1 Scope

This requirement for suppliers is only applicable for welding-related orders for the manufacturing of converters as well as for welded components.

2 Purpose

This requirement for suppliers is to ensure the required quality of welded seams, as well as for the correct execution of all welding work and procedures.

3 Scope of application

- **Converters and welded components**
- **For construction of rail-bound vehicles and ships, there are complementary regulations.**

4 Terms

IWE	**International Welding Engineer**
rWS	**responsible Welding Supervisor**
ISTR	**Initial Sample Test Report**
FAT	**Factory Acceptance Test**

5 General guidelines

- **Prior to welding, oil, slag, rust and scale must be removed.**
- **After the welding, spatters must be generally removed.**
- **After the welding, the converters must be generally cleaned from welding- and grinding-dusts.**

6 Normative guidelines

6.1 Basic normative guidelines

- **Proof of the process flow accordingly AWS D1.1 / D1.1M.**

The operation must have a responsible welding supervisor according to AWS B5.16. The responsibilities and tasks of the responsible welding supervisor must be organised in accordance with AWS B5.16.

Verification of the execution of the welding work, taking into account the corresponding base materials, corresponding appropriate welding procedure test and welding instructions according to standard:

- **AWS D1.1 / D1.1M**
  4. Qualification, Part B Welding Procedure Specification (WPS) Qualification.
  Table 4.1 WPS Qualification Production Welding Positions Pipe and Tube Tests.
  Table 4.2 WPS Qualification CJP Groove Welds: Number and Type of Test Specimens and Range of Thickness and Diameter Qualified.
  Table 4.3 Number and Type of Test Specimens and Range of Thickness Qualified— WPS Qualification; PJP Groove Welds.
  Table 4.4 Number and Type of Test Specimens and Range of Thickness Qualified— WPS Qualification; Fillet Welds.
  Table 4.5 PQR Essential Variable Changes Requiring WPS Requalification for SMAW, SAW, GMAW, FCAW, and GTAW, and
  Table 4.6 PQR Supplementary Essential Variable Changes for CVN Testing Applications Requiring WPS Requalification for SMAW, SAW, GMAW, FCAW, and GTAW must be taken into account in the qualification.

Verification for the executing welders are, taking into account the basic and welding consumables, the welding process and the welding position corresponding valid certificates according to standard:

- **AWS D1.1 / D1.1M**
  4. Qualification, Part C Performance Qualification

For rail vehicle construction there are supplementary regulations:

- **Rail Vehicle Construction: Requirements from the Standards AWS D15.1 / D15.1M Recommended Practices for the Welding of Rails and Related Rail Components for Use by Rail Vehicles must be adhered to.**

6.2 Normative guidelines for the execution of welding work

- The welding seam preparation must be made under the consideration of the technical documentation and the drawing related specifications according to the standard:
  AWS D1.1 / D1.1M
  Figure 3.2—Prequalified PJP Groove Welded Joint Details,
  Figure 3.3—Prequalified CJP Groove Welded Joint Details.

- Minimum requirement for irregularities in welds, according to the standard:
  AWS B1.11M/B1.11, 5. Weld Surface Conditions In individual cases, higher requirements may also be stipulated in the technical documentation or drawing specifications.

- Minimum requirement for general tolerances for the execution of welded constructions according to the standard:
  ASTM A6 or
  ASME Y14.5

6.3 Normative guidelines for the materials to be processed

The processed base materials must be evidenced by an inspection certificate 3.1. The processed welding consumables must be evidenced by an inspection certificate 2.2.

The verification is carried out in accordance with the standard: EN 10204 Metallic products: Types of inspection documents

6.4 Normative guidelines for testing the welding work carried out

- For the visual inspection qualified persons are available according to AWS QC1, Certification of Welding Inspectors.
- When performing the visual inspection is the AWS B1.11M/B1.11 Visual inspection of fusion welded joints, to take into account.

7 Documents to be archived and/or submitted

The required documents according to separate order text and the specifications from point 6 following, have to be archived for at least 10 years (project based with the Hug order number) and need to be submitted to Hug Engineering AG on request.

8 Contract review

Prior to a confirmation of order by the supplier, it must be guaranteed in form of a contract review, that all requirements to the welding performance/requirement can be properly met. This also includes:

- The examination under a construction/design perspective related to arrangement, design and execution of the welding connections according the presented building documentations (drawings). Related deficiencies that are detected must be reported to Hug Engineering prior to the confirmation of order.
- Examination related to the completeness of the documentation.

9 Specifications from the rWS of Hug Engineering AG

The rWS of Hug Engineering AG decides on a project based necessity of work samples, special tests and photo documentations.

10 Materials

Materials must be used according to their specifications. Basic materials must be marked (short determination e.g. Standard materials eventually colour marked). The marking must be made in a manner that it remains legible at all times during transport and storage. The supplier must guarantee the separated handling and machining of INOX-steels and black-steels.

For the marking and storage of welding auxiliary materials it is to be observed:

- **Welding sticks must be marked individually by flags or stamping.**
- **Welding wire must be marked at the roll/coil.**
- **Stick electrodes must be marked by stamping at the coating. Appropriate storage conditions (special storage room for special materials, drying, oven) must be kept.**

11 Subcontracting

The subcontracting of the manufacturing of welded parts/components to third parties is only allowed after prior written permission of rWS and the procurement department. Subcontractors must comply with all quality standards and requirements of the present norm.

12 Initial Sample Test Report inspection for series projects

The sampling (ISTR) and quality assurance of series production is agreed on with the contractor prior to the award.

13 Tests / Documentation / FAT

Performed tests must be assigned to an individual tester i.e. by a signature. The test characteristics to be documented are detailed in the test-drawing. In case this is not available, they are to be mutually agreed with Hug Engineering.

On the test document, a signature of the Welding Supervisor is mandatory.

An eventual FAT is going to be announced by a separate order text.

14 Documents to be handed over to Hug Engineering AG after the finishing of a product

The documents required according to the separate order text must be provided to the procurement department and the rWS.

15 Monitoring

The monitoring of the required approvals and verifications according to point 6 and 9 are in the supplier's responsibility.

It is expected that the supplier proactively clarifies any questions and ambiguity with the rWS of Hug Engineering AG.