

Technology Challenge 11: Organic Acid Corrosion Prevention & Mitigation for Carbon Steel Topsides Piping & Equipment

TECHNICAL DATA SPECIFICATION

No.	Parameters	Description
1	GENERAL REQUIREMENT	
	i. Damage Mechanisms	Organic Acid Corrosion
	ii. Protected Asset Material of Construction	Carbon Steel
	iii. Application	New Constructions & Operations
	iv. Business Portfolio	Upstream
	v. Location	Topsides Terminals (optional)
	vi. Corrosion Mitigation / Control Method	Process Fluid Alteration E.g. removal of organic before separation process
	vii. Protected Asset Type	Equipment & Piping system
	viii. Technology Readiness	TRL6 and above
	ix. Process System	Full Well Stream, Wet Gas, Non-Associate Gas
	x. Past Experience	Available
xi. Qualification for piping & equipment	Tested and qualified	
2	SAFETY	
	i. Fire hazard	Safe to be installed at Zone 1 & 2 Requirement for Passive Fire Protection Respondent to declare in the proposal any Fire Rating
	ii. Compliance to Explosion rating	Class 1
iii. Other Hazard (Radiation, Operational)	Respondent to declare in the proposal	
3	OPERATION / MAINTENANCE	
	i. Dimension/size	Equipment: Any Size Piping: Min 1/2", Max 36"
	ii. Design	Rugged and shock proof design
	iii. Degree of Installation Difficulty (low/medium/high)	Respondent to declare in the proposal. Can addressed geometry complexity
	iv. Operation	Manual / Automatic Operation
	v. Maintainability	Low Maintenance
	vi. Maintenance Difficulty	Easy to Medium
	vii. Operating Window	Pressure: Max 3,500 psi Temperature: Min 20 deg C, Max 250 deg C
	viii. Resistance to Water & High Salinity Environment (if applicable)	Respondent to declare in the proposal based on rust rating
ix. Weathering Performance	UV Resistance, Marine Environment	
4	INSPECTION, MONITORING & EFFECTIVENESS	
	i. Solution Effectiveness	Easy to monitor, Automatic or Manual
	ii. Integrity Assessment	Technique available for integrity assessment
iii. Components & Parts Accessibility	Accessibility for inspection especially critical parts & component	
5	COMPETENCIES	
	i. Technical Expert Availability	Available
	ii. Operator/ Operation Manual	Certified
	iii. Maintenance Personnel	Trained
iv. Inspection Procedure / Personnel	Available	

Technology Challenge 11: Organic Acid Corrosion Prevention & Mitigation for Carbon Steel Topside Piping & Equipment

No.	Parameters	Description
6	COMPLIANCE TO INTERNATIONAL STANDARD	
	i. Design	Respondent to declare in the proposal
	ii. Testing	Respondent to declare in the proposal
	iii. Maintenance	Respondent to declare in the proposal
	iv. Repair	Respondent to declare in the proposal

Technology Challenge 11: Organic Acid Corrosion Prevention & Mitigation for Carbon Steel Topside Piping & Equipment

Technology Readiness Level (TRL) DEFINITION:

TRL	Development Stage Completed	Definition of Development Stage
0	Unproven concept (Basic R&D, paper concept)	<ul style="list-style-type: none"> Basic scientific/engineering principles observed and reported; paper concept; no analysis or testing completed; no design history
1	Proven concept (Proof of concept as a paper study or R&D experiment)	<ul style="list-style-type: none"> Technology concept and/or application formulated Concept and functionality proven by analysis or reference to features common with/to existing technology No design history; essentially a paper study not involving physical models but may include R&D experimentation
2	Validated concept (Experimental proof of concept using physical model tests)	<ul style="list-style-type: none"> Concept design or novel features of design is validated by a physical model, a system mockup or dummy of functionally tested in a laboratory environment; no design history; no environmental tests; materials testing and reliability testing is performed on key parts or components in a testing laboratory prior to prototype construction
3	Proto type tested (System function, performance and reliability tested)	<ul style="list-style-type: none"> A) Item prototype is built and put through (generic) functional and performance tests; reliability tests are performed including; reliability growth tests, accelerated life tests and robust design development test program in relevant laboratory testing environments; tests are carried out without integration into a broader system B) The extend to which application requirements are met are assessed and potential benefits and risks are demonstrated
4	Environment tested (Pre-production system environment tested)	<ul style="list-style-type: none"> Meets all the requirements of TRL 3; designed and built as production unit (or full scale prototype) and put through its qualification program in simulated environment (e.g. hyperbaric chamber to simulate pressure) or actual intended environment (e.g. subsea environment) but not installed o operating; reliability testing limited to demonstrating that prototype function and performance criteria can be met in the intended operating condition and external environment

Technology Challenge 11: Organic Acid Corrosion Prevention & Mitigation for Carbon Steel Topside Piping & Equipment

TRL	Development Stage Completed	Definition of Development Stage
5	System tested (Production system interface tested)	<ul style="list-style-type: none"> Meets all the requirements of TRL 4; designed and built as production unit (or full scale prototype) and integrated into intended operating system with full interface and functional test but outside the intended field environment
6	System installed (Production system installed and tested)	<ul style="list-style-type: none"> Meets all the requirements of TRL 5; production unit (or full scale prototype) built and integrated into the intended operating system; full interface and function test program performed in the intended (or closely simulated) environment and operated for less than 3 years; at TRL 6 new technology equipment might require additional support for the first 12 to 18 months
7	Field proven (Production system field proven)	<ul style="list-style-type: none"> Production unit integrated into intended operating system, installed and operating for more than three years with acceptable reliability, demonstrating low risk of early life failure in the field