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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (prEN 15085-1:2004) has been prepared by Technical Committee CEN/TC 256 “Railway Applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document 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:

— Council Directive 93/38/EEC of 14 June 1993 coordinating the procurement procedures of entities operating in the water, energy, transport and telecommunications sectors[1])

This series of European Standards prEN 15085 "Railway applications – Welding of railway vehicles and components" consists of the following parts:

— Part 1: General

— Part 2: Quality requirements and certification of welding manufacturer

— Part 3: Design requirements

— Part 4: Production requirements

— Part 5: Inspection, testing and documentation

[1]) Official Journal of the European Communities No L 199 of 9.8.93

Introduction

Welding is an essential process in the manufacture of railway vehicles and their parts. The required provisions for the special process "welding" are laid down in the standards EN ISO 9001 (see [1]) and EN 729 (see [2] to [5]). The basis of these provisions is the basic technical welding standards in respect of the special requirements for the construction of railway vehicles.

In respect to the railway environment, this series of standards defines the certification and quality requirements for the welding manufacturer to undertake new build and repair work. It then provides an essential link between performance requirements defined during design, the achievement of appropriate quality welds during production and the demonstration of the required quality by inspection.

This link is achieved by the definition of a weld quality class during design, which is based on safety and stress factors relevant to railway operation. Weld defect levels are assigned to the quality classes to ensure levels of performance intended during design. Certification levels are specified for the production of these weld quality classes and this in turn defines the relevant welding controls and welder qualifications for the manufacturer. Inspection methods and frequency are also specified in relation to the weld quality classes.

This standard deals with the welding of steel and aluminium alloys. The welding of other parent materials (e.g. Cu, Mg) shall be carried out according to applicable parts of this standard.

This standard is aimed at defining the terms of enforcement applicable to European Standards, it shall not be construed as a substitute to these standards.

This standard can also be used by internal and external parties, including certification bodies, to assess the organisation’s ability to meet customer, regulatory and the organisation’s own requirements.

1 Scope

This standard gives general recommendations and definitions for the welding of railway vehicles and associated components. Except for specific provisions laid down contractually, this standard applies to all assemblies, sub-assemblies or parts welded by any welding process, either manual or semi-automatic or automatic as defined in European standard EN ISO 4063.

Materials employed in the manufacture of the above may normally include:

— structural and alloy steels including castings;

— wrought aluminium and cast aluminium alloys.

— stainless steel alloys.

Items of equipment subject to specific regulations are not relevant to the scope of this standard, i.e. air reservoirs.

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.

EN ISO 4063, *Welding and Allied Processes – Nomenclature of processes and reference numbers.*

3 Definitions

For the purposes of this standard the following definitions apply:

3.1
admissible fatigue stress
maximum stress applicable to materials to which a specific coefficient to the assembly to be welded is applied

3.2
acceptance authority
an organisation which is responsible for the acceptance of the product. This organisation may be part of the customer's organisation or be an independent organisation appointed or approved by the customer

3.3
certification
procedure used to demonstrate the qualification of personnel or organisation leading to the issue of a certificate

3.4
certification body
the body which certifies persons, organisations, equipment or materials

3.5
certified
a person or organisation with qualification which has been demonstrated by certification issued by an external body/authority

3.6
customer
an organisation which has the responsibility for defining the technical requirements, quality requirements and the acceptance procedures for the welded product

3.7
effective cross section
the cross-section of a welded joint that is considered when performing sizing calculations

3.8
inspection class
all the inspections required for a given welded joint weld quality class

3.9
joint static size
the dimension of a welded joint that is needed to achieve the required static mechanical characteristics

3.10
joint fatigue size
the dimension type of welded joint that is needed to achieve the required fatigue characteristics

3.11
manufacturer
an organisation which:

— has a welding facility to manufacture, maintain or repair railway vehicles or parts of railway vehicles – Certification level 1, 2, or 3 (prEN 15085-2:2004, table 1 – see [6]);

— designs welded rail vehicles or parts of welded rail vehicles, or buys welded parts for assembly into railway vehicles – Certification level 4 (prEN 15085-2:2004, table 1 – see [6]).

3.12
NDT
non-destructive testing or non-destructive examination

3.13
qualification
evidence of training, professional knowledge, skill and experience to enable the personnel to perform the required tasks

3.14
qualified
a person with evidence of training, professional knowledge, skill and experience, proven by an internal test

3.15
recognised office
the body which has been recognised on the basis of EU Directive, a law or a regulation (so-called regulated area) by the safety regulatory authority.

3.16
safety category
the category which defines the consequences of failure of the single welded joint in respect to the effects on persons, facilities and the environment

The safety categories are differentiated as follows:

Low: Failure of the welded joint does not lead to any direct impairment of the overall function. Consequential events with personal injuries are unlikely.

Medium: Failure of the welded joint leads to an impairment of the overall function or can lead to consequential events with personal injuries.

High: Failure of the welded joint leads to consequential events with personal injuries and breakdown of the overall function.

3.17
safety regulatory authority
national government body responsible for setting or agreeing the safety requirements for a railway and ensuring that the railway complies with the requirements

3.18
stress factor
the factor which is the ratio of the calculated fatigue stress to the admissible fatigue stress of the joint type, adjusted by the appropriate safety factor

3.19
stress category
the category which describes the utilisation of the allowable stresses

3.20
test or work specimen
test or work specimens (mock-ups) are sample welded joints to prove the manual skill of the welder or to demonstrate acceptable production of the welded joint

3.21
weld quality class
quality of the welded joint defined with respect to the stress level and the safety level of the assembly

For further terms see EN 12345 (see [7]).

4 General Requirements

Generally, customers prescribe performances applicable to finished products; they do not prescribe welding methods. The manufacturer thus has full freedom to select whichever welding process, consumables and edge preparation he wishes to implement.

In return, upon customer request, the manufacturer shall demonstrate that they have full control and that the quality level requested by customers will be achieved, in particular through the following:

— company qualification;

— welder and welding operator qualification;

— welding process and mock-up qualification.

However, customers may contractually restrict the use of certain welding processes.

As regards drawings issued prior to this standard, the prescriptions laid down herein may be applied. The manufacturer shall inform their customers beforehand.

This standard does not deal with product qualification (refer to other standards for fatigue mock-ups for instance).

For materials and welding processes outside the scope of this standard, the customer and manufacturer shall agree on new rules or the applicability of existing rules, which achieve the same level of controls as those ensured by this standard. These shall include agreement on quality and certification requirements of the manufacturer, the application of weld quality classes based on stress and safety categories, the definition of defect levels to ensure the required levels of performance, and rules for production and inspection to ensure the achievement of quality requirements.

Bibliography

[1] EN ISO 9001, Quality systems – Model for quality assurance in design/development, production, installation and servicing.

[2] EN 729-1, Quality requirements for welding – Fusion welding of metallic materials – Part 1: Guidelines for selection and use.

[3] EN 729-2, Quality requirements for welding – Fusion welding of metallic materials – Part 2: Comprehensive quality requirements.

[4] EN 729-3, Quality requirements for welding – Fusion welding of metallic materials – Part 3: Standard quality requirements.

[5] EN 729-4, Quality requirements for welding – Fusion welding of metallic materials – Part 4: Elementary quality requirements.

[6] prEN 15085-2:2004, Railway applications – Welding of railway vehicles and components – Part 2: Quality requirements and certification of welding manufacturer.

[7] EN 12345, Welding – Multilingual Terms for Welded Joints with Illustrations.