

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-384-3
Relating to Exemptions Under Section 27156
of the Vehicle Code

ENGELHARD CORPORATION
ETX-2002 REBUILD KIT

Pursuant to the authority vested in the Air Resources Board (ARB) by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-9;

IT IS ORDERED AND RESOLVED: That installation of the ETX-2002 Rebuild Kit, manufactured by Engelhard Corporation of 101 Wood Avenue, P.O. Box 770, Iselin, New Jersey 08830-0770, has been found not to reduce the effectiveness of the applicable vehicle pollution control system, and therefore, the ETX-2002 Rebuild Kit is exempt from the prohibitions of Section 27156 of the Vehicle Code for installation on 1988-1993 model-year Detroit Diesel Corporation (DDC) 6V92TA DDEC two-stroke urban bus diesel engines with power ratings of 253 and 277 horsepower.

The ETX-2002 Rebuild Kit rebuilds all applicable engines to federal 1991-1993 model-year DDC specification. The ETX-2002 Rebuild Kit is exempt only when used in conjunction with other DDC engine rebuild parts. The required ETX-2002 Rebuild Kit parts and DDC rebuild parts are listed in the parts lists which are attached hereto and incorporated herein.

The ETX-2002 Rebuild Kit includes ceramic coated cylinder head, valves, and pistons, an improved turbocharger, and an oxidation catalytic muffler. The components are ceramic coated solely by the Engelhard Corporation. For 1988-1990 model-year engines, the ETX-2002 Rebuild Kit also includes fuel injectors, engine camshafts, and an ECM upgrade.

This Executive Order may be modified to reflect any changes resulting from the NOx map issue currently being reviewed by U.S. EPA due to the ECM upgrade for 1988-1990 model-year engines. The future resolution will be appropriately incorporated in the exemption.

This exemption is based on emission tests conducted by Engelhard Corporation on a California 1988 model-year 6V92TA DDEC II engine. Engelhard Corporation submitted the following federal transient heavy-duty diesel engine test results for a 552 cubic inch 6V92TA DDEC engine with a 277 horsepower rating:

	HC	CO	NOx	PM
	<u>(grams per brake horsepower-hour)</u>			
Baseline	0.8	1.4	5.5	0.426
Rebuilt to 1991 MY Configuration	0.5	1.9	4.7	0.277
With ETX-2002 Kit	0.2	0.6	4.96	0.094
<i>Emission Standard</i>	<i>1.3</i>	<i>15.5</i>	<i>5.0</i>	<i>0.1</i>

The test data show that the ETX-2002 Rebuild Kit did not adversely affect the exhaust emissions of the DDEC 6V92TA engine. The same emissions impact is expected when the ETX-2002 Rebuild Kit is installed on the engines for which the exemption is requested.

This Executive Order is valid provided that installation instructions for the ETX-2002 Rebuild Kit not recommend tuning the vehicle to specifications different from those submitted by the vehicle manufacturer.

Changes made to the design or operating conditions of the ETX-2002 Rebuild Kit, as exempt by the ARB, which adversely affect the performance of a vehicle's pollution control system shall invalidate this Executive Order.

Marketing of the ETX-2002 Rebuild Kit using an identification other than that shown in this Executive Order or for an application other than those listed in this Executive Order shall be prohibited unless prior approval is obtained from the ARB.

In addition to the foregoing, the ARB reserves the right in the future to review this Executive Order and the exemption provided herein to assure that the exempted add-on or modified part continues to meet the standards and procedures of Title 13, California Code of Regulations, Section 2222 et seq.

This Executive Order does not constitute any opinion as to the effect the use of the ETX-2002 Rebuild Kit may have on any warranty either expressed or implied by the vehicle manufacturer.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF ENGELHARD CORPORATION'S ETX-2002 REBUILD KIT.

No claim of any kind, such as "Approved by the Air Resources Board," may be made with respect to the action taken herein in any advertising or other oral or written communication.

Violation of any of the above conditions shall be grounds for revocation of this Executive Order. The Executive Order may be revoked only after a ten-day written notice of intention to revoke the

ENGELHARD CORPORATION
ETX-2002 REBUILD KIT

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Executive Order, in which period the holder of the Executive Order may request in writing a hearing to contest the proposed revocation. If a hearing is requested, it shall be held within ten days of receipt of the request and the Executive Order may not be revoked until a determination after the hearing that grounds for revocation exist.

Executed at El Monte, California, this 8th day of January 1999.

A handwritten signature in cursive script, appearing to read "R. B. Summerfield".

R. B. Summerfield, Chief
Mobile Source Operations Division

ETX-2002 Rebuild Kit

Parts List

ETX REBUILD KITS FOR 1988 to 1990 6V92TA DDEC II URBAN BUS CONFIGURATIONS

Kit Numbers:

<u>Kit #</u>	<u>Engine Orientation</u>	<u>Rotation</u>	<u>Gear Mount</u>	<u>HP RATING</u>
ETX-05B-XX	43 Degree Tilt	LH	Bolt	253 or 277
ETX-06B-XX	15 Degree Tilt	LH	Bolt	253 or 277
ETX-07B-XX	Upright	RH	Bolt	253 or 277

Note: The last two digits of the ETX kit number are identical to the last two digits of the CMX-5 Catalytic Converter Muffler P/N used in the kit.

ETX Kit Components

Component	Number	Part Number
GPX-5 Coated Cylinder Head	2	A109-011
Cylinder Kits	6	A109-002
Turbocharger	1	A109-020
CMX-5 Catalytic Converter Muffler	1	CMX5-00XX
Injectors	6	5234960
RB Cam and Plug assembly LH Rot - ETX-05B & ETX-06B	1	23507992
LB Cam and Plug assembly LH Rot - ETX-05B & ETX-06B	1	23507991
RB Cam and Plug assembly RH Rot - ETX-07B only	1	23507995
LB Cam and Plug assembly RH Rot - ETX-07B only	1	23507993
ECM upgrade - only if necessary	1	
Engine specific parts list	1	

Engine Specific Parts List: 1988 to 1990

Component	Number	Part Number
Blower	1	8927039

Engine ECM List - provided at with the kit at no cost if necessary

Engine Configuration and Fuel	ECM Number
253 hp Upright right hand rotation #1 diesel, 880 Torque	260
253 hp Upright right hand rotation #1 diesel, 775 Torque	261
253 hp Upright right hand rotation #2 diesel, 880 Torque	318
253 hp Upright right hand rotation #2 diesel, 775 Torque	320
253 hp 15 or 43 deg left hand rotation #1 diesel, 880 Torque	263
253 hp 15 or 43 deg left hand rotation #1 diesel, 775 Torque	264
253 hp 15 or 43 deg left hand rotation #2 diesel, 880 Torque	319
253 hp 15 or 43 deg left hand rotation #2 diesel, 775 Torque	321
277 hp Upright right hand rotation #1 diesel	259
277 hp Upright right hand rotation #2 diesel	316
277 hp 15 or 43 deg left hand rotation #1 diesel	262
277 hp 15 or 43 deg left hand rotation #2 diesel	317

ETX REBUILD KITS FOR 1991 to 1993 6V92TA DDEC II URBAN BUS CONFIGURATIONS

Kit Numbers:

<u>Kit #</u>	<u>Engine Orientation</u>	<u>Rotation</u>	<u>Gear Mount</u>	<u>HP RATING</u>
ETX-05B-XX	43 Degree Tilt	LH	Bolt	253 or 277
ETX-06B-XX	15 Degree Tilt	LH	Bolt	253 or 277
ETX-07B-XX	Upright	RH	Bolt	253 or 277

Note: The last two digits of the ETX kit number are identical to the last two digits of the CMX-5 Catalytic Converter Muffler P/N used in the kit.

ETX Kit Components

Component	Number	Part Number
GPX-5 Coated Cylinder Head	2	A109-011
Cylinder Kits	6	A109-002
Turbocharger	1	A109-020
CMX-5 Catalytic Converter Muffler	1	CMX5-00XX
ECM upgrade - only if necessary	1	
Engine specific parts list	1	

Engine Specific Parts List: 1991 to 1993

Component	Number	Part Number
Injectors	6	5234960
Blower	1	8927039
RB Cam and Plug assembly LH Rot - ETX-05B & ETX-06B	1	23507992
LB Cam and Plug assembly LH Rot - ETX-05B & ETX-06B	1	23507991
RB Cam and Plug assembly RH Rot - ETX-07B only	1	23507995
LB Cam and Plug assembly RH Rot - ETX-07B only	1	23507993

Engine ECM List - provided at with the kit at no cost if necessary

Engine Configuration and Fuel	ECM Number
253 hp Upright right hand rotation #1 diesel, 880 Torque	260
253 hp Upright right hand rotation #1 diesel, 775 Torque	261
253 hp Upright right hand rotation #2 diesel, 880 Torque	318
253 hp Upright right hand rotation #2 diesel, 775 Torque	320
253 hp 15 or 43 deg left hand rotation #1 diesel, 880 Torque	263
253 hp 15 or 43 deg left hand rotation #1 diesel, 775 Torque	264
253 hp 15 or 43 deg left hand rotation #2 diesel, 880 Torque	319
253 hp 15 or 43 deg left hand rotation #2 diesel, 775 Torque	321
277 hp Upright right hand rotation #1 diesel	259
277 hp Upright right hand rotation #2 diesel	316
277 hp 15 or 43 deg left hand rotation #1 diesel	262
277 hp 15 or 43 deg left hand rotation #2 diesel	317

CMX Catalytic Muffler Parts List

GMC|TMC|RTS

CMX Kit Numbers for Different Bus Configurations											
Engine Manufacturer	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC
Engine Model	6V71N	8V71N	6V71T	6V92TA MUI	6V92TA MUI	6V92TA DDEC I	6V92TA DDEC I	6V92TA DDEC II	6V92TA DDEC II	6L71 TA DDEC	6V92TA MUI
Exhaust Type	ROAD & ROOF	STREET	ROAD & ROOF	STREET	ROOF	STREET	ROOF	STREET	ROOF	STREET	STREET
MODEL	RTS-4	RTS-3									TMC MC-9
YEAR											
1993											
1992										CMX-0006	
1991 END out muffler								CMX-0005	CMX-0005		
1991 SIDE out muffler											
1990 END out muffler								CMX-0005	CMX-0005		
1990 SIDE out muffler											
1989 END out muffler								CMX-0005	CMX-0005		
1989 SIDE out muffler								CMX-0040			
1988 END out muffler	CMX-0048							CMX-0005	CMX-0005		
1988 SIDE out muffler	CMX-0048							CMX-0040			
1987 END out muffler						CMX-0037	CMX-0037				
1987 SIDE out muffler				CMX-0020		CMX-0039		CMX-0040			
1986 END out muffler			CMX-0076			CMX-0037	CMX-0037				
1986 SIDE out muffler			CMX-0076	CMX-0020		CMX-0039					
1985 END out muffler			CMX-0076			CMX-0037	CMX-0037				
1985 SIDE out muffler			CMX-0076	CMX-0020		CMX-0039					
1984 END out muffler	CMX-0048										CMX-0033
1984 SIDE out muffler	CMX-0048			CMX-0020							CMX-0033
1983 END out muffler	CMX-0048										CMX-0033
1983 SIDE out muffler	CMX-0048			CMX-0020							CMX-0033
1982 END out muffler				CMX-0038	CMX-0038						
1982 SIDE out muffler				CMX-0020							
1981 END out muffler	CMX-0048			CMX-0038	CMX-0038						
1981 SIDE out muffler	CMX-0048			CMX-0020							
1980 END out muffler	CMX-0048	CMX-0052									
1980 SIDE out muffler	CMX-0048	CMX-0052		CMX-0020							
1979		CMX-0052									
1978		CMX-0052									
1977		CMX-0052									
1976											
1975											
DESIGN	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP
PROTOTYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP
MANUFACTURE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP
Redesign											

Neoplan

CMX Kit Numbers for Different Bus Configurations										
Engine Manufacturer	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC
Engine Model	8V92TA	6V92TA MUI	6V92TA MUI	6V92TA MUI	6V92TA DDEC I	6V92TA DDEC I	6V92TA DDEC I	6V92TA DDEC II	6V92TA DDEC II	6V92TA DDEC II
Exhaust Type	STREET	STREET	STREET	ROOF	STREET	STREET	ROOF	STREET	STREET	ROOF
Model Year		96" Width	102" Width		96" Width	102" Width		96" Width	102" Width	
1993										
1992										
1991										CMX-0009
1990										CMX-0009
1989							CMX-0031	CMX-0029	CMX-0056	CMX-0009
1988					CMX-0028	CMX-0055	CMX-0031			
1987	CMX-0022				CMX-0028	CMX-0055	CMX-0031			
1986		CMX-0023	CMX-0030	CMX-0014	CMX-0028	CMX-0055				
1985		CMX-0023	CMX-0030	CMX-0014						
1984		CMX-0023	CMX-0030	CMX-0014						
1983		CMX-0023	CMX-0030	CMX-0014						
1982		CMX-0023	CMX-0030	CMX-0014						
1981										
1980										
1979										
1978										
1977										
1976										
DESIGN	HOLD	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP
PROTOTYPE	HOLD	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP
MANUFACTURE	HOLD	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP
Notes:	High delta P			CMX-0009/14/31			CMX-0009/14/31			CMX-0009/14/31
				Redesigned			Redesigned			Redesigned

FLXIBLE

CMX Kit Numbers for Different Bus Configurations										
Engine Manufacturer	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC
Engine Model	6V71N	6V71N	8V71N	6V92TA MUI	6V92TA MUI	6V92TA DDEC I	6V92TA DDEC I	6V92TA DDEC II	6V92TA DDEC II	6L71 TA DDEC
Exhaust Type	ROOF	ROOF	ROOF	STREET	ROOF	STREET	ROOF	STREET	ROOF	ROOF
Model Year	530 Model	870 Model	870 Model	METRO	METRO	METRO	METRO	METRO	METRO	METR
1993										
1992								CMX-0072	CMX-0073	CMX-0041
1991								CMX-0044	CMX-0060	CMX-0041
1990								CMX-0044	CMX-0060	CMX-0041
1989						CMX-0046	CMX-0058	CMX-0047	CMX-0059	
1988				CMX-0045		CMX-0046	CMX-0058	CMX-0047	CMX-0059	
1987				CMX-0045	CMX-0057	CMX-0046	CMX-0058		CMX-0059	
1986				CMX-0045	CMX-0057	CMX-0046	CMX-0058			
1985				CMX-0045	CMX-0057					
1984			CMX-0071	CMX-0045	CMX-0057					
1983			CMX-0071	CMX-0045	CMX-0057					
1982			CMX-0071	CMX-0045	CMX-0057					
1981		CMX-0027	CMX-0071		CMX-0057					
1980		CMX-0027	CMX-0071		CMX-0057					
1979			CMX-0071							
1978	CMX-0080		CMX-0071							
1977	CMX-0080									
1976										
1975										
DESIGN	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP
PROTOTYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP
MANUFACTURE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	C MP
Notes:				Special	Special	Special	Special	Special	Special	
				CMX0045/46/47	CMX0057/58/59	CMX0045/46/47	CMX0057/58/59	CMX-0044/0072	CMX-0060/0073	

MCI

CMX Kit Numbers for Different Bus Configurations							
Engine Manufacturer	DDC	DDC	DDC	DDC	DDC	DDC	DDC
Engine Model	6V71N	8V71N	6V92TA MUI	6V92TA DDEC I	6V92TA DDEC II	6V92TA DDEC II	6V92TA DDEC II
Exhaust Type	STREET	STREET	STREET	STREET	STREET	ROOF	STREET
Model Year	Detroit/OC Transpo	MC-9	MC-9	MC-9	"Classic"	"Classic"	102A3
1993	(1900 Series)						
1992 "End In & Out"						CMX-0010	
1991							CMX-0063
1990 "End In & Out"						CMX-0074	
1990 "End In/Side Out"					CMX-0011	CMX-0011	
1989 "End In/Side Out"					CMX-0011	CMX-0011	
1988 "End In/Side Out"					CMX-0011	CMX-0011	
1987	CMX-0053		CMX-0033	CMX-0032			
1986	CMX-0053		CMX-0033	CMX-0032			
1985	CMX-0053		CMX-0033				
1984	CMX-0053		CMX-0033				
1983			CMX-0033				
1982			CMX-0033				
1981		CMX-0068	CMX-0033				
1980		CMX-0068	CMX-0033				
1979		CMX-0068	CMX-0033				
1978		CMX-0068					
1977							
1976							
1975							
DESIGN	COMP	COMP	COMP	COMP	COMP	COMP	COMP
PROTOTYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP
MANUFACTURE	COMP	COMP	COMP	COMP	COMP	COMP	COMP

MCI

Notes:	27 Degree tilt		CMX-0032/33/63	CMX-0032/33/63			CMX-0032/33/63
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BIA

CMX Kit Numbers for Different Bus Configurations									
Engine Manufacturer	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC
Engine Model	6V71N	6V92TA MUI	6V92TA MUI	6V92TA DDEC I	6V92TA DDEC II	6V92TA DDEC II	6V92TA DDEC II	6L71 TA	6V92TA DDEC II
Exhaust Type	ROOF	STREET	ROOF	ROOF	STREET	ROOF	ROOF	STREET	ROOF
Model Year	ORION 1	ORION 1	ORION 1	ORION 1	ORION 1	ORION 1	ORION 1	ORION 1	ORION 5
					Standard Radiator	Standard Radiator	Covers Standard & Crossflow Radiator		Crossflow Radiator
1993									CMX-0075
1992									CMX-0075
1991						CMX-0013	CMX-0085		CMX-0081
1990					CMX-0051	CMX-0013	CMX-0085		
1989					CMX-0051	CMX-0013	CMX-0085		
1988					CMX-0051	CMX-0013	CMX-0085	CMX-0012	
1987				CMX-0070				CMX-0012	
1986		CMX-0050		CMX-0070					
1985		CMX-0050							
1984			CMX-0079						
1983	CMX-0026								
1982									
1981									
1980									
1979									
1978									
1977									
1976									
1975									
DESIGN	HOLD	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP
PROTOTYPE	HOLD	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP
MANUFACTURE	HOLD	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP
Notes:		CMX-0050/51	CMX-0013/70/79	CMX-0013/70/79	CMX-0050/51	CMX-0013/70/79	OC Transpo on		CMX-0075/81

Gillig & Flyer

CMX Kit Numbers for Different Bus Configurations							
Bus Manufacturer	GILLIG	GILLIG	GILLIG	GILLIG	New Flyer	New Flyer	New Flyer
Bus Model	PHANTOM	PHANTOM	PHANTOM	PHANTOM	D-35, D-40 & D-60	D-35, D-40 & D-60	D-60
Engine Manufacturer	DDC	DDC	DDC	DDC	DDC	DDC	DDC
Engine Model	6V92TA MUI	6V92TA MUI	6V92TA DDEC I	6V92TA DDEC II	6V92TA DDEC II	6V92TA DDEC II	6V92TA DDEC II
Exhaust Type	ROOF	ROOF	ROOF	ROOF	ROOF	ROOF	STREET
Model Year	see Note 1	see Note 2					
1993				CMX-0036		CMX-0084	CMX-0083
1992				CMX-0036		CMX-0084	
1991				CMX-0036	CMX-0042		
1990				CMX-0036	CMX-0042		
1989			CMX-0035	CMX-0036	CMX-0042		
1988			CMX-0035	CMX-0036	CMX-0042		
1987		CMX-0004	CMX-0035				
1986		CMX-0004	CMX-0035				
1985		CMX-0004					
1984	CMX-0069	CMX-0004			CMX-0066		
1983	CMX-0069						
1982	CMX-0069						
1981							
1980							
1979							
1978							
1977							
1976							
1975							
DESIGN	COMP	COMP	COMP	COMP	COMP	HOLD	HOLD
PROTOTYPE	COMP	COMP	COMP	COMP	COMP	HOLD	HOLD
MANUFACTURE	COMP	COMP	COMP	COMP	COMP	HOLD	HOLD
Notes:							
1 Replace Gillig Muffler number 53-07860							
2 Replace Gillig Muffler number 53-15450							

Other

CMX Kit Numbers for Different Bus Configurations										
Bus Manufacturer	MAN	GMCC	GMCC	GMC	IKARUS	IKARUS	BRADA	EAGLE	EAGLE	S & S
Bus Model	SG-310	T8H5307A	T8H5307A	"New Look"	416.05	436		10	20	
Engine Manufacturer	MAN	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC
Engine Model	4 Stroke	6V92TA MUI	8V71N	6V71N	6V92TA DDEC2	6V92TA DDEC2	6V92TA DDEC2	6V92TA MUI	6V92TA DDEC2	8.2 Liter
Exhaust Type	STREET	ROOF	ROOF	ROAD	ROOF	ROOF	ROOF	ROAD	ROAD	ROOF
Model Year		"Classic"	"Classic"	TDH6303/6304						
1993										
1992					CMX-0065					
1991						CMX-0082				
1990							CMX-0089			
1989									CMX-0078	
1988										
1987										CMX-0067
1986										
1985	CMX-0008									
1984	CMX-0008	CMX-0061						CMX-0077		
1983	CMX-0008	CMX-0061								
1982		CMX-0061								
1981		CMX-0061	CMX-0062							
1980			CMX-0062							
1979			CMX-0062							
1978			CMX-0062							
1977			CMX-0062							
1976			CMX-0062							
1967				CMX-0064						
1966				CMX-0064						
1965				CMX-0064						Medium
1964				CMX-0064						Duty Engine
DESIGN	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	COMP	HOLD
PROTOTYPE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	HOLD	COMP	HOLD
MANUFACTURE	COMP	COMP	COMP	COMP	COMP	COMP	COMP	HOLD	COMP	HOLD