Maricopa County
Air Quality Department

NON-TITLE V
TECHNICAL SUPPORT DOCUMENT

PERMIT NUMBER:	000258	**App. ID(s):**	407246
BUSINESS NAME:	DIGITAL REALTY TRUST CHANDLER, LLC	**Revision(s):**	3.0.0.0
SOURCE TYPE:	DATA PROCESSING GENERATORS	**Revision Type(s):**	RENEWAL
PERMIT ENGINEER:	Sean Riley	**Date Prepared:**	05/18/2016

BACT: Yes **MACT:** No **NSPS:** Yes **SYNTH MINOR:** Yes **AIRS:** Yes

DUST PLAN REQUIRED: No **DUST PLAN RECEIVED:** No

O&M PLAN REQUIRED: No **O&M PLAN RECEIVED:** No

PORTABLE SOURCE: No **SITE VISIT: Waived**

PROCESS DESCRIPTION:
This facility is a data processing center with 30 emergency generators and 6 non-emergency generators; all of which emit products of combustion and have no associated emissions controls. This source has generators it uses in the SRP PowerPartner™ Program. This is a demand response (DR) program that is intended to reduce peak demands of electricity. These generators will be turned on when SRP declares an event under the program, thereby lessoning the power load on the grid.

PERMIT HISTORY:

Date Received	Revision Number	Description
10/13/2000	0.0.0.0	Submitted application for new permit for 4 emergency engines
03/31/2006	1.0.0.0	Submitted application for renewal permit
05/24/2007	1.1.0.0	Non-minor modification submitted to add 12 emergency engines
04/03/2009	1.2.0.0	Non-minor modification submitted to bring 2 of the above 12 emergency engines into prime engine (demand response) category
11/08/2010	1.3.0.0	Non-minor modification submitted to add 4 DR, Tier II prime engines, BACT and synthetic minor triggered
11/08/2010	2.0.0.0	Submitted application for renewal permit
01/06/2012	2.1.0.0	Non-minor modification submitted to add 3 emergency engines and 3 diesel storage tanks
01/06/2012	2.2.0.0	Non-minor modification submitted to add 3 emergency engines and 3 diesel storage tanks
05/01/2013	2.2.1.0	Minor modification requested to add 10 Cummins QSK60-G6 NR2 emergency generators to the permit and equipment list
04/16/2016	3.0.0.0	Submitted application for renewal permit

PURPOSE FOR APPLICATION:
Renewal

A. APPLICABLE COUNTY REGULATIONS:
Rule 100: General Provisions and Definitions
Rule 200: Permit Requirements
Rule 220: Non-Title V Permit Provisions
Rule 280: Fees: Table A (Source Subject to BACT Determination)

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Rule 324: Stationary Internal Combustion (IC) Engines

B. APPLICABLE FEDERAL REGULATIONS:

40 CFR, Part 60, Subpart IIII: This facility operates several emergency generators manufactured after April, 2006. NSPS Subpart IIII applies to owners and operators of:

1. Compression ignition engines [§ 60.4200(a)]
2. Manufactured after April 1, 2006 [§ 60.4200(a)(2)(i)]

This facility is therefore subject to the requirements of 40 CFR, Part 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

C. APPLICABLE FEDERAL REGULATIONS:

40 CFR Part 63, Subpart ZZZZ: This facility operates four emergency generators manufactured in 2000. In general, an emergency generator manufactured prior to 2006 would be subject to MACT ZZZZ, however, emergency RICE located at a residential, commercial or institutional area sources are exempt from the requirements of MACT ZZZZ per 40 CFR § 63.6590(b)(3). Per EPA guidance, a data center is considered a Commercial source. This facility is a data center and is therefore exempt from the requirements of MACT ZZZZ.

D. AIR POLLUTION CONTROL EQUIPMENT/EMISSION CONTROL SYSTEM(s): N/A

E. EMISSIONS:

Calculation Sheet 000258.xlsx

Emissions for all engines are calculated using manufacturer compliance statement test results, manufacturer exhaust emissions data and AP-42 emission factors. All emergency engines were evaluated at 100 hrs/yr operation and the 6 non-emergency engines were evaluated at 350 hrs/yr operation. Emissions were calculated to bring the NOx emissions to no more than 90 tons per year. All emissions calculations are presented in the attached spreadsheet.

PTE EMISSIONS

Pollutants	Emergency Engines (tons/yr)	Non-Emergency Engines (tons/yr)	Facility-Wide PTE Emissions (tons/yr)
CO:	33.42	20.33	53.75
NOx:	58.39	31.53	89.92
PM10:	2.08	1.16	3.24
PM2.5:	2.08	1.16	3.24
VOC:	4.74	1.28	6.02
SOX:	0.05	0.04	0.09

F. HAP EMISSION IMPACTS:

Based on the information provided in the permit application, the facility emits insignificant amount of HAPs; therefore, SCREEN modeling was not performed per the Department's HAPs policy.

G. BACT DETERMINATION:

The Bay Area Air Quality Management District (http://hank.baaqmd.gov/pmt/bactworkbook/default.htm) identifies the current Tier standard for criteria pollutants at applicable horsepower rating as BACT for this source category. Maricopa County, by policy, assumes this determination is acceptable without requiring a top down analysis.

In 2000, the original permit was processed and emissions from the 4 original emergency engines were determined to be below the BACT threshold. For this reason, they are exempt from BACT applicability.

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In 2007, Revision 1.1.0.0 requested the addition of 12 new emergency generators to be installed in the future. Since the modification was requested over 5 years after the original engines were installed, this modification was determined to be a standalone modification, not being submitted as a phase of a larger project. For this reason, BACT was determined for the 12 new generators alone. The new generators were given a 58 hour per year operation limitation to avoid triggering BACT. Currently, only 10 of these engines are operating as emergency engines and there combined emissions at 100 hours per year are below the BACT thresholds.

In 2009, Revision 1.2.0.0 was requested to bring 2 of the 12 emergency engines, added in Revision 1.1.0.0, into prime engine category. Because emissions were increased above the limitation created to avoid BACT in Revision 1.1.0.0, BACT was triggered for the 2 newly categorized prime engines (MTU/DDC G83 prime engines).

In 2010, Revision 1.3.0.0 was requested to add 4 more MTU/DDC G83 prime engines for a total of 6 MTU/DDC G83 prime engines, 2 from Revision 1.2.0.0 and 4 from Revision 1.3.0.0. Since BACT had been triggered by that time, all additions must meet the current BACT standard for the year they are installed. Per §60.4201(b), a non-emergency engine, manufactured in 2007 through 2010 with a maximum engine power greater than 3,000 hp, is required to meet the standards in Table 1 of 40 CFR, Part 60, Subpart IIII, as presented below. Since these 6 engines were installed between 2007 and 2010, the standards below are BACT for these engines.

	g/KW-hr (g/HP-hr)			
Maximum engine power	HC	NOx	CO	PM
KW>560 (HP>750)	1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)

The 6 MTU/DDC G83 prime engines are certified Tier 2 compliant, which is below the standards stated in the Table above and therefore BACT compliant.

The 16 emergency engines installed since 2012, in Revisions 2.1.0.0, 2.2.0.0 and 2.2.1.0, all have an engine rating of 2,919 hp. Per 40 CFR § 60.4202(a)(2), engines rated greater than 50 hp but less than 3,000 hp, manufactured after 2007, are subject to the standards set forth in 40 CFR § 89.112 and 40 CFR § 89.113 for all pollutants. Per 40 CFR § 89.112, engines manufactured after 2006, with an engine rating greater than 500kW, are required to meet Tier 2 standards. Therefore, BACT for all 16 emergency engines installed since 2012, is meeting Tier 2 standards. All 16 emergency engines are certified Tier 2 compliant and therefore BACT compliant.

H. REGULATORY REQUIREMENTS AND MONITORING:

The general and specific conditions of the permit were updated to be consistent with the most current regulatory language for a facility with emergency and non-emergency generators subject to NSPS IIII requirements.

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Digital Realty Trust

2121 S. Price Road

Chandler, AZ 85248

Summary Emissions

Permitted

Emergency Engines:

4 - Caterpillar 3516B, 2,934bhp Tier 1;

10 - MTU/DDC G81, 2,937 bhp Tier 1;

16 - Cummins QSK60-G6, 2,919 bhp Tier 2

Pollutant	Emissions (tons)
CO	33.42
NOx	58.39
SOx	0.05
PM10	2.08
PM2.5	2.08
VOC	4.74

Prime Engines:

6 - MTU/DDC G83, 3,363 bhp Tier 2

Pollutant	Emissions (tons)
CO	20.33
NOx	31.53
SOx	0.04
PM10	1.16
PM2.5	1.16
VOC	1.28

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HITEC #	MCAQD #	Equipment	bHP Rating	Permitted Daily Operating Hours	Permitted Annual Operating Hours	Serial Number	Model Year	Tier Rating	Permitted Hours	Actual Emissions (lbs)					
										CO	NOx	SOx	PM10	PM2.5	VOC
25	5	MTU/DDC G83	3,363	24	350	527104005	2007	II	350.0	6,775.4	10,511.6	14.2	387.2	387.2	425.9
26	6	MTU/DDC G83	3,363	24	350	527104006	2007	II	350.0	6,775.4	10,511.6	14.2	387.2	387.2	425.9
42	17	MTU/DDC G83	3,363	24	350	527104468	2007	II	350.0	6,775.4	10,511.6	14.2	387.2	387.2	425.9
41	18	MTU/DDC G83	3,363	24	350	527104469	2007	II	350.0	6,775.4	10,511.6	14.2	387.2	387.2	425.9
43	19	MTU/DDC G83	3,363	24	350	527104201	2007	II	350.0	6,775.4	10,511.6	14.2	387.2	387.2	425.9
44	20	MTU/DDC G83	3,363	24	350	527104202	2007	II	350.0	6,775.4	10,511.6	14.2	387.2	387.2	425.9
TOTAL (lbs)										40,652.5	63,069.5	85.5	2,323.0	2,323.0	2,555.3
TOTAL (tons)										20.326	31.535	0.043	1.162	1.162	1.278

Emission factors:

CO:	3.50	g/kW-hr	from manufacturer specifications
NOx:	5.43	g/kW-hr	from manufacturer specifications
PM:	0.20	g/kW-hr	from manufacturer specifications
VOC:	0.22	g/kW-hr	from manufacturer specifications
CO:	5.76E-03	lb/hp-hr	converted from above
NOx:	8.93E-03	lb/hp-hr	converted from above
PM10:	3.29E-04	lb/hp-hr	converted from above
PM2.5:	3.29E-04	lb/hp-hr	converted from above
VOC:	3.62E-04	lb/hp-hr	converted from above
SOx:	1.21E-05	lb/hp-hr	AP-42, Table 3.4-1, Assume 15 ppm Sulfur Content

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CAT #	MCAQD #	Equipment	bHP Rating	Permitted Daily Operating Hours	Permitted Annual Operating Hours	Serial Number	Model Year	Tier Rating	Permitted Hours	Actual Emissions (lbs)					
										CO	NOx	SOx	PM10	PM2.5	VOC
3	1	Caterpillar 3516B	2,934	24	100	7RN01367		I	100.0	1,613.7	7,041.6	3.6	205.4	205.4	206.8
1	2	Caterpillar 3516B	2,934	24	100	7RN01372		I	100.0	1,613.7	7,041.6	3.6	205.4	205.4	206.8
2	3	Caterpillar 3516B	2,934	24	100	7RN01378		I	100.0	1,613.7	7,041.6	3.6	205.4	205.4	206.8
4	4	Caterpillar 3516B	2,934	24	100	7RN01381		I	100.0	1,613.7	7,041.6	3.6	205.4	205.4	206.8
TOTAL (lbs)										6,454.8	28,166.4	14.2	821.5	821.5	827.4
TOTAL (tons)										3.227	14.083	0.007	0.411	0.411	0.414

Emission factors for diesel (AP-42, Table 3.4-1):

CO:	5.50E-03	lb/hp-hr
NOx:	2.40E-02	lb/hp-hr
PM10:	7.00E-04	lb/hp-hr
PM2.5	7.00E-04	lb/hp-hr
VOC:	7.05E-04	lb/hp-hr
SOx[1]:	1.21E-05	lb/hp-hr

Notes:

[1] Assumes sulfur content of diesel fuel is 0.0015% by weight. (AP-42, Table 3.4-1).

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HITEC #	MCAQD #	Equipment	bHP Rating	Permitted Daily Operating Hours	Permitted Annual Operating Hours	Serial Number	Model Year	Tier Rating	Permitted Hours	Actual Emissions (lbs) CO	NOx	SOx	PM10	PM2.5	VOC
21	7	MTU/DDC G81	2,937	24	100	527102710		I	100.0	5,506.3	4,443.7	3.6	260.8	260.8	627.9
22	8	MTU/DDC G81	2,937	24	100	527102711		I	100.0	5,506.3	4,443.7	3.6	260.8	260.8	627.9
24	9	MTU/DDC G81	2,937	24	100	527102712		I	100.0	5,506.3	4,443.7	3.6	260.8	260.8	627.9
23	10	MTU/DDC G81	2,937	24	100	527102763		I	100.0	5,506.3	4,443.7	3.6	260.8	260.8	627.9
31	11	MTU/DDC G81	2,937	24	100	527102764		I	100.0	5,506.3	4,443.7	3.6	260.8	260.8	627.9
36	12	MTU/DDC G81	2,937	24	100	527102765		I	100.0	5,506.3	4,443.7	3.6	260.8	260.8	627.9
33	13	MTU/DDC G81	2,937	24	100	527102766		I	100.0	5,506.3	4,443.7	3.6	260.8	260.8	627.9
35	14	MTU/DDC G81	2,937	24	100	527102767		I	100.0	5,506.3	4,443.7	3.6	260.8	260.8	627.9
32	15	MTU/DDC G81	2,937	24	100	527102768		I	100.0	5,506.3	4,443.7	3.6	260.8	260.8	627.9
34	16	MTU/DDC G81	2,937	24	100	527102949		I	100.0	5,506.3	4,443.7	3.6	260.8	260.8	627.9
TOTAL (lbs)										55,062.8	44,436.6	35.5	2,608.2	2,608.2	6,279.1
TOTAL (tons)										27.531	22.218	0.018	1.304	1.304	3.140

Emission factors:

CO:	11.4	g/kW-hr	from manufacturer specifications
NOx:	9.2	g/kW-hr	from manufacturer specifications
PM:	0.54	g/kW-hr	from manufacturer specifications
VOC:	1.3	g/kW-hr	from manufacturer specifications

CO:	1.87E-02	lb/hp-hr	converted from above
NOx:	1.51E-02	lb/hp-hr	converted from above
PM10:	8.88E-04	lb/hp-hr	converted from above
PM2.5	8.88E-04	lb/hp-hr	converted from above
VOC:	2.14E-03	lb/hp-hr	converted from above
SOx:	1.21E-05	lb/hp-hr	AP-42, Table 3.4-1, Assume 15 ppm Sulfur Content

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Cummins #	MCAQD #	New Equipment	bHP Rating	Daily Operating Hours	Annual Operating Hours	Serial Number	Model Year	Tier Rating	Permitted Hours	Actual Emissions (lbs) CO	NOx	SOx	PM10	PM2.5	VOC
G202	21	Cummins QSK60-G6	2,919	24	100	D110210849	2011	II	100.0	135.1	3,288.5	3.5	25.7	25.7	148.0
G203	22	Cummins QSK60-G6	2,919	24	100	E110218075	2011	II	100.0	135.1	3,288.5	3.5	25.7	25.7	148.0
G2023	23	Cummins QSK60-G6	2,919	24	100	E110218477	2011	II	100.0	135.1	3,288.5	3.5	25.7	25.7	148.0
H202	24	Cummins QSK60-G6	2,919	24	100	D110210849	2011	II	100.0	135.1	3,288.5	3.5	25.7	25.7	148.0
H203	25	Cummins QSK60-G6	2,919	24	100	E110218075	2011	II	100.0	135.1	3,288.5	3.5	25.7	25.7	148.0
H2023	26	Cummins QSK60-G6	2,919	24	100	E110218477	2011	II	100.0	135.1	3,288.5	3.5	25.7	25.7	148.0
TOTAL (lbs)										810.9	19,730.7	21.2	154.4	154.4	888.1
TOTAL (tons)										0.405	9.865	0.011	0.077	0.077	0.444

Emission factors:			
CO:	0.21	g/hp-hr	from manufacturer specifications
NOx:	5.11	g/hp-hr	from manufacturer specifications
PM:	0.04	g/hp-hr	from manufacturer specifications
VOC:	0.23	g/hp-hr	from manufacturer specifications
CO:	4.63E-04	lb/hp-hr	converted from above
NOx:	1.13E-02	lb/hp-hr	converted from above
PM10:	8.82E-05	lb/hp-hr	converted from above
PM2.5	8.82E-05	lb/hp-hr	converted from above
VOC:	5.07E-04	lb/hp-hr	converted from above
SOx:	1.21E-05	lb/hp-hr	AP-42, Table 3.4-1, Assume 15 ppm Sulfur Content

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New Engines To Be Permitted

Cummins #	MCAQD #	New Equipment	bHP Rating	Daily Operating Hours	Annual Operating Hours	Serial Number	Model Year	Tier Rating	Permitted Hours	Actual Emissions (lbs) CO	NOx	SOx	PM10	PM2.5	VOC
J106	27	Cummins QSK60-G6 NR2	2,919	24	100	33196468	2013	II	100.0	450.5	2,445.4	2.8	57.9	57.9	148.0
K102	28	Cummins QSK60-G6 NR2	2,919	24	100	33196544	2013	II	100.0	450.5	2,445.4	2.8	57.9	57.9	148.0
J204	29	Cummins QSK60-G6 NR2	2,919	24	100	33196446	2013	II	100.0	450.5	2,445.4	2.8	57.9	57.9	148.0
J207	30	Cummins QSK60-G6 NR2	2,919	24	100	33196447	2013	II	100.0	450.5	2,445.4	2.8	57.9	57.9	148.0
K201	31	Cummins QSK60-G6 NR2	2,919	24	100	33196445	2013	II	100.0	450.5	2,445.4	2.8	57.9	57.9	148.0
L201	32	Cummins QSK60-G6 NR2	2,919	24	100	33196573	2013	II	100.0	450.5	2,445.4	2.8	57.9	57.9	148.0
J-RG	33	Cummins QSK60-G6 NR2	2,919	24	100	33196481	2013	II	100.0	450.5	2,445.4	2.8	57.9	57.9	148.0
JKL-RG	34	Cummins QSK60-G6 NR2	2,919	24	100	TBD	2013	II	100.0	450.5	2,445.4	2.8	57.9	57.9	148.0
Cent Plant A	35	Cummins QSK60-G6 NR2	2,919	24	100	33196869	2013	II	100.0	450.5	2,445.4	2.8	57.9	57.9	148.0
Cent Plant B	36	Cummins QSK60-G6 NR2	2,919	24	100	33196886	2013	II	100.0	450.5	2,445.4	2.8	57.9	57.9	148.0
TOTAL (lbs)										4,504.7	24,454.2	27.6	579.2	579.2	1,480.1
TOTAL (tons)										2.252	12.227	0.014	0.290	0.290	0.740

Emission factors:

CO:	0.7	g/hp-hr	from manufacturer compliance statement - Test Results - CARB Diesel Fuel (< 15 ppm Sulfur)
NOx:	3.8	g/hp-hr	from manufacturer compliance statement - Test Results - CARB Diesel Fuel (< 15 ppm Sulfur)
PM:	0.09	g/hp-hr	from manufacturer compliance statement - Test Results - CARB Diesel Fuel (< 15 ppm Sulfur)
VOC:	0.23	g/hp-hr	from manufacturer specifications - Exhause Emission Data Sheet
SO2:	0.004	g/hp-hr	from manufacturer specifications - Exhause Emission Data Sheet factored by 0.0015% Sulfur Fuel to 0.035% Sulfur Fuel
CO:	1.54E-03	lb/hp-hr	converted from above
NOx:	8.38E-03	lb/hp-hr	converted from above
PM10:	1.98E-04	lb/hp-hr	converted from above
PM2.5	1.98E-04	lb/hp-hr	converted from above
VOC:	5.07E-04	lb/hp-hr	converted from above
SOx:	9.45E-06	lb/hp-hr	converted from above

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Power Generation

Exhaust Emission Data Sheet
2000DQKAB
60 Hz Diesel Generator Set

Engine Information:

Model:	Cummins Inc. QSK60-G6 NR2	Bore:	6.25 in. (158 mm)
Type:	4 Cycle, 60°V, 16 Cylinder Diesel	Stroke:	7.48 in. (189 mm)
Aspiration:	Turbocharged and Low Temperature aftercooled	Displacement:	3673 cu. in. (60.1 liters)
Compression Ratio:	14.5:1		
Emission Control Device:	Aftercooled		

	1/4	1/2	3/4	Full	Full	
PERFORMANCE DATA	**Standby**	**Standby**	**Standby**	**Standby**	**Prime**	
BHP @ 1800 RPM (60 Hz)	730	1460	2189	2919	2639	
Fuel Consumption (gal/Hr)	43.9	76.4	105.8	137.9	124.7	
Exhaust Gas Flow (CFM)	6510	10220	12000	14920	13780	
Exhaust Gas Temperature (°F)	772	838	873	893	884	
EXHAUST EMISSION DATA						
HC (Total Unburned Hydrocarbons)	0.38	0.32	0.23	0.23	0.25	
NOx (Oxides of Nitrogen as NO2)	3.18	3.04	4.60	5.11	5.02	
CO (carbon Monoxide)	0.65	0.40	0.19	0.21	0.16	
PM (Particular Matter)	0.20	0.12	0.03	0.04	0.03	
SO2 (Sulfur Dioxide)	0.13	0.12	0.10	0.10	0.10	
Smoke (Bosch)	0.65	0.52	0.19	0.24	0.15	
						All Values are Grams/HP-Hour, Smoke is Bosch #

TEST CONDITIONS

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load (±2%). Pressures, temperatures, and emission rates were stabilized.

Fuel Specification:	46.5 Cetane Number, 0.035 Wt.% Sulfur; Reference ISO8178-5, 40CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.
Fuel Temperature:	99 ± 9 °F (at fuel pump inlet)
Intake Air Temperature:	77 ± 9 °F
Barometric Pressure:	29.6 ± 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H2O/lb dry air
Reference Standard:	ISO 8178

The NOx, HC, CO and PM emission data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may results in elevated emission levels.

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Power Generation

2013 EPA Tier 2 Exhaust Emission Compliance Statement 2000 DQKAB Stationary Emergency

60 Hz Diesel Generator Set

Compliance Information:

The engine used in this generator set complies with U.S. EPA New Source Performance Standards for Stationary Emergency emission under the provisions of 40 CFR Part 60 Subpart IIII when tested per ISO 8178 D2.

Engine Manufacturer:	Cummins Inc
EPA Certificate Number:	DCEXL060.AAD-017
Effective Date:	5/1/2012
EPA Engine Family (Cummins Emissions Family):	DCEXL060.AAD (D593)
CARB / AQMD Certificate:	

Engine Information:

Model:	QSK60/ QSK60-G6 NR2	Bore:	6.25 in. (159 mm)
Engine Nameplate HP:	2922	Stroke:	7.48 in. (190 mm)
Type:	4 Cycle, 60°V, 16 Cylinder Diesel	Displacement:	3673 cu. in. (60.2 liters)
Aspiration:	Turbocharged and CAC	Compression Ratio:	14.5:1
Emission Control Device:	Electronic Control	Exhaust Stack Diameter:	2-14 in.

Diesel Fuel Emission Limits

D2 Cycle Exhaust Emissions

	Grams per BHP-hr			Grams per kWm-hr		
	NOx + NMHC	CO	PM	NOx + NMHC	CO	PM
Test Results - Diesel Fuel (300-4000 ppm Sulfur)	4.2	0.7	0.10	5.6	1.0	0.14
EPA Emissions Limit	4.8	2.6	0.15	6.4	3.5	0.20
Test Results - CARB Diesel Fuel (<15 ppm Sulfur)	3.8	0.7	0.09	5.1	1.0	0.12
CARB Emissions Limit	4.8	2.6	0.15	6.4	3.5	0.20

The CARB emission values are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.
Test Methods: EPA/CARB Nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A for Constant Speed Engines (ref. ISO8178-4, D2)
Diesel Fuel Specifications: Cetane Number: 40-48. Reference: ASTM D975 No. 2-D.
Reference Conditions: Air Inlet Temperature: 25°C (77°F), Fuel Inlet Temperature: 40°C (104°F). Barometric Pressure: 100 kPa (29.53 in Hg), Humidity: 10.7 g/kg (75 grains H2O/lb) of dry air; required for NOx correction, Restrictions; Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to a maximum allowable limit.

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results.
Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.