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

GB/T 15825.5-2008

Replacing GB/T 15825.5-1995

Sheet metal formability and test methods - Part 5: Bending test

金属薄板成形性能与试验方法 第5部分：弯曲试验

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Foreword

GB/T 15825 Sheet metal formability and test methods is divided into 8 parts. -- Part

1 Scope

GB/T 15825.5-2008 is the Chinese national standard on sheet metal formability and test methods - part 5: bending test, in the field of metallurgy. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 23 December 2008 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China; Standardization Administration of China, and has been in force since 1 June 2009. Classification: ICS 77.040.10, CCS J32. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This Part of GB/T 15825 specifies the sheet metal bending formability test methods with the minimum relative bending radius as the index. This Part applies to sheet metal with a thickness of

0.30 mm ~

2 Normative references

The terms in the following documents become the terms of this Part through the reference of this Part of

GB/T 15825. For dated references, all subsequent amendments (not including errata content) or revisions do not apply to this Part. However, parties to agreements that are based on this Part are encouraged to study whether the latest versions of these documents can be used. For undated references, the latest edition applies to this Part.

GB/T 15825.2-2008, Sheet metal formability and test methods - Part

3 Symbols, names and units

The symbols, names and units used in this Part are shown in Table 1.

4 Test principle

In this test, a series of punches with different bottom arc radii (or cushion-type dies with different thicknesses) are used to shape the sample according to the specified bending angle (Figure 1, Figure 2).

5 Samples

5.1 Strip samples are used in this test. The width shall be greater than 10 times the basic sheet thickness, but shall not be less than 20 mm; the length shall enable the bending into a "V" shape or a "U" shape.

5.2 Strip samples with a width of 50 mm ±

0.5 mm and a length of 150 mm ±

2.0 mm are recommended.

5.3 The length direction of the sample shall be perpendicular to the rolling direction (sampling angle $\theta = 90^\circ$). If there are special requirements, the sampling angle can be changed to other values, which, however, shall be indicated in the test report.

6 Molds

6.1 Molds shall be prepared according to the provisions of Chapter 4 in GB/T 15825.2-2008.

6.2 The width of punch, cushion-type die and die shall be larger than the width of the sample.

6.4 For the punch bottom arc radius R_p (Figure 1), each interval of

0.1 mm, in principle, is regarded as a level of specification; the manufacturing tolerance range is $\pm$

0.01 mm. In order to reduce the test workload, it is recommended to use the punch specifications listed in Table 2.

6.5 For the cushion-type die thickness used for 180° bending [Figure 2a)], in principle, every interval of

0.2 mm is regarded as a level of specification; the manufacturing tolerance range is $\pm$ 0.01 mm.

7.1 Test device Prepare the test device according to the provisions in

5.1 of GB/T 15825.2-2008; it is required to meet the following technical conditions.

7.2 Testing machine According to

5.2 of GB/T 15825.2-2008, equipment such as material testing machine or hydraulic press can be used, by referring to the following technical conditions.

8 Test temperature

Usually, the test can be carried out in an ambient environment of 10 °C ~ 35 °C, and if necessary, the temperature environment can also be set to 23 °C $\pm$ 5 °C.

9 Test procedure and operating methods

9.1 Before the test, clean, inspect and lubricate the mold, test device and testing machine according to 4.2, 5.1.2,

5.2.3 of GB/T 15825.2-2008.

9.2 Before each test, use L-AN100 oil for total loss system to lubricate the die mouth fillet area.

9.3 Adjust the die opening and lock it after adjustment.

9.5 When the compression bending test method in Figure 1 is used, if the punch or cushion-type die of the smallest specifications still cannot cause cracks or significant

depressions on the outer surface of the deformation area of the sample, change the bending angle of the sample OR perform the 180° fold bending as shown in Figure 2b) for the sample, which, however, shall be stated in the test report.

9.6 If the punch stiffness allows, the sample can be directly bent at 180° using the compression bending test method shown in Figure 1, and the die opening can be determined according to Formula (2).

9.7 When the compression bending test method cannot be used for 180° bending, the sample shall be bent to a certain angle, and then moved to between the upper and lower pressing plates for 180° bending (Figure 2).

9.8 Carry out more than 3 effective repeated tests on the front and back sides of the same material, respectively.

10 Measurement of bending angle and determination of minimum bending radius

10.1 Measure the bending angle under loading conditions, and the allowable measurement error is $\pm 1^\circ$.

10.2 When the test device or the testing machine is not provided with a bending angle display device, use the sample plate to measure the bending angle during the test loading process, or convert the bending angle into the punch stroke for test control.

10.3 During the compression bending test or the 180° bending test with a cushion-type die, determine the minimum bending radius R_{min} according to Formula (3).

11 Calculation of test results

11.1 Calculate the minimum relative bending radius R_{min}/t , and keep one decimal place for the calculation result.

12 Test report

12.1 The format of the test report is designed separately.