GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 77.040.01
H 22

GB/T 34487-2017

Shear Testing Method of Aluminum Alloy Products for Structural Members

结构件用铝合金产品剪切试验方法

Issued on: October 14, 2017 **Implemented on: May 1, 2018**

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

Standardization Administration of the People's Republic of China.

Table of Contents

Foreword 3
1 Scope 4
2 Normative References 4
3 An Overview of Method 4
4 Testing Machine 4
5 Fixture 5
6 Test Sample 5
7 Test Procedure 7
8 Result Calculation 7
9 Test Report 7
Appendix A (Informative) Fixture 9
Appendix B (Informative) Double Shear Sample 17
Appendix C (Informative) Single Shear Sample 19

Shear Testing Method of Aluminum Alloy Products for Structural Members

1 Scope

This Standard stipulates an overview of method, testing machine, fixture, test sample, test procedure, result calculation and test report for shear testing method of aluminum alloy products for structural members.

This Standard is applicable to the determination of shear performance of aluminum alloy products for structural members.

2 Normative References

The following documents are indispensable to the application of this document. In terms of references with a specific date, only versions with a specific date are applicable to this document. In terms of references without a specific date, the latest versions (including all the modification lists) are applicable to this document.

GB/T 8170 Rules of Rounding off for Numerical Values & Expression and Judgement of Limiting Values

GB/T 16491 Electronic Universal Testing Machines

GB/T 16825.1 Verification of Static Uniaxial Testing Machines - Part 1: Tension/compression Testing Machines - Verification and Calibration of the Force-measuring System

3 An Overview of Method

Through the application of shear load onto test sample, when the maximum load emerges, or, when the test sample ruptures, stop. Use the maximum load that per unit area bears to evaluate the shear performance of aluminum alloy products for structural members.

4 Testing Machine

Testing machine shall comply with the stipulations in GB/T 16491 or GB/T 16825.1. Testing machine shall be Grade-1 or a more superior grade.

Where,

A_2---sample shear area, expressed in (mm^2).

7 Test Procedure

7.1 Use organic solvents (such as alcohol and acetone) to eliminate oil stain on the fixture and the sample.

7.2 Install the fixture, which is already cleaned, on the testing machine (Chapter 4). Then, install the sample, which is already cleaned, on the fixture.

7.3 Initiate the testing machine; reset the load.

7.4 At a displacement speed of not more than 19 mm/min, conduct shear test of the sample. When the maximum load emerges, or, when the sample ruptures, stop. Then, record the maximum load. During the process of the shear test, the stress is not allowed to be more than 690 N/mm^2 per minute.

8 Result Calculation

In accordance with Formula (3), calculate the shear strength. The numerical value rounding-off rule shall comply with GB/T 8170. The result shall be rounded off to single digit.

$$\tau_b = \frac{F_{max}}{A} \qquad \cdots\cdots (3)$$

Where,

τ_b---shear strength, expressed in (MPa);

F_{max}---maximum shear load, expressed in (N);

A---sample shear area (double shear area: A_1; single shear area: A_2), expressed in (mm^2).

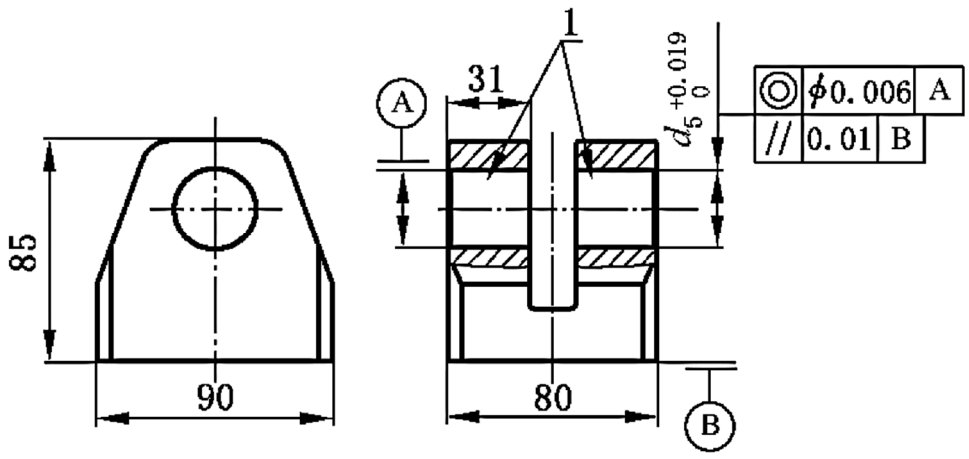
9 Test Report

Test report shall include the following content:

a) Serial No. of this Standard;

b) Product nameplate, state and dimensions;

Unit: millimeter



Keys:

1---support ring installation hole, aperture $d_5 = d_3$.

Figure A.5 -- Sketch Map of Base

A.1.5.2 Base should select alloy steel. Through thermal treatment, its hardness is 40 HRC ~ 45 HRC.

A.1.5.3 The rigidity of base shall be not lower than e^{10} N/m.

A.1.5.4 Roughness Ra of the contact surface between the base and the support ring shall be not more than 0.8 μm.

A.2 Single Shear Fixture

A.2.1 Composition of single shear fixture

Single shear fixture is constituted of junction plate and fixing pin, as it is shown in Figure A.6.

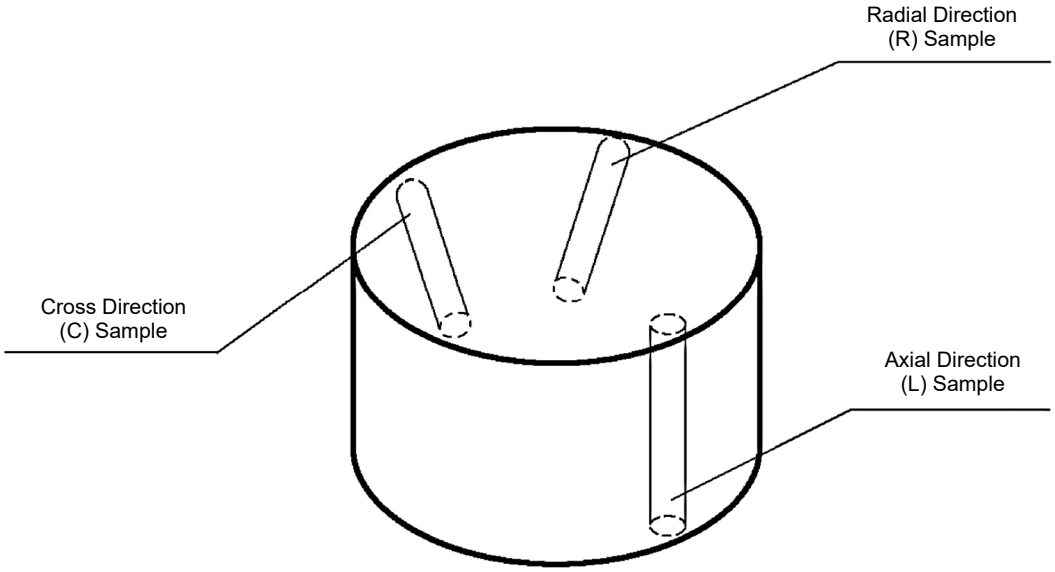


Figure B.2 -- Sketch Map of Circular Cross-sectional Product Sampling Direction

B.2 Sample Code and Sample Preparation

B.2.1 Sample code, sample dimension, diameter deviation and surface roughness shall comply with the stipulations in Table B.2.

Table B.2 -- Sample Code, Sample Dimension, Diameter Deviation and Surface Roughness

Sample Code	Sample Dimension mm		Diameter Deviation mm	Surface Roughness Ra μm
	Sample Nominal Diameter D	Sample Length L		
F1	5	100	$^{0}_{-0.016}$	⩽0.8
F2	10			
F3	12.5			

B.2.2 On an aluminum alloy product, cut a round billet with the diameter of 1.5 D, or, a 1.5 D × 1.5 D square-stick billet. The length of the billet shall be determined in accordance with processing equipment. Process the sample on the billet. Billet processing mode shall not influence the sample's material performance.

This is an excerpt of the PDF (Some pages are marked off intentionally)

------ The End ------