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## **Addendum 3**

*Insert the attached Annex Q after Annex P*

## **Annex Q** (normative)

### **Repair and remanufacture requirements**

#### **Q.1 General**

This annex defines the requirements for repair and remanufacture of user/purchaser owned wellhead and christmas tree equipment originally manufactured in accordance with this International Standard for continued service by the user/purchaser. This annex is not applicable to field repair, with or without the replacement of parts and modification of equipment and is not applicable to repair or remanufacture of used or surplus equipment intended for resale.

Repaired or remanufactured equipment is not eligible for licensing under the API Monogram Program in accordance with Annex N of this international standard.

This International Standard also provides requirements for repair and remanufacture of wellhead and Christmas tree equipment originally manufactured with ISO 10423, API 6A or API 14D under a quality assurance program.

#### **Q.1.1 Definitions**

##### **Q.1.1.1**

##### **original product definition**

Complete definition of the requirements for the original component, subassembly or assembly including specified limits and tolerances, health, safety and environmental requirements, limitations of use, customer specific requirements, design acceptance criteria, materials of construction, materials processing requirements and physical properties, physical dimensions, and requirements for manufacturing process controls, inspection, assembly and testing, marking, handling, storage, maintenance, and records requirements.

##### **Q.1.1.2**

##### **certificate of compliance**

Document containing the statement by the repairer/remanufacturer certifying that the repair, rework or remanufacture meets the requirements of Annex Q.

##### **Q.1.1.3**

##### **certificate of conformance**

Document certifying that repaired/remanufactured equipment and all of its component parts meet the requirements of the original product definition.

#### **Q.2 Repair and remanufacture levels**

##### **Q.2.1 General**

Repair and remanufacture levels (RL) provide the basis for defining and controlling repair and remanufacture of wellhead and christmas tree equipment during its life cycle. RL levels as defined in this annex include requirements consistent with sound industry practices for repair and remanufacture activities.

##### **Q.2.2 RL levels**

RL levels are representative of the product specifications and, if applicable, product specification level (PSL) to which the equipment was originally manufactured. RL levels indicate the level of technical requirements associated with the repair or remanufacture of equipment and do not represent equipment suitability for specific service or performance

requirements. Table Q.1 summarizes the requirements of this annex to assist the customer and the repairer/remanufacturer in the selection of the appropriate RL level for equipment.

### **Q.2.3 Application of RL levels**

The original product specification and PSL levels shall be used to determine the RL levels to which equipment may be repaired or remanufactured as follows:

- a) equipment identified as originally manufactured to API;
- b) equipment identified as originally manufactured as PSL 1 shall be repaired or remanufactured to RL 1;
- c) equipment identified as originally manufactured as PSL 2 shall be repaired or remanufactured to RL 1 or RL 2;
- d) equipment identified as originally manufactured as PSL 3/3G shall be repaired or remanufactured to RL 1, RL 2, RL 3; and
- e) equipment identified as originally manufactured as PSL 4 shall be repaired or remanufactured to RL 1, RL 2, RL 3 or RL 4.

This annex is not applicable to the repair and remanufacture of equipment, which cannot be identified as originally manufactured to the requirements of ISO 10423, API 6A or API 14D.

## **Q.3 Design and performance requirements**

### **Q.3.1 Performance requirements—general**

Replacement parts or remanufactured equipment and parts shall be designed to perform to requirements that meet or exceed the original equipment design. For RLs 1 to 4, designs shall be in accordance with the requirements of the corresponding PSLs and performance requirements (PR) as required by Clauses 4 and 10.

### **Q.3.2 Design of product attributes and replacement parts**

Requirements for the design of replacement part shall be as follows:

- a) product attributes and replacement parts for RL 1 shall be in accordance with documented designs as required by Clauses 4 and 10 which are functionally and materially similar to the original product definition;
- b) product attributes and replacement parts for RLs 2 to 4 shall be in accordance with documented designs as required by Clauses 4 and 10 which meet or exceed the original product definition.

### **Q.3.3 Design of remanufactured parts**

Requirements for designs utilized in the process of remanufacturing equipment and parts are as follows:

- a) remanufactured parts for RL 1 shall be in accordance with documented designs which are functionally and materially similar to the original product definition;
- b) remanufactured parts for RLs 2 to 4 shall be in accordance with documented designs that meet or exceed the original product definition.

**Table Q.1—Summary of Annex Q requirements**

Requirement	RL 1	RL 2	RL 3	RL 4
Corresponding PSL level	PSL 1	PSL 2	PSL 3/3G	PSL 4
Equipment identified as originally manufactured in accordance with API 6A prior to introduction of PSL levels	x			
Equipment identified as originally manufactured as PSL 1	x			
Equipment identified as originally manufactured as PSL 2	x	x		
Equipment identified as originally manufactured as API 14D/ASME SPPE 1		x		
Equipment identified as originally manufactured as PSL 3/3G	x	x	x	
Equipment identified as originally manufactured as PSL 4	x	x	x	x
Design status indeterminate	x			
Design status acceptable	x	x	x	x
<b>Design of product attributes and parts similar to the OPD<sup>a</sup> requirements</b>	x			
<b>Design of product attributes and parts meet or exceed OPD requirements</b>		x	x	x
Complete disassembly and cleaning		x	x	x
Visual examination	x <sup>b</sup>	x	x	x
Dimensional <b>inspection</b> of specified dimensions of this International Standard	x	x	x	x
Surface NDE for remanufactured parts		x	x	x <sup>c</sup>
Welding controlled to include material identification	x	x	x	x <sup>c</sup>
Visual weld examination for remanufactured parts		x	x	x <sup>c</sup>
Weld surface NDE for remanufactured parts		x	x	x <sup>c</sup>
Weld volumetric NDE for remanufactured parts		x	x	x <sup>c</sup>
Weld hardness test			x	x <sup>c</sup>
Hardness testing for sour service	x <sup>e</sup>	x <sup>e</sup>	x <sup>e</sup>	x <sup>e</sup>
Hardness testing to requirements of this International Standard		x <sup>e</sup>	x <sup>e</sup>	x <sup>e</sup>
Reassembly traceability			x	x
Hydrostatic body test	x <sup>f</sup>	x	x	x
Hydrostatic seat test	x	x	x	x
Extended seat test			x	x
Drift test	x	x	x	x
Gas test			x <sup>d</sup>	x
Certificate of conformity provided to customer			x	x
Assembly traceability and test records provided to customer			x	x
Complete quality control records provided to customer				x

<sup>a</sup> OPD = Original Product Definition.  
<sup>b</sup> Examination required only to extent permitted by disassembly.  
<sup>c</sup> Welding is not permitted except for weld overlays.  
<sup>d</sup> Gas test for PSL 3G or 4 option only.  
<sup>e</sup> Applicable to body, bonnet, end and outlet connections and stems.  
<sup>f</sup> Hydrostatic test required only at working pressure.

### **Q.3.4 Design status**

Establishing the RL level for repair or remanufacture shall include the determination of the design status as defined by the original product definition based on equipment markings and records traceable to equipment markings. If this cannot be defined, equipment shall only be repaired/remanufactured to RL 1.

Equipment designs established as no longer suitable for repair and remanufacture as a result of design changes such as materials, processes, physical features or application limits shall not be repaired or remanufactured according to this annex.

## **Q.4 Materials**

Requirements for materials used to manufacture replacement parts shall conform to the corresponding PSL requirements and Clause 5. Replacement parts shall meet all applicable requirements of Clause 10 of this specification.

## **Q.5 Repair and remanufacture**

### **Q.5.1 Personnel**

Personnel performing repair and remanufacture operations described in this annex shall be qualified in accordance with written requirements of the repairer/remanufacturer which include minimum training and qualification requirements.

### **Q.5.2 Equipment identification**

Identification of equipment shall be determined through markings, or records traceable to markings, as follows:

- a) original manufacturer;
- b) size and working pressure;
- c) PSL, PR, temperature rating, material class/retained fluid rating/API 14D service class, and RL as applicable;
- d) serial number and any other traceable information, as applicable;
- e) comments as to general condition;
- f) product design status.

The repairer/remanufacturer shall document the above information, the RL level designated for repair or remanufacture of the equipment, the basis for determination of the RL level and, for RL 2 to RL 4, records traceable to the original product definition. Documentation shall be maintained as a record per the retention requirements identified in the standard.

### **Q.5.3 Repair of equipment**

Repair of equipment shall not include remanufacturing of bodies, bonnets, end and outlet connections, stems and valve-bore sealing mechanisms.

Repair of equipment shall require the following.

- a) Disassembly and cleaning shall be performed in accordance with the repairer's/remanufacturer's documented requirements. Control features shall be included to segregate or identify components of each assembly to avoid mixing or mismatching of parts.
  - 1) For RL 2 to RL 4, complete disassembly is required.
  - 2) For RL 1, disassembly is required to the extent necessary to evaluate the equipment in accordance with the requirements of this annex and replace parts necessary to return the equipment to working condition.
- b) Visual examination shall be performed in accordance with documented specifications, which include acceptance criteria. Results of the examination shall be documented.
- c) All dimensions controlled by this International Standard shall be inspected. Results of the inspection shall be documented and maintained.
- d) Hardness testing shall be performed in accordance with the requirements of this annex.
- e) Replacement or remanufacture of those parts necessary to return the equipment to working condition. Replacement parts shall be in accordance with the PSL level corresponding to the RL level to which the equipment is being repaired. Remanufacture of parts other than bodies, bonnets and end and outlet connections, stems and valve-bore sealing mechanisms shall be in accordance with the quality control requirements of the repairer/remanufacturer.
- f) Equipment shall be reassembled in accordance with documented specifications of the repairer/remanufacturer.
- g) Equipment shall be tested in accordance with the requirements of Clause 7 to the requirements for the PSL level corresponding to the RL level to which the equipment is being repaired.

#### **Q.5.4 Remanufacture of equipment**

Remanufacture of equipment includes remanufacturing of bodies, bonnets, end and outlet connections, stems and valve-bore sealing mechanisms. Remanufacturing of other parts necessary to return the equipment to working condition may also be performed.

Remanufacture of equipment shall require the following.

- a) Disassembly and cleaning shall be performed in accordance with the repairer's/remanufacturer's documented requirements. Control features shall be included to segregate or identify components of each assembly to avoid mixing or mismatching of parts.
  - 1) For RL 2 to RL 4, complete assembly is required.
  - 2) For RL 1, disassembly is required to the extent necessary to evaluate the equipment in accordance with the requirements of this annex and replace parts necessary to return the equipment to working condition.
- b) Visual examination shall be performed in accordance with documented specifications, which include acceptance criteria. Results of the examination shall be documented.
- c) All dimensions controlled by this International Standard shall be inspected. Results of the inspection shall be documented and maintained.
- d) Hardness testing shall be performed in accordance with the requirements of this annex.

- e) Dimensional inspection and non-destructive examination of remanufactured parts shall be performed in accordance with the requirements of this annex. Results of inspections, tests and examinations shall be documented.
- f) For replacement or remanufacture of all parts which do not meet acceptance criteria, replacement parts shall be in accordance with the PSL level corresponding to the RL level to which the equipment is being repaired; remanufacture of parts shall be in accordance with the quality control requirements of this annex.
- g) Equipment shall be reassembled in accordance with documented specifications of the repairer/remanufacturer.
- h) Equipment shall be tested in accordance with the requirements of Clause 7 for the PSL level corresponding to the RL level to which the equipment is being repaired.

## **Q.6 Welding**

For RL 1 to RL 4, the material being welded shall be identified and welding shall be performed in accordance with the requirements of Clause 6 for the PSL level corresponding to the RL level to which the equipment is being repaired.

## **Q.7 Quality control**

### **Q.7.1 General**

Quality control Tables Q.2 and Q.3 are included in this annex to provide a matrix of requirements for specific parts and equipment.

### **Q.7.2 Personnel**

Personnel performing quality control activities shall be qualified in accordance with the requirements of Clause 7.

### **Q.7.3 Measuring and testing equipment**

Measuring and test equipment shall be maintained and calibrated in accordance with the requirements of Clause 7.

### **Q.7.4 Bodies, bonnets and end and outlet connections (reused parts)**

Table Q.2 lists the quality control requirements for the reuse of parts for bodies, bonnets, end and outlet connections, stems and mandrel hanger parts.

#### **Q.7.4.1 RL 1**

##### **Q.7.4.1.1 Hardness testing**

All parts to be reused that are intended for sour service shall be hardness-tested in accordance with 7.4.1.5, using the methods specified in 7.4.2.1.3.

##### **Q.7.4.1.2 Inspection of dimensions**

All dimensions controlled by this International Standard shall be inspected.

All dimensions affected by remanufacturing shall be inspected to documented design specifications.

**Table Q.2—Quality control requirements for bodies, bonnets, end and outlet connections, stems and mandrel hanger bodies (reused parts)**

	Subclause reference			
	RL 1	RL 2	RL 3	RL 4
Hardness testing	Q.7.4.1.1	Q.7.4.1.1	Q.7.4.3.1	Q.7.4.3.1
Dimensional inspection	Q.7.4.1.2	Q.7.4.1.2	Q.7.4.1.2	Q.7.4.1.2
Traceability		—	Q.7.4.3.3	Q.7.4.3.3
Visual examination	Q.7.4.1.3	Q.7.4.2.3	Q.7.4.2.3	Q.7.4.2.3
Surface NDE	—	Q.7.4.2.4	Q.7.4.3.5	Q.7.4.3.5
Weld NDE				
General	Q.7.4.1.4	Q.7.4.2.5	Q.7.4.2.5	Q.7.4.4.6 <sup>a</sup>
Visual examination	—	Q.7.4.2.6	Q.7.4.2.6	Q.7.4.2.6 <sup>a</sup>
NDE surface	—	Q.7.4.2.7	Q.7.4.3.8	Q.7.4.3.8 <sup>a</sup>
Repair welds	—	Q.7.4.2.8	Q.7.4.3.9	Q.7.4.4.9 <sup>a</sup>
NDE volumetric	—	Q.7.4.2.9	Q.7.4.2.9	—
NDE hardness testing	—	—	Q.7.4.3.11	—

<sup>a</sup> Welding is not permitted for RL 4 except for weld overlays and repairs to weld overlays.

**Q.7.4.1.3 Visual examination**

All accessible areas shall be visually examined to the extent permitted by disassembly.

The repairer/remanufacturer shall perform visual examination in accordance with documented specifications that include acceptance criteria.

**Q.7.4.1.4 Weld NDE**

Quality control requirements for welding shall be in accordance with Table 12.

**Q.7.4.2 RL 2**

**Q.7.4.2.1 Hardness testing**

Hardness testing requirements for RL 2 shall be identical to the requirements for RL 1.

**Q.7.4.2.2 Inspection of dimensions**

Requirements for inspection of dimensions of RL 2 shall be identical to the requirements for RL 1.

**Q.7.4.2.3 Visual examination**

Visual examination requirements for RL 2 shall be identical to the requirements for RL 1, except that all accessible areas shall be examined.

**Q.7.4.2.4 Surface NDE**

All accessible wetted surfaces and all accessible sealing surfaces affected by remanufacturing shall be examined in accordance with the requirements of 7.4.2.2.8 or 7.4.2.2.9.

#### **Q.7.4.2.5 Weld NDE—general**

Quality control requirements for welding shall be in accordance with 7.4.2.2.10.

#### **Q.7.4.2.6 Weld NDE—visual**

All welds shall be examined visually in accordance with the requirements of 7.4.2.2.11.

#### **Q.7.4.2.7 Weld NDE—surface**

Weld-surface NDE shall be performed in accordance with the requirements of 7.4.2.2.12. Additionally, all accessible wetted and sealing surfaces shall be examined after final heat treatment and machining.

#### **Q.7.4.2.8 Repair welds**

All repair welds shall be examined in accordance with the requirements of 7.4.2.2.13. Additionally, all accessible wetted and sealing surfaces shall be examined after final heat treatment and machining.

#### **Q.7.4.2.9 Weld NDE—volumetric**

All pressure-containing welds and all repair welds where the repair is greater than 25% of the wall thickness or 25 mm (1 in.), whichever is less, shall be examined in accordance with 7.4.2.2.14.

### **Q.7.4.3 RL 3**

#### **Q.7.4.3.1 Hardness testing**

Hardness-testing requirements for RL 3 shall be identical to the requirements for RL 2, except that all parts shall be hardness-tested at a minimum of one location specified by the repairer/remanufacturer. Acceptance criteria shall meet the requirements of 7.4.2.1.3 and 7.4.1.5. Acceptance criteria shall also meet the original product definition requirements if these exceed the requirements of this International Standard.

#### **Q.7.4.3.2 Inspection of dimensions**

Requirements for inspection of dimensions of RL 3 shall be identical to the requirements for RL 1.

#### **Q.7.4.3.3 Traceability**

Parts shall not be reused if the serial markings in accordance with 7.4.2.3.14 are no longer legible or otherwise traceable to the part.

#### **Q.7.4.3.4 Visual examination**

Visual examination requirements for RL 3 shall be identical to the requirements for RL 2.

#### **Q.7.4.3.5 Surface NDE**

Surface NDE requirements for RL 3 shall be identical to the requirements for RL 2, except that magnetic-particle examination shall use the wet fluorescent method per ASTM E709.

#### **Q.7.4.3.6 Weld NDE—general**

Quality control requirements for welding shall be identical to the requirements of RL 2.

#### **Q.7.4.3.7 Weld NDE—visual**

The requirements for visual examination of welds for RL 3 shall be identical to the requirements for RL 2.

#### **Q.7.4.3.8 Weld NDE—surface**

The requirements for NDE of weld surfaces for RL 3 shall be identical to the requirements for RL 2, except that magnetic-particle examination shall use the wet fluorescent method per ASTM E 709. Additionally, all accessible surfaces shall be examined after final heat treatment and machining.

#### **Q.7.4.3.9 Repair welds**

The requirements for examination of repair welds for RL 3 shall be identical to the requirements for RL 2, except that magnetic-particle examination shall use the wet fluorescent method per ASTM E709. Additionally, all accessible surfaces shall be examined after final heat treatment and machining.

#### **Q.7.4.3.10 Weld NDE—volumetric**

The requirements for volumetric examination of welds for RL 3 shall be identical to the requirements for RL 2.

#### **Q.7.4.3.11 Weld hardness testing**

The requirements for hardness testing of welds shall be in accordance with 7.4.2.3.13. Acceptance criteria shall meet the requirements of 7.4.2.1.3 and 7.4.1.5. Acceptance criteria shall also meet the original product definition requirements if these exceed the requirements of this International Standard.

### **Q.7.4.4 RL 4**

#### **Q.7.4.4.1 Hardness testing**

The requirements for hardness testing for RL 4 shall be identical to the requirements for RL 3.

#### **Q.7.4.4.2 Inspection of dimensions**

The requirements for inspection of dimensions for RL 4 shall be identical to the requirements for RL 1.

#### **Q.7.4.4.3 Traceability**

Traceability requirements for RL 4 shall be identical to the requirements for RL 3.

#### **Q.7.4.4.4 Visual examination**

The requirements for visual examination for RL 4 shall be identical to the requirements for RL 2.

#### **Q.7.4.4.5 Surface NDE**

Surface NDE requirements for RL 4 shall be identical to the requirements for RL 3.

#### **Q.7.4.4.6 Weld NDE—general**

Quality control requirements for welding shall be in accordance with 7.4.2.2.10. Welding other than weld overlays is not allowed.

#### Q.7.4.4.7 Weld NDE—visual

The requirements for visual examination of welds for RL 4 shall be identical to the requirements for RL 2.

#### Q.7.4.4.8 Weld NDE—surface

The requirements for NDE of weld surfaces for RL 4 shall be identical to the requirements for RL 3.

#### Q.7.4.4.9 Repair welds

- a) the requirements for examination of repair welds for RL 4 shall be identical to the requirements for RL 3;
- b) welding other than weld overlays or repair to weld overlays is not allowed.

### Q.7.5 Stems (reused parts)

The quality control requirements for stems are the same as bodies, bonnets and end and outlet connections. Table Q.2 lists the quality control requirements for the reuse of stems.

### Q.7.6 Valve-bore sealing mechanisms (reused parts)

Table Q.3 lists the quality control requirements for the reuse of parts for valve-bore sealing mechanisms.

#### Q.7.6.1 RL 1

##### Q.7.6.1.1 Inspection of dimensions

All dimensions affected by remanufacturing shall be inspected to documented design specifications.

##### Q.7.6.1.2 Visual examination

- a) all accessible areas shall be visually examined to the extent permitted by disassembly;
- b) the repairer/remanufacturer shall perform visual examination in accordance with documented specifications that include acceptance criteria.

**Table Q.3—Quality control requirements for valve-bore sealing mechanisms (reused parts)**

	Subclause reference			
	RL 1	RL 2	RL 3	RL 4
Dimensional inspection	Q.7.6.1.1	Q.7.6.1.1	Q.7.6.1.1	Q.7.6.1.1
Traceability	—	—	Q.7.6.3.2	Q.7.6.3.2
Visual examination	Q.7.6.1.2	Q.7.6.2.2	Q.7.6.2.2	Q.7.6.2.2
Surface NDE	—	—	Q.7.6.3.4	Q.7.6.3.4
Weld NDE				
General	—	Q.7.6.2.3	Q.7.6.2.3	Q.7.6.4.5 <sup>a</sup>
Visual examination	—	Q.7.6.2.4	Q.7.6.2.4	Q.7.6.2.4 <sup>a</sup>
NDE surface	—	Q.7.6.2.5	Q.7.6.3.7	Q.7.6.3.7 <sup>a</sup>
Repair welds	—	Q.7.6.2.6	Q.7.6.3.8	Q.7.6.4.8 <sup>a</sup>
NDE hardness testing	—		Q.7.6.3.9	—

<sup>a</sup> Welding is not permitted for RL 4 except for weld overlays and repairs to weld overlays.

## **Q.7.6.2 RL 2**

### **Q.7.6.2.1 Inspection of dimensions**

The requirements for inspection of dimensions for RL 2 shall be identical to the requirements for RL 1.

### **Q.7.6.2.2 Visual examination**

The requirements for visual examination for RL 2 shall be identical to the requirements for RL 1, except that all accessible areas shall be examined.

### **Q.7.6.2.3 Weld NDE—general**

Quality control requirements for welding shall be in accordance with 7.4.2.2.10.

### **Q.7.6.2.4 Weld NDE—visual**

All welds shall be examined visually in accordance with the requirements of 7.4.2.2.11.

### **Q.7.6.2.5 Weld NDE—surface**

NDE of weld surfaces shall be performed in accordance with the requirements of 7.4.2.2.12.

### **Q.7.6.2.6 Repair welds**

All repair welds shall be examined in accordance with the requirements of 7.4.2.2.13. Additionally, all accessible wetted and sealing surfaces shall be examined after final heat treatment and machining.

## **Q.7.6.3 RL 3**

### **Q.7.6.3.1 Inspection of dimensions**

The requirements for inspection of dimensions for RL 3 shall be identical to the requirements for RL 1.

### **Q.7.6.3.2 Traceability**

Parts shall not be reused if the serialization markings in accordance with 7.4.2.3.14 are no longer legible or otherwise traceable to the part.

### **Q.7.6.3.3 Visual examination**

The requirements for visual examination of RL 3 shall be identical to the requirements for RL 2.

### **Q.7.6.3.4 Surface NDE**

All accessible wetted surfaces and all accessible sealing surfaces affected by remanufacturing shall be examined in accordance with the requirements of 7.4.2.2.8 or 7.4.2.2.9, except that magnetic-particle examination shall use the wet fluorescent method per ASTM E709.

### **Q.7.6.3.5 Weld NDE—general**

Quality control requirements for welding shall be in accordance with 7.4.2.2.10.

#### **Q.7.6.3.6 Weld NDE—visual**

The requirements for visual examination of welds for RL 3 shall be identical to the requirements for RL 2.

#### **Q.7.6.3.7 Weld NDE—surface**

The requirements for NDE of weld surfaces for RL 3 shall be identical to the requirements for RL 2, except that magnetic-particle examination shall use the wet fluorescent method per ASTM E709.

#### **Q.7.6.3.8 Repair welds**

The requirements for examination of repair welds for RL 3 shall be identical to the requirements for RL 2, except that magnetic-particle examination shall use the wet fluorescent method per ASTM E709. Additionally, all accessible surfaces shall be examined after final heat treatment and machining.

#### **Q.7.6.3.9 Weld hardness testing**

The requirements for hardness testing of welds shall be in accordance with 7.4.2.3.13. Acceptance criteria shall meet the requirements of 7.4.2.1.3 and 7.4.1.5. Acceptance criteria shall also meet the original product definition requirements if these exceed the requirements of this International Standard.

### **Q.7.6.4 RL 4**

#### **Q.7.6.4.1 Inspection of dimensions**

The requirements for inspection of dimensions for RL 4 shall be identical to the requirements for RL 1.

#### **Q.7.6.4.2 Traceability**

Traceability requirements for RL 4 shall be identical to the requirements for RL 3.

#### **Q.7.6.4.3 Visual examination**

Visual examination requirements for RL 4 shall be identical to the requirements for RL 2.

#### **Q.7.6.4.4 Surface NDE**

Surface NDE requirements for RL 4 shall be identical to the requirements for RL 3.

#### **Q.7.6.4.5 Weld NDE—general**

- a) quality control requirements for welding shall be in accordance with 7.4.2.2.10;
- b) welding other than weld overlays is not allowed.

#### **Q.7.6.4.6 Weld NDE—visual**

The requirements for visual examination of welds for RL 4 shall be identical to the requirements for RL 2.

#### **Q.7.6.4.7 Weld NDE—surface**

The requirements for NDE of weld surfaces for RL 4 shall be identical to the requirements for RL 3.

#### **Q.7.6.4.8 Repair welds to weld overlays**

- a) the requirements for examination of repair welds for RL 4 shall be identical to the requirements for RL 3;
- b) welding other than weld overlays or repair to weld overlays is not allowed.

#### **Q.7.7 Tubing hanger mandrel bodies (reused parts)**

The quality control requirements for tubing hanger mandrel bodies are the same as for bodies, bonnets and end and outlet connections. Table Q.2 lists the quality control requirements for the reuse of parts for tubing hanger mandrel bodies.

#### **Q.7.8 Studs and nuts (reused parts)**

Studs and nuts which are intended for reuse shall be examined in accordance with specified requirements of the repairer/remanufacturer.

#### **Q.7.9 Non-metallic sealing materials (reused parts)**

Non-metallic seals which are intended for reuse shall be examined in accordance with specified requirements of the repairer/remanufacturer.

#### **Q.7.10 Assembled equipment**

The quality control requirements for assembled equipment shall be in accordance with Clause 7.

Assembled equipment shall be tested in accordance with 7.4.9 to the PSL level corresponding to the RL level to which the equipment is being repaired or remanufactured.

- a) RL 1 shall be tested to the requirements of PSL 1, except that the minimum hydrostatic body test pressure shall be equal to the rated working pressure.
- b) RL shall be tested to the requirements of PSL 2.
- c) RL 3 shall be tested to the requirements of PSL 3 or PSL 3G as applicable and specified by the user/purchaser.
- d) RL 4 shall be tested to the requirements of PSL 4.

#### **Q.7.11 Quality control records**

##### **Q.7.11.1 Replacement part records**

The requirements for quality control records for replacement parts shall conform to Clause 7 for the numerical PSL level corresponding to the RL level to which the equipment is being repaired or remanufactured.

##### **Q.7.11.2 Reused part records**

The requirements for quality control records for reused parts shall conform to Clause 7 for the PSL level corresponding to the RL level to which the equipment is being repaired or remanufactured, except that material test records are not required.

### **Q.7.11.3 Assembled equipment records**

The requirements for quality control records for assembled equipment shall conform to Clause 7 for the numerical PSL level corresponding to the RL level to which the equipment is being repaired or remanufactured.

### **Q.7.11.4 Records to be furnished to user/purchaser**

Quality control records required to be furnished to user/owner shall conform to Clause 7. Records shall be required in accordance with the requirements for the PSL level corresponding to the RL level to which the equipment is being repaired or remanufactured.

For RL 3 and RL 4, the certificate of compliance shall state that the equipment was repaired or remanufactured in accordance with the requirements of this International Standard.

When requested by the user/purchaser, a certificate of conformance shall be furnished certifying that the equipment and all of its component parts meet the requirements of the original product definition. The certificate of conformance shall be traceable to documentation including, but not limited to, the documentation required by the original product definition. The documentation shall be retained by the repairer/remanufacturer as specified in Clause 7.

## **Q.8 Equipment marking**

### **Q.8.1 General**

Equipment repaired or remanufactured shall be marked in accordance with the requirements of this annex. These marking requirements are in addition to and do not replace marking requirements of Clause 8, which are applicable to the repair or remanufacture. The original markings shall be retained on repaired or remanufactured equipment.

### **Q.8.2 Metallic marking locations**

The locations of metallic marking for equipment which is repaired or remanufactured are shown in Clause 8.

### **Q.8.3 Repair and remanufacture markings**

The following RL markings shall be placed in close proximity to PSL markings:

- a) "RMFR" for remanufacture or "RPR" for repair;
- b) repairer's/remanufacturer's name or mark;
- c) repair/remanufacturer level (RL);
- d) date of repair or remanufacture (month and year).

## **Q.9 Storing and shipping**

Storing and shipping shall be in accordance with the requirements of Clause 9.