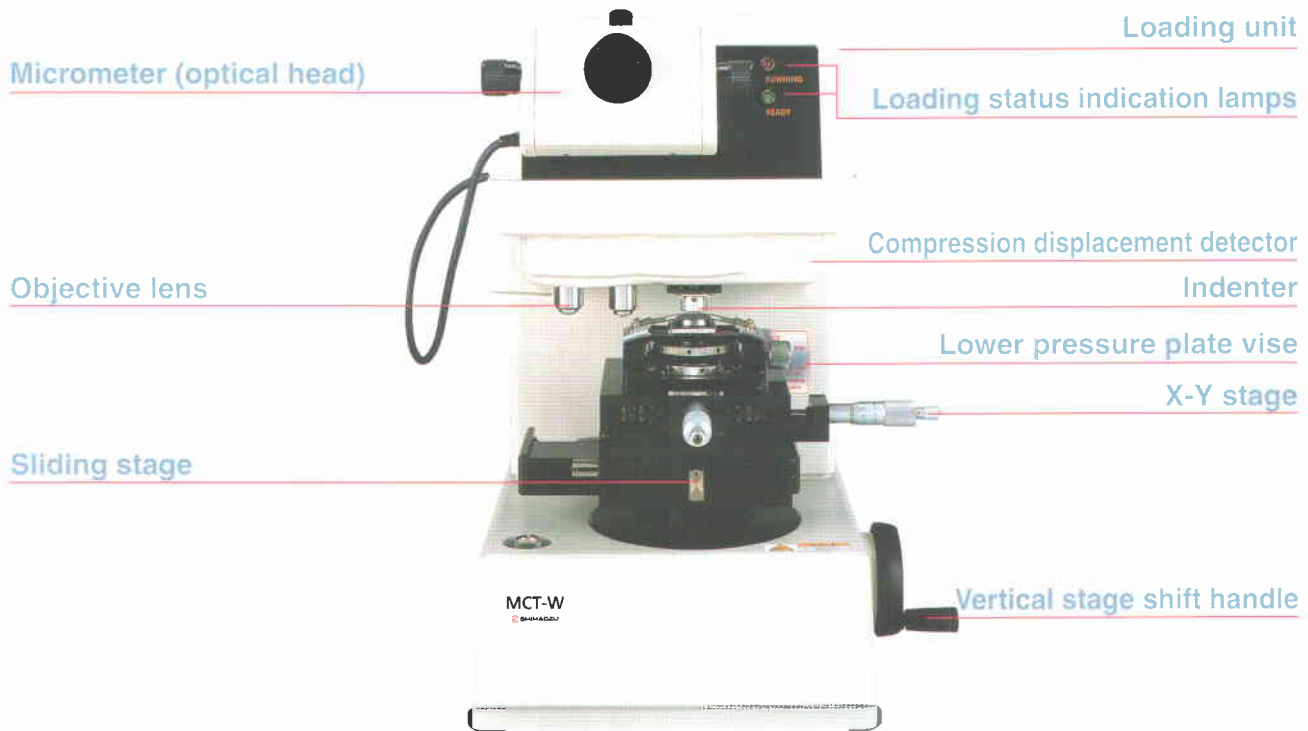
1. Setting test parameters
2. Specimen observation with a microscope and dimensional measurement (when necessary)
3. Loading
4. Analysis

## Display of Specimen Images During Compression (optional)

An image captured in side observation during compression can be displayed (the optional side observation kit is required).

## Testing also Possible under High-Temperature Conditions (optional system)

Testing can be performed in temperature conditions ranging from 50 to 250°C.



## A Design with Simplicity in Mind

### Micrometer (optical head)

This unit measures the size of the specimen. The specimen is sandwiched by two indicators to enable measurement up to 200 $\mu$ m at an increment of 0.1 $\mu$ m (when the  $\times 50$  objective lens is used). The measured dimension is displayed on the PC screen where it can be further processed to calculate and display the strength of the specimen.

### Objective Lenses

The standard  $\times 50$  and optional  $\times 100$  lenses are available for length measurement. For observation, the standard  $\times 10$  and optional  $\times 20$  lenses are available.

### Sliding Stage

The test point is selected with the micrometer and that point is shifted to just below the indenter. The click-stop mechanism ensures accurate positioning of the specimen. The positioning accuracy is within  $\pm 5\mu$ m (an accuracy of  $\pm 0.2\mu$ m can be achieved with careful handling).

### Vertical Stage Shift Handle

The stage is smoothly shifted with this single handle.

### Loading Unit

The test force range is from 9.8 to 4900mN or 1960mN. The electromagnetic method ensures highly precise loading.

### Loading Status Indication Lamps

The red lamp (RUNNING) is lit during loading. The green lamp (READY) indicates that the operator can touch the indenter with safety.

### Compression Displacement Detector

A detector is configured in the upper section of the indenter to accurately measure the compression displacement.

### Indenters

The following indenters are available.

- 50 $\mu$ m diameter flat indenter
- 500 $\mu$ m diameter flat indenter (optional)
- 115° triangular pyramid indenter (optional)

(The triangular pyramid indenter is used for tests where the specimen is larger than 500 $\mu$ m and cannot be broken at a test load of 4900mN.)

### Lower Pressure Plate Vise

This ergonomically constructed vise firmly secures the lower pressure plate.

### X-Y Stage

This stage can be shifted over a range of 25mm in the X-Y directions. It can be moved in increments of 0.01mm with the standard micrometer. A digital micrometer is also available as an option.