

ISO 6892-1:2019-11 (E)

Metallic materials - Tensile testing - Part 1: Method of test at room temperature

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Symbols	6
5	Principle	8
6	Test pieces	8
6.1	Shape and dimensions	8
6.1.1	General	8
6.1.2	Machined test pieces	9
6.1.3	Unmachined test pieces	9
6.2	Types	9
6.3	Preparation of test pieces	10
7	Determination of original cross-sectional area	10
8	Original gauge length and extensometer gauge length	10
8.1	Choice of the original gauge length	10
8.2	Marking the original gauge length	10
8.3	Choice of the extensometer gauge length	11
9	Accuracy of testing apparatus	11
10	Conditions of testing	11
10.1	Setting the force zero point	11
10.2	Method of gripping	11
10.3	Testing rates	12
10.3.1	General information regarding testing rates	12
10.3.2	Testing rate based on strain rate (method A)	12
10.3.3	Testing rate based on stress rate (method B)	14
10.3.4	Report of the chosen testing conditions	15
11	Determination of the upper yield strength	16
12	Determination of the lower yield strength	16
13	Determination of proof strength, plastic extension	16
14	Determination of proof strength, total extension	17
15	Method of verification of permanent set strength	17
16	Determination of the percentage yield point extension	17

17	Determination of the percentage plastic extension at maximum force	17
18	Determination of the percentage total extension at maximum force	18
19	Determination of the percentage total extension at fracture	18
20	Determination of percentage elongation after fracture	18
21	Determination of percentage reduction of area	19
22	Test report	20
23	Measurement uncertainty	20
23.1	General	20
23.2	Test conditions	21
23.3	Test results	21
Annex A (informative) Recommendations concerning the use of computer-controlled tensile testing machines		34
Annex B (normative) Types of test pieces to be used for thin products: sheets, strips, and flats between 0,1 mm and 3 mm thick		40
Annex C (normative) Types of test pieces to be used for wire, bars, and sections with a diameter or thickness of less than 4 mm		43
Annex D (normative) Types of test pieces to be used for sheets and flats of thickness equal to or greater than 3 mm and wire, bars, and sections of diameter or thickness equal to or greater than 4 mm		44
Annex E (normative) Types of test pieces to be used for tubes		48
Annex F (informative) Estimation of the crosshead separation rate in consideration of the stiffness (or compliance) of the testing equipment		50
Annex G (normative) Determination of the modulus of elasticity of metallic materials using a uniaxial tensile test		52
Annex H (informative) Measuring the percentage elongation after fracture if the specified value is less than 5 %		61
Annex I (informative) Measurement of percentage elongation after fracture based on subdivision of the original gauge length		62
Annex J (informative) Determination of the percentage plastic elongation without necking, A_{wn} , for long products such as bars, wire, and rods		64
Annex K (informative) Estimation of the uncertainty of measurement		65
Annex L (informative) Precision of tensile testing -- Results from interlaboratory programmes		69
Bibliography		76