

# DIN EN ISO 21809-1:2020-09 (E)

## Petroleum and natural gas industries - External coatings for buried or submerged pipelines used in pipeline transportation systems - Part 1: Polyolefin coatings (3-layer PE and 3-layer PP) (ISO 21809-1:2018)

---

<b>Contents</b>		<b>Page</b>
	European foreword .....	4
	Foreword .....	5
	Introduction .....	6
<b>1</b>	<b>Scope</b> .....	<b>7</b>
<b>2</b>	<b>Normative references</b> .....	<b>7</b>
<b>3</b>	<b>Terms and definitions</b> .....	<b>9</b>
<b>4</b>	<b>Conformance</b> .....	<b>12</b>
	4.1 Rounding .....	12
	4.2 Compliance with this document .....	12
<b>5</b>	<b>Symbols and abbreviated terms</b> .....	<b>12</b>
	5.1 Symbols .....	12
	5.2 Abbreviations .....	13
<b>6</b>	<b>Information supplied by the purchaser</b> .....	<b>13</b>
	6.1 General information .....	13
	6.2 Additional information .....	14
<b>7</b>	<b>Coating classification</b> .....	<b>15</b>
	7.1 General .....	15
	7.2 Coating classes .....	15
	7.3 Coating thickness classes .....	15
<b>8</b>	<b>Qualification processes</b> .....	<b>16</b>
	8.1 General — Qualification scheme .....	16
	8.2 Application procedure specification .....	17
	8.3 Pre-production trial (PPT) .....	18
	8.4 Inspection and testing plan (ITP) .....	18
	8.5 Procedure qualification trial (PQT) .....	19
<b>9</b>	<b>Coating material qualification</b> .....	<b>19</b>
	9.1 Composition of the coating system .....	19
	9.2 Qualification of the coating materials .....	20
	9.2.1 General requirements .....	20
	9.2.2 Epoxy material .....	20
	9.2.3 Adhesive material .....	21
	9.2.4 PE/PP top layer material .....	21
	9.3 Batch certificate .....	23
	9.4 Storage and handling of coating materials .....	24
<b>10</b>	<b>Coating system qualification</b> .....	<b>24</b>
<b>11</b>	<b>Application of the coating system</b> .....	<b>25</b>
	11.1 General .....	25
	11.2 Surface preparation .....	26
	11.2.1 Initial preparation .....	26
	11.2.2 Abrasive blast cleaning — Cleanliness and surface roughness .....	26
	11.2.3 Surface dust contamination .....	26
	11.2.4 Surface pre-treatment and salt contamination .....	27
	11.3 Coating application .....	27
	11.3.1 General .....	27

11.3.2	Epoxy application.....	27
11.3.3	Adhesive application.....	27
11.3.4	PE/PP application.....	28
11.3.5	Rough coat application.....	28
11.4	Cutback.....	28
<b>12</b>	<b>Inspection and testing</b> .....	<b>28</b>
12.1	General.....	28
12.2	Re-testing.....	31
<b>13</b>	<b>Coating repairs</b> .....	<b>31</b>
<b>14</b>	<b>Marking</b> .....	<b>31</b>
14.1	General.....	31
14.2	Required markings.....	32
<b>15</b>	<b>Handling and storage in the applicator's facilities</b> .....	<b>32</b>
15.1	Handling.....	32
15.2	Storage.....	32
<b>16</b>	<b>Test reports and certificate of compliance</b> .....	<b>32</b>
<b>Annex A</b>	<b>(normative) Inspection of thickness</b> .....	<b>33</b>
<b>Annex B</b>	<b>(normative) Holiday detection test</b> .....	<b>35</b>
<b>Annex C</b>	<b>(normative) Peel strength test</b> .....	<b>37</b>
<b>Annex D</b>	<b>(normative) Thermal analysis of epoxy and cured epoxy coating film with <math>T_g \leq 115^\circ\text{C}</math></b> .....	<b>40</b>
<b>Annex E</b>	<b>(normative) Impact test</b> .....	<b>45</b>
<b>Annex F</b>	<b>(normative) Indentation test</b> .....	<b>47</b>
<b>Annex G</b>	<b>(normative) UV ageing test and thermal ageing test</b> .....	<b>48</b>
<b>Annex H</b>	<b>(normative) Cathodic disbondment test</b> .....	<b>52</b>
<b>Annex I</b>	<b>(normative) Flexibility test</b> .....	<b>57</b>
<b>Annex J</b>	<b>(normative) Gel time of the epoxy powder</b> .....	<b>59</b>
<b>Annex K</b>	<b>(normative) Total volatile/moisture content of the epoxy powder — Mass loss</b> .....	<b>61</b>
<b>Annex L</b>	<b>(normative) Hot water immersion test</b> .....	<b>63</b>
<b>Annex M</b>	<b>(normative) Density of epoxy powder</b> .....	<b>65</b>
	<b>Bibliography</b> .....	<b>67</b>