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EXTERNAL REFERENCE

Report Clarification - Use of fluids

Defines the requirements pertaining to the use of fluids and markers. Defines the stage in manufacture form when the requirements shall be satisfied.

Approval Process			
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<i>Change Log</i>				
<i>Title (UId)</i>	<i>Versio n</i>	<i>Latest Status</i>	<i>Issue Date</i>	<i>Description of Change</i>
Clarification - Use of fluids (N5NHDG_v1_1)	v1.1	Approved	27 Jan 2014	Requirement on onset clarified.
Clarification - Use of fluids (N5NHDG_v1_0)	v1.0	Signed	27 Jan 2014	

1 Background

The requirements as specified in The ITER Vacuum Handbook [1] are mandatory.

The ITER Vacuum Handbook States the following;

ITER Vacuum Handbook Section (reference)	Requirement(s)
6.1.2 VQC 1 and 3 Cutting Fluids	Cutting fluids for use on VQC 1 and 3 systems shall be water soluble, non-halogenated and phosphorus and sulphur free.
	Accepted cutting fluids for use in VQC 1 and 3 vacuum applications are listed in Appendix 4 [2]. The use of other cutting fluids requires prior <i>acceptance</i> .
6.1.3 VQC 2 and 4 Cutting Fluids	For VQC 2 & 4 vacuum applications it is recommended that cutting fluids be water soluble, non-halogenated and phosphorus and sulphur free. They should be chosen from those listed in Appendix 4.
24.1 Cleaning	Parts and sub-components shall be degreased using solvents or alkaline detergents, rinsed with demineralised water, and dried in hot gas or an oven to <i>accepted</i> procedures. The use of halogenated solvents is forbidden at any stage. Lists of accepted cleaning fluids can be found in Appendix 4.
28 Marking of Vacuum Equipment	Dyes, marker pens, paints, etc. shall not be used on surfaces which will be exposed to vacuum.

While not explicitly stated in the vacuum handbook the use of all fluids, including Liquid dye penetrant, Ultrasonic couplant and fluids for picking and passivation also require *acceptance* by the ITER Vacuum RO (i.e. shall be chosen from the fluids listed in Appendix 4 of the IVH).

It is specified in the IVH the requirements pertaining to the use of fluids shall be satisfied during all stages of manufacture.

2 Scope

The scope of this document is to clarify the requirements pertaining to the use of fluids on vacuum surfaces including from which stage in the manufacture the requirements shall apply.

3 Use of Fluids

3.1 Onset of Requirements

The requirements pertaining to cutting fluids, cleaning fluids, marker pens and US couplants shall apply to all applications where any final surface of the component is exposed or machined.

The requirements pertaining to the use of Liquid Dye Penetrant shall apply at all stages of manufacture.

3.1.1 Fluid Requirements Pertaining to VQC

Table 1 lists the general VQC specific fluid requirements which shall be satisfied.

Only fluids accepted by the ITER Vacuum RO shall be used in the manufacture of components assigned a VQC. Fluids accepted for use and any restrictions in their use are listed in Appendix 4 [2] of the IVH.

VQC	Fluid Group Requirements		
	Cutting	Cleaning	Other
1	Water soluble, sulphur, phosphorus and halogen (fluoride & chloride) content below 200 ppm for each	Solvents or alkaline detergents, rinsed with demineralised water Halogen content below (fluoride & chloride) content below 200 ppm for each	Water based UT couplants, Approved Liquid penetrant product families*.
2	Recommended Water soluble, recommended sulphur, phosphorus and halogen (fluoride & chloride) content below 200 ppm for each		Water based UT couplants, Approved Liquid penetrant product families†.
3	Water soluble, sulphur, phosphorus and halogen (fluoride & chloride) content below 200 ppm for each		Water based UT couplants, Approved Liquid penetrant product families†.
4	Recommended Water soluble, recommended sulphur, phosphorus and halogen (fluoride & chloride) content below 200 ppm for each		Water based UT couplants, Approved Liquid penetrant product families†.
*Only ITER qualified LPT on systems baked to $\geq 200^{\circ}\text{C}$ for at least 24 hours prior to leak testing			
†The use of LPT on VQC 2, 3 and 4 shall only be agreed through the submission of a deviation request			

Table 1 General Fluid Requirements

3.1.2 Use of markers

Markers shall satisfy the following general requirements;

Sulphur, phosphorus and halogen (fluoride & chloride) content below 200 ppm for each.

Markers shall be accepted for use. Markers accepted for use, and any restrictions are listed in Appendix 4 of the ITER IVH.

4 References

- [1] Attachment 1 Welding (2FMM4B v1.2).
- [2] Welding Clarification -Special Processes (MUX8HR v1.0).
- [3] ITER Vacuum Handbook (ITER_D_2EZ9UM).