

AIR RESOURCES BOARD
HAAGEN-SMIT LABORATORY
9528 TELSTAR AVENUE
EL MONTE, CA 91731-2990
PHONE: (818) 575-6800

Reference No. A-93-551



OCT 7 1993.

TO: ALL INTERESTED PARTIES

SUBJECT: APPROVED ALTERNATIVE FUEL CONVERSION SYSTEMS

Attached is an updated List of "Approved Alternative Fuel Conversion Systems," revised on October 5, 1993.

Should you have any questions regarding this list, please contact the Public Information Office at (800) 242-4450.

Rosalinda Castro
for Norman Kayne, Chief
Certification Branch

Attachment

LIST OF MANUFACTURERS OF ALTERNATIVE FUEL CONVERSION KITS

LIQUIFIED PETROLEUM GAS CONVERSIONS

Advanced LP Systems, Inc.
5327-U Jacuzzi St.
Richmond, CA **94804**

Holley Replacement Parts Division
Colt Industries Operating Corp.
11955 East Nine Mile Road
Warren, MI **48090**

Algas Carburetion
16101 Vallen Drive
Houston, TX **77041**

Impco Carburetion, Inc.
16916 Gridley Pl.
Cerritos, CA **90701**

Algas Industries, Inc.
Box **20794**
2657 Andjon Drive
Dallas, TX **75220**

Landi-Hartog, U.S., Inc.
3208 South Hutchinson Ave.
Los Angeles, CA **90034**

Automotive Natural Gas, Inc. (ANGI)
265 North Janesville St.
P.O. Box **39**
Milton, WI **53563**

LPF Carburetion, Inc.
P.O. Box **522**
Hutchinson, KA **67501**

Beam Products, Manufacturing Company
3040 Rosslyn St.
Los Angeles, CA **90065**

Marvel Schleber/Tillotson
Division of Borg Warner Corp.
2195 South Elwin Rd.
Decatur, IL **62625**

Carburetion Labs
515 N.E. 190 Street
Miami, FL **33179**

OHG, Inc.
10065A Greenleaf Ave.
Santa Fe Springs, CA **90670**

Eagle Propane
1871 Lake Place
Ontario, CA **91761**

Toyo Red Cab LPG Conversion
16609 South Halldale Ave.
Gardena, CA **90247**

Greenway Environmental Research
40208 Industrial Park Circle
Georgetown, TX **78626**

Vialle U.S.A., Inc.
(Formerly Vialle Autogas System)
9101 Ely Rd.
Pensacola, FL **32514**

LIST OF MANUFACTURERS OF ALTERNATIVE FUEL CONVERSION KITS

COMPRESSED NATURAL GAS CONVERSIONS

Algas Carburetion
16101 Vallen Drive
Houston, TX 77041

Essex Cryogenics
8007 Chivvis Drive
St. Louis, MO 63123

Automotive Natural Gas, Inc. (ANGI)
265 North Janesville St.
P.O. Box 39
Milton, WI 53563

Impco Carburetion, Inc.
16916 Gridley Pl.
Carritos, CA 90701

Beam Products Manufacturing Company
3040 Rosslyn Street
Los Angeles, CA 90065

Mesa Environmental
3125 West Bolt Street
Fort Worth, TX 76110

Beacon Power Systems
447 E. Elmwood
Troy, MI 48083

NGV Development
2250 Cherry Industrial Circle
Long Beach, CA 90805

Carburetion Labs
515 N.E. 190 Street
Miami, FL 33179

PAS, Inc.
570 Executive Dr.
Troy, MI 48083

Century Products
(Formerly Vialle Autogas Systemen)
9101 Ely Road
Pensacola, FL 32514

Stewart & Stevenson
5840 Dahlia Street
Commerce City, CO 80022

Dual Fuel Systems, Inc.
Subsidiary of Pacific Lighting Corp.
1120 Maple
Montebello, CA 90640

Vialle U.S.A., Inc.
(Formerly Vialle Autogas Systemen)
9101 Ely Rd.
Pensacola, FL 32514

ALTERNATIVE FUEL CONVERSION SYSTEMS

MAEUFACTURER	MODEL YEAR	MIXER #	REGULATOR	ENGINE SIZE (CID)	FUEL COEJV. TYPE	APPLICATIONS	OTHER COMPONENTS	REMARKS/ MODIFICATIONS ALLOWED
Advanced LP Systems # B-7	E.O. 1979 & Older		63		LPG DF	Datsun and Toyota PC and LDT equipped with a 4 cyl. carbureted engine		
Algas Industries (LPG) # B-3-1A	E.O. 1981 & Older	M500	250	> 250	LPG DF	All MDV and HDV. OK for LDT with VV systems.		
E.O. # B-3	1974	PCA 500C	C250A-4	< 140	LPG	PC, LDT, MDV, HDV.		
	&	PCA 500C	C-250A-4	200-300	LPG	PC, LDT, MDV, HDV.		
	Older	PCA 500C	C250A-3	251.300	LPG DF			
Algas Carburetion Also known as Piccision General, Inc. E.O. # B-14-1	1993 & Older	ECOTRIM LPG system	C250ALRS-200	250.460	LPG, LPG DF	LDT, MDV, HDV	VSS-1 vacuum safety switch, EPC-1 controller, AIV-1 control valve, MSH-2 mode selector relay (dual fuel only), Mixer M500LP, FI Chrysler use Autotronic P/N 8789 8	
E.O. # 0 14-7	1993 & Older	CNG or LPG Fumigation System			CNG Fum LPG Fum	HD Diesel	As shown in E.O., Catalytic converter required.	

ALTERNATIVE FUEL CONVERSION SYSTEMS

MANUFACTURER	MODEL YEAR	MIXER#	REGULATOR#	ENGINE SIZE (CID)	FUEL CONV. TYPE	APPLICATIONS	OTHER COMPONENTS	REMARKS/ MODIFICATIONS ALLOWED
'Algas Carburation Also known as Precision General, Inc. E.O. # B-14-6	1993 & Older	ECOTRIM M500CPCL	C250AC-225	250-460	CNG, CNG DF	LDT, MDV, HDV	EPC-1 controller, AIV-1 control valve, MSR-2 mode selector relay (dual fuel only), FI Chrysler use Auto-tronic P/N 8789-8	
E.O. # B-14-5	1993 & Older	ECOTRIM MSOOLPCL	C250ALRS-240	250-460	LPG, LPG DF	LDT, MDV, HDV	EPC-1 controller, AIV-1 control valve, MSR-2 mode selector relay (dual fuel only), FI Chrysler use Auto-tronic PIN 8789-1	
E.O. # B-14-4	1987 & Older	M500CP	C250AC-225	250-460	CNG, CNG DF	LDT, MDV, HDV with open loop catalyst or non-catalyst equipped.	VSS-1 vacuum safety switch.	
E.O. # B-14-3	1987 & Older	M500CP	C250AC-225	250-460	LPG, LPG DF	LDT, MDV, HDV with open loop catalyst or non-catalyst equipped.	VSS-1 vacuum safety switch.	
E.O. # B-14	1987 & Older	M500	250	> 250	LPG	Non computer controlled, carbureted MDV, HDV	Remove heated air intake system, remove carbon canister emission control system	

ALTERNATIVE FUEL CONVERSION SYSTEMS

MANUFACTURER	MODEL YEAR	MIXER#	REGULATOR	ENGINE SIZE (CID)	FUEL CONV. TYPE	APPLICATIONS	OTHER COMPONENTS	REMARKS/ MODIFICATIONS ALLOWED
Automotive Natural Gas, Inc. (ANGI) E.O. # B-10-22	1993 & Older	D-5		ALL	CNG, CNG DF	PC, LDT, MDV, HDV. Also approved for vehicles with TWC-CL and FI systems.	1) GM Vehicles use ANGI trouble code micro computer except with mass flow fuel system.	
				ALL	LPG, LPG DF	PC, LDT, MDV, HDV Also approved for vehicles with TWC CL and FI systems.	2) Ford and Chrysler vehicles with OBD systems use O2 sensor fix. 3) FI Chrysler vehicles use injector fix.	
E.O. # B-10-21	1993 & Older	ANGI-LEVS Electronic Feedback System		ALL	CNG, CNG DF	PC, LDT, MOV, HDV With closed loop system.	GM Vehicles use trouble code micro computer FI Chrysler vehicles use injector fix.	
Beacon Power Systems B-18-1	1993 & Older	-		153-350	CNG, CNG DF	General Motors LDT, MDV, HDV with TBI		
Beam Products Mfg. Co. E.O. # B-1-2	1974 & Older	5C-60N	JOOAV	201-300	CNG DF	PC, LDT, MDV, HDV		
E.O. # B-1-1	1973 & Older	51CN	400AV	> 200	CNG OF	PC, LDT, MDV, HDV		
E.O. # B-1-2	1974 & Older	5C-60	450	201-301	LPG DF	PC, LDT, MDV, HDV		
E.O. # B-1-1	1973 & Older	51C	450	> 200	LPG DF	PC, LDT, MDV, HDV		

ALTERNATIVE FUEL CONVERSION SYSTEMS

MANUFACTURER	MODEL SEAR	MIXER#	REGULATOR#	ENGINE SIZE (CID)	FUEL CONV. TYPE	APPLICATIONS	OTHER COMPONENTS	REMARKS/ MODIFICATIONS ALLOWED
Carburetion Lubs International, Inc. B-17-2	1993 & Older	KG5000D	PEV-1		LNG Fum	4-Stroke HD Diesel excluding those with self compensating fuel pumps.	Hold Relay, Throttle Position Sensor, 3-Way solenoid valve, needle valve, ECU, catalyst ECAT-6000, first stage pressure regulator, 49 p.s.i. low pressure sensor.	Diesel fuel flow restricted up to 20% of normal capacity.
E.O.# B-17-1	1993 & Older	KG5000D	PEV-1 IIPR 501		CNG Fum	4-Stroke HD Diesel excluding those with self compensating fuel pumps.	Hold Relay, Throttle Position Sensor, 3-Way solenoid valve, needle valve, ECU, catalyst ECAT-6000, first stage pressure regulator, 49 p.s.i. low pressure sensor	Diesel fuel flow restricted up to 20% of normal capacity.
Century Products E.O. # B-10-12	1987 & Older	3C705-L 3C705 DTL	M 6 M 6	< 300 > 200	CNG CNG	LDT, MDV, HDV, vehicles with FI systems		
E.O. # B-10-12	1987 & Older	3C705 L 3C705 DTL	M 6 M 6	< 300 > 200	LPG LPG	LDT, MDV, HDV, vehicles with FI systems		

ALTERNATIVE FUEL CONVERSION SYSTEMS

MANUFACTURER	MODEL YEAR	MIXER#	REGULATOR#	ENGINE SIZE (CID)	FUEL CONV. TYPE	APPLICATIONS	OTHER COMPONENTS	REMARKS/ MODIFICATIONS ALLOWED
Dual Fuel Systems, Inc. Subsidiary of Pacific Lighting E.O.# B-6-17	1986 & Older	1.25	8400	All	CNG DF	PC, LDT, MDV, HDV with carbureted/throttle body fuel injected engines. LDT and MDV with 140-200 CID port fuel injected engines. Also, vehicles with 1wc-CL and VV systems.		
E.O. # B-6-18	1986 & Older	2.25	8401	> 300	CNG DF	Also approved for vehicles with TWC-CL and VV systems.		
Eagle Propane Service E.O. # B-15-1	1993 & Older		OHG	350	LPG	GM Police Vehicles	EPS-20 Fuel Tank EPS-32 Remote Fill Assembly EPS 21 Adaptor OHG X-450 Carb. Feedback Control Air Fuel Mixture control computer OHG converter fuel lockoff & filter unit Autotronics computer Irx (Part # 8690)	Remove air cleaner assembly and replace with OHG air cleaner.
Essex Cryogenics, Inc. E.O. I B-2	1974 & Older	300AN	615000 1	> 300	CNG DF	PC, LDT, MDV, HDV		Mixer adapter manufactured by IMPCO

ALTERNATIVE FUEL CONVERSION SYSTEMS

MANUFACTURER	MODEL YEAR	MIXER#	REGULATOR#	ENGINE SIZE (CID)	FUEL CONV. TYPE	APPLICATIONS	OTHER COMPONENTS	REMARKS/ MODIFICATIONS ALLOWED
Greanway Environmental Research E.O. # 8-31	1993 & Older				LPG	HDV with Cummins "B" series or Navistar DTA-360 series diesel engines	A5 listed in executive order. Catalytic converter required (P/N GER CAT LP)	
Holley Replacement Parts Div.-Colt Industries Operating Corp. E.O. # B-12-2	1982 & Older	4176	8400	301-375	LPG	MDV, HDV. Approved only for vehicles equipped with 4 Barrel Carburetors.		
E.O. # B-12-1	1980 & Older	2301	8400	300-375	LPG	MDV, HDV. Approved only for vehicles equipped with 2 Barrel or 4- Barrel Carburetors.		
E.O. # B-12-3A	1982 & Older	1976	8401		LPG	Datsun Pick-up trucks.		
E.O. # B-12-4	1983	1977	8400	300	LPG	Open loop Ford 300 CID LDT only.		

ALTERNATIVE FUEL CONVERSION SYSTEMS

MANUFACTURER	MODEL YEAR	MIXER#	REGULATOR#	ENGINE SIZE (CID)	FUEL CONJV. TYPE	APPLICATIONS	OTHER COMPONENTS	REMARKS/ MODIFICATIONS ALLOWED
Impco Carburetion, Inc. E.O.# 8-4-41	1993 & Older	CA100	HPR-501 or HPR3000 plus	0-360	CNG, CNG	PC, LDT, MDV,	1) GM vehicles with OBD use Autotronics #8690 with conv. kit. Vehicles using this part must operate in CL configuration and use IMPCO's alternate fuel controller 2) Vehicles with TWC- CL systems must operate in closed loop while utilizing CNG.	The Imperial 300 is the same as the IMPCO CA300A. Idle speed control solenoid on 1992 and older carbureted vehicles may be mechanically disconnected from carburetor while remaining electrically connected.
		CA125	PEV or PJ	0-360	DF	HDV. Also		
		CA175		50-360		approved for		
		CA200		>180		vehicles with TWC-		
		CA225		>180		CL, FI, and VV		
		CA300A	HPR-501 or HPR-3000 plus	ALL		systems.		
		(1, 20, 50, 70)	PEV					
CA425		>300						
E.O.# 8-4-42	1993 & Older	AFE-92-G-CNG System	-		CNG, CNG	LDT, MDV, HDV		
E.O.# B-4-43	1993 & Older	AFE-92 G LPG SYSTEM		350	LPG, LPG	General Motors LDT, MDV, HDV		

ALTERNATIVE FUEL CONVERSION SYSTEMS

MANUFACTURER	MODEL YEAR	MIXER#	REGULATOR#	ENGINE SLZE (CID)	FUEL CONV. TYPE	APPLICATIONS	OTHER COMPONENTS	REMARKS/ MODIFICATIONS ALLOWED
Impco Carburetion, Inc. E.O. # B-4-38	1993 & Older	CA100	E,L,J	0.360	LPG, LPG	PC, LDT, MDV, HDV. Also approved for vehicles with TWC-CL, FI, and VV systems.	1) GM vehicles with OBD use Autotronics #8690 with conv. kit. 2) 1993 and older vehicles with TWC-CL must use IMPCO propane feedback system with fuel control valve (P/N FCV) except Ford vehicles with VV carb. and OEM feedback controls. 3) Ford 2.3L and Nissan 2.4L may incorporate vacuum power valve (.075" orifice) and cold weather regulator (Ford P/N D7Z6-9E862-AA)	1) Modification/bypass to the EGR vacuum amplifier on Ford HDV and on closed loop Chrysler vehicles and Ford HDV required. EGR valve on 1976 and older vehicles may be replaced with IMPCO EC-1 valve.
		CA125	E,L,J	0-360	DF			
		CA175	E,L,J	50.360				
		CA200	E,L,J	> 180				
		CA225	E,L,J	> 180				
		CA300A	E,L,J	ALL				
CA425	E,L	> 300						
E.O. # B-4-9	1983 & Older	CA225	E,L	0.375	LPG	Chrysler vehicles with TWC-CL systems only.	Fuel control valve must be used on all TWC-CL system equipped vehicles except for those equipped with a VV carburetor.	
E.O. # B-4-8C	1981 & Older	CA300A	E,L	> 300	LPG, LPG DF	MDV, HDV		The Imperial 300 is the same as the IMPCO CA300A

ALTERNATIVE FUEL CONVERSION SYSTEMS

MANUFACTURER	MODEL YEAR	MIXER#	REGULATOR#	ENGINE SIZE (CID)	FUEL CONV. TYPE	APPLICATIONS	OTHER COMPONENTS	REMARKS/ MODIFICATIONS ALLOWED
Impco Carburetion, Inc. E.O. # B-4-5	1979 & Older	CA425	E		LPG	PC, MDV, HDV with eng. size > 200 CID MDV, HDV with eng. size > 250 CID		.
E.O. # B-4-1	1976 & Older	CA425	E	> 200	LPG, LPG DF	LDT, MDV, HDV		EGR Valve may be disconnected if the EC-I valve is used.
Landi-Hartog, U.S., Inc. E.O. # B-8	1980 & Older	1000 U.S.	JHdhh	> 300	LPG DF	PC, LDT, HDV		
LPF Carburetion E.O. B-11-1	1981 & Older	L-50	T	> 250	LPG DF	LDT, MDV, HDV		
Marvel Schebler/Tillotson Division of Borg Warner E.O. # B-5-3	1981 & Older	MS/T2569	MS/TM 4 or M6	> 300	LPG DF	PC, LDT, MDV, HDV		Marvel-Schebler/Tillotson mixer aka "Century"
E.O. # B-5-1	1976 & Older	3C-705 LE 3C 706 LE 3C or 3CG 705 DTLE 3C OH 3CG 06 DTLE		0-250 201-300 > 250 > 300	LPG LPG	PC, LDT, MDV, HDV PC, LDT, MDV, HDV PC, LDT, MDV, HDV	On Chrysler and Ford 6 cyl. engines the vacuum amplifier for EGR valve may be replaced by a Century delay control valve.	Vacuum advance diaphragm on engines using single diaphragm distributors may be disconnected. Marvel Schebler/Tillotson mixer aka "Century"
						PC, LDT, MDV, HDV		

ALTERNATIVE FUEL CONVERSION SYSTEMS

MANUFACTURER	MODEL YEAR	MIXER #	REGULATOR9	ENGINE SIZE (CID)	FUEL CONV. TYPE	APPLICATIONS	OTHER COMPONENTS	REMARKS/ MODIFICATIONS ALLOWED
Mesa Environmental E.O. # 8.34	1993 & Older	GEM			CNG CNG DF	GM LDT with 5.7, 2.5, or 2.2 liter engines	ECM, gas mixer nozzle, regulator, metering valve assembly, PROM.	
Mogas Sales, Inc. B-19	1993 & Older	ECOLO CNG conversion			CNG, CNG DF	PC, LDT, MDV, IIDV	Injector Fix for Chrysler, Signal Fix for Ford, Autotronics 98690 for GM, heated oxygen sensor for open loop vehicles.	
NGV Technologies Conipaoy, Inc. E.O. 9 B-28-2	1993 & Older	NGV CNG Conversion Kit			CNG, CNG DF	General Motors LDT, MDV, IIDV		Modification allowed to OEM air cleaner
PAS, Inc. 8.32	1992-1993		P/N 90210	350	CNG	General Motors C1500 or C2500 Pick Ups with 350 CID engines	90018 low-pressure shut off valve, 10096129 heated oxygen sensor, 16192816 PROM. 90053 fuel pressure sending unit, 90612 natural gas injectors, 90402 manual shut off valve, 90415 fuel injector plate	

ALTERNATIVE FUEL CONVERSION SYSTEMS

MANUFACTURER	MODEL YEAR	MIXER#	REGULATOR#	ENGINE SIZE (CID)	FUEL CONV. TYPE	APPLICATIONS	OTHER COMPONENTS	REMARKS/ MODIFICATIONS ALLOWED
OHG, Inc. E.O. # B-13-4 E.O. # B-13-7	1993 & Older	X-450	X-1	300-460	LPG	Nori-Feedback LDT, MDV, HDV	Autotronics computer fix (part # 8690) required on all GM vehicles with OBD systems, except those with mass flow fuel system.	
		X-450FB	X-1	300-460	LPG	Feedback LDT, MDV, HDV		
		X-450FB	x-2	230-350	LPG	Feedback LDT, MDV, HDV		
Stewart & Stevenson Power, Inc. B-16-1	1993 & Older	GFI Conv. system	P/N 10999.621 OOOD	All	CNG, CNG DF	PC, LDT, MDV, HDV	Primary Fuel Filter (A00093) Fuel metering valve/computer (A00125) Fuel Nozzle (10999 D B A00074 or 10999 D-40 009 B Ortech 70)	
Toyo Red Cab LPG Conversion E.O. # B-9	1979 & Older	1000	v-3	0-300	LPG DF	PC, LDT, HDV		
		2000	v-3	301.360	LPG DF	PC, LDT, HDV		
		3000	v-3	> 360	LPG DF	PC, LDT, HDV		

ALTERNATIVE FUEL CONVERSION SYSTEMS

MANUFACTURER	MODEL YEAR	MIXER#	REGULATOR#	ENGINE SIZE (CID)	FUEL CONV. TYPE	APPLICATIONS	OTHER COMPONENTS	REMARKS/ MODIFICATIONS ALLOWED
Vialle U. S. A., Inc. E.O. # B-10-19	1992 & Older	D-5	-	ALL	CNG, CNG OF	LDT, MDV, HDV. Also approved for vehicles with TWC-CL and FI systems.	GM Vehicles use ANGI part #D35A44441 except with mass flow fuel system. Ford and Chrysler vehicles with OBD systems use 02 sensor fix. FI Chrysler vehicles use injector fix.	
		c-5		ALL	LPG, LPG DF	PC, LDT, MDV, tIDV	GM Vehicles use ANGI part #D35A44441 except with mass flow fuel system. Ford and Chrysler vehicles with OBD systems use 02 sensor fix. FI Chrysler vehicles use injector fix.	
Vialle U. S. A., Inc. E.O. # B-10-20	1992 & Older	D-5		ALL	CNG, CNG DF	PC with carb. or FI.	GM Vehicles use ANGI part #D35A44441 except with mass flow fuel system. Ford and Chrysler vehicles with OBD systems use 02 sensor fix. FI Chrysler vehicles use injector fix.	

ALTERNATIVE FUEL CONVERSION SYS EMS

MANUFACTURER	MODEL YEAR	MIXER#	REGULATOR#	ENGINE SIZE (CID)	FUEL CONV. TYPE	APFICATIONS	OTHER COMPONENTS	REMARKS/ MODIFICATIONS ALLOWED
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CNG = Compressed Natural Gas
OF= Dual Fuel
LPG = Liquefied Petroleum Gas
LNG = Liquefied Natural Gas
FUM = Fumigation System
PC = Passenger Car
LOT = Light Duty Truck
MDV = Medium Duty Vehicles
HDV = Heavy Duty Vehicles
VV = Variable Venturi Carburetor
FI = Fuel Injected
TBI = Throttle Body Injected
TWC-CL = Three-way catalyst closed loop