

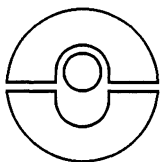
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**Technical specification
for the approval of a procedure
for fusion welding on aluminium
and its alloys**



International Union of Railways



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Leaflet to be classified in volumes:

- V - Transport stock
- VI - Traction
- VIII - Technical specifications

Amendments

Preliminary remarks:

The double vertical line (||) in the margin denotes amendments introduced at the date shown at the foot of the page.

Enforcement of this leaflet is governed by the provisions listed under "Application" at the end of this document.

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Note

This Leaflet is part of a series which also includes (among others):

Leaflet 897-20	Technical specification for the approval of welders for the fusion welding of aluminium and its alloys (to be published)
Leaflet 897-22	Technical specification for the quality control of rolling stock assemblies made of aluminium and its alloys (to be published)

1 - Purpose

This leaflet lays down methods and conditions for approval of a welding procedure (WP) based on a welding procedure description (WPD), together with conditions for undertaking approval tests and the validity limits of an approved procedure.

The welding procedure description shall be compulsory.

When the welding procedure is compulsory, it shall require approval through the welding test procedure described in this Leaflet.

In the case of butt-welds, a welding approval test is compulsory for all Class B joints shown on drawings in line with the design specification.

For approval of class C assemblies ⁽¹⁾ and class B ⁽¹⁾ fillet welded joints, the method of approval of the welding procedure must be subject to agreement between the builder and the customer railway and approval may be obtained via one of the following methods:

- by experience acquired;
- by reference to a standard procedure in a procedure description approved by the customer railway or by an approved body;
- by producing a prototype (or pre-production test);
- by a standardised welding procedure test.

Additional approval testing (mock-up or test-assembly) must be covered by an agreement between the builder and the customer railway.

(1) The examinations and checks on such assemblies may be carried out in accordance with Table 5.

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A welding procedure test shall be compulsory whenever the properties of the material in the weld metal and the heat-affected zone are critical for the structure.

The processes of approval and monitoring during manufacture shall be covered by UIC leaflet 897-22 ⁽¹⁾.

2 - Scope

This leaflet shall apply to any welding or resurfacing operation (construction and repair) performed on welded structures of:

- railway rolling stock;
- lines or pipes and accessories for this rolling stock;
- machine welding of the components of this rolling stock;
- containers.

Resurfacing shall be covered by a welding procedure specified in advance and submitted to the railway for approval.

This leaflet shall only apply to arc welding of welded aluminium and its alloys in accordance with ISO standards 2092 and 2107.

Welded joints of parts of cast aluminium must be subject to agreements between the manufacturer and the customer railway.

(2) UIC Leaflet 897-22 " Technical specification for the quality control of rolling stock assemblies made of aluminium and its alloys".

3 - Range of approval

3.0 - General

The range of approval for which a procedure specification is to be approved shall cover all the following variables:

- the welding process,
- the type of welded joint,
- the base material and filler product,
- the dimensions of the test weld,
- the position in which welding is performed,
- the application technique.

The railway representative shall be the competent authority assigned to pronounce the approval of a procedure description. He may belong to the railway or to an outside examining body approved by the railway.

The results of approval tests shall be recorded in a document and certified by the representative of the railway, on his sole responsibility.

This document must include, in addition to the builder's identification, complete information about the procedure description, the tests and the results of the tests.

Documents prepared by the builder shall be accepted only if they include the requisite information.

3.1 - Welding processes

3.1.1 - This leaflet shall apply to the classified arc welding processes listed below ⁽¹⁾.

(1) cf. ISO 4063.

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Each welding process may be manual, semi-automatic or automatic, as the case may be:

- 131 arc welding with core wire (with shielding gas);
- 141 arc welding with refractory electrode (with shielding gas);
- 151 plasma arc welding.

For other processes not mentioned above, a special approval programme shall be drawn up.

Each of the welding processes may be approved separately or in combination with other processes when a welding procedure entails several different welding processes. Similarly, one or more processes may be removed from an approved welding procedure, provided that the thickness of the weld joint lies within the thickness validity range (see point 3.4.1) for the process(es) chosen.

3.1.2 - Each test shall normally serve to approve a single process.

As such, a change of process shall necessitate a new approval test.

3.2 - Types of welded joints

3.2.1 - The approval samples shall be butt welds (BW) on plates or pipes.

The preparation of the edges and alignments must conform to the welding procedure description (WPD).

3.3 - Base materials and filler products

3.3.1 - Materials - Grades of filler product

Refined, extruded, drawn, forged and cast materials shall be covered.

The materials shall be classified in 4 groups.

This classification shall apply for determining the grade of filler product which must be compatible with that used for welding refined metals in the same group.

Table 1 shows these groups and applies also to filler products.