GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 21.040.20
J 04

GB/T 12716-2011

Replacing GB/T 12716-2002

Pipe Threads with the Thread Angle of 60 Degrees Where Pressure-Tight Joints are Made on Threads

60° 密封管螺纹

Issued on: December 30, 2011 **Implemented on: October 01, 2012**

Issued by: General Administration of Quality Supervision, Inspection and Quarantine;
Standardization Administration of PRC.

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Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Standard replaced GB/T 12716-2002 *Pipe Threads with the Thread Angle of 60 Degrees Where Pressure-Tight Joints are Made on the Threads*. Compared with GB/T 12716-2002, this Standard has the major technical changes as follows:

--- Adjust tolerance values of partial thread crest height and thread bottom height (Table 1);

--- Adjust the values of partial thread reference distance and assembly allowance (Table 2);

--- Adjust the maximum pitch diameter of partial cylinder female thread (Table 4);

--- Add Thread inspection (Clause 11) and Thread Gauge (Appendix A);

--- The new standard deletes the Appendix A (Pipe Thread Inch Size Table) from the old standard.

This Standard adopted the re-drafting method to modify and use the American Standard ASME B1.20.2M:2006 *General Purpose Pipe Thread*. Compared with American Standard, China's Standard has the major differences as follows:

--- Thread size code: American uses D_x, E_x, K_x, p, D and d to express the thread's major diameter, pitch diameter, minor diameter, thread pitch, pipe's outside diameter and inside diameter; while China and ISO use D, D_2, D_1, d, d_2, d_1 and P to express the female thread's major diameter, pitch diameter, minor diameter, male thread's major diameter, pitch diameter, minor diameter, thread pitch. In order to avoid conflict with China and ISO existing thread code system, this Standard doesn't use the partial American size codes that conflict with that of China.

--- In the thread markings, the American standard firstly gives the thread size code, then gives the thread feature code; while China's standard firstly gives the thread feature code, then give the thread size code. Additionally, to simplify the thread markings, China's standard allows to omit the number of thread teeth from the thread markings.

--- The normative references quote GB/T 14791 *Screw Threads – Vocabulary*.

This Standard was proposed by National Technical Committee for Standardization of Threads (SAC/TC 108).

This Standard shall under the jurisdiction of National Technical Committee for

Pipe Threads with the Thread Angle of 60 Degrees Where Pressure-Tight Joints are Made on Threads

1 Scope

This Standard specifies the thread form, basic size, tolerance, marking and gauge of pipe thread (NPT and NPSC) with sealed thread pair and thread form angle of 60°.

This Standard is applicable to sealed thread connection for pipe, valve, pipe joint, cock, and other pipe fittings.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 14791 Screw Threads – Vocabulary

3 Terms and Codes

3.1 Terms and definitions

The following terms and definitions and those ones stipulated in GB/T 14791 are applicable to this document.

3.1.1 Reference plane

The visible plane of reference workpiece for reading the inspection values (position deviation of the datum plane) during using the gauge to inspect the thread. It is the outer end-face of female thread and small end-face of male thread.

3.2 Code

D – major diameter of female thread in the datum plane;

d – major diameter of male thread in the datum plane;

D_2 – pitch diameter of female thread in the datum plane;

d_2 – pitch diameter of male thread in the datum plane;

D_1 – minor diameter of female thread in the datum plane;

d_1 – minor diameter of male thread in the datum plane;

n – number of teeth contained in the axial length of 25.4mm;

P – thread pitch;

H – Original triangle height;

h – height of thread tooth form;

f – depth of truncation;

L_1 – reference distance;

L_2 – effective thread length;

L_3 – assembly allowance;

L_5 – complete thread length;

L_6 – incomplete thread length;

L_7 – wrenching allowance;

V – length of vanish thread.

4 Thread Form

4.1 Design of thread form

See Figure 1 for thread form of cylinder female thread (NPSC); see Figure 2 for thread from of cylinder thread (NPT).

The left and right flank angles of the thread form are equal; the angle bisector of the thread form angle is perpendicular to the thread axis. The taper of tapered thread is 1:16.

The theoretical position of datum plane of taper male thread is located in the plane with one reference distance from the small end-face (reference plane) and perpendicular to the thread axis; the theoretical position of the datum plane of female thread is located in the end-face (reference plane) perpendicular to the thread axis, see Figure 4.

6.3 Integrated position tolerance

The taper pipe thread (NPT) datum plane axial position limit deviation: ±1*P*.

6.4 Tolerance between major and minor diameters

In the same axial position plane, the sizes of the thread major and minor diameters shall be changed as the change of the pitch diameter; so that ensure the sizes of thread crest height and thread root height shall be within the tolerance range specified in Clause 4.

6.5 Single element tolerance of thread

The conical degree, lead and flank angle limit deviation of taper pipe thread (NPT) shall comply with the provisions of Table 3.

Table 3 -- Single Element Limit Deviation of Taper Pipe Thread (NPT)

Number of Teeth n	Limit Deviation of Pitch Diameter Line Conical Degree (1/16)	Accumulative Deviation of the Effective Thread Lead / mm	Limit Deviation OF Flank Angle / °
27	+1/96 −1/192	±0.076	±1.25
18、14			±1
11.5、8			±0.75
NOTE: for thread with effective thread length greater than 25.4, the maximum measurement span of the lead cumulative error shall be 25.4mm.			

Generally, the thread conical degree, lead and flank angle error are ensured by the controlling tools. In order to ensure the sealing performance of the thread, the designer can separately propose the technical requirements for inspecting the thread conical degree, lead and flank angle error.

NOTE: the roundness error of the thread has a direct effect on the sealing performance of the thread.

7 Basic Size and Tolerance of Cylinder Female Thread (NPSC)

7.1 Basic size

The basic sizes of the major diameter, pitch diameter and minor diameter of cylinder

NPT - Taper pipe thread

NPSC - Cylinder female thread

The thread size code can refer to Column 1 in Table 2 and Table 4.

For the left-hand thread, add “LH” after the size code.

10.2 Marking example

3/4-size, 14-tooth right-hand cylinder female thread: NPSC 3/4-14 or NPSC 3/4

6-size right-hand taper female thread or taper male thread: NPT 6

14-size left-hand taper female thread or taper male thread: NPT 14-LH

11 Thread Inspection

Inspect 60° gland thread size with a thread gauge.

The thread gauge shall comply with the provisions of Appendix A.

The basic size of thread working gauge shall conform to the provisions of Table A.3.

A.4 Tolerance of thread working gauge

A.4.1 Manufacturing tolerance of thread working gauge

The manufacturing tolerance of thread working gauge shall conform to the provisions of Table A.4 and Table A.5.

A.4.2 Allowable wearing capacity of thread working gauge

Relative to the new gauge size, the axial wearing capacity for thread working plug gauge and ring gauge is 0.25P.

A.5 Thread working gauge marking

The marking of thread working gauge is the same as that of the inspected workpiece thread, see Clause 10.

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