

**Keevitamine. Metallmaterjalide
hõõrdkeevitus**

Welding - Friction welding of metallic materials

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 15620:2000 sisaldab Euroopa standardi EN ISO 15620:2000 ingliskeelset teksti.

Käesolev dokument on jõustatud 18.12.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN ISO 15620:2000 consists of the English text of the European standard EN ISO 15620:2000.

This document is endorsed on 18.12.2000 with the notification being published in the official publication of the Estonian national standardisation organisation.

The standard is available from Estonian standardisation organisation.

Käsitlusala:

This standard specifies requirements for the friction welding of components manufactured from metals. It specifies requirements particular to rotation friction welding related to welding knowledge, quality requirements, welding procedure specification, welding procedure approval and welding personnel.

Scope:

This standard specifies requirements for the friction welding of components manufactured from metals. It specifies requirements particular to rotation friction welding related to welding knowledge, quality requirements, welding procedure specification, welding procedure approval and welding personnel.

ICS 25.160.01

Võtmesõnad:

English version

Welding

Friction welding of metallic materials
(ISO 15620 : 2000)

Soudage – Soudage par friction des
matériaux métalliques
(ISO 15620 : 2000)

Schweißen – Reibschweißen von
metallischen Werkstoffen
(ISO 15620 : 2000)

This European Standard was approved by CEN on 2000-03-10.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Contents

Page

| | |
|--|-----------|
| Foreword | 3 |
| Introduction | 3 |
| 1 Scope | 4 |
| 2 Normative references | 4 |
| 3 Terms and definitions | 4 |
| 4 Welding knowledge | 7 |
| 4.1 Process | 7 |
| 4.2 Materials and material combinations | 10 |
| 4.3 Friction welding machines | 10 |
| 5 Quality requirements | 12 |
| 5.1 General | 12 |
| 5.2 Pre-welding conditions | 12 |
| 5.3 Post-welding treatment | 13 |
| 5.4 Quality assurance | 13 |
| 6 Welding procedure specification (WPS) | 14 |
| 6.1 General | 14 |
| 6.2 Information related to the manufacturer | 14 |
| 6.3 Information related to the material | 14 |
| 6.4 Welding parameters | 14 |
| 6.5 Joint | 15 |
| 6.6 Optional devices | 15 |
| 7 Welding procedure approval | 15 |
| 7.1 Principles | 15 |
| 7.2 Welding procedure tests | 15 |
| 7.3 Welding procedure approval record (WPAR) | 19 |
| 7.4 Previous experience | 19 |
| 7.5 Circumstances mandating requalification | 19 |
| 7.6 Machine-specific nature of a WPS | 19 |
| 7.7 Requalification procedure requirements | 19 |
| 8 Welding personnel | 19 |
| 8.1 Friction welding machine operator | 19 |
| 8.2 Friction welding machine setter | 19 |
| 8.3 Welding coordination personnel (supervisor) | 19 |
| Annex A (informative) – Relationship of welding parameters | 20 |
| Annex B (informative) – Additional processes based on friction | 22 |
| Annex C (informative) – Material combinations weldable by friction welding | 24 |
| Annex D (informative) – Guidelines for quality assurance | 25 |
| Annex E (informative) – Examination and test | 26 |
| Annex F (informative) – Manufacturer's friction welding procedure specification (WPS) | 28 |
| Annex G (informative) – Characteristics of friction welded components | 30 |
| Annex H (informative) – Welding procedure approval record form (WPAR) | 34 |

Foreword

The text of EN ISO 15620:2000 has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS, in collaboration with Technical Committee ISO/TC 44 "Welding and allied processes".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2001, and conflicting national standards shall be withdrawn at the latest by January 2001.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Friction welding is a method for making welds in the solid phase in which one component is moved relative to and in pressure contact with the mating component to produce heat at the faying surfaces, the weld being completed by the application of a force during or after the cessation of relative motion. There are several forms of supplying energy and various forms of relative movements.

The generation of friction heating results in a comparatively low joining temperature at the interface. This is largely the reason why friction welding is suitable for materials and material combinations which are otherwise difficult to weld. The weld region is generally narrow and normally has a refined microstructure.

Whilst the friction welding process deals primarily with components of circular cross section it does not preclude the joining of other component shapes.

1 Scope

This standard specifies requirements for the friction welding of components manufactured from metals.

It specifies requirements particular to rotational friction welding related to welding knowledge, quality requirements, welding procedure specification, welding procedure approval and welding personnel.

This standard is appropriate where a contract, an application standard or regulatory requirement requires the demonstration of the manufacturer's capability to produce welded constructions of a specified quality. It has been prepared in a comprehensive manner to be used as a reference in contracts. The requirements given may be adopted in full or some may be deleted, if not relevant to the construction concerned.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 1289

Non-destructive examination of welds – Penetrant testing of welds – Acceptance levels

EN 1290

Non-destructive examination of welds – Magnetic particle examination of welds

EN 1711

Non-destructive examination of welds – Eddy current examination of welds by complex plane analysis

EN ISO 4063

Welding and allied processes – Nomenclature of processes and reference numbers (ISO 4063:1998)

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply.

3.1

axial force

Axial force between components to be welded.

3.2

axial pressure

Pressure (force per unit area) on the faying surfaces.

3.3

burn-off length

Loss of length in the friction phase.

3.4

burn-off rate

The rate of shortening of the components during application of the friction force.

3.5

component

A single item before welding.

3.6

component induced braking

Reduction in rotational speed resulting from friction between the interfaces.

3.7

contact force

Axial force on contact of components.