

ICS 77.040.10
CCS H 22



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

GB/T 29459.1-2012

**Small punch test methods of metallic materials for in-service
pressure equipment - Part 1: General requirements**

在役承压设备金属材料小冲杆试验方法 第1部分总则

(English Translation)

Issued on: December 31, 2012

Implemented on: July 1, 2013

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

Table of Contents

Foreword...	3
Introduction...	4
1 Scope...	5
2 Normative references...	5
3 Terms, definitions and symbols...	5
4 Specimen...	8
5 Test device...	9
6 Test report...	10

Foreword

GB/T 29459 Small punch test methods of metallic materials for in-service pressure equipments consists of the following two parts.

- Part 1. General requirements;
- Part 2. Method of test for tensile properties at room temperature.

This Part is the first part of GB/T 29459.

This Part was drafted in accordance with the rules given in GB/T 1.1-2009.

This Part mainly referred to relative technical content of CWA 15627 Small punch test methods of metallic materials and was formulated based on the combination of the actual situation of China and research results.

This Part was proposed by and shall be under the jurisdiction of National Technical Committee on Boiler and Pressure Vessel of Standardization Administration of China (SAC/TC 262).

The drafting organizations of this Part. China Special Equipment Inspection and Research Institute, East China University of Science and Technology, Nanjing University of Technology, Nanjing University of Technology, Jiangsu Special Equipment Safety Supervision and Inspection Institute.

Main drafters of this Part. Xu Tong, Sun Liang, Jia Guodong, Guan Kaishu,

Wang Zhiwen, Ling Xiang, Yuan Biao, Qian Gong, Zhang Xian, Li Liqun, Ding Keqin.

Small punch test methods of metallic materials
for in-service pressure equipments -
Part 1. General requirements

1 Scope

This Part of GB/T 29459 specifies general requirements for small punch test methods of metallic materials for in-service pressure equipment.

This Part is applicable to metallic materials for pressure equipment.

2 Normative references

The following referenced 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 16825.1-2008, Verification of static uniaxial testing machines - Part 1. Tension/compression testing machines - Verification and calibration of the force-measuring system

3.1 Terms and definitions

The following terms and definitions apply to this document.

3.1.1 small punch test; SPT

a test method for mechanical properties which takes micro-sheet sample as test object; this method fixes the edge of the sheet specimen; the center of the specimen is loaded with a spherical punch at the top of the punch in a mechanically loading manner; the mechanical properties of the composites are determined by experimental data association. The schematic diagram of the test device is shown in Figure 1.

3.1.2 load; F

the mechanical force exerted by the plunger on the specimen

3.1.9 sample

a sheet of material removed from the equipment

3.1.10 specimen

the sheet material which meets small punch test requirements

3.2 Symbols

d1 - specimen diameter, in millimeters (mm);

d2 - lower fixture aperture, in millimeters (mm);

E - elastic modulus, in megapascals (MPa);

F - load, in newtons (N);

h - specimen thickness, in millimeters (mm);

r - radius of the punch or ball, in millimeters (mm);

T - test temperature, in Celsius degrees (°C);

t - test time, in seconds (s);

u - punch displacement, in millimeters (mm);

V - test speed (movement speed of punch under pressure), in millimeters per second (mm/s).

4.1.1 General requirements

Sampling should prevent overheating and work hardening which shall affect the mechanical properties of the specimen. The specimen shall not contain any cracks and other macroscopic defects. And it should ensure that the cut pieces have integrity.

4.1.2 Sampling position

The cutting of test piece should avoid the corrosion layer (as shown in Figure 3).

.....