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

GB/T 10878-2011

Replacing GB 10878-1999

Special taps of taper threads for gas cylinders

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Foreword

This standard is drafted in accordance with the rules given in GB/T 1.1-2009 Directives for standardization - Part 1: Structure and drafting of standards.

This standard replaces GB 10878-1999 Special taps of taper threads for gas cylinders.

The main modifications with respect to GB 10878-1999 are as follows: for PZ19.2 the minor diameter d_1 has been changed from 16.872 to 16.876, the pitch diameter d_2 from 18.036 to 18.038 and the total length L from 78 to 75; for PZ27.8 the minor diameter d_1 has been changed from 25.472 to 25.476, the pitch diameter d_2 from 26.636 to 26.638, the length of the square L_2 from 24 to 20 and the total length L from 85 to 80; for PZ39.0 the minor diameter d_1 has been changed from 36.286 to 36.290, the pitch diameter d_2 from 37.643 to 37.645, the length of the square L_2 from 28 to 24 and the total length L from 95 to 90.

This standard was proposed by and is under the jurisdiction of the National Technical Committee on Gas Cylinders of Standardization Administration of China (SAC/TC 31).

Drafting organizations of this standard: Langfang Hengyu Tools Co., Ltd., Ningbo Fuhua Valve Co., Ltd., Xiangshan Valve Manufacturing Co., Ltd., and Shanghai High Pressure Vessel Co., Ltd.

Main drafters of this standard: Zhang Xiuzhi, Qian Faxiang, Weng Guodong, Chen Weiming and Gu Qihua.

The previous editions of the standard replaced by this standard are GB 10878-1989 and GB 10878-1999.

1 Scope

The Chinese national standard for the taps that cut the taper thread in the neck of a gas cylinder. The neck thread is the joint that holds the valve into a pressurized cylinder, and it is a taper thread precisely because a taper wedges tight and seals; a thread cut a little too

deep or a little too shallow will either not seal or will not take the valve to its proper depth. Since the thread is defined by the tool that cuts it, the tool has to be controlled as tightly as the thread itself. This standard sets the type and dimensions of the three tap designations PZ19.2, PZ27.8 and PZ39.0, their thread profile and the tolerances on it, the material and hardness they are made to, the surface finish and run-out allowed on them, a cutting performance test that a production batch must pass before it leaves the works, and the marking and packing rules. It applies to taps used to machine the internal taper threads specified in GB 8335, and its users are the toolmakers who produce the taps and the cylinder manufacturers who buy and use them. The 2011 edition adjusted the minor and pitch diameters of all three designations by a few thousandths of a millimetre and shortened the taps and their squares.

This standard specifies the type and dimensions, the technical requirements, the performance test, the marking and the packaging of taps for the taper threads of gas cylinders.

This standard is applicable to taps used for machining the internal taper threads conforming to GB 8335.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 145 Centre holes.

GB 8335 Gas cylinder threads.

3 Type and dimensions

3.1 The type and dimensions of the taps are as specified in Figure 1 and Table 1. Table 1 gives, for each of the three designations PZ19.2, PZ27.8 and PZ39.0, the number of threads per 25.4 mm, the pitch, the total length, the length of the threaded portion, the length of the taper part with its limit deviation, the length of the chamfer, the shank diameter with its limit deviation and the two dimensions of the square.

3.2 The profile and the dimensions of the tap thread are as specified in Figure 2 and Table 2. Table 2 gives the taper, the major, pitch and minor diameters at the basic plane, the thread height with its limit deviations, the half angle of the profile with its limit deviation, the limit deviation of the pitch over 25.4 mm, the limit deviation of the taper angle and the radius of the root arc.

3.3 The centre holes at both ends of the tap shall be made to type A of GB/T 145.

3.4 The bisector of the thread profile angle shall be perpendicular to the generatrix of the

cone.

3.5 The pitch shall be measured parallel to the generatrix of the cone.

3.6 The clause recommends nominal cutting angles for the tap, namely a lower limit for the rake angle and a lower limit for the relief angle.

3.7 Example of designation: a tap for a cylinder taper thread whose basic size is 27.8 is designated PZ27.8 GB/T 10878-2011.

4 Technical requirements

4.1 Material and hardness. 4.1.1 The threaded part of the tap shall be made of W6Mo5Cr4V2 high speed steel or of steel of equal or better performance, and the welded shank of 45 steel or of steel of equal or better performance. 4.1.2 The clause sets a minimum hardness in HRC for the threaded part and a lower minimum for the square of the tap.

4.2 Appearance and surface roughness. 4.2.1 The surface of the tap shall be free from cracks, broken teeth, traces of rust, grinding burns and other defects that affect its performance. 4.2.2 The maximum allowable values of the surface roughness of the tap are those of Table 3, which gives the roughness parameter and its value for the thread surface, the front face, the back face and the shank.

4.3 The thread profile of the tap shall be relief-ground.

4.4 The junction between the front face of the tap and the flute shall be smooth.

4.5 The diameter of the tap thread at the basic plane shall lie within the range of the limit deviations for the basic plane.

4.6 The tolerance on the square dimension a of the tap is $h12$, form and position tolerances included.

4.7 Position tolerances. The circular run-out tolerances of the several parts of the tap are as specified in Table 4, which covers the oblique run-out of the cutting portion with respect to the common axis, the radial run-out of the calibrating (threaded) portion and the radial run-out of the shank.

5 Performance test

5.1 Taps produced in batches shall undergo a sampling test of their cutting performance before leaving the works.

5.2 Test conditions. 5.2.1 Machine tool: a machine tool meeting the requirements of machining accuracy. 5.2.2 Tools: the sample consists of three pieces. 5.2.3 Test blank: the material is 30CrMo, or another grade of alloy steel of equal performance, of stated

minimum hardness, the thickness of the blank being chosen according to the length of the taper part. 5.2.4 Form of the tapped hole: a 3:25 through hole, which shall be checked and accepted with a smooth taper gauge. 5.2.5 Clamping of the tool: the tap is held in a tapping chuck, the oblique run-out of its cutting portion with respect to the shank axis not exceeding the stated limit. 5.2.6 The cutting specification is that of Table 5, which fixes the cutting speed and the number of holes tapped per piece for each designation. 5.2.7 The cutting fluid is an emulsified oil solution.

5.3 Evaluation of the test results. 5.3.1 After the test the tap shall show no chipping, no breakage and no marked wear, and shall retain its original working performance. 5.3.2 The thread accuracy of the tapped test pieces shall meet the requirements of GB 8335; if any one test piece fails to meet these requirements, the performance test of that batch of taps is judged non-conforming. 5.3.3 After the test each tap shall meet 4.2.1 and 4.2.2, failing which the batch of taps is judged non-conforming.

6 Marking and packaging

6.1 Marking. 6.1.1 The tap shall be marked with a) the trademark of the manufacturer; b) the thread code; c) the material code HSS. 6.1.2 The packing box shall be marked with a) the name, trademark and address of the manufacturer; b) the items specified in the example of designation of the tap; c) the grade or code of the material; d) the number of pieces; e) the year and month of manufacture.

6.2 Packaging. Taps shall be rust-proofed before packing, a certificate of conformity shall be enclosed in the packing box, and the packaging shall be secure and able to prevent damage during transport.