

PACKAGED RECIPROCATING COMPRESSORS API 11P 3RD EDITION DATA SHEET	Section 4 General			JOB NO.		ITEM NO.		
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	4.1	Purchaser	The purchaser shall specify whether data, drawings, and dimensions shall be in the U.S. customary (USC) or SI system of measurements.	<input type="checkbox"/> U.S. Customary Units <input type="checkbox"/> SI Units	
2	4.2	Purchaser	The purchaser shall specify any language requirements other than English	<input type="checkbox"/> Other:	
3	4.3	Purchaser and Packager	The purchaser and the packager shall determine the measures to be taken to comply with any governmental codes, regulations, ordinances, or rules that are applicable to the equipment, its packaging and preservation.		
4	4.4	Purchaser	The purchaser shall specify any package content needed to facilitate emission compliance. Emissions sources during various operating modes to be considered may include:		
5			a) Engine exhaust		
6			b) Engine crankcase vent		
7			c) Engine starter exhaust		
8			d) Compressor packing vents and drains		
9			e) Compressor crankcase vent		
10			f) Blowdown valve		
11			g) Valve actuator vents		
12			h) Controller vents		
13			i) Scrubber drains		
14			j) Blowcase vents		
14			k) Leaks		
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PACKAGED RECIPROCATING COMPRESSORS API 11P 3RD EDITION DATA SHEET	Section 5 Requirements				JOB NO.		ITEM NO.		
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	5.1	Purchaser	a) Required compressor capacity (operating point and range)		
2			b) Process gas analysis (attach to datasheets)		
3			c) Souders-Brown constant (K) (reference paragraph 13.4.14 and Annex L.7)		
4			d) Suction pressure (operating point and range)		
5			e) Suction temperature (operating point and range)		
6			f) Discharge pressure (operating point and range)		
7			g) Process gas aftercooler discharge temperature (minimum and maximum)		
8			h) Driver type	<input type="checkbox"/> Gas engine <input type="checkbox"/> Electric motor <input type="checkbox"/> Other:	
9			i) Available fuel gas composition, pressure, temperature, and flow rates		
10			j) Available start gas composition, pressure, temperature, and flow rates		
11			k) Preferred cooler type and approach temperature		
12			l) Installation site location		
13			m) Installation site elevation		
14			n) Installation site ambient temperature, min and max	Maximum ambient temperature = Minimum ambient temperature =	
15			o) Minimum design metal temperature (MDMT)	MDMT =	
16			p) Corrosion Allowance	<input type="checkbox"/> 1/8 inch (3.2mm) <input type="checkbox"/> 1/16 inch (1.6 mm) <input type="checkbox"/> Other:	
17			q) Any wind, seismic or snow load requirements		
18			r) Available installation site utilities		
19			s) Electric power available, including source, voltage, phase, frequency, and short circuit current.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
20	5.1	Purchaser	t) Media available for starting, instruments and controls; air, process gas or other	<input type="checkbox"/> Air <input type="checkbox"/> Process gas <input type="checkbox"/> Other:	
21			u) Available media pressure and flowrate for instruments and controls	Pressure = Flowrate =	
22			v) Desired or preferred capacity control method(s)		
24			w) Package installed in a building	<input type="checkbox"/> Yes, <input type="checkbox"/> No	
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	6.6.1	Purchaser	The purchaser shall specify any additional limits on the rod load.		
2	6.8.16	Purchaser or Manufacturer	Non-metallic wear bands, if required by the manufacturer or specified by the purchaser, shall not overrun valve ports or counter-bores by more than one-half the axial width of the wear band.	<input type="checkbox"/> Yes, wearbands are required	
3	6.8.19	Purchaser	Unless otherwise specified, coated piston rods are not required.	<input type="checkbox"/> Yes, required	
4	6.9.1	Purchaser	The purchaser shall specify the distance piece type.	<input type="checkbox"/> Type 0 <input type="checkbox"/> Type 1 <input type="checkbox"/> Type 2 <input type="checkbox"/> Type 3	
5	6.10	Purchaser	Unless otherwise specified, compressor crankcase over-pressure relief devices are not required.	<input type="checkbox"/> Yes, required	
6	6.12.5	Purchaser	Unless otherwise specified, a strainer upstream of the pre-lube pump is not required.	<input type="checkbox"/> Yes, required	
7	6.12.9	Purchaser	Unless otherwise specified, a lubricant storage tank with level gage is not required.	<input type="checkbox"/> Yes, required	
8	6.12.9	Purchaser	Unless otherwise specified, the storage tank shall have a minimum 30-day capacity.	<input type="checkbox"/> 30-day capacity <input type="checkbox"/> Other:	
9	6.12.10	Purchaser	Unless otherwise specified by the purchaser, the packager shall provide fire safety valves designed to fail closed and shut off the oil supply from the storage tank and crankcase inlet.	<input type="checkbox"/> Not required	
10	6.12.11	Purchaser	Unless otherwise specified, a lube oil heater is not required.	<input type="checkbox"/> Yes, required	
11	6.13.1	Purchaser	Unless otherwise specified, a consumption meter is not required.	<input type="checkbox"/> Yes, required	
12	6.13.2	Purchaser	Unless otherwise specified, a lubricant storage tank with level gauge is not required.	<input type="checkbox"/> Yes, required	
13	6.13.2	Purchaser or Packager	Unless otherwise specified, the storage tank shall have a minimum 30-day capacity.	<input type="checkbox"/> 30-day capacity <input type="checkbox"/> Other:	

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
14	6.14.1	Purchaser	Unless otherwise specified, materials of construction shall be the compressor manufacturer's standard for the specified process conditions and shall be stated in the proposal.		
15	6.14.11	Purchaser	Unless otherwise specified, material certificates are not required.	<input type="checkbox"/> Yes, material certificates are required	
16	6.14.12	Purchaser	When non-destructive testing is specified	<input type="checkbox"/> Yes, required Specifics:	
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	7.1	Purchaser	The purchaser shall specify any excess power requirements.	<input type="checkbox"/> None <input type="checkbox"/> Yes, specifics:	
2	7.2	Packager	The packager shall specify undesirable operating speeds that result from adverse torsional or acoustic study outcomes.		
3	7.3	Purchaser	Electric, air, gas or other starting systems for the engine driver shall be specified by the purchaser.	<input type="checkbox"/> Electric <input type="checkbox"/> Process gas <input type="checkbox"/> Air <input type="checkbox"/> Other:	
4	7.4.1	Purchaser	Unless otherwise specified, the engine manufacturer's standard intake air filter, suitable for outdoor service, shall be provided.		
5	7.6	Purchaser	Unless otherwise specified, certification of ignition system compliance to applicable hazardous locations codes is not required.	<input type="checkbox"/> Yes, certificate of compliance is required	
6	7.7.1	Purchaser or Packager	Engines shall be equipped with the engine manufacturer's standard lube oil system unless otherwise specified.		
7	7.8	Purchaser	Unless otherwise specified, crankcase over-pressure relief devices are not required to be furnished on the engine crankcase.	<input type="checkbox"/> Yes, furnish	
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	8.1	Purchaser	The purchaser shall specify the motor description including:	Voltage =	
2			a) Available supply voltage and frequency	Frequency =	
3			b) Starting conditions and method		
4			c) Type of enclosure		
5			d) Area classification including the temperature code rating and gas group	Temperature code =	
6			e) Type of insulation	Gas group =	
7			f) Service factor	Insulation =	
			g) Required accessories such as temperature detectors, vibration sensors, heaters, and instrumentation	<input type="checkbox"/> Temperature detectors required <input type="checkbox"/> Vibration sensor required <input type="checkbox"/> Heater required <input type="checkbox"/> Instrumentation required =	
8	8.2	Purchaser	Unless otherwise specified by the purchaser, the design of the motor shall conform to NFPA 70 and NEMA MG-1 specifications	<input type="checkbox"/> No, motor shall be according to:	
9	8.4	Purchaser	Unless otherwise specified, shaft grounding devices are not required.	<input type="checkbox"/> Shaft grounding is required	
10	8.6	Purchaser	When specified for tropical locations, the insulation material shall be given the following treatments:		
11			a) All parts (such as coils and windings) shall be protected against fungus attack	<input type="checkbox"/> Yes, required	
			b) Unpainted ferrous metal surfaces shall be protected against corrosion by plating or other suitable coating.	<input type="checkbox"/> Yes, required	
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PACKAGED RECIPROCATING COMPRESSORS API 11P 3RD EDITION DATA SHEET	Section 9 Main Drive Couplings and Guards			JOB NO.		ITEM NO.		
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	9.1.1	Purchaser	Unless otherwise specified, the coupling shall be a torsionally rigid, disc-pack type. With approval of the purchaser other coupling types may be used.	<input type="checkbox"/> Purchaser grants approval for another coupling type	
2	9.2.4	Purchaser	Guards shall be constructed of steel, brass, aluminum, or non-metallic (polymer) materials. If specified, non-sparking guards of agreed material shall be supplied	<input type="checkbox"/> Steel <input type="checkbox"/> Brass <input type="checkbox"/> Aluminum <input type="checkbox"/> Non-metallic <input type="checkbox"/> Other:	
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PACKAGED RECIPROCATING COMPRESSORS API 11P 3RD EDITION DATA SHEET	Section 10 Air Cooled Heat Exchangers			JOB NO.		ITEM NO.		
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	10.2	Purchaser or Packager	<p>The following air-cooler application design parameters shall be specified by the purchaser and/or packager as a minimum.</p> <p>NOTE: Annex S provides typical default values that may be used where required design parameters have not been specified.</p> <p>a) Compressor performance calculations at the specified design conditions. Where varying conditions are specified, the extents of the operating range shall be provided, considering suction pressures, discharge pressures, inlet gas temperatures, and gas compositions [reference 5.1 b)]</p>		
2			b) Maximum design inlet air temperature at air-cooler	Maximum design inlet air temperature at air-cooler =	
3			c) Minimum design inlet air temperature at air-cooler	Minimum design inlet air temperature at air-cooler =	
4			d) Site altitude [reference 5.1 m)]	Site altitude =	
5			e) Each gas interstage cooler (IC) tube bundle maximum design outlet temperature or maximum design approach temperature		
6			f) Final stage gas aftercooler (AC) tube bundle maximum design outlet temperature or maximum design approach temperature		
7			g) Minimum IC and/or AC gas tube bundle outlet temperatures		
8			h) Gas outlet temperature control design (manually actuated louvers, automatic pneumatic or electric actuated louvers, warm air recirculation system, variable speed fan, etc.)		
9			i) Maximum allowable working pressure (MAWP) for gas tube bundle(s)		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
10	10.2	Purchaser or Packager	j) Maximum allowable fan parasitic horsepower for engine-driven fans	Maximum allowable fan parasitic horsepower for engine-driven fans =	
11			k) Fan sound level limits, if specified		
12			l) Fan tip speed limit, where applicable	Fan tip speed limit =	
13			m) Fan air flow draft of forced-draft (fan on cold air-side of tube bundles) or induced-draft (fan on warm air-side of tube bundles)		
14			n) Any specification for gas cooler tube bundle tube materials of construction, where applicable		
15			o) Any specification for gas cooler tube bundle header materials of construction, where applicable		
16			p) Any specification for gas cooler tube bundle header minimum corrosion allowance and/or non-destructive examination (NDE) above ASME Section VIII Division 1 requirements, where applicable		
17			q) Engine and/or compressor coolant type and percentage composition	Coolant type = Coolant composition =	
18			r) Packager shall specify the process gas tube bundle nozzle locations and/or orientations, when predetermined.		
19	s) Any dimensional limits for transportation and/or installation, where applicable				
20	10.3.2	Purchaser	Unless otherwise specified, maximum allowable pressure drops for gas cooler tube bundles shall be as specified in Table 3.		
21	10.3.4	Purchaser or Packager	Purchaser or packager to specify if gas cooler tube bundles shall be registered with the National Board of Boiler and Pressure Vessel Inspectors.	<input type="checkbox"/> Yes, registration is required	

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
22	10.3.5	Purchaser or Packager	Maximum allowable working pressure (MAWP), maximum design metal temperature and minimum design metal temperature (MDMT) of each gas cooler bundle, shall be as follows, unless otherwise specified: a) MAWP shall be the greater of 10% or (345 kpa (50 psi) above the maximum specified operating pressure		
23	10.3.5	Purchaser or Packager	b) Maximum design temperature shall be 176.6 °C (350°F)		
24			c) Minimum design metal temperature (MDMT) shall be -28.8 °C (-20 °F)		
25	10.3.8	Purchaser or Packager	When required, purchaser or packager shall specify if direct air to compressor oil cooling tube bundle is to be installed in the main air-cooler, or if a separate air-cooler for oil cooling service is required.	<input type="checkbox"/> Compressor frame oil cooler in main air-cooler <input type="checkbox"/> Separate compressor frame oil air cooler required	
26	10.3.10	Purchaser or Packager	Unless otherwise specified by the purchaser or packager, the minimum fouling factor on tube bundles shall be as specified in Table 4.	<input type="checkbox"/> No, minimum fouling factor shall be:	
27	10.4.3	Purchaser	Other exterior exposed fan drive system moving parts that require safety guarding shall be by this API 11P standard or by prevailing Occupational Safety and Health Administration (OSHA) standards, unless otherwise specified by purchaser.		
28	10.4.4	Purchaser or Packager	Purchaser or packager to specify if louvers are manually or automatically controlled with either pneumatic (air) or electric actuators and if louvers on cold air-side of tube bundles are required.	<input type="checkbox"/> Manual louvers <input type="checkbox"/> Automated louvers with air actuators <input type="checkbox"/> Automated louvers with electric actuators <input type="checkbox"/> Louvers on cold air side are required	
29	10.4.4	Purchaser or Packager	Purchaser or packager to specify any preference for the elevation of manual louver operators in relation to bottom of air-cooler.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
30	10.4.4	Purchaser or Packager	Purchaser or packager to specify any preference for auto louver air or electric actuator locations and accessibility requirements.		
31	10.4.5	Purchaser or Packager	Unless otherwise specified, inlet screens and/or discharge hail guards are not required.	<input type="checkbox"/> Inlet screens are required <input type="checkbox"/> Discharge hail guards are required	
32	10.4.9	Purchaser or Packager	Unless otherwise specified, a self-actuating braking device is not required to prevent reverse rotation of an idle motor-driven fan.	<input type="checkbox"/> Self-actuating braking device is required	
33	10.5.1	Purchaser or Packager	Purchaser or packager shall specify:	Voltage =	
34			a) voltage and frequency	Frequency =	
35			b) applicable motor specification		
36			c) hazardous area classification		
37			d) temperature classification		
			e) insulation class		
38	10.5.3	Purchaser or Packager	NEMA motors shall be utilized with frames of cast steel or cast iron construction with integrally cast support feet, unless specified otherwise.		
39	10.5.5	Packager	Unless otherwise specified, fan motor space heaters are not required.	<input type="checkbox"/> Yes, space heater(s) required	
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	11.1	Purchaser	Unless otherwise specified, the skid shall be designed to accommodate the compressor, driver, vessels, piping, cooler, control panel and all other equipment included in a complete compressor package.		
2	11.2	Purchaser	The purchaser shall specify the intended foundation type for the compressor package and any off-skid equipment		
3	11.3	Purchaser or Packager	Unless otherwise specified, the packager shall provide pad eyes or trunnions suitable to permit hoisting of the skid.	<input type="checkbox"/> Pad-eyes or trunnions are not required	
4	11.3	Purchaser or Packager	Unless otherwise specified, an engineered lift study and/or lift drawing is not required to be provided by the packager.	<input type="checkbox"/> Yes, lift study is required <input type="checkbox"/> Yes, lift drawing is required	
5	11.4	Purchaser	Unless otherwise specified, the skid shall have a minimum of two full-length main runner beams parallel to the crankshaft.		
6	11.5.3.6	Purchaser	Unless otherwise specified, epoxy grout shall be used for machines mounted on concrete foundations.		
7	11.6.1	Purchaser	Unless otherwise specified the package anchor bolts shall be provided by the purchaser.	<input type="checkbox"/> Package anchor bolts provided by the packager	
8	11.6.2	Purchaser	Unless otherwise specified, levelling plates are not required.	<input type="checkbox"/> Yes, levelling plates are required	
9	11.9	Purchaser	Unless otherwise specified, the skid shall be furnished with a drip-lip adequate for preventing leakage of fluid off the skid and shall be furnished with a 38 mm (1½ in.) NPT or larger drain connection in each corner.	<input type="checkbox"/> Drip-lip is not required	
10	11.10	Purchaser	Unless otherwise specified, grout access ports with covers are not required.	<input type="checkbox"/> Yes, grout access ports with covers are required	
11	11.14	Purchaser or Packager	Unless otherwise agreed, skids shall have members located at discharge bottle support locations.		
12	11.16	Purchaser	Unless otherwise specified by the purchaser, concrete shall be poured into the skid in the packager's shop.	<input type="checkbox"/> Concrete shall not be poured in packager's shop	

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BALLOT DRAFT

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	12.2.1	Purchaser	The purchaser shall specify whether the capacity control system is to be manual or automated.	<input type="checkbox"/> Manual <input type="checkbox"/> Automated	
2	12.2.1	Purchaser	The purchaser may specify a preferred capacity control method and control parameters.		
3	12.2.2	Purchaser	Unless otherwise specified by the purchaser, valve clearance spacers are acceptable.	<input type="checkbox"/> Valve clearance spacers are not acceptable	
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BALLOT DRAFT

PACKAGED RECIPROCATING COMPRESSORS API 11P 3RD EDITION DATA SHEET	Section 13 Pressure Vessels			JOB NO.		ITEM NO.		
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	13.1.1	Purchaser	Unless otherwise specified, the governing pressure vessel code shall be the ASME Boiler and Pressure Vessel Code (BPVC) Section VIII.		
2	13.1.2	Purchaser	Unless otherwise specified, pressure vessels are not required to be registered with the National Board of Boiler and Pressure Vessel Inspectors.	<input type="checkbox"/> Yes, registration is required	
3	13.1.3	Purchaser	Unless otherwise specified, vessels are not required to be designed to withstand a wind load in conformance with ASCE 07.	<input type="checkbox"/> Yes, vessels are required to conform to ASCE 07	
4	13.2.1	Packager	The packager shall specify in the proposal, the size and maximum working pressure of all vessels.		
5	13.2.1	Purchaser	Unless otherwise specified, the following list provides the design pressure and temperatures of each vessel:		
6			a) Maximum design temperature for discharge vessels shall be 177 °C (350 °F)	<input type="checkbox"/> Yes, this is acceptable <input type="checkbox"/> No, shall be =	
7			b) Maximum design temperature for scrubbers and suction vessels shall be 93 °C (200 °F)	<input type="checkbox"/> Yes, this is acceptable <input type="checkbox"/> No, shall be =	
8			c) Minimum design temperature for all vessels shall be -29 °C (-20 °F)	<input type="checkbox"/> Yes, this is acceptable <input type="checkbox"/> No, shall be =	
9			d) MAWP for any vessel shall be at least the greater of 10% (gauge) or 3.45 bar (50 psi) higher than the highest expected operating pressure for the particular vessel and the system settle out pressure where applicable	<input type="checkbox"/> No, shall be =	
10	13.2.2	Purchaser	Purchaser shall specify any requirements for a corrosion allowance or corrosion-resistant material for pressure vessels.	<input type="checkbox"/> Corrosion allowance = <input type="checkbox"/> Corrosion resistant material, specifics:	

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
11	13.2.5	Purchaser	Vertical vessels shall be designed to avoid mechanical resonance. Unless otherwise specified:		
12			a) Skirt wall thickness shall match the shell thickness unless calculations supporting a lesser thickness are approved by the purchaser.		
13			b) Support legs shall not be used unless approved by the purchaser.	<input type="checkbox"/> Support legs are acceptable	
14			c) The skirt shall have an access opening to accommodate any service or maintenance.	<input type="checkbox"/> Access opening not required	
15			d) When not welded to the skid a minimum of four anchor bolts shall be used.		
16			e) Anchor bolts shall be a minimum 19 mm (3/4-in.) diameter.		
17	13.2.6	Purchaser	Unless otherwise specified, vessel openings shall conform to the following:		
18			a) Slip-on flanges may only be used with purchaser approval.	<input type="checkbox"/> Slip-on flanges are acceptable	
19			b) If used, slip-on flanges shall have full internal and external fillet welds.		
20			c) Blind flange manways shall be complete with bolting, gaskets, davits, or hinges.		
21			d) Nozzle sizes NPS 1-1/4, 2-1/2, 3-1/2, and 5 shall not be used.	<input type="checkbox"/> These nozzle sizes are acceptable	
22			e) All connections larger than NPS 2, shall be of flanged and welded construction.		
			f) Cast fittings shall not be used for threaded connections.	<input type="checkbox"/> Cast fittings are acceptable for threaded connections	

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
23	13.2.6	Purchaser	g) Threaded connections NPS 1 and larger shall have a minimum Class 6000 rating and NPS ¾ and smaller shall have a Class 3000 minimum rating.		
24			h) Flange projection shall be sufficient for maintenance and, where appropriate, insulation.		
25			i) Reinforcing pads, where used, shall be a minimum of 50 mm (2 in.) wide, with a minimum thickness of 9.5 mm (3/8 in.).		
26	13.4.3	Purchaser	Unless otherwise specified, scrubbers shall not be designed for upstream bulk liquid capacity.		
27	13.4.6	Packager	The packager shall specify the demister type used for each scrubber.		
28	13.4.13	Purchaser	Unless otherwise specified, mesh pads shall have a minimum thickness of 102 mm (4 in.) and a minimum mesh density of 144 kg/m ³ (9 lbs/ft ³)		
29	13.4.15	Purchaser	When specified the packager shall provide scrubber process design calculations for the purchaser's review and approval.	<input type="checkbox"/> Scrubber process design calculations are required	
30	13.5.1	Purchaser	Unless otherwise specified, pulsation bottle cylinder connection nozzles are not required to be fabricated using long weld neck flanges.	<input type="checkbox"/> Long weld neck flanges are required	
31	13.5.2	Purchaser	Unless otherwise specified by a mechanical analysis or the purchaser, all weld neck or long weld neck bottle nozzles shall have reinforcing pads which shall extend a minimum of 50 mm (2 in.) radially beyond the nozzle.		
32	13.5.5	Purchaser	Unless otherwise agreed by the purchaser, baffles shall be cut from a spherical or 2:1 elliptical head.		
33	13.5.8	Purchaser	Unless otherwise specified, test ports are not required.	<input type="checkbox"/> Test ports are required	

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
34	13.5.11	Purchaser or Packager	Unless specified by the pulsation study, when pulsation bottles are not used, the minimum piping diameter to and/or from the compressor cylinders shall be at least equal to the diameter of the compressor cylinder flanges.		
35	13.5.13	Purchaser	Unless otherwise specified, vessels are not required to be designed to accommodate insulation and/or guarding of hot metal surfaces.	<input type="checkbox"/> Vessels are to be designed to accommodate insulation and/or guarding	
36	13.5.14	Purchaser	Unless otherwise specified, lifting eyes are not required on pulsation bottles.	<input type="checkbox"/> Yes, lifting eyes are required	
37	13.6.1	Purchaser	Unless otherwise specified, threaded connections shall not be seal welded.	<input type="checkbox"/> Yes, threaded connections shall be seal welded	
38	13.6.4	Packager	Unless otherwise determined by the pulsation study, choke tube support tabs shall be 13 mm (½ in.) minimum thickness.		
39	13.6.7	Purchaser	Unless otherwise specified, pulsation bottles are not required to be stress relieved when not required by the applicable pressure vessel code.	<input type="checkbox"/> Yes, bottles shall be stress relieved	
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	14.1	Purchaser	Unless otherwise specified, gas piping design, fabrication, inspection, and testing shall be in accordance with ASME B31.3.	<input type="checkbox"/> No, shall be in accordance with:	
2	14.1	Purchaser	Unless otherwise specified, process gas, fuel and starting gas piping systems shall be seamless carbon steel or seamless stainless steel designed and fabricated in accordance with the agreed governing code.	<input type="checkbox"/> Seamless carbon steel <input type="checkbox"/> Seamless stainless steel	
3	14.1	Purchaser or Packager	Service pressure and temperature requirements shall be specified by the purchaser, or by the packager in the quotation.		
4	14.3	Purchaser	Unless otherwise specified, raised face weld-neck flanges shall be used for ASME Class 150 through Class 900 flanges.		
5	14.3	Purchaser	Unless otherwise specified, all flanged connections shall have ASTM A-193, Grade B7 studs with ASTM A-194, Grade 2H hex nuts		
6	14.3	Purchaser	Unless otherwise specified, no special coating is required for studs and nuts.	<input type="checkbox"/> Yes, a coating is required, specifics:	
7	14.3	Purchaser	Unless otherwise specified, slip-on flanges shall not be used	<input type="checkbox"/> Slip-on flanges are acceptable	
8	14.5	Purchaser	Unless otherwise specified, threaded piping joints shall not be seal welded.	<input type="checkbox"/> Yes, threaded joints shall be seal welded	
9	14.6	Purchaser	Unless otherwise specified, hose shall not be used for process gas.		
10	14.7	Purchaser	Unless otherwise specified 300 series seamless stainless-steel tubing shall be used as a minimum	<input type="checkbox"/> No, tubing material shall be:	
11	14.7	Purchaser	Unless otherwise specified by the purchaser, carbon steel fittings may be used.	<input type="checkbox"/> Carbon steel fittings shall not be used	
12	14.7	Packager	Make and model of fittings shall be specified by the packager.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
13	14.8	Purchaser	Valves shall be suitable for the service and selected and installed according to the manufacturer's specified pressure, temperature and service rating. Unless otherwise specified: a) All valves shall be steel or stainless-steel bodies with stainless steel trim.		
14			b) Isolation valves on main process flow lines shall match the line size and be full port, with the exception that isolation valves around control valves may match the control valve size.		
15			c) Ball valves over NPS 8 shall be trunnion style valves.		
16			d) Manual ball valves over NPS 12 shall have gear operators. Gear operators should be considered for smaller high pressure manual ball valves.		
17			e) Quarter-turn manual actuator levers shall be unobstructed through the entire range of motion.		
18			f) The packager shall indicate if and where lug valves or wafer valves will be supplied.		
19			g) Discharge check valves shall be suitable for pulsating service.		
20	14.8	Purchaser	Unless otherwise specified, double block and bleed valves are not required.	<input type="checkbox"/> Yes, double block and bleed valves are required	
21	14.8	Purchaser	The purchaser shall specify any requirements for fire safe valves.		
22	14.9.1	Packager	The packager shall provide a list of all overpressure protection devices being provided in the packager's scope of supply.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
23	14.9.1	Packager	Unless otherwise specified, the packager shall provide a pressure safety valve downstream of each stage sized for 100% blocked flow, and a pressure safety valve on the inlet scrubber sized for a fire case, where the MAWP is lower than the first stage discharge MAWP.		
24	14.9.2.1	Purchaser	Unless otherwise specified, no additional pressure relief capacity is required.	<input type="checkbox"/> Yes, additional capacity is required, specifics:	
25	14.9.2.1	Purchaser	Unless otherwise specified, the packager shall determine the size and the set pressure of all on-skid relief devices.		
26	14.9.2.3	Purchaser	If the relief devices vent to the purchaser's flare or vent header, the purchaser shall specify the maximum back pressure at the skid edge connection.	<input type="checkbox"/> Yes, relief devices vent to a flare/vent header Maximum back pressure =	
27	14.9.2.4	Purchaser	Unless otherwise specified, pressure safety valves are not required to be flanged.	<input type="checkbox"/> Yes, pressure safety valves are to be flanged	
28	14.10	Purchaser	Unless otherwise specified, piping, vessels and instrumentation are not required to be designed to accommodate heat tracing and insulation.	<input type="checkbox"/> Yes, design to accommodate heat tracing and insulation	
29	14.11	Purchaser	Unless otherwise specified, insulation and/or guarding of hot piping surfaces is not provided.	<input type="checkbox"/> Yes, heat tracing is to be provided <input type="checkbox"/> Yes, insulation is to be provided	
30	14.12	Purchaser	Unless otherwise specified, the packager shall install removable basket or cone type screens upstream of each suction pulsation bottle to prevent debris from entering the compressor cylinder(s).		
31	14.12	Purchaser	Unless otherwise specified by the purchaser or required by the compressor manufacturer, removable start up screens shall be minimum 150% flow area with #40 316 stainless wire mesh over steel cone/basket frame.		
32	14.14.1	Purchaser and Packager	Purchaser and packager shall agree on packager's scope of off skid or interconnecting piping and field welds.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
33	14.14.2.3	Purchaser	Unless otherwise specified, companion flanges shall not be provided.	<input type="checkbox"/> Yes, companion flanges shall be provided	
34	14.15	Purchaser	The purchaser shall specify the extent of the process gas piping, valves, instrument connections and the package isolation strategy.		
35	14.15	Purchaser	Unless otherwise specified, the packager's process piping scope shall start at the scrubber inlet flange, include all interstage piping and end at the aftercooler outlet flange.		
36	14.15	Purchaser	Full port isolation valves are required to be installed upstream and downstream of the compressor package. Unless otherwise specified, full port isolation valves are not provided by the packager.	<input type="checkbox"/> Full port isolation valves are to be provided by the packager	
37	14.15	Purchaser	Unless otherwise specified, the check valve is not required to be provided by the packager.	<input type="checkbox"/> Yes, the check valve is to be provided by the packager	
38	14.15	Purchaser	The purchaser may specify additional scope including, but not limited to:		
39			a) Pressurization valve		
40			b) Automated package isolation valves		
41			c) Suction pressure control valve		
42			d) Individual component isolation valves		
43			e) Side stream connections and valving		
44	14.16	Purchaser	The purchaser shall specify the extent of pressure safety valve piping, valves and other components to be included with the package.		
45	14.16	Purchaser	Unless otherwise specified, the packager's scope shall include a pressure safety valve on the discharge of each compressor stage piped individually to skid edge or to safe location(s) on the package.		
46	14.16	Purchaser	Unless otherwise specified, relief devices are not required to be installed on piping with the use of a tee.	<input type="checkbox"/> Yes, PSVs to be installed using a tee	

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
47	14.16	Purchaser	Unless otherwise specified, pressure safety valves shall be individually vented with vent stacks to atmosphere at safe locations.		
48	14.16	Purchaser	Unless otherwise specified, pressure safety valve vent manifolds shall not be piped in common with any other vents or drain lines.		
49	14.16	Purchaser	The purchaser may specify additional scope including, but not limited to:		
50			a) Suction pressure safety valve for purchaser specified conditions		
51			b) Pressure safety valve outlet manifolded to a single skid edge connection		
52			c) Lockable isolation valves, bypass valves, test rings or test kits for each process gas pressure safety valve to allow for testing		
53			d) Remote mounted pressure safety valves		
54			e) Duplex pressure safety valves		
55			f) Pilot operated pressure safety valves		
56	14.17.4	Purchaser	Unless otherwise specified, the packager's scope shall not include a capacity control recycle valve.	<input type="checkbox"/> Yes, a capacity control recycle valve is required	
57	14.17.4	Purchaser	The purchaser may specify additional scope including, but not limited to:		
58			a) Actuated startup unloading recycle valve		
59			b) Manual or automatic recycle valve for capacity control		
60			c) Isolation valves and a manual bypass around a recycle control valve		
			d) Low pressure volume vessel or other design strategy to limit settle out equalization pressure		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
61	14.18	Purchaser	The purchaser shall specify the extent of the blowdown gas piping, valves and instrument connections to be included with the package.		
62	14.18	Purchaser	Unless otherwise specified, the packager's scope shall include a manual blowdown valve and piping to skid edge or a safe location.		
63	14.18	Purchaser	Where the package vent header is tied to a remote vent or flare system, the purchaser shall state the maximum backpressure at the skid edge.	Vent/flare system maximum back-pressure =	
64	14.18	Purchaser	When requested by the purchaser, the packager shall calculate and state the package depressurization time from the calculated equalization pressure, and considering isolation of the package between the skid edge suction and discharge flanges (except where additional volume has been specified). The Packager and Purchaser may agree on design strategies to regulate or control the depressurization time.		
65	14.18	Purchaser	The purchaser may specify additional scope including, but not limited to:		
66			a) Automatic blowdown valve b) Sizing criteria for the valve considering time, freezing, noise, etc.		
67	14.19.2	Purchaser	Unless otherwise specified, a liquid coalescer/separator installed downstream of the regulator is not required.	<input type="checkbox"/> Yes, a liquid coalescer/separator installed downstream of the regulator is required.	
68	14.19.2	Purchaser	Unless otherwise specified, the liquid level control valves are not required to be automated.	<input type="checkbox"/> Yes, liquid level control valves shall be automated	
69	14.19.3	Purchaser	When specified by the purchaser, an additional automatic shut-off valve shall be provided upstream of the engine to shut off fuel and vent downstream fuel gas.	<input type="checkbox"/> Yes, automatic shut-off valve shall be provided	

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
70	14.19.4	Purchaser	Unless otherwise specified, a high-pressure regulator is not required.	<input type="checkbox"/> Yes, a high-pressure regulator is required	
71	14.20	Purchaser	The purchaser shall specify the extent of the scrubber drain piping system to be included with the package.		
72	14.20	Purchaser	Unless otherwise specified, the packager's scope shall include automatic and manual drain valves on each scrubber and piping or tubing to manifold or cascade to a single skid edge connection.		
73	14.20	Purchaser	The purchaser shall specify if the following items are to be supplied by the packager:		
			a) Lockable isolation valves around the automatic drain valve	<input type="checkbox"/> Yes, required	
			b) Automated isolation valve at skid edge connection or on each scrubber drain	<input type="checkbox"/> Yes, required	
			c) Scrubber level monitoring and drain control utilizing the local control panel logic	<input type="checkbox"/> Yes, required	
			d) Restriction orifices	<input type="checkbox"/> Yes, required	
74	14.21.2	Purchaser	Unless otherwise specified, a high-pressure regulator is not required.	<input type="checkbox"/> Yes, required	
75	14.22.1	Purchaser	d) Unless otherwise specified by the purchaser, piping and supports for remote mounted air cleaners shall be furnished by the purchaser.		
76			i) Unless otherwise specified, an air filter pressure drop indicator is not required.	<input type="checkbox"/> Yes, air filter pressure drop indicator is required	
77	14.22.2	Purchaser	Unless otherwise specified, an air intake silencer is not required.	<input type="checkbox"/> Yes, an air intake silencer is required	
78	14.22.2	Purchaser	The purchaser shall specify the noise attenuation requirement.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
79	14.23.1	Purchaser	Unless otherwise specified, the packager shall provide a complete exhaust system that meets the following minimum requirements:		
80			a) The packager shall state the insertion loss dB(A) specification of the exhaust silencer.		
81			b) Provision for proper anchoring and support with accommodation for thermal expansion		
82		Purchaser	c) All material(s) shall be suitable for the maximum exhaust temperature.		
83			d) Construction of corrosion resistant material or, if carbon steel, with sufficient corrosion allowance and externally coated with a finish suitable for the design temperature.		
84			e) Exhaust system back pressure to be within engine manufacturer's specified limits.		
85			f) Provisions to prevent rain water entering the system, to prevent liquids from draining toward the engine and for draining accumulated liquid.		
		g) Provisions for any required instrumentation			
86	14.23.2	Purchaser	The purchaser shall specify any design requirements for the following:		
87			a) Sound attenuation		
88			b) Exhaust emission limits		
89			c) Catalyst or provision for catalyst by others		
90			d) Emission sampling ports		
91			e) Personnel protection (insulation, guarding, access ladders or platforms)		
92			f) Spark arresting capability		
		g) Exhaust stack height for emissions dispersion			

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
93	14.23.2	Purchaser	Unless otherwise specified, an exhaust system capable of withstanding the pressure resulting from the ignition of unburned fuel or include provisions for relieving such pressure to a safe area without damaging the exhaust system is not required.		
94	14.23.3	Purchaser	Unless specified otherwise, insulation and/or guarding of hot metal surfaces shall not be provided.	<input type="checkbox"/> Yes, insulation and/or guarding is required	
95	14.24	Purchaser	The purchaser may specify additional scope including, but not limited to:		
96			a) Duplex frame oil filters		
97			b) Cylinder lubricator feed filters		
98			c) Cylinder lubrication consumption metering		
99			d) Cylinder lubrication heater		
100			e) Heat tracing of prelube pump suction line		
101			f) Valved oil drain line at skid edge		
102			g) Motor driven cylinder lubricator		
103	14.25.1	Purchaser	Unless otherwise specified, coolant piping and equipment are not pressure code systems.	<input type="checkbox"/> Yes, the coolant piping system is a pressure code system	
104	14.25.1	Purchaser	Unless otherwise specified, the package piping system shall include as a minimum:		
105			a) Complete interconnect piping between equipment installed on the package skid, i.e. engine, compressor, heat exchangers, and pumps.		
106			b) Where heat exchangers or coolers are installed off skid, the packager shall specify if interconnecting piping has been included in the scope.		
			c) Thermostatic temperature control valves for each circuit		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
107	14.25.1	Purchaser	d) Isolation, vent and drain valves to ensure complete filling and draining		
108			e) Flexible connections on equipment that shall be moved or adjusted for alignment purposes, or to compensate for thermal expansion of piping		
109			f) Expansion tank for each circuit with level sight glass, low level shutdown switch, vent valves, and pressure cap Note: Expansion tanks are not ASME rated (less than 14 psig design pressure).		
110			g) Removable strainers at the inlet of each coolant circulation pump.		
111			h) High temperature alarm and shutdown protection		
112			i) Flow balance valves at the outlet of each heat load, where required		
113	14.25.2	Purchaser	The purchaser may specify additional equipment as follows:		
114			a) Coolant drain/holding tank for service		
115			b) Valved fill connections or transfer pumps at operator level		
116			c) Temperature indicators (local or panel mounted) on the inlet and/or outlet of each cooler		
117			d) Coolant sight flow indicators		
118			e) Post shutdown circulating pump		
119			f) Insulation or guarding of hot piping for personnel protection		
120	g) Coolant preheat systems for cold starting				
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	15.1	Purchaser	The purchaser shall provide the following information:		
2			a) Availability and type of purge gas		
3			b) Availability of vacuum source or vapor recovery system		
4			c) Restrictions on venting		
5			d) Requirement for drain retention on skid		
6	15.2	Purchaser	e) Other vents tied to the package vent/drain system		
7			a) The purchaser shall specify the venting method being used for the package at skid edge - to atmosphere, to flare with back-pressure, a vacuum system or captured and reinjected.	<input type="checkbox"/> To atmosphere <input type="checkbox"/> To flare with back-pressure <input type="checkbox"/> Vacuum system <input type="checkbox"/> Capture/reinject <input type="checkbox"/> Other:	
8			b) The purchaser shall specify the drain method being used at skid edge - gravity, pressurized or pumped.	<input type="checkbox"/> Gravity <input type="checkbox"/> Pressurized <input type="checkbox"/> Pumped <input type="checkbox"/> Other:	
9	15.3	Purchaser	c) Unless otherwise specified by the purchaser, an on-skid separation pot shall be provided by the packager.	<input type="checkbox"/> On-skid separation pot is not required	
10	15.5	Purchaser	Unless other specified by the purchaser, all single compartment distance piece packing vents/drains may be routed to a manifold terminating at the edge of the skid. The manifold is typically connected either to a vent gas collection system or flare system that is not part of the package scope.		
			Unless otherwise specified by the purchaser, the outer distance piece vent and drain on each throw may be combined and routed to a manifold terminating at the edge of the skid.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
11	15.5	Purchaser	Unless otherwise specified by the purchaser, the inner distance piece vent and drain on each throw may be combined and routed to a manifold terminating at the edge of the skid.		
12	15.5	Purchaser	Unless other specified by the purchaser, all two compartment distance piece packing vents/drains may be routed to a manifold terminating at the edge of the skid.		
13	15.6	Purchaser	Unless otherwise specified, a purge system is not required	<input type="checkbox"/> Purge system required	
14	15.7	Purchaser	Unless otherwise specified, a separation pot shall be furnished by the packager to separate vented process gas from drained lubricants	<input type="checkbox"/> Separation pot is not required	
15	15.7	Purchaser	Unless otherwise specified by the purchaser, the pot shall not be classified as a pressure vessel.	<input type="checkbox"/> Separation pot is to be classified as a pressure vessel	
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	16.1	Purchaser	The level of compressor package instrumentation, protection and control shall be specified by the purchaser.		
2	16.1	Purchaser	The purchaser shall specify if control capability is required for:		
			a) automated start and stop sequencing	<input type="checkbox"/> Yes, required	
			b) isolation valve control	<input type="checkbox"/> Yes, required	
			c) capacity control	<input type="checkbox"/> Yes, required	
			d) remote operation, or	<input type="checkbox"/> Yes, required	
			e) remote monitoring	<input type="checkbox"/> Yes, required	
3	16.2.2	Purchaser	The purchaser shall specify motor shutdown method. Electric motors may be shut down by opening fail open contacts (constant run signal) or pulsing fail closed momentary contacts (pulse control).	<input type="checkbox"/> Opening fail open contacts <input type="checkbox"/> Pulsing fail closed momentary contacts	
4	16.2.3	Purchaser	Unless specified otherwise by the purchaser, an ESD shall stop all systems immediately without delay.		
5	16.2.3	Purchaser	Unless specified otherwise by the purchaser, an ESD will only affect the compressor package, sometimes referred to as a unit ESD as opposed to a plant ESD.		
6	16.2.3	Purchaser	Unless otherwise specified, the ESD protection shall not be divided into ESD and emergency shut down and de-pressurization (ESDD). The blow down valve shall not open on an ESD but shall open on an ESDD. The packager and the purchaser shall agree on other shut down valve operation for the ESD and ESDD.		
7	16.2.4	Purchaser	Unless otherwise specified, when the specified installation location is normally unmanned and remote monitoring is not specified, alarms are not required.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
8	16.2.4	Purchaser	Unless otherwise specified or proposed, when the specified installation location is normally manned or when remote monitoring is specified, programming provisions shall be included for alarms on all shutdown parameters monitored with analog sensors.		
9	16.2.4	Purchaser	Unless otherwise specified or proposed, alarms are not required for parameters monitored with physical switches such as level switches or vibration switches.		
10	16.2.4	Purchaser	Unless otherwise specified or proposed, alarms are not required for parameters monitored by engine or compressor OEM supplied systems when those systems do not have alarm capability.		
11	16.2.6	Packager	The packager shall specify which alarms and shutdowns are classified as Class A, B or C: a) Class A are always active b) Class B become active after a timer expires c) Class C become active when the measured value clears a setpoint (example - low suction pressure is not active until the suction pressure rises above the setpoint)		
12	16.2.9	Purchaser	When an actuated blow down valve (BDV) is specified, the purchaser shall specify if the BDV is to open on an ESD, on a shutdown and/or on a normal stop.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
13	16.2.10	Purchaser or Packager	Compressor protection parameters are listed below. The list is intended to define the minimum requirements. Additional requirements may be added by the packager or specified by the purchaser. If the compressor manufacturer's minimum requirements exceed what is specified in the list, the manufacturer's incremental requirements shall prevail.		
14			a) High discharge temperature shutdown, each cylinder (Class A)		
15			b) Low suction gas pressure shutdown, first stage (Class C)		
16			c) High suction gas pressure shutdown, first stage (Class A or C)		
17			d) Low discharge gas pressure shutdown, each stage (Class C)		
18			e) High discharge gas pressure shutdown, each stage (Class A on final stage)		
19			f) Low cylinder lubricator flow or no-flow shutdown (Class B)		
20			g) Low frame oil pressure shutdown (Class A with prelube, or Class B)		
21			h) Low frame oil level shutdown (Class A)		
22			i) High frame vibration shutdown (Class A)		
23			j) High Compressor Oil Temperature shutdown (Class A)		
	k) Low compressor oil temperature (permissive)				

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
24	16.2.11	Purchaser or Packager	Engine driver protection parameters are listed below. The list is intended to define the minimum requirements. Additional requirements may be added by the packager or specified by the purchaser. If the engine manufacturer's minimum requirements exceed what is specified in the table, the manufacturer's incremental requirements shall prevail.		
25			a) Low engine oil level shutdown (Class A)		
26			b) Low jacket coolant level shutdown (Class A)		
27			c) Low auxiliary coolant level shutdown (if equipped) (Class A)		
28			d) Low engine oil pressure shutdown		
29			e) High jacket coolant temperature shutdown		
30			f) Low jacket coolant temperature (permissive)		
31			g) High auxiliary coolant temperature shutdown (if equipped)		
32			h) High engine vibration shutdown (Class A)		
33			i) Engine overspeed shutdown		
34			j) High engine oil temperature shutdown		
			k) Low engine oil temperature (permissive)		
35	16.2.12	Purchaser or Packager	Additional requirements may be added by the packager or specified by the purchaser. If the motor manufacturer's minimum requirements exceed the above, the manufacturer's incremental requirements shall prevail.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
36	16.2.13	Purchaser or Packager	Other package component protection parameters are listed below. The list is intended to define the minimum requirements. Additional requirements may be added by the packager or specified by the purchaser. If the component manufacturer's minimum requirements exceed what is specified in the table, the manufacturer's incremental requirements shall prevail.		
37			a) High liquid level, each scrubber LSHH (Class A)		
38			b) Manual ESD switch (Class A) c) High cooler fan vibration shutdown (see note) (Class A)		
39	16.3.1	Purchaser	The purchaser shall specify the control functions to be included in the protection and control system.		
40	16.3.5	Purchaser	Unless otherwise specified, the startup recycle valve shall fail open (FO).		
41	16.3.6	Purchaser	The purchaser shall specify the speed control parameter(s).		
42	16.3.7	Purchaser	When automatic recycle control is specified the control system shall include capability to vary the recycle control valve position. The purchaser shall specify the control parameter(s).		
43	16.3.8	Purchaser	Unless otherwise specified, panel automatic shutdown valve control is not required.	<input type="checkbox"/> Yes, panel automatic shutdown valve control is required	
44	16.3.8	Purchaser	Unless otherwise specified, panel shutdown valve position monitoring is not required.	<input type="checkbox"/> Yes, panel shutdown position monitoring is required	
45	16.3.8	Purchaser	Unless otherwise specified by the purchaser, shutdown isolation valves shall fail in the closed position.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
46	16.3.8	Purchaser	The purchaser shall specify which valves are to be controlled by the local panel and which are to be included in the shutdown sequence:		
			a) suction isolation valve	<input type="checkbox"/> Yes	
			b) discharge isolation valve	<input type="checkbox"/> Yes	
			c) side stream isolation valve(s)	<input type="checkbox"/> Yes	
			d) fuel isolation valve	<input type="checkbox"/> Yes	
			j) scrubber drain isolation valve(s)	<input type="checkbox"/> Yes	
			d) blowdown valve (fail open unless specified otherwise)	<input type="checkbox"/> Yes	
			e) startup recycle valve (fail open unless specified otherwise)	<input type="checkbox"/> Yes	
			f) recycle control valve (fail open unless specified otherwise)	<input type="checkbox"/> Yes	
47	16.3.9	Purchaser	When panel automatic purge control is specified, the control system shall include a discrete output to actuate a purge inlet valve immediately downstream of the inlet isolation valve and a discrete output to actuate a purge vent valve (or the blow down valve) upstream of the discharge isolation valve. The control system shall include capability to confirm purge flow by pressure rise or other means. The purge cycle shall include cycling the startup recycle valve or the recycle control valve to purge the recycle line. Purge vents shall be piped to a safe location.	<input type="checkbox"/> Panel automatic purge control is required	

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
48	16.3.10	Purchaser	<p>When panel automatic start/load/unload/stop control is specified, the control system shall include all necessary programming and outputs so that from a single operator input, the system can perform all prerequisite preheat, prelube, and purge steps, open the recycle valve, close the blowdown valve, start the prime mover (including, for a gas engine, a purge cycle of the engine and exhaust system), cycle through all class B timers, open the process shutdown isolation valves and load the compressor.</p> <p>The system shall also include all necessary programming and outputs so that from a single operator input, the system can unload, cool down, stop, post lube and close the shutdown valves.</p> <p>During the start and stop cycles the control system shall indicate the current state and the permissive or countdown timer to the next step.</p> <p>When specified, the panel program shall include the option, for commissioning, to pause at each step until the operator releases the program to proceed.</p>	<input type="checkbox"/> The panel program shall include the option, for commissioning, to pause at each step until the operator releases the program to proceed.	
49	16.3.12	Purchaser	The purchaser shall specify the method and extent of any remote monitoring capability.		
50	16.3.13	Purchaser	The purchaser shall specify the method and extent of any data storage and trending capability.		
51	16.3.14	Purchaser	The purchaser will specify the time requirements for the warning before a remote start can occur.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
52	16.4.1	Purchaser	Unless otherwise specified, all enclosures shall be suitable for outdoor locations, using NEMA4 or equivalent		
53	16.4.2	Purchaser	Unless otherwise specified by the purchaser, Instruments and control components shall be in accordance with NFPA 70 for Class I Division 2 Group D areas.		
54	16.4.6.1	Purchaser	Unless otherwise specified by the purchaser, a control panel shall be provided for each compressor package.		
55	16.4.6.2	Purchaser	When the control panel is not included in the packager's scope of supply, the purchaser shall specify if any of the following are to be included in the packager's scope:		
			a) Mounting of the panel on the package		
			b) Extent of package wiring for end devices, i.e. mounting of end devices only up to skid edge junction box(es)		
			c) Use of the panel for any shop testing including provisions for panel related delays		
			d) Hosting panel supplier personnel		
			e) Wire labels		
			f) Drafting or review of panel related documents: 1) Control system theory of operation 2) Alarm and shutdown set points 3) Panel wiring diagrams or schematics 4) Cause and effect diagrams		
56	16.4.6.3	Purchaser	Unless otherwise specified by the purchaser or by the packager, the panel shall be skid mounted.		
57	16.4.6.4	Purchaser	Unless otherwise specified or agreed to by the purchaser, wiring gland or conduit penetrations shall be on the bottom of the panel enclosure.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
58	16.4.6.5	Purchaser	The purchaser shall specify the operator interface.		
59	16.4.6.6	Purchaser	The purchaser shall specify any requirements for beacons, strobes or horns.		
60	16.4.6.8	Purchaser	The purchaser shall specify the type and quantity of spare analog/digital input/output channels, relays and/or fuses.		
61	16.4.7.1	Purchaser	Unless otherwise specified, liquid filled pressure gauges are not required.	<input type="checkbox"/> Liquid filled pressure gauges are required	
62	16.4.7.1	Purchaser	Unless otherwise specified, pressure gauge calibration certificates are not required	<input type="checkbox"/> Pressure gauge calibration certificates are required	
63	16.4.7.2	Purchaser	Unless specified by the purchaser, programmable pressure transmitters, transmitters with integral displays and transmitters with digital communication protocol capability are not required.		
64	16.4.7.4	Purchaser	The purchaser may specify additional scope including:		
65			a) Welded or flanged root valves or thermowells at each instrument connection on process, fuel and start gas piping		
66			b) Stainless steel block and test instrument valves at each pressure instrument		
67			c) Multi valve manifolds at each differential pressure instrument		
68	16.4.8.1	Purchaser	Unless otherwise specified, liquid filled temperature gauges are not required.	<input type="checkbox"/> Liquid filled temperature gauges are required	
69	16.4.8.2	Purchaser	Unless otherwise specified by the purchaser, RTD or TC elements may be connected as dedicated RTD or TC inputs in the panel or they may be connected to local transmitters and connected as analog inputs in the panel.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
70	16.4.8.2	Purchaser	Unless specified by the purchaser, programmable temperature transmitters, transmitters with integral displays and transmitters with digital communication protocol capability are not required.	<input type="checkbox"/> Programmable temperature transmitters are required. <input type="checkbox"/> Transmitters with integral displays are required. <input type="checkbox"/> Transmitters with digital communication protocol capability are required.	
71	16.4.8.2	Purchaser	Unless otherwise specified by the purchaser, electric motor winding RTDs are to be connected to the motor starter in the motor control center and not to the local panel.		
72	16.4.8.4	Purchaser	Unless otherwise specified by the purchaser, thermowells may be threaded or welded. Threaded thermowells shall be a minimum of ½ inch NPT.		
73	16.4.8.5	Purchaser	Unless otherwise specified, thermowell vibration calculations per ASME PTC 19.3 TW 2016 are not required.	<input type="checkbox"/> Vibration calculations per ASME PTC 19.3 TW 2016 are required	
74	16.4.9.2	Purchaser	Unless otherwise specified, level transmitters shall not be required.	<input type="checkbox"/> Level transmitters are required	
75	16.4.9.3	Purchaser	Level switches may be float switches or other technologies where specified by the purchaser.		
76	16.4.9.4	Purchaser	Unless otherwise specified, level controlled by the panel with a level sensor input and an output to a dump valve is not required.	<input type="checkbox"/> Level controlled by the panel is required	
77	16.4.9.4	Purchaser or Packager	Unless otherwise specified, level controls are not required to be mounted in a bridle mounted on flanges with isolation valves.	<input type="checkbox"/> Levels controls shall be mounted in a bridle mounted on flanges with isolation valves	
78	16.4.10	Purchaser	Unless otherwise specified or proposed, flow measurement is not required.	<input type="checkbox"/> Flow measurement is required	

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
79	16.4.11	Purchaser	The packager's scope shall include pipe or tubing from a single skid edge connection manifolded to each end device with an isolation valve for each device. Pressure regulation shall be supplied to meet the limitations of end devices. The purchaser may specify additional scope including:		
80			a) Centralized instrument air or gas manifold with a valved drain		
81			b) Spare valved branch connections		
82			c) Galvanized or stainless-steel manifold, piping and/or valves		
83			d) Individual pressure regulation for each end device		
84	16.4.11	Purchaser	e) Low instrument air or gas pressure alarm or shutdown instrumentation		
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	17.1	Purchaser	The package shall meet or exceed the requirements of the latest editions of the applicable mandatory codes as specified by the purchaser based on the package installation location.		
2	17.2	Purchaser	Electrical systems shall be suitable for the area classification in the destination jurisdiction as specified by purchaser.		
3	17.2	Purchaser	Unless otherwise specified by the purchaser, electrical systems shall be in accordance with NFPA 70 for Class I Division 2 Group D T2 areas.	<input type="checkbox"/> The electrical system shall be in accordance with:	
4	17.4.2	Purchaser	The purchaser shall specify the available control system power supply. Data shall include:		
			a) source (UPS or utility)		
			b) redundancy		
			c) voltage		
			d) phase		
			e) frequency		
			f) short circuit current		
5	17.6	Purchaser	Lighting and convenience receptacle requirements shall be specified by the purchaser.		
6	17.7.1	Purchaser	Unless otherwise specified, cable trays shall be aluminum material with non-corrosive fasteners.		
7	17.8.10	Purchaser	Unless otherwise specified, metal clad armoured cabling with overall jacket of suitable polymeric material may be provided as an option in lieu of conduit.		
8	17.8.11	Purchaser	All cable seals shall be packed or poured prior during fabrication unless otherwise specified by purchaser.		
9	17.8.14	Purchaser	Unless specified by the purchaser, all instrumentation tagging shall follow ANSI ISA tagging requirements.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
10	17.9.2	Purchaser	Unless otherwise specified, all terminal boards in junction boxes and control panels are not required to have at least 20% spare terminal points.		
11	17.12	Purchaser	Unless otherwise specified, the packager is not required to supply fire and gas detection.	<input type="checkbox"/> Yes, packager to furnish	
12	17.13	Packager	The packager shall specify the power, voltage, frequency, applicable motor specification, area classification, duty, temperature rating, and insulation class for all auxiliary motors being supplied.		
13	17.14	Purchaser	Unless otherwise specified, an electric starting motor with starter control is not required.	<input type="checkbox"/> Yes, required	
14	17.14	Purchaser	Unless otherwise specified, a battery set for the starting motor is not required	<input type="checkbox"/> Yes, required	
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	18.1	Packager	The packager shall specify all material selections and equipment design features that are included for compatibility with sour or corrosive gases		
2	18.2.2	Purchaser	Unless otherwise specified by the purchaser, where the H ₂ S concentration of the gas mixture is within region "B" on the graph shown in Figure 8, the following requirements shall apply.		
3			a) The manufacturer's standard materials may be used in the compressor, pressure vessels, pressure piping, gas cooling systems and instrumentation.		
4			b) Copper or copper alloys shall not be used for any gas wetted components.		
5			c) All elastomeric seals shall be suitable for the specified gas analysis and the intended service.		
			d) All vents (including the crankcase breather) and drains shall be piped to the edge of the skid. Vents shall terminate to safe areas.		
6	18.2.3	Purchaser	For H ₂ S concentration of the gas mixture within region "A" of Figure 8, the compressor and package shall be designed to avoid susceptibility to stress corrosion cracking and to prevent leakage of sour gas into the crankcase and into the atmosphere. Unless otherwise specified by the purchaser, the following minimum requirements shall apply.		
7			a) All items b) thru d) in 18.2.2		
			b) The hardness of carbon and low alloy steel parts which come in contact with the process gas stream shall not exceed a hardness of Rockwell C22 and the yield strength shall not exceed 90 ksi (620 MPa)		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
8	18.2.3	Purchaser	c) The base material of piston rods shall be either carbon steel with a maximum hardness of RC22 or stainless steel. A suitable hard coating shall be applied in the packing travel area. The rod material will be considered acceptable as long as the base hardness and yield strength remain within the manufacturer's specified values. Threads shall be rolled after heat treatment, and an increase in hardness around thread surfaces due to thread rolling is acceptable.		
9			d) Packing and piston ring material shall be non-metallic.		
10			e) A two-compartment distance piece, Figure 3 (6.9.2 Type 2) or Figure 4 (6.9.2 Type 3)		
11			f) A suitable distance piece vent, vacuum, and/or purge system shall be provided, in compliance with the compressor manufacturer's application requirements.		
12			g) Compressor valve components shall be the compressor manufacturer's recommended material selection for the service.		
13			h) All process gas wetted compressor cylinder bolting shall be ASTM A193 Grade B7M. Note: Cylinder and distance piece bolting outside the process gas containment are not considered "wetted".		
14			i) Carbon steel pressure vessel materials shall have an appropriate corrosion allowance, 1/8-inch (3.2 mm) minimum		
15			j) All instrumentation that comes in contact with the process gas (e.g., liquid level controls, shutdowns, bourdon tubes, process valves, pressure safety valves, etc.) shall be suitable for sour and corrosive gas service.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
16	18.2.3	Purchaser	k) When specified by the compressor manufacturer, a compounded or synthetic cylinder oil lubrication system shall be provided complete with separate day tank, filters, valves, piping and appurtenances.		
17	18.2.4	Purchaser or Packager or Manufacturer	Depending on the criticality and severity of the service, the following additional requirements may be specified by the purchaser, the packager or the compressor manufacturer.		
18			a) Suction port oil injection shall be used when carbon steel compressor valves are used.	<input type="checkbox"/> Yes, suction port oil injection shall be used	
19			b) Stainless steel compressor valve components.	<input type="checkbox"/> Yes, stainless steel valve components shall be used	
20			c) Stainless steel tube fittings.	<input type="checkbox"/> Yes, stainless steel tube fittings shall be used	
21			d) Erosional velocities should be considered for piping systems with two phase flow regimes. Maximum gas velocity can be calculated as follows in Equation 4 (SI and USC units): $V_e = \frac{c}{\sqrt{\rho_m}} \quad (4)$ Where: V _e = maximum velocity, m/s (ft/s) ρ _m = gas density, kg/m ³ (lbs/ft ³) c = empirical constant for which API RP 14E recommends c = 122 using SI units (100 for USC units) for continuous service		
22			e) Hydrogen Induced Crack (HIC) resistant fine grain carbon steel should be used for pressure vessel material.		
			f) No threaded connections in carbon steel piping, pulsation bottles and scrubbers.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
23	18.2.4	Purchaser or Packager or Manufacturer	g) Threaded shoulder plugs with soft iron or stainless-steel gaskets on cooler headers		
34			h) A corrosion resistant alloy steel for process gas cooler tubes.		
25			i) 100% radiographic testing for all process piping, pulsation bottles and scrubbers.		
26			j) Ultrasonic or radiographic testing for process gas cooler headers.		
27			k) Post weld heat-treatment for all carbon steel process piping, pulsation bottles, scrubbers and cooler headers.		
28			l) Electronic H ₂ S monitoring and alarm systems.		
29	18.3.2	Purchaser	Unless otherwise specified by the purchaser or the packager, for CO ₂ concentrations within Region B of Figure 9, the packager's and manufacturers' standard materials shall be used in the compressor, cooling system and package.		
30	18.3.3	Purchaser	Unless otherwise specified by the purchaser, for CO ₂ concentrations within Region A of Figure 9, the following minimum requirements shall apply.		
31			a) All elastomeric seals shall be suitable for the specified gas analysis and the intended service.		
32			b) The base material of piston rods shall be stainless steel with a suitable hard coating in the packing travel area.		
33			c) A two-compartment distance piece, Figure 2 (6.9.2 Type 2) or Figure 3 (6.9.2 Type 3)		
			d) When specified by the compressor manufacturer, a compounded or synthetic cylinder oil lubrication system shall be provided complete with separate day tank, filters, valves, piping and appurtenances.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
34	18.3.3	Purchaser	e) Compressor valve components shall be stainless steel or the compressor manufacturer's standard for CO ₂ service.		
35			f) Suction port oil injection shall be provided when carbon steel valves are used.		
36			g) Tube fittings shall be stainless steel.		
37			h) All process gas wetted compressor cylinder bolting shall be stainless steel.		
			Note: Cylinder and distance piece bolting outside the process gas containment are not considered "wetted".		
38			i) All instrumentation that comes in contact with the process gas (e.g., liquid level controls, shutdowns, bourdon tubes, process valves, pressure safety valves, etc.) shall be suitable for corrosive service.		
39	j) Erosional velocities should be considered for piping systems with two phase flow regimes. Maximum gas velocity can be calculated using Equation 4 in 18.2.4.				
40	18.3.4	Purchaser	Unless otherwise specified, the packager shall make provision for venting and purging of the process gas system for shut down and maintenance purposes.	<input type="checkbox"/> Yes, required	
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	19.2	Purchaser or Packager	Unless otherwise specified, all components, other than those listed below, shall be painted, or otherwise coated to protect against corrosion.		
2			a) Galvanized steel grating, stairs and associated galvanized fasteners		
3			b) Concrete structures		
4			c) Any component made of plastic, and plastic-coated materials		
5			d) Any component made of nonferrous material		
6			e) Mating machined surfaces		
7	19.3	Purchaser	The purchaser shall specify any additional regulatory electrical area classification requirements.		
8	19.6.2	Purchaser	The purchaser shall specify the roll and pitch of the vessel to determine whether a crankcase dry sump system might be required.		
9	19.7.1	Purchaser	Unless otherwise specified:		
10			a) The cooler structure and section side frames shall be hot dip galvanized or zinc metalized.		
11			b) Carbon steel cooler headers shall be zinc metalized.		
12			c) Cooler tubes shall be made of chloride resistant materials. If carbon steel tubes are used, the bare tube ends shall be epoxy coated.		
13	19.7.2	Purchaser	d) Cooler tube fins shall be made of marine-grade aluminum, such as 5005 aluminum alloy.		
			The purchaser shall specify the maximum seawater outlet temperature.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
14	19.8.1	Purchaser	The purchaser shall specify the skid mounting method and underlying support structure.		
15	19.8.1	Purchaser	The purchaser may specify baseplate design and fabrication requirements to minimize corrosion.		
16	19.8.3	Purchaser	Unless otherwise specified, the skid shall be furnished with a minimum 77 mm (3 in.) drip-lip and shall be furnished with a minimum 51 mm (2 in.) NPT drain connection in each corner, and from any trapped volume in the baseplate. This drain system is not intended as secondary containment.		
17	19.9	Purchaser	The purchaser shall specify the maximum pitch and roll angles of the marine transport vessel.		
18	19.9	Purchaser	Unless otherwise specified the package sea fasteners shall be designed for 0.5 G horizontal acceleration.		
19	19.10.1	Purchaser	Instrument housings shall be made of corrosion resistant materials such as AISI 316. When approved by the purchaser, non-metallic UV resistant housings may be used.	<input type="checkbox"/> Non-metallic UV resistant housings may be used.	
20	19.10.5	Purchaser	Unless otherwise specified, tubing and fittings shall be AISI 316 stainless steel or higher-grade material.		
21	19.12.1	Purchaser	Unless otherwise specified by the purchaser, the surface preparation, paint and application shall be in accordance with the packager's severe duty or marine coating specification. The packager's painting specification shall be submitted in the proposal for the purchaser's review. The purchaser should carefully review the packager's paint and coating specifications, application and inspection procedures in order to ensure that adequate surface preparation, coverage and film thicknesses are achieved in all required areas of the package		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
22	19.12.2	Purchaser	Unless otherwise specified by the purchaser, surfaces should be prepared for painting in accordance with Table 8.		
23	19.12.3.1	Purchaser	Unless otherwise specified by the purchaser, paint shall be applied to the coating manufacturer's specifications.		
24	19.12.3.3	Purchaser	Unless otherwise specified, hoses, wiring harnesses, grounding lugs, name and data plates, safety placards, finish painted instruments, non-metallic products, rotating parts of machinery, machinery mating surfaces, finned tubes surfaces, belts, sheave grooves and temporary closures should not be painted. Painting of corrosion resistant components is not required.		
25	19.13	Purchaser	Unless otherwise agreed, the packager shall measure and log the following as a minimum:		
26			a) Blast profile for each item		
27			b) Date, time, temperature and relative humidity when each coat is applied to each item		
28			c) The dry film thickness of each coat		
29			d) Any other critical parameter specific to the coating per the coating manufacturer		
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1			None		
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	21.5.1	Purchaser	Unless otherwise specified, for cold starting at the minimum ambient temperature, a suitable crankcase oil and/or jacket water heating system is not required.		
2	21.5.1	Packager	The packager shall specify the heating system type, any electric power supply requirements or heat medium circulation fluid and temperature.		
3	21.5.2	Purchaser	When specified, circulating heating systems shall be installed in the engine or compressor piping systems at the specific tie-in locations specified by the engine or compressor manufacturer. Circulating systems shall have adequate isolation valves to permit maintenance of the system components.		
4	21.6	Purchaser	Unless otherwise specified for operation at the minimum ambient temperature, an engine combustion air heating system is not required.	<input type="checkbox"/> An engine combustion air heating system is required	
5	21.7	Purchaser	Unless otherwise specified, insulation and heat tracing of any outdoor vessel liquid sections, drain lines or piping that may contain liquid water and are vulnerable to freezing are not required.	<input type="checkbox"/> Insulation and heat tracing of outdoor vessel liquid sections, drain lines or piping that may contain liquid water is required.	
6	21.8.1	Purchaser	<p>The packager or air cooler manufacturer shall ensure the cooler fan performance has been calculated at the minimum ambient temperature to ensure the fan and fan drive system or motor are not overloaded in cold weather. The cooler fan should be capable of operation at the design blade pitch and speed setting throughout the maximum to minimum ambient temperature range.</p> <p>If a reduced fan blade pitch is required for low ambient temperatures, it shall be specified and any limitations clearly stated in the operating information.</p>		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
7	21.8.3	Purchaser	Unless otherwise specified, water cooler sections shall be designed for the use of a coolant mixture of 50% ethylene or propylene glycol and demineralized water.		
8	21.8.4	Purchaser or Packager	When specified by the packager or the purchaser, a variable speed driven fan and/or either manual or automatic temperature-controlled louvers shall be furnished on one or more finned tube cooling sections.		
9	21.8.5	Purchaser	Variable frequency drive (VFD) is recommended for electric motor driven cooler fans. All cooler drive electric motors shall be rated for inverter duty. Unless otherwise specified, the purchaser shall furnish the VFD.		
10	21.8.8	Purchaser	When specified by the packager or the purchaser, methanol injection nozzles shall be furnished upstream of each gas cooler section inlet nozzle.		
11	21.9.2	Purchaser	The following requirements for instrumentation located outdoors should be considered, and if deemed applicable, should be specified by the purchaser or the packager:		
12			a) An electric heater should be furnished inside the unit control panel.		
13			b) Outdoor level gages, bridles and chambers should be protected and winterized by furnishing insulation and heat tracing.		
14			c) Where wet process gas is used for instrument gas supply, it should be supplied through a coalescing filter to prevent liquids from condensing and/or freezing at low ambient temperatures.		
			d) The Purchaser shall provide a clean and dry instrument air or gas supply at all operating and ambient temperatures and pressures.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
15	21.9.2	Purchaser	e) Removable insulation blankets should be furnished on outdoor control valves or regulators.		
16			f) Instrument sensing lines or capillaries should be protected.		
17	21.10.1	Purchaser	Unless otherwise specified by the purchaser, where buildings are used, the purchaser shall be responsible for ensuring that the building classification and design is appropriate and compliant with any prevailing codes and standards.		
18	21.10.2	Purchaser or Packager	The following requirements for buildings and enclosures housing a gas compressor package should be considered and, if deemed applicable, should be specified by the purchaser or the packager.		
19			a) Where a self-framing building is installed and supported on the compressor skid, the skid lifting lugs should be designed to facilitate lifting and moving the module with the building installed.		
20			b) Where supplemental building heating is required, the design case should be with the unit shut down at minimum ambient temperature.		
21			c) Where a building is provided, the governing design case for ventilation should be with the unit operating at rated power at maximum ambient temperature.		
			d) Engine combustion air may be drawn from inside the building or ducted outside to an appropriate location. A diverting duct may be furnished to select inside/outside combustion air.		

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**Section 21
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
22	21.10.2	Purchaser or Packager	e) Where combustion air is drawn from inside the building, adequate replacement air vents should be provided. Engine air filter housings should be located to provide suitable access to service engine air filters.		
23			f) Careful consideration should be given to routing of intake and exhaust ducting, to facilitate maintenance access. Exhaust gases must terminate outside the building in a safe location.		
24			g) The complete exhaust piping system inside the building or other enclosure shall be insulated. The insulation on flanges and expansion joints shall be removable and reusable.		
25			h) Safe egress of personnel and access to equipment necessary for routine and major maintenance should be considered in the design.		
26			i) On an enclosed package, unless otherwise specified, a service crane shall be provided to lift heavy items for maintenance and repair. The load rating of the crane shall be clearly identified, and the crane should be compliant with all applicable codes and standards. The crane should be sized to lift the heaviest compressor cylinder body. The purchaser shall specify any requirement for a parts lay-down area within the building.		
27			j) Fill and drain connections for clean oil, waste oil and coolant shall be accessible.		
28			k) The purchaser and packager shall agree on the provision for spill containment.		
29			l) Adequate lighting for operation and maintenance, including exterior entrances and landings, shall be provided.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
30	21.10.2	Purchaser or Packager	m) The purchaser shall specify any requirement for combustible or toxic gas detection systems and/or UV flame detection systems.		
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PACKAGED RECIPROCATING COMPRESSORS API 11P 3RD EDITION DATA SHEET	Section 22 Pulsation, Mechanical Vibration, and Piping Flexibility Analysis and Control			JOB NO.		ITEM NO.		
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	22.2.1	Purchaser	<p>All references to API Standard 688 in this section 22 shall mean API Standard 688, 2nd Edition.</p> <p>Unless otherwise specified by purchaser, the requirements for pulsation and vibration control shall be in compliance with API Standard 688, except that the requirements of this section 22 shall take precedence over any requirements of API Standard 688.</p>		
2	22.2.2	Purchaser	<p>Purchaser shall specify the pulsation, mechanical vibration and piping flexibility studies that are required to be performed by the packager.</p> <p>NOTE: In some cases, the purchaser or a third-party engineering company, rather than the packager, may have direct responsibility for all or some of the studies.</p>	<input type="checkbox"/> Packager responsible for pulsation and mechanical vibration study <input type="checkbox"/> Packager responsible for piping flexibility study <input type="checkbox"/> Other studies to be responsibility of packager, specifics:	
3	22.2.2	Purchaser	<p>Purchaser shall specify the Design Approach (i.e., Design Approach 2 or 3) according to the requirements of Table 1 in paragraph 5.1.4 of API Standard 688.</p>	<input type="checkbox"/> Design Approach #2 <input type="checkbox"/> Design Approach #3	
4	22.2.3	Purchaser and Packager	<p>Packager's proposal shall specify preliminary pulsation suppression devices, including as a minimum, the outside diameter, seam-to-seam length, and MAWP of each device. The preliminary sizing shall be determined using one of the following methods:</p> <p>Preliminary analysis by a pulsation study supplier, or the GMRC Preliminary Field Gas Compressor Bottle Sizing Procedure, or packager's proprietary method that is identified and described with the proposal, or other method specified by the purchaser.</p>		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
5	22.2.6	Purchaser	Unless otherwise specified by the purchaser of the pulsation study, the requirements for maximum allowable pressure pulsation at the compressor cylinder valves in paragraph 5.1.7.3 of API Standard 688 shall not apply.		
6	22.4	Purchaser	If specified by the Purchaser of the study, a dynamic analysis of the compressor package skid shall be conducted and shall include:		
7			a) A finite element model of the compressor, driver, skid structure and major skid-mounted components, including, where applicable, pulsation suppression devices, scrubbers and coolers.		
8			b) Consideration in the model of the specific foundation specified by the purchaser, e.g. reinforced concrete, caliche pad, driven piles, etc., that the package is to be used on, including the foundation dynamic properties.		
9			c) Application of dynamic loads due to unbalanced inertia forces and couples, engine roll torque, vertical crosshead forces and gas rod loads (acting on cylinders causing "stretch").		
			d) Predicted (i.e., not field measured) skid analysis vibration acceptance criteria: 1) The specified limits of the compressor and engine manufacturers, 2) Pedestal limit of 0.3 in/sec (0-to-peak), and 3) Main skid limit of 0.2 in/sec (0-to-peak) for mounting on concrete foundations, or 4) Main skid limit of 0.3 in/sec (0-to-peak) for mounting on piles and gravel pads.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	23.2.2	Purchaser	<p>b) System components (compressor, motor or engine driver, and coupling) modeled and analyzed in multiple discrete elements as shown in Figure 12, using mass-elastic data provided by the component manufacturer(s) or calculated from detailed drawings and other information provided by the manufacturer(s). Unless specified by the purchaser of the TVA, cooler fan drives are not typically included in a torsional analysis.</p> <p>Mass-elastic elements should be created at significant changes in diameter, where significant inertia is added and where significant forces occur (such as at each compressor throw).</p>		
2			<p>The torsional vibration analysis shall include the following requirements:</p> <p>g) Unless otherwise specified, an evaluation of synchronous motor driver transient torsional analysis for across the line starts, including low-cycle fatigue failure analysis, is not required.</p>		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
3	23.6	Purchaser	<p>Unless otherwise specified, the Purchaser shall be responsible for the implementation and cost of any torsional vibration testing.</p> <p>NOTE 1: Annex E.2 provides guidelines for torsional testing.</p> <p>NOTE 2: An on-site vibration and torsional startup survey during commissioning is a best practice to confirm that all recommendations to control vibration have been properly implemented, to identify any differences between the intended design and the as-built configuration, and to provide a baseline for reference in maintenance and troubleshooting.</p>		
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	24.1.3	Purchaser	The purchaser shall specify the extent of their participation in the inspection and testing program during the bidding phase and confirm prior to any fabrication.		
2	24.1.4	Purchaser	The purchaser shall specify hold points on the inspection and test plan.		
3	24.1.5	Purchaser	The purchaser shall specify witness points on the inspection and test plan.		
4	24.2.3	Purchaser	Unless otherwise specified, it is not required for the purchaser's representative to have access to the packager's quality control program for review prior to the start of fabrication.		
5	24.3.1.2	Purchaser	Unless otherwise specified, it is not required for the assembled package to be tested for piping leaks.	<input type="checkbox"/> The assembled package shall be tested for piping leaks.	
6	24.3.1.3	Purchaser	Unless otherwise specified by the purchaser, the hydrostatic tests shall be satisfactory when no leaks are observed for a period of 30 minutes or a period as required by code.		
7	24.4.1	Purchaser	Equipment shall be suitably prepared for the type of shipment or storage as specified by the purchaser. If a storage period is specified, the purchaser will consult with the packager regarding recommended procedures to be followed. Proper storage of the unit is the responsibility of the purchaser.		
8	24.4.2	Purchaser	Unless otherwise specified, it is not required that the equipment be crated for export shipment.	<input type="checkbox"/> Export crating is required	
9	24.4.2	Purchaser	Unless otherwise specified, special lifting devices and rigging are not required to be supplied with the unit.	<input type="checkbox"/> Special lifting devices and rigging are to be supplied with the unit.	
10	24.4.4.1	Purchaser	Preparation for shipment shall be made after all testing and inspection of the equipment has been accomplished and approved by the purchaser if required.		

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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
11	24.4.5	Purchaser	Unless otherwise specified and noted in the VDDR (See Annex D), one copy of the packager's standard installation data book is not required to be packed and shipped with the package.	<input type="checkbox"/> A copy of the packager's standard installation data book is required to be packed and shipped with the package.	
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Line	Paragraph	Pur/Pkg Req?	Required Data	Purchaser	Packager
1	25.2.2	Purchaser	Unless otherwise specified, drawings are not required to be certified by a professional engineer.	<input type="checkbox"/> Drawings are required to be certified by a professional engineer	
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