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## European foreword

This document (EN 18007-2:2024) has been prepared by Technical Committee CEN/TC 121 “Welding and allied processes”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by January 2025, and conflicting national standards shall be withdrawn at the latest by January 2025.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

The EN 18007 series of standards, under the general title *Electromagnetic pulse welding*, consists of the following parts:

- *Part 1: Welding knowledge, terminology and vocabulary,*
- *Part 2: Design of welded joints,*
- *Part 3: Qualification of welding operators and weld setters,*
- *Part 4: Specification and qualification of welding procedures,*
- *Part 5: Quality and inspection requirements.*

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

## Introduction

Electromagnetic pulse welding is an innovative solid-state welding technology that belongs to the group of pressure welding processes and is based on the use of electromagnetic forces to deform, accelerate and weld workpieces. No external heat source is used, the connection is only created by a high-velocity impact.

The increasing use of the electromagnetic pulse welding process has created the need for a standard, to ensure that the welding operations are carried out in the most effective manner and that appropriate controls are performed on all aspects of the implementation.

To be effective, welded products should be free from problems in production and in service. To achieve this goal, it is recommended to provide controls from the design phase through material selection, choice of parameters, the fabrication itself, and inspection. For example, poor design can create serious and costly difficulties in the workshop or in service. Incorrect process parameters and/or material selection can result in welding defects. Welding procedures should be correctly formulated and approved to avoid weld discontinuities. To ensure the manufacture of a quality product, management should understand the causes of potential problems and implement appropriate inspection procedures and subsequent quality measures. Supervision should be implemented to ensure that the specified quality is achieved.

## 1 Scope

This document specifies design requirements for electromagnetic pulse welds and provides design guidelines for electromagnetic pulse welding.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 18007-1, *Electromagnetic pulse welding — Part 1: Welding knowledge, terminology and vocabulary*

EN 18007-3, *Electromagnetic pulse welding — Part 3: Qualification of welding operators and weld setters*

EN 18007-4:2024, *Electromagnetic pulse welding — Part 4: Specification and qualification of welding procedures*

EN 18007-5, *Electromagnetic pulse welding — Part 5: Quality and inspection requirements*

EN ISO 2553, *Welding and allied processes — Symbolic representation on drawings — Welded joints (ISO 2553)*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 18007-1 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

## 4 Design requirements

### 4.1 Documentation

The weldment shall be designed in accordance with defined requirements that supports the end use of the welded product (for example leak tightness, strength requirements, ...). Documentation shall clearly define the essential information of the weld and any special requirements, such as fracture-critical, durability-critical, mission-critical, or safety-critical requirements, that are imposed on top of the general requirements. Essential process controls shall be defined to substantiate that all design requirements can be met by the welds that were produced in accordance with the qualified welding procedure specification (WPS) and inspection requirements.

Weld symbols shall be those shown in the latest edition of EN ISO 2553.

### 4.2 Joint design

#### 4.2.1 General

The weld joint design shall take into account the necessary material property data.

For the electromagnetic pulse welding process, butt joints are not possible until now. A division between lap joints of sheet metal and cylindrical products is made.