

<Instruction Manual for Standard Microstructure Pieces>

To properly use this product, please read the following before use.

1. How to Use the Standard Microstructure Pieces

(1) The surface of the standard pieces has been microscopically examined for microstructure

The surface of the standard pieces has been grounded with a grinder, then emery polished (#320 to #1200), buffed and etched. The surface under microscopic examination is coated with vinyl (Seal Peel*¹) to prevent rust, so the vinyl film must be peeled off before conducting the examination. To do so, it is advisable to put an adhesive tape (e.g., cellophane tape) on the film and peel them off together with a single stroke. If the rust preventive oil contained in the vinyl film remains on the examination surface, wash it with clean alcohol and blow it off at once with a blower to dry. Due care must be exercised not to damage the polished surface when handling the standard pieces.

(2) The standard microstructure pieces might gather rust

Especially, if left in a highly humid room, the surface of the standard pieces might become discolored or rusted. In severe cases, it will become difficult to observe the microstructure. In the case of cast iron, even if the piece is vinyl coated, the graphite contained in the cast iron absorbs moisture and might cause some rust.

(3) In the event of rust formation

In the case that rust forms, polish and etch the standard piece again before examining it. Polishing should be done according to the degree of the rust. The more severe the rust, apply coarser-grain emery polishing, then finishing (#800 to #1200) and buffing. After the series of polishing, rinse the piece with running water, while being careful not to touch the polished surface, and blow air to dry. Because, if heated, some standard pieces might undergo changes in their microstructure, do not apply grinder polishing.

Next, put some etching fluid (e.g., Nital) in a small plate, soak the piece in the etching fluid with its polished surface facing down, and hold it for an appropriate period, then rinse it with water and dry. The appropriate etching fluid and etching periods are shown under each of the microstructure photos.

(4) Storage after use

After use, the standard pieces must be stored in a place with low humidity, such as a desiccator.

2. Guidance on Standard Microstructure Pieces*²

<Standard Series>

- Group 1 Carbon Steels & Cast Irons (25 pcs)
- Group 2 Alloy Tool Steel & High Speed Steel (25 pcs)
- Group 3 Structural Alloy Steel & Steel for Special uses (25 pcs)
- Group 4 Non-ferrous Alloy (25 pcs)
- Group 6 Surface Modification of Metals (25 pcs)
- Group 7 Abnormal Structure (23 pcs)

<Introductory Series>

- Set A Introduction to Microstructure of Carbon Steels & Cast Iron (5 pcs)
(Ferrite, Ferrite & Pearlite, Pearlite, Network Cementite, Gray Cast Iron)
- Set B Introduction to Microstructure of Heat-Treated Carbon Steels (5 pcs)
(Martensite, Martensite & Retained Austenite, Tempered Martensite, High Temperature Tempered Martensite, Lower Bainite)

*¹ When purchased new, the surface of the standard pieces is coated with a seal peel. However, seal peel body is not included since it is a spray can type and cannot be exported. If you want to use it outside of Japan, please prepare an equivalent product by yourself.

*² Since the product is sold as a package, in addition to the English manual, Japanese reference books are included. Please utilize it if you would like.

