



COMPRESSION LEASING SERVICES

PROVIDING THE WORLD WITH HIGH PRESSURE BOOSTERS & COMPRESSORS

MAIN LOCATION

• 1935 N. Loop Avenue & 1925 N. Loop Ave.
Casper, Wyoming 82601
307.265.3242

BRANCH FACILITIES

• 5530 Joliet Street
Denver, Colorado 80239
303.733.4882

• 5551 Magnuson Boulevard, Unit D
Gillette, Wyoming 82718
307.682.2084

Ariel JGA-4, with 2 tandem cylinders OFFSHORE SERIES BOOSTER

Compressor

Manufacturer: Ariel
Model: JGA-4 four stages with (2) tandem cylinders
RPM: Variable (engine speed adjusted with controller)
Application: Used to boost air pressure
Valves: Hoerbiger with PEEK plates as per Ariel STD.
VVP: None

First Stage Cylinder(s)

Model: Quantity (1) 4.750" Bore (5-1/8 JG)
MAWP: 865 PSIG (relief set pressure)
RDP: 786.4 PSIG (normal max operating pressure)
Valves: Hoerbiger with PEEK plates as per Ariel STD
VVP: None

Second Stage Cylinder(s)

Model: Quantity (1) 3.625" Bore (3-5/8 JG)
MAWP: 1640 PSIG (relief set pressure)
RDP: 1491 PSIG (normal max operating pressure)
Valves: Hoerbiger with PEEK plates as per Ariel STD.
VVP: None

Third Stage Cylinder(s)

Model: Quantity (2) 3.00" Bore (3SG11-FS-CE)
MAWP: 5000 PSIG (relief set pressure)
RDP: 4546 PSIG (normal max operating pressure)
Valves: Hoerbiger with PEEK plates as per Ariel STD
VVP: None

Fourth Stage Cylinder(s)

Model: Quantity (2) 1.750" Bore (1-3/4SG11-FS-HE)
MAWP 6100 PSIG (relief set pressure)
RDP 5546 PSIG (normal max operating pressure)
Valves: Hoerbiger with PEEK plates as per Ariel STD
VVP: None

Performance: See Attached Performance Run, performance generally +/- 5% or to Ariel standards

INCLUDED ACCESSORIES TO BOOSTER COMPRESSOR FRAME

- Divider block style lubrication
- Oil Thermostat with oil filter
- No-Flow lubrication shutdown on cylinder lube
- Manual Pre-lube pump
- Flywheel- included material to this bid
- Custom designed flywheel by Ariel designed as per a torsional study provided by CLS, mounted on the input shaft of the compressor in conjunction with coupling and motor requirements.

Engine: Cummins Option
Manufacturer: Cummins
Model: Cummins QSX-15 US Tier III
Description: 4 cycle, 6 cylinder, 15 liter displacement, turbocharged, air- to-air after cooled and electronically injected diesel.
RPM: 1800 RPM for this application.
HP: 600 HP at 1800 RPM.
Starter: Electric 24V. Plus TDI turbine air start.
Alternator: 24V.
Battery System: 24V, two 12V 8D, maintenance free.
Radiator: By Cummins, Standard Heavy duty ambient (not custom extreme ambient)
Turbo-after cooler: By Cummins, air-to-air after cooled. Standard Heavy duty ambient (not custom extreme ambient)
Fan: Anti-Static, blower type.
Air Cleaner: By Cummins, radial flow, with inner and outer elements.
Rig Saver: Included

Compressor Coupling:

Manufacturer: Per Torsional study, Reich planned
Model: AC6 to AC7 depending on Torsional Study
Features: Torsionally soft, tolerant of misalignment as possible within this skid, with CLS stub shaft and adapters to allow replacement without moving engine or compressor.

Skid CLS skid and lifting rack

Runners: (4) W12x40lb/ft.
Cross-members: W8x28.
Deck: Welded, with checkered plate.
Ends: Welded, with checkered plate.
Drip Lip: 2" seal welded
Lifting Rack: Yes with four point lift, sling grating in center section All by certified welders

Piping and Valves:

Certification: B31.3 standard with additional X-ray as noted below:
Size: 2" and 3" piping appropriate for pressures, MTR's on pipe and 100% X-Ray and Hydro test on all 2" and 3". INCLUDED. Code/certified welders used for piping.
Pipe Size: Combination of Pipe and Hose, 2" butt welded and flanged piping appropriate for pressure and air velocity through pipes.
Bypass Piping: A manual bypass will be installed by CLS for routing the feed air around compressor cylinders.
Valves: Check valves, ball valves, and needle valves will be provided where appropriate.
Relief Setting: determined through ASME vessel design using pressure relief valves, located before inter-stage cooling.
Inlet: 2" fig 206, Outlet 2" 1502

Pressure Vessels:

Suction scrubber, suction pulsation bottle and discharge pulsation bottle will be provided for each stage of compression. Vessels are carbon steel with corrosion allowance.

Suction Scrubbers:

Used to extract liquids from feed air and condensed vapor from inter-stage cooling utilizing mesh pad to coalesce liquid droplets. Corrosion Allowance between 0.030" and 0.0625"

Suction Pulsation Bottles:

One per stage, stages with tandem cylinders are dual connected bottles, mounted directly to cylinders, volume type, used to dampen vibration from impulses associated with reciprocating

compressor. All stages per standard method, no internals, no acoustical study, within limits of space available. Corrosion Allowance between 0.030” and 0.0625”

Discharge Pulsation Bottles:

One per stage, stages with tandem cylinders are dual connected bottles, mounted directly to cylinder, volume type, used to dampen vibration from impulses associated with reciprocating compressor. All stages per standard method, no internals, no acoustical study, within limits of space available. Corrosion Allowance between 0.030” and 0.0625”

Standard Cooler:

Manufacturer:	Fin X or equal
Description:	Single static free fan, horizontal shaft, blower, 4 sections
Features:	304 SS tubes, dimetcote coated headers and plenum
Pressure and Temp Ratings:	As required to match other components, generally 350F
Approach to ambient:	Approx 25F.
Cooler Drive System:	Belt driven off of compressor crank with bearing, couplings, and tensioning idlers as needed to protect the crankshaft and tension the belts.

All vessels are appropriately sized for your application regarding flow, pressure, velocity, and temperature. Vessels designed appropriate for performance shown.

Certification: ASME code, National Board certified with code papers provided at no charge, all vessels properly tagged.

Electrical and Controls

Control Panel:

Large panel only this unit. 316 SS, with front access only, panel sheet hinged for access from front, back pan for mounting electrical, NEMA 4X, Based around Controls Inc. J1939 engine/compressor controller/display. 6 Rosemont pressure transducers (suction, all discharges, and oil pressure) with shutdown indication and provision for local and remote E-stop. Pyrometer temperature display (4 Discharge Temperatures) and shutdown using J type thermocouple. ESD button, key switch (on/off/start), air start, compressor oil bypass switch.

Booster Control Shutdowns with indication lights or device:

- 1.) Emergency-Stop Push Button (ESD).
- 2.) High discharge temperature per stage (4)
- 3.) High scrubber liquid level per stage (4)
- 4.) Low compressor oil pressure
- 5.) Low liquid compressor oil
- 6.) Standard engine shutdowns from Cummins engine
- 7.) Engine over-speed protection

Fuel System:

Capacity:

Approximately 24 gallons, volume as limited by package constraints. With Quick connects for fuel supply and return.

OPTIONAL EXTRAS

OPTIONAL ITEMS	DESCRIPTION
Additional Air Filtration	Used for small particles utilizing a particulate filter or activated carbon to absorb contaminants and oil mist.
Auto- Dumps	Electronic or mechanical dumps, used to remove water automatically after a particular duration of time (Electronic) or once water reaches a certain point (Mechanical)
Australian Certs	This is required by Australia for pressure vessels and coolers, this unit has 11 pressure vessels and 4 coolers.
CAT- C18	This adder will replace the Cummins QSX-15, this will be very difficult to keep the packages dimensions to fit in a sea can.
Cold Start Ether Kit	Automatically injects proper amount of ether into air intake.
Cold Weather Engine Kit	Block Heater and oil pan heater
Exhaust Wraps	Protection against operators getting burned and needed in some environments. 1" Fiberglass insulation good for 120°F
L.E.D Work Lights	Bright, low energy work lights for night. Our standard is two lights.
Tool Box	Metal tool box attached to unit for extra capacity of tools.
Full Open Frame DNV 2.7-1 Lifting Rack	8'Wx9'6"T x20'L made by CLS, ASME XI certified welders to DNV 2.7-1 specification. 4- point lift with sling grating. Integrated for pockets. Non-slip diamond plate deck with containment lip. ISO corners. Slings included. Offshore quality paint.
Extreme Weather Enclosure (Full Lifting rack required)	Metal panels and door with insulation: for extreme ambient conditions, sound deadening, or nonstandard obs. Curtain style available. <i>Consult CLS for other enclosure options.</i>

PLEASE ENQUIRE FOR OTHER OPTIONS YOU MAY NEED

Documentation:	Two complete unit books and electronic manuals with all test records included.
Weight:	Approximately 38-43,000 lbs based on configuration.
Paint:	
Manufacturer:	Diamond Vogel.
Coats:	One coat Zinc (on all blasted steel), one coat epoxy primer, and one coat synthetic urethane paint.
Color:	Customer Choice. One color, no metallic.
Decals:	Included
General Design:	8'6" wide x 9'6" tall x 19'10.5" open frame with ISO corner blocks, lifting eyes, roof grating etc- similar to our signature series.
Warranty:	Normal CLS warranty
Engine:	1 Year by Cummins or CAT
Compressor Cylinders:	One year on materials and workmanship by Ariel
Compressor Frame:	One year on materials and workmanship Ariel.
Manufacturing:	One year by CLS against defects in material or workmanship, see additional documentation.
Excluded:	Normal wear, compressor valves & lubricator pumps.

CLS-manufacturers/ builds/assembles the entire unit, DNV skid, vessels and packages everything in house. No third party manufacturers are used to assemble this booster compressor. This process ensures quality control throughout the entire package.



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Ariel Performance



Company: Ariel Corporation

Customer:

Quote:

Inquiry:

7.7.2.0

Case 1:

Project:

Compressor Data:

Elevation,ft:	50.00	Barmtr,psia:	14.669	Ambient,°F:	100.00
Frame:	JGA/4	Stroke, in:	3.00	Rod Dia, in:	1.125
Max RL Tot, lbf:	20000	Max RL Tens, lbf:	10000	Max RL Comp, lbf:	11000
Rated RPM:	1800	Rated BHP:	560.0	Rated PS FPM:	900.0
Calc RPM:	1800.0	BHP:	549	Calc PS FPM:	900.0

Driver Data:

Type:	Diesel
Mfg:	
Model:	QSX-15
BHP:	0
Avail:	0 (30)

Services

Gas Model

Service 1

VMG

Stage Data:

	1	2	3	---	4	---
Target Flow, SCFM	2000.000	2000.000	2000.000	---	2000.000	---
Flow Calc, SCFM	1956.616	1956.617	1954.720	---	1954.108	---
BHP per Stage	115.5	170.3	163.7	---	87.3	---
Specific Gravity	0.9983	0.9983	0.9987	---	0.9988	---
Ratio of Sp Ht (N)	1.4046	1.4062	1.4066	---	1.3916	---
Comp Suct (Zs)	0.9880	0.9844	0.9789	---	1.0115	---
Comp Disch (Zd)	0.9963	1.0098	1.0510	---	1.1018	---
Pres Suct Line, psig	330.00	N/A	N/A	---	N/A	---
Pres Suct Flg, psig	326.55	606.88	1377.76	---	3189.38	---
Pres Disch Flg, psig	616.88	1390.84	3214.99	---	5050.15	---
Pres Disch Line, psig	N/A	N/A	N/A	---	5000.00	---
Pres Ratio F/F	1.851	2.261	2.319	---	1.581	---
Temp Suct, °F	100.00	120.00	120.00	---	120.00	---
Temp Clr Disch, °F	120.00	120.00	120.00	---	120.00	---

Cylinder Data:

	Throw 2	Throw 4	Throw 1	Throw 3	Throw 1	Throw 3
Cyl Model	5-1/8JG	3-5/8JG	3SG11-FS-CE	3SG11-FS-CE	1-1/2SG12-FS-HE	1-1/2SG12-FS-HE
Cyl Bore, in	4.750	3.625	3.000	3.000	1.500	1.500
Cyl RDP (API), psig	786.4	1490.9	4545.5	4545.5	8181.8	8181.8
Cyl MAWP, psig	865.0	1640.0	5000.0	5000.0	9000.0	9000.0
Cyl Action	DBL	DBL	CE	CE	HE	HE
Cyl Disp, CFM	107.6	61.4	19.0	19.0	5.5	5.5
Pres Suct Intl, psig	305.60	546.52	1302.93	1302.93	3102.73	3102.73
Temp Suct Intl, °F	104	125	125	125	122	122
Pres Disch Intl, psig	653.20	1508.63	3397.10	3397.10	5234.50	5234.50
Temp Disch Intl, °F	237	321	310	310	214	214
HE Suct Gas Vel, FPM	6755	8816	N/A	N/A	4480	4480
HE Disch Gas Vel, FPM	6083	7987	N/A	N/A	4865	4865
HE Spcrs Used/Max	0/2	0/1	N/A	N/A	0/1	0/1
HE Vol Pkt Avail, %	1.17+53.15	1.16+49.54	N/A	N/A	No Pkt	No Pkt
Vol Pkt Used, %	0.00 (V)	0.00 (V)	N/A	N/A	No Pkt	No Pkt
HE Min Clr, %	21.69	14.64	N/A	N/A	17.39	17.39
HE Total Clr, %	22.86	15.80	N/A	N/A	17.39	17.39
CE Suct Gas Vel, FPM	6376	7966	6228	6228	N/A	N/A
CE Disch Gas Vel, FPM	5742	7218	6322	6322	N/A	N/A
CE Spcrs Used/Max	0/2	0/1	0/2	0/2	N/A	N/A
CE Min Clr, %	23.93	17.44	51.47	51.47	N/A	N/A
CE Total Clr, %	23.93	17.44	51.47	51.47	N/A	N/A
Suct Vol Eff HE/CE, %	83.6/83.0	83.3/82.1	N/A/59.3	N/A/59.3	91.6/N/A	91.6/N/A
Disch Event HE/CE, ms	8.2/9.2	7.5/8.4	N/A/6.9	N/A/6.9	9.5/N/A	9.5/N/A
Suct Pseudo-Q HE/CE	6.4/5.7	11.0/9.0	N/A/7.1	N/A/7.1	4.2/N/A	4.2/N/A
Gas Rod Ld Comp, lbf	6479 C	10532 C	8639 C	8639 C	8639 C	8639 C
Gas Rod Ld Tens, lbf	5497 T	8387 T	7850 T	7850 T	7850 T	7850 T
Gas Rod Ld Total, lbf	11976	18919	16489	16489	16489	16489
Xhd Pin Deg/%Rvrsl lbf	174/78.1	179/75.7	180/66.2	162/68.0	180/66.2	162/68.0
Flow Calc, SCFM	1956.616	1956.617	977.360	977.360	977.054	977.054
Cyl BHP	115.5	170.3	81.8	81.8	43.6	43.6