

ICS 25.160.10

CCS J 33



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

GB/T 43754-2024

Rotary friction welding of metallic materials

金属材料的旋转摩擦焊

(English Translation)

Issued on: March 15, 2024

Implemented on: October 1, 2024

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface
1 Scope
2 Normative references
3 Terms and Definitions
4 Welding
5 Quality Requirements
6 Welding procedure specification
7 Welding procedure qualification
8 Welding personnel
Appendix A (Informative) Comparison of structure numbers between this document and ISO 15620:2019
Appendix B (Informative) Technical differences between this document and ISO 15620:2019 and their causes
Appendix C (Informative) Relationships between Rotary Friction Welding Parameters
Appendix D (Informative) Rotary Friction Welding Material Combinations
Appendix E (Informative) Quality Assurance Guidelines
Appendix F (Informative) Inspection and Test
Appendix G (Informative) Manufacturer's Rotary Friction Welding Procedure Specification (WPS)
Appendix H (Informative) Characteristics of Rotary Friction Welding Joints
Appendix I (Informative) Welding Procedure Qualification Report (WPQR)
Reference

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is modified to adopt ISO 15620:2019 "Friction welding of metallic materials".

Compared with ISO 15620:2019, this document has many structural adjustments. The structural number changes between the two documents are shown in the table below.

See Appendix A.

This document has many technical differences compared to ISO 15620:2019.

A list of these technical differences and their reasons is given in Appendix B.

The following editorial changes were made to this document.

- a) Change the name of the standard from "Friction Welding of Metal Materials" to "Rotary Friction Welding of Metal Materials";
- b) The original Figure 2, the schematic diagram of the relationship between the parameters of continuous drive friction welding, was revised and the horizontal and vertical axes were added;
- c) The word "inertia" in the first paragraph of 4.1.3 and Figure 3 (Figure 4 in this document) is changed to "inertia disk";
- d) Add the introductory sentence "The manufacturer's information includes the following" in 6.2;
- e) Add the introductory sentence "Workpiece conditions include the following" in 6.3.2;
- f) Add the introductory sentence "Welding joint conditions include the following" in 6.5;
- g) Added the legends of t and D in Figure 8, and the unit of the number 25 (see Figure 8);
- h) Move the notes outside the original Table 3 in 7.2.5.1 to Table 3 as table notes;
- i) Added the comparison of the structure numbers between this document and ISO 15620-2019 (Appendix A) and the comparison of the structure numbers between this document and ISO 15620-2019 Technical differences and their causes (Appendix B);
- j) Add table identifiers and table titles to the tables in Appendix D, add table headers to the first column of the first row of the table content, and add the last row of the table the "□" symbol is changed to the text "blank column";
- k) Change Note 1 under Table D.1 (see Table E.1) to Note 1 and Note 2;
- l) Deleted Appendix B of the original text;
- m) The sixth and seventh columns in Table E.1 have been replaced with synonyms to meet my country's technical requirements;
- n) Deleted the second paragraph of the original document E.1.3;
- o) The international documents cited in Appendix F are replaced by informative national standards, as follows.
 - ISO 17637 was replaced by GB/T 32259, which is a modified international standard (see F.1.2);
 - ISO 23277 was replaced by GB/T 26953, which is a modified international standard (see

F.1.4);

--- ISO 17638 was replaced by GB/T 26951, which is a modified international standard (see F.1.5);

--- Replaced ISO 10863 with GB/T 41115 which is equivalent to the international standard (see F.1.7);

--- ISO 13588 was replaced by GB/T 40733, which is a modified international standard (see F.1.7);

--- ISO 17640 has been replaced by GB/T 11345, which is a modified international standard (see F.1.7).

p) In Appendix F, the eddy current testing standard in F.1.6 was changed from ISO 3452.1 to GB/T 26954 to meet my country's technical requirements.

q) Added format instructions to Appendix G and Appendix I.

r) In Table H.1, add "adjust welding parameters" to the solution column for "double burrs I";

Add "visual inspection" to the column of commonly used testing methods to increase the completeness of the standard.

1 Scope

This document specifies the terms and definitions, welding methods, quality requirements, welding procedure specifications, welding procedures for rotary friction welding of metallic materials.

Assessment and welding personnel.

This document applies to rotary friction welding of metallic materials.

2 Normative references

This document has no normative references.

3 Terms and definitions

The following terms and definitions apply to this document.

Axial force

The force applied axially to the workpiece being welded.

Friction deformation burn-off length the axial shortening length of the workpiece metal during the friction stage.

Artifact component

Individual components to be welded.

The reduction in rotational speed due to friction at the interface between the two workpieces.

Faying surface

The interface between workpieces that come into contact and form a joint.

Upsetting force

The force applied perpendicular to the joint surface during or after the relative motion between the two workpieces stops.

Forgeburn-offlength

The reduction in the total length of the workpiece when the upset force is applied.

Forge phase

The interval from the start to the end of the application of the upset force.

Forge pressure

The force per unit area on the joint surface due to the application of axial upsetting force.