



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):
SHENTEL

2. NAME OF FACILITY (IF DIFFERENT FROM ABOVE):
67155 Cabin Creek Tower

3. NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) CODE:
517312

4A. MAILING ADDRESS: 500 Summers St.
Charleston, WV 25301

4B. PHYSICAL ADDRESS: 300 Rest Area Pointe
Cabin Creek, WV 25301

5A. DIRECTIONS TO FACILITY (PLEASE PROVIDE MAP AS ATTACHMENT A): FROM CHARLESTON: HEAD SOUTH ON 1-64 E/1-77 S. TAKE EXIT 85 TOWARD US-60/WV-61/CHELYAN/CEDAR GROVE. CONTINUE ONTO ADMIRAL T.J. LOPEZ BRIDGE/CHELYAN BRIDGE. TURN RIGHT TOWARD WV-61 S. KEEP LEFT TO CONTINUE TOWARD WV-61 S. TURN LEFT ONTO WV-61 S. SLIGHT RIGHT ONTO ARMSTRONG CREEK. TURN RIGHT ONTO S COLUMBIA RD. TAKE LEFT FORK IN ROAD. TAKE A RIGHT AND THEN A SHARP LEFT (N 38° 05' 40.49", W 81° 20' 59.66") (0.78 MI). TAKE LEFT (N 38° 06' 17.07", W 81° 20' 47.80") (0.78 MI). TAKE LEFT (N 38° 06' 33.81", W 81° 21' 22.76") (0.67 MI). TAKE RIGHT (N 38° 06' 28.88", W 81° 22' 01.34") (0.27 MI). TAKE RIGHT (N 38° 06' 25.99", W 81° 22' 16.06") AND FOLLOW OUT TO TOWER.

5B. NEAREST ROAD:
S. Columbia Road

5C. NEAREST CITY OR TOWN:
Cabin Creek

5D. COUNTY:
Kanawha

5E. UTM NORTHING (KM):
4217857

5F. UTM EASTING (KM):
467378

5G. UTM ZONE:
17S

6A. INDIVIDUAL TO CONTACT IF MORE INFORMATION IS REQUIRED:
Chris Harris

6B. TITLE:
WV Manager

6C. TELEPHONE:
304-353-8917

6D. FAX:
304-353-8938

6E. E-MAIL:
Christopher.Harris@emp.shentel.com

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):

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:
5/1/2018

10B. DATE OF ANTICIPATED START-UP:
5/1/2018

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 PROCESSES, 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 8760 HR/YR) DIVIDED BY 2000 LB/TON
PM	0.008	0.03
PM ₁₀	0.006	0.02
VOCs	0.06	0.26
CO	0.09	0.39
NO _x	0.26	1.14
SO ₂	0.05	0.23
Pb	-	-
HAPs (AGGREGATE AMOUNT)	Formaldehyde 0.03	Formaldehyde 0.13
TAPs (INDIVIDUALLY)*	-	-
OTHER (INDIVIDUALLY)*	-	-

* 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, KEVIN FOLK (TYPE NAME) 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: VP WIRELESS NETWORK OPERATIONS

DATE: 3 / 12 / 2018

** 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

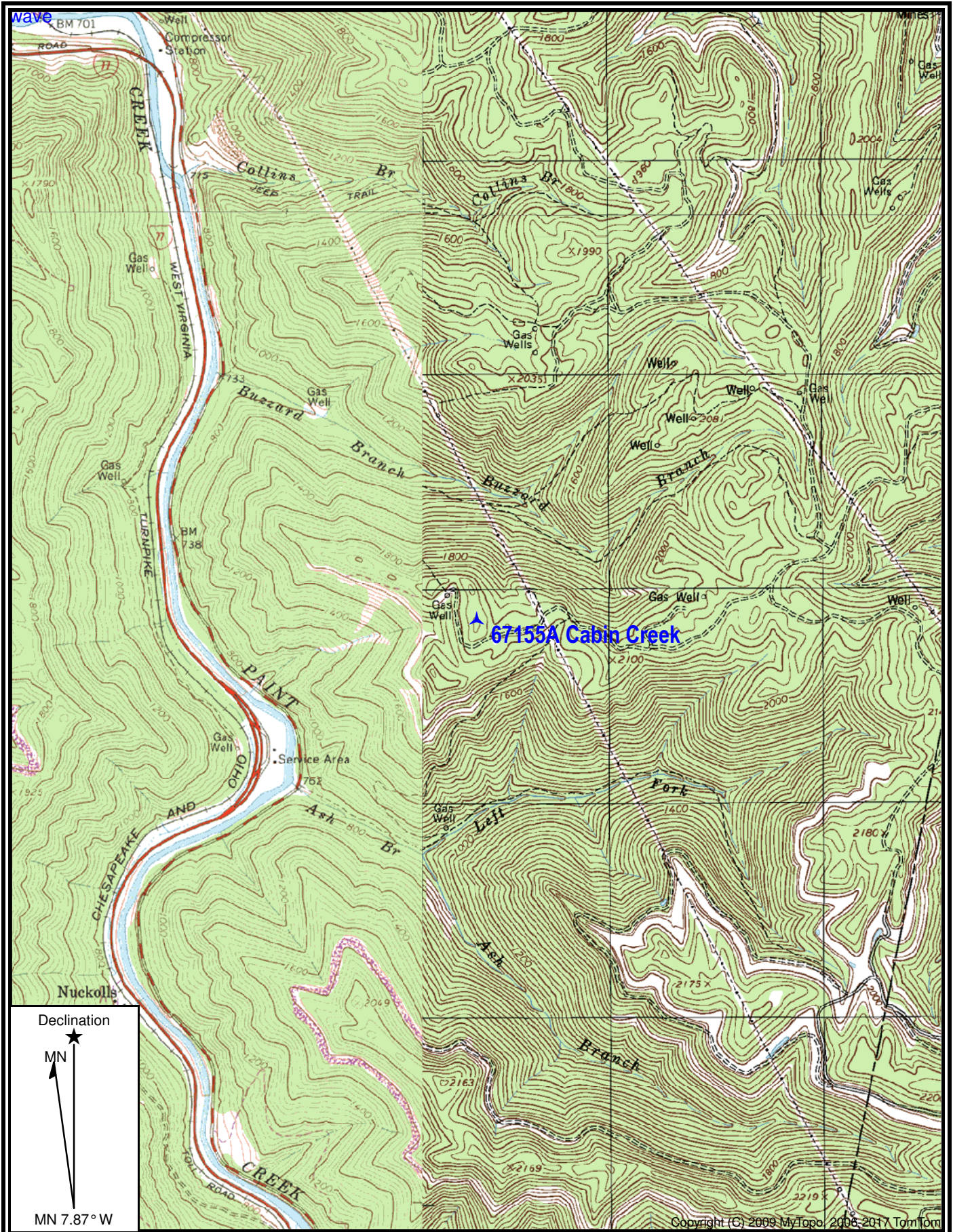
RECORDS ON ALL CHANGES ARE REQUIRED TO BE KEPT AND MAINTAINED ON-SITE FOR TWO (2) YEARS.

THE PERMIT DETERMINATION FORM WITH THE INSTRUCTIONS CAN BE FOUND ON DAQ'S PERMITTING SECTION WEB SITE:

www.dep.wv.gov/daq

Attachment A

Topo Map



Map Name: POWELLTON
 State Name: WV
 Print Date: 04/17/17

Scale: 1 inch = 2,000 ft.
 Horizontal Datum: NAD83
 Date Photo Revised: Unknown

Date Published: 2002

Attachment B

Drawings



1150 SHENANDOAH VILLAGE DRIVE
WAYNESBORO, VA 22980

SITE NAME: CABIN CREEK

SITE NUMBER: 67155

SITE ADDRESS:
300 REST AREA POINTE
CABIN CREEK, WV 25103

AREA: LEASE AREA = 200 SQ. FT.

TOWER OWNER:
SBA COMMUNICATIONS CORP.
5900 BROKEN SOUND PKWY. NW
BOCA RATON, FL 33487

COUNTY: KANAWHA

LATITUDE: N38° 20' 44.0"
(38.107944°)

LONGITUDE: W82° 18' 35.6"
(-81.372111°)

NO.	REVISION/ISSUE	DATE
1	ISSUE FOR COMMENT	04/02/18



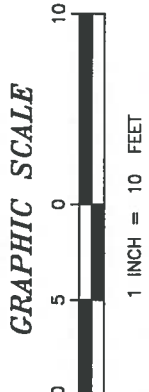
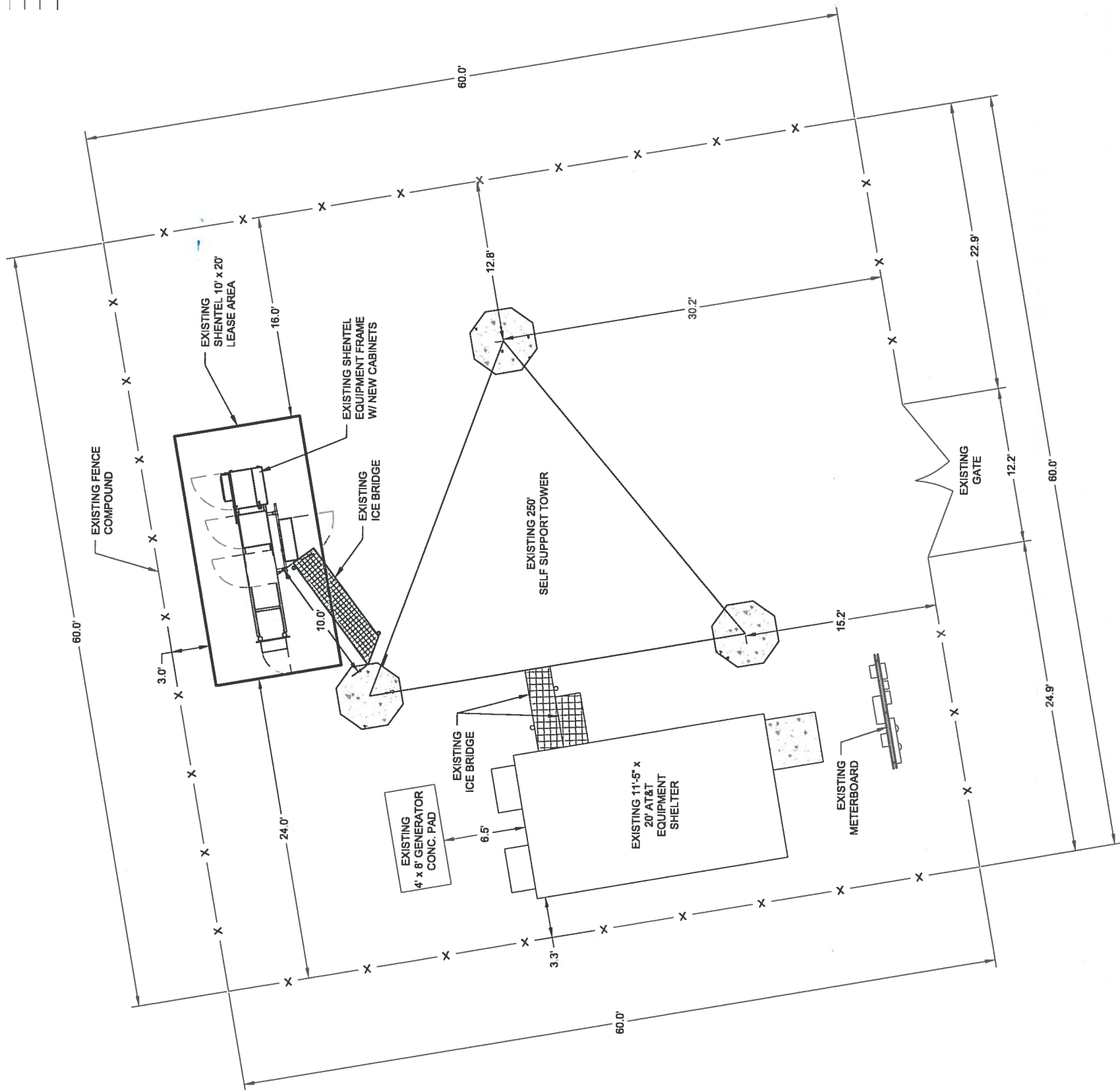
400 TRACY WAY, SUITE 200
CHARLESTON, WV 25311
(304) 345-6712 PHONE
(304) 345-6714 FAX

PROJECT # R4461000-171638.01

EXISTING SITE PLAN
SHEET C-1

LEGEND

- PROPERTY LINE
- TRACT LINE
- LEASE LINE
- ROW LINE
- X- EXISTING FENCE LINE
- XX- EXISTING FENCE LINE
- G- GAS LINE
- E- OVERHEAD POWER
- T- OVERHEAD TELEPHONE
- UE- UNDERGROUND POWER
- UT- UNDERGROUND TELCO.
- E&T- OVERHEAD POWER/TELEPHONE
- E&T- EXISTING UTILITY POLE





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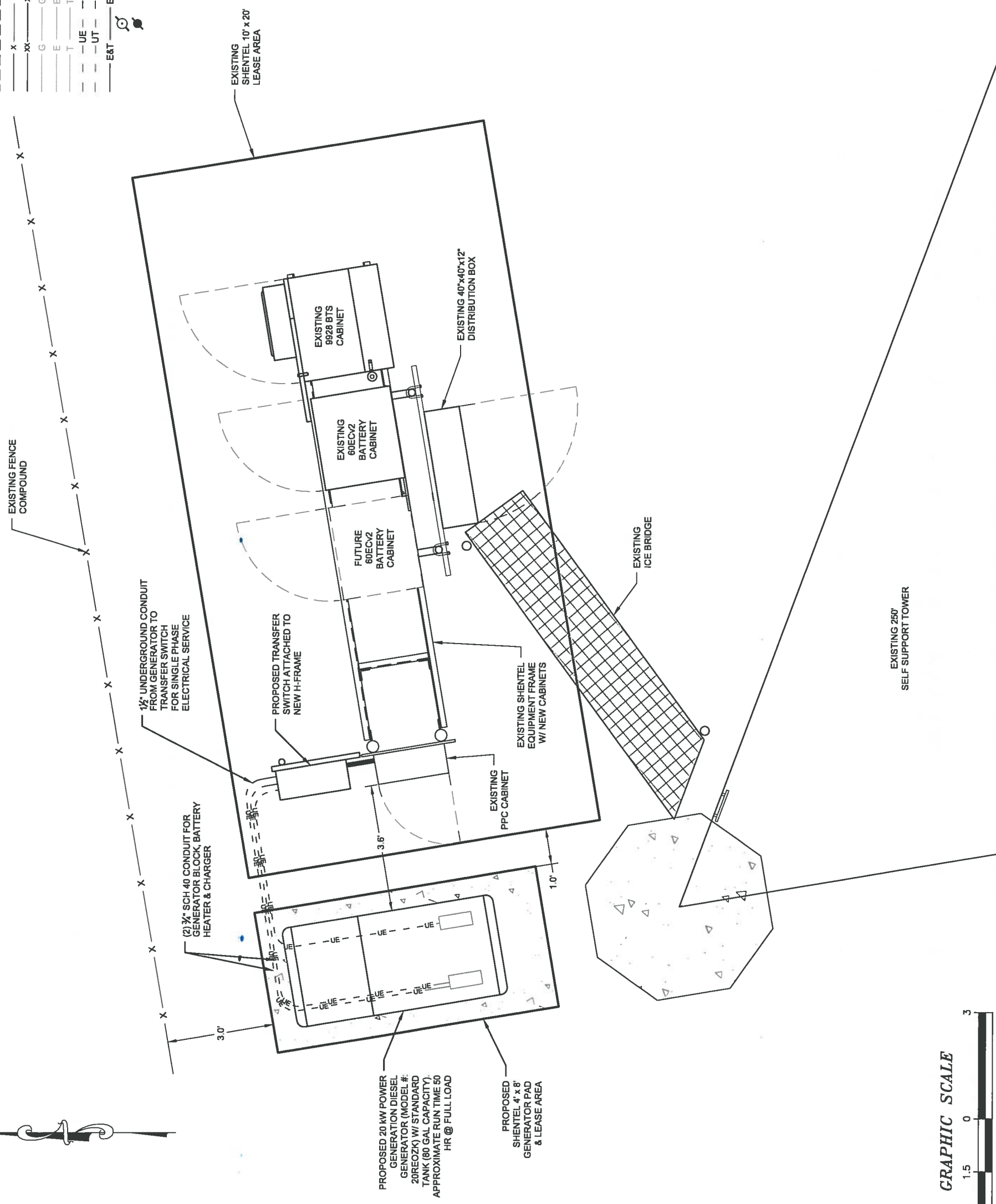
400 TRACY WAY, SUITE 200
CHARLESTON, WV 25311
(304) 345-6712 PHONE
(304) 345-6714 FAX

PROJECT # R4461000-171638.01

EXISTING PLAN SHEET C-2

LEGEND

- PROPERTY LINE
- TRACT LINE
- LEASE LINE
- ROW LINE
- X- EXISTING FENCE LINE
- XX- EXISTING FENCE LINE
- G- GAS LINE
- E- OVERHEAD POWER
- T- OVERHEAD TELEPHONE
- UE- UNDERGROUND POWER
- UT- UNDERGROUND TELCO.
- E&T- OVERHEAD POWER/TELEPHONE
- E&T- EXISTING UTILITY POLE



Attachment C

Process Description

PROCESS DESCRIPTION

The installation will be a Kohler Power Systems Diesel generator, Model 20REOZK. This unit meets the EPA certified stationary emergency generator requirements according to the design spec sheet. The generator will be used to supply power to the wireless communications facility in case of power failure. During normal operation, the generator may be exercised weekly for approximately one hour for an annual run time of 52 hours. It is not expected that the generator will exceed 8,760 hours/year allowed by the State of West Virginia.

The generator/shelters installed on all properties have the following useful fuel safeguards:

- The internal generator fuel tank is a U.L. 142 and NFPA 30 approved double wall sub-base fuel tank and meets Local, State, and Federal codes.
- The generators have remote alarms that are monitored 24 x 7. There is a fuel tank rupture sensor that reports back any spillage that occurs within the fuel containment pan. The network also monitors low-level fuel, generator on and operating in emergency mode.
- For remote generator installations (generators not installed in a shelter), the entire unit is housed in a "Crystal Quiet Enclosure" with an internally mounted silencer.

SEISMIC MOUNTING NOTE:
 FOR SEISMIC CERTIFIED UNITS,
 MOUNT WITH THE FOLLOWING HARDWARE:
WALL MOUNTED (STEEL)
 Ø9.53 [1.375] Dia. SAE GRADE 1 / ASTM A307 BOLTS.
WALL MOUNTED (CONCRETE)
 Ø9.53 [1.375] Dia. HILTI KWIK BOLT TZ-CS WITH MIN.
 EMBEDMENT 50.8 [2.00]; EDGE DISTANCE OF 101.6 [4.00]
 ON A 101.6 [4.00] THICK 4000 PSI CONCRETE WALL.
 HARDWARE TO COMPLY WITH SPECIFICATIONS
 ON ADV-7456.

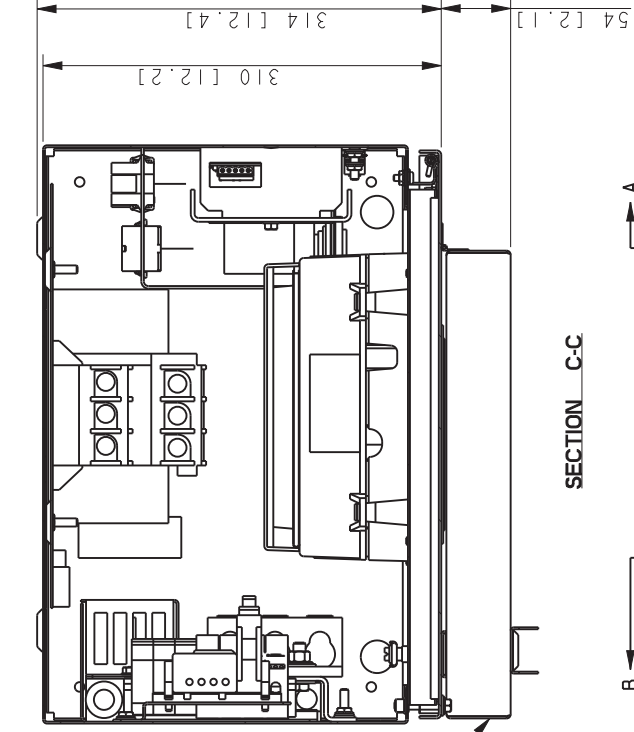
SECURITY COVER
 OPTIONAL ON NEMA 1
 REQUIRED FOR NEMA 3R

ACCESSORY MODULE
 (OPTIONAL
 MPAC 1200 ONLY)

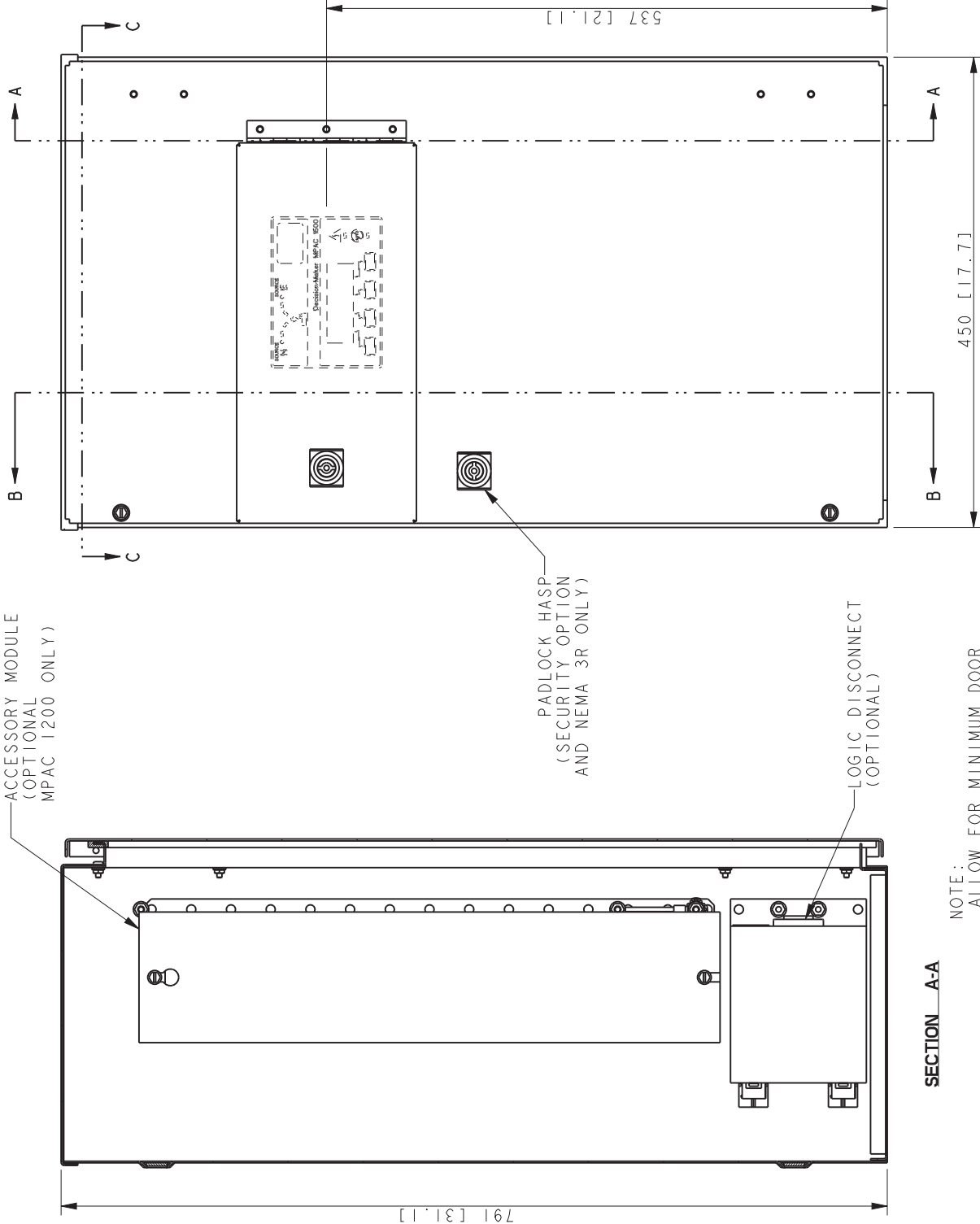
PADLOCK HASP
 (SECURITY OPTION
 AND NEMA 3R ONLY)

LOGIC DISCONNECT
 (OPTIONAL)

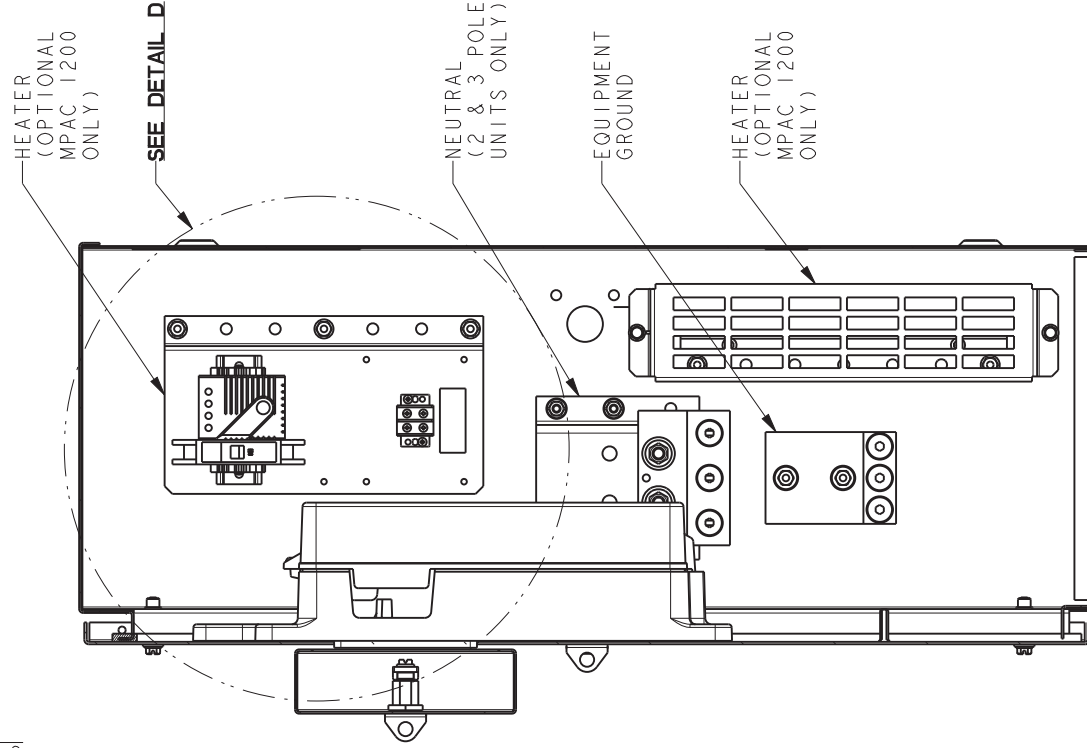
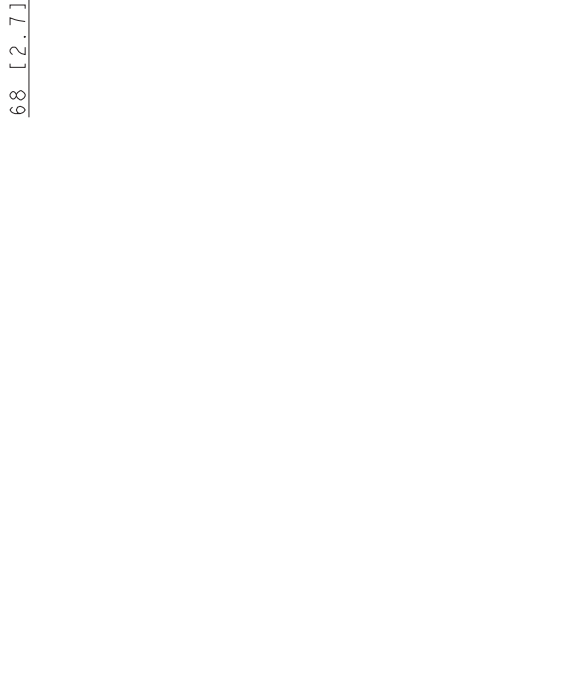
NOTE:
 ALLOW FOR MINIMUM DOOR
 SWING CLEARANCE OF 508 [20.0]
 IN FRONT OF CABINET.



SECTION C-C



SECTION A-A



RECOMMENDED ENTRANCE AREA
 TOP & BOTTOM

SURGE PROTECTION
 (OPTIONAL
 MPAC 1200
 ONLY)

HEATER
 (OPTIONAL
 MPAC 1200
 ONLY)

SEE DETAIL D

NEUTRAL
 (2 & 3 POLE
 UNITS ONLY)

EQUIPMENT
 GROUND

HEATER
 (OPTIONAL
 MPAC 1200
 ONLY)

DETAIL D
 OF SECTION B-B

NOTE:
 DUE TO THE SPACE LIMITATIONS,
 SURGE PROTECTION OR HEATER
 MAY BE ORDERED, BUT NOT BOTH.

NOTES:
 DIMENSIONS IN [] ARE INCHES.
 FINISH: ANSI 49 GRAY.

REFER TO OPERATOR'S MANUAL PRIOR TO
 INSTALLATION AND OPERATION OF UNIT.

FOR SEISMIC CERTIFIED UNITS, REFER TO
 ADV-7456 AND INSTALLATION INSTRUCTIONS.

REV	DATE	REVISION	BY	UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS	SCALE	TOLERANCES ARE:	APPROVALS	DATE	TITLE
-	8-22-13	NEW DRAWING [CT54441]	BTW						
A	4-22-14	(A-6) VOLTS: 208-600 WAS 208-480; [CT78618] BTW	BTW						

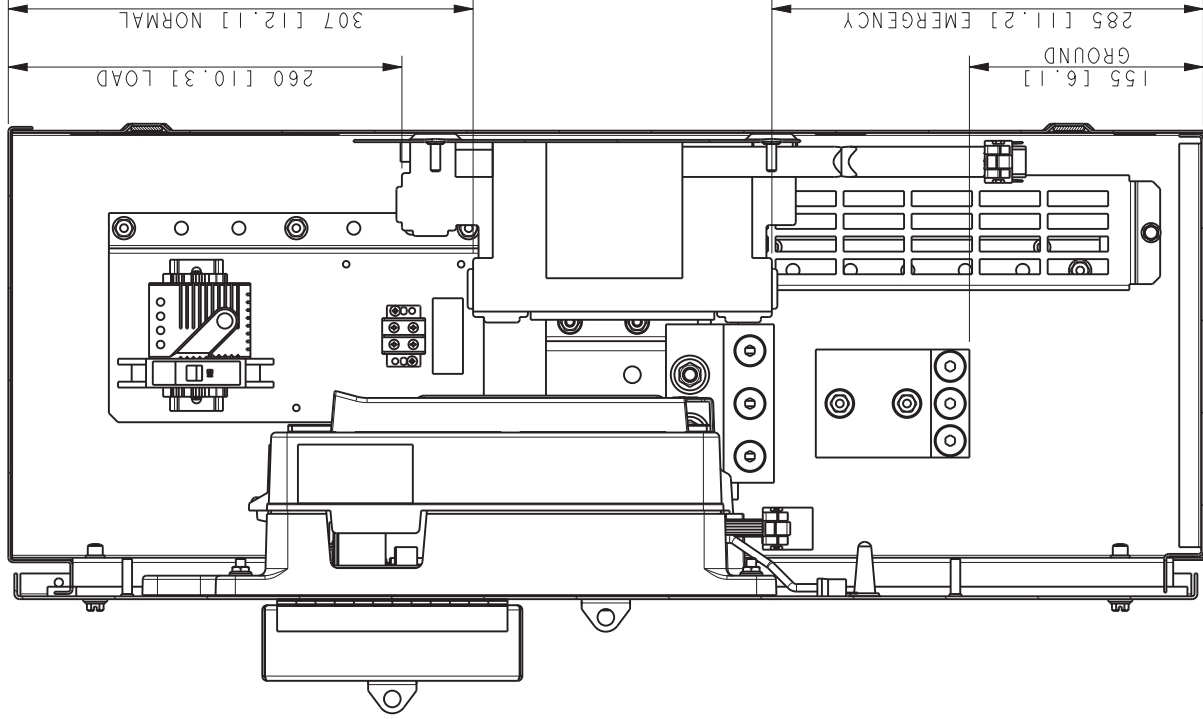
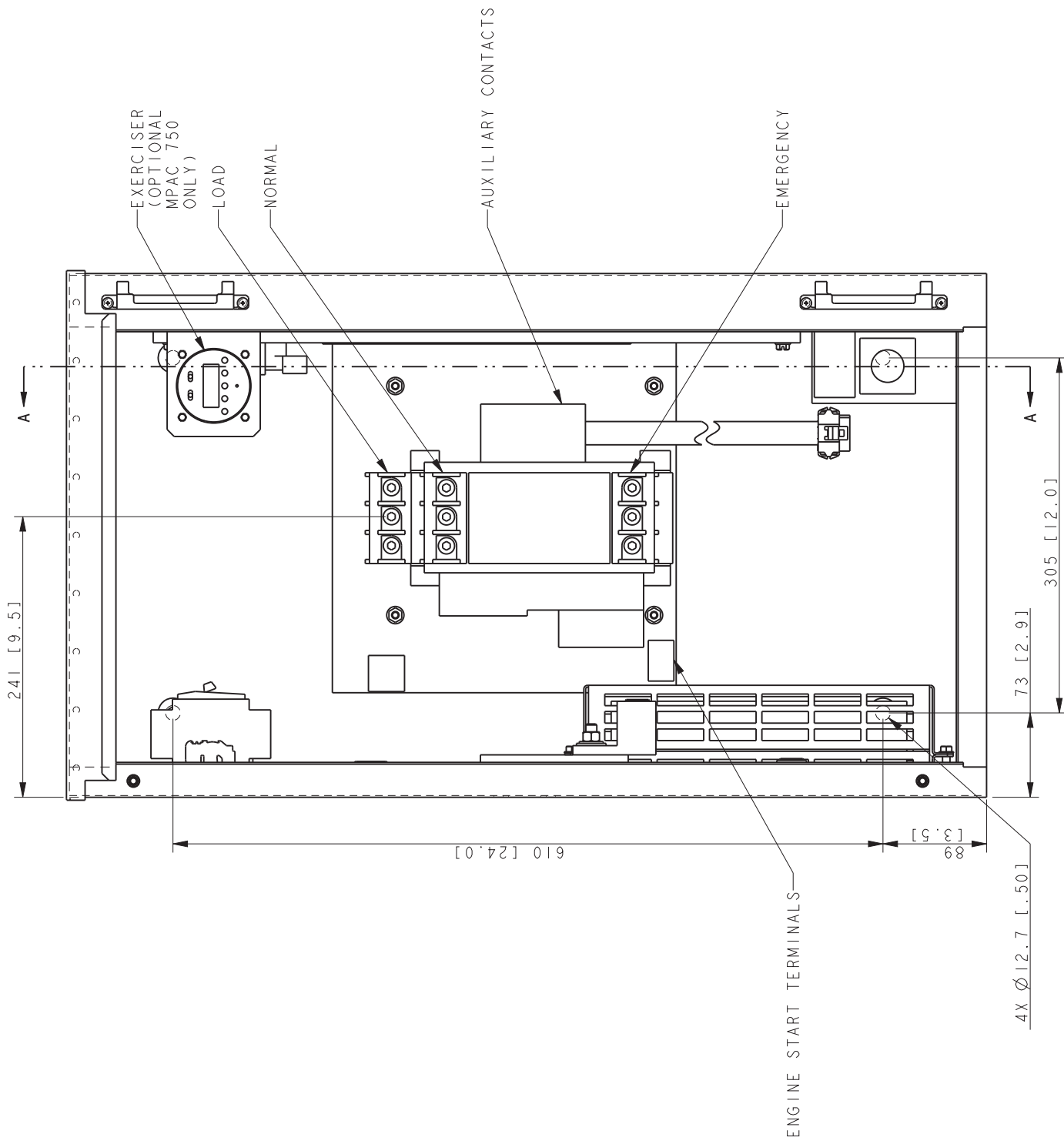
KOHLER CO.
 POWER SYSTEMS, KOHLER, WI. 53044 U.S.A.
 THIS DRAWING IN DESIGN AND DETAIL IS KOHLER CO.
 PROPERTY AND WILL BE USED ONLY FOR THE PROJECT
 CONNECTION WITH KOHLER CO. PRODUCTS. ALL RIGHTS OF
 DESIGN OR INVENTION ARE RESERVED.

THIRD ANGLE PROJECTION	APPROVALS	DATE	SCALE	NONE	CAD NO.	DWG NO.	SHEET 1 of 2

STYLE	MECHANISM	TRANSITION	MPAC LOGIC	VOLTS	POLES	NEUTRAL	ENCLOSURE	AMPS	CONNECTION
KSS	SPECIFIC	STANDARD	750, 1200	208-600	2, 3, 4	SOLID, SW	1, 3R	40, 80, 100, 150, 200, 225	STANDARD

SEE ADV-8565 FOR FULL MODEL CODE DEFINITION

DIMENSION PRINT



SECTION A-A

SWITCH RATING (AMPS)		SCREW TYPE TERMINALS FOR EXTERNAL POWER CONNECTION	
RANGE OF WIRE SIZES		RANGE OF WIRE SIZES	
CONTACTOR (PER PHASE)	NEUTRAL (2 & 3 POLE)	CONTACTOR (PER PHASE)	NEUTRAL (2 & 3 POLE)
40-150	(1) #8 TO 3/0	(3) #6-3/0	(3) #6-3/0
200-225	(1) #6 TO 250 KCMIL OR (6) 1/0-250 KCMIL	(3) #4-600 KCMIL	(3) #4-600 KCMIL OR (6) 1/0-250 KCMIL

WEIGHTS KG (LBS)	
2 POLE	30 (65)
3 POLE	31 (68)
4 POLE	31 (68)

REV	DATE	BY	REVISION	UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS	TOLERANCES ARE:	BY	DATE	REVISION	BY	DATE	REVISION
-	8-22-13	BTW	NEW DRAWING [CT54441]			BTW	8-22-13		BTW	8-22-13	
A	4-22-14	BTW	SEE SHEET 1 [CT18618]			BTW	8-22-13		BTW	8-22-13	

APPROVALS	DATE	TITLE
BTW	8-22-13	DRAWN
BTW	8-22-13	CHECKED
MTL	8-22-13	APPROVED

SCALE	NONE	CAD NO.	SCALE	NONE	CAD NO.

CO. NO.	DATE	SCALE	NO.	DATE	SCALE	NO.
ADV-8584	8-22-13			8-22-13		

KOHLER CO. METRIC PRO-E
 POWER SYSTEMS, KOHLER, WI. 53044 U.S.A.
 THIS DRAWING IN DESIGN AND DETAIL IS KOHLER CO. PROPERTY AND IS NOT TO BE REPRODUCED OR USED FOR ANY OTHER PROJECT WITHOUT THE WRITTEN CONSENT OF KOHLER CO. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.

DIMENSION PRINT

SHEET 2 of 2



Tier 4i EPA-Certified for Stationary Emergency Applications

Ratings Range

60 Hz

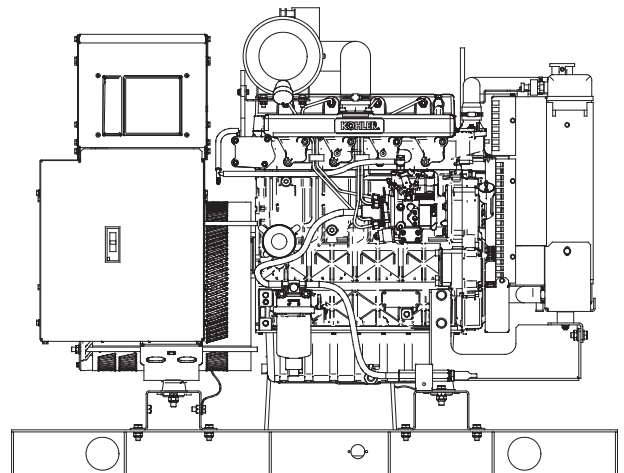
Standby:	kW	18.0-24.0
	kVA	18.0-30.0
Prime:	kW	16.5-21.0
	kVA	16.5-26.3

Generator Set Ratings

Alternator	Voltage	Ph	Hz	130°C Rise Standby Rating		105°C Rise Prime Rating	
				kW/kVA	Amps	kW/kVA	Amps
4D3.8	120/208	3	60	20.0/25.0	69.4	19.0/23.8	65.9
	127/220	3	60	20.0/25.0	65.6	18.5/23.1	60.7
	120/240	3	60	20.0/25.0	60.1	19.0/23.8	57.1
	120/240	1	60	18.0/18.0	75.0	16.5/16.5	68.8
	139/240	3	60	20.0/25.0	60.1	18.5/23.1	55.6
	220/380	3	60	19.5/24.4	37.0	18.5/23.1	35.1
	277/480	3	60	20.0/25.0	30.1	18.5/23.1	27.8
347/600	3	60	20.0/25.0	24.1	18.5/23.1	22.3	
4D5.0	120/208	3	60	23.0/28.8	79.8	20.0/25.0	69.4
	127/220	3	60	23.0/28.8	75.4	20.0/25.0	65.6
	120/240	3	60	23.0/28.8	69.2	20.0/25.0	60.1
	120/240	1	60	22.0/22.0	91.7	20.0/20.0	83.3
	139/240	3	60	23.0/28.8	69.2	20.0/25.0	60.1
	220/380	3	60	22.0/27.5	41.8	20.0/25.0	38.0
	277/480	3	60	23.0/28.8	34.6	20.0/25.0	30.1
347/600	3	60	23.0/28.8	27.7	20.0/25.0	24.1	
4D5.6	120/208	3	60	23.0/28.8	79.8	20.0/25.0	69.4
	127/220	3	60	23.0/28.8	75.4	20.0/25.0	65.6
	120/240	3	60	23.0/28.8	69.2	20.0/25.0	60.1
	120/240	1	60	22.0/22.0	91.7	20.0/20.0	83.3
	139/240	3	60	23.0/28.8	69.2	20.0/25.0	60.1
	220/380	3	60	22.0/27.5	41.8	20.0/25.0	38.0
	277/480	3	60	23.0/28.8	34.6	20.0/25.0	30.1
347/600	3	60	23.0/28.8	27.7	20.0/25.0	24.1	
4D8.3	120/208	3	60	24.0/30.0	83.3	21.0/26.3	72.9
	127/220	3	60	24.0/30.0	78.7	21.0/26.3	68.9
	120/240	3	60	24.0/30.0	72.2	21.0/26.3	63.1
	120/240	1	60	23.0/23.0	95.8	20.0/20.0	83.3
	139/240	3	60	24.0/30.0	72.2	21.0/26.3	63.1
	220/380	3	60	23.0/28.8	43.7	20.0/25.0	38.0
	277/480	3	60	24.0/30.0	36.1	21.0/26.3	31.6
347/600	3	60	24.0/30.0	28.9	21.0/26.3	25.3	
4E3.8	120/240	1	60	22.0/22.0	91.7	20.0/20.0	83.3
4E5.6	120/240	1	60	24.0/24.0	100	21.0/21.0	87.5

Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- The generator set engine is certified to meet the Environmental Protection Agency (EPA) emergency stationary emissions requirements.
- A one-year limited warranty covers all generator set systems and components. Two- and five-year extended limited warranties are also available.
- Alternator features:
 - Kohler's wound field excitation system with its unique PowerBoost™ design delivers great voltage response and short-circuit capability.
 - The brushless, rotating-field alternator has broadrange reconnectability.
- Other features:
 - Kohler designed controllers for guaranteed system integration and remote communication. See Controllers on page 3.
 - The low coolant level shutdown prevents overheating (standard on radiator models only).
 - Integral vibration isolation eliminates the need for under-unit vibration spring isolators.



RATINGS: All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor. Standby Ratings: Standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Prime Power Ratings: At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528-1 and ISO-3046-1. For limited running time and continuous ratings, consult the factory. Obtain the technical information bulletin (TIB-101) for ratings guidelines, complete ratings definitions, and site condition derates. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

Alternator Specifications

Specifications	Alternator
Manufacturer	Kohler
Type	4-Pole, Rotating-Field
Exciter type	Brushless, Wound Field
Leads: quantity, type	12, Reconnectable 4, 110-120/220-240
Voltage regulator	Solid State, Volts/Hz
Insulation:	NEMA MG1
Material	Class H
Temperature rise	130°C, Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Amortisseur windings	Full
Voltage regulation, no-load to full-load	Controller Dependent
One-step load acceptance	100% of Rating
Unbalanced load capability	100% of Rated Standby Current

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Windings are vacuum-impregnated with epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.

Specifications	Alternator
Peak motor starting kVA @ 0.3 PF:	(35% dip for voltages below)
480 V 4D3.8 (12 lead)	48
480 V 4D5.0 (12 lead)	58
480 V 4D5.6 (12 lead)	75
480 V 4D8.3 (12 lead)	120
240 V 4E3.8 (4 lead)	31
240 V 4E5.6 (4 lead)	44

Application Data

Engine

Engine Specifications	
Manufacturer	Kohler Diesel
Engine model	KDI2504M
Engine type	4-Cycle, Naturally Aspirated
Cylinder arrangement	4 Inline
Displacement, L (cu. in.)	2.5 (158)
Bore and stroke, mm (in.)	88 x 102 (3.46 x 4.02)
Compression ratio	18:1
Piston speed, m/min. (ft./min.)	367 (1206)
Main bearings: quantity, type	5, Sleeve
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	29.7 (39.9)
Cylinder head material	Cast Iron
Crankshaft material	Cast Iron
Valve material:	
Intake	Stainless Steel
Exhaust	Stainless Steel
Governor: type, make/model	Stanadyne/Mechanical (or Electronic *)
Frequency regulation, no-load to full-load	Drop, 5% (or Isochronous *)
Frequency regulation, steady state	±0.5%
Frequency	Fixed
Air cleaner type, all models	Dry

* Requires available electronic governor option

Exhaust

Exhaust System	
Exhaust manifold type	Dry
Exhaust flow at rated kW, m ³ /min. (cfm)	6 (212)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	570 (1058)
Maximum allowable back pressure, kPa (in. Hg)	8.5 (2.5)
Exhaust outlet size at engine hookup, mm (in.)	41 (1.6)

Engine Electrical

Engine Electrical System	
Battery charging alternator:	
Ground (negative/positive)	Negative
Volts (DC)	12
Ampere rating	50
Starter motor rated voltage (DC)	12
Battery, recommended cold cranking amps (CCA):	
Quantity, CCA rating	One, 650
Battery voltage (DC)	12

Fuel

Fuel System	
Fuel supply line, min. ID, mm (in.)	8.0 (0.31)
Fuel return line, min. ID, mm (in.)	6.0 (0.25)
Max. lift, electric fuel pump, m (ft.)	3.0 (10.0)
Max. fuel flow, Lph (gph)	46.0 (12.2)
Max. return line restriction, kPa (in. Hg)	20 (5.9)
Fuel filter	
Prefilter	74 Microns
Primary/Water Separator	5 Microns @ 98% Efficiency
Recommended fuel	#2 Ultra Low Sulfur Diesel

Lubrication

Lubricating System	
Type	Full Pressure
Oil pan capacity, L (qt.)	10.7 (11.3)
Oil pan capacity with filter, L (qt.)	11 (11.6)
Oil filter: quantity, type	1, Cartridge
Oil cooler	—

Application Data

Cooling

Radiator System

Ambient temperature, °C (°F) *	50 (122)
Engine jacket water capacity, L (gal.)	4.4 (1.6)
Radiator system capacity, including engine, L (gal.)	11.4 (3)
Engine jacket water flow, Lpm (gpm)	56.8 (15)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	21.6 (1228)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	406 (16.0)
Fan, kWm (HP)	0.6 (0.8)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H ₂ O)	0.125 (0.5)

* Enclosure reduces ambient temperature capability by 5°C (9°F).

Operation Requirements

Air Requirements

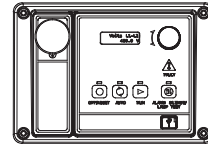
Radiator-cooled cooling air, m ³ /min. (scfm) †	36.8 (1300)
Combustion air, m ³ /min. (cfm)	2.1 (74.2)
Heat rejected to ambient air:	
Engine, kW (Btu/min.)	20.4 (1160)
Alternator, kW (Btu/min.)	5.1 (290)

† Air density = 1.20 kg/m³ (0.075 lbm/ft³)

Fuel Consumption

Diesel, Lph (gph) at % load	Standby Rating	
100%	7.9	(2.1)
75%	6.1	(1.6)
50%	4.3	(1.1)
25%	2.5	(0.7)
Diesel, Lph (gph) at % load	Prime Rating	
100%	7.2	(1.9)
75%	5.7	(1.5)
50%	3.8	(1.0)
25%	2.3	(0.6)

Controller



Decision-Maker® 3000 Controller

Provides advanced control, system monitoring, and system diagnostics for optimum performance and compatibility.

- Digital display and menu control provide easy local data access
- Measurements are selectable in metric or English units
- Remote communication thru a PC via network or serial configuration
- Controller supports Modbus® protocol
- Integrated hybrid voltage regulator with ±0.5% regulation
- Built-in alternator thermal overload protection
- NFPA 110 Level 1 capability

Refer to G6-100 for additional controller features and accessories.

Modbus® is a registered trademark of Schneider Electric.

Additional Standard Features

- Air Cleaner, Heavy Duty
- Alternator Protection
- Battery Rack and Cables
- Closed Crankcase Ventilation
- Oil Drain and Coolant Drain with Hose Barb
- Oil Drain Extension (with enclosure models only)
- Operation and Installation Literature
- Stainless Steel Fasteners on Enclosure (with enclosure models only)
- Rodent Guards

Available Options

Approvals and Listings

- CSA Certified
- IBC Seismic Certification
- UL2200 Listing

Enclosed Unit

- Sound Enclosure (with enclosed critical silencer)
- Weather Enclosure (with enclosed critical silencer)
- Stainless Steel Latches and Hinges

Open Unit

- Exhaust Silencer, Critical (kit: PA-352663)
- Flexible Exhaust Connector, Stainless Steel

Fuel System

- Flexible Fuel Lines
- Fuel Pressure Gauge
- Subbase Fuel Tanks

Controller

- Common Failure Relay
- Input/Output Module
- Manual Speed Adjust (requires Electronic Governor)
- Remote Annunciator Panel
- Remote Emergency Stop
- Run Relay

Cooling System

- Block Heater (700 W, 110–120 V)
Recommended for ambient temperatures below 0°C (32°F).
- Radiator Duct Flange

Electrical System

- Alternator Strip Heater
- Battery
- Battery Charger, Equalize/Float Type
- Battery Heater
- Electronic Governor
- Line Circuit Breaker (NEMA type 1 enclosure)
- Line Circuit Breaker with Shunt Trip (NEMA type 1 enclosure)

Miscellaneous

- Air Cleaner Restriction Indicator
- Engine Fluids Added
- Rated Power Factor Testing

Literature

- General Maintenance
- NFPA 110
- Overhaul
- Production

Warranty

- 2-Year Basic Limited
- 5-Year Basic Limited
- 5-Year Comprehensive Limited

Other Options

- _____
- _____
- _____
- _____
- _____

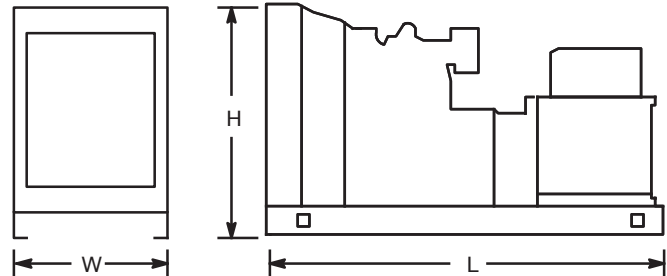
Dimensions and Weights

Overall Size, L x W x H, mm (in.):

Open Unit Skid: 1400 x 813 x 1024 (55.1 x 32.0 x 40.3)

Enclosure Skid: 1938 x 813 x 1174 (76.5 x 32.0 x 47.0)

Weight (radiator model), wet, kg (lb.): 512 (1130)



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

DISTRIBUTED BY:

Attachment D

MSDS for Diesel Fuel



SAFETY DATA SHEET

SDS ID NO.: 0290MAR019
Revision Date: 06/01/2016

1. IDENTIFICATION

Product Name: Marathon Petroleum No. 2 Ultra Low Sulfur Diesel

Synonym: #2 Diesel; No. 2 Ultra Low Sulfur Diesel 15 ppm Sulfur Max; Ultra Low Sulfur Diesel No. 2 15 ppm Sulfur Max; Ultra Low Sulfur Diesel No. 2 15 ppm Sulfur Max with Polar Plus; No. 2 Diesel, Motor Vehicle Use, Undyed; No. 2 Diesel, Motor Vehicle Use, Undyed, with Polar Plus; ULSD No. 2 Diesel 15 ppm Sulfur Max; ULSD No. 2 Diesel 15 ppm Sulfur Max with Polar Plus; No. 2 MV 15 Diesel; No. 2 MV 15 Diesel with Polar Plus; No. 2 Ultra Low Sulfur Diesel Dyed 15 ppm Sulfur Max; Ultra Low Sulfur Diesel No. 2 Dyed 15 ppm Sulfur Max; Ultra Low Sulfur Diesel No. 2 Dyed 15 ppm Sulfur Max with Polar Plus; No. 2 Diesel, Tax Exempt-Motor Vehicle Use, Dyed; No. 2 Diesel, Tax Exempt-Motor Vehicle Use, Dyed, with Polar Plus; ULSD No. 2 Diesel Dyed 15 ppm Sulfur Max; ULSD No. 2 Diesel Dyed 15 ppm Sulfur Max, with Polar Plus; No. 2 MV 15 Diesel Dyed; #2 MV 15 CFI Diesel; #2 MV 15 CFI Diesel Dyed; No. 2 Low Sulfur Diesel (TxLED); No. 2 MV 15 Diesel Dyed, with Polar Plus; No. 2 NRLM 15 Diesel Dyed; No.2 NRLM Diesel Dyed; No. 2 MV 500 ppm TxLED; No.2 Low Emission Low Sulfur Diesel; No. 2 Low Sulfur Diesel (TxLED) 500 ppm Sulfur Max; No. 2 Heating Oil 5000 NMA Unmarked; NEMA No. 2 Heating Oil; Heating Oil, No. 2 Low Sulfur 5000 ppm; No. 2 Ultra Low Sulfur Diesel Dyed with <6% Renewable Diesel Fuel; Ultra Low Sulfur No. 2 Diesel Dyed with <6% Renewable Diesel Fuel; No. 2 Diesel Dyed with <6% Renewable Diesel Fuel 15 ppm Sulfur Max; No. 2 Ultra Low Sulfur Diesel with <6% Renewable Diesel Fuel; Ultra Low Sulfur No. 2 Diesel with <6% Renewable Diesel Fuel; No. 2 Diesel with <6% Renewable Diesel Fuel 15 ppm Sulfur Max; Garyville Export Diesel; Export Diesel, Garyville; Diesel Fuel, Export Garyville; #2 Motor Vehicle ULSD 15 ppm with 0-5% Renewable Diesel; Marathon No. 2 ULSD with 0-5% Renewable Fuel with R100; Marathon No. 2 ULSD with 0-5% Renewable Fuel with R99; No. 2 Heating Oil 2000 ppm Sulfur Max, Clear (Undyed) Unmarked; Ultra Low Sulfur Heating Oil 15 ppm Sulfur Max, Clear (Undyed) Unmarked; ULS Heating Oil 15 ppm Clear (Undyed) Unmarked; ULS HO 15 ppm CLR; Ultra-Low Sulfur Heating Oil (<= 15ppm, Undyed); No. 2 Heating Oil 2000 ppm Sulfur Max, Dyed Unmarked; No. 2 Heating Oil 2000 ppm Sulfur Max, Dyed Marked; Ultra Low Sulfur Heating Oil 15 ppm Sulfur Max, Dyed Unmarked; Ultra Low Sulfur Heating Oil 15 ppm Sulfur Max, Dyed Marked; 15 ppm Sulfur Heating Oil Grade 67; 15 PPM Heating Oil; 15 PPM Dyed Heating Oil; 0291MAR019; 0306MAR019; 0308MAR019; 0334MAR019; 0335MAR019; 0336MAR019; 0337MAR019; 0340MAR019;

Chemical Family: Complex Hydrocarbon Substance

Recommended Use: Fuel.
Restrictions on Use: All others.

Manufacturer, Importer, or Responsible Party Name and Address:
MARATHON PETROLEUM COMPANY LP
539 South Main Street
Findlay, OH 45840

SDS information: 1-419-421-3070

Emergency Telephone: 1-877-627-5463

2. HAZARD IDENTIFICATION

Classification

OSHA Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 3
Acute toxicity - Inhalation (Dusts/Mists)	Category 4
Skin corrosion/irritation	Category 2
Carcinogenicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Specific target organ toxicity (repeated exposure)	Category 2
Aspiration toxicity	Category 1
Acute aquatic toxicity	Category 2
Chronic aquatic toxicity	Category 2

Hazards Not Otherwise Classified (HNOC)


Static accumulating flammable liquid

Label elements

EMERGENCY OVERVIEW

Danger

FLAMMABLE LIQUID AND VAPOR
 May accumulate electrostatic charge and ignite or explode
 May be fatal if swallowed and enters airways
 Harmful if inhaled
 Causes skin irritation
 May cause respiratory irritation
 May cause drowsiness or dizziness
 Suspected of causing cancer
 May cause damage to organs (thymus, liver, bone marrow) through prolonged or repeated exposure
 Toxic to aquatic life with long lasting effects



Appearance Yellow to Red Liquid **Physical State** Liquid **Odor** Hydrocarbon

Precautionary Statements - Prevention

- Obtain special instructions before use
- Do not handle until all safety precautions have been read and understood
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking
- Keep container tightly closed
- Ground/bond container and receiving equipment
- Use only non-sparking tools.
- Use explosion-proof electrical/ventilating/lighting/equipment
- Take precautionary measures against static discharge
- Do not breathe the mist/vapors/spray
- Use only outdoors or in a well-ventilated area
- Wear protective gloves/protective clothing/eye protection/face protection

Wash hands and any possibly exposed skin thoroughly after handling
Avoid release to the environment

Precautionary Statements - Response

IF exposed or concerned: Get medical attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
If skin irritation occurs: Get medical attention
Wash contaminated clothing before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor if you feel unwell
IF SWALLOWED: Immediately call a POISON CENTER or doctor
Do NOT induce vomiting
In case of fire: Use water spray, fog or regular foam for extinction
Collect spillage

Precautionary Statements - Storage

Store in a well-ventilated place. Keep container tightly closed
Keep cool
Store locked up

Precautionary Statements - Disposal

Dispose of contents/container at an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

No. 2 Ultra Low Sulfur Diesel is a complex mixture of paraffins, cycloparaffins, olefins and aromatic hydrocarbon chain lengths predominantly in the range of eleven to twenty carbons. May contain up to 5% Renewable Diesel. May contain small amounts of dye and other additives (<0.15%) which are not considered hazardous at the concentration(s) used. May contain a trace amount of benzene (<0.01%). Contains a trace amount of sulfur (<0.0015%)

Composition Information:

Name	CAS Number	% Concentration
No. 2 Diesel Fuel	68476-34-6	50-100
Kerosine, Petroleum	8008-20-6	0-50
Alkanes, C10-C20 branched and linear	928771-01-1	0-5
Naphthalene	91-20-3	0.3-2.6

All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

4. FIRST AID MEASURES

First Aid Measures

General Advice: In case of accident or if you feel unwell, seek medical advice immediately (show directions for use or safety data sheet if possible).

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

Skin Contact: Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. May be absorbed through the skin in harmful amounts. Get medical attention if irritation persists. Any injection injury from high pressure equipment should be evaluated immediately by a physician as potentially serious (See NOTES TO PHYSICIAN).

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. Destroy contaminated, non-chemical resistant footwear.

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. Gently remove contacts while flushing. Get medical attention if irritation persists.

Ingestion: Do not induce vomiting because of danger of aspirating liquid into lungs, causing serious damage and chemical pneumonitis. If spontaneous vomiting occurs, keep head below hips, or if patient is lying down, turn body and head to side to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Most important signs and symptoms, both short-term and delayed with overexposure

Adverse Effects: Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking. Prolonged or repeated exposure may cause adverse effects to the thymus, liver, and bone marrow.

Indication of any immediate medical attention and special treatment needed

Notes To Physician: INHALATION: This material (or a component) sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

SKIN: Leaks or accidents involving high-pressure equipment may inject a stream of material through the skin and initially produce an injury that may not appear serious. Only a small puncture wound may appear on the skin surface but, without proper treatment and depending on the nature, original pressure, volume, and location of the injected material, can compromise blood supply to an affected body part. Prompt surgical debridement of the wound may be necessary to prevent irreversible loss of function and/or the affected body part. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES.

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

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. Firefighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Unsuitable extinguishing media

Do not use straight water streams to avoid spreading fire.

Specific hazards arising from the chemical

This product has been determined to be a flammable liquid per the OSHA Hazard Communication Standard and should be handled accordingly. May accumulate electrostatic charge and ignite or explode. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. For additional fire related information, see NFPA 30 or the Emergency Response Guidebook 128.

Hazardous combustion products

Smoke, carbon monoxide, and other products of incomplete combustion.

Explosion data

Sensitivity to Mechanical Impact No.

Sensitivity to Static Discharge Yes.

Special protective equipment and precautions for firefighters

Firefighters should wear full protective clothing and positive-pressure self-contained breathing apparatus (SCBA) with a full face-piece, as appropriate. 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.

Additional firefighting tactics

FIRES INVOLVING TANKS OR CAR/TRAILER LOADS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after the fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

EVACUATION: Consider initial downwind evacuation for at least 1000 feet. If tank, rail car or tank truck is involved in a fire, ISOLATE for 5280 feet (1 mile) in all directions; also, consider initial evacuation of 5280 feet (1 mile) in all directions.

NFPA Health 1 Flammability 2 Instability 0 Special Hazard -

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. All contaminated surfaces will be slippery.
- Protective equipment:** Use personal protection measures as recommended in Section 8.
- Emergency procedures:** 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.
- Environmental precautions:** Avoid release to the environment. Avoid subsoil penetration.
- Methods and materials for containment:** Contain liquid with sand or soil. Prevent spilled material from entering storm drains, sewers, and open waterways.
- Methods and materials for cleaning up:** Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids. Recover and return free product to proper containers. When recovering free liquids ensure all equipment is grounded and bonded. Use only non-sparking tools.

7. HANDLING AND STORAGE

Safe Handling Precautions: NEVER SIPHON THIS PRODUCT BY MOUTH. Use appropriate grounding and bonding practices. Static accumulating flammable liquid. Bonding and grounding may be insufficient to eliminate the hazard from static electricity. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Vapors may travel along the ground or be moved by ventilation. Flashback may occur along vapor trails. No smoking. Use only non-sparking tools. Avoid breathing fumes, gas, or vapors. Use only with adequate ventilation. Avoid repeated and prolonged skin contact. Use personal protection measures as recommended in Section 8. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water. Do not cut, drill, grind or weld on empty containers since explosive residues may remain. Refer to applicable EPA, OSHA, NFPA and consistent state and local requirements.

Hydrocarbons are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering, pumping at high flow rates or loading and transfer operations. If this charge reaches a sufficiently high level, sparks can form that may ignite the vapors of flammable liquids. Sudden release of hot organic chemical vapors or mists

from process equipment operating under elevated temperature and pressure, or sudden ingress of air into vacuum equipment may result in ignition of vapors or mists without the presence of obvious ignition sources. Nozzle spouts must be kept in contact with the containers or tank during the entire filling operation.

Portable containers should never be filled while in or on a motor vehicle or marine craft. Containers should be placed on the ground. Static electric discharge can ignite fuel vapors when filling non-grounded containers or vehicles on trailers. The nozzle spout must be kept in contact with the container before and during the entire filling operation. Use only approved containers.

A buildup of static electricity can occur upon re-entry into a vehicle during fueling especially in cold or dry climate conditions. The charge is generated by the action of dissimilar fabrics (i.e., clothing and upholstery) rubbing across each other as a person enters/exits the vehicle. A flash fire can result from this discharge if sufficient flammable vapors are present. Therefore, do not get back in your vehicle while refueling.

Cellular phones and other electronic devices may have the potential to emit electrical charges (sparks). Sparks in potentially explosive atmospheres (including fueling areas such as gas stations) could cause an explosion if sufficient flammable vapors are present. Therefore, turn off cellular phones and other electronic devices when working in potentially explosive atmospheres or keep devices inside your vehicle during refueling.

High-pressure injection of any material through the skin is a serious medical emergency even though the small entrance wound at the injection site may not initially appear serious. These injection injuries can occur from high-pressure equipment such as paint spray or grease or guns, fuel injectors, or pinhole leaks in hoses or hydraulic lines and should all be considered serious. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES (See First Aid Section 4).

Storage Conditions:

Store in properly closed containers that are appropriately labeled and in a cool, well-ventilated area. Do not store near an open flame, heat or other sources of ignition.

Incompatible Materials

Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Name	ACGIH TLV	OSHA PELs:	OSHA - Vacated PELs	NIOSH IDLH
No. 2 Diesel Fuel 68476-34-6	100 mg/m ³ TWA Skin - potential significant contribution to overall exposure by the cutaneous route	-	-	-
Kerosine, Petroleum 8008-20-6	200 mg/m ³ TWA Skin - potential significant contribution to overall exposure by the cutaneous route	-	-	-
Alkanes, C10-C20 branched and linear 928771-01-1	-	-	-	-
Naphthalene 91-20-3	10 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 10 ppm TWA: 50 mg/m ³	10 ppm TWA 50 mg/m ³ TWA 15 ppm STEL 75 mg/m ³ STEL	250 ppm

Notes:

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

Engineering measures:

Local or general exhaust required in an enclosed area or with inadequate ventilation. Use mechanical ventilation equipment that is explosion-proof.

Personal protective equipment

- Eye protection:** Use goggles or face-shield if the potential for splashing exists.
- Skin and body protection:** Wear neoprene, nitrile or PVA gloves to prevent skin contact. Glove suitability is based on workplace conditions and usage. Contact the glove manufacturer for specific advice on glove selection and breakthrough times.
- Respiratory protection:** Use a NIOSH approved organic vapor chemical cartridge or supplied air respirators when there is the potential for airborne exposures to exceed permissible exposure limits or if excessive vapors are generated. Observe respirator assigned protection factors (APFs) criteria cited in federal OSHA 29 CFR 1910.134. Self-contained breathing apparatus should be used for fire fighting.
- Hygiene measures:** Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State	Liquid
Appearance	Yellow to Red Liquid
Color	Yellow to Red
Odor	Hydrocarbon
Odor Threshold	No data available.

<u>Property</u>	<u>Values (Method)</u>
Melting Point / Freezing Point	No data available.
Initial Boiling Point / Boiling Range	154-366 °C / 310-691 °F (ASTM D86)
Flash Point	58-76 °C / 136-168 °F (ASTM D93)
Evaporation Rate	No data available.
Flammability (solid, gas)	Not applicable.
Flammability Limit in Air (%):	
Upper Flammability Limit:	No data available.
Lower Flammability Limit:	No data available.
Explosion limits:	No data available.
Vapor Pressure	No data available.
Vapor Density	No data available.
Specific Gravity / Relative Density	0.82-0.86 (ASTM D4052)
Water Solubility	No data available.
Solubility in other solvents	No data available.
Partition Coefficient	No data available.
Decomposition temperature	No data available.
pH:	Not applicable
Autoignition Temperature	No data available.
Kinematic Viscosity	1.90-3.32 cSt @ 40°C (ASTM D445)
Dynamic Viscosity	No data available.
Explosive Properties	No data available.
VOC Content (%)	No data available.
Density	No data available.
Bulk Density	Not applicable.

10. STABILITY AND REACTIVITY

- Reactivity** The product is non-reactive under normal conditions.
- Chemical stability** The material is stable at 70°F, 760 mmHg pressure.

<u>Possibility of hazardous reactions</u>	None under normal processing.
<u>Hazardous polymerization</u>	Will not occur.
<u>Conditions to avoid</u>	Excessive heat, sources of ignition, open flame.
<u>Incompatible Materials</u>	Strong oxidizing agents.
<u>Hazardous decomposition products</u>	None known under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Potential short-term adverse effects from overexposures

Inhalation	Harmful if inhaled. May cause irritation of respiratory tract. May cause drowsiness or dizziness. Breathing high concentrations of this material in a confined space or by intentional abuse can cause irregular heartbeats which can cause death.
Eye contact	Exposure to vapor or contact with liquid may cause mild eye irritation, including tearing, stinging, and redness.
Skin contact	Causes skin irritation. Effects may become more serious with repeated or prolonged contact. May be absorbed through the skin in harmful amounts.
Ingestion	May be fatal if swallowed or vomited and enters airways. May cause irritation of the mouth, throat and gastrointestinal tract.

Acute toxicological data

Name	Oral LD50	Dermal LD50	Inhalation LC50
No. 2 Diesel Fuel 68476-34-6	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	>1 - <5 mg/L (Rat) 4 h
Kerosine, Petroleum 8008-20-6	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.28 mg/L (Rat) 4 h
Alkanes, C10-C20 branched and linear 928771-01-1	-	-	>1 - <5 mg/l (Rat) 4 h
Naphthalene 91-20-3	490 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 340 mg/m ³ (Rat) 1 h

Delayed and immediate effects as well as chronic effects from short and long-term exposure

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. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffer's Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline.

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: The combustion of diesel fuels produces gases including carbon monoxide, carbon dioxide, oxides of nitrogen and/or sulfur, and hydrocarbons that can be irritating and hazardous with overexposure. Long-term occupational overexposure to diesel exhaust and diesel exhaust particulate matter has been associated with an increased risk of respiratory disease, including lung cancer, and is characterized as a “known human carcinogen” by the International Agency for Research on Cancer (IARC), as “a reasonably anticipated human carcinogen” by the National Toxicology Program, and as “likely to be carcinogenic to humans” by the EPA, based upon animal and occupational exposure studies. However, uncertainty exists with these classifications because of deficiencies in the supporting occupational exposure/epidemiology studies, including reliable exposure estimates. Lifetime animal inhalation studies with pulmonary overloading exposure concentrations of diesel exhaust emissions have produced tumors and other adverse health effects. However, in more recent long-term animal inhalation studies of diesel exhaust emissions, no increase in tumor incidence and in fact a substantial reduction in adverse health effects along with significant reductions in the levels of hazardous material emissions were observed and are associated with fuel composition alterations coupled with new technology diesel engines.

Adverse effects related to the physical, chemical and toxicological characteristics

Signs and Symptoms

Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking. Prolonged or repeated exposure may cause damage to organs.

Sensitization

Not expected to be a skin or respiratory sensitizer.

Mutagenic effects

None known.

Carcinogenicity

Suspected of causing cancer.

Cancer designations are listed in the table below

Name	ACGIH (Class)	IARC (Class)	NTP	OSHA
No. 2 Diesel Fuel 68476-34-6	Confirmed animal carcinogen (A3)	Not Classifiable (3)	Not Listed	Not Listed
Kerosine, Petroleum 8008-20-6	Confirmed animal carcinogen (A3)	Not Classifiable (3)	Not Listed	Not Listed
Alkanes, C10-C20 branched and linear 928771-01-1	Not Listed	Not Listed	Not Listed	Not Listed
Naphthalene	Confirmed animal	Possible human carcinogen	Reasonably anticipated to	Not Listed

91-20-3	carcinogen (A3)	(2B)	be a human carcinogen
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Reproductive toxicity None known.

Specific Target Organ Toxicity (STOT) - single exposure Respiratory system. Central nervous system.

Specific Target Organ Toxicity (STOT) - repeated exposure Thymus. Liver. Bone marrow.

Aspiration hazard May be fatal if swallowed or vomited and enters airways.

12. ECOLOGICAL INFORMATION

Ecotoxicity This product should be considered toxic to aquatic organisms, with the potential to cause long lasting adverse effects in the aquatic environment.

Name	Algae/aquatic plants	Fish	Toxicity to Microorganisms	Crustacea
No. 2 Diesel Fuel 68476-34-6	-	96-hr LC50 = 35 mg/l Fathead minnow (flow-through)	-	48-hr EL50 = 6.4 mg/l Daphnia magna
Kerosine, Petroleum 8008-20-6	72-hr EL50 = 5.0-11 mg/l Algae	96-hr LL50 = 18-25 mg/l Fish	-	48-hr EL50 = 1.4-21 mg/l Invertebrates
Alkanes, C10-C20 branched and linear 928771-01-1	-	-	-	-
Naphthalene 91-20-3	-	96-hr LC50 = 0.91-2.82 mg/l Rainbow trout (static) 96-hr LC50 = 1.99 mg/l Fathead minnow (static)	-	48-hr LC50 = 1.6 mg/l Daphnia magna

Persistence and degradability Expected to be inherently biodegradable.

Bioaccumulation Has the potential to bioaccumulate.

Mobility in soil May partition into air, soil and water.

Other adverse effects No information available.

13. DISPOSAL CONSIDERATIONS

Description of Waste Residues
This material may be a flammable liquid waste.

Safe Handling of Wastes
Handle in accordance with applicable local, state, and federal regulations. Use personal protection measures as required. Use appropriate grounding and bonding practices. Use only non-sparking tools. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. No smoking.

Disposal of Wastes / Methods of Disposal
The user is responsible for determining if any discarded material is a hazardous waste (40 CFR 262.11). Dispose of in accordance with federal, state and local regulations.

Methods of Contaminated Packaging Disposal
Empty containers should be completely drained and then discarded or recycled, if possible. Do not cut, drill, grind or weld on empty containers since explosive residues may be present. Dispose of in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT (49 CFR 172.101):

UN Proper Shipping Name: Fuel Oil, No. 2
UN/Identification No: NA 1993
Transport Hazard Class(es): 3
Packing Group: III

TDG (Canada):

UN Proper Shipping Name: Diesel Fuel
UN/Identification No: UN 1202
Transport Hazard Class(es): 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.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product does not contain any component(s) included on EPA's Extremely Hazardous Substance (EHS) List.

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
No. 2 Diesel Fuel	NA
Kerosine, Petroleum	NA
Alkanes, C10-C20 branched and linear	NA
Naphthalene	NA

SARA Section 304: This product may contain 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	Hazardous Substances RQs
No. 2 Diesel Fuel	NA
Kerosine, Petroleum	NA
Alkanes, C10-C20 branched and linear	NA
Naphthalene	100 lb final RQ 45.4 kg final RQ

SARA: The following EPA hazard categories apply to this product:

- Acute Health Hazard
- Fire Hazard
- Chronic Health Hazard

SARA Section 313: This product may contain component(s), which if in exceedance of the de minimus threshold, may be subject to the reporting requirements of SARA Title III Section 313 Toxic Release Reporting (Form R).

Name	CERCLA/SARA 313 Emission reporting:
No. 2 Diesel Fuel	None
Kerosine, Petroleum	None
Alkanes, C10-C20 branched and linear	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:

No. 2 Diesel Fuel

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 2444
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:	SN 2444 TPQ: 10000 lb (Under N.J.A.C. 7:1G, environmental hazardous substances in mixtures such as gasoline or new and used petroleum oil may be reported under these categories)
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed
Kerosine, Petroleum	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1091
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
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:	SN 1091 TPQ: 10000 lb (Under N.J.A.C. 7:1G, environmental hazardous substances in mixtures such as gasoline or new and used petroleum oil may be reported under these categories)
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed
Alkanes, C10-C20 branched and linear	
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
California Proposition 65:	Carcinogen, initial date 4/19/02

New Jersey Right-To-Know:	SN 1322 SN 3758
Pennsylvania Right-To-Know:	Environmental hazard Present (particulate)
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 (Reportable at the de minimis quantity of >0.1%)
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	100 lb RQ (air); 1 lb RQ (land/water)

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

Canadian Regulatory Information: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the (M)SDS contains all the information required by the Controlled Products Regulations.

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
No. 2 Diesel Fuel	B3,D2A,D2B	0.1%
Kerosine, Petroleum	B3,D2B	1%
Alkanes, C10-C20 branched and linear	B3,D2A,D2B	0.1%
Naphthalene	B4,D2A	0.1%



Note: Not applicable.

16. OTHER INFORMATION

Prepared By Toxicology and Product Safety

Revision Date: 06/01/2016

Revision Note:

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is intended as guidance for safe handling, use, processing, storage, transportation, accidental release, clean-up and disposal and is not considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Attachment E

Calculations and Supporting Documents

Emissions Definitions Regarding Kohler 20REOZK Generator Used in Cummins Power Generation
20 KW Stationary Gen Application Operation at 75% Capacity
ACTUAL Emissions Rates given by Technical Specs in lb/hr

Certified Values for this specific engine were used in the below calculations. Carb Certification in Appendix C. The generator meets EPA Tier 4i Emission requirements they emit no more than what is specified in **40 CFR §89.112. For annual ACTUAL calculations, 500 hrs/year was used. The generator will be tested periodically and utilized only during power outages.**

NO_x - on the attached EPA Engine Certification

Hourly NO_x = 5.99 g/kW-hr * 20 kW * 1 lb/453.592g = 0.26 lb/hr

Annual NO_x = 0.26 lb/hr * 500 hr/yr * 1 ton /2000lbs = 0.06 ton/yr

CO - on the attached EPA Engine Certification

Hourly CO = 2.1 g/kW-hr * 20 kW * 1 lb/453.592g = 0.09 lb/hr

Annual CO = 0.09 lb/hr * 500 hr/yr * 1 ton/2000lbs = 0.02 ton/yr

PM - on the attached EPA Engine Certification

Hourly PM = 0.18 g/kW-hr * 20 kW * 1 lb/453.592g = 0.008 lb/hr

Annual PM = 0.008 lb/hr * 500 hr/yr * 1ton/2000 lb = 0.002 ton/yr

HC - on the attached EPA Engine Certification

Hourly HC = 0.42 g/kW-hr * 20 kW * 1 lb/453.592g = 0.02 lb/hr

Annual HC = 0.02 lb/hr * 500 hr/yr * 1ton/2000 lb = 0.005 ton/yr

VOC - AP42

Per AP-42 Table 3.3-1, the emission factor of #2 Diesel Fuel is 0.00247 lb/hp-hr

Hourly VOC = 0.00247 lb/hp-hr * 26 bhp = 0.06 lb/hr

Yearly VOC = 0.06 lb/hr * 500 hr/yr * 1 ton/2000 lb = 0.02 ton/yr

SO_x - AP42

Per AP-42 Table 3.3-1, the emission factor of #2 Diesel Fuel is 0.00205 lb/hp-hr

Hourly SO₂ = 0.00205 lb/hp-hr * 26 bhp = 0.05 lb/hr

Yearly SO₂ = 0.05 lb/hr * 500 hr/yr * 1ton/2000 lb = 0.01 ton/yr

Formaldehyde - AP42

Per AP-42 Table 3.3-2, the emission factor of #2 Diesel Fuel is 0.00118 lb/hp-hr

Hourly VOC = 0.00118 lb/hp-hr * 26 bhp = 0.03 lb/hr

Yearly formaldehyde = 0.03 lb/hr * 500 hr/yr * 1ton/2000 lb = 0.01 ton/yr

**Emissions Definitions Regarding Kohler 20REOZK Generator Used in Cummins Power Generation
20 KW Stationary Gen Application Operation at 75% Capacity
POTENTIAL Emissions Rates given by Technical Specs in lb/hr**

Certified Values for this specific engine were used in the below calculations. Carb Certification in Appendix A. The generator meets EPA Tier 4i Emission requirements they emit no more than what is specified in 40 CFR §89.112. For annual POTENTIAL calculations, 8760 hrs/year was used. The generator will be used intermittently (<500 hrs/yr).

NO_x - on the attached EPA Engine Certification

Hourly NO_x = 5.99 g/kW-hr * 20 kW * 1 lb/453.592g = 0.26 lb/hr
Annual NO_x = 0.26 lb/hr * 8760 hr/yr * 1 ton /2000lbs = 1.14 ton/yr

CO - on the attached EPA Engine Certification

Hourly CO = 2.1 g/kW-hr * 20 kW * 1 lb/453.592g = 0.09 lb/hr
Annual CO = 0.09 lb/hr * 8760 hr/yr * 1ton/2000lbs = 0.39 ton/yr

PM - on the attached EPA Engine Certification

Hourly PM = 0.18 g/kW-hr * 20 kW * 1 lb/453.592g = 0.008 lb/hr
Annual PM = 0.008 lb/hr * 8760 hr/yr * 1ton/2000 lb = 0.04 ton/yr

HC - on the attached EPA Engine Certification

Hourly HC = 0.42 g/kW-hr * 20 kW * 1 lb/453.592g = 0.02 lb/hr
Annual HC = 0.02 lb/hr * 8760 hr/yr * 1ton/2000 lb = 0.09 ton/yr

VOC - AP42

Per AP-42 Table 3.3-1, the emission factor of #2 Diesel Fuel is 0.00247 lb/hp-hr
Hourly VOC = 0.00247 lb/hp-hr * 26 bhp = 0.06 lb/hr
Yearly VOC = 0.06 lb/hr * 8760 hr/yr * 1 ton/2000 lb = 0.26 ton/yr

SO_x - AP42

Per AP-42 Table 3.3-1, the emission factor of #2 Diesel Fuel is 0.00205 lb/hp-hr
Hourly SO₂ = 0.00205 lb/hp-hr * 26 bhp = 0.05 lb/hr
Yearly SO₂ = 0.05 lb/hr * 8760 hr/yr * 1ton/2000 lb = 0.23 ton/yr

Formaldehyde - AP42

Per AP-42 Table 3.3-2, the emission factor of #2 Diesel Fuel is 0.00118 lb/hp-hr
Hourly VOC = 0.00118 lb/hp-hr * 26 bhp = 0.03 lb/hr
Yearly formaldehyde = 0.03 lb/hr * 8760 hr/yr * 1ton/2000 lb = 0.13 ton/yr



20REOZK

60 HZ. DIESEL INDUSTRIAL GENERATOR SET EMISSION DATA SHEET

ENGINE INFORMATION

Model:	KDI 2504 M	Bore, mm (in.)	88 (3.46)
Nameplate BHP @ 1800 RPM:	39.9	Stroke, mm (in.)	102 (4.02)
Type:	4-Cycle, 4 Cyl., Inline	Displacement, L (cu. In.)	2.5 (158)
Aspiration:	Naturally	EPA Family:	JKHXL2.48ESM
Compression Ratio:	18:1	EPA Certificate:	JKHXL2.48ESM-003

PERFORMANCE DATA:

Engine bkW @ 1800 RPM	29.7
Fuel Consumption (Lph) @ 100% Load (Standby)	7.9
Exhaust Gas Flow (m ³ /min)	6
Exhaust Temperature (°C)	570

EXHAUST EMISSION DATA:

NMHC	0.42
CO ₂	2.1
NO _x (Oxides of Nitrogen as NO ₂)	5.99
CO (Carbon Monoxide)	2.1
PM (Particular Matter)	0.18

Values are in g/kWh unless otherwise noted



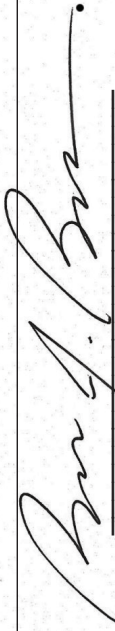
**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2018 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT**

**OFFICE OF TRANSPORTATION
AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105**

Mead & Hunt, Inc.

Certificate Issued To: Kohler Co.
(U.S. Manufacturer or Importer)
Certificate Number: JKHXL2.48ESM-003

Effective Date:
08/10/2017
Expiration Date:
12/31/2018


Byron J. Bunker, Division Director
Compliance Division

Issue Date:
08/10/2017
Revision Date:
N/A

Model Year: 2018
Manufacturer Type: Original Engine Manufacturer
Engine Family: JKHXL2.48ESM

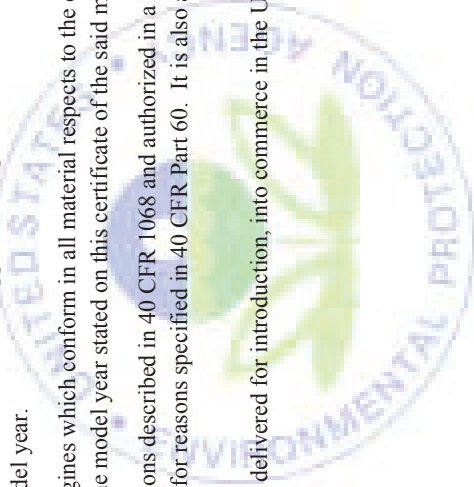
Mobile/Stationary Indicator: Stationary
Emissions Power Category: 19<=kW<37
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Non-standard Non-After Treatment Device Installed

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.





**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2018 MODEL YEAR
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**OFFICE OF TRANSPORTATION
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ANN ARBOR, MICHIGAN 48105**

Certificate Issued To: Kohler Co.
(U.S. Manufacturer or Importer)
Certificate Number: JKHXL2.48ESM-003

Effective Date:
08/10/2017
Expiration Date:
12/31/2018


Byron J. Bunker, Division Director
Compliance Division

Issue Date:
08/10/2017
Revision Date:
N/A

Model Year: 2018
Manufacturer Type: Original Engine Manufacturer
Engine Family: JKHXL2.48ESM

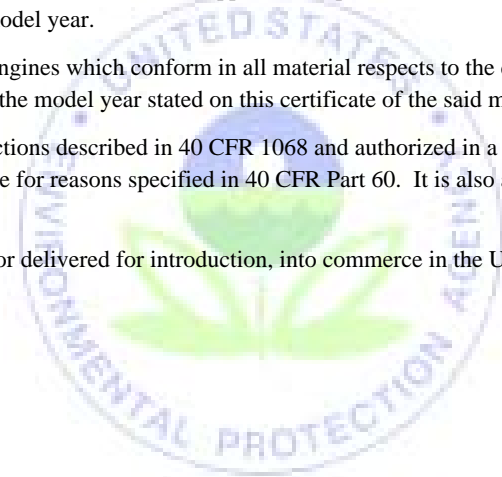
Mobile/Stationary Indicator: Stationary
Emissions Power Category: 19<=kW<37
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Non-standard Non-After Treatment Device Installed

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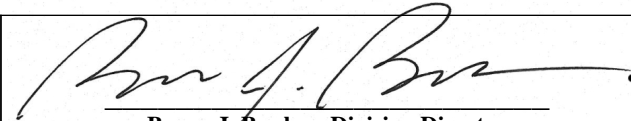


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Byron J. Bunker, Division Director
Compliance Division

Issue Date:
08/10/2017
Revision Date:
N/A

Model Year: 2018
Manufacturer Type: Original Engine Manufacturer
Engine Family: JKHXL2.48ESM

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 19<=kW<37
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Non-standard Non-After Treatment Device Installed

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.

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