



## Weldments

### Qualification of welding operations

**GN9001**

#### 1 – Range of application

This standard specifies the minimum requirements for the welding operation with respect to its qualifications, unless these are defined by additional regulations.  
It must in principle be observed for all weldments of GROB-WERKE!

#### 2 – Qualification of the welding operation

The welding operation demands certain qualifications for performing welding work on components of GROB-WERKE. They depend upon the function and material of the component. These requirements are set out on Page 4 (Attachment).

The certificates demonstrating the requirements concerned must be presented to the client.

Subdivision of qualifications:

- Certificates associated with a procedure qualification (e.g. certification by classification companies)
- Certificates that do not require procedure qualifications (e.g. manufacturer's qualification to DIN EN 1090-1 or certification to DIN EN ISO 14731)

In the case of highly-stressed components, it is important to ensure that a procedure qualification is always performed. If in doubt, the supplier must ask the client about the component's function and degree of stress.

In principle, the welding work must not be started until the requisite qualification certificates have been presented!

The client decides any possible exceptions in special cases. These exceptions are then contractually regulated.

#### 3 – Qualification of welding personnel

Contract work on weldments is basically reserved for qualified and certified welding personnel!

The welding personnel qualification comprises a valid welding procedure qualification according to the international standard in the required scope. Welding procedure qualification recognized by GROB-WERKE shall be performed in accordance with DIN EN ISO 9606-1, DIN EN ISO 9606-2, AWS or ASME.

The qualification of the operators for welding machines or equipment (e.g. robots) is governed by the requirements of DIN EN ISO 3834-3.

## Standardization

#### **4 – Welding procedure**

The welding procedure to be employed is essentially specified and stated in the order documents. Alternatively, other procedures shown in the overview on page 4 can be applied.

In this section, a distinction is drawn between manual, partially-mechanized and fully-mechanized welding procedures which are employed.

In principle, no fully-mechanized procedure is used for complex components!

Welding work can be performed on complex components using robots. This requires a separate procedure qualification.

#### **5 – Repair welds**

For repair welds intended for minor repairs to weldments or cast parts, the manual welding procedure E-Hand is permitted.

The supplier is responsible for selecting the correct electrode for the base component material to be repaired.

#### **6 – Procedure qualifications**

Procedure qualifications must be performed on special combinations of base material, welding filler and welding procedure.

The procedure qualification lapses if any of the aforementioned parameters change. In this case, the supplier must notify the client without delay!

A procedure qualification can be performed at regular intervals.

The client reserves the right to perform an additional procedure qualification at any time if quality deteriorates.

#### **7 – Welding filler materials**

The supplier is responsible for selecting the correct welding filler materials. The supplier must ensure that only approved welding fillers are used. This also applies for other welding consumables (e.g. welding powder, flux, etc.).

**8 – Reference to cited standards**

<b>Standard description</b>	<b>Issue date</b>	<b>Description</b>
DIN EN 573-3	2013-12	Aluminum and aluminum alloys – chemical composition and form of semi-finished product Part 3: Chemical composition and product forms
DIN EN 1090-1	2014-04	Basis for the manufacturer's qualification
DIN EN 1706	2013-12	Aluminium and aluminium alloys - Castings - Chemical composition and mechanical properties
DIN EN 10025-1	2005-02	Hot rolled products of structural steels Part 1: General technical delivery conditions
DIN EN 10025-2	2005-04	Hot rolled products of structural steels Part 2: Technical delivery conditions for non-alloy structural steels
DIN EN ISO 3834-1	2006-03	Quality requirements for the fusion welding of metallic materials Part 1: Criteria for the selection of suitable quality requirement levels
DIN EN ISO 3834-3	2006-03	Quality requirements for the fusion welding of metallic materials Part 3: Standard quality requirements
DIN EN ISO 3834-5	2006-03	Quality requirements for the fusion welding of metallic materials Part 5: Documents whose requirements must be satisfied in order to demonstrate compliance with the requirements of ISO 3834-2, ISO 3834-3 or ISO 3834-4
DIN EN ISO 9606-1	2013-12	Qualification of welders – Fusion welding Part 1: Steels
DIN EN ISO 9606-2	2005-03	Qualification of welders – Fusion welding Part 2: Aluminum and aluminum alloys
DIN EN ISO 14731	2006-12	Welding supervisor - Tasks and responsibility
DIN EN ISO 17637	2011-05	Non-destructive testing of welds - Visual inspection of fusion-welded joints

## Attachment – Qualification certifications and procedure certifications

Legend:

- Requirements
- additionally, at least one of these certificates is required
- only when expressly requested in the order
- permissible procedure
- X not relevant
- A Agreement in consultation with client is required!

(R = single killed steel)  
 (RR = double killed steel)  
 (FF = fully killed steel)

		Qualification certifications for welding operations							Procedure certifications					
		Welders of the applicable material groups according to DIN EN ISO 9606-1/-2/AWS/ASME currently being examined	Certification according to DIN EN ISO 3834	Welding examiners VT according to DIN EN ISO 17637	Manufacturer's qualification to DIN EN ISO 1090	Certification by a classification company	TÜV certification	Other certifications	E-arc welding, manual procedure (E-manual)	Shielded metal arc welding, suitable procedure released	Shielded metal arc welding, fully-mechanized	Submerged arc welding (= fully-mechanized)	Other welding procedures	Procedure qualification (also recognized by reference orders in some cases)
Legend:														
● Requirements														
■ additionally, at least one of these certificates is required														
□ only when expressly requested in the order														
○ permissible procedure														
X not relevant														
A Agreement in consultation with client is required!														
(R = single killed steel) (RR = double killed steel) (FF = fully killed steel)														
General components Z	Construction steel FF (R/RR) DIN EN 10025-1/2	●	●	X	X	□	□	A	○	○	○	○	A	□
	Aluminum alloys EN 573-3; EN 1706	●	●	X	X	□	□		X	○	○	○		□
Highly-stressed components H	Construction steel FF (R/RR) – Construction steel FF (R/RR)	●	●	●	●	□	□	A	○	○	○	○	A	□
	Construction steel FF (R/RR) – alloy steel	●	●	●	●	□	□		○	○	○	○		□
	Alloy steel – alloy steel	●	●	●	●	□	□		○	○	○	○		□
	Aluminum alloy suitable for welding	●	●	●	●	□	□		X	○	○	○		□
	Other materials	●	●											