

ISO 24817:2017-08 (E)

Petroleum, petrochemical and natural gas industries - Composite repairs for pipework - Qualification and design, installation, testing and inspection

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	14
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	16
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	30
7.5.10 Dent and/or gouge type defects	34
7.5.11 Fretting type defects	34
7.5.12 Delamination or blister type defects	34
7.5.13 Repair of other components	35
7.5.14 Design output	38
7.6 Re-qualification of the repair system	38
7.6.1 Overview	38
7.6.2 For type A defect repairs	38
7.6.3 For type B defect repairs	38
8 Installation	39
8.1 Storage conditions	39

8.2	Documentation prior to repair application	39
8.2.1	Method statement	39
8.2.2	Work pack	39
8.3	Installer qualifications	40
8.4	Installation procedure	40
8.5	Repair completion documentation	41
8.6	Live repairs	43
8.7	Repair of clamps, piping components, tanks, or vessels	43
8.8	Environmental considerations	43
9	Testing and inspection	43
9.1	General	43
9.2	Allowable defects for the repair system	44
9.3	Repair of defects within the repair system	47
9.4	Inspection methods	48
9.5	Repair system maintenance and remedial options	48
9.5.1	Overview	48
9.5.2	Condition of the repair - visual inspection	48
9.5.3	Condition of the pipe substrate	49
9.5.4	Remedial options	49
9.5.5	Extension (revalidation) of repair design lifetime	49
9.5.6	Future modifications	50
10	System testing	50
11	Decommissioning	51
	Annex A (normative) Design data sheet	52
	Annex B (normative) Qualification data	55
	Annex C (normative) Short-term pipe spool survival test	59
	Annex D (normative) Measurement of LCL for through-wall defect calculation	61
	Annex E (normative) Measurement of performance test data	64
	Annex F (normative) Measurement of impact performance	67
	Annex G (normative) Measurement of the degradation factor	68
	Annex H (informative) Axial extent of repair look-up table	70
	Annex I (normative) Installer qualification	72
	Annex J (informative) Installation requirements and guidance	75
	Annex K (informative) Design considerations	77
	Annex L (informative) Management of the integrity of composite repair systems to pipework and vessels	82
	Bibliography	86