WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
601 57th Street, SE
Charleston, WV 25304
Phone: (304) 926-0475
www.dep.wv.gov/daq

PERMIT DETERMINATION FORM (PDF)

FOR AGENCY USE ONLY: PLANT I.D. # _____

PDF # _____ PERMIT WRITER _____

1. NAME OF APPLICANT (AS REGISTERED WITH THE WV SECRETARY OF STATE'S OFFICE):
West Virginia Army National Guard

2. NAME OF FACILITY (IF DIFFERENT FROM ABOVE):
Logan-Mingo Readiness Center

3. NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (**NAICS**) CODE:
928110

4A. MAILING ADDRESS:
1703 Coonskin Drive
Charleston, WV 25311

4B. PHYSICAL ADDRESS:
361 22 Mine Road
Holden, WV 25625

5A. DIRECTIONS TO FACILITY (PLEASE PROVIDE **MAP** AS **ATTACHMENT A**):
See attachment A

5B. NEAREST ROAD:	5C. NEAREST CITY OR TOWN:	5D. COUNTY:
Co. Rt. 7/10	Holden, WV	Logan & Mingo
5E. UTM NORTHING (KM):	**5F. UTM EASTING (KM):**	**5G. UTM ZONE:**
4180.016	402.094	17

6A. INDIVIDUAL TO CONTACT IF MORE INFORMATION IS REQUIRED:
Phillip Emmerth

6B. TITLE: Environmental Compliance Manager

6C. TELEPHONE:	6D. FAX:	6E. E-MAIL:
304-201-3529	304-201-3519	Phill.p.Emmerth.nfg@mail.mil

7A. DAQ PLANT I.D. NO. (FOR AN EXISTING FACILITY ONLY):
___ ___ ___ – ___ ___ ___ ___ ___

7B. PLEASE LIST ALL CURRENT 45CSR13, 45CSR14, 45CSR19 AND/OR TITLE V (45CSR30) PERMIT NUMBERS ASSOCIATED WITH **THIS** PROCESS (FOR AN EXISTING FACILITY ONLY):
None

7C. IS THIS PDF BEING SUBMITTED AS THE RESULT OF AN ENFORCEMENT ACTION? IF YES, PLEASE LIST:
No

8A. TYPE OF EMISSION SOURCE (CHECK ONE):
☒ **NEW SOURCE** ☐ **ADMINISTRATIVE UPDATE**
☐ **MODIFICATION** ☐ **OTHER** (PLEASE EXPLAIN IN 11B)

8B. IF ADMINISTRATIVE UPDATE, DOES DAQ HAVE THE APPLICANT'S CONSENT TO UPDATE THE EXISTING PERMIT WITH THE INFORMATION CONTAINED HEREIN?
☐ **YES** ☐ **NO**

9. IS *DEMOLITION* OR PHYSICAL *RENOVATION* AT AN EXISTING FACILITY INVOLVED? ☐ **YES** ☒ **NO**

10A. DATE OF ANTICIPATED INSTALLATION OR CHANGE:	10B. DATE OF ANTICIPATED START-UP:
03 / 15 / 2015	06 / 28 / 2015

11A. PLEASE PROVIDE A **DETAILED PROCESS FLOW DIAGRAM** SHOWING EACH PROPOSED OR MODIFIED PROCESS EMISSION POINT AS **ATTACHMENT B**.

11B. PLEASE PROVIDE A **DETAILED PROCESS DESCRIPTION** AS **ATTACHMENT C**.

12. PLEASE PROVIDE **MATERIAL SAFETY DATA SHEETS (MSDS)** FOR ALL MATERIALS PROCESSED, USED OR PRODUCED AS **ATTACHMENT D**. FOR CHEMICAL PROCESSE, PLEASE PROVIDE A MSDS FOR EACH COMPOUND EMITTED TO AIR.

13A. **REGULATED AIR POLLUTANT EMISSIONS:**

⇒ **FOR A NEW FACILITY,** PLEASE PROVIDE PLANT WIDE EMISSIONS BASED ON THE POTENTIAL TO EMIT (PTE) FOR THE FOLLOWING AIR POLLUTANTS INCLUDING ALL PROCESSES.

⇒ **FOR AN EXISTING FACILITY,** PLEASE PROVIDE THE PROPOSED CHANGE IN EMISSIONS BASED ON THE PTE OF ALL PROCESS CHANGES FOR THE FOLLOWING AIR POLLUTANTS.

PTE FOR A GIVEN POLLUTANT IS TYPICALLY BEFORE AIR POLLUTION CONTROL DEVICES AND IS COLLECTED BASED ON THE MAXIMUM DESIGN CAPACITY OF PROCESS EQUIPMENT.

POLLUTANT	**HOURLY PTE** (LB/HR)	**YEARLY PTE** (TON/YR) (HOURLY PTE MULTIPLIED BY 500 HR/YR) DIVIDED BY 2000 LB/TON
PM	0.033	0.0082
PM_{10}	0.033	0.0082
VOCs	0.075	0.019
CO	0.43	0.11
NO_x	0.78	0.20
SO_2	0.043	0.011
Pb	NA	NA
HAPs (AGGREGATE AMOUNT)	1.13×10^{-3}	2.81×10^{-4}
TAPs (INDIVIDUALLY)*	see calculations Att. E	
OTHER (INDIVIDUALLY)*	see calculations Att. E	

* ATTACH ADDITIONAL PAGES AS NEEDED

13B. PLEASE PROVIDE ALL **SUPPORTING CALCULATIONS** AS **ATTACHMENT E.**

CALCULATE AN HOURLY AND YEARLY PTE OF EACH PROCESS EMISSION POINT (SHOWN IN YOUR DETAILED PROCESS FLOW DIAGRAM) FOR ALL AIR POLLUTANTS LISTED ABOVE INCLUDING INDIVIDUAL HAP'S (LISTED IN SECTION 112[b] OF THE 1990 CAAA), TAP'S (LISTED IN 45CSR27), AND OTHER AIR POLLUTANTS (E.G. POLLUTANTS LISTED IN TABLE 45-13A OF 45CSR13, MINERAL ACIDS PER 45CSR7, ETC.).

14. **CERTIFICATION OF DATA**

I, COL JOSEPH P. STEVENS, ATTEST THAT ALL THE REPRESENTATIONS CONTAINED IN THIS APPLICATION, OR APPENDED HERETO, ARE TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE BASED ON INFORMATION AND BELIEF AFTER REASONABLE INQUIRY, AND THAT I AM A ***RESPONSIBLE OFFICIAL**** (*PRESIDENT, VICE PRESIDENT, SECRETARY OR TREASURER, GENERAL PARTNER OR SOLE PROPRIETOR*) OF THE APPLICANT.

SIGNATURE OF RESPONSIBLE OFFICIAL: _____

TITLE: COL Joseph P. Stephens, C & FMO DATE: 6 / 30 / 2015

THE DEFINITION OF THE PHRASE '*RESPONSIBLE OFFICIAL***' CAN BE FOUND AT 45CSR13, SECTION 2.23.

NOTE: PLEASE CHECK ENCLOSED ATTACHMENTS

☒ **ATTACHMENT A** ☒ **ATTACHMENT B** ☒ **ATTACHMENT C** ☒ **ATTACHMENT D** ☒ **ATTACHMENT E**
☒ **ATTACHMENT F**

RECORDS ON ALL CHANGES ARE REQUIRED TO BE KEPT AND MAINTAINED ON-SITE FOR TWO (2) YEARS.

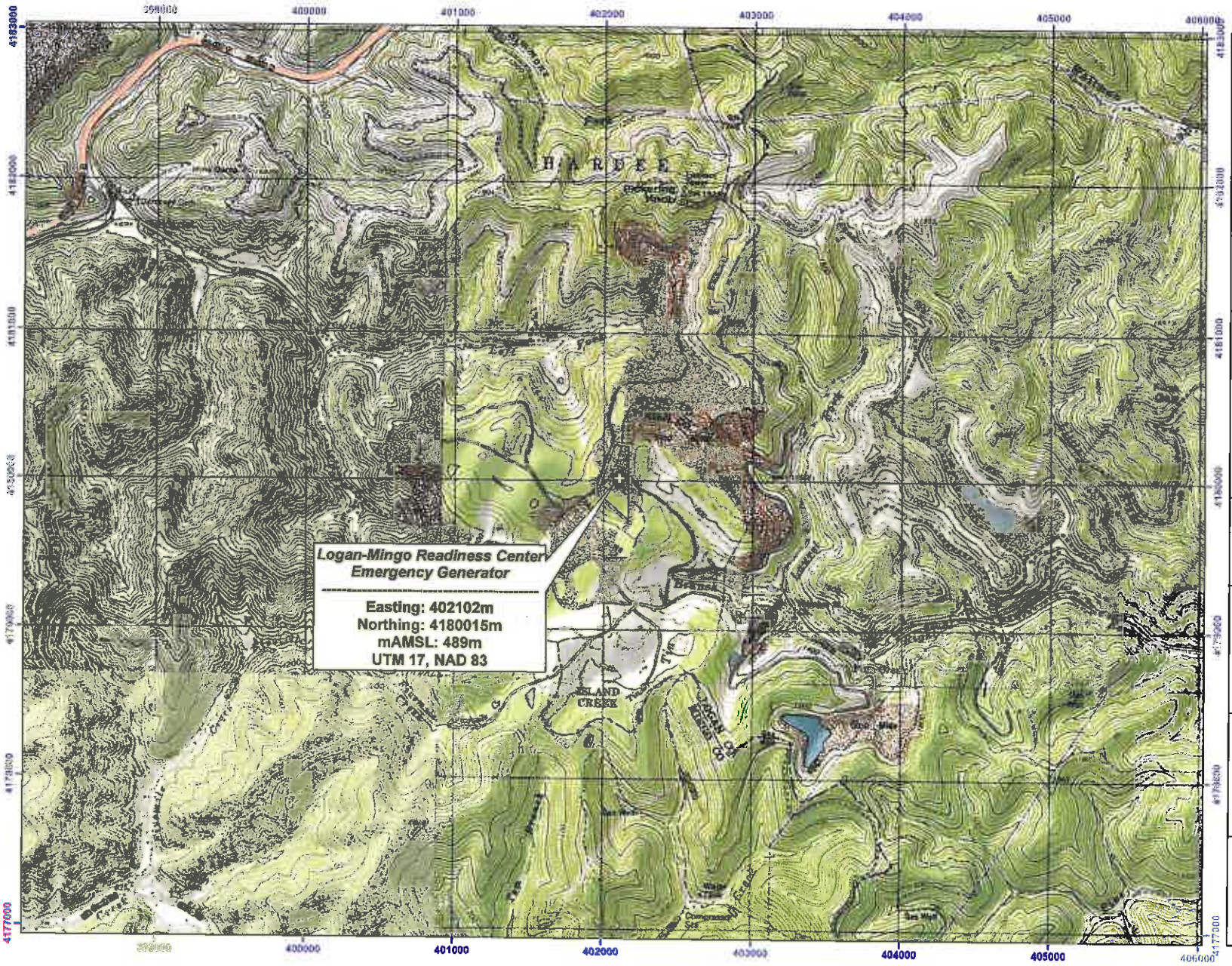
THE PERMIT DETERMINATION FORM WITH THE INSTRUCTIONS CAN BE FOUND ON DAQ'S PERMITTING SECTION WEB SITE ***www.dep.wv.gov/daq***

Attachment A Site Maps

Figure 1 - Area Map

Figure 2 – Plot Plan

Figure 3 - Site Location Maps



Logan-Mingo Readiness Center

AREA MAP

Legend

- Emergency Generator
- Approximate Property Boundary/ Fence Line
- Cemetery (4)
- Church (2)

0 200 400 600 Meters

0 750 1,500 2,250 3,000 Feet

N

1 in = 2,000 ft

Prepared for:

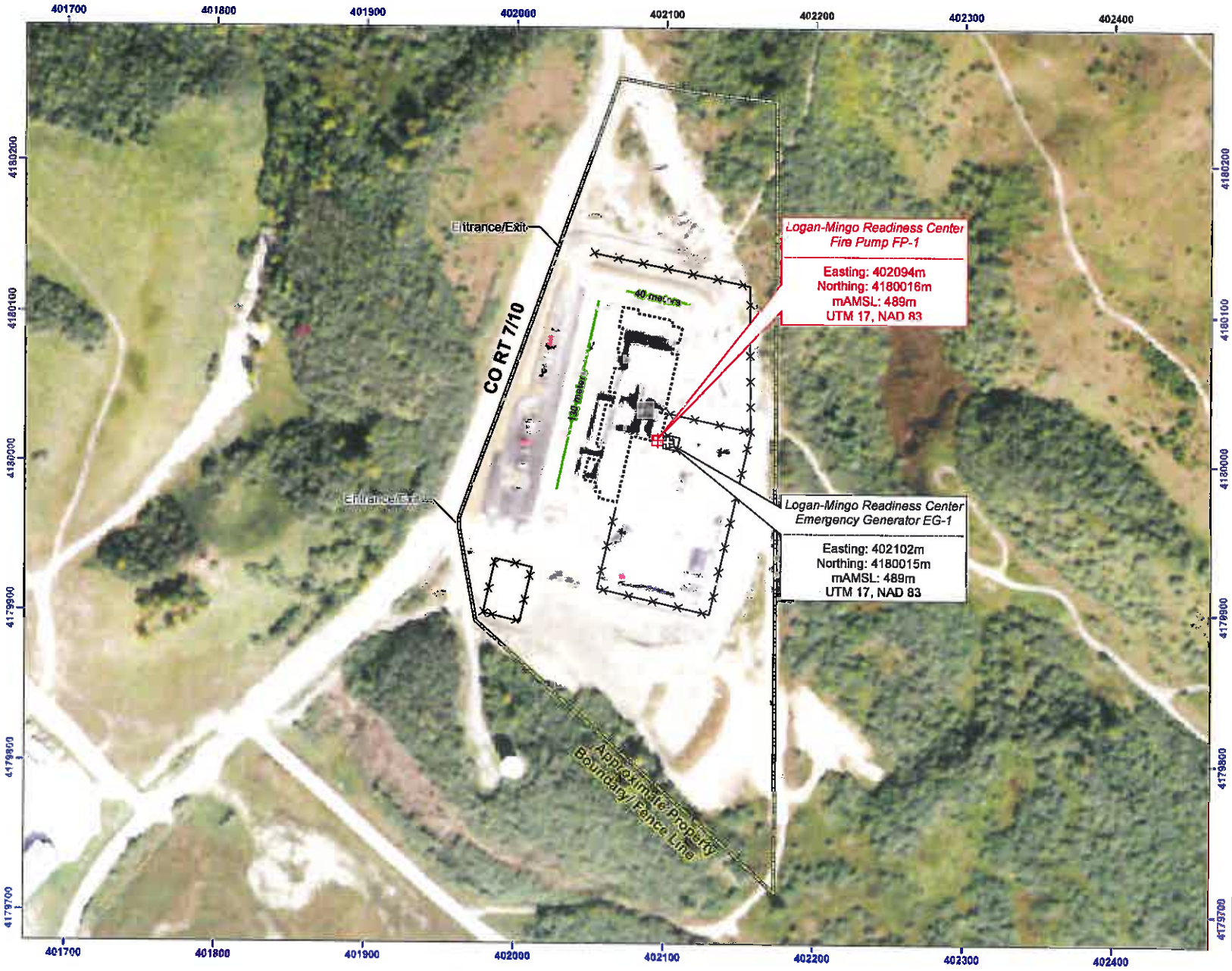
West Virginia Army National Guard

Prepared by:

amec foster wheeler

11003 Bluegrass Parkway, Suite 690
Louisville, KY 40299
Phone: (502) 267-0700

Imagery: USGS 24k TOPO - Holden, WV 1978
Projection: NAD 1983 UTM Zone 17N
Drawn by: DJC, Submitted: 05-15-2015



Logan-Mingo Readiness Center

PLOT PLAN

- Fire Pump (FP-1)
- Emergency Generator (EG-1)
- Fence
- Approximate Property Boundary/ Fence Line

0 75 Meters
0 250 Feet
N
1 in = 200 ft

Prepared for:

West Virginia Army National Guard

Prepared by:

amec foster wheeler

11003 Bluegrass Parkway, Suite 690
Louisville, KY 40299
Phone: (502) 267-0700

Imagery: USGS - 2014
Projection: NAD 1983 UTM Zone 17N
Drawn by: DJC, Submitted: 05-15-2015

Figure 3 - Site Location Map
Logan-Mingo Readiness Center

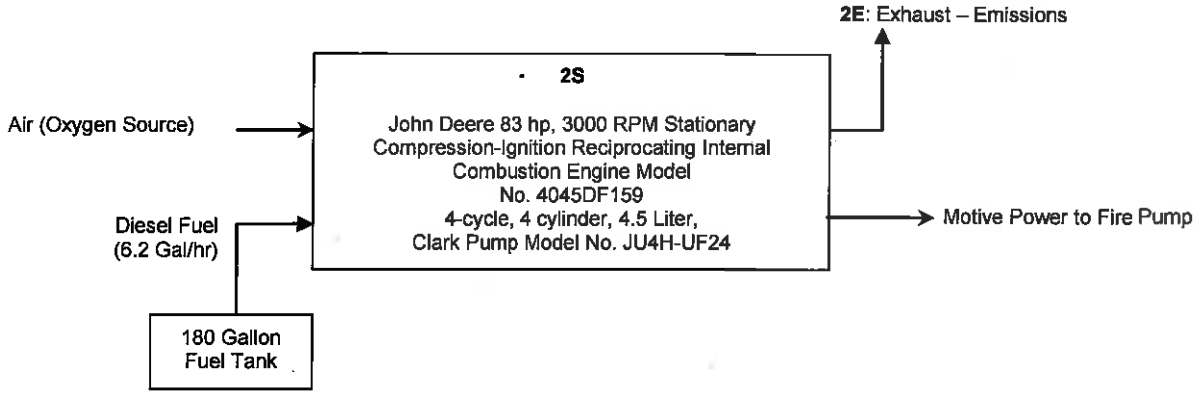
Directions to site: Turn left off of WV 119 approximately 4 miles south of Holden, WV, onto County Route (CR 65/30) aka. "22 Mine Road", then in approximately 0.4 mile continue right on CR 9, which becomes CR 7/02, for approximately 1.5 miles and bear right on CR 7/10, and continue approximately 0.5 miles and turn left into Access Road to Facility. Note: The 22 Mine Road follows this route from WV 119 to the facility.

Attachment B Process Flow Diagram

Attachment B Process Flow Diagram

Diesel Fuel-Fired Fire Water Booster Pump Engine

FP-1



Attachment C Process Description and Emission Unit Details

The WVARNG proposes one (1) new diesel-fired, standby/emergency fire pump (FP-1) at the Logan-Mingo Readiness Center installation located in Logan-Mingo, West Virginia.

- FP-1 consists of a Clarke model JU4H-UF24 fire pump with a John Deere 4-cycle engine driver, as shown as provided in the attached manufacturers' specifications. A 180-gallon tank stores diesel fuel to supply the FP-1 engine.

Manufacturer-provided specifications are attached for your information.

RECEIVED
NOV 3 2013

SUBMITTAL COVER SHEET

(Attach to each copy of each submittal.)

PROJECT: The New Logan-Mingo Readiness Center for WVARNG

ARCHITECT/ENGINEER: ZMM, Inc.
222 Lee Street West
Charleston, WV 25302

A/E COMMISSION #: 0612
(found on cover of Project Manual)

PRIME CONTRACTOR: Paramount Builders

SUBCON./SUPPLIER: Brewer & Company of WV, Inc.

MANUFACTURER: Aurora

ITEM SUBMITTED: Diesel-Drive, Centrifugal Fire Pumps Product Data

SUBMITTAL #: 30

SPEC. SECTION #: 13922

PARAGRAPH #: 1.4A

DRAWING REFERENCE: _____

DETAIL #: _____

CERTIFICATION: *(Circle one.)*

(A) Certified to comply with Drawings and Specifications.

B. Certified to comply with Drawings and Specifications except as noted on attached Submittal Deviation Sheet.

Signature: Subcontractor/Supplier Date

Signature: Prime Contractor 11/21/2013 Date

Reviewed for conformance to plans and specifications. This review shall not relieve the supplier or subcontractor from any of their responsibleness for compliance, coordination, quantities, dimensions, verification, nor errors or emissions in their shop.

Specification number: 13922

Specification description: Diesel-Drive, Centrifugal Fire Pumps Product Data

___ Approved

___ Not Approved

___ Approved as Corrected

___ Revise and Resubmit

Paramount Builders, LLC.

By _____ Date _____

(PRIME CONTRACTOR APPROVAL STAMP)

☐ NO EXCEPTION TAKEN	☒ EXCEPTION NOTED
☐ SUBMIT SPECIFIED	☐ REVISE AND RESUBMIT
☐ SEE COVER LETTER	☐ REJECTED

COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR: CONFIRMING AND CORRELATING QUANTITIES AND DIMENSIONS, SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION, COORDINATING THIS WORK WITH THAT OF ALL OTHER TRADES, AND PERFORMING WORK IN A SAFE AND SATISFACTORY MANNER. NOTE ANY DEVIATIONS IN ATTACHED SUBMITTAL DEVIATION SHEET.

DATE: 12-10-13 BY: S Cook ZMM, Inc.

(ARCHITECT/ENGINEER REVIEW STAMP)

Submit product data on remote alarm panel.

LETTER OF TRANSMITTAL

DATE: 11.21.2013	JOB NO. 151
ATTENTION: Tess Doeffinger	
RE: WVARNG Logan-Mingo	
Transmittal	

PARAMOUNT BUILDERS
PO Box 1370
St, Albans, WV 25177
Phone (304) 727-2770
Fax (304) 727-0302
WV #032815

TO: ZNM
Tess Doeffinger
Copy David Unrue
222 Lee Street
Charleston, WV 25302

WE ARE SENDING YOU ☒ Submittals ☐ Hard Copy ☒ Digital Copy
☐ Shop Drawing ☐ Product Data ☒ Samples

COPIES	DATE	No.	Spec Section	DESCRIPTION
1	11/21/2013	30	13922	Diesel-Drive, Centrifugal Fire Pumps-Product Data

THESE ARE TRANSMITTED as checked below:
☒ For approval ☐ Approved as submitted ☐ Resubmit ____ copies for approval
☐ For review & comment ☐ _____
☐ FOR BIDS DUE ☐ PRINTS RETURNED

REMARKS:

COPY TO: Dave Unrue SIGNED: Julie Brightwell

WVARNG Mingo-Logan Readiness Center 9213-1310

Fire Pump

Product Data Brochure

Brewer & Company of WV, Inc.
3601 7th Avenue
Charleston, WV 25387
(304) 744-5314
800 642-8598

PENTAIR **AURORA**

Submittal Data For FIRE PUMPS with ENGINE DRIVES

NO. OF PRINTS	
XX	For Approval
	Final
	Reproducible

Sales Office: Keystone Fluid Handling, LLC P.O. No.

Factory Order No.: Service: Fire Protection

Job: Mingo Logan Readiness Center

Engineer:

Contractor: Brewer & Company of West Virginia

Sold To: Same P.O. No.

Reference: Mingo Logan Readiness Center

PUMP

Number of Units: One (1) Pump Only: ☐

Model: 491 Rotation:

Size: 4-491-11A RH: ☒

GPM: 750 LH: ☐

TDH: 100 PSI Connections:

RPM: 3000 Threaded: ☐

Flanged: ☒

☒ 125#

Construction:

☐ Standard Fitted

☒ Bronze Fitted ☐ 250#

Case: Cast Iron

Imp.: Bronze Lubrication:

Shaft: Steel Grease: ☒

Sleeve: Bronze Oil: ☐

Case Ring: Bronze Stuffing Box:

Imp. Ring: N/A Packing: ☒

Lantern Ring: ☒

OPTIONS

Base:

Steel Drip Rim ☐

Steel Form ☐

Fabricated Steel ☒

Cast Iron Ring Type ☐

Coupling:

Mfg: Clark

Size: Univ

Spacer ☐

Guard ☒

Test:

Certified Performance ☒

Wit. Certified Performance ☐

Hydro ☒

Field AC ☒

ENGINE

Manufacturer: Clarke Fire ☒ Aurora To Furnish

Model: JU4H-UF24 ☐ Others To Furnish

RPM: 3000

SPECIAL REQUIREMENTS:

CERTIFIED PRINT:

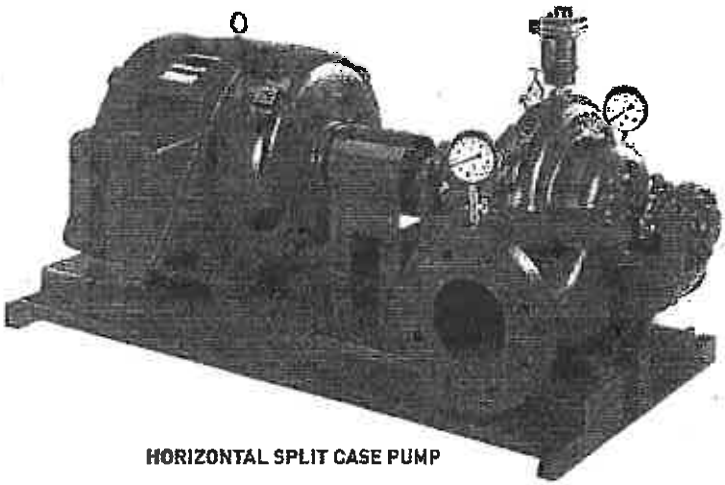
Section: 913 Page: Curve Number:

Special: Maintenance Sent:

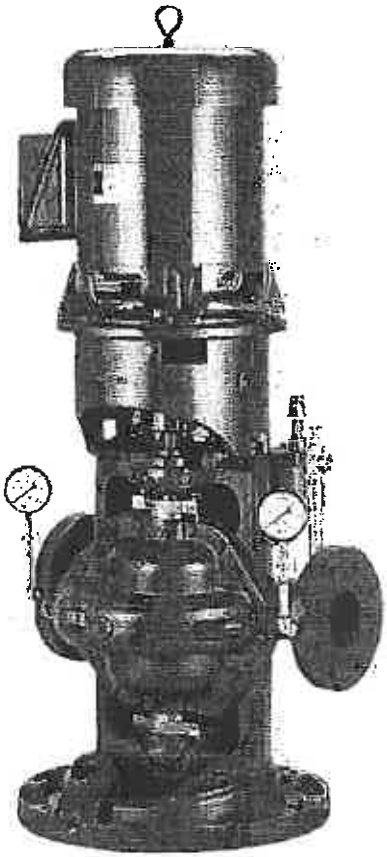
By: PG Date: 11-1-13 Office: KFH, LLC

This order will not be processed for manufacturing until approval is received. Prints are not to scale and are certified correct only for this order. All orders are subject to acceptance at Aurora Pump, North Aurora, Illinois.

PENTAIR



HORIZONTAL SPLIT CASE PUMP



VERTICAL SPLIT CASE PUMP

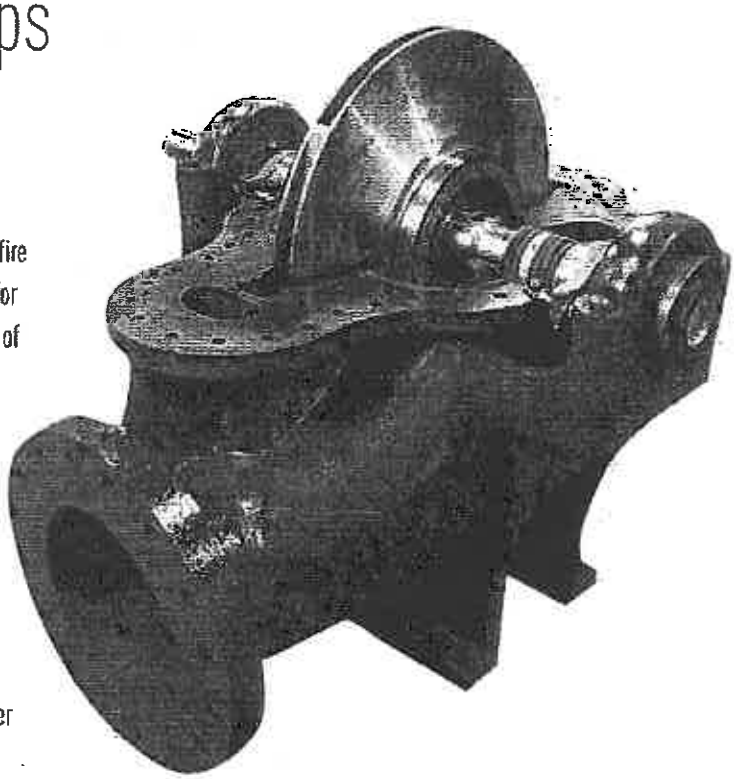
AURORA® 900 SERIES
SPLIT CASE FIRE PUMPS

Built Per NFPA 20

UL LISTED FM APPROVED

WWW.AURORAPUMP.COM

AURORA® 900 SERIES
Split Case Fire Pumps



Horizontal split case pumps are the most common type of fire pump. These pumps are specifically designed and tested for fire service applications where reliability of performance is of vital importance. Split case pumps are characterized by:

- Easy access to all working parts;
- Rugged construction;
- Liberal water passages; and
- Efficient operation.

Split case fire pumps are specified when the source of water is located above the surface of the ground and provides a positive suction pressure to the pump at any performance point. Single-stage or multistage pumps are available dependent upon discharge pressure requirements.

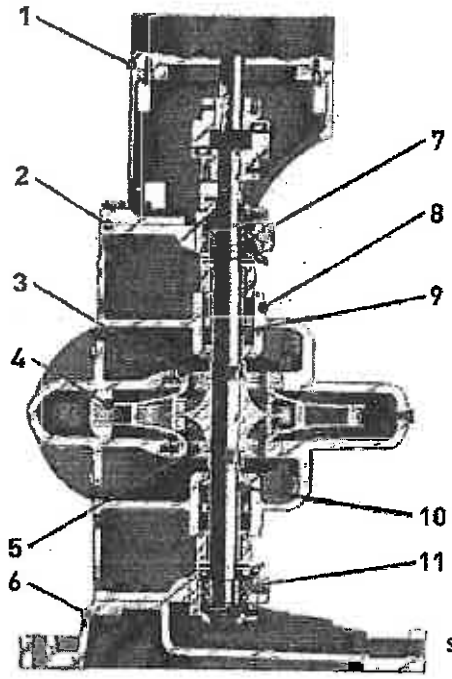
Aurora split case fire pumps are built per the rigid standards of NFPA 20 and are listed by Underwriters Laboratories (UL) and approved by Factory Mutual (FM).

Available in a broad range of operating pressures and flows from a minimum of 250 GPM, Aurora split case pumps can be driven by either an electric motor or diesel engine. Aurora's UL-Listed, FM-Approved fire pump packages also include the system controller, with a full range of options and accessories available to complete the NFPA-compliant fire pump package.

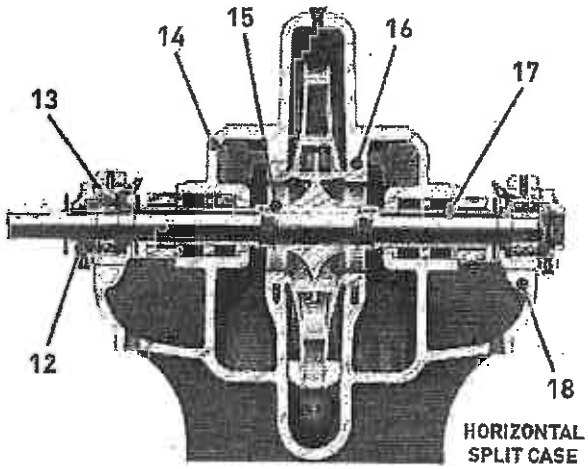
In addition to horizontal split case pumps, Aurora also offers split case performance in a vertical format. Vertical fire pumps provide distinct advantages over horizontal pump constructions.

- Less floor space is required.
- In-line piping arrangement allows piping in any direction in most cases.
- Elevated motor protects against potential flooding if the pump station is in a low area.
- Components are register-fitted to prevent misalignment.

Pump Features



VERTICAL SPLIT CASE



HORIZONTAL SPLIT CASE

1. **Computer Machined**
major components with 360 degree registered fits to assure concentricity of parts.

2. **Integral Bearing Arms**
eliminate bearing misalignment and simplify maintenance.

3. **Enclosed Impeller Design**
provides high efficiency and performance.

4. **Dynamically Balanced Impeller**
is keyed to the shaft and secured by adjustable shaft sleeves.

5. **Double Suction Impeller**
balances hydraulic thrust loads.

6. **Cast Iron Drip Rim Base**
directs condensation and any stuffing box leakage to drain.

7. **Short Bearing Span**
holds shaft deflection to .002" at face of stuffing box at maximum load.

8. **Internal Water Seal Passages**
between volute and stuffing box cannot be damaged.

9. **Interwoven, Graphite Impregnated T.F.E.**
diagonally cut packing rings seal the pump shaft.

10. **Stuffing Boxes**
are extra deep for proper sealing. Split packing glands simplify packing maintenance.

11. **Double Row Thrust**
ball bearing.

12. **Grease Seals**
and nonsparking neoprene rotating slingers protect both bearings during pump operation and washdown.

13. **Bearings**
selected for 50,000 hour minimum life at maximum load. Average bearing life 5 x minimum.

14. **Split Case Design**
simplifies disassembly. The suction and discharge piping and shaft alignment are not disturbed.

15. **O-Ring Sealed Shaft Sleeves**
prevent corrosion of the shaft. This eliminates the need for stainless steel shafts.

16. **Case Wearing Rings**
and throttle bushings protect the casing from wear and are easily and inexpensively replaced.

17. **Bronze Shaft Sleeve**
prevents shaft wear, is slip fit over the shaft, keylocked, and extends the entire length of the seal box.

18. **Certified Performance Test with Positive Suction Pressure**
is provided for each fire pump for customer approval. Pumps are also hydrostatically tested per NFPA 20 at no less than 250 psi.

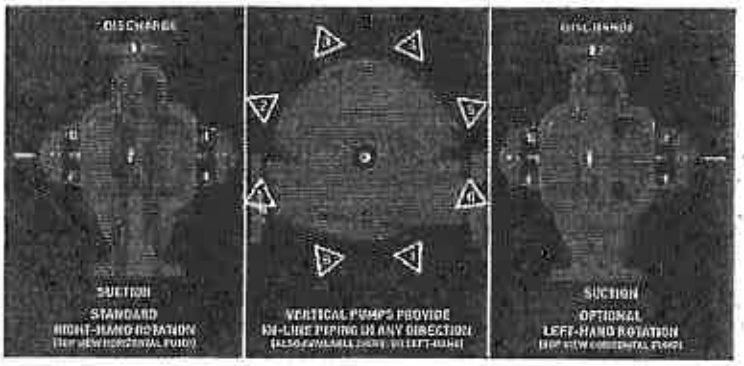
Fire Pump Feature Selector

Standard

- Bronze fitted pump construction
- Bronze shaft sleeves
- Bronze case wearing rings
- Dynamically balanced impellers
- Stainless steel impeller key
- Carbon steel shaft
- Corrosion-resistant lantern rings*
- Bronze stuffing box bushings
- Bronze glands
- Interwoven graphite-impregnated T.F.E. packing rings
- Cast integral bearing arms (most models)
- Regreaseable ball bearings
- Double row thrust bearing (outboard side)
- Upper casing lifting lugs
- Water slingers and grease seals
- Hydrostatic and Certified Performance test**
- Coupling guard
- Suction and discharge gauges with shutoff cocks
- Automatic air release valve
- Casing relief valve (electric driven units only)

Optional

- Ductile iron casings (available in selected 481 and 485 models)
- Right- or left-hand rotation
- Impeller wearing rings
- Stainless steel shafts
- Double row ball bearings on inboard side
- External bypass line from casing to stuffing boxes (optional on Model 480s, standard on Model 490s)
- Formed steel drip-rim base (horizontal electric driven units only)
- 15' Suction lift test to verify performance at 150% of rated flow
- Available accessories include valves, headers, main relief valves, increasers and reducers, waste cones, and more.



* Standard on Model 490s; furnished when suction pressure is below 40 psi on Model 480's.
** Test is performed with positive suction pressure.

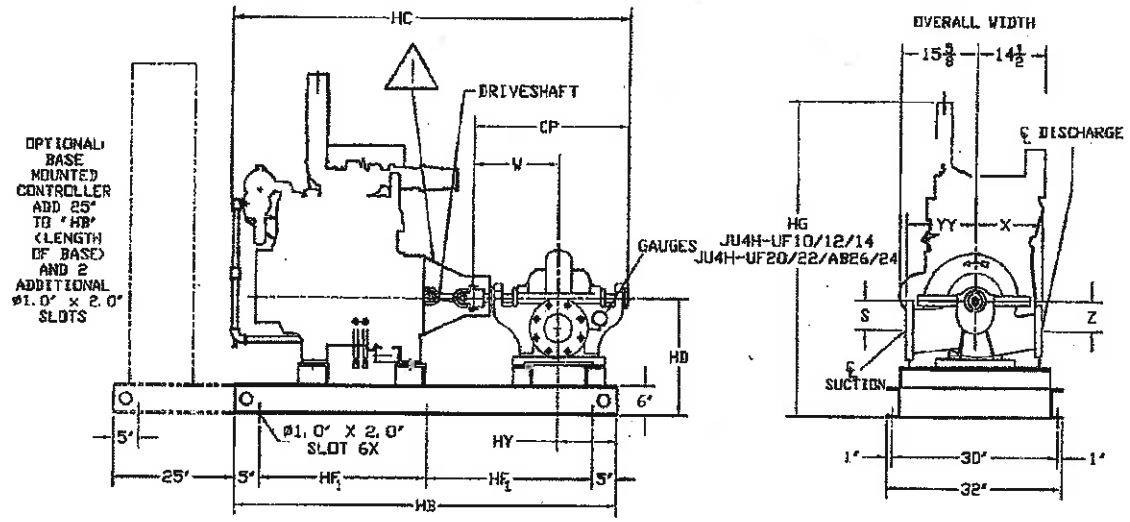
PENTAIR

800 AIRPORT ROAD, NORTH AURORA, ILLINOIS 60542 WWW.AURORAPUMP.COM

AURORA® PUMPS

SINGLE-STAGE HSC FIRE PUMPS
CLARKE MODELS JU4H-UF10,UF12,UF14, UF20, UF22, AB26, AB24

⚠ WARNING
DO NOT OPERATE THIS MACHINE WITHOUT PROTECTIVE GUARD IN PLACE. ANY OPERATION OF THIS MACHINE WITHOUT PROTECTIVE GUARD CAN RESULT IN SEVERE BODILY INJURY.



UL LISTED DRIVESHAFT	
ENGINE MODEL	DRIVESHAFT MODEL
JU4H-UF10, 12, 14, 20, 22, AB26, 24	CDS10-SC

PUMP SIZE			SUCTION	POWER SERIES	S	W	X	Z	CP	HB	HC	HD	HF1	HG	HY	YY
DISCH	MODEL	CASE BORE														
3	491	9	5	-	6-1/8	14-5/8	11	6-1/8	25-15/16	78	75-1/8	20	34	60-7/8	15-3/8	12
4	491	14	6	-	6-7/8	17-5/8	13	8-3/8	31-11/16	88	80-7/8	20	39	60-7/8	22-3/8	15-1/4
4	491	8	6	-	5-3/4	14-5/8	10	5-1/2	25-15/16	78	75-1/8	20	34	60-7/8	15-3/8	11-1/4
4	491	11	6	-	6-7/8	16-5/8	11-1/4	7-1/8	29-11/16	78	78-7/8	21	34	61-7/8	13-3/8	14
4	491	14	5	-	7-3/8	18-3/8	13-1/2	7-3/8	33-3/16	78	82-3/8	20	34	60-7/8	11-5/8	14
4	491	18	6	-	9-1/2	18-3/8	14	9-1/2	33-1/4	88	82-7/16	22	39	62-7/8	21-5/8	14
4	491	10	6	-	6-1/2	18-7/8	10-1/4	6-1/2	29-13/16	78	79	20	34	60-7/8	13-1/8	11
5	491	14	8	-	8-1/4	17-5/8	13-1/2	9-3/4	31-11/16	88	80-7/8	23	39	63-7/8	22-3/8	17-1/4
5	491	18	8	-	8-1/8	18-7/8	15	10-5/8	33-3/8	88	82-9/16	23	39	63-7/8	21-1/8	18-3/4
5	491	10	8	-	8	20	12-1/2	7	35-1/2	88	84-11/16	23	39	63-7/8	20	13
6	491	14	10	-	8-3/8	20-1/8	13-1/4	10	35-7/8	88	85-1/16	25	39	65-7/8	19-7/8	18
6	491	12	10	-	6-7/8	18-5/8	20-1/2	7-1/8	29-11/16	78	78-7/8	23	34	63-7/8	13-3/8	14
6	491	15	8	-	8-3/4	22-1/2	15-1/2	8-3/4	40-1/4	88	89-7/16	23	39	63-7/8	17-1/2	15
6	491	10	10	-	9	20-5/8	13	7-1/2	36-3/4	88	85-15/16	25	39	65-7/8	19-3/8	15
8	491	14	12	-	10-3/4	20-1/2	16	10-3/4	36-5/8	88	85-3/4	28	39	68-7/8	19-1/2	22

NOTES:
1. Flange ratings are either 125# or 250#. Reducers and/or increasers may be required to meet NFPA Pamphlet 20, Table 2-19.
2. Not for construction, installation or application puposes unless certified. Dimensions shown are typical and may vary due to various tolerances.
3. All bases are required to be completely filled with grout.
4. Unit installation and final driveshaft alignment must be done by the installing contractor.

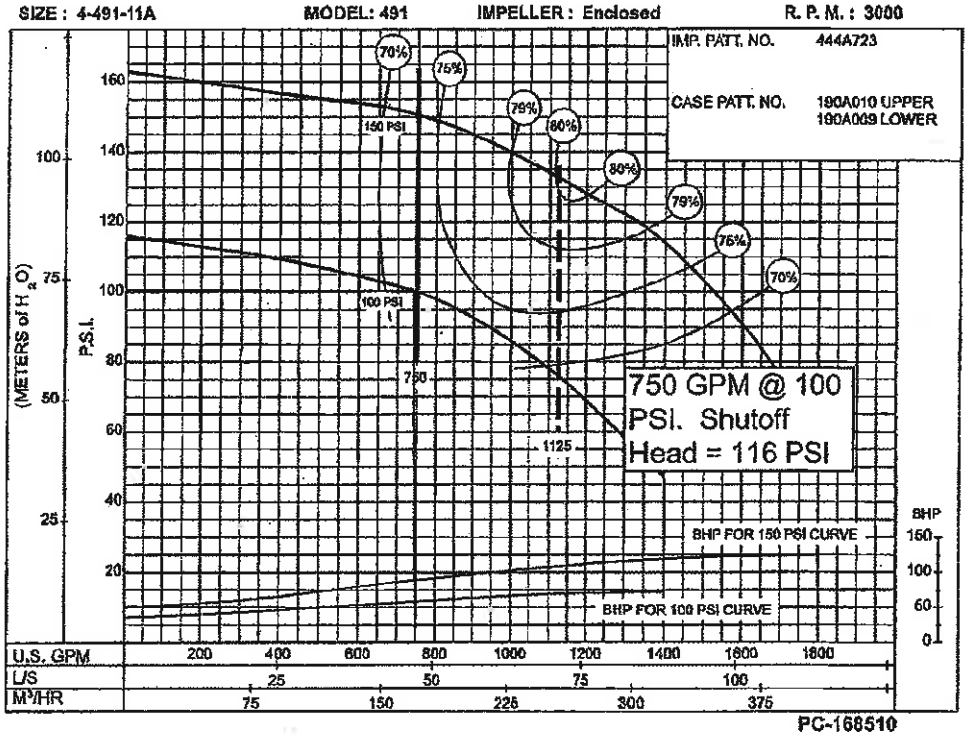
CAUTION:
The driveshaft is designed to operate at a 2° angle with the input and output shafts in parallel. The engine crankshaft is to be set with a parallel offset of 0.25"±0.09 inches vertically above the pump shaft and 0.00"±0.09 inch parallel offset horizontally right or left of the pump shaft. Refer to the certified driveshaft instructions manual for alignment instructions.

AURORA® 750 GPM 913 SERIES

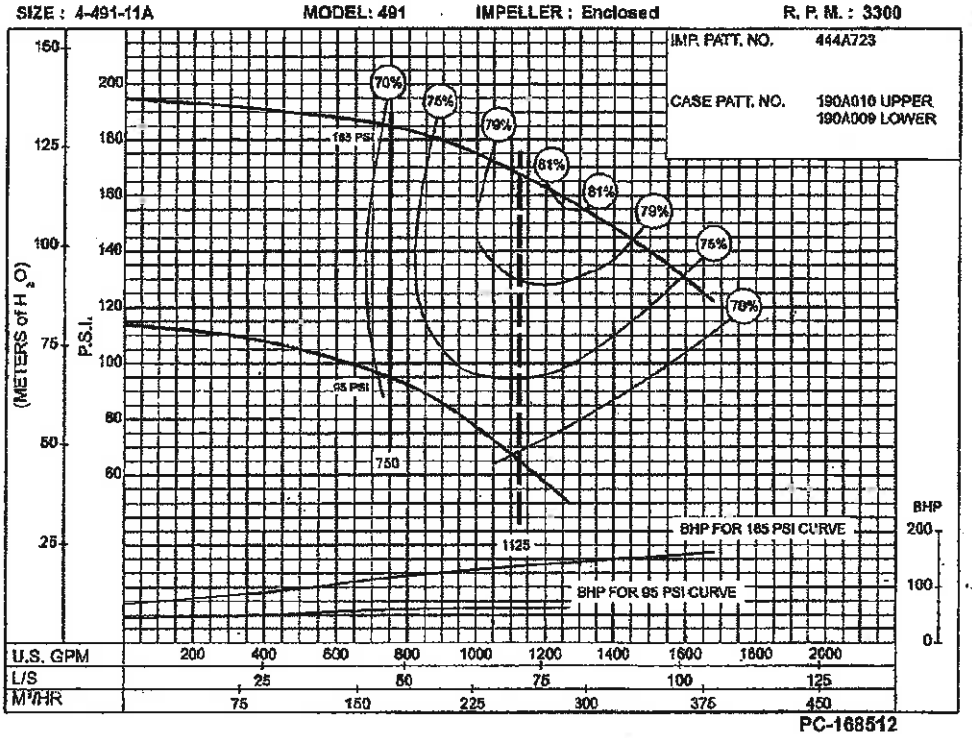
DIESEL ENGINE DRIVE

Supersedes Section 913 Page 424
Dated September 2009

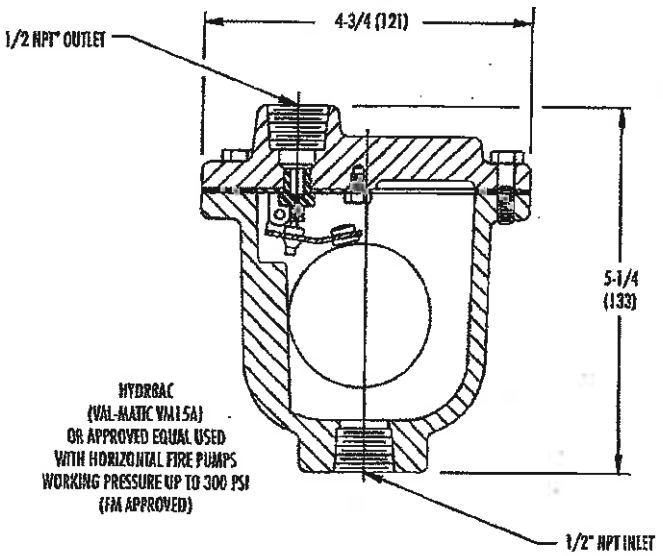
100 to 150 P.S.I.

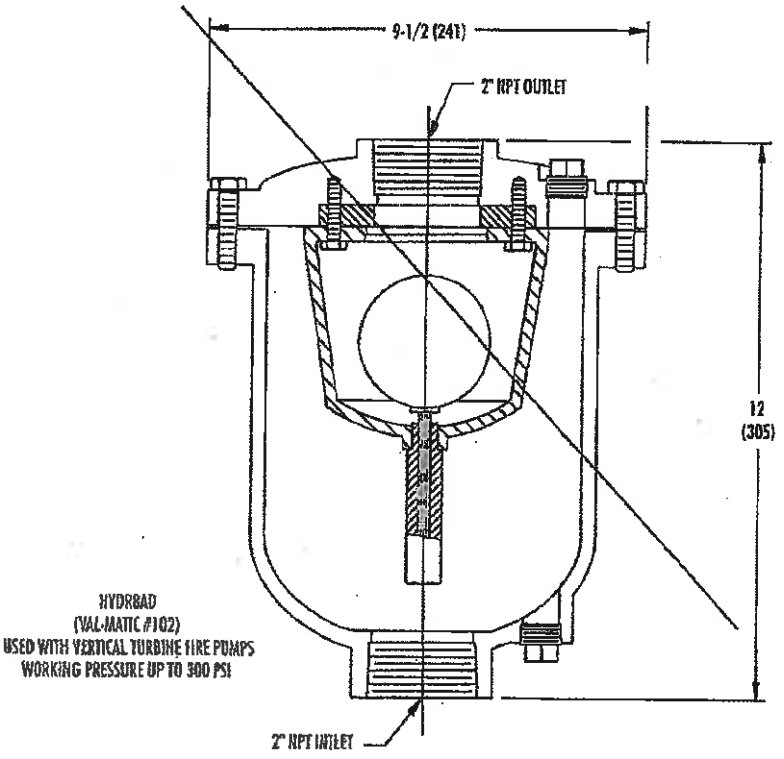


95 to 185 P.S.I.

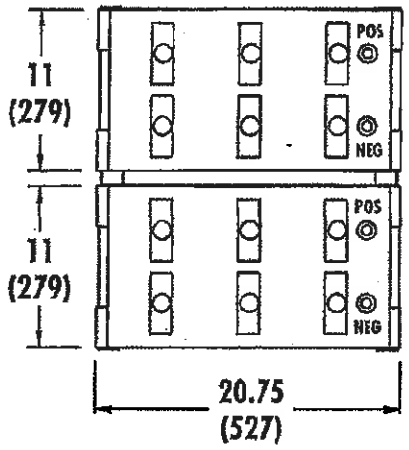


AURORA FIRE PUMPS
AUTOMATIC AIR RELEASE VALVE



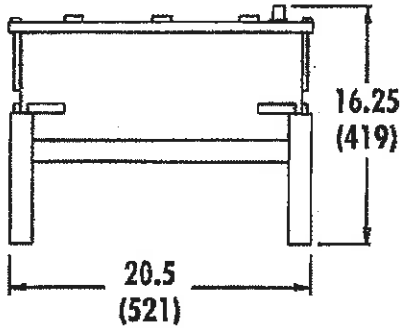


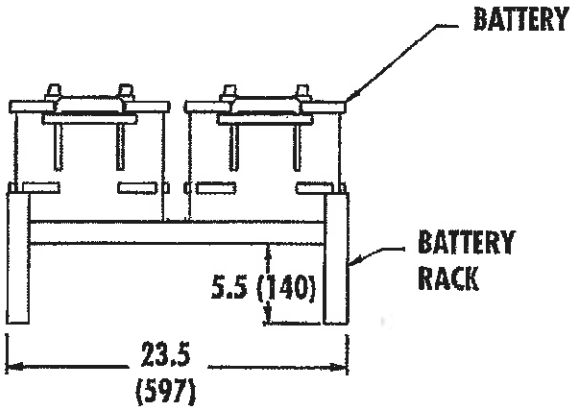
NOTES:
1. All dimensions are in inches (mm) and may vary ± 1/4 (6).



NOTES:

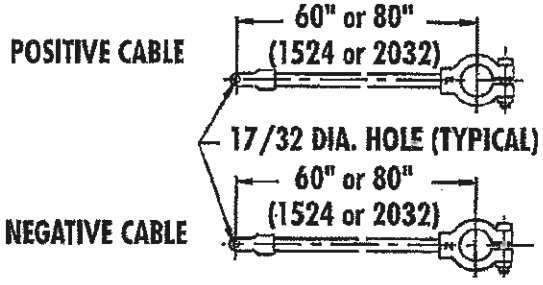
1. Dimensions are in inches (mm) and may vary ± 1/4" (6).
2. Batteries are 12 volt, lead-acid type D-8D, approximately 95 lbs. each, dry.
3. Batteries are shipped dry. Electrolyte (approx.19 quarts per battery) must be procured locally.
4. Refer to Section 916 page 252 for exact number of batteries & cables to be furnished based on the diesel engine manufacturer and model used.
5. Battery racks are fabricated steel, approximately 20 lbs. each.
6. Each rack holds 2 batteries. Racks are not to be stacked.

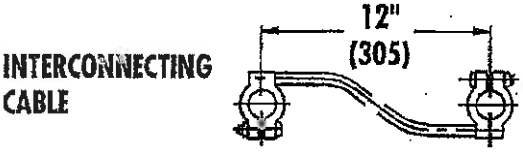




NOTES:

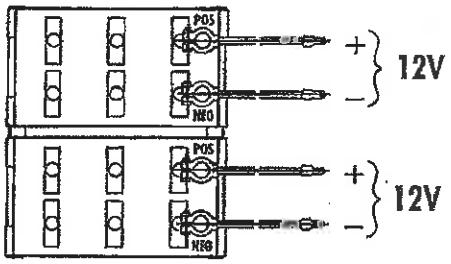
1. All cables are SAE J55BA type SGT with tensile attachment of 700-800 lbs.
2. Positive & negative cables 60" (1524) long are 2/0 gauge; positive & negative cables 80" (2032) long are 3/0 gauge.
3. Terminal clamps have steel reinforced inserts.
4. Not all cable types are required for every engine. Refer to Section 916 page 252 for cable applicability.





AURORA MODEL 481 & 485 PUMPS

DIESEL BATTERY CABLE DIAGRAMS

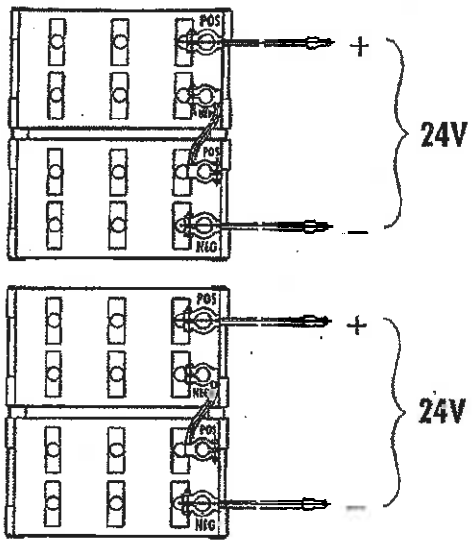


☐ 12 VOLT SYSTEM

REQUIRED COMPONENTS	ENGINE APPLICABILITY
(1) BATTERY RACK (2) BATTERIES (2) POSITIVE CABLES (2) NEGATIVE CABLES	CUMMINS: ALL "CFP" MODELS CLARKE: ALL "JU4H" MODELS ALL "JU64" MODELS ALL "JW6H" MODELS EDWARDS: ALL MODELS

NOTES:

1. Clarke "VMFP," "JU4H" & "JU6H" Engines require cable sets of different lengths. On these engine models, a 2/0 guage postive and negative cable set 60" (1524 mm) long, and a 3/0 guage positive and negativecable set 80" (2032 mm) long are furnished.
2. Refer to Section 916, Page 251 for details of batteries, racks and cables.



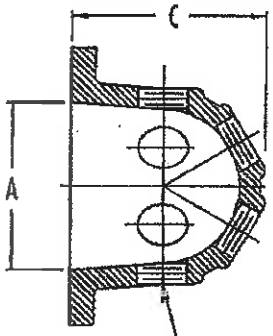
☐ 24 VOLT SYSTEM

REQUIRED COMPONENTS	ENGINE APPLICABILITY
(2) BATTERY RACKS (4) BATTERIES (2) POSITIVE CABLES (2) NEGATIVE CABLES (2) INTERCONNECTING CABLES	CLARKE: ALL "JX6H" MODELS CATERPILLAR: ALL MODELS

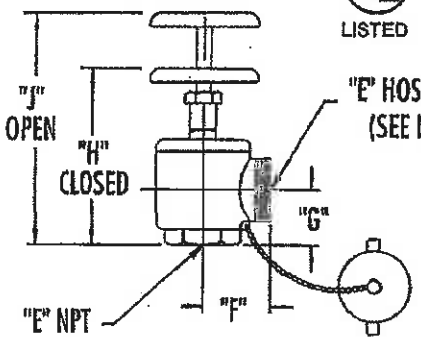
AURORA FIRE PUMPS

OPTION 75 - TEST MANIFOLD
OPTION 76 - HOSE VALVES
OPTION 77 - BALL DRIP VALVE

LISTED FM APPROVED



QTY "B" SIZE "D" PIPE TAPS FOR HOSE VALVES



VALVE SIZE "E"	"F"	"G"	"H"	"J"
1-1/2	2.25 (57)	2.00 (51)	6.50 (165)	7.50 (191)
2-1/2	3.5 (89)	2.75 (70)	9.50 (241)	11.00 (297)

XX OPTION 75 - TEST MANIFOLD

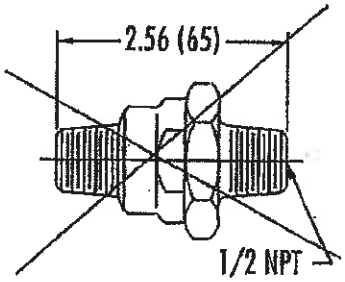
XX STD. 125# ASA FLANGES ☐ OPT. 250# ASA FLANGES

XX OPTION 76 - HOSE VALVE(S)

XX WITH CAPS AND CHAINS ☐ WITHOUT CAPS AND CHAINS

PUMP RATING G.P.M.	50	100 150 200	250 300	400 450 500	750	1000	1250 1500 2000	2500	3000	3500	4000 4500	5000
"A" MANIFOLD SUPPLY SIZE	1.5"	2.5"	3"	4"	6"	6"	8"	10"	10"	12"	12"	12"
"B"	1	1	1	2	3	4	6	8	12	12	16	20
"C"	1.00 (25)	1.13 (29)	1.31 (33)	8.50 (216)	10.62 (270)	10.62 (270)	11.75 (298)	12.50 (318)	25.63 (651)	31.63 (803)	31.63 (803)	43.75 (1111)
"D"	1-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2

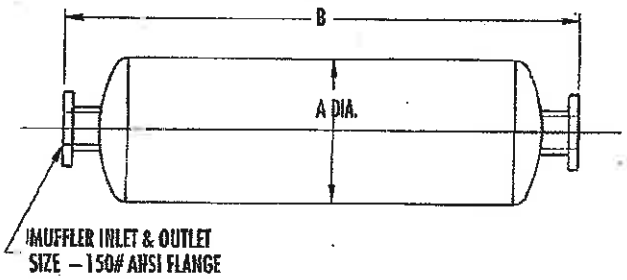
NOTES:
1. Dimensions are in inches (mm) and may vary ±1/4 (6).
2. Components shown are shipped loose for field installation and assembly.
3. Manifold supply size "A" and the number of hose valves ("B") meets or exceeds the minimums specified by N.F.P.A. 20 for the pump ratings indicated.
4. Manifolds for 3000 through 5000 GPM ratings consist of multiple sections and may require support (by others).
5. 1-1/2" Hose valves furnished with 1-1/2" National Standard Fire Hose Thread: 1.9900 (50.55) O.D. (max.), 6 threads per inch. 2-1/2" Hose valves are furnished with 2-1/2" National Standard Fire Hose Thread: 3.0686 (77.94) O.D. (max.), 7-1/2 threads per inch. Refer to factory for other thread conventions or adaptors.



☐ OPTION 77 - BALL DRIP VALVE

Designed to drain a branch line leading to an outside test manifold where danger of freezing exists. Opens at zero flow.

AURORA FIRE PUMPS
DIESEL ENGINE MUFFLERS

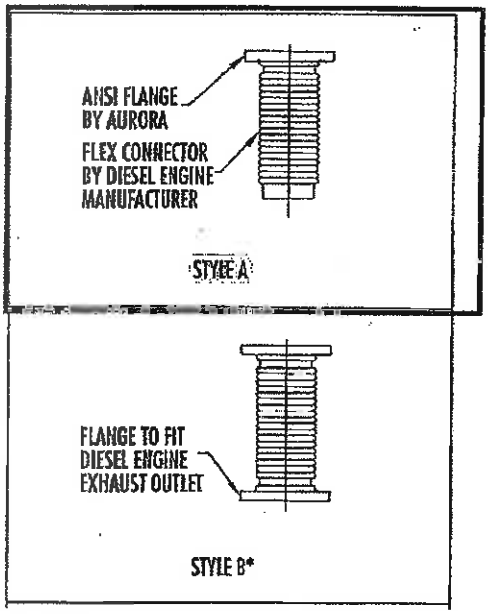


ENGINE MODEL	MUFFLER INLET & OUTLET	COMMERCIAL GRADE			RESIDENTIAL GRADE			CRITICAL GRADE		
		A	B	WGT	A	B	WGT	A	B	WGT
CATERPILLAR										
3406C	6" FLANGED	12	42	35	12	54	43	16	73	131
3412C*, 3508C, C18*	8" FLANGED	18	49	110	18	61	124	20	75	220
CLARKE FIRE PROTECTION										
JU4H-UF10, -UF12, -UF14, -UF20, -UF22, -UF24; -UFAB26, -UFAEA0, -UFAEE8, -UFAEF2, -UFADJ2, -UFADJ8	3" NPT	8	36	19	8	42	21	10	42	42
JU4R-UF09, -UF11, -UF13, -UF19, -UF21, -UF23, -UFAEA9, -UFAEE7, -UFAEF1										
JU4H-UF30, -UF32, -UF34, -UF40, -UF42, -UF 50, -UF52, -UF54, -UF58, -UFADJG, -UFADP0, -UFADR0, -UFADW8, -UFADY8, -UFADSG	4" FLANGED	10	36	24	10	46	29	12	55	68
JU4R-UF40, -UF49, UF51 -UF53										
JU6H-UF30, -UF32, -UF34, -UF 50, -UF52, -UF54, -UF58, -UF60, -UF62, -UF62, -UF68, -UF84, -UFAAPG, -UFAAQ8, -UFAARG, -UFAAS0, -UFAB76, -UFABL0, -UFABL8, -UFD0, -UFD2, -UFG8, -UFM8, -UFM2, -UFM8, -UFAD58, -UFAD88, -UFADM0, -UFADM8, -UFADN0, -UFADNG, -UFADP8	5" FLANGED	10	42	27	10	54	34	14	61	92
DP6H SERIES										
JW6H-UF30, -UF40, UF48										
D50H SERIES*	5" FLANGED	10	42	27	10	54	34	14	61	92
DR8H SERIES*										
JW6H-UF50, -UF58, -UF60, -UF8, -UFAAM8, -UFAA80, -UFADD0, -UFADB0, -UFADF0, -UFADJ0, -FAD70, -UFAD80	6" FLANGED	12	42	35	12	54	43	16	73	131
JU6H-UFAD98, -UFADP0, -UFADQ0, -UFADR0, -UFADR8, -UFADS0, -UFADS8, -FADT0, -UFADW8 -UFADX8										
DQ6H SERIES										
DT2H SERIES*										
JX6H SERIES	8" FLANGED	18	49	110	18	61	124	20	75	220
CUMMINS										
CFP5E, CFP59, CFP7E Series	4" NPT, FLANGED	10	36	24	10	46	29	12	55	68
CFP83 Series	4" NPT, FLANGED	10	36	24	10	46	29	12	55	68
CFP9E Series	5" NPT, FLANGED	10	42	27	10	54	34	14	61	92
CFP11E Series	5" NPT, FLANGED	10	42	27	10	54	34	14	61	92
CFP15E Series	6" FLANGED	12	42	35	12	54	43	16	73	131
CFP23E Series	8" NPT, FLANGED	18	49	110	18	61	124	20	75	220
CFP30E Series	10" NPT, FLANGED	22	64	205	22	75	220	28	99	360
DEUTZ										
DFP4-2011 Series	3" NPT	8	36	19	8	42	21	10	42	42
DFP4-2012 Series	4" FLANGED	10	36	24	10	46	29	12	55	68
DFP6 Series	6" FLANGED	12	42	35	12	54	43	16	73	131

AURORA
Pentair Water

AURORA FIRE PUMPS
EXHAUST FLEX CONNECTORS

ENGINE MODEL	MUFFLER CONNECTION SIZE	FLEX CONNECTOR STYLE
CATERPILLAR		
3406C	6" FLANGED	B
3412C*, 3508C, C18*	8" FLANGED	B
CLARKE FIRE PROTECTION		
JU4H-UF10, -UF12, -UF14, -UF20, -UF22, -UF29, -UFAB26, -UFAEA0, -UFAEE8, -UFAEF2, -UFADJ2, -UFADJ8	3" NPT	A
JU4R-UF09, -UF11, -UF13, -UF19, -UF21, -UF23, -UFAEA9, -UFAEE7, -UFAEF1		
JU4H-UF30, -UF32, -UF34, -UF40, -UF42, -UF 50, -UF52, -UF54, -UF58, -UFADJG, -UFADP0, -UFADR0, -UFADW8, -UFADY8, -UFAD5G	4" FLANGED	A
JU4R-UF40, -UF49, UF51 -UF53		
JU6H-UF30, -UF32, -UF34, -UF 50, -UF52, -UF54, -UF58, -UF60, -UF62, -UF62, -UF68, -UF84, -UFAAP0, -UFAAQ8, -UFAAR0, -UFAAS0, -UFAB76, -UFABL0, -UFABL8, -UFD0, -UFD2, -UFG8, -UFM0, -UFM2, -UFM8, -UFAD58, -UFAD88, -UFADM0, -UFADM8, -UFADN0, -UFADN6, -UFADP8	5" FLANGED	B
DP6H SERIES		
JW6H-UF30, -UF40, UF48		
DS0H SERIES*	5" FLANGE	B
DR8H SERIES*		
JW6H-UF50, -UF58, -UF60, -UF8, -UFAAM8, -UFAA80, -UFADD0, -UFADB0, -UFADF0, -UFADJ0, -FAD70, -UFAD80	6" FLANGED	B
JU6H-UFAD98, -UFADP0, -UFADQ0, -UFADR0, -UFADR8, -UFADS0, -UFADS8, -FADT0, -UFADW8 -UFADX8		
DQ6H SERIES		
DT2H SERIES*		
JX6H SERIES	8" FLANGED	B
CUMMINS		
CFP5E, CFP5G, CFP7E Series	3" NPT, FLANGED, CUFF	A, B
CFP83 Series	4" NPT, FLANGED, CUFF	A, B
CFP9E Series	4" NPT, FLANGED, CUFF	A, B
CFP11E Series	5" NPT, FLANGED, CUFF	A,B
CFP15E Series	6" FLANGED	B
CFP23E Series	6" FLANGED	B
CFP30E Series	6" FLANGED	B
DEUTZ		
DFP4-2011 Series	3" NPT	A
DFP4-2012 Series	4" FLANGED	B
DFP6 Series	6" FLANGED	B

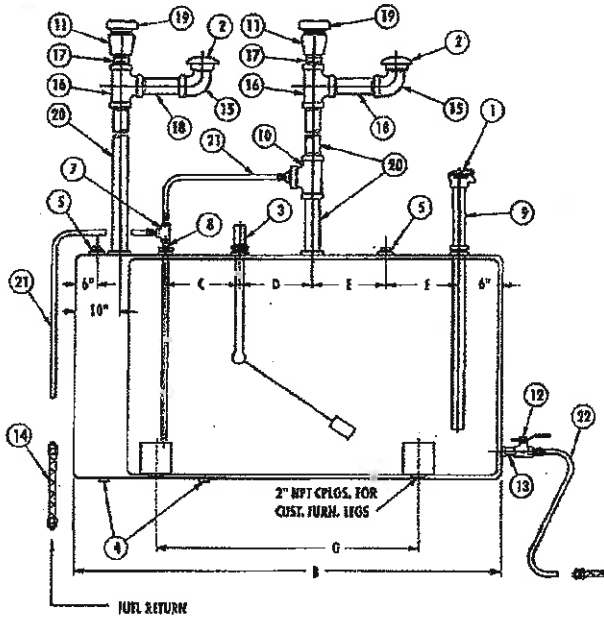


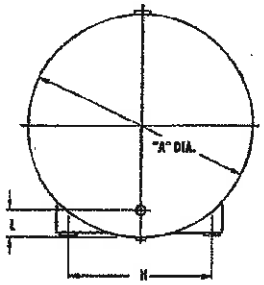
*FLANGED FLEX CONNECTOR PROVIDED BY DIESEL ENGINE MANUFACTURER. NO ADDITIONAL FLEX CONNECTOR OR ADAPTOR FITTING IS REQUIRED OR PROVIDED BY AURORA.

AURORA
Pentair Water

AURORA FIRE PUMPS

DOUBLE WALL FUEL TANKS WITH FITTINGS





DIESEL FUEL TANKS:

1. Tanks are constructed and labeled in accordance with UL-142.
2. Fittings shown are consistent with N.F.P.A. 30 and UL-142.
3. Tank to be pitched toward drain 1/4" per foot with outlet on the same elevation as engine fuel pump. Means of elevating tank (by others) may be required.
4. Usable tank volume is total capacity less 5% for sump and 5% for expansion.

NOMINAL TANK SIZE IN GALLONS	USABLE VOLUME IN GALLONS	A	B	C	D	E	F	G	H	L	Z
119	105	24.5 (622)	73 (1853)	6 (152)	6 (152)	6 (152)	19 (482)	40 (1015)	14 (355)	3 (76)	4
187	165	31 (787)	73 (1853)	6 (152)	6 (152)	6 (152)	19 (482)	40 (1015)	16 (406)	3 (76)	4
300	270	39 (990)	73 (1853)	6 (152)	6 (152)	6 (152)	19 (482)	40 (1015)	22-7/8 (581)	3-3/4 (95)	4
359	320	41 (1041)	73 (1853)	6 (152)	6 (152)	6 (152)	31 (787)	40 (1015)	22-7/8 (581)	4 (102)	4
572	515	51 (1294)	73 (1853)	6 (152)	6 (152)	6 (152)	31 (787)	40 (1015)	30 (761)	5 (127)	4
849	766	65 (1651)	72 (1829)	6 (152)	6 (152)	6 (152)	19 (482)	44 (1118)	30 (761)	4-3/4 (121)	4
1100	993	65 (1651)	84 (2134)	6 (152)	6 (152)	6 (152)	37 (940)	44 (1118)	30 (761)	4-3/4 (121)	6

COMPONENTS FURNISHED BY OTHERS*		
ITEM NO.	QTY. REQ'D	DESCRIPTION
20	2	"Z" Diameter Piping for Vent
21	1	1/2" Black Pipe
22	1	3/4" Black Pipe

NOTES

1. All dimensions are in inches (mm) and may vary ± 1/4".
2. Components shown are shipped loose for field assembly.
3. Illustration is for component identification only. Actual installation must meet local codes and all applicable standards.
4. Item 10 may consist of a combination of fittings.
5. Refer to Section 916 page 259 for details of Aurora-furnished components.
6. Items 11 & 17 not required for 515 gallon tanks.

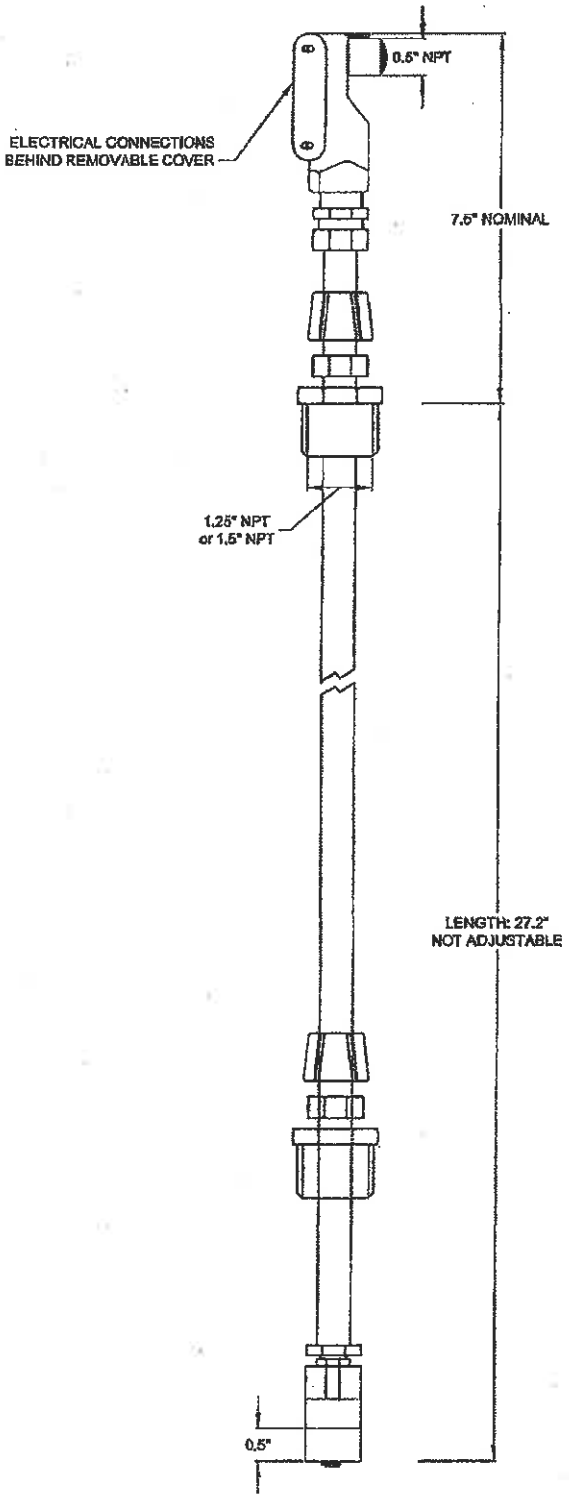
*Included with fire pump package systems.

COMPONENTS FURNISHED BY AURORA PUMP		
ITEM NO.	QTY. REQ'D	DESCRIPTION
1	1	2" NPT Lockable Fuel Cap
2	2	2" Screened Tank Vent
3	1	Fuel Gauge 1-1/2" NPT
4	2	1" NPT Drain Plug
5	2	2" NPT Pipe Plug
7	1	1/2" Tee
8	1	1/2" Close Nipple
9	1	2" Fuel Fill Pipe
10	1	"Z" x "Z" x 2" Tee
11	2	"Z" Coupling
12	1	3/4" NPT Lockable Fuel Valve
13	1	3/4" Close Nipple
14	2	Fuel Hoses for Supply & Return (Furnished by Engine Mfr.)
15	2	2" Street Elbow
16	2	"Z" x "Z" x 2" Tee
17	2	"Z" Close Nipple
18	2	2" Nipple
19	2	"Z" Emergency Vent

AURORA®
Pentair Water

DIESEL ENGINE FIRE PUMP CONTROLLER
HIGH OR LOW FUEL LEVEL SWITCH MODEL : GPD
Schematic

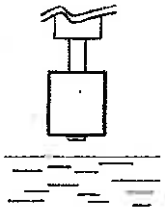
BUILT TO LATEST NFPA20 STANDARD EDITION



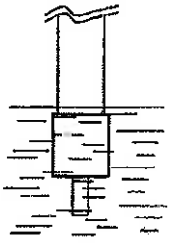
ORDERING INSTRUCTIONS :

- SPECIFY FITTING SIZE : - 1 1/4" (OPTIONS D07A & D08A)
- 1 1/2" (OPTIONS D07B & D08B)

FLOAT SWITCH CONFIGURATION



THE CONTACT IS CLOSED WHEN THE FLOAT IS ABOVE THE LIQUID LEVEL



THE CONTACT IS OPEN WHEN THE FLOAT IS IN THE LIQUID

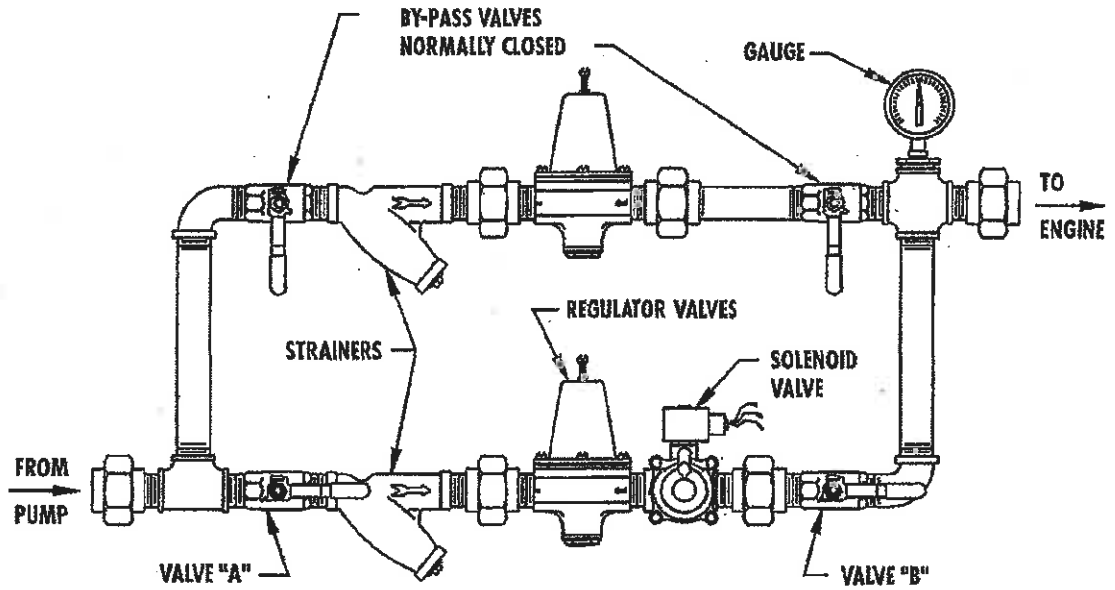
CONTACT RATING :
MAXIMUM 0-30 VDC, 0.3 A
(REED SWITCH)
PILOT DUTY ONLY

Drawing for information only.
Manufacturer reserves the right to modify this drawing without notice.
For drawing for approval or installation, please contact manufacturer.

gpdfloat	REV.	DATE	DESCRIPTION	APP.
	3.	12/07/20	NEW FLOAT FOR VIZI	
	2.	12/05/22	CHANGE LENGHT	DES.
	1	08/04/02	FLOAT DESCRIPTION	VER.

DRAWING No.
GPD-FL001 /E

AURORA MODEL 481 & 485
DIESEL ENGINE DRIVEN FIRE PUMP
COOLING WATER PIPING DATA



This instructional data explains the installation and operation of the cooling system for UL listed, FM approved Fire Pump engines equipped with heat exchangers.

Engines equipped with heat exchangers use an engine mounted water pump to circulate jacket water around the tubes of the heat exchanger to maintain proper jacket water temperatures. Cooling water, supplied by the Fire Pump, is piped through the tubes and discharged to waste.

REQUIREMENTS

The loop portion of the cooling water supply piping, shown above, incorporates all components required by NFPA and is sized to provide the required volume of water at the proper pressure for the heat exchangers of the engine models listed in Table A.

Model 481 & 485 pumps are shipped from the plant with the loop piped between the pump and engine. The pipe and loop sizes are determined by the engine model.

COMPONENTS

1. A flushing type strainer is used to protect the regulator valve, solenoid valve and the tubes of the heat exchanger from foreign material.

2. The regulator valve is used to control the volume and pressure of the cooling water.

3. The solenoid valve opens automatically when the engine is started and closes automatically on engine shutdown to prevent the waste of cooling water. (One red wire must be connected to terminal #1 of the engine junction box, the other red wire to terminal #11 of the engine junction box, and the green wire grounded to the engine block. Refer to applicable wiring diagrams.)

4. The valves in the BYPASS line of the loop are normally CLOSED. They should ONLY be opened to provide cooling water to the engine if the regulator valve or solenoid valve require repair.

5. Valves "A" and "B" are normally OPEN. They should ONLY be closed if repair is required to the regulator valve or solenoid valve.

6. The gauge indicates back pressure on the cooling water discharge. The recommended back pressure to assure adequate flow is 15-20 PSI and should not exceed the allowable pressure shown in Table A.

7. Since cooling loop components are subject to bumps and movement during shipping, all components must be checked for pipe strain and leakage prior to initial startup.

INSTALLATION -COOLING WATER OUTLET

The cooling water outlet piping from the engine heat exchanger must be at least the size listed in Table A. The piping must be short, have no valves and discharge into an open waste cone. If deviations from the requirement of discharge to an open waste cone are permitted by the authority having jurisdiction, the proposed plumbing must be reviewed to assure that the back pressure created will not reduce the cooling water flow to below that required for the engine.

AURORA MODEL 481 & 495
DIESEL ENGINE DRIVEN FIRE PUMP
COOLING WATER PIPING DATA

If the outlet piping from two or more engines is connected to a common manifold, the manifold piping should be sized such that the velocity resulting from the combined flow is the same as that in the outlet piping between the manifold and heat exchanger.

Adequate pipe supports must be provided for the loop and outlet piping to minimize vibration and prevent excessive strain at the heat exchanger, pump and engine connections.

Engine coolant should be added in accordance with the engine manufacturer's recommendations.

OPERATION

The regulator valve is adjusted during operational tests at the plant and set between 15 and 20 PSI back pressure. If additional adjusting is necessary, see the following procedure:

With the pump operating at the rated duty, the adjustment is made after the engine block temperature has risen to the level required to open the engine thermostat. The thermostat opens at approximately 170°F. The temperature will stabilize and then decrease slightly. At this point, the regulator is adjusted between 15 and 20 PSI by turning the regulator screw clockwise to increase the pressure and counterclockwise to reduce the pressure. The regulator screw is then locked into place with the locknut provided.

MAINTENANCE

1. Strainers must be inspected frequently and kept clean.

2. If cooling water temperature changes, the regulator valve may require adjustment.

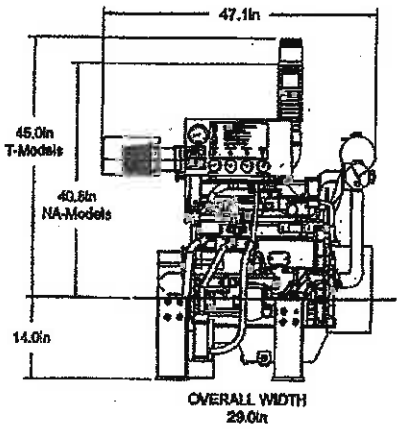
CLARKE®

FIRE PUMP ENGINES

JU4H-UF10 JU4H-UF12 JU4H-UF14 JU4H-UF20 JU4H-UF22 JU4H-UFAB26 JU4H-UF24 JU4H-UF30 JU4H-UF32 JU4H-UF34 JU4H-UFH0 JU4H-UFH2 JU4H-UF40 JU4H-UF42 JU4H-UF50 JU4H-UF52 JU4H-UF54 JU4H-UF58

FM-UL-cUL APPROVED RATINGS BHP/KW

JU4H MODEL	RATED SPEED 1470		1760		2100		2350		2600		2800		3000		US-EPA (NSPS) Available Until
UF10			61	51	51	38	55	41							12/31/10
UF12							55	41	59	44					12/31/10
UF14											70	52	71	53	12/31/13 +
UF20			60	45	67	50	72	54							12/31/10
UF22							72	54	75	56					12/31/10
UFAB26											80	60			12/31/13 +
UF24											80	60	83	62	12/31/13 +
UF30			64	48	79	59	85	63							12/31/10
UF32							85	63	85	63					12/31/10
UF34											104	78	115	86	12/31/12 +
UFH0	63	47	73	54											12/31/10
UFH0			73	54	88	66	96	72							12/31/10
UFH2							98	73	99	74					12/31/10
UF40			84	70	105	78	106	79							12/31/10 ▼ 12/31/09 ▲
UF42							106	79	106	79					12/31/09
UF58	79	59	110	82											12/31/09
UF50			110	82	130	97	122	95							12/31/09
UF52							127	95	127	95					12/31/09
UF54											145	108	145	108	12/31/12 +



● USA EPA (NSPS) Emissions Compliant. Applies to John Deere model year per Table 4 of 40 CFR Part 60 Sub Part IIII.

♦ All Models are available for Export

+ Not Available in California

▼ Less than 100HP

▲ Greater than 99HP

SPECIFICATIONS

ITEM	JU4H MODELS UF10/12/14	UF20/22/AB26/24	UF30/32/34	UFH0/H0/H2	UF40/42	UF58/50/52/54
Number of Cylinders	4					
Aspiration	NA		T			
Rotation*	CW					
Weight – lb (kg)	910 (413)		935 (424)			
Compression Ratio	17.6:1		17.0:1			
Displacement – cu. in. (L)	275 (4.6)					
Engine Type	4 Stroke Cycle – Inline Construction					
Bore & Stroke – in. (mm)	4.19 x 5.00 (106 x 127)					
Installation Drawing	D534					
Wiring Diagram AC	C07591					
Wiring Diagram DC	C071590					
Engine Series	John Deere 4045 Series					
Speed Interpolation	OPT.					

Abbreviations: CW – Clockwise NA – Naturally Aspirated T – Turbocharged
*Rotation viewed from Heat Exchanger / Front of engine

CERTIFIED POWER RATING

- Each engine is factory tested to verify power and performance.
- Although FM-UL ratings are shown at specific speeds, Clarke engines with optional speed interpolation can be applied at any intermediate speed. To determine the intermediate speed power, make a linear interpolation from the Clarke FM-UL power curve. Contact Clarke or your Pump OEM Representative to obtain details.

c UL us

Meets NFPA 20 Requirements

c FM us APPROVED

ENGINE RATINGS BASELINES

- Engines are to be used for stationary emergency standby fire pump service only. Engines are to be tested in accordance with NFPA 25.
- Engines are rated at standard SAE conditions of 29.61 in. (752.1 mm) Hg barometer and 77°F (25°C) inlet air temperature (approximates 300 ft. (91.4 m) above sea level) by the testing laboratory (see SAE Standard J 1349).
- A deduction of 3 percent from engine horsepower rating at standard SAE conditions shall be made for diesel engines for each 1000 ft. (305 m) altitude above 300 ft. (91.4 m)
- A deduction of 1 percent from engine horsepower rating as corrected to standard SAE conditions shall be made for diesel engines for every 10°F (5.6°C) above 77°F (25°C) ambient temperature.

ENGINE EQUIPMENT

EQUIPMENT	STANDARD	OPTIONAL
Air Cleaner	Direct Mounted, Washable, Indoor Service with Drip Shield	Disposable, Drip Proof, Indoor Service Outdoor Type, Single or Two Stage
Alternator	12V-DC, 42 Amps with Poly-Vee Belt and Guard	24V-DC, 40 Amps with Poly-Vee Belt and Guard
Exhaust Protection	Blankets on UF10/12/14/20/22/AB26/24; Metal Guards on Manifolds and Turbocharger on UF30/32/34/H8/H0/H2/40/42/50/52/54	
Coupling	Bare Flywheel	Listed Driveshaft and Guard, UF10/12/14, UF20/22/AB26/24 – CDS10-SC; UF30/32/34, UFH8/H0/H2, UF40/42 – CDS20-SC; UF50/52/54 – CDS30-ST
Exhaust Flex Connection	For NA Engines - Stainless Steel Flex, NPT(M) Connection, 3" For T Engines – Stainless Steel Flex, NPT(M) Connection, 4"	For NA Engines – Stainless Steel Flex, NPT(M) Connection, 4" For T Engines - Stainless Steel Flex, 150# ANSI Flanged Connection, 5"
Flywheel Housing	SAE #3	
Flywheel Power Take Off	11.5" SAE Industrial Flywheel Connection	
Fuel Connections	Fire Resistant, Flexible, USA Coast Guard Approved, Supply and Return Lines	Stainless Steel, Braided, cUL Listed, Supply and Return Lines
Fuel Filter	Primary Filter with Priming Pump	
Fuel Injection System	Stanadyne Direct Injection	
Engine Heater	115V-AC, 1000 Watt	230V-AC, 1000 Watt
Governor, Speed	Constant Speed, Mechanical	
Heat Exchanger	Tube and Shell Type, 60 PSI (4 BAR), NPT(F) Connections – Sea/Salt Water Compatible	
Instrument Panel	English and Metric, Tachometer, Hourmeter, Water Temperature, Oil Pressure and Two (2) Voltmeters	
Junction Box	Integral with Instrument Panel; For DC Wiring Interconnection to Engine Controller	
Lube Oil Cooler	Engine Water Cooled, Plate Type	
Lube Oil Filter	Full Flow with By-Pass Valve	
Lube Oil Pump	Gear Driven, Gear Type	
Manual Start Control	On Instrument Panel with Control Position Warning Light	
Overspeed Control	Electronic with Reset and Test on Instrument Panel	
Raw Water Solenoid Operation	Automatic from Fire Pump Controller and from Engine Instrument Panel	
Run – Stop Control	On Instrument Panel with Control Position Warning Light	
Run Solenoid	12V-DC Energized to Run	12V-DC Energized to Stop, 24V-DC Energized to Run; 24V-DC Energized to Stop
Starters	Two (2) 12V-DC	Two (2) 24V-DC
Throttle Control	Adjustable Speed Control, Tamper Proof	
Water Pump	Centrifugal Type, Poly-Vee Belt Drive with Guard	

Abbreviations: DC –Direct Current, AC – Alternating Current, SAE – Society of Automotive Engineers, NPT(F) – National Pipe Tapered Thread (Female), NPT(M) – National Pipe Tapered Thread (Male), NA – Naturally Aspirated, T- Turbocharged, ANSI – American National Standards Institute

MODEL NOMENCLATURE (10 Digit Models)

JU 4 H - UF A B 26
- JU: John Deere Base Engine
- 4: 350 Series
- H: 4 Cylinder
- UF: Heat Exchanger Cooled
- A: UL Listed and FM Approved
- B: Built in USA
- 26: EPA NSPS Compliant
- Power Curve Number

MODEL NOMENCLATURE (8 Digit Models)

JU 4 H - UF 34
- JU: John Deere Base Engine
- 4: 350 Series
- H: 4 Cylinder
- UF: Heat Exchanger Cooled
- 34: UL Listed and FM Approved
- Power Curve Number

CLARKE®

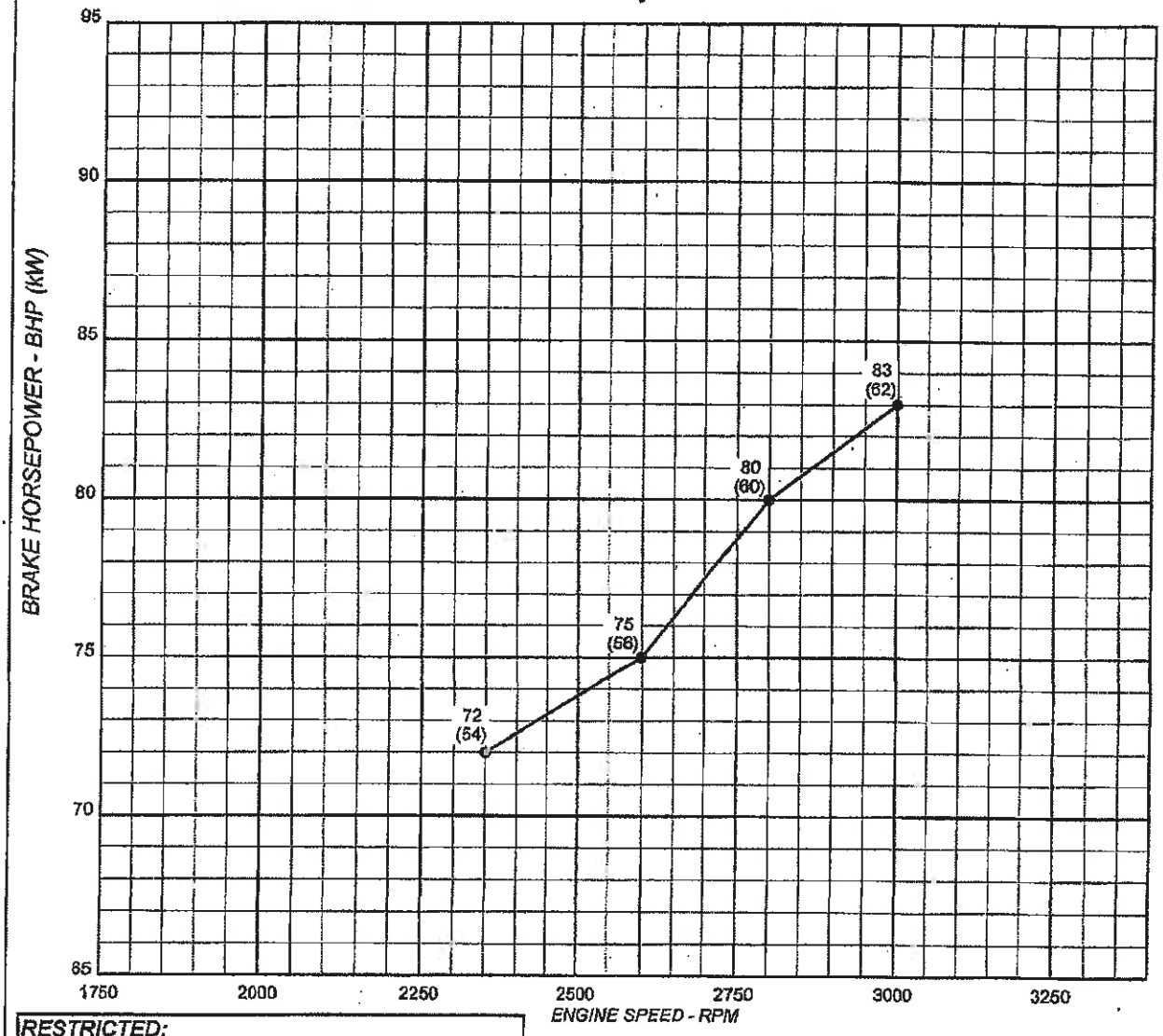
CLARKE Fire Protection Products, Inc.
3133 E. Kemper Rd., Cincinnati, Ohio 45241
United States of America
Tel +1-513-475-FIRE (3473) Fax +1-513-771-0726
www.clarkefire.com

CLARKE UK, Ltd.
Grange Works, Lomond Rd., Coatbridge, ML5-2NN
United Kingdom
Tel +44-1236-429946 Fax +44-1236-427274
www.clarkefire.com

CLARKE

Fire Protection Products, Inc.

FIRE PUMP MODEL: JU4H-UF24
Heat Exchanger
Naturally Aspirated
4.6L 4 Cylinder



RESTRICTED:
USE ONLY FOR STAND-BY FIRE PUMP APPLICATIONS

ENGINE PERFORMANCE:
STANDARD CONDITIONS: (SAE J1349, ISO 3046)
77°F (25°C) AIR INLET TEMPERATURE
29.61 IN. (751.1MM) HG BAROMETRIC PRESSURE
#2 DIESEL FUEL (SEE C13940)

KEVIN KUNKLER 19MAY04

NAMEPLATE BHP (MAXIMUM PUMP LOAD)

CREATED	DATE CREATED
KJK	05/19/04

ENGINE MODEL JU4H-UF24

DRAWING NO.	REV
C131089	A

CLARKE
Fire Protection Products, Inc.

JU4H-UF24
INSTALLATION & OPERATION DATA (I&O Data)
USA Produced

Basic Engine Description

Engine Manufacturer	John Deere Co.
Ignition Type	Compression (Diesel)
Number of Cylinders	4
Bore and Stroke - in (mm)	4.19 (106) X 5 (127)
Displacement - in³ (L)	275 (4.5)
Compression Ratio	17.6:1
Valves per cylinder	
Intake	1
Exhaust	1
Combustion System	Direct Injection
Engine Type	In-Line, 4 Stroke Cycle
Fuel Management Control	Mechanical, Rotary Pump
Firing Order (CW Rotation)	1-3-4-2
Aspiration	Natural
Charge Air Cooling Type	None
Rotation, viewed from front of engine, Clockwise (CW)	Standard
Engine Crankcase Vent System	Open
Installation Drawing	D534
Weight - lb (kg)	910 (413)

Power Rating	2350	2600	2800	3000
Nameplate Power - HP (kW)	72 (54)	75 (56)	80 (60)	83 (62)

Cooling System - [C051128]	2350	2600	2800	3000
Engine Coolant Heat - Btu/sec (kW)	40 (42.2)	42 (44.3)	44 (46.4)	45 (47.5)
Engine Radiated Heat - Btu/sec (kW)	16 (16.9)	17 (17.9)	18 (19)	19 (20)
Heat Exchanger Minimum Flow				
60°F (15°C) Raw H_2O - gal/min (L/min)	8 (30.3)	9 (34.1)	10 (37.9)	11 (41.6)
95°F (35°C) Raw H_2O - gal/min (L/min)	10 (37.9)	11 (41.6)	12 (45.4)	13 (49.2)
Heat Exchanger Maximum Cooling Raw Water				
Inlet Pressure - psi (bar)	60 (4.1)			
Flow - gal/min (L/min)	40 (151)			
Typical Engine H_2O Operating Temp - °F (°C)[1]	170 (76.7) - 190 (87.8)			
Thermostat				
Start to Open - °F (°C)	170 (76.7)			
Fully Opened - °F (°C)	190 (87.8)			
Engine Coolant Capacity - qt (L)	14.79 (14)			
Coolant Pressure Cap - lb/in² (kPa)	10 (68.9)			
Maximum Engine Coolant Temperature - °F (°C)	200 (93.3)			
Minimum Engine Coolant Temperature - °F (°C)	160 (71.1)			
High Coolant Temp Alarm Switch - °F (°C)	205 (96.1)			

Electric System - DC	Standard		Optional	
System Voltage (Nominal)	12		24	
Battery Capacity for Ambients Above 32°F (0°C)				
Voltage (Nominal)	12	[C07633]	24	[C07633]
Qty. Per Battery Bank	1		2	
SAE size per J537	8D		8D	
CCA @ 0°F (-18°C)	1400		1400	
Reserve Capacity - Minutes	430		430	
Battery Cable Circuit, Max Resistance - ohm	0.0012		0.0012	
Battery Cable Minimum Size				
0-120 in. Circuit Length[2]	00		00	
121-160 in. Circuit Length[2]	000		000	
161-200 in. Circuit Length[2]	0000		0000	
Charging Alternator Maximum Output - Amp,	40	[C07639]	40	[C071048]
Starter Cranking Amps, Rolling - @60°F (15°C)	345	[RE59595/RE59589]	250	[C07819/C07820]

NOTE: This engine is intended for indoor installation or in a weatherproof enclosure. [1]Engine H_2O temperature is dependent on raw water temperature and flow. [2]Positive and Negative Cables Combined Length.

CLARKE
Fire Protection Products, Inc.

JU4H-UF24
INSTALLATION & OPERATION DATA (I&O Data)
USA Produced

Exhaust System	2350	2600	2800	3000
Exhaust Flow - ft.³/min (m³/min)	469 (13.3)	531 (15)	581 (16.5)	630 (17.8)
Exhaust Temperature - °F (°C)	1076 (580)	1095 (591)	1110 (599)	1125 (607)
Maximum Allowable Back Pressure - in H_2O (kPa)	30 (7.5)	30 (7.5)	30 (7.5)	30 (7.5)
Minimum Exhaust Pipe Dia. - in (mm)[3]	3 (76.2)	3 (76.2)	3 (76.2)	3 (76.2)

Fuel System	2350	2600	2800	3000
Fuel Consumption - gal/hr (L/hr)	5.6 (21.2)	5.8 (22)	6 (22.7)	6.2 (23.5)
Fuel Return - gal/hr (L/hr)	9 (34.1)	9.5 (36)	9.9 (37.5)	10.3 (39)
Fuel Supply - gal/hr (L/hr)	14.6 (55.3)	15.3 (57.9)	15.9 (60.2)	16.5 (62.5)
Fuel Pressure - lb/in² (kPa)	3 (20.7) - 6 (41.4)			
Minimum Line Size - Supply - in.	.50 Schedule 40 Steel Pipe			
Pipe Outer Diameter - in (mm)	0.848 (21.5)			
Minimum Line Size - Return - in.	.375 Schedule 40 Steel Pipe			
Pipe Outer Diameter - in (mm)	0.675 (17.1)			
Maximum Allowable Fuel Pump Suction Lift with clean Filter - in H_2O (mH_2O)	31 (0.8)			
Maximum Allowable Fuel Head above Fuel pump, Supply or Return - ft (m)	4.5 (1.4)			
Fuel Filter Micron Size	2			

Heater System	Standard	Optional
Engine Coolant Heater		
Wattage (Nominal)	1000	1000
Voltage - AC, 1 Phase	115 (+5%, -10%)	230 (+5%, -10%)
Part Number	[C122188]	[C122192]

Air System	2350	2600	2800	3000
Combustion Air Flow - ft.³/min (m³/min)	166 (4.7)	186 (5.3)	202 (5.7)	218 (6.2)
Air Cleaner	Standard		Optional	
Part Number	[C03749]		[C03327]	
Type	Indoor Service Only, with Shield		Canister, Single-Stage	
Cleaning method	Washable		Disposable	
Air Intake Restriction Maximum Limit				
Dirty Air Cleaner - in H_2O (kPa)	10 (2.5)		10 (2.5)	
Clean Air Cleaner - in H_2O (kPa)	5 (1.2)		5 (1.2)	
Maximum Allowable Temperature (Air To Engine Inlet) - °F (°C)[4]	130 (54.4)			

Lubrication System	
Oil Pressure - normal - lb/in² (kPa)	50 (345) - 95 (655)
Low Oil Pressure Alarm Switch - lb/in² (kPa)	20 (138)
In Pan Oil Temperature - °F (°C)	220 (104) - 245 (118)
Total Oil Capacity with Filter - qt (L)	15.5 (14.7)

Lube Oil Heater	Optional	Optional
Wattage (Nominal)	150	150
Voltage	120V (+5%, -10%)	240V (+5%, -10%)
Part Number	C04430	C04431

Performance	2350	2600	2800	3000
BMEP - lb/in² (kPa)	88 (607)	83 (572)	82 (565)	80 (552)
Piston Speed - ft/min (m/min)	1968 (597)	2167 (661)	2333 (711)	2500 (762)
Mechanical Noise - dB(A) @ 1m	C131537			
Power Curve	C131089			

[3]Based on Nominal System. Back pressure flow analysis must be done to assure maximum allowable back pressure is not exceeded. (Note: minimum exhaust Pipe diameter is based on: 15 feet of pipe, one 90° elbow, and a silencer pressure drop no greater than one half of the maximum allowable back pressure.) [4]Review for horsepower derate if ambient air entering engine exceeds 77°F (25°C). [ ] indicates component reference part number.

JU4H, JU4R & JU6H, JU6R ENGINE MODELS
ENGINE MATERIALS AND CONSTRUCTION

Air Cleaner
Type..... Indoor Usage Only
Oiled Fabric Pleats
Material..... Surgical Cotton
Aluminum Mesh

Air Cleaner - Optional
Type..... Canister
Material..... Pleated Paper
Housing..... Enclosed

Camshaft
Material..... Cast Iron
Chill Hardened
Location..... In Block
Drive..... Gear, Spur
Type of Cam..... Ground

Charge Air Cooler (JU6H-60,62,66,74,84, ADK0, AD58, ADNG, ADN0, ADQ0, ADR0, AAQ8, AARG, ADP8, ADP0, ADT0, AD88, ADR8, AD98, ADS0, ADW8, ADX8, AD98 only)
Type..... Raw Water Cooled
Materials (in contact with raw water)
Tubes..... 90/10 CU/NI
Headers ..... 36500 Muntz
Covers ..... 83600 Red Brass
Plumbing ..... 316 Stainless Steel/ Brass
90/10 Silicone

Charge Air Cooler (JU6R-AA67, 59, 61, PF, Q7, RF, 89, 83 only)
Type..... Air to Air Cooled
Materials
Core..... Aluminum

Coolant Pump
Type..... Centrifugal
Drive..... Poly Vee Belt

Coolant Thermostat
Type..... Non Blocking
Qty..... 1

Connecting Rod
Type..... I-Beam Taper
Material..... Forged Steel Alloy

Crank Pin Bearings
Type..... Precision Half Shell
Number..... 1 Pair Per Cylinder
Material..... Wear-Guard

Crankshaft
Material..... Forged Steel
Type of Balance..... Dynamic

Cylinder Block
Type..... One Piece with
Non-Siamese Cylinders
Material..... Annealed Gray Iron

Cylinder Head
Type..... Slab 2 Valve
Material..... Annealed Gray Iron

Cylinder Liners
Type..... Centrifugal Cast, Wet Liner
Material..... Alloy Iron Plateau, Honed

Fuel Pump
Type..... Diaphragm
Drive..... Cam Lobe

Heat Exchanger (USA) - JU4H & JU6H Only
Type..... Tube & Shell
Materials
Tube & Headers..... Copper
Shell..... Copper
Electrode..... Zinc

Heat Exchanger (UK) - JU4H & JU6H Only
Type..... Tube & Bundle
Materials
Tube & Headers..... Copper
Shell..... Aluminum

Injection Pump
Type..... Rotary
Drive..... Gear

Lubrication Cooler
Type..... Plate

Lubrication Pump
Type..... Gear
Drive..... Gear

Main Bearings
Type..... Precision Half Shells
Material..... Steel Backed-Aluminum Lined

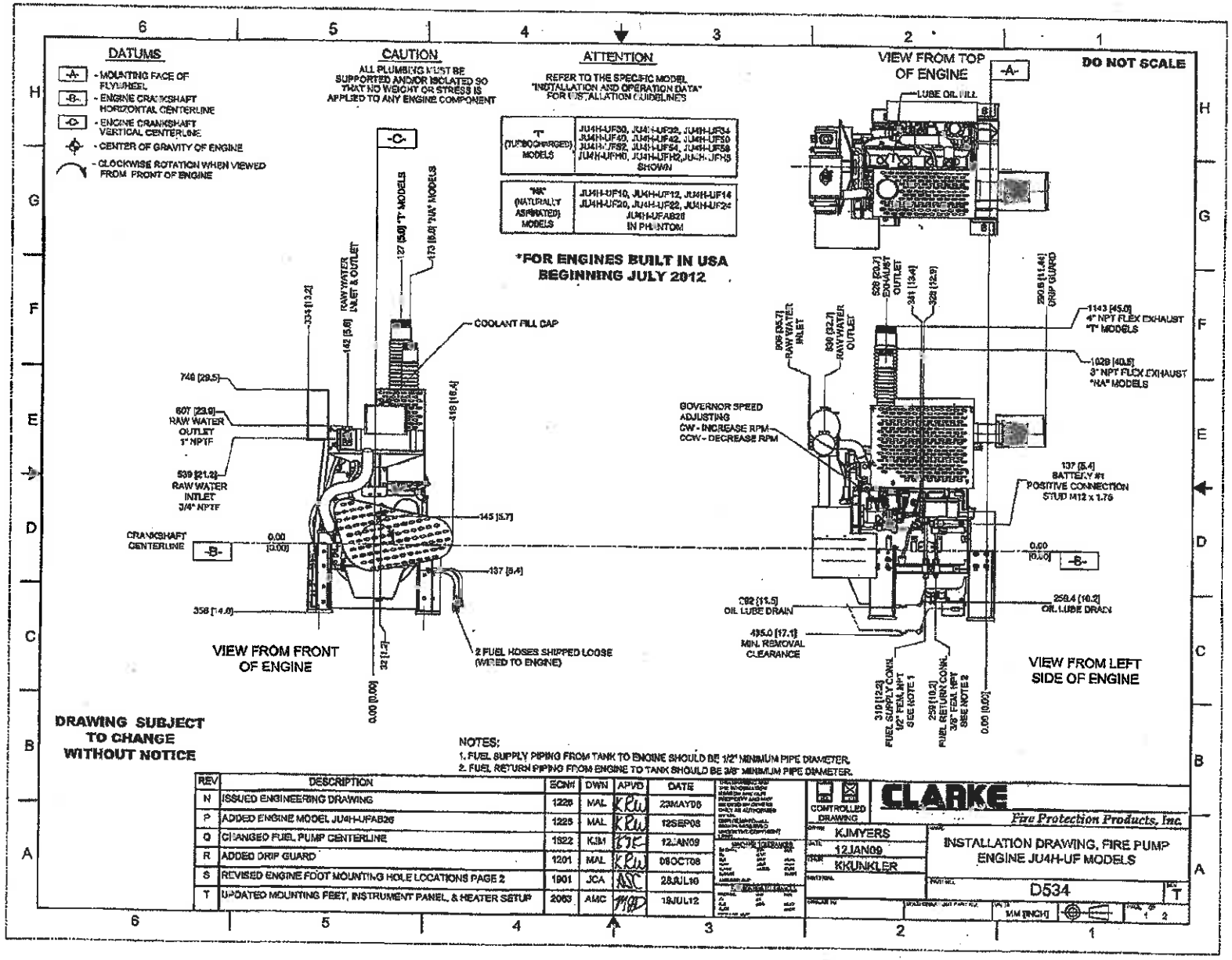
Piston
Type and Material..... Aluminum Alloy with Reinforced
Top Ring Groove
Cooling..... Oil Jet Spray

Piston Pin
Type..... Full Floating - Offset

Piston Rings
Number/Piston..... 3
Top..... Keystone Barrel Faced -
Plasma Coated
Second..... Tapered Cast Iron
Third..... Double Rail Type
w/Expander Spring

Radiator - JU4R & JU6R Only
Type..... Plate Fin
Materials
Core..... Copper & Brass
Tank & Structure..... Steel

Valves
Type..... Poppet
Arrangement..... Overhead Valve
Number/Cylinder..... 1 intake
1 exhaust
Operating Mechanism..... Mechanical Rocker Arm
Type of Lifter..... Large Head
Valve Seat Insert..... Replaceable



REV	DESCRIPTION	ECN#	DWN	APVD	DATE
N	ISSUED ENGINEERING DRAWING	1226	MAL	KRW	23MAY06
P	ADDED ENGINE MODEL JU4H-UFAB26	1225	MAL	KRW	12SEP06
Q	CHANGED FUEL PUMP CENTERLINE	1922	KJM	KJK	12JAN09
R	ADDED DRIP GUARD	1201	MAL	KRW	09OCT06
S	REVISED ENGINE FOOT MOUNTING HOLE LOCATIONS PAGE 2	1901	JCA	ASC	28JUL10
T	UPDATED MOUNTING FEET, INSTRUMENT PANEL, & HEATER SETUP	2069	AMC	MGP	19JUL12

CONTROLLED DRAWING

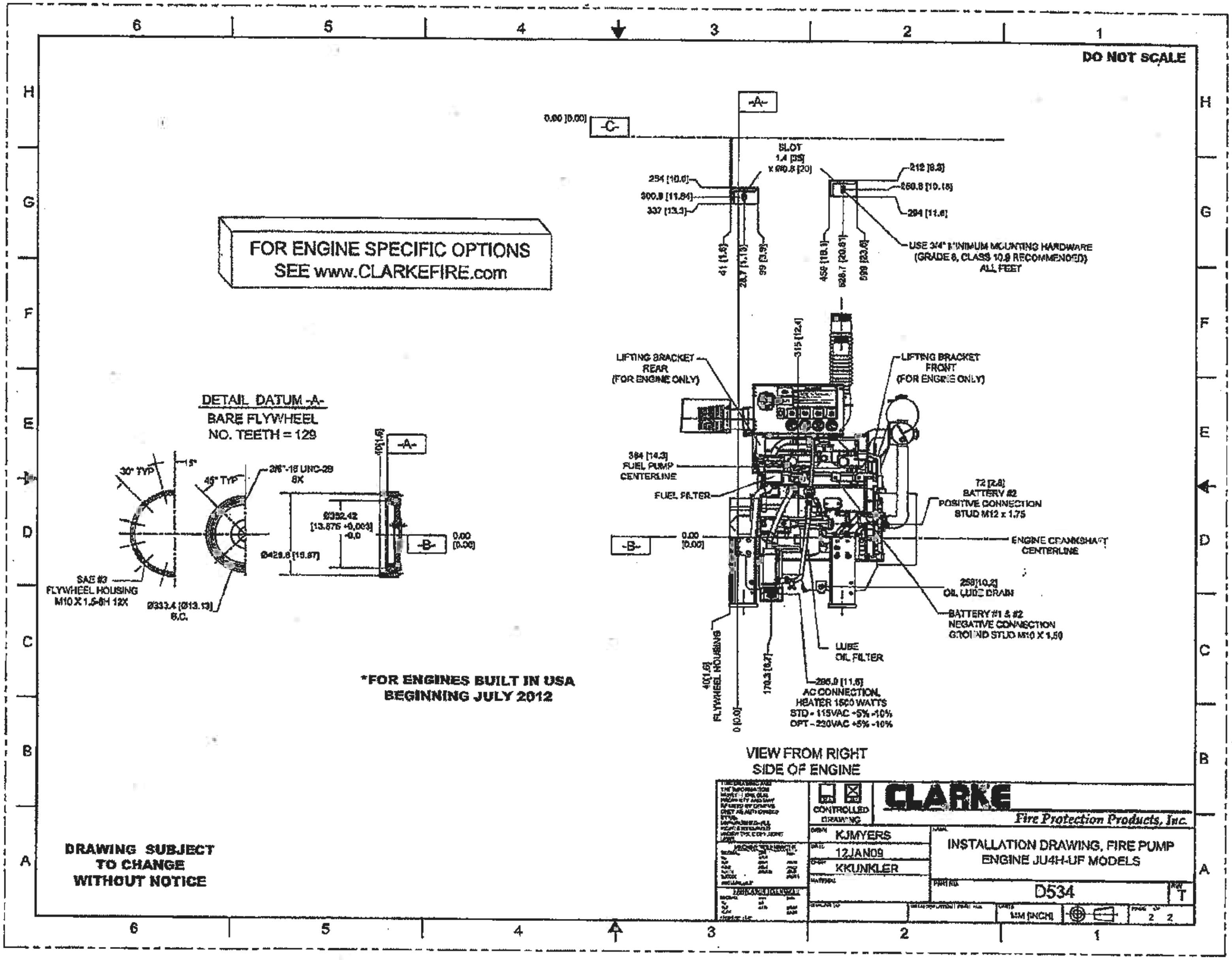
CLARKE Fire Protection Products, Inc.

DRWN KJMYERS
DATE 12JAN09
ITEM KKUNKLER

INSTALLATION DRAWING, FIRE PUMP ENGINE JU4H-UF MODELS

PART NO. D534 REV. T

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MM [INCH] TOLERANCES: SHEET 1 OF 2


DO NOT SCALE
FOR ENGINE SPECIFIC OPTIONS
SEE www.CLARKEFIRE.com
DETAIL DATUM -A-
BARE FLYWHEEL
NO. TEETH = 129
30° TYP
15°
45° TYP
3/8"-16 UNC-2B
8X
Ø352.42
[13.875 +0.003]
-0.0
Ø428.6 [16.87]
SAE #3
FLYWHEEL HOUSING
M10 X 1.5-6H 12X
Ø333.4 [Ø13.13]
B.C.
-A-
-B-
-C-
0.00 [0.00]
SLOT
1.4 [35]
x Ø0.8 [20]
254 [10.0]
300.9 [11.84]
337 [13.3]
41 [1.6]
28.7 [1.13]
99 [3.9]
212 [8.3]
260.8 [10.18]
294 [11.6]
456 [18.0]
528.7 [20.81]
599 [23.6]
USE 3/4" MINIMUM MOUNTING HARDWARE
(GRADE 8, CLASS 10.9 RECOMMENDED)
ALL FEET
315 [12.4]
LIFTING BRACKET
REAR
(FOR ENGINE ONLY)
LIFTING BRACKET
FRONT
(FOR ENGINE ONLY)
364 [14.3]
FUEL PUMP
CENTERLINE
FUEL FILTER
72 [2.8]
BATTERY #2
POSITIVE CONNECTION
STUD M12 x 1.75
ENGINE CRANKSHAFT
CENTERLINE
258 [10.2]
OIL LUBE DRAIN
BATTERY #1 & #2
NEGATIVE CONNECTION
GROUND STUD M10 X 1.50
LUBE
OIL FILTER
295.0 [11.6]
AC CONNECTION,
HEATER 1500 WATTS
STD - 115VAC +5% -10%
OPT - 230VAC +5% -10%
170.3 [6.7]
40 [1.6]
FLYWHEEL HOUSING
0 [0.0]
VIEW FROM RIGHT
SIDE OF ENGINE
*FOR ENGINES BUILT IN USA
BEGINNING JULY 2012
DRAWING SUBJECT
TO CHANGE
WITHOUT NOTICE
CONTROLLED
DRAWING
CLARKE
Fire Protection Products, Inc.
KJMYERS
12JAN09
KKUNKLER
INSTALLATION DRAWING, FIRE PUMP
ENGINE JU4H-UF MODELS
D534
T
MM [INCH]
2 2

JU4H-UF24
Stationary Fire Pump Engine Driver
EMISSION DATA
EPA 40 CFR Part 60

4 Cylinders
Four Cycle
Lean Burn
Naturally Aspirated

500 PPM SULFUR #2 DIESEL FUEL								
RPM	BHP[3]	FUEL GAL/HR (L/HR)	GRAMS / HP- HR				EXHAUST	
			NMHC	NOx	CO	PM[4]	°F (°C)	CFM (m^3/min)
2800	80	6.0 (22.6)	0.37	4.16	1.71	0.15	1110 (599)	581 (16)
3000	83	6.2 (23.3)	0.41	4.29	2.36	0.18	1125 (607)	630 (18)

Notes:

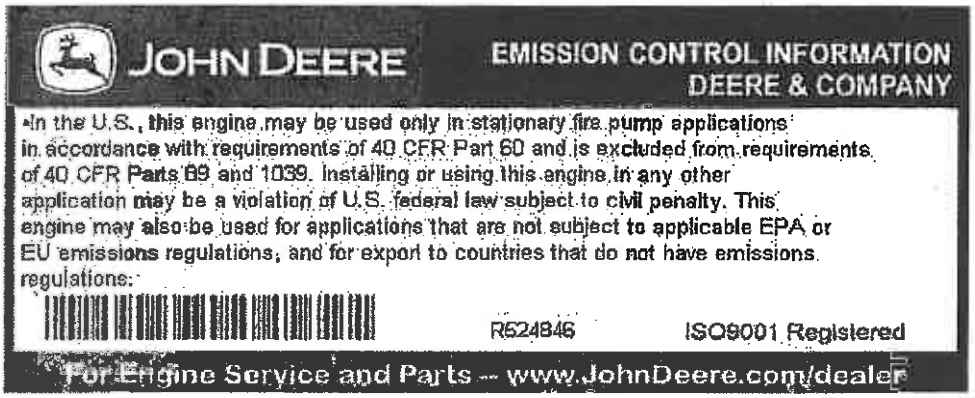
1) *4045DF159 Base Engine Model manufactured by John Deere Corporation. For John Deere Emissions Conformance to EPA 40 CFR Part 60 see Page 2 of 2.*
2) *The Emission Warranty for this engine is provided directly to the owner by John Deere Corporation. A copy of the John Deere Emission Warranty can be found in the Clarke Operation and Maintenance Manual.*
3) *Engines are rated at standard conditions of 29.61in. (7521 mm) Hg barometer and 77°F (25° C) inlet air temperature. (SAE J1349)*
4) *PM is a measure of total particulate matter, including PM_{10}.*

John Deere Power Systems
3801 W. Ridgeway Ave., PO Box 5100
Waterloo, Iowa USA 50704-5100

31 October 2007

Subject: **Fire Pump Ratings – Conformance to EPA 40 CFR Part 60 (NSPS requirements)**

All John Deere stationary fire pump engines conform to the requirements of 40 CFR Part 60. All such engines include an emission label, stating the engine conforms to the requirements of 40 CFR Part 60. An example of the emission label is show below:



This label applies to all of the following engine models, sold to Clarke Fire Protection, for use in stationary fire pump applications:

John Deere Engine Model
4045DF120
4045DF159
4045TF252
4045TF254
4045TF220
6068TF252
6068TF254
6068HF252
6068HF254
6068HF120
6068TF220
6081AF001
6081HF001
6125AF001
6125HF070

All engines conforming to 40 CFR Part 60 (identified by emission label, as shown above) are covered under the emissions warranty of 40 CFR Part 89.

Sincerely,

Kyle J. Tingle
Regional Sales Manager, JDPS

JU4H-UF24
FIRE PUMP DRIVER
NOISE DATA

Mechanical Engine Noise *

RPM	BHP	OVERALL dB(A)	Octave Band 31.5 Hz dB(A)	63 Hz dB(A)	125 Hz dB(A)	250 Hz dB(A)	500 Hz dB(A)	1k Hz dB(A)	2k Hz dB(A)	4k Hz dB(A)	8k Hz dB(A)	16k Hz dB(A)
2800	80	103.5	65.9	71.6	88.3	87.7	94.2	99.1	97.4	94.2	86.2	75.0
3000	83	104.4	65.7	72.3	87.0	88.4	96.6	100.0	98.8	97.8	89.3	75.6

Raw Exhaust Engine Noise **

RPM	BHP	OVERALL dB(A)	Octave Band 31.5 Hz dB(A)	63 Hz dB(A)	125 Hz dB(A)	250 Hz dB(A)	500 Hz dB(A)	1k Hz dB(A)	2k Hz dB(A)	4k Hz dB(A)	8k Hz dB(A)	16k Hz dB(A)
2800-3000	80-83	104		93.8	98.2	92.9	95.1	94.7	97.4	93.6	84.3	77.9

** Values above are provided at 3.3ft (1m) from engine block and do not include the raw exhaust noise.*

*** Values above are provided at 23ft (7m), 90° horizontal, from a vertical exhaust outlet and does not include noise created mechanically by the engine.*

The above data reflects values for a typical engine of this model, speed and power in a free-field environment.

Installation specifics such as background noise level and amplification of noise levels from reflecting off of surrounding objects, will affect the overall noise levels observed. As a result of this, Clarke makes no guarantees to the above levels in an actual installation.

Attachment D Material Safety Data Sheet for Diesel Fuel

Material Safety Data Sheet

MSDS ID NO.: 0279MAR019
Revision date: 12/07/2010

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product name: Marathon No. 2 Low Sulfur Diesel Dyed 500 ppm Sulfur Max
Synonym: Diesel No. 2 Dyed 500 ppm Sulfur Max; No. 2 Diesel, Non-Road Use, Dyed; No. 2 Diesel Dyed 500 ppm Sulfur Max; No. 2 NR 500 Diesel Dyed; No. 2 Diesel Dyed (0.05% Sulfur Max)
Chemical Family: Petroleum Hydrocarbon
Formula: Mixture

Manufacturer:
Marathon Petroleum Company LP
539 South Main Street
Findlay OH 45840

Other information: 419-421-3070
Emergency telephone number: 877-627-5463

2. COMPOSITION/INFORMATION ON INGREDIENTS

No. 2 Diesel is a complex mixture of paraffins, cycloparaffins, olefins, and aromatic hydrocarbons having hydrocarbon chain lengths predominately in the range of C11 through C20. May contain a trace amount of benzene (<0.01%). Can contain small amounts of red dye and additives (<0.15%) which are not considered hazardous at the concentrations used.

Note: May contain up to 5% Renewable Diesel, CASN 928771-01-1.

Product information:

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Marathon No. 2 Diesel	68476-30-2	100	Skin - potential significant contribution to overall exposure by the cutaneous route 100 mg/m³ TWA		

Component Information:

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Saturated Hydrocarbons	Mixture	54-85			

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Aromatic Hydrocarbons	Mixture	15-45			
Unsaturated Hydrocarbons	Mixture	1-6			
Naphthalene	91-20-3	0.01-0.5	Skin - potential significant contribution to overall exposure by the cutaneous route 10 ppm TWA 15 ppm STEL	= 10 ppm TWA = 50 mg/m^3 TWA = 15 ppm STEL = 75 mg/m^3 STEL	

Notes: The manufacturer has voluntarily elected to reflect exposure limits contained in OSHA's 1989 air contaminants standard in its MSDS's, even though certain of those exposure limits were vacated in 1992.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

CAUTION!

VAPORS, FUMES, OR MISTS MAY CAUSE RESPIRATORY TRACT IRRITATION
MAY BE HARMFUL OR FATAL IF SWALLOWED
MAY CAUSE LUNG DAMAGE
OVEREXPOSURE MAY CAUSE CNS DEPRESSION

MAY CAUSE CANCER BASED ON ANIMAL DATA
SEE TOXICOLOGICAL INFORMATION SECTION FOR MORE INFORMATION

COMBUSTIBLE LIQUID AND VAPOR
VAPOR MAY CAUSE FLASH FIRE
MATERIAL MAY ACCUMULATE STATIC CHARGE

STABLE

Inhalation:

Breathing high concentrations may be harmful.
May cause central nervous system depression or effects. Symptoms may include headache, excitation, euphoria, dizziness, incoordination, drowsiness, light-headedness, blurred vision, fatigue, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death, depending on the concentration and duration of exposure. Overexposure to this material may cause systemic damage including target organ effects listed under "Toxicological Information."

Ingestion:

Swallowing this material may be harmful.
May cause irritation of the mouth, throat and gastrointestinal tract. Symptoms may include salivation, pain, nausea, vomiting and diarrhea.
Aspiration into lungs may cause chemical pneumonia and lung damage. Exposure may also cause central nervous system symptoms similar to those listed under "Inhalation" (see Inhalation section).

Skin contact:

Contact may cause reddening, itching and inflammation. Effects may become more serious with repeated or prolonged contact. Skin contact may cause harmful effects in other parts of the body.

Eye contact:

Contact may cause pain and severe reddening and inflammation of the conjunctiva. Effects may become more serious with repeated or prolonged contact.

Carcinogenic Evaluation:

Product information:

Name	IARC Carcinogens:	NTP Carcinogens:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Marathon No. 2 Diesel 68476-30-2	NE			

Notes:

The International Agency for Research on Cancer (IARC) has determined that there is inadequate evidence for the carcinogenicity of diesel fuel/fuel oil in humans. IARC determined that there was limited evidence for the carcinogenicity of marine diesel fuel in animals. Distillate (light) diesel fuels were not classifiable as to their carcinogenicity to humans (Group 3A).

IARC has determined that there is sufficient evidence for the carcinogenicity in experimental animals of diesel engine exhaust and extracts of diesel engine exhaust particles. IARC determined that there is only limited evidence for the carcinogenicity in humans of diesel engine exhaust. However, IARC's overall evaluation has resulted in the IARC designation of diesel engine exhaust as probably carcinogenic to humans (Group 2A) because of the presence of certain engine exhaust components.

The International Agency for Research on Cancer (IARC) has also determined that there is sufficient evidence for the carcinogenicity in experimental animals of light and heavy vacuum distillates, of light and heavy catalytically cracked distillates and of cracked residues (including heavy thermocracked distillates/residues) derived from the refining of crude oil.

Component Information:

Name	IARC Carcinogens:	NTP Carcinogens:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Naphthalene 91-20-3	Monograph 82 [2002]	Reasonably Anticipated To Be A Human Carcinogen male rat-clear evidence; female rat-clear evidence; male mice-no evidence; female mice-some evidence	A4 - Not Classifiable as a Human Carcinogen	Present

Notes:

The International Agency for Research on Cancer (IARC) and the Environmental Protection Agency (EPA) have determined that naphthalene is a possible human carcinogen.

4. FIRST AID

Eye Contact:

Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. GET IMMEDIATE MEDICAL ATTENTION.

Skin Contact:

Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. Get medical attention if irritation persists. Place contaminated clothing in closed container until cleaned or discarded. If clothing is to be laundered, inform the person performing the operation of contaminant's hazardous properties.

Ingestion:

Do not induce vomiting. If spontaneous vomiting is about to occur, place victim's head below knees. If victim is drowsy or unconscious, place on the left side with head down. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Inhalation:

Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear and give oxygen. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

NOTES TO PHYSICIAN:

INGESTION: If ingested this material represents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended.

Medical Conditions Aggravated By Exposure:

skin,

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:

For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFF/ATC) can be used. Fire fighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Specific hazards:

This product has been determined to be a combustible liquid per the OSHA Hazard Communication Standard and should be handled accordingly. For additional fire related information, see NFPA 30 or the North American Emergency Response Guide 128.

Special protective equipment for firefighters:

Avoid using straight water streams. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Avoid excessive water spray application. Keep surrounding area cool with water spray from a distance and prevent further ignition of combustible material. Keep run-off water out of sewers and water sources.

Flash point: 130-190 F
Autoignition temperature: 637 F
Flammable limits in air - lower (%): 0.7

5. FIRE FIGHTING MEASURES

Flammable limits in air - upper (%): 5.0

NFPA rating:
Health: 1
Flammability: 2
Instability: 1
Other: -

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources. Advise authorities and National Response Center (800-424-8802) if the product has entered a water course or sewer. Notify local health and pollution control agencies, if appropriate. Contain liquid with sand or soil. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids.

7. HANDLING AND STORAGE

Handling:
Comply with all applicable EPA, OSHA, NFPA and consistent state and local requirements. Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Avoid repeated and prolonged skin contact. Never siphon this product by mouth. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT

Engineering measures: Local or general exhaust required when using at elevated temperatures that generate vapors or mists.

Respiratory protection: Use approved organic vapor chemical cartridge or supplied air respirators when material produces vapors that exceed permissible limits or excessive vapors are generated. Observe respirator assigned protection factors (APFs) criteria cited in federal OSHA 1910.134. Self-contained breathing apparatus should be used for fire fighting.

Skin and body protection: Neoprene, nitrile, polyvinyl alcohol (PVA), polyvinyl chloride and polyurethane gloves to prevent skin contact.

Eye protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields.

Hygiene measures: No special protective clothing is normally required. Select protective clothing depending on industrial operations. Use mechanical ventilation equipment that is explosion-proof.

9. PHYSICAL AND CHEMICAL PROPERTIES:

Appearance: Red Liquid

9. PHYSICAL AND CHEMICAL PROPERTIES:

Physical state (Solid/Liquid/Gas):	Liquid
Substance type (Pure/Mixture):	Mixture
Color:	Red
Odor:	Slight Hydrocarbon
Molecular weight:	180
pH:	Neutral
Boiling point/range (5-95%):	400-640 F
Melting point/range:	Not determined.
Decomposition temperature:	Not applicable.
Specific gravity:	C.A. 0.8
Density:	6.76 lbs/gal
Bulk density:	No data available.
Vapor density:	4-5
Vapor pressure:	1-10 mm Hg @ 100 F
Evaporation rate:	No data available.
Solubility:	Negligible
Solubility in other solvents:	No data available.
Partition coefficient (n-octanol/water):	No data available.
VOC content(%):	10%
Viscosity:	1.9-3.4 @ 40 C

10. STABILITY AND REACTIVITY

Stability:	The material is stable at 70 F, 760 mm pressure.
Polymerization:	Will not occur.
Hazardous decomposition products:	Combustion produces carbon monoxide, aldehydes, aromatic and other hydrocarbons.
Materials to avoid:	Strong oxidizers such as nitrates, perchlorates, chlorine, fluorine.
Conditions to avoid:	Excessive heat, sources of ignition and open flames.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

Product information:

Name	CAS Number	Inhalation:	Dermal:	Oral:
Marathon No. 2 Diesel	68476-30-2	No data available	No data available	No data available

Toxicology Information:

MIDDLE DISTILLATES, PETROLEUM: Long-term repeated (lifetime) skin exposure to similar materials has been reported to result in an increase in skin tumors in laboratory rodents. The relevance of these findings to humans is not clear at this time.

MIDDLE DISTILLATES WITH CRACKED STOCKS: Light cracked distillates have been shown to be carcinogenic in animal tests and have tested positive with in vitro genotoxicity tests. Repeated dermal exposures to high concentrations in test animals resulted in reduced litter size and litter weight, and increased fetal resorptions at maternally toxic doses. Dermal exposure to high concentrations resulted in severe skin irritation with weight loss and some mortality. Inhalation exposure to high concentrations resulted in respiratory tract irritation, lung changes/infiltration/accumulation, and reduction in lung function.

ISOPARAFFINS: Studies in laboratory animals have shown that long-term exposure to similar materials (isoparaffins) can cause kidney damage and kidney cancer in male laboratory rats. However, in-depth research indicates that these findings are unique to the male rat, and that these effects are not relevant to humans.

NAPHTHALENE: Severe jaundice, neurotoxicity (kernicterus) and fatalities have been reported in young children and infants as a result of hemolytic anemia from overexposure to naphthalene. Persons with Glucose 6-phosphate dehydrogenase (G6PD) deficiency are more prone to the hemolytic effects of naphthalene. Adverse effects on the kidney have been reported in persons overexposed to naphthalene but these effects are believed to be a consequence of hemolytic anemia, and not a direct effect. Hemolytic anemia has been observed in laboratory animals exposed to naphthalene. Laboratory rodents exposed to naphthalene vapor for 2 years (lifetime studies) developed non-neoplastic and neoplastic tumors and inflammatory lesions of the nasal and respiratory tract. Cataracts and other adverse effects on the eye have been observed in laboratory animals exposed to high levels of naphthalene. Findings from a large number of bacterial and mammalian cell mutation assays have been negative. A few studies have shown chromosomal effects (elevated levels of Sister Chromatid Exchange or chromosomal aberrations) in vitro. Naphthalene has been classified as Possibly Carcinogenic to Humans (2B) by IARC, based on findings from studies in laboratory animals.

DIESEL EXHAUST: Chronic inhalation studies of whole diesel engine exhaust in mice and rats produced a significant increase in lung tumors. Combustion of kerosine and/or diesel fuels produces gases and particulates which include carbon monoxide, carbon dioxide, oxides of nitrogen and/or sulfur and hydrocarbons. Significant exposure to carbon monoxide vapors decreases the oxygen carrying capacity of the blood and may cause tissue hypoxia via formation of carboxyhemoglobin.

TARGET ORGANS: central nervous system, skin, respiratory system, lungs, kidney, liver, thymus, reproductive organs,

12. ECOTOXICOLOGICAL INFORMATION

Mobility:

May partition into air, soil and water.

Ecotoxicity:

Toxic to aquatic organisms.

Bioaccummulation:

Not expected to bioaccumulate in aquatic organisms.

Persistance/Biodegradation:

Readily biodegradable in the environment.

13. DISPOSAL CONSIDERATIONS

Cleanup Considerations:

This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of an "characteristic" hazardous waste. This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

14. TRANSPORT INFORMATION

49 CFR 172.101:

DOT:

Transport Information: This material when transported via US commerce would be regulated by DOT Regulations.

Proper shipping name:	Fuel Oil, No. 2
UN/Identification No:	NA 1993
Hazard Class:	3
Packing group:	III
DOT reportable quantity (lbs):	Not applicable.

Proper shipping name:	Fuel Oil, No. 2
UN/Identification No:	NA 1993
Hazard Class:	3
Packing group:	III

15. REGULATORY INFORMATION

US Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

OSHA Hazard Communication Standard: This product has been evaluated and determined to be hazardous as defined in OSHA's Hazard Communication Standard.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product contains the following component(s) that have been listed on EPA's Extremely Hazardous Substance (EHS) List:

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Saturated Hydrocarbons	NA
Aromatic Hydrocarbons	NA
Unsaturated Hydrocarbons	NA
Naphthalene	NA

SARA Section 304: This product contains the following component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	CERCLA/SARA - Hazardous Substances and their Reportable Quantities
Saturated Hydrocarbons	NA
Aromatic Hydrocarbons	NA
Unsaturated Hydrocarbons	NA
Naphthalene	= 100 lb final RQ = 45.4 kg final RQ

SARA Section 311/312 The following EPA hazard categories apply to this product:

Acute Health Hazard
Fire Hazard
Chronic Health Hazard

SARA Section 313: This product contains the following component(s) that may be subject to reporting on the Toxic Release Inventory (TRI) From R:

Name	CERCLA/SARA 313 Emission reporting:
Saturated Hydrocarbons	None
Aromatic Hydrocarbons	None
Unsaturated Hydrocarbons	None
Naphthalene	= 0.1 % de minimis concentration

State and Community Right-To-Know Regulations:
The following component(s) of this material are identified on the regulatory lists below:

Saturated Hydrocarbons

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.

Saturated Hydrocarbons	
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed
Aromatic Hydrocarbons	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed
Unsaturated Hydrocarbons	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed
Naphthalene	
Louisiana Right-To-Know:	Not Listed

Saturated Hydrocarbons

California Proposition 65:	carcinogen, initial date 4/19/02
New Jersey Right-To-Know:	sn 1322
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	carcinogen
New Jersey - Environmental Hazardous Substances List:	SN 1322 TPQ 500 lb
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 1 lb RQ land/water = 100 lb RQ air

Canadian Regulatory Information:

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Naphthalene	B4, D2A	1 %

NOTE: Not Applicable.

16. OTHER INFORMATION

Additional Information: No data available.

Prepared by: Mark S. Swanson, Manager, Toxicology and Product Safety

The information and recommendations contained herein are based upon tests believed to be reliable. However, Marathon Petroleum Company LP (MPC) does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage maybe required. MPC assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

Attachment E Supporting Calculations

Potential-To-Emit (PTE) Calculations - Fire Pump
WVARNG Logan-Mingo Readiness Center

#2 Fuel Oil (BTU/gal) 136,600 Btu/gal average

Capacity Data						
Source ID No.	Full Standby Fuel Rate (gph)	Fuel Through-put (gpy)	Fuel Through-put (ft3/hr)	Fuel Through-put (MMft3/yr)	BHP Rating @ full standby	BSFC (Btu/bhp-hr)
Fire Pump (PDF Exemption)	6.2	3100	0.83	0.00041	83	10204

Criteria Pollutant Potential Emissions

Sample Calculation: AP-42 Emission Factor (lb/MMBtu) X 136,600 Btu/gal diesel fuel x fuel consumption rate (gal/hr) ÷ 1,000,000 Btu/MMBtu = Emission Rate (lb / hr)

Sample Calculation: Cummins Emission Factor (gram/HP-hr) X HP Rating at full standby load ÷ 453.593 grams / LB = Emission Rate (lb / hr)

	1. Emission Factor (lbs/MMBtu) [Ref 1: AP-42 c03s04, Table 3.4-1] [Ref 2: AP-42 c03s03, Table 3.3-1]					2. Emission Factor (grams/HP-hr) [Mfr. Data Sheet]					Potential Emissions (lbs/hr)					Potential Emissions at 500 operating hours (tons/yr)				
Source ID No.	NO_X	CO	VOC	SO_2 [500 ppm Sulfur]	PM_{10}	NO_X	CO	VOC	SO_2	PM_{10}	NO_X [Ref: 2]	CO [Ref: 2]	VOC [Ref: 2]	SO_2 [Ref: 1]	PM_{10} [Ref: 2]	NO_X	CO	VOC	SO_2	PM_{10}
Fire Pump (PDF Exemption)	NA	NA	NA	0.051	NA	4.29	2.36	0.41	NA	0.18	0.78	0.43	0.075	0.043	0.033	0.20	0.11	0.019	0.011	0.0082

Hazardous Air Pollutant (HAP) Emissions

Sample Calculation: AP-42 Emission Factor (lb/MMBtu) X 136,600 Btu/gal diesel fuel x fuel consumption rate (gal/hr) ÷ 1,000,000 Btu/MMBtu = Emission Rate (lb / hr)

	Emission Factors (lb/MMBtu) AP-42, c03s04, Tbl 3.4-3] [Ref 2: AP-42, c03s03, Tbl. 3.3-2] [Ref 1;						Potential Emissions (lbs/hr)						Potential Emissions at 500 operating hours (tons/yr)					
Source ID No.	Benzene	Ethyl benzene	Toluene	Xylenes	n-hexane	Form-aldehyde	Benzene	Ethyl benzene	Toluene	Xylenes	n-hexane	Form-aldehyde	Benzene	Ethyl benzene	Toluene	Xylenes	n-hexane	Form-aldehyde
Fire Pump (PDF Exemption)	7.76E-04	Not Available	2.81E-04	1.93E-04	Not Available	7.89E-05	6.57E-04	Not Available	2.38E-04	1.63E-04	Not Available	6.68E-05	1.64E-04	Not Available	5.95E-05	4.09E-05	Not Available	1.67E-05

Attachment F Fire Pump Engine EPA Certificate of Conformity

	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY **2014 MODEL YEAR** **CERTIFICATE OF CONFORMITY** **WITH THE CLEAN AIR ACT OF 1990**	**OFFICE OF TRANSPORTATION AND AIR QUALITY** **ANN ARBOR, MICHIGAN 48105**

Certificate Issued To: Deere & Company (U.S. Manufacturer or Importer) **Certificate Number:** EJDXL04.5141-011	**Effective Date:** 09/10/2013 **Expiration Date:** 12/31/2014	Byron J. Bunker, Division Director Compliance Division	**Issue Date:** 09/10/2013 **Revision Date:** N/A

Model Year: 2014 **Manufacturer Type:** Original Engine Manufacturer **Engine Family:** EJDXL04.5141	**Mobile/Stationary Indicator:** Stationary **Emissions Power Category:** 56<=kW<75 **Fuel Type:** Diesel **After Treatment Devices:** No After Treatment Devices Installed **Non-after Treatment Devices:** Non-standard Non-After Treatment Device Installed, Smoke Puff Limiter, Engine Design Modification

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.