

DIN EN ISO 24817:2015-12 (E)

Petroleum, petrochemical and natural gas industries - Composite repairs for pipework - Qualification and design, installation, testing and inspection (ISO 24817:2015); English version EN ISO 24817:2015

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols and abbreviated terms	6
4.1 Symbols.....	6
4.2 Abbreviated terms.....	9
5 Applications	9
6 Summary of key issues	11
7 Qualification and design	13
7.1 Repair feasibility assessment.....	13
7.2 Repair class.....	13
7.3 Repair design lifetime.....	14
7.4 Required data.....	15
7.4.1 Background.....	15
7.4.2 Original equipment design data.....	15
7.4.3 Maintenance and operational histories.....	15
7.4.4 Service condition data.....	15
7.4.5 Repair system qualification data.....	15
7.5 Design methodology.....	17
7.5.1 Overview.....	17
7.5.2 Environmental compatibility.....	19
7.5.3 Design temperature effects.....	19
7.5.4 Design based on substrate load sharing (defect type A).....	21
7.5.5 Design based on repair laminate allowable strains (defect type A).....	23
7.5.6 Design based on repair-allowable stresses determined by performance testing (defect type A).....	24
7.5.7 Design of repairs for through-wall defects (defect type B).....	25
7.5.8 Axial extent of repair.....	28
7.5.9 Optional design considerations.....	29
7.5.10 Dent and/or gouge type defects.....	33
7.5.11 Fretting type defects.....	33
7.5.12 Delamination or blister type defects.....	33
7.5.13 Repair of other components.....	34
7.5.14 Design output.....	37
7.6 Re-qualification of the repair system.....	37
7.6.1 Overview.....	37
7.6.2 For type A defect repairs.....	37
7.6.3 For type B defect repairs.....	37

8	Installation	38
8.1	Storage conditions	38
8.2	Documentation prior to repair application	38
	8.2.1 Method statement	38
	8.2.2 Work pack	38
8.3	Installer qualifications	39
8.4	Installation procedure	39
8.5	Repair completion documentation	40
8.6	Live repairs	41
8.7	Repair of clamps, piping components, tanks, or vessels	42
8.8	Environmental considerations	42
9	Testing and inspection	42
9.1	General	42
9.2	Allowable defects for the repair system	43
9.3	Repair of defects within the repair system	46
9.4	Inspection methods	46
9.5	Repair system maintenance and remedial options	46
	9.5.1 Overview	46
	9.5.2 Condition of the repair - visual inspection	46
	9.5.3 Condition of the pipe substrate	47
	9.5.4 Remedial options	47
	9.5.5 Extension (re-validation) of repair design lifetime	47
	9.5.6 Future modifications	48
10	System testing	48
11	Decommissioning	49
	Annex A (normative) Design data sheet	50
	Annex B (normative) Qualification data	53
	Annex C (normative) Short-term pipe spool survival test	57
	Annex D (normative) Measurement of γ_{LCL} for through-wall defect calculation	59
	Annex E (normative) Measurement of performance test data	62
	Annex F (normative) Measurement of impact performance	65
	Annex G (normative) Measurement of the degradation factor	66
	Annex H (informative) Axial extent of repair look-up table	68
	Annex I (normative) Installer qualification	70
	Annex J (informative) Installation requirements and guidance	73
	Annex K (informative) Design considerations	75
	Annex L (informative) Management of the integrity of composite repair systems to pipework and vessels	80
	Bibliography	84