

# ISO 15551:2023-09 (E)

## Petroleum and natural gas industries - Drilling and production equipment - Electric submersible pump systems for artificial lift

---

<b>Contents</b>		<b>Page</b>
Foreword.....		vi
<b>1</b>	<b>Scope</b> .....	<b>1</b>
<b>2</b>	<b>Normative references</b> .....	<b>1</b>
<b>3</b>	<b>Terms and definitions</b> .....	<b>2</b>
<b>4</b>	<b>Symbols and abbreviated terms</b> .....	<b>16</b>
<b>5</b>	<b>Functional specification</b> .....	<b>18</b>
5.1	General.....	18
5.2	Component type.....	19
5.3	Functional requirements.....	19
5.3.1	General.....	19
5.3.2	Application parameters.....	19
5.3.3	Environmental compatibility.....	21
5.3.4	Compatibility with related well equipment and services.....	22
5.4	User/purchaser selections.....	23
5.4.1	General.....	23
5.4.2	Design validation.....	23
5.4.3	Component functional evaluation.....	23
5.4.4	Quality grades.....	24
5.4.5	Shipping, handling and storage.....	24
5.4.6	Operator's manual.....	24
5.4.7	Subcomponent condition classifications in manufacture of components.....	24
5.4.8	Additional documentation.....	24
<b>6</b>	<b>Technical specification</b> .....	<b>24</b>
6.1	General.....	24
6.2	Design criteria.....	25
6.2.1	General.....	25
6.2.2	Design documentation.....	25
6.2.3	Materials.....	25
6.2.4	Dimensional information.....	29
6.2.5	Component and assembled system design verification.....	29
6.2.6	Component design validation.....	29
6.2.7	Component functional evaluation requirements.....	29
6.2.8	Assembled system functional evaluation.....	29
6.2.9	Design changes.....	30
6.3	Technical specification — All components.....	30
6.3.1	Technical characteristics.....	30
6.3.2	Performance rating.....	30
6.4	Technical specification — Bolt-on discharge.....	30
6.4.1	General.....	30
6.4.2	Technical characteristics for the discharge.....	30
6.4.3	Performance ratings.....	31
6.4.4	Scaling of design validation.....	31
6.5	Technical specification — Pump and gas handler.....	31
6.5.1	General.....	31
6.5.2	Technical characteristics for the pump and gas handler.....	31
6.5.3	Performance ratings.....	31
6.5.4	Scaling of design validation.....	31

6.6	Technical specification — Bolt-on intake.....	31
6.6.1	General.....	31
6.6.2	Technical characteristics for the bolt-on intake.....	32
6.6.3	Performance ratings.....	32
6.6.4	Scaling of design validation.....	32
6.7	Technical specification — Mechanical gas separators.....	32
6.7.1	General.....	32
6.7.2	Technical characteristics.....	32
6.7.3	Performance ratings.....	32
6.7.4	Scaling of design validation.....	32
6.8	Technical specification — Seal chamber sections.....	32
6.8.1	General.....	32
6.8.2	Technical characteristics.....	32
6.8.3	Performance ratings.....	33
6.8.4	Scaling of design validation.....	33
6.9	Technical specification — Motors.....	33
6.9.1	General.....	33
6.9.2	Technical characteristics.....	33
6.9.3	Performance ratings.....	33
6.9.4	Scaling of design validation.....	34
6.10	Technical specifications — Power and motor lead extension cable.....	34
6.10.1	General.....	34
6.10.2	Technical characteristics.....	34
6.10.3	Performance ratings.....	34
6.10.4	Scaling of design validation.....	34
6.11	Technical specifications — Pothead.....	34
6.11.1	General.....	34
6.11.2	Technical characteristics.....	34
6.11.3	Performance ratings.....	35
6.11.4	Scaling of design validation.....	35
6.12	Assembled ESP system – Additional requirements.....	35
6.12.1	General.....	35
6.12.2	Technical characteristics.....	35
6.12.3	System capabilities.....	35
6.13	Technical specification response guideline – ESP components.....	36
	<b>Supplier's/mannufacturer's requirements.....</b>	<b>37</b>
7.1	General.....	37
7.2	Documented information.....	37
7.2.1	General.....	37
7.2.2	Delivery documentation.....	37
7.2.3	Operator's manual.....	38
7.2.4	Certificate of conformance.....	38
7.2.5	Component data sheet.....	38
7.3	Component identification.....	42
7.3.1	Permanent identification.....	42
7.3.2	Semi-permanent identification.....	42
7.4	Quality.....	42
7.4.1	General.....	42
7.4.2	Quality grade requirements.....	42
7.5	Raw materials.....	44
7.6	Additional processes applied to components.....	44
7.6.1	Documentation.....	44
7.6.2	Coatings and surface treatments.....	44
7.6.3	Welding.....	44
7.7	Traceability.....	45
7.8	Calibration systems.....	45
7.9	Examination and inspection.....	45
7.9.1	General.....	45
7.9.2	Weld.....	46
7.9.3	Component and subcomponent dimensional inspection.....	46
7.9.4	Construction features.....	48
7.10	Manufacturing non-conformance.....	48
7.11	Component functional testing.....	48

<b>8</b>	<b>Shipping, handling and storage</b> .....	<b>48</b>
8.1	General.....	48
8.2	Storage.....	49
<b>9</b>	<b>Subcomponent condition classifications in manufacture of components</b> .....	<b>49</b>
<b>Annex A</b>	<b>(normative) Design validation performance rating requirements by component</b> .....	<b>50</b>
<b>Annex B</b>	<b>(normative) Requirements for determining performance capabilities as an assembled system</b> .....	<b>80</b>
<b>Annex C</b>	<b>(normative) Functional evaluation: single component</b> .....	<b>83</b>
<b>Annex D</b>	<b>(normative) Cable reference information</b> .....	<b>91</b>
<b>Annex E</b>	<b>(informative) Functional evaluation guideline — Assembled ESP system</b> .....	<b>98</b>
<b>Annex F</b>	<b>(informative) Establishing recommended operating range of ESP system</b> .....	<b>103</b>
<b>Annex G</b>	<b>(informative) Example of user's/purchaser's ESP functional specification form</b> .....	<b>105</b>
<b>Annex H</b>	<b>(informative) Considerations for use of three-phase low and medium voltage adjustable speed drives for ESP applications</b> .....	<b>109</b>
<b>Annex I</b>	<b>(informative) Analysis after ESP use</b> .....	<b>115</b>
<b>Annex J</b>	<b>(informative) Downhole monitoring of ESP assembly</b> .....	<b>127</b>
<b>Annex K</b>	<b>(informative) Information on permanent magnet motors for ESP applications</b> .....	<b>129</b>
<b>Annex L</b>	<b>(informative) User guide</b> .....	<b>131</b>
<b>Bibliography</b>	.....	<b>135</b>