

# ISO 6892-1:2019-11 (E)

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

<b>Contents</b>		<b>Page</b>
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