

**CITY OF NAPLES
PURCHASING DIVISION
CITY HALL, 735 8TH STREET SOUTH
NAPLES, FLORIDA 34102
PH: 239-213-7100 FX: 239-213-7105**

ADDENDUM NUMBER 1

NOTIFICATION DATE:	BID TITLE:	BID NUMBER:	BID OPENING DATE & TIME:
03/19/15	RADIATORS FOR WATER PLANT GENERATORS	15-033	04/02/15 2:00 PM

**THE FOLLOWING INFORMATION IS HEREBY INCORPORATED INTO,
AND MADE AN OFFICIAL PART OF THE ABOVE REFERENCED BID.**

The following clarifications are issued for the referenced solicitation:

- Please advise whether optional protective coatings are required for the radiators (none are presently specified). For installations in Florida, we recommend galvanized steel structural members and solder-coated fins for the radiator core.

ANSWER: The contractor shall provide the radiator manufacturer's recommended materials and coatings for the intended service/environmental conditions.

- Please provide technical data for the engines, specifically, "heat load rejected to jacket water" (btu/min), and "jacket water flow rate" (gpm).

ANSWER: Attached are the data sheets (Exhibit A) for the existing engine that include the cooling system information. However the proposed radiator model listed in the drawings was based on radiator manufacturer coordination directly with the engine manufacturer. The contractor shall coordinate directly with the radiator and engine manufacturers to confirm the heat loading and jacket water flow rates as needed and to confirm that the radiator manufacturer will warrant the operation of the radiator for the intended service.

- Please provide a Budget for the above-named project.

ANSWER: The total Opinion of Probable Construction Cost is estimated at \$174,000.

- Are the radiators Owner Furnished? I do not see a specification section for them.

ANSWER: The radiator make and model is specified on the first page of the drawings/plans (page 63 of the bid document). Reference Note 4 listed on page 63 per below:

IMPORTANT MESSAGE

PLEASE ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THE BID COVER SHEET.

NOTES:

1. CONTRACTOR TO FIELD ROUTE PIPING TO AND FROM RADIATOR.
2. CONTRACTOR TO SUPPORT NEW PIPE PER SECTION 40 05 15.
3. PIPE INSULATION PROVIDED PER SECTION 40 42 13.
4. RADIATOR TO BE YOUNG TOUCHSTONE (A WABTEC COMPANY)
MODEL NO. HS24NX124115H XXXXX XXXXX R, FAN MODEL NO.
S4-2630-FAC-27; 54 INCH DIAMETER; 9 BLADES; 27.0 DEGREE PITCH
OR EQUAL.
5. CONTRACTOR TO FIELD VERIFY ALL PIPE ROUTING AND ELEVATIONS.
6. CONTRACTOR TO REMOVE SHRUBS, GRASS AND LANDSCAPING
NECESSARY TO INSTALL RADIATORS.
7. CONTRACTOR TO MODIFY SURGE TANKS SUPPORTS AS NECESSARY.

EXHIBIT A - Generator Engine Data Sheets

IMPORTANT MESSAGE

PLEASE ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THE BID COVER SHEET.

EXHIBIT A - Generator Engine Data Sheets

CUMMINS ENGINE COMPANY, INC.

Engine Model: KTA-2300 G/GS/GC-1

Engine Data Sheet

Date: September, 1981

Bulletin: 3383086 Rev. 9/81

GENERAL ENGINE DATA

Type 4 Cycle; 60° Vee; 12 Cylinder Diesel
 Aspiration Turbocharged & Aftercooled
 Bore-in. (mm) X stroke-in. (mm) 6.25 (159) x 6.25 (159)
 Displacement-in.³ (liter) 2300 (37.8)
 Compression Ratio 14.5:1

Dry Weight

Engine only per Installation Diagram 3003604
 Radiator Cooled Engine without Main Generator per Installation Diagram 3003608
 Heat Exchanger Cooled Engine without Main Generator per Installation Diagram 3012501

Dry Type Exhaust Manifold lb. (kg)	Water Cooled Exhaust Manifold lb. (kg)
8200 (3723)	8368 (3799)
12625 (5732)	12793 (5808)
8706 (3953)	8894 (4038)
13569 (6160)	13757 (6246)

Wet Weight

Engine only per Installation Diagram 3003604
 Radiator Cooled Engine without Main Generator per Installation Diagram 3003608
 Heat Exchanger Cooled Engine without Main Generator per Installation Diagram 3012501

Moment of Inertia of Rotating Components (exclusive of Flywheel) -lb_m*ft² (kg*m²) 94 (3.96)
 Cyclic Speed Variation with FW 6001 Flywheel at 1800 rpm; 1500 rpm 1/103; 1/85

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block-lb.ft. (N-m) 3000 (4068)

EXHAUST SYSTEM

Maximum Back Pressure-in. Hg (mm Hg) 3 (75)

AIR INDUCTION SYSTEM

Maximum Intake Air Restriction-With Dirty Filter Element-in. H₂O (mm H₂O) 25 (635)
 -With Heavy Duty Air Cleaner and Clean Filter Element-in. H₂O (mm H₂O) 15 (380)
 -With Light Duty Air Cleaner and Clean Filter Element-in. H₂O (mm H₂O) 10 (250)
 Minimum Dirt Holding Capacity -Heavy Duty Air Cleaner - g/CFM (g-liter⁻¹-sec.) 25 (53)
 -Light Duty Air Cleaner - g/CFM (g-liter⁻¹-sec.) 3 (6.4)

COOLING SYSTEM

Coolant Capacity - Engine only-U.S. quart (liter) 125 (118)
 - With 100°F HX 6004 Radiator - U.S. quart (liter) 344 (325)
 - With HX 6018 Heat Exchanger - U.S. quart (liter) 201 (190)
 Maximum Coolant Friction Head External to Engine-PSI (kPa) 5.0 (35)
 Maximum Static Head of Coolant Above Engine Crank Centerline-ft. (meter) 25 (7.6)
 Maximum Air Restriction on Discharge Side of HX 6004 Radiator and Fan-in. H₂O (mm H₂O) 0.5 (12.7)
 Minimum Raw Water Flow @ 90°F to HX 6018 Heat Exchanger-U.S. GPM (liter/min.) 108 (409)
 Maximum Raw Water Inlet Pressure at HX 6018 Heat Exchanger-PSI (kPa) 50 (345)
 Standard Thermostat (modulating) Range-°F (°C) 175-195 (80-90)
 Maximum Output Pressure of Engine Water Pump (exclusive of pressure cap)-PSI (kPa) 35 (240)
 Minimum Pressure Cap-PSI (kPa) 7 (50)
 Maximum Top Tank Temperature-°F (°C) 212 (100)
 Minimum Top Tank Temperature-°F (°C) 160 (70)
 Minimum Fill Rate-U.S. GPM (liter/min.) 5 (20)
 Maximum Initial Fill Time-With Engine Mounted Radiator-min. 5
 Minimum Coolant Expansion Space-% of System Capacity 5
 Maximum Deaeration Time-min. 25
 Drawdown* Must Exceed the Volume Not Filled at Initial Fill
 Minimum Allowable Drawdown*-U.S. quart (liter) 22 (20.8)

Dry Type Exhaust Manifold	Water Cooled Exhaust Manifold
125 (118)	135 (128)
344 (325)	354 (335)
201 (190)	211 (200)

*Drawdown does not include expansion space. It is suggested that initial design be at least 10% of system capacity.

LUBRICATION SYSTEM

Oil Pressure @ Idle-PSI (kPa) 20 (140) Minimum
 @ Rated Speed-PSI (kPa) 45-70 (310-483)
 Maximum Oil Temperature -°F (°C)
 Maximum Oil Consumption-U.S. quart/hr. (liter/hr.) 0.66 (0.62)
 By-Pass Filter Size-in.³ (liter)
 By-Pass Filter Capacity-U.S. gal. (liter) 2 x 0.73 (2 x 2.8)
 Oil Capacity (Oil Pan Option No. OP6012); High-Low-U.S. gal. (liter) 30-23 (114-87)
 Total System Capacity (including by-pass filter) -U.S. gal. (liter) 35 (132)
 Angularity of OP6012 Oil Pan
 -Front Down 30°
 -Front Up 30°
 -Side to Side 30°

FUEL SYSTEM

Type Injection System Cummins PT Direct Inject
 Maximum Restriction to PT Fuel Injection Pump - With Clean Fuel Filter-in. Hg (mm Hg) 4 (100)
 - With Dirty Fuel Filter-in. Hg (mm Hg) 8 (200)
 Maximum Injector Return Line Restriction-in. Hg (mm Hg) 4 (100)
 Maximum Fuel Flow to Pump - U.S. GPH (liter/hr) 173 (655)

ELECTRICAL SYSTEM

Battery Charging System, Negative Ground—Volt; Ampere	24; 35
Cranking Motor (Heavy Duty, Positive Engagement)—Volt	24
Maximum Allowable Resistance of Cranking Circuit—Ohm	0.002
Minimum Recommended Battery Capacity	1200
Cold Soak @ 50°F (10°C) and above—0°F CCA	1280
Cold Soak @ 32°F to 50°F (0°C to 10°C)—0°F CCA	1800
Cold Soak @ 0°F to 32°F (-18°C to 0°C)—0°F CCA	
Cranking Motor Current Based on Lube Oil Viscosity per Bulletin 3379002	1660
Breakaway Current at Zero RPM @ 50°F (10°C)—Amp	1600
Breakaway Current at Zero RPM @ 32°F (0°C)—Amp	2120
Breakaway Current at Zero RPM @ 0°F (-18°C)—Amp	920
Cranking Current @ 50°F (10°C)—Amp	890
Cranking Current @ 32°F (0°C)—Amp	1180
Cranking Current @ 0°F (-18°C)—Amp	

PERFORMANCE DATA

Steady-State Speed Stability Band at any Constant Load—%	± 0.25
Maximum Overspeed Capability—RPM	2700
Estimated Free Field Sound Pressure Level @ 3 ft.—dBA	109

Excludes Noise from Intake, Exhaust, Cooling System & Driven Components.

All data is based on operation under SAE Standard J816b conditions of 500 ft. (150m) altitude (29.00 in. [736mm] Hg dry barometer), 85°F (29°C) intake air temperature and 0.38 in. (9.6mm) Hg water vapor pressure, using No. 2 diesel or a fuel corresponding to ASTM D2. Data is based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

Chart below reflects data based on following variables at conditions of rated power:

Coolant Temperature—°F (°C)	185 (85)	Air Intake Restriction—in. H ₂ O (mm H ₂ O)	10 (250)
Water Inlet Pressure—PSI (kPa)	7 (50)	Air Intake Temperature—°F (°C)	85 (30)
Water Pressure in Engine Block—PSI (kPa)	35 (240)	Exhaust Restriction—in. Hg (mm Hg)	2.0 (50)

	STAND-BY		PRIME POWER	
	60 Hz	50 Hz	60 Hz	50 Hz
Engine Speed—RPM	1800	1500	1800	1500
Gross Engine Power Output—BHP (kW)	1135 (847)	940 (701)	1030 (768)	850 (634)
Brake Mean Effective Pressure—PSI (kPa)	217 (1496)	216 (1489)	197 (1358)	195 (1344)
Piston Speed—ft./min. (m/s)	1875 (9.5)	1562 (7.9)	1875 (9.5)	1562 (7.9)
Maximum Regenerative Power Absorption Capacity—kW	164	110	164	110
Engine Water Flow—U.S. GPM (liter/s)	411 (25.0)	343 (21.6)	411 (25.9)	343 (21.6)
Engine Data with Dry Type Exhaust Manifold				
Net Engine Power With				
100°F HX 6004 Radiator and Fan—BHP (kW)	1095 (817)	916 (683)	990 (739)	826 (616)
125°F HX 6005 Radiator and Fan—BHP (kW)	1095 (817)	916 (683)	990 (739)	826 (616)
Intake Air Flow—CFM (liter/s)	2750 (1298)	1850 (873)	2550 (1204)	1700 (802)
Exhaust Gas Temperature—°F (°C)	915 (491)	1015 (546)	895 (479)	1000 (538)
Exhaust Gas Flow—CFM (liter/s)	7100 (3351)	5350 (2525)	6500 (3068)	4750 (2242)
Radiated Heat to Ambient—BTU/min. (kW)	9900 (174)	8000 (141)	9000 (158)	7750 (136)
Heat Rejection to Coolant—BTU/min. (kW)	29510 (519)	24440 (430)	26780 (471)	22100 (389)
Heat Rejection to Exhaust—BTU/min. (kW)	41900 (737)	34000 (598)	38200 (672)	30700 (540)
Cooling Fan Air Flow with				
100°F HX 6004 Radiator and Fan—CFM (liter/s)	77350 (36509)	63820 (30123)	77350 (36509)	63820 (30123)
125°F HX 6005 Radiator and Fan—CFM (liter/s)	71430 (33715)	58650 (27683)	71430 (33715)	58650 (27683)
Engine Data with Water Cooled Exhaust Manifold				
Net Engine Power With				
100°F HX 6005 Radiator and Fan—BHP (kW)	1095 (817)	916 (683)	990 (739)	826 (616)
125°F HX Radiator and Fan—BHP (kW)				
Intake Air Flow—CFM (liter/s)	2300 (1086)	1775 (838)	2220 (1048)	1650 (779)
Exhaust Gas Temperature—°F (°C)	885 (474)	985 (529)	865 (463)	970 (521)
Exhaust Gas Flow—CFM (liter/s)	5960 (2813)	4940 (2332)	5670 (2676)	4550 (2148)
Radiated Heat to Ambient—BTU/min. (kW)	7400 (130)	6000 (105)	6700 (118)	5800 (102)
Heat Rejection to Coolant—BTU/min. (kW)	37455 (658)	31020 (545)	33990 (598)	28050 (493)
Heat Rejection to Exhaust—BTU/min. (kW)	37000 (650)	31300 (550)	29800 (524)	28300 (498)
Cooling Fan Air Flow With				
100°F HX 6005 Radiator and Fan—CFM (liter/s)	71430 (33715)	58650 (27683)	71430 (33715)	58650 (27683)
125°F HX Radiator and Fan—CFM (liter/s)				

REFERENCE INFORMATION

Performance Curve	C-3642-C
Wiring Diagram	194076
Installation Diagram	
— Engine Only	3003604
— With Radiator	3003608
— With Heat Exchanger	3012501
— For Remote Cooling	3003609

Engine Model: KTA-2300 G/GS/GC-1
 Data Sheet: DS-3642-C
 Date: September, 1981
 Bulletin No: 3383086 Rev. 9/81