



**FACILITY INTEGRITY
SMALL BORE PIPING, TUBING AND FLEXIBLE HOSE
MANAGEMENT**

OPERATOR:.....

INSPECTION DATE(S):

FACILITY(S):

Note: The following hoses are largely excluded from this assessment as management systems should already exist to ensure their integrity: Fire hoses, aviation fuel hoses, breathing apparatus hoses, floating and submarine hoses including large diameter cargo offloading hoses, subsea umbilicals, subsea jumpers and flexible risers, flowlines and pipelines.

No	Prompt	Remarks	Comments /Status
1	Strategy and Plan		<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> Tick one (✓)
1.1	<p>Is there a documented strategy and plan for managing the integrity of small bore piping, tubing and flexible hose assembly (FHA) at the facility? FHA includes rubber and thermoplastic constructions, stainless steel braided and convoluted, metallic and non-metallic used on hydrocarbon/hazardous facilities.</p>	<p>The strategy and plan should include:</p> <ul style="list-style-type: none"> • Procurement specification with life cycle consideration. • Transportation, storage and traceability of material, assembly and components. • Maintenance and inspection strategy, with due consideration for criticality and risk assessment. • Change management in dealing with modification or change of service condition. • Integrity is retained during commissioning. • Training and competency requirements. • Awareness of published UKOOA/IP/HSE "Flexible Hose Management Guidelines" 	



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1.2	Are responsibilities / accountabilities adequately defined for management of small bore piping, tubing and flexible hose assembly?	<ul style="list-style-type: none"> Is there a procedure clearly defining the responsibility of inspection, maintenance and testing of these items in the facility Who has the authority to approve modification and selection of non-like-for-like replacement/repair? 	
1.3	Is there a flexible hose assembly (FHA) life cycle management to enable the continuing integrity of FHAs?	The FHA life cycle management should include performance standards, conceptual and detailed design, risk analysis, construction/ installation/commissioning, operations/ maintenance/ inspection/ testing, modification or change of service conditions, and decommissioning.	
2	Field Installation		<input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Tick one (✓)
2.1	Maintenance and Inspection What specific maintenance, operation and inspection procedures are in place for small bore piping, tubing and flexible hose assembly?	Procedures should include: <ul style="list-style-type: none"> All hoses and tubings in critical service applications should be examined on a regular basis, to assess their suitability for continued service. Hoses, tubings and their fittings should be visually examined for physical damage including erosion potential and their support for vibration control Process leakage or seepage from compression 	



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		joints and pipe thread connections	
2.2	<p>Control of risks from vibration Has the operator identified any vibration problem, or considered the potential existence of such a problem?</p>	Vibration induced fatigue should be considered in the risk assessment. The operator should have a structured assessment methodology in place.	
2.3	<p>Assessment of Vibration Does the operator have a structured assessment methodology to identify potential problem areas?</p> <p>Has the identified remedial actions followed a structured assessment?</p> <p>Have these actions been implemented?</p>	<p>Structured assessment should include:</p> <p>1. Divide the facility into manageable systems and for each system identify the excitation mechanisms from:</p> <ul style="list-style-type: none"> • Flow induced turbulence • High frequency acoustic excitation • Mechanical excitation • Pulsation • Transient excitation (fast acting valve) • Pressure surge <p>2. Determine the extent to which any excitation mechanism will cause vibration problems</p> <p>3. If there is likelihood of vibration induced failure, identify contributing factors such as fittings, length of branch, number and sizes of valves, wall thickness and location.</p>	



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2.4	<p>Field Installation practice How is interchange of sub-components prevented?</p> <p>How are fittings inspected prior to installation and on completion?</p> <p>What training/competence assessment has been carried out, and how is work on small bore tubing restricted to competent persons?</p>	<p>The operator should have procedures available to installation personnel who deal with the selection, assembly and inspection of the range of tubing and fittings that they will encounter.</p> <p>It is not permissible to interchange sub-components of different designs or types of fittings</p>	
2.5	<p>Integrity of supporting arrangements</p> <p>Are the supporting arrangements in accordance with specified arrangements? (To be examined for selected systems)</p>	<p>Support should be provided as per manufacturer's instructions to prevent unacceptable stresses on fittings e.g. eliminate sagging and vibration.</p> <p>Valves, gauges etc. should be independently mounted. Expansion loops should be provided as per design. Tube support material should be as per design specification.</p> <p>Small bore piping, tubing and flexible hose assembly should be adequately supported as necessary when connections are being tightened or uncoupled.</p>	



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2.6	<p>Isolation practices and standards</p> <p>Does the isolation procedure address the particular requirements for small bore tubing?</p> <p>How do isolation standards on site compare with recommended practice?</p>	<p>Guidance on isolation for instrumentation is to be documented.</p> <p>A primary isolation valve (piping standard) should be located close to the pipe or vessel, and be to the same standard of pressure integrity.</p> <p>Instruments will generally be provided with local isolation facilities that, together with the primary isolation, can provide a double block and bleed isolation. Drain, vent and test points should be provided with valves to close them off when not in use.</p>	
2.7	<p>FHA selection and operations</p> <p>Are flexible hose assemblies being used in suitable applications?</p> <p>Is there a FHA maintenance and inspection strategy?</p>	<p>FHA should only be used in hazardous duties where permanent piped solutions are not suitable or do not offer a safer alternative solution. Class 5 FHA should be replaced by alternative solution which demonstrates that risks are ALARP</p> <p>FHA should be classified according to the risks of failure, and a complete register of FHA installed at site, including temporary hoses, should be created and kept current. The inspection and replacement frequency should be according to the hose classification.</p>	



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3	Performance measurement		<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Tick one (✓)
3.1	Performance Monitoring How is performance monitored against predetermined criteria? What reviews have been carried out against performance standards?	Operator is to demonstrate this with inspection findings, maintenance records and summary report. The system of pre-operational inspection & punch listing and acceptance process is expected and documented within their work processes. Who reviews the performance (supervisor/facility custodian)?	
3.2	Audit and Review What arrangements are in place to review and audit the small bore piping, tubing and flexible hose assembly? When was the last audit? Have recommendations arising from audits and reviews been implemented?	Covered by company's audit, how frequent?	
3.3	Testing/records/tagging Is there a tag number or unique identification assigned to each FHA?	Each FHA should be identified with a unique identity code and order number on a tag. The fixing of the tag must not promote local corrosion or create a site for chafing or cutting of the hose	



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		surface.	

Legend:

-  - Complies
-  - Partially complies (incomplete system)
-  - Non compliance (major failing – key elements missing)
-  - Not tested / No evidence

(Please send the completed prompt sheets to T3 EA with 3 good practices and 3 practices with deficiencies/major failures)

INSPECTION CARRIED OUT BY

Name: **Signature:**