

# E DIN EN ISO 24817:2017-06 (E)

Erscheinungsdatum: 2017-05-05

**Petroleum, petrochemical and natural gas industries - Composite repairs for pipework - Qualification and design, installation, testing and inspection (ISO/FDIS 24817:2017); English version prEN ISO 24817:2017**

---

## Contents

Page

Foreword	v
Introduction	vi
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms and definitions</b>	<b>2</b>
<b>4 Symbols and abbreviated terms</b>	<b>6</b>
4.1 Symbols	6
4.2 Abbreviated terms	9
<b>5 Applications</b>	<b>9</b>
<b>6 Summary of key issues</b>	<b>11</b>
<b>7 Qualification and design</b>	<b>13</b>
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
<b>8 Installation</b>	<b>39</b>
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
<b>9</b>	<b>Testing and inspection.....</b>	<b>43</b>
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
<b>10</b>	<b>System testing.....</b>	<b>50</b>
<b>11</b>	<b>Decommissioning.....</b>	<b>51</b>
	<b>Annex A (normative) Design data sheet.....</b>	<b>52</b>
	<b>Annex B (normative) Qualification data.....</b>	<b>55</b>
	<b>Annex C (normative) Short-term pipe spool survival test.....</b>	<b>59</b>
	<b>Annex D (normative) Measurement of <math>\gamma_{LCL}</math> for through-wall defect calculation.....</b>	<b>61</b>
	<b>Annex E (normative) Measurement of performance test data.....</b>	<b>64</b>
	<b>Annex F (normative) Measurement of impact performance.....</b>	<b>67</b>
	<b>Annex G (normative) Measurement of the degradation factor.....</b>	<b>68</b>
	<b>Annex H (informative) Axial extent of repair look-up table.....</b>	<b>70</b>
	<b>Annex I (normative) Installer qualification.....</b>	<b>72</b>
	<b>Annex J (informative) Installation requirements and guidance.....</b>	<b>75</b>
	<b>Annex K (informative) Design considerations.....</b>	<b>77</b>
	<b>Annex L (informative) Management of the integrity of composite repair systems to pipework and vessels.....</b>	<b>82</b>
	<b>Bibliography.....</b>	<b>86</b>