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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 228.2-2015

**Metallic materials -- Tensile testing -- Part 2: Method of test at
elevated temperature
(English Translation)**

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Foreword

GB/T 228 Metallic Materials - Tensile Testing can be divided into the following four parts.

- Part 1. Method of Test at Room Temperature;
- Part 2. Method of Test at Elevated Temperature;
- Part 3. Method of Test at Low Temperature;
- Part 4. Method of Test in Liquid Helium.

This Part belongs to Part 2 of GB/T 228.

This Part was drafted as per the rules specified in GB/T 1.1-2009.

This Part replaced GB/T 4338-2006 Metallic Materials - Tensile Testing at Elevated Temperature; compared with GB/T 4338-2006, this Part has the major technical

changes as follows.

- Modify the standard name;
- Modify and increase partial terms and symbols, for instance, the indicated temperature symbol is changed from " θ " to "T"; the prescribed temperature symbol is changed from " θ_{tai} " to "Ti"; increase term "holding time t_s "; change "prescribed non-proportional extension strength R_p " into "prescribed plastic elongation strength R_p ";
- Add test rate control method A strain rate control method;
- Increase " $1000^{\circ}\text{C} < T \leq 1100^{\circ}\text{C}$ " allowable deviation of temperature and temperature gradient to the Table 2 Allowable Deviation of Temperature and Temperature Gradient in Chapter 9;
- Add extensometer and chucking method to Chapter 10;
- Modify the rounding off the test result values.

This Part adopts the re-drafting method to modify and use international standard ISO 6892-2.2011 Metallic Materials - Tensile Testing - Part 2. Method of Test at Elevated Temperature.

This Part is basically consistent with ISO 6892-2.2011 in the aspects of overall structure, layer division, preparation method and technical content.

This Part made the modification and supplement against the international standard in Metallic Materials - Tensile Testing - Part 2. Method of Test at Elevated Temperature

1 Scope

This Part specifies the definitions, symbols instructions, specimen and its dimension measurement, test equipment, test requirements, property determination, determination result values rounding off and test report for the method of tensile testing of metallic materials at the temperature higher than the room temperature.

This Part is applicable to the test of tensile property of metallic materials at the temperature higher than the room temperature.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 228.1-2010 Metallic Materials - Tensile Testing - Part 1. Method of Test at Room Temperature (ISO 6892-1:2009, MOD)

GB/T 16825.1 Verification of Static Uniaxial Testing Machines - Part 1.

Tension/Compression Testing Machines - Verification and Calibration of the Force-Measuring System (GB/T 16825.1-2008, ISO 7500-1:2004, IDT)

GB/T 12160 Calibration of Extensometers Used in Uniaxial Testing (GB/T 12160-2002, ISO 9513:1999, IDT)

3 Terms and Definitions

The following terms and definitions stipulated in GB/T 228.1-2010 are applicable to this document.

Generally, all specimens' geometric dimensions shall be measured at the room temperature; the extensometer gauge length (see 3.3 and 10.2.2) may be exceptional.

NOTE: Unless otherwise specified in the relevant specifications and agreements, generally, the elevated temperature performance shall not be measured.

- Specified residual extension strength (R_r);
- Residual elongation rate;
- Residual extension rate;
- Percentage yield point extension (A_e);
- Percentage total extension at maximum force (A_{gt});
- Percentage plastic extension at maximum force (A_g);
- Total extension at fracture (A_t).

3.1 Original gauge length (L_0)

The specimen gauge length at room temperature before heating and exerting force.

3.2 Percentage elongation after fracture (A)

At room temperature, the ratio between gauge length residual elongation after fracture ($L_u - L_0$) and the original gauge length (L_0).

NOTE: see 3.4.2 in GB/T 228.1-2010.

3.3 Extensometer gauge length (L_e)

When using the extensometer to measure the parallel part extension, the used starting gauge length of the extensometer.

3.4 Extension

The increment of extensometer gauge length L_e given the scale during the test period.

3.5 Percentage extension

Extension percentage expressed by extensometer gauge length L_e .

3.6 Percentage reduction of area (Z)

The ratio between the maximum reduction of specimen cross-sectional area after fracture ($S_0 - S_u$) and the original cross-sectional area S_0 ; S_0 and S_u are obtained through measuring the specimen dimension at room temperature.

3.7 Stress (R)

The force at any moment during the test is divided by the original cross-sectional area S_0 of the specimen.

in between the two ends of the specimen that are clamped. Once the zero point of force is set, the force-measuring system can't be changed during the test period.

NTOE. the above method ensures, on one hand, the weight of clamping system can be supplemented when measuring the force; on the other hand, ensure the force generated during

the clamping process shall not influence the measurement of the force.