

Purchase Specification	Technical Quality Sulzer Pumps	
Castings requiring CMTR's type 3.1, 100% surface examination VT, PT and ultrasonic examination (UT) of critical areas		Page: 1 of 3

1.0 Scope

- 1.1 This specification details the minimum inspection, testing and certification requirements for castings requiring certified material test reports of chemical composition, mechanical properties and heat treatment, 100% surface examination using liquid penetrant and ultrasonic examination.

2.0 Reference Documents

- 2.1 All standards referenced shall be current issues unless stated otherwise.
- 2.2 Sulzer procedures referred herein can be downloaded from www.sulzer.com/q-documents.
- | | |
|---------------------|--|
| ASME BPVC Sec. VIII | Rules for Construction of Pressure vessels |
| ASME BPVC Sec. IX | Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators |
| ASTM A488 | Standard practice for steel castings, welding, qualifications of procedures and personnel |
| EN 10204* | Metallic Products – Types of Inspection Documents |
| EN ISO 9606* | Qualification test of welders – Fusion Welding |
| EN ISO 15614* | Specification and qualification of welding procedures for metallic materials – Welding procedure test |
| MSS SP-55 | Quality Standard for Steel Castings for Valves, Flanges, Fittings, and Other Piping Components |

* = To accommodate for possible licensing contract variations and localized standards requirements, as long as the content of the standard is identical, the norm may be purchased under a different issuing standards body. e.g. ISO standard may be purchased as a DIN EN ISO release in Germany, if the DIN contains a customer requested order specific requirement as long as the standard is identical. This deviating requirement has to be defined by the Order Fulfilment team of the PO issuing facility.

Sulzer

- | | |
|----------|--|
| PS-4008 | Minimum requirements on welding from suppliers |
| SQS-0011 | Definition of critical sections (UT) |
| TP-0001 | NDT – Liquid Penetrant Inspection |
| TP-0035 | NDT – UT inspection of castings |
| TP-0012 | NDT – Visual Inspection of castings |

3.0 Materials

Material type specification and grade shall be as stated in the Sulzer Purchase Order.

4.0 Manufacturer's Certification

- 4.1 The following documentation shall be provided as appropriate:
- a) Certified material test report according to EN 10204 type 3.1
 - b) Heat treatment certificate stating time and temperature of heat treatments.
If specified on the Purchase Order (e.g. order specific requirements), manufacturer shall provide heat treatment charts, otherwise, the manufacturer shall retain the charts and provide them upon request.
 - c) NDE reports on completion of surface examinations
 - d) Weld map including location and size of major repair excavations
 - e) NDE reports of repair excavations
 - f) NDE reports on completion of a weld repair
- 4.2 All certification and delivery advice documentation shall include the Sulzer Purchase Order number, line item number, casting melt/heat number and material (Sulzer article) number
- 4.3 All documentation shall be provided on or prior to delivery of the material.

Revision:	0	Date:	30 Mar 2022	Amendment:	Initial issue
This document has been prepared and published under the authority of the Technical Quality Working Group					Doc No: PS-3113

Purchase Specification	Technical Quality Sulzer Pumps	
Castings requiring CMTR's type 3.1, 100% surface examination VT, PT and ultrasonic examination (UT) of critical areas		Page: 2 of 3

4.4 All documentation shall be in the English language, legible and suitable for reproduction.

5.0 Inspection

5.1 Examinations shall be carried out on completion of heat treatment.

5.2 Visual Examination:

- a) Sulzer Test Procedure: TP-0012
- b) All accessible surfaces of the casting shall be examined and shall be free of adhering sand, scale, cracks and hot tears.
Other surface indications shall meet the requirements of MSS SP-55.
- c) Hydraulic surfaces are to be clean and free from obtrusions with a surface roughness in the order of 25µm (N11) / SCRATA A1.

5.3 Liquid Penetrant Examination:

- a) Sulzer Test Procedure TP-0001
- b) Areas to be examined: 100% surfaces as far as accessible, repair excavations and completed repair welds
- c) Acceptance Criteria: ASME BPVC Sec. VIII, Div. 1, App. 7, Para 7-3(a)(4)

5.4 Ultrasonic Examination:

- a) Sulzer Test Procedure: TP-0035
- b) Areas to be examined: 100% critical areas as defined in SQS-0011 unless otherwise specified in the Purchase Order.
- c) Acceptance Criteria: ASME BPVC VIII, Div. 1, App. 7, Para. 7-3(b)(3)
- d) Centrifugally cast items are not required to be examined by UT. Some materials (e.g. duplex) are difficult to examine with UT. For such materials, carefully review the requirement with Sulzer.

5.5 Sulzer and/or their client's representatives shall be afforded access and assistance at all reasonable times to carry out inspections at the manufacturer's premises.

6.0 Repairs

6.1 Unacceptable surface imperfections shall be removed and blended into their surrounding surfaces to avoid any sharp contours.

6.2 Major weld repairs shall not be performed without Sulzer's written agreement.

6.3 Iron castings shall not be weld repaired without Sulzer's written agreement.

6.4 All welding shall be performed in compliance with the requirements stated in PS-4008

6.5 Whenever an imperfection is to be weld repaired, the excavation shall be examined by the liquid penetrant method (clause 5.3) to verify that the imperfection has been removed or reduced to an acceptable size.

6.6 No repair welding shall be carried out prior to Sulzer's review of the proposed weld repair procedures.

6.7 All weld repairs shall be carried out using welding procedures and operators qualified in accordance with:

- a) ASTM A 488 respectively ASME BPVC Sec. IX; or
- b) EN ISO 15614 respectively ISO 9606

6.8 When impact testing is required by the purchase order or material specification, then the welding procedure qualifications shall include impact testing to the same test criteria.

6.9 Definition of a major weld repair:

- a) Removal of more than 20% of the wall thickness or 25mm (1") whichever is smaller
- b) Area of excavation exceeding 65cm² (10 in²)
- c) Leakage during hydrostatic pressure testing

Revision:	0	Date:	30 Mar 2022	Amendment:	Initial issue
This document has been prepared and published under the authority of the Technical Quality Working Group					Doc No: PS-3113

Purchase Specification	Technical Quality Sulzer Pumps	
Castings requiring CMTR's type 3.1, 100% surface examination VT, PT and ultrasonic examination (UT) of critical areas		Page: 3 of 3

- 6.10 On completion of welding, repaired areas shall be blended into their surrounding surfaces to avoid any sharp contours and be examined by the liquid penetrant method (clause 5.3). When subsequent heat treatment is required, examination of the repaired area shall be conducted after heat treatment.

7.0 Contamination Control and Cleaning

- 7.1 Thorough casting inspection is required by the foundry prior to shipment to guarantee all passageways are free from blast media, scale, flashing, fins, core supports, shot, swarf, etc. Internal casting inspection is also required to guarantee the alignment of welded core closures and complete penetration of core closure welds. This inspection is also to assure that the casting is free from defects that allow leak paths between adjacent passageways.
- 7.2 Austenitic and duplex castings shall be free of all ferrous contaminants. Cleaning shall be carried out immediately prior to shipment, after all other operations are complete. Cleaning may be accomplished by blasting with clean, uncontaminated blast media, pickling and passivation or by other approved methods. Note: Recycled stainless steel shot cannot be guaranteed to be free of ferrous contaminants and is therefore not an acceptable method.

8.0 Product Marking

- 8.1 To provide traceability between the material and the documentation, each piece of material/component shall be individually marked, at a prominent location with the following:
- a) Casting melt / heat number
 - b) Material Specification, Grade, and Class
 - c) Sulzer Purchase Order number, line item number and material (Sulzer article) number

9.0 General Notes

- 9.1 Acceptance of the material shall be on satisfactory compliance to the Purchase Order requirements.
- 9.2 Failure to comply with the above requirements could result in rejection or delayed payment of invoices.

Revision:	0	Date:	30 Mar 2022	Amendment:	Initial issue
This document has been prepared and published under the authority of the Technical Quality Working Group					Doc No: PS-3113