SLOVENSKI STANDARD
oSIST prEN ISO 7285:2020

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Pnevmatski cilindri za večtočkovno varjenje (ISO 7285:1995)

Pneumatic cylinders for mechanized multiple spot welding (ISO 7285:1995)

Pneumatik-Schweißzylinder für Vielpunktschweißeinrichtungen (ISO 7285:1995)

Vérins pneumatiques pour soudage multipoints mécanisés (ISO 7285:1995)

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25.160.30	Varilna oprema	Welding equipment

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INTERNATIONAL STANDARD

ISO 7285

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Pneumatic cylinders for mechanized multiple spot welding

Vérins pneumatiques pour soudage multipoints mécanisé

Reference number
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Contents

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 7285 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 6, *Resistance welding*.

Annexes A, B and C form an integral part of this International Standard. Annex D is for information only.

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Pneumatic cylinders for mechanized multiple spot welding

1 Scope

This International Standard specifies the requirements of the geometrical and mechanical characteristics of pneumatic cylinders used for multiple spot welding machines and their manufacturing, delivery and test specifications.

These cylinders for a nominal air pressure of 1 MPa (10 bar) are double-acting, with two piston stages in series for the advance during the operational stroke and the force, and a single piston stage for the return.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4394-1:1980, *Fluid power systems and components — Cylinder barrels — Part 1: Requirements for steel tubes with specially finished bores.*

3 Nominal characteristics

The cylinders covered by this International Standard are characterized by their nominal stroke, their nominal force and their outside dimensions.

3.1 Nominal strokes

The nominal strokes standardized, in millimetres, are

25 — 31,5 — 40 — 50 — 63 — 80 — 100 — 125 — 160

3.2 Nominal forces

The nominal forces standardized, in kilonewtons, for a pressure of 1 MPa (10 bar) are

2,19 — 2,86 — 3,61 — 4,61 — 5,92 — 7,60 — 9,74

4 Fixing the cylinder

The cylinder is mounted on the machine by one of the methods A to H described in annex A.

5 Dimensions

5.1 Outside dimensions

Depending on the method of mounting the cylinder, the nominal force and the nominal stroke, the cylinders shall have the dimensions indicated in the drawings in annex C taking into account the characteristics of the electrode holder attachment indicated in annex B.

The nominal values of the maximum outside dimensions, in millimetres, are

46 — 51 — 56 — 63 — 71 — 80 — 90

5.2 Bore diameter

The recommended dimensions, in millimetres, are

40 — 45 — 50 — 56 — 63 — 71 — 80

Tolerances shall be in accordance with ISO 4394-1 — H12.

6 Operating specifications

6.1 Nominal force

The nominal force shall be given at a pressure of 1 MPa (10 bar) with a tolerance of ± 5 %.

6.2 Return force

The return force shall not be less than 40 % of the nominal force.

6.3 Maximum supply pressure

The maximum supply pressure is 1,6 MPa (16 bar).

7 Construction

7.1 Point of application of the reaction

The cylinders shall function correctly when the reaction to the nominal force is being applied at a maximum distance of 28 mm from the axis of thrust.

7.2 Piston rod

The sliding bearing surfaces of the rod shall have an adequate hardness to avoid friction, wear, oxidization and any scale caused by sputtering (sparks).

7.3 Rotation

The piston rod assembly is considered as non-rotating. The anti-rotating device shall withstand, without being damaged, a rotary torque of 150 N·m applied in either direction and at any point of the travel of the piston rod.

7.4 Seals

The seals shall be compatible with fluids used to lubricate the cylinder.

7.5 Perpendicularity — Parallelism between the mounting point and the attachment

Any faults in perpendicularity or parallelism of the bearing surface of the body of the cylinder with respect to the axis of the shank cone of the electrode holder shall not exceed 0,2 % (for inspection, see 10.2).

7.6 Leakage

The bodies of the cylinders shall not leak in normal conditions of use (to check this, see 10.5).

7.7 Behaviour under pressure

The body of the cylinder shall be able to withstand without being damaged a test pressure equal to two times the maximum supply pressure applied for 1 min in each direction (see 10.4).

7.8 Electrode holder attachment

The electrode holder attachment shall be completely electrically insulated with respect to the body of the cylinder (to check this, see 10.3). This subclause does not apply to electrode holder attachments according to Nos. 13 and 22.

7.9 Endurance

The cylinders shall be able to withstand the endurance test described in 10.8 according to the requirements of 10.8.5 and 10.8.6.

7.10 Finish

The outer surfaces shall be protected against corrosion.

8 Marking

8.1 Identification of the cylinders

The cylinders are identified by an alphanumeric symbol, the different numbers or letters of which are separated by a dash and arranged as follows:

— apparatus operating with a pneumatic fluid:	letter P
— two-stage cylinder:	number 2
— double-action cylinder:	letter D
— method of mounting:	letter A to H in accordance with annex A
— nominal force:	indicate the number from 3.2
— dimensions of the body or width of the cylinder defining the overall dimensions of the cylinder:	number giving dimension *E* of annex C
— nominal stroke:	number consisting of three figures giving the nominal stroke
— electrode holder attachment:	number consisting of two figures symbolizing the attachment in accordance with annex B

Examples:

P — 2 — D — A — 2,19 — 46 — 025 — 11
P — 2 — D — C — 4,61 — 63 — 100 — 22

8.2 Rating plate

See figure 1.

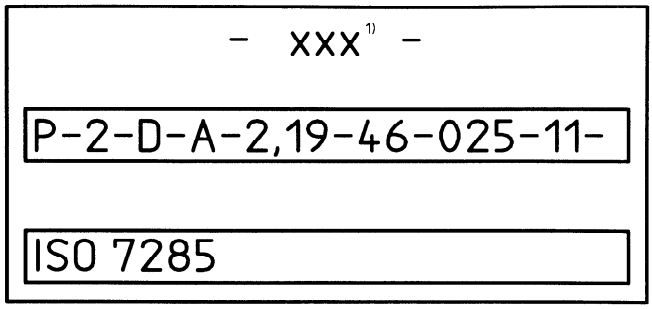
The cylinders shall have the following information on a rating plate or stamped directly on the body of the cylinder:

— name of the manufacturer;

— alphanumeric identification symbol in accordance with 8.1;

— reference to ISO 7285.

These indications shall be permanent and shall not be affected by any industrial chemical in common use.



1) Name of the manufacturer.

Figure 1 — Example of a rating plate

9 Delivery conditions

The cylinders shall be supplied

— in good working order;

— protected so that even after prolonged storage at the user's premises in the original packing, all the parts likely to deteriorate (rods, seals, internal surfaces, cones, openings, etc.) retain the qualities required by ISO 7285;

— with the openings stopped up;

— in packing the outside of which is marked with the identification specified in clause 8.

10 Inspection and type tests

10.1 Visual inspection

Conformity to the specifications of 7.10 and clauses 8 and 9 is checked by visual inspection.

10.2 Dimensional inspection

Dimensional inspection includes

— verification of conformity with the drawings;

— inspection of the shank cone of the electrode holder by means of a standard gauge, which should show a minimum of 2/3 blue, with a bias towards the base diameter;

— checking of the perpendicularity or parallelism (see 7.5).

10.3 Inspection of the electrical insulation of the electrode holder attachment

A voltage of 48 V d.c. is applied between the attachment and the mounting. The resistance shall not be less than 1 MΩ.

10.4 Pressure type test

Conformity with the specifications of 7.7 is checked by applying a liquid (water) pressure of 3,2 MPa (32 bar) at the inlet or outlet of the cylinder for 1 min in each direction. After drying, the cylinder is subjected to the test described in 10.5.

10.5 Leak type test

The cylinder supplied with air is immersed in water. The test is carried out at two different air pressures, 0,2 MPa (2 bar) and 1,0 MPa (10 bar), which shall be kept constant for 1 min and in the forward and return position. No air bubbles shall appear when a new cylinder is tested.

10.6 Separation force type test

The supplied pressure of the cylinder shall increase progressively from 0 MPa (0 bar) to 0,1 MPa (1 bar). The movement of the piston shall commence before 0,1 MPa (1 bar) and shall continue smoothly without jolts. Before the test, carry out five forward and return cycles.

10.7 Nominal force type test

The measuring device shall be accurate to ± 1,5 %.

10.8 Endurance type test

For the purpose of this endurance type test, cylinders of nominal force of 2,86 kN and 4,61 kN and of 50 mm stroke serve as reference.

10.8.1 Test set-up

Cables shall not be restricted.

— Electrodes offset by: 28 mm.

— Centre to centre spacing of the cylinders (d) and gaps as a function of the force (see table 1 and figure 2).

Table 1

Force kN	Centre to centre spacing (d) mm
2,19	53
2,86	60
3,61	67
4,61	75
5,92	85
7,60	95
9,74	106

Dimensions in millimetres

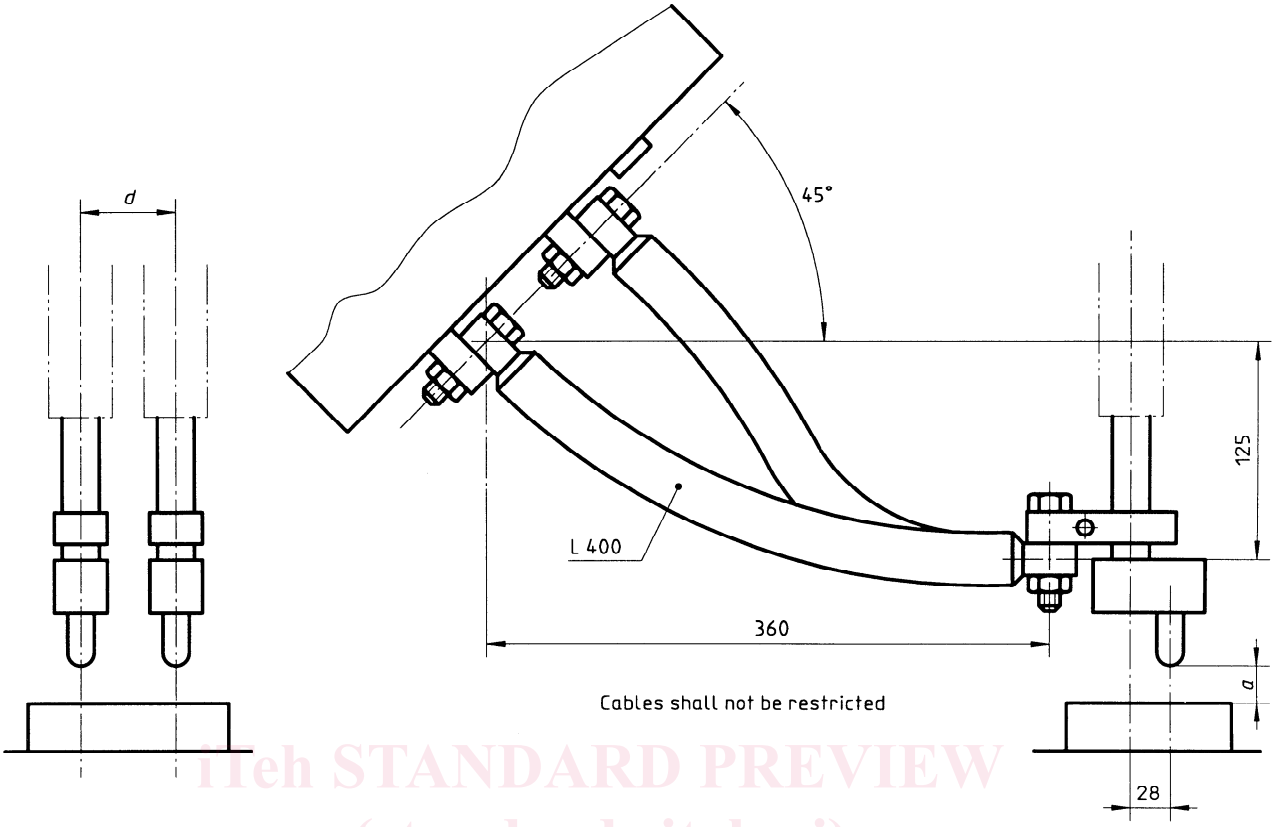


Figure 2 — Test set-up

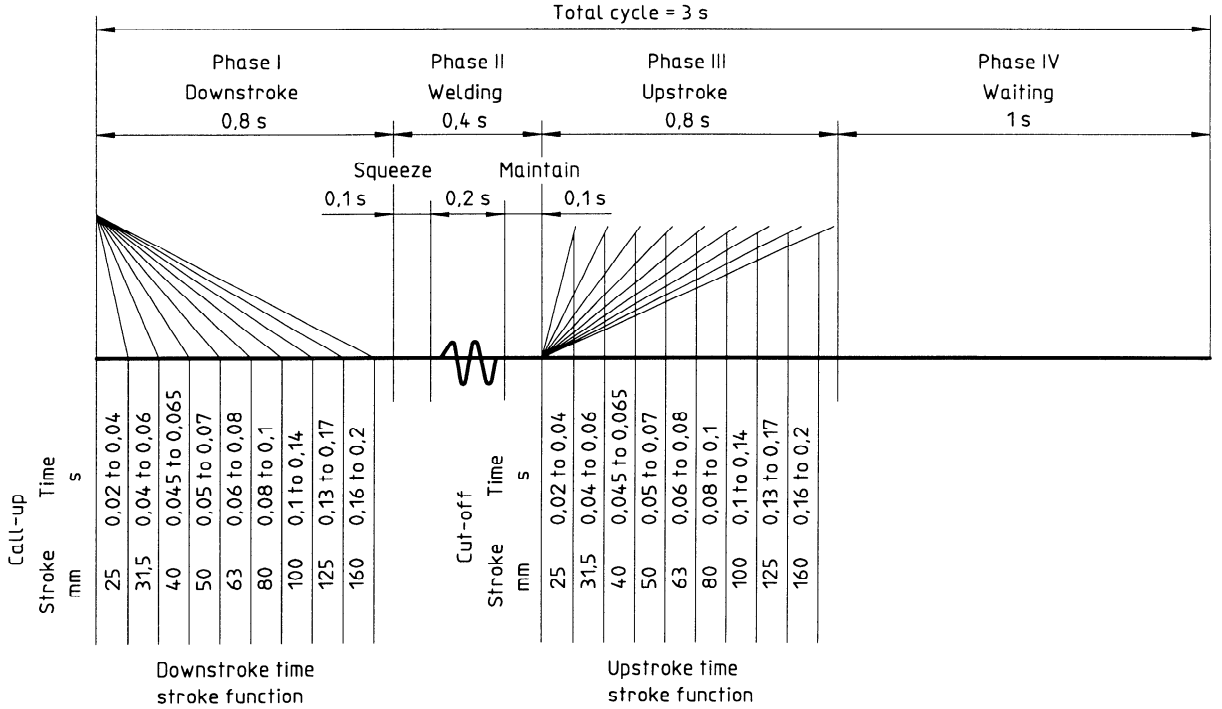


Figure 3 — Schematic representation of the cycle

10.8.2 Air supply

Dry oil-free air with 40 µm filtration under a pressure of 1 MPa (10 bar).

10.8.3 Stroke of the cylinder and number of cycles

A schematic representation of the cycle is given in figure 3.

The stroke of the cylinder during the course of these tests is equal to the nominal stroke less 5 mm on the forward stroke.

The number of cycles to be performed is given as a function of the nominal stroke in table 2.

Table 2

Nominal stroke mm	Test stroke *a* mm	Number of cycles
25	20	2 225 000
31,5	26,5	1 700 000
40	35	1 300 000
50	45	1 000 000
63	58	800 000
80	75	600 000
100	95	500 000
125	120	400 000
160	155	300 000

10.8.4 Welding current

The intensity of the current that is to circulate in the test device is given in table 3 as a function of the nominal force.

Table 3

Nominal force kN	Current kA
2,19	12,5
2,86	14
3,61	14
4,61	16
5,92	16
7,60	20
9,74	20

10.8.5 Leakage

A further leakage test is carried out after the endurance test. The cylinder is subjected to a pressure of 1,0 MPa (10 bar) and then shut off from the supply. At 10 s after shut-off the pressure shall not have fallen by more than 0,1 MPa (1 bar) (10 % of the test pressure applied).

10.8.6 Measurement of play after the endurance test

With the piston rod extended to a length equal to the nominal stroke at a torque of 70 N·m applied in one direction and then the other, the piston rod shall not turn by more than 2°.