



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Washington, DC 20460

FEB 14 2019

OFFICE OF
AIR AND RADIATION

Steve Hoke
CEO
Clean Diesel Group LLC
10505 Plaza Drive BLDG C
Whitmore Lake, MI 48189

Dear Mr. Hoke:

The U.S. Environmental Protection Agency (EPA) has reviewed your request for verification of the Clean Diesel Group LLC's (CDG's) Low Nitrogen Dioxide (also known as NO₂) Filter (LNF) System for highway application. The LNF system consists of a metallic flow through pre-filter and a cordierite wall flow diesel particulate filter. Based on the information provided, EPA hereby verifies that this technology reduces emissions of certain criteria pollutants by the percentages described in the table below.

This verification approval is based on the technical information and test data provided along with the in-use compliance test report approved by the California Air Resource Board (CARB). CARB's in-use approval is accepted by EPA through the reciprocity policy.

Technology	Engine Model/Application	Fuel, Max Sulfur (ppm)	Reductions (%)			
			PM	NO _x	HC	CO
Low Nitrogen Dioxide Filter (LNF)	Highway model year 1993 through 2006 and have an engine family name listed in the Attachment A	15	90	0	90	80

The following criteria must be met in order for appropriately retrofitted engines to achieve the aforementioned emission reductions:

1. The engine must be certified to a PM emission level of at most 0.1 grams per brake horsepower-hour (g/bhp-hr), and greater than 0.01 g/bhp-hr.
2. The engine must be used by an on-road motor vehicle with a manufacturer's Gross Vehicle Weight Rating of over 14,000 pounds.
3. The application must have a duty cycle with an exhaust temperature profile that: Results in a Weighted Average Temperature (WAT) that is at least 237 degrees Celsius; or Is either greater than 235 degrees Celsius for at least 40 percent of the time or greater than 300 degrees Celsius for at least 10 percent of the time.
4. The engine must be rated to at least 100 horsepower (hp) and no more than 600 hp.

5. The engine may or may not be certified as having exhaust gas recirculation.
6. The engine must not have a pre-existing original equipment manufacturer (OEM) diesel particulate filter.
7. The engine may or may not have a pre-existing OEM oxidation catalyst.
8. The engine must have a four-stroke combustion cycle.
9. The engine must be turbocharged.
10. The engine may be mechanically or electronically controlled.
11. The engine must be well maintained and must not consume lubricating oil at a rate greater than that specified by the engine manufacturer.
12. Lube oil or other oil must not be mixed with the fuel.
13. Each vehicle that is a candidate for installation of the LNF system based on the WAT criterion must first have its exhaust temperature measured and recorded for an appropriate period of time during typical operation. CDG or its authorized representative must maintain these data for each LNF-equipped vehicle and make them available to EPA upon request.

If the LNF system is modified from the application description provided to EPA and representative of products tested, you must notify EPA immediately. This verification does not automatically confer to modified devices or devices that are similar to this original verification. EPA reserves the right to conduct testing of technologies submitted for verification. Verification approval and web listing may be revoked if the technology is modified from the device tested and described in the application or if it fails to meet requirements in EPA testing.

Information on the Clean Diesel Group LLC LNF system, percent reduction, and applicable engines will be posted on the EPA's Verified Technologies List website at: <https://www.epa.gov/verified-diesel-tech/verified-technologies-list-clean-diesel>. EPA reserves the right to review and/or revoke this verification if these operating criteria are not met or if information becomes available regarding the safety, design and/or operation of the technology.

Thank you for participating in EPA's Technology Assessment Center Verification Program. If you have any questions or comments, please contact Kuang Wei, of my staff, at (202) 343-9329.

Sincerely,



Karl Simon, Director
Transportation and Climate Division
Office of Transportation and Air Quality

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
1994	Caterpillar	RCP403DZDARW	6.6
1994	Caterpillar	RCP403DZDASW	6.6
1994	Cummins	RCE359D6DASW	5.9
1994	Cummins	RCE505D6DARW	8.3
1994	Cummins	RCE505F6DABW	8.3
1994	Detroit Diesel	RDD12.EJDASW	12.7
1994	Detroit Diesel	RDD8.5FJDARW	8.5
1994	International	RNV444C8DARA	7.3
1994	International	RNV530D6DARW	8.7
1994	Mack	RMK728EGDATW	11.9
1994	Mack	RMK728EJDARW	11.9
1994	Mack	RMK12.EJDARW	12
1994	Mack	RMK728EGDASW	11.9
1994	Mack	RMK728EJDASW	11.9
1994	Mack	RMK728EJDATW	11.9
1994	Mercedes	RMB10.E6DARA	10
1994	Mercedes	RMB12.E6DARA	12
1994	Perkins	RPK365DGDAAA	5.9
1994	Saab-Scania	RSA673E6DARA	11
1995	Caterpillar	SCP403DZDARW	6.6
1995	Caterpillar	SCP893EZDARW	14.6
1995	Cummins	SCE359D6DARW	5.9
1995	Cummins	SCE505D6DARW	8.3
1995	Cummins	SCE505F6DABW	8.3
1995	Detroit Diesel	SDD12.EJDASW	12.7
1995	International	SNV444C8DAAA	7.3
1995	International	SNV444C8DARW	7.3
1995	International	SNV444C8DASW	7.3
1995	Isuzu	SSZ7.1D6DARW	7.1
1995	Mack	SMK12.EJDARW	11.9
1995	Mack	SMK728EGDASW	11.9
1995	Mack	SMK728EGDATW	11.9
1995	Mack	SMK728EJDARW	11.9
1995	Mack	SMK728EJDASW	11.9
1995	Mack	SMK728EJDATW	11.9
1995	Mercedes Benz	SMB10.E6DARA	10
1995	Mercedes Benz	SMB12.E6DARA	12
1995	Mitsubishi	SMT238B7DAAA	3.9
1995	Mitsubishi	SMT460D7DARW	7.5
1995	Renault	SR3377D8DARW	6.2
1995	Renault	SR3377D8DASW	6.2
1997	Cummins	VCE359D6DARW	5.9
1997	Mack	VMK728EJDARW	11.9
1997	Mack	VMK728EJDASW	11.9
1997	Mack	VMK12.EJDARW	11.9

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
1998	Caterpillar	WCPXH0638MRW	10.5
1998	Caterpillar	WCPXH0893MRW	14.6
1998	Cummins	WCEXH0239BAA	3.9
1998	Cummins	WCEXH0359BAB	5.9
1998	Cummins	WCEXH0359BAC	5.9
1998	Cummins	WCEXH0359BAG	5.9
1998	Cummins	WCEXH0505CAA	8.3
1998	Cummins	WCEXH0661MAF	10.8
1998	Mack	WMKXH0602M48	9.8
1998	Mack	WMKXH0728V40	11.9
1998	Mack	WMKXH0728V41	11.9
1998	Mack	WMKXH0728V43	11.9
1998	Mack	WMKXH0728M44	11.9
1998	International	WNVXH0466ENE	7.6
1998	International	WNVXH0466FNA	7.6
1998	International	WNVXH0466FNC	7.6
1998	International	WNVXH0530FNA	8.7
1998	International	WNVXH0530FNC	8.7
1998	International	WNVXH0444FNA	7.3
1998	International	WNVXH0444FNC	7.3
1998	Renault	WR3XH0377BNF	6.2
1998	Scania	WY9XH11.7203	11.7
1999	Caterpillar	XCPXH0638MRW	10.5
1999	Caterpillar	XCPXH0893MRW	14.6
1999	Cummins	XCEXH0239BAA	3.9
1999	Cummins	XCEXH0359BAM	5.9
1999	Cummins	XCEXH0359BAQ	5.9
1999	Cummins	XCEXH0359BAR	5.9
1999	General Motors	XGMXH06.5522	6.5
1999	International	XNVXH0444ACC	7.3
1999	International	XNVXH07.3FCC	7.3
1999	International	XNVXH07.3FNH	7.3
1999	Renault	XR3XH0377BNF	6.2
1999	Renault	XR3XH0377BWF	6.2
2000	Cummins	YCEXH0239BAA	3.9
2000	Cummins	YCEXH0359BAA	5.9
2000	Cummins	YCEXH0359BAX	5.9
2000	Cummins	YCEXH0359BAY	5.9
2000	Mercedes	YMBXH12.0DJA	12
2000	General Motors	YGMXH06.5528	6.5
2000	General Motors	YGMXH06.5529	6.5
2000	General Motors	YGMXH06.5522	6.5
2000	International	YNVXH07.3FNB	7.3
2000	Renault	YR3XH0377BWF	6.2
2000	Scania	YY9XH10.6106	10.6
2000	Scania	YY9XH11.7202	11.7

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
2001	Cummins	1CEXH0359BAX	5.9
2001	Cummins	1CEXH0359BAA	5.9
2001	Cummins	1CEXH0359BAY	5.9
2001	General Engine Products	1GEPH06.5522	6.5
2001	General Motors	1GMXH06.5528	6.5
2001	General Motors	1GMXH06.5529	6.5
2001	International	1NVXH07.3FNB	7.3
2001	Isuzu	1SZXH06.63RA	6.6
2001	Renault	1R3XH0377BWF	6.2
2001	Scania	1Y9XH11.7202	11.7
2001	Scania	1Y9XH10.6106	10.6
2002	Cummins	2CEXH0359BAD	5.9
2002	Cummins	2CEXH0359BAX	5.9
2002	Cummins	2CEXH0359BAE	5.9
2002	General Motors	2GMXH06.5528	6.5
2002	General Motors	2GMXH06.5529	6.5
2002	International	2NVXH07.3FNB	7.3
2002	Isuzu	2SZXH06.63RA	6.6
2002	Scania	2Y9XH10.6106	10.6
2002	Scania	2Y9XH11.7202	11.7
2003	Cummins	3CEXH0359BAE	5.9
2003	Cummins	3CEXH0359BAI	5.9
2003	Cummins	3CEXH0505CAM	8.3
2003	Cummins	3CEXH0540LAB	8.8
2003	International	3NVXH0530ACT	8.7
2004	Cummins	4CEXH0239BAD	3.9

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
1993	Caterpillar	PCT0629FZE2	10.3
1993	Caterpillar	PCT0893FZE3	14.6
1993	Cummins	PCE0505FDA5	8.3
1993	Cummins	PCE0661FZA2	11
1993	Cummins	PCE0661FZB3	11
1993	Cummins	PCE0855FZK4	14
1993	Detroit Diesel Corporation	PDD08.5FZK7	8.5
1993	Mack	PMT0728FAGX	11.9
1993	Mack	PMT0728FAH0	11.9
1993	Mack	PMT0728FAL6	11.9
1994	Caterpillar	RCP403DZDAAA	6.6
1994	Caterpillar	RCP403DZDABA	6.6
1994	Caterpillar	RCP629EZDARA	10.3
1994	Caterpillar	RCP638EZDARA	10.5
1994	Caterpillar	RCP893EZDARA	14.6
1994	Cummins	RCE359D6DAAB	5.9
1994	Cummins	RCE359D6DAAW	5.9
1994	Cummins	RCE359D6DABW	5.9
1994	Cummins	RCE505D6DAAA	8.3
1994	Cummins	RCE505D6DAAB	8.3
1994	Cummins	RCE505D6DAAC	8.3
1994	Cummins	RCE505F6DAAW	8.3
1994	Cummins	RCE661EJDARA	10.8
1994	Cummins	RCE661EJDARC	10.8
1994	Cummins	RCE661EJDARW	10.8
1994	Cummins	RCE661FJDAAA	10.8
1994	Cummins	RCE855EJDARW	14
1994	Cummins	RCE855EJDASW	14
1994	Detroit Diesel Corporation	RDD11.EJDARA	11.1
1994	Detroit Diesel Corporation	RDD12.EJDARA	12.7
1994	Detroit Diesel Corporation	RDD8.5EJDARA	8.5
1994	Detroit Diesel Corporation	RDD8.5EJDARW	8.5
1994	Detroit Diesel Corporation	RDD8.5FJDABA	8.5
1994	General Motors	RGM6.5C6DAAC	6.5
1994	General Motors	RGM6.5C6DAAA	6.5
1994	Hino	RHM3.8C7DARW	3.8
1994	Hino	RHM6.5D7DARW	6.5
1994	International	RNV408D6DAAW	6.7
1994	International	RNV444C8DABA	7.3
1994	International	RNV466D6D0TW	7.6
1994	International	RNV466D6DAAA	7.6
1994	International	RNV466D6DABA	7.6
1994	International	RNV466D6DARW	7.6
1994	International	RNV466D6DASW	7.6
1994	International	RNV530D6DAAA	8.7

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
1994	International	RNV7.3C8DAAA	7.3
1994	Isuzu	RSZ3.9C6DARW	3.9
1994	Mack	RMK728EGDARA	11.9
1994	Mack	RMK728EJDARA	11.9
1994	Mercedes Benz	RMB6.0D6DAAA	6
1994	Mercedes Benz	RMB6.0D6DARA	6
1994	Mitsubishi	RMT238B7DAAA	3.9
1994	Nissan	RND254C6DAAA	4.2
1994	Nissan	RND423D6DAAA	7
1994	Perkins	RPK243C6DAAA	4
1994	Perkins	RPK365D6DAAA	6
1994	Volvo	RVT12.EJDBRA	12.1
1994	Volvo	RVT6.7D6DBRA	6.7
1995	Caterpillar	SCP403DZDAAA	6.6
1995	Caterpillar	SCP403DZDABA	6.6
1995	Caterpillar	SCP403DZDARK	6.6
1995	Caterpillar	SCP442DZDARK	7.1
1995	Caterpillar	SCP629EZDARK	10.3
1995	Caterpillar	SCP629EZDARM	10.3
1995	Caterpillar	SCP638EZDARA	10.5
1995	Caterpillar	SCP729EZDARL	12
1995	Caterpillar	SCP893EZDARK	14.6
1995	Cummins	SCE239D6DAAA	5.9
1995	Cummins	SCE359D6DAAA	5.9
1995	Cummins	SCE359D6DAAW	5.9
1995	Cummins	SCE359D6DABW	5.9
1995	Cummins	SCE505D6DAAA	8.3
1995	Cummins	SCE505D6DAAW	8.3
1995	Cummins	SCE505D6DABW	8.3
1995	Cummins	SCE505F6DAAW	8.3
1995	Cummins	SCE661EJDARA	10.8
1995	Cummins	SCE661EJDARC	10.8
1995	Cummins	SCE661EJDARW	10.8
1995	Cummins	SCE661EJDASW	10.8
1995	Cummins	SCE661EJDATW	10.8
1995	Cummins	SCE661FJDAAA	10.8
1995	Cummins	SCE855EJDARA	14
1995	Cummins	SCE855EJDARB	14
1995	Cummins	SCE855EJDARW	14
1995	Cummins	SCE855EJDASW	14
1995	Cummins	SCE855EJDATW	14
1995	Detroit Diesel Corporation	SDD11.EJDARA	11.1
1995	Detroit Diesel Corporation	SDD12.EJDARA	12.7
1995	Detroit Diesel Corporation	SDD8.5FJDABA	8.5
1995	Detroit Diesel Corporation	SDD8.5EJDARA	8.5
1995	Detroit Diesel Corporation	SDD8.5EJDARW	8.5
1995	Hino	SHM3.8C7DARW	3.8

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
1995	Hino	SHM6.5D7DARW	6.5
1995	International	SNV444C8D0AA	7.3
1995	International	SNV444C8D0RA	7.3
1995	International	SNV444C8D0SA	7.3
1995	International	SNV466D6DARA	7.6
1995	International	SNV466D6DASA	7.6
1995	International	SNV466D6DATA	7.6
1995	International	SNV466D8DARB	7.6
1995	International	SNV466D8DASB	7.6
1995	International	SNV466D8DATB	7.6
1995	International	SNV530D6DARA	8.7
1995	International	SNV530E6DASA	8.7
1995	International	SNV530F6DATA	8.7
1995	International	SNV7.3C8DAAA	7.3
1995	Isuzu	SSZ3.9C6DARW	3.9
1995	Isuzu	SSZ7.1D6DAAA	7.1
1995	Mack	SMK728EGDARA	11.9
1995	Mack	SMK728EJDARA	11.9
1995	Mercedes Benz	SMB6.0D6DAAA	6
1995	Mercedes Benz	SMB6.0D6DARA	6
1995	Mitsubishi	SMT460D7DAAA	7.5
1995	Nissan	SND254C6DAAA	4.2
1995	Nissan	SND423D6DAAA	7
1995	Perkins	SPK243C6DAAA	4
1995	Perkins	SPK365D6DAAA	6
1995	Renault	SR3377D8DAAW	6.2
1995	Renault	SR3377D8DABW	6.2
1995	Volvo	SVT12.EJDBRA	12.1
1995	Volvo	SVT6.7D6DBRA	6.7
1996	Caterpillar	TCP403DZDAAA	6.6
1996	Caterpillar	TCP403DZDABA	6.6
1996	Caterpillar	TCP403DZDARK	6.6
1996	Caterpillar	TCP442DZDAAK	7.1
1996	Caterpillar	TCP442DZDARK	7.1
1996	Caterpillar	TCP629EZDARK	10.3
1996	Caterpillar	TCP629EZDARM	10.3
1996	Caterpillar	TCP638EZDARA	10.5
1996	Caterpillar	TCP729EZDARL	12
1996	Caterpillar	TCP893EZDARK	14.6
1996	Cummins	TCE239D6DAAA	3.9
1996	Cummins	TCE359D6DAAA	5.9
1996	Cummins	TCE359D6DABW	5.9
1996	Cummins	TCE505D6DAAA	8.3
1996	Cummins	TCE505D6DAAW	8.3
1996	Cummins	TCE505D6DABW	8.3
1996	Cummins	TCE661EJDARA	10.8
1996	Cummins	TCE661EJDARB	10.8

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
1996	Cummins	TCE661EJDARC	10.8
1996	Cummins	TCE661EJDARW	10.8
1996	Cummins	TCE661EJDASW	10.8
1996	Cummins	TCE661EJDATW	10.8
1996	Cummins	TCE661FJDABA	10.8
1996	Cummins	TCE855EJDARA	14
1996	Cummins	TCE855EJDARB	14
1996	Cummins	TCE855EJDARW	14
1996	Cummins	TCE855EJDASW	14
1996	Cummins	TCE855EJDATW	14
1996	Detroit Diesel Corporation	TDD11.EJDARA	11.1
1996	Detroit Diesel Corporation	TDD12.EJDARA	12.7
1996	Detroit Diesel Corporation	TDD12.EJDATW	12
1996	Detroit Diesel Corporation	TDD8.5EJDARA	8.5
1996	Detroit Diesel Corporation	TDD8.5EJDARW	8.5
1996	Detroit Diesel Corporation	TDD8.5FJDABA	8.5
1996	General Motors	TGM6.5C6DABA	6.5
1996	General Motors	TGM6.5C6DABW	6.5
1996	Hino	THM3.8C7DARW	3.8
1996	Hino	THM6.5D7DARW	6.5
1996	International	TNV444C8D0RA	7.3
1996	International	TNV444C8D0SA	7.3
1996	International	TNV466D6DARB	7.6
1996	International	TNV466D6DATB	7.6
1996	International	TNV466D8DARB	7.6
1996	International	TNV466D8DATB	7.6
1996	International	TNV530D6DARA	8.7
1996	International	TNV530D8DARA	8.7
1996	International	TNV530E6DASA	8.7
1996	International	TNV530E8DASA	8.7
1996	International	TNV7.3C8DAAA	7.3
1996	Isuzu	TSZ3.9C6DARW	3.9
1996	Isuzu	TSZ7.1D6DAAA	7.1
1996	Isuzu	TSZ7.1D6DAAA	7.1
1996	Mack	TMK728EGDARA	11.9
1996	Mack	TMK728EJDARA	11.9
1996	Mitsubishi	TMT238C7DBAA	3.9
1996	Mitsubishi	TMT358D7DBAA	5.9
1996	Mitsubishi	TMT460D7DBAA	7.5
1996	Nissan	TND254C6DAAA	4.2
1996	Nissan	TND423D6DAAA	6.9
1996	Perkins	TPK243C6DAAA	4
1996	Perkins	TPK365D6DAAA	6
1996	Renault	TR3377D8DAAW	6.2
1996	Renault	TR3377D8DABW	6.2
1996	Volvo	TVT12.EJDBRA	12.1
1996	Volvo	TVT6.7D6DBRA	6.7

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
1997	Caterpillar	VCP403DZDAAA	6.6
1997	Caterpillar	VCP403DZDABA	6.6
1997	Caterpillar	VCP403DZDARK	6.6
1997	Caterpillar	VCP442DZDAAK	7.1
1997	Caterpillar	VCP442DZDARK	7.1
1997	Caterpillar	VCP629EZDARK	10.3
1997	Caterpillar	VCP629EZDARX	10.3
1997	Caterpillar	VCP638EZDARA	10.5
1997	Caterpillar	VCP729EZDARX	12
1997	Caterpillar	VCP893EZDARA	14.6
1997	Caterpillar	VCP893EZDARX	14.6
1997	Caterpillar	VCP967EZDARK	15.8
1997	Cummins	VCE239D6DAAA	3.9
1997	Cummins	VCE359D6DAAA	5.9
1997	Cummins	VCE359D6DABW	5.9
1997	Cummins	VCE359DJDARA	5.9
1997	Cummins	VCE505D6DAAA	8.3
1997	Cummins	VCE505D6DAAW	8.3
1997	Cummins	VCE505D6DABW	8.3
1997	Cummins	VCE661EJDARB	10.8
1997	Cummins	VCE661EJDARC	10.8
1997	Cummins	VCE661EJDASA	10.8
1997	Cummins	VCE661EJDATW	10.8
1997	Cummins	VCE661FJDABA	10.8
1997	Cummins	VCE855EJDARA	14
1997	Cummins	VCE855EJDARB	14
1997	Cummins	VCE855EJDARC	14
1997	Cummins	VCE855EJDATW	14
1997	Detroit Diesel Corporation	VDD11.EJDARA	11.1
1997	Detroit Diesel Corporation	VDD12.EJDARA	12.7
1997	Detroit Diesel Corporation	VDD12.EJDATA	12
1997	Detroit Diesel Corporation	VDD3.8C8DABA	3.8
1997	Detroit Diesel Corporation	VDD8.5EJDARA	8.5
1997	Detroit Diesel Corporation	VDD8.5FJDABA	8.5
1997	General Motors	VGM6.5C6DABA	6.5
1997	General Motors	VGM6.5C6DABW	6.5
1997	General Motors	VGM6.5C6DARW	6.5
1997	Hino	VHM8.0DHDARA	8
1997	International	VNV444C8DARW	7.3
1997	International	VNV444C8DASW	7.3
1997	International	VNV466D6DARA	7.6
1997	International	VNV466D8DARW	7.6
1997	International	VNV466D8DASA	7.6
1997	International	VNV530D6DARA	8.7
1997	International	VNV530D8DARA	8.7
1997	International	VNV530E6DASA	8.7
1997	International	VNV530E8DASA	8.7
1997	International	VNV7.3C8DAAA	7.3

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
1997	International	VNV7.3C8DAAW	7.3
1997	Isuzu	VSZ3.9C6DARA	3.9
1997	Isuzu	VSZ7.1D6DAAA	7.1
1997	Isuzu	VSZ7.1D6DAAW	7.1
1997	Mack	VMK728EGDARA	11.9
1997	Mack	VMK728EJDARA	11.9
1997	Mack	VMK728EJDAYW	11.9
1997	Mitsubishi	VMT238C7DBAA	3.9
1997	Mitsubishi	VMT358D7DBAA	5.9
1997	Mitsubishi	VMT460D7DBAA	7.5
1997	Nissan	VND254C6DAAA	4.2
1997	Nissan	VND423D6DAAA	6.9
1997	Renault	VR3377D8DAAW	6.2
1997	Renault	VR3377D8DABW	6.2
1997	Volvo	VVT12.EJDBRA	12.1
1997	Volvo	VVT6.7D6DBRA	6.7
1998	Caterpillar	WCPXH0442HRK	7.2
1998	Caterpillar	WCPXH0442HSK	7.2
1998	Caterpillar	WCPXH0629ERK	10.3
1998	Caterpillar	WCPXH0729ERK	12
1998	Caterpillar	WCPXH0893ERK	14.6
1998	Caterpillar	WCPXH0967ERK	15.9
1998	Cummins	WCEXH0359BAD	5.9
1998	Cummins	WCEXH0359BAE	5.9
1998	Cummins	WCEXH0505CAC	8.3
1998	Cummins	WCEXH0505CAD	8.3
1998	Cummins	WCEXH0505CAE	8.3
1998	Cummins	WCEXH0505CAF	8.3
1998	Cummins	WCEXH0661MAA	10.8
1998	Cummins	WCEXH0661MAB	10.8
1998	Cummins	WCEXH0661MAC	10.8
1998	Cummins	WCEXH0661MAD	10.8
1998	Cummins	WCEXH0661MAE	10.8
1998	Cummins	WCEXH0855NAA	14
1998	Cummins	WCEXH0855NAB	14
1998	Cummins	WCEXH0855NAC	14
1998	Cummins	WCEXH0912XAA	15
1998	Detroit Diesel Corporation	WDDXH03.8C1C	3.8
1998	Detroit Diesel Corporation	WDDXH08.5EJD	8.5
1998	Detroit Diesel Corporation	WDDXH08.5FJC	8.5
1998	Detroit Diesel Corporation	WDDXH11.1EHD	11.1
1998	Detroit Diesel Corporation	WDDXH12.7EGD	12.7
1998	General Motors	WGMXH06.5521	6.5
1998	General Motors	WGMXH06.5522	6.5
1998	General Motors	WGMXH06.5523	6.5
1998	Hino	WHMXH08.0JTR	5.3
1998	International	WNVXH0444CCB	7.3

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
1998	International	WNVXH0444CCD	7.3
1998	International	WNVXH0466CCB	7.6
1998	International	WNVXH0466CCD	7.6
1998	International	WNVXH0530CCB	8.7
1998	International	WNVXH0530CCD	8.7
1998	Isuzu	WSZXH07.84RA	7.8
1998	Mack	WMKXH11.9E51	11.9
1998	Mack	WMKXH11.9E52	11.9
1998	Mack	WMKXH11.9E53	11.9
1998	Mercedes Benz	WMBXH4.25DJA	4.2
1998	Nissan	WNDXH04.2TAB	4.2
1998	Nissan	WNDXH06.9FAB	6.9
1998	Volvo	WVTXH07.350S	7.3
1998	Volvo	WVTXH12.150S	12.1
1999	Caterpillar	XCPXH0442HRK	7.2
1999	Caterpillar	XCPXH0442HSK	7.2
1999	Caterpillar	XCPXH0629ERK	10.3
1999	Caterpillar	XCPXH0729ERK	12
1999	Caterpillar	XCPXH0893ERK	14.6
1999	Caterpillar	XCPXH0967ERK	15.8
1999	Cummins	XCEXH0359BAI	5.9
1999	Cummins	XCEXH0359BAJ	5.9
1999	Cummins	XCEXH0359BAK	5.9
1999	Cummins	XCEXH0505CAC	8.3
1999	Cummins	XCEXH0505CAD	8.3
1999	Cummins	XCEXH0505CAE	8.3
1999	Cummins	XCEXH0505CAF	8.3
1999	Cummins	XCEXH0661MAC	10.8
1999	Cummins	XCEXH0661MAG	10.8
1999	Cummins	XCEXH0661MAH	10.8
1999	Cummins	XCEXH0661MAI	10.8
1999	Cummins	XCEXH0855NAD	14
1999	Cummins	XCEXH0855NAE	14
1999	Cummins	XCEXH0855NAF	14
1999	Cummins	XCEXH0912XAB	14.9
1999	Cummins	XCEXH0912XAD	14.9
1999	Daimler Benz	XMBXH4.25DJA	4.2
1999	Daimler Benz	XMBXH6.37DJA	6.3
1999	Detroit Diesel Corporation	XDDXH03.8C1N	3.8
1999	Detroit Diesel Corporation	XDDXH08.5EJL	8.5
1999	Detroit Diesel Corporation	XDDXH08.5FJN	8.5
1999	Detroit Diesel Corporation	XDDXH11.1EHL	11.1
1999	Detroit Diesel Corporation	XDDXH12.7EGL	12.7
1999	Detroit Diesel Corporation	XDDXH14.0ELL	14
1999	General Motors	XGMXH06.5521	6.5
1999	General Motors	XGMXH06.5523	6.5
1999	Hino	XHMXH08.0JTR	8

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
1999	International	XNVXH0444ANA	7.3
1999	International	XNVXH0444ANB	7.3
1999	International	XNVXH0466ANA	7.6
1999	International	XNVXH0466ANB	7.6
1999	International	XNVXH0530ACT	8.6
1999	International	XNVXH0530ANA	8.6
1999	International	XNVXH0530ANB	8.6
1999	International	XNVXH07.3ACA	7.3
1999	International	XNVXH07.3ANE	7.3
1999	Isuzu	XSZXH04.83AA	4.8
1999	Isuzu	XSZXH07.84RA	7.8
1999	Mack	XMKXH11.9E54	11.9
1999	Mitsubishi	XMTXH03.9D4A	3.9
1999	Mitsubishi	XMTXH05.8D6A	5.8
1999	Mitsubishi	XMTXH07.5D6A	7.5
1999	Nissan	XNDXH04.6FAB	4.6
1999	Nissan	XNDXH06.9FAB	6.9
1999	Renault	XR3XH0377KWC	6.2
1999	Renault	XR3XH0377LWC	6.2
1999	Volvo	XVTXH07.350S	7.3
1999	Volvo	XVTXH07.399B	7.3
1999	Volvo	XVTXH12.150S	12.1
2000	Caterpillar	YCPXH0442HRK	7.2
2000	Caterpillar	YCPXH0629ERK	10.3
2000	Caterpillar	YCPXH0729ERK	12
2000	Caterpillar	YCPXH0893ERK	14.6
2000	Caterpillar	YCPXH0967ERK	15.9
2000	Cummins	YCEXH0359BAI	5.9
2000	Cummins	YCEXH0359BAO	5.9
2000	Cummins	YCEXH0359BAP	5.9
2000	Cummins	YCEXH0505CAF	8.3
2000	Cummins	YCEXH0505CAG	8.3
2000	Cummins	YCEXH0505CAH	8.3
2000	Cummins	YCEXH0505CAI	8.3
2000	Cummins	YCEXH0540LAA	8.8
2000	Cummins	YCEXH0661MAG	10.8
2000	Cummins	YCEXH0661MAH	10.8
2000	Cummins	YCEXH0661MAI	10.8
2000	Cummins	YCEXH0855NAD	14
2000	Cummins	YCEXH0855NAE	14
2000	Cummins	YCEXH0855NAF	14
2000	Cummins	YCEXH0912XAC	14.9
2000	Cummins	YCEXH0912XAD	14.9
2000	Cummins	YCEXH0912XAE	14.9
2000	DaimlerChrysler	YMBXH4.25DJA	4.3
2000	DaimlerChrysler	YMBXH6.37DJA	6.4
2000	Detroit Diesel Corporation	YDDXH03.8C1N	3.8

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
2000	Detroit Diesel Corporation	YDDXH08.5EJB	8.5
2000	Detroit Diesel Corporation	YDDXH08.5EJL	8.5
2000	Detroit Diesel Corporation	YDDXH08.5FJN	8.5
2000	Detroit Diesel Corporation	YDDXH12.7EGL	12.7
2000	Detroit Diesel Corporation	YDDXH14.0ELL	14
2000	General Motors	YGMXH06.5521	6.5
2000	Hino	YHMXH05.3JTD	5.3
2000	Hino	YHMXH08.0JTP	8.0
2000	Hino	YHMXH08.0JTR	8.0
2000	International	YNVXH0444ACT	7.3
2000	International	YNVXH0444ANA	7.3
2000	International	YNVXH0444ANB	7.3
2000	International	YNVXH0444ANC	7.3
2000	International	YNVXH0466ANA	7.6
2000	International	YNVXH0466ANB	7.6
2000	International	YNVXH0530ACT	8.7
2000	International	YNVXH0530ANA	8.7
2000	International	YNVXH0530ANB	8.7
2000	International	YNVXH07.3ANA	7.3
2000	Isuzu	YSZXH04.83AA	4.8
2000	Isuzu	YSZXH07.84RA	7.8
2000	Mack	YMKXH11.9E56	11.9
2000	Mack	YMKXH11.9V57	11.9
2000	Mitsubishi	YMTXH03.9D4A	3.9
2000	Mitsubishi	YMTXH05.8D6A	5.8
2000	Mitsubishi	YMTXH07.5D6A	7.5
2000	Nissan	YNDXH04.6FAB	4.6
2000	Nissan	YNDXH06.9FAB	6.9
2000	Renault	YR3XH0377KWC	6.2
2000	Volvo	YVTXH07.350S	7.3
2000	Volvo	YVTXH12.150S	12.1
2001	Caterpillar	1CPXH0442HAK	7.2
2001	Caterpillar	1CPXH0442HBK	7.2
2001	Caterpillar	1CPXH0442HRK	7.2
2001	Caterpillar	1CPXH0629ERK	10.3
2001	Caterpillar	1CPXH0729ERK	12
2001	Caterpillar	1CPXH0893ERK	14.7
2001	Caterpillar	1CPXH0967ERK	15.9
2001	Cummins	1CEXH0239BAD	3.9
2001	Cummins	1CEXH0239BAE	3.9
2001	Cummins	1CEXH0359BAO	5.9
2001	Cummins	1CEXH0359BAU	5.9
2001	Cummins	1CEXH0359BAV	5.9
2001	Cummins	1CEXH0505CAM	8.3
2001	Cummins	1CEXH0505CAN	8.3
2001	Cummins	1CEXH0505CAO	8.3
2001	Cummins	1CEXH0505CAP	8.3

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
2001	Cummins	1CEXH0540LAA	8.9
2001	Cummins	1CEXH0540LAB	8.9
2001	Cummins	1CEXH0540LAC	8.8
2001	Cummins	1CEXH0661MAP	10.9
2001	Cummins	1CEXH0661MAQ	10.9
2001	Cummins	1CEXH0661MAR	10.9
2001	Cummins	1CEXH0855NAD	14
2001	Cummins	1CEXH0855NAE	14
2001	Cummins	1CEXH0855NAF	14
2001	Cummins	1CEXH0912XAC	15
2001	Cummins	1CEXH0912XAD	15
2001	Cummins	1CEXH0912XAE	15
2001	DaimlerChrysler	1MBXH12.0DJA	12
2001	DaimlerChrysler	1MBXH12.8DJA	12.8
2001	DaimlerChrysler	1MBXH4.25DJA	4.25
2001	DaimlerChrysler	1MBXH6.37DJA	6.37
2001	DaimlerChrysler	1MBXH6.37DJC	6.37
2001	Detroit Diesel Corporation	1DDXH08.5EJB	8.5
2001	Detroit Diesel Corporation	1DDXH08.5EJL	8.5
2001	Detroit Diesel Corporation	1DDXH08.5FJY	8.5
2001	Detroit Diesel Corporation	1DDXH12.7EGL	12.7
2001	Detroit Diesel Corporation	1DDXH14.0ELL	14
2001	General Motors	1GEPH06.5CFF	6.5
2001	General Motors	1GMXH06.5521	6.5
2001	General Motors	1GMXH06.5526	6.5
2001	Hino	1HMXH05.3JTD	5.3
2001	Hino	1HMXH08.0JTP	8
2001	Hino	1HMXH08.0JTR	8
2001	International	1NVXH0444ANA	7.3
2001	International	1NVXH0444ANB	7.3
2001	International	1NVXH0444ANC	7.3
2001	International	1NVXH0466ANA	7.6
2001	International	1NVXH0466ANB	7.6
2001	International	1NVXH0530ACT	8.7
2001	International	1NVXH0530ANA	8.7
2001	International	1NVXH0530ANB	8.7
2001	International	1NVXH07.3ACE	7.3
2001	International	1NVXH07.3ANA	7.3
2001	Isuzu	1SZXH04.83AA	4.8
2001	Isuzu	1SZXH07.84RA	7.8
2001	Mack	1MKXH11.9H56	11.9
2001	Mack	1MKXH11.9H59	11.9
2001	Mack	1MKXH11.9V57	11.9
2001	Mack	1MKXH11.9V60	11.9
2001	Mack	1MKXH11.9V61	11.9
2001	Mitsubishi	1MTXH03.9D4A	3.9
2001	Mitsubishi	1MTXH04.8M5A	4.8
2001	Mitsubishi	1MTXH05.8D6A	5.8

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
2001	Mitsubishi	1MTXH07.5D6A	7.5
2001	Nissan	1NDXH04.6FAB	4.6
2001	Nissan	1NDXH06.9FAB	6.9
2001	Volvo	1VTXH07.350S	7.3
2001	Volvo	1VTXH12.150S	12.1
2002	Caterpillar	2CPXH0442HRK	7.2
2002	Caterpillar	2CPXH0629ERK	10.3
2002	Caterpillar	2CPXH0729ERK	12
2002	Caterpillar	2CPXH0893ERK	14.6
2002	Caterpillar	2CPXH0967ERK	15.9
2002	Cummins	2CEXH0239BAD	3.9
2002	Cummins	2CEXH0239BAE	3.9
2002	Cummins	2CEXH0359BAB	5.9
2002	Cummins	2CEXH0359BAO	5.9
2002	Cummins	2CEXH0505CAM	8.3
2002	Cummins	2CEXH0505CAN	8.3
2002	Cummins	2CEXH0505CAQ	8.3
2002	Cummins	2CEXH0540LAB	8.8
2002	Cummins	2CEXH0540LAC	8.8
2002	Cummins	2CEXH0661MAP	10.8
2002	Cummins	2CEXH0661MAS	10.8
2002	Cummins	2CEXH0855NAA	14.0
2002	Cummins	2CEXH0912XAF	15.0
2002	DaimlerChrysler	2MBXH12.0DJA	12
2002	DaimlerChrysler	2MBXH12.8DJA	12.8
2002	DaimlerChrysler	2MBXH15.9DJB	15.9
2002	DaimlerChrysler	2MBXH4.25DJA	4.3
2002	DaimlerChrysler	2MBXH6.37DJA	6.4
2002	DaimlerChrysler	2MBXH6.37DJC	6.4
2002	Detroit Diesel Corporation	2DDXH08.5EJL	8.5
2002	Detroit Diesel Corporation	2DDXH08.5FJY	8.5
2002	Detroit Diesel Corporation	2DDXH12.7EGL	12.7
2002	Detroit Diesel Corporation	2DDXH12.7FGN	12.7
2002	Detroit Diesel Corporation	2DDXH14.0ELL	14
2002	General Engine Products	2GEPH06.5521	6.5
2002	General Motors	2GEPH06.5CFF	6.5
2003	General Motors	3GEPH06.5527	6.5
2002	General Motors	2GMXH06.5521	6.5
2002	Hino	2HMXH05.3JTD	5.3
2002	Hino	2HMXH08.0JTP	8
2002	Hino	2HMXH08.0JTR	8
2002	International	2NVXH0444ANA	7.3
2002	International	2NVXH0444ANB	7.3
2002	International	2NVXH0444ANC	7.3
2002	International	2NVXH0466ANA	7.6
2002	International	2NVXH0466ANB	7.6
2002	International	2NVXH0530ACT	8.7

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
2002	International	2NVXH0530ANA	8.7
2002	International	2NVXH0530ANB	8.7
2002	International	2NVXH0530ANC	8.7
2002	International	2NVXH07.3ACE	7.3
2002	International	2NVXH07.3ANA	7.3
2002	Isuzu	2SZXH04.83AA	6.6
2002	Isuzu	2SZXH06.64RA	6.6
2002	Isuzu	2SZXH07.84RA	7.8
2002	Mack	2MKXH11.9H59	11.9
2002	Mack	2MKXH11.9H63	11.9
2002	Mack	2MKXH11.9V60	11.9
2002	Mack	2MKXH11.9V61	11.9
2002	Mack	2MKXH11.9V65	11.9
2002	Mack	2MKXH11.9V66	11.9
2002	Mack	2MKXH11.9V67	11.9
2002	Mitsubishi	2MTXH03.9D4A	3.9
2002	Mitsubishi	2MTXH04.8M5A	4.8
2002	Mitsubishi	2MTXH05.8D6A	5.8
2002	Mitsubishi	2MTXH07.5D6A	7.5
2002	Nissan	2NDXH04.6FAB	4.6
2002	Nissan	2NDXH06.9FAB	6.9
2002	Renault	2R3XH0377BNA	6.2
2002	Renault	2R3XH0377CNA	6.2

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
2002	Volvo	2VTXH07.350S	7.3
2002	Volvo	2VTXH12.150S	12.1
2003	Cummins	3CEXH0239BAD	3.9
2003	Cummins	3CEXH0505CAN	8.3
2003	Cummins	3CEXH0505CAQ	8.3
2003	Cummins	3CEXH0540LAC	8.8
2003	DaimlerChrysler	3MBXH12.0DJA	12
2003	DaimlerChrysler	3MBXH12.8DJA	12.8
2003	DaimlerChrysler	3MBXH15.9DJB	11.9
2003	DaimlerChrysler	3MBXH4.25DJA	4.3
2003	DaimlerChrysler	3MBXH4.25DJC	4.3
2003	DaimlerChrysler	3MBXH6.37DJA	6.4
2003	DaimlerChrysler	3MBXH6.37DJC	6.4
2003	General Engine Products	3GEPH06.5521	6.5
2003	Hino	3HMXH05.3JTD	5.3
2003	Hino	3HMXH08.0JTP	8
2003	Hino	3HMXH08.0JTR	8
2003	International	3NVXH0365AEA	6
2003	International	3NVXH0444ANB	7.3
2003	International	3NVXH0444ANC	7.3
2003	International	3NVXH0466ANA	7.6
2003	International	3NVXH0466ANB	7.6
2003	International	3NVXH0530ANA	8.7
2003	International	3NVXH0530ANB	8.7
2003	International	3NVXH0530ANC	8.7
2003	Isuzu	3SZXH04.83AA	4.8
2003	Isuzu	3SZXH06.64RA	6.6
2003	Isuzu	3SZXH07.84AA	7.8
2003	Isuzu	3SZXH07.84RA	7.8
2003	Mitsubishi	3MTXH03.9D4A	3.9
2003	Mitsubishi	3MTXH04.8M5A	4.9
2003	Mitsubishi	3MTXH05.8D6A	5.9
2003	Mitsubishi	3MTXH07.5D6A	7.5
2003	Nissan	3NDXH04.6FAB	4.6
2003	Nissan	3NDXH06.9FAB	6.9
2004	Cummins	4CEXH0505CAS	8.3
2004	Cummins	4CEXH0505CAR	8.3
2004	Cummins	4CEXH0540LAE	8.8
2004	International	4NVXH0466ANA	7.6
2004	International	4NVXH0466ANB	7.6
2004	International	4NVXH0530ANA	8.7
2004	International	4NVXH0530ANB	8.7
2004	International	4NVXH0530ANC	8.7

Attachment A: Engine Families For Low Nitrogen Dioxide Filter (LNF) System

Model Year	Manufacturer	Engine Family	Displacement (L)
2005	Cummins	5CEXH0540LAE	8.8
2005	Cummins	5CEXH0505CAR	8.3
2006	Cummins	6CEXH0359BAI	5.9