California Environmental Protection Agency **Air Resources Board**	DETROIT DIESEL CORPORATION	**EXECUTIVE ORDER A-290-0155** **New On-Road Heavy-Duty Engines** **Page 1 of 2 Pages**

Pursuant to the authority vested in the Air Resources Board by Health and Safety Code Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-14-012;

IT IS ORDERED AND RESOLVED: The engine and emission control systems produced by the manufacturer are certified as described below for use in on-road motor vehicles with a manufacturer's GVWR over 14,000 pounds. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	ENGINE SIZES (L)	FUEL TYPE [1]	STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS [2]	ECS & SPECIAL FEATURES [3]	DIAGNOSTIC [6]
2016	GDDXH12.8FED	12.8	Diesel	Diesel	HHDD	DDI, TC, CAC, ECM, EGR, OC, PTOX, SCR-U, AMOX	OBD($)

PRIMARY ENGINE'S IDLE EMISSIONS CONTROL [5]	ADDITIONAL IDLE EMISSIONS CONTROL [5]
30g	N/A

ENGINE (L)	ENGINE MODELS / CODES (rated power, in hp)
12.8	See attachment for engine models and ratings

* =not applicable; **GVWR**=gross vehicle weight rating; **13 CCR xyz**=Title 13, California Code of Regulations, Section xyz; **40 CFR 86.abc**=Title 40, Code of Federal Regulations, Section 86.abc; **L**=liter; **hp**=horsepower; **kw**=kilowatt; **hr**=hour;

[1] **CNG/LNG**=compressed/liquefied natural gas; **LPG**=liquefied petroleum gas; **E85**=85% ethanol fuel; **MF**=multi fuel a.k.a. **BF**=bi fuel; **DF**=dual fuel; **FF**=flexible fuel;

[2] **L/M/H HDD**=light/medium/heavy heavy-duty diesel; **UB**=urban bus; **HDO**=heavy duty Otto;

[3] **ECS**=emission control system; **TWC/OC**=three-way/oxidizing catalyst; **NAC**=NOx adsorption catalyst; **SCR-U / SCR-N**=selective catalytic reduction – urea / -- ammonia; **WU (prefix)** =warm-up catalyst; **DPF**=diesel particulate filter; **PTOX**=periodic trap oxidizer; **HO2S/O2S**=heated/oxygen sensor; **HAFS/AFS**=heated/air-fuel-ratio sensor (a.k.a., universal or linear oxygen sensor); **TBI**=throttle body fuel injection; **SFI/MFI**=sequential/multi port fuel injection; **DGI**=direct gasoline injection; **GCARB**=gaseous carburetor; **IDI/DDI**=indirect/direct diesel injection; **TC/SC**=turbo/super charger; **CAC**=charge air cooler; **EGR / EGR-C**=exhaust gas recirculation / cooled EGR; **PAIR/AIR**=pulsed/secondary air injection; **SPL**=smoke puff limiter; **ECM/PCM**=engine/powertrain control module; **EM**=engine modification; **2 (prefix)**=parallel; **(2) (suffix)**=in series;

[5] **ESS**=engine shutdown system (per 13 CCR 1956.8(a)(6)(A)(1); **30g**=30 g/hr NOx (per 13 CCR 1956.8(a)(6)(C); **APS** =internal combustion auxiliary power system; **ALT**=alternative method (per 13 CCR 1956.8(a)(6)(D); **Exempt**=exempted per 13 CCR 1956.8(a)(6)(B) or for CNG/LNG fuel systems; **N/A**=not applicable (e.g., Otto engines and vehicles);

[6] **EMD**=engine manufacturer diagnostic system (13 CCR 1971); OBD**(F)** / **(P)** / **($)**=full / partial / partial with a fine / on-board diagnostic;);

Following are: 1) the FTP exhaust emission standards, or family emission limit(s) as applicable, under 13 CCR 1956.8; 2) the SET and NTE limits under the applicable California exhaust emission standards and test procedures for heavy-duty diesel engines and vehicles (Test Procedures); and 3) the corresponding certification levels, for this engine family. "Diesel" CO, SET and NTE certification compliance may have been demonstrated by the manufacturer as provided under the applicable Test Procedures in lieu of testing. (For flexible- and dual-fueled engines, the CERT values in brackets [ ] are those when tested on conventional test fuel. For multi-fueled engines, the STD and CERT values for default operation permitted in 13 CCR 1956.8 are in parentheses.).[4]

in g/bhp-hr	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET
STD	0.14	0.14	0.20	0.20	*	*	15.5	15.5	0.01	0.01	*	*
FEL					*	*					*	*
CERT	0.001	0.002	0.09	0.01	*	*	0.1	0.01	0.000	0.001	*	*
NTE	0.21		0.30		*		19.4		0.02		*	

[4] **g/bhp-hr**=grams per brake horsepower-hour; **FTP**=Federal Test Procedure; **SET**=Supplemental emissions testing; **NTE**=Not-to-Exceed; **STD**=standard or emission test cap; **FEL**=family emission limit; **CERT**=certification level; **NMHC/HC**=non-methane/hydrocarbon; **NOx**=oxides of nitrogen; **CO**=carbon monoxide; **PM**=particulate matter; **HCHO**=formaldehyde;

BE IT FURTHER RESOLVED: The manufacturer has demonstrated compliance with the Greenhouse Gas Emission Standards as specified in Title 13 CCR 1956.8 and the incorporated "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy Duty Diesel-Engines and Vehicles" (HDDE Test Procedures) adopted Dec. 12, 2002, as last amended Oct. 21, 2014 using the 2014 model year National Heavy-Duty Engine and Vehicle Greenhouse Gas Program as specified in Section 1036.108 of the HDDE Test Procedures. The manufacturer has submitted the required information and therefore has met the criteria necessary to receive a California Executive Order based on the Environmental Protection Agency's Certificate of Conformity for the above listed engine family.

	EPA CERTIFICATE OF CONFORMITY		PRIMARY INTENDED SERVICE CLASS	
	DDX-ONHWY-16-01		TRACTOR\VOCATIONAL	
In g/bhp-hr	CO_2		CH_4	N_2O
	FTP	SET		
STD	555	460	0.10	0.10
FCL	519	458	*	*
FEL	535	472	0.10	0.10
CERT	513	444	0.02	0.04

[4] **g/bhp-hr**=grams per brake horsepower-hour; **FTP**=Federal Test Procedure; **SET**=Supplemental emissions testing; **STD** = standard or emission test cap; **FEL**=family emission limit; **FCL**=family certification level; **CERT**=certification level; **CO_2**=carbon dioxide; **CH_4**=methane; **N_2O**=nitrous oxide; **VOCATIONAL**=vocational engine; **TRACTOR**=tractor engine

BE IT FURTHER RESOLVED: Certification to the FEL(s) / FCL(s) listed above, as applicable, is subject to the following terms, limitations and conditions. The FEL(s) / FCL(s) is the emission level declared by the manufacturer and serves in lieu of an emission standard for certification purposes in any averaging, banking, or trading (ABT) programs. It will be used for determining compliance of any engine in this family and compliance with such ABT programs.

BE IT FURTHER RESOLVED: The listed engine models are conditionally certified in accordance with 13 CCR Section 1971.1(k) (deficiency and fines provisions for certification of malfunction and diagnostic system) because the heavy-duty on-board diagnostic (HD OBD) system of the listed engine models has been determined to have eight deficiencies. The listed engine models are approved subject to the manufacturer paying a fine of $200 per engine for the third through eighth deficiencies in the listed engine family that is produced and delivered for sale in California. On a quarterly basis, the manufacturer shall submit to the Air Resources Board reports of the number of engines produced and delivered for sale in California and pay the full fine owed for that quarter pursuant to this conditional certification. Payment shall be made payable to the State Treasurer for deposit in the Air Pollution Control Fund no later than thirty (30) days after the end of each calendar quarter during the 2015 model-year production period. Failure to pay the quarterly fine, in full, in the time provided, may be cause for the Executive Officer to rescind this conditional certification, effective from the start of the quarter in question, in which case all engines covered under this conditional certification for that quarter and all future quarters would be deemed uncertified and subject to a civil penalty of up to $5000 per engine pursuant to HSC Section 43154.

BE IT FURTHER RESOLVED: For the listed engine models the manufacturer has submitted the materials to demonstrate certification compliance with 13 CCR 1965 (emission control labels), 13 CCR 1971.1 (on-board diagnostic, full or partial compliance) and 13 CCR 2035 et seq. (emission control warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

The Bureau of Automotive Repair will be notified by copy of this Executive Order.

This Executive Order hereby cancels and supersedes Executive Order A-209-0155 dated December 01, 2015.

Executed at El Monte, California on this 11 day of December 2015.

Annette Hebert, Chief
Emissions Compliance, Automotive Regulations and Science Division

ATTACHMENT 1 OF 2

Engine Model Summary Template

A-290-0155

12/9/2015

Engine Family	1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
GDDXH12.8FED	I (v & t)	DD13 1 box	370@1625	212.3	114.7	1250@1075	218.1	78.0	ECM, TC, CAC
GDDXH12.8FED	II (v & t)	DD13 1 box	350@1625	200.7	108.5	1350@1075	235.6	84.3	EGR, PTOX
GDDXH12.8FED	III (v & t)	DD13 1,2 box	380@1625	218.1	117.8	1450@1075	253.0	90.5	OC, DDI
GDDXH12.8FED	IV (v & t)	DD13 1,2 box	380@1625	218.1	117.8	1450@1075	253.0	90.5	AMOX, SCR-U
GDDXH12.8FED	V (v & t)	DD13 1,2 box	410@1625	235.5	127.2	1450@1075	253.0	90.5	(all ratings)
GDDXH12.8FED	VI (v & t)	DD13 1,2 box	410@1625	235.5	127.2	1450@1075	253.0	90.5	
GDDXH12.8FED	VII (v & t)	DD13 1,2 box	435@1625	250.3	135.2	1550@1075	270.8	96.8	
GDDXH12.8FED	VIII (v & t)	DD13 1,2 box	450@1625	259.4	140.1	1550@1075	270.8	96.8	(v =vocational)
GDDXH12.8FED	IX (v & t)	DD13 1,2 box	410@1625	235.5	127.2	1550@1075	270.8	96.8	(t = tractor)
GDDXH12.8FED	X (v & t)	DD13 1,2 box	450@1625	259.4	140.1	1650@1075	289.1	103.4	
GDDXH12.8FED	XI (v & t)	DD13 1,2 box	450@1625	259.4	140.1	1650@1075	289.1	103.4	
GDDXH12.8FED	XII (v & t)	DD13 1 box	410@1625	235.5	127.2	1650@1075	289.1	103.4	
GDDXH12.8FED	XIII (v & t)	DD13 1 box	470@1625	271.9	146.9	1650@1075	289.1	103.4	
GDDXH12.8FED	XIV (v & t)	DD13 1 box	400@1625	229.7	124.1	1750@1075	307.8	110.0	
GDDXH12.8FED	XV (v & t)	DD13 1 box	505@1625	295.8	159.8	1850@1075	327.3	117.0	
GDDXH12.8FED	XVI (v & t)	DD13 coach	410@1625	235.5	127.2	1450@1075	253.0	90.5	
GDDXH12.8FED	XVII (v & t)	DD13 coach	450@1625	259.4	140.1	1650@1075	289.1	103.4	
GDDXH12.8FED	XVIII (v & t)	DD13 coach	450@1625	259.4	140.1	1550@1075	270.8	96.8	
GDDXH12.8FED	XIX (v & t)	DD13 EVO Bus	410@1625	235.5	127.2	1450@1075	253.0	90.5	
GDDXH12.8FED	XX (v & t)	DD13 EVO Bus	450@1625	259.4	140.1	1550@1075	270.8	96.8	
GDDXH12.8FED	XXI (v)	DD13 FCCC	470@1625	271.9	146.9	1650@1075	289.1	103.4	
GDDXH12.8FED	XXII (v)	DD13 FCCC	525@1625	311.1	168.0	1850@1075	327.3	117.0	
GDDXH12.8FED	XXIII (v)	DD13 FCCC	505@1625	295.8	159.8	1750@1075	307.8	110.0	
GDDXH12.8FED	Emergency	Vehicle	Models	Below					ECM, TC, CAC
GDDXH12.8FED	XXIV (v)	DD13 fire truck	470@1625	271.9	146.9	1650@1075	289.1	103.4	EGR, PTOX
GDDXH12.8FED	XXV (v)	DD13 fire truck	505@1625	295.8	159.8	1750@1075	307.8	110.0	OC, DDI

ATTACHMENT 2 OF 2

Engine Model Summary Template

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GDDXH12.8FED	XXVI (v)	DD13 fire truck	525@1625	311.1	168.0	1850@1075	327.3	117.0	AMOX, SCR-U, ECM, TC, CAC, DDI, EGR, PTOX, OC