INTERNATIONAL STANDARD

ISO 6210-1

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Cylinders for robot resistance welding guns —

Part 1:
General requirements

Vérins pour têtes de soudage par résistance montées sur robot —
Partie 1: Prescriptions générales

Reference number
ISO 6210-1:1991(E)

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 6210-1 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes.*

ISO 6210 consists of the following parts, under the general title *Cylinders for robot resistance welding guns*:

— *Part 1: General requirements*

— *Part 2: Cylinders for scissor type guns*

— *Part 3: Cylinders for C-type guns*

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INTERNATIONAL STANDARD ISO 6210-1:1991(E)

Cylinders for robot resistance welding guns —

Part 1:
General requirements

1 Scope

This part of ISO 6210 specifies requirements for geometrical and mechanized characteristics of cylinders particularly designed for robot welding guns and their manufacturing, delivery and test specifications.

These cylinders, designed for a nominal air pressure of 1,0 MPa (10 bar), are double-acting and available in various single or multiple piston combinations, together with rotatable and non-rotatable piston rods.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 6210. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 6210 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 497:1973, *Guide to the choice of series of preferred numbers and of series containing more rounded values of preferred numbers.*

ISO 7285:—[1], *Pneumatic cylinders for mechanized multiple spot welding.*

3 Nominal characteristics

The cylinders covered by this part of ISO 6210 are characterized by their nominal forces and their nominal strokes.

3.1 Nominal forces at the piston rod

The nominal forces standardized, in kilonewtons, are

1,25 — 1,6 — 2,0 — 2,5 — 3,15 — 4,0 — 5,0 — 6,3 — 8,0 — 10,0 — 12,5 — 16,0 — 20,0

3.2 Nominal strokes

The nominal strokes standardized, in millimetres, are

— for cylinders without high-lift[2] stroke

25 — 31,5 — 40 — 50 — 63 — 80

— for cylinders with high-lift stroke

The sum of the working stroke and the high-lift stroke shall be

50 — 63 — 80 — 100 — 125 — 160 — 200

If longer strokes are needed, the values shall be chosen in accordance with ISO 497.

1) To be published.

2) "High-lift" is cylinder movement additional to the normal welding stroke to enable electrodes to clear obstructions and to avoid unnecessarily-long welding strokes.

4 Bore diameters

All cylinder bores shall be chosen from the preferred number series. The choice of bore within these predetermined series is left to the discretion of the manufacturer.

The following series of numbers are given for guidance:

40 — 45 — 50 — 56 — 63 — 71 — 80 — 90 — 100 — 112 — 125 — 140 — 160

Smaller or bigger bore diameters shall be chosen from the series R20 of preferred numbers.

5 Operating specifications

5.1 Nominal force

The nominal forces shall be theoretically calculated at an air pressure of 1,0 MPa (10 bar), from which the friction shall be subtracted to get the effective force.

The friction shall not be more than 5 % of the nominal force.

5.2 Return force

The return force shall not be less than 25 % of the nominal force.

5.3 Starting pressure

The starting pressure is the pressure needed to get the cylinder moving. The starting pressure shall be less than 0,10 MPa (1,0 bar).

5.4 Maximum supply pressure

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

6 Construction

6.1 Piston rod

The sliding bearing surfaces of the rod shall be treated to minimize friction, wear, oxidation and any scale caused by weld spatter.

6.2 Rotation

If non-rotation of the piston rod is required, 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.

6.3 Seals

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

6.4 Leakage

The bodies of the cylinder shall not leak in normal conditions of use (see 9.5).

6.5 Behaviour under pressure

The body of the cylinder shall be able to withstand, without being damaged, a test pressure equal to twice the maximum supply pressure applied for 1 min in each direction (see 9.4).

6.6 Insulation

The cylinder body shall be insulated electrically from the piston rod if required and specified by the customer.

6.7 Endurance

The cylinder shall withstand 4 000 000 cycles under welding conditions.

6.8 Finish

The external surfaces shall be protected against corrosion.

7 Designation and marking

The cylinder shall be designated and marked in accordance with manufacturer's type, nominal force and stroke/strokes.

8 Delivery conditions

The cylinders shall be supplied

— in good working order;

— with protection 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 ports, etc.) retain the qualities required in accordance with this part of ISO 6210;

— with the ports stopped up;

— in packing, the outside of which is marked with the identification specified in clause 7.

9 Inspection and type tests

9.1 Visual inspection

Conformity to the specifications in accordance with 6.8, clause 7 and clause 8 is checked by visual inspection.

9.2 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.

9.3 Inspection of the electrical insulation (when specified)

A voltage of 48 V d.c. is applied between the cylinder body and the piston rod. The resistance shall not be less than 1 MΩ.

9.4 Pressure type test

Conformity with the specifications in 6.5 is checked by applying a liquid 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 9.5.

9.5 Leak type test

The cylinder supplied with air is immersed in water with a corrosion inhibitor. 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 in the forward and return position. No air bubbles shall appear.

9.6 Starting pressure type test

The supply pressure to 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.

9.7 Nominal force type test

The measuring device shall be accurate to $\pm 1{,}5$ % of the nominal force.

9.8 Endurance type test

The endurance test shall be in accordance with ISO 7285, when applicable.

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