

Pursuant to the authority vested in the Air Resources Board by Sections 43013, 43018, 43101, 43102, 43104 and 43105 of the Health and Safety 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-02-003;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engines and emission control system produced by the manufacturer are certified as described below for use in off-road equipment. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	DISPLACEMENT (liters)	FUEL TYPE	USEFUL LIFE (hours)
2004	4HZXL3.43C42	2.57, 3.43	Diesel	8000
SPECIAL FEATURES & EMISSION CONTROL SYSTEMS			TYPICAL EQUIPMENT APPLICATION	
Direct Diesel Injection			Generator Set, Pump, Other Industrial Equipment	

The engine models and codes are attached.

The following are the exhaust certification standards (STD) and certification levels (CERT) for hydrocarbon (HC), oxides of nitrogen (NOx), or non-methane hydrocarbon plus oxides of nitrogen (NMHC+NOx), carbon monoxide (CO), and particulate matter (PM) in grams per kilowatt-hour (g/kW-hr), and the opacity-of-smoke certification standards and certification levels in percent (%) during acceleration (Accel), lugging (Lug), and the peak value from either mode (Peak) for this engine family (Title 13, California Code of Regulations, (13 CCR) Section 2423):


RATED POWER CLASS	EMISSION STANDARD CATEGORY		EXHAUST (g/kW-hr)					OPACITY (%)		
			HC	NOx	NMHC+NOx	CO	PM	ACCEL	LUG	PEAK
37 ≤ kW < 75	Tier 2	STD	N/A	N/A	7.5	5.0	0.40	N/A	N/A	N/A
		CERT	--	--	7.0	3.3	0.18	--	--	--

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the information and materials to demonstrate certification compliance with 13 CCR Section 2424 (emission control labels), and 13 CCR Sections 2425 and 2426 (emission control system warranty).

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

This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.

Executed at El Monte, California on this 6TH day of May 2004.


 Allen Lyons, Chief
 Mobile Source Operations Division

Model Year: 2004
 Manufacturer: Motorenfabrik Hatz GmbH & Co. KG
 Engine Family: 4HZXL3.43C42

Issued:
 Revised: 3/17/2004
 E.O. Number: U-R-034-0055

Small Off-Road Engine Model Summary Form

Units for Table: hp

Worst Case?	47. Model Designation	48. Sales Code	49. Displ (cc)	50. Bore/Stroke	51. Ignition Timing	52. Max Power	53. Rated Speed (RPM)	54. Rated Torque	55. Torque Speed (RPM)	56. Emiss Control Sys
	For model	information,	3432	look	in the	enclosed	4HZXL343	C42.xls	excel file.	EM
	The worst	case engine	3432	marked in	red bold	capital	letters!!!			DDI

3M41Z
CONSTANT SPEED

4HZXL3.43C42

ENGINE MODEL	RATED POWER		TORQUE		ENGINE SPEED [rpm]	FUEL RATE		TORQUE		TORQUE SPEED [rpm]	FUEL RATE AT MAX. TORQUE			
	[kW]	[hp]	[Nm]	[lbf·ft]		[mm ³ /h]	[lbs/hr]	[kg/h]	[Nm]		[lbf·ft]	[mm ³ /h]	[lbs/hr]	[kg/h]
3M41Z	39.1	52.4	124	92	3000	44.0	7.4	3.3	124	92	3000	44.0	7.4	3.3
3M41Z	38.8	52.0	126	93	2950	44.0	7.2	3.3	126	93	2950	44.0	7.2	3.3
3M41Z	38.5	51.6	127	93	2900	44.0	7.1	3.2	127	93	2900	44.0	7.1	3.2
3M41Z	38.3	51.3	128	95	2850	44.0	7.0	3.2	128	95	2850	44.0	7.0	3.2
3M41Z	38.0	50.9	130	96	2800	44.0	6.9	3.1	130	96	2800	44.0	6.9	3.1
3M41Z	37.8	50.7	131	97	2750	44.5	6.8	3.1	131	97	2750	44.5	6.8	3.1
3M41Z	37.5	50.3	133	98	2700	44.5	6.7	3.0	133	98	2700	44.5	6.7	3.0
3M41Z	37.3	50.0	134	99	2650	44.5	6.6	3.0	134	99	2650	44.5	6.6	3.0
3M41Z	37.0	49.6	136	100	2600	45.0	6.5	3.0	136	100	2600	45.0	6.5	3.0
3M41Z	36.2	49.2	136	100	2500	45.0	6.5	3.0	136	100	2500	45.0	6.5	3.0
3M41Z	37.3	50.0	158	117	2250	51.0	6.4	2.9	158	117	2250	51.0	6.4	2.9

Worst case engine:

The 3M41Z engine has more frictional power losses caused by the balancer shafts with the same fuel quantity than the 3M41 at the same rated speed (this engine is without balancer shafts). This is the worst case engine we tested for the EPA engine family because emissions are divided by less power (g/kWh) at the same fuel quantity specifications.

3M41
CONSTANT SPEED

4HZXL3.43C42

ENGINE MODEL	RATED POWER		TORQUE		ENGINE SPEED [rpm]	FUEL RATE		TORQUE		TORQUE SPEED [rpm]	FUEL RATE AT MAX. TORQUE			
	[kW]	[hp]	[Nm]	[lbf·ft]		[mm ³ /h]	[lbs/hr]	[kg/h]	[Nm]		[lbf·ft]	[mm ³ /h]	[lbs/hr]	[kg/h]
3M41	39.8	53.3	127	93	3000	44.0	7.4	3.3	127	93	3000	44.0	7.4	3.3
3M41	39.6	53.1	128	95	2950	44.0	7.2	3.3	128	95	2950	44.0	7.2	3.3
3M41	39.3	52.7	129	95	2900	44.0	7.1	3.2	129	95	2900	44.0	7.1	3.2
3M41	39.1	52.4	131	97	2850	44.0	7.0	3.2	131	97	2850	44.0	7.0	3.2
3M41	38.8	52.0	132	98	2800	44.5	6.9	3.1	132	98	2800	44.5	6.9	3.1
3M41	38.6	51.7	134	99	2750	44.5	6.8	3.1	134	99	2750	44.5	6.8	3.1
3M41	38.3	51.3	135	100	2700	44.5	6.7	3.0	135	100	2700	44.5	6.7	3.0
3M41	38.1	51.1	137	101	2650	44.5	6.6	3.0	137	101	2650	44.5	6.6	3.0
3M41	37.8	50.7	139	102	2600	45.0	6.5	2.9	139	102	2600	45.0	6.5	2.9
3M41	37.4	50.1	140	103	2550	45.0	6.4	2.9	140	103	2550	45.0	6.4	2.9
3M41	38.9	52.1	162	119	2300	51.0	6.5	3.0	162	119	2300	51.0	6.5	3.0
3M41	38.2	51.2	162	120	2250	51.0	6.4	2.9	162	120	2250	51.0	6.4	2.9
3M41	37.4	50.1	162	120	2200	51.0	6.3	2.8	162	120	2200	51.0	6.3	2.8

4M41
CONSTANT SPEED

4HZXL3.43C42

ENGINE MODEL	RATED POWER		TORQUE		ENGINE SPEED		FUEL RATE		TORQUE		TORQUE SPEED		FUEL RATE AT MAX. TORQUE	
	[kW]	[hp]	[Nm]	[lbf·ft]	[rpm]	[mm ³ /hr]	[l/hr]	[kg/h]	[Nm]	[lbf·ft]	[rpm]	[mm ³ /hr]	[l/hr]	[kg/h]
4M41	53.1	71.2	169	125	3000	44.0	7.4	3.3	169	125	3000	44.0	7.4	3.3
4M41	52.8	70.8	171	126	2950	44.0	7.2	3.3	171	126	2950	44.0	7.2	3.3
4M41	52.5	70.4	173	127	2900	44.0	7.1	3.2	173	127	2900	44.0	7.1	3.2
4M41	52.1	69.8	175	129	2850	44.0	7.0	3.2	175	129	2850	44.0	7.0	3.2
4M41	51.8	69.4	177	130	2800	44.0	6.9	3.1	177	130	2800	44.0	6.9	3.1
4M41	51.5	69.0	179	132	2750	44.5	6.8	3.1	179	132	2750	44.5	6.8	3.1
4M41	51.2	68.6	181	134	2700	44.5	6.7	3.0	181	134	2700	44.5	6.7	3.0
4M41	50.9	68.2	183	135	2650	44.5	6.6	3.0	183	135	2650	44.5	6.6	3.0
4M41	50.6	67.8	186	137	2600	45.0	6.5	3.0	186	137	2600	45.0	6.5	3.0
4M41	50.0	67.0	187	138	2550	45.0	6.4	2.9	187	138	2550	45.0	6.4	2.9
4M41	49.3	66.1	188	139	2500	46.0	6.4	2.9	188	139	2500	46.0	6.4	2.9
4M41	48.7	65.3	190	140	2450	46.0	6.3	2.9	190	140	2450	46.0	6.3	2.9
4M41	48.1	64.5	191	141	2400	46.0	6.2	2.8	191	141	2400	46.0	6.2	2.8
4M41	47.1	63.1	191	141	2350	46.0	6.0	2.7	191	141	2350	46.0	6.0	2.7
4M41	52.0	69.7	216	159	2300	51.0	6.5	3.0	216	159	2300	51.0	6.5	3.0
4M41	51.0	68.3	216	160	2250	51.0	6.4	2.9	216	160	2250	51.0	6.4	2.9
4M41	50.0	67.0	217	160	2200	51.0	6.3	2.8	217	160	2200	51.0	6.3	2.8
4M41	49.0	65.7	218	160	2150	51.0	6.1	2.8	218	160	2150	51.0	6.1	2.8
4M41	48.0	64.3	218	161	2100	51.0	6.0	2.7	218	161	2100	51.0	6.0	2.7
4M41	47.0	63.0	219	161	2050	51.0	5.8	2.6	219	161	2050	51.0	5.8	2.6
4M41	46.0	61.6	220	162	2000	51.0	5.7	2.6	220	162	2000	51.0	5.7	2.6
4M41	44.8	60.0	219	162	1950	49.0	5.3	2.4	219	162	1950	49.0	5.3	2.4
4M41	43.7	58.6	220	162	1900	49.0	5.2	2.4	220	162	1900	49.0	5.2	2.4
4M41	42.5	57.0	219	162	1850	49.0	5.1	2.3	219	162	1850	49.0	5.1	2.3
4M41	41.3	55.3	219	162	1800	49.0	4.9	2.2	219	162	1800	49.0	4.9	2.2

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4M41
CONSTANT SPEED

4HZXL3.43C42

ENGINE MODEL	RATED POWER		TORQUE		RATED SPEED		FUEL RATE		TORQUE		TORQUE SPEED		FUEL RATE AT MAX. TORQUE	
	[kW]	[hp]	[Nm]	[lbf·ft]	[rpm]	[mm ³ /sh]	[lbs/hr]	[kg/h]	[Nm]	[lbf·ft]	[rpm]	[mm ³ /sh]	[lbs/hr]	[kg/h]
4M41	47.8	64.1	152	112	3000	40.0	6.7	3.0	152	112	3000	40.0	6.7	3.0
4M41	47.5	63.7	154	113	2950	40.0	6.6	3.0	154	113	2950	40.0	6.6	3.0
4M41	47.2	63.2	155	115	2900	40.0	6.5	2.9	155	115	2900	40.0	6.5	2.9
4M41	46.9	62.8	157	116	2850	40.0	6.4	2.9	157	116	2850	40.0	6.4	2.9
4M41	46.6	62.4	159	117	2800	40.0	6.2	2.8	159	117	2800	40.0	6.2	2.8
4M41	46.4	62.2	161	119	2750	40.5	6.2	2.8	161	119	2750	40.5	6.2	2.8
4M41	46.1	61.8	163	120	2700	40.5	6.1	2.8	163	120	2700	40.5	6.1	2.8
4M41	45.8	61.4	165	122	2650	40.5	6.0	2.7	165	122	2650	40.5	6.0	2.7
4M41	45.5	61.0	167	123	2600	40.5	5.9	2.7	167	123	2600	40.5	5.9	2.7
4M41	45.0	60.3	169	124	2550	40.5	5.8	2.6	169	124	2550	40.5	5.8	2.6
4M41	44.4	59.5	170	125	2500	41.0	5.7	2.6	170	125	2500	41.0	5.7	2.6
4M41	43.8	58.7	171	126	2450	41.0	5.6	2.5	171	126	2450	41.0	5.6	2.5
4M41	43.2	57.9	172	127	2400	41.0	5.5	2.5	172	127	2400	41.0	5.5	2.5
4M41	42.4	56.8	172	127	2350	41.0	5.4	2.4	172	127	2350	41.0	5.4	2.4
4M41	46.8	62.7	194	143	2300	47.0	6.0	2.7	194	143	2300	47.0	6.0	2.7

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AHZXL3.43C42

ENGINE MODEL	RATED POWER		TORQUE		RATED SPEED		FUEL RATE		TORQUE		TORQUE SPEED		FUEL RATE AT MAX. TORQUE	
	[kW]	[hp]	[Nm]	[lbfm]	[rpm]	[mm ³ /sh]	[lbsm/h]	[kg/h]	[Nm]	[lbf]	[rpm]	[mm ³ /sh]	[lbsm/h]	[kg/h]
4M412	51.6	69.1	164	164	3000	44.0	7.4	3.3	164	121	3000	44.0	7.4	3.3
4M412	51.3	68.7	166	166	2950	44.0	7.2	3.3	166	122	2950	44.0	7.2	3.3
4M412	51.0	68.3	168	168	2900	44.0	7.1	3.2	168	124	2900	44.0	7.1	3.2
4M412	50.6	67.8	170	170	2850	44.0	7.0	3.2	170	125	2850	44.0	7.0	3.2
4M412	50.3	67.4	172	172	2800	44.0	6.9	3.1	172	127	2800	44.0	6.9	3.1
4M412	50.0	67.0	174	174	2750	44.5	6.8	3.1	174	128	2750	44.5	6.8	3.1
4M412	49.7	66.6	176	176	2700	44.5	6.7	3.0	176	130	2700	44.5	6.7	3.0
4M412	49.4	66.2	178	178	2650	44.5	6.6	3.0	178	131	2650	44.5	6.6	3.0
4M412	49.1	65.8	180	180	2600	45.0	6.5	3.0	180	133	2600	45.0	6.5	3.0
4M412	48.3	65.0	182	182	2550	45.0	6.4	2.9	182	134	2550	45.0	6.4	2.9
4M412	48.3	64.7	184	184	2500	46.0	6.4	2.9	184	136	2500	46.0	6.4	2.9
4M412	47.7	63.9	186	186	2450	46.0	6.3	2.9	186	137	2450	46.0	6.3	2.9
4M412	47.1	63.1	187	187	2400	46.0	6.2	2.8	187	138	2400	46.0	6.2	2.8
4M412	46.1	61.8	187	187	2350	46.0	6.0	2.7	187	138	2350	46.0	6.0	2.7
4M412	51.0	68.3	212	212	2300	47.0	6.0	2.7	212	156	2300	47.0	6.0	2.7
4M412	50.0	67.0	212	212	2250	51.0	6.4	2.9	212	156	2250	51.0	6.4	2.9
4M412	49.0	65.7	213	213	2200	51.0	6.3	2.8	213	157	2200	51.0	6.3	2.8
4M412	48.0	64.3	213	213	2150	51.0	6.1	2.8	213	157	2150	51.0	6.1	2.8
4M412	47.0	63.0	214	214	2100	51.0	6.0	2.7	214	158	2100	51.0	6.0	2.7
4M412	46.0	61.6	214	214	2050	51.0	5.8	2.6	214	158	2050	51.0	5.8	2.6
4M412	45.0	60.3	215	215	2000	51.0	5.7	2.6	215	158	2000	51.0	5.7	2.6
4M412	43.8	58.7	214	214	1950	49.0	5.3	2.4	214	158	1950	49.0	5.3	2.4
4M412	42.7	57.2	215	215	1900	49.0	5.2	2.4	215	158	1900	49.0	5.2	2.4
4M412	41.5	55.6	214	214	1850	49.0	5.1	2.3	214	158	1850	49.0	5.1	2.3
4M412	40.3	54.0	214	214	1800	49.0	4.9	2.2	214	158	1800	49.0	4.9	2.2

4M412
CONSTANT SPEED

4HZXL3.43C42

ENGINE MODEL	RATED POWER		TORQUE		RATED SPEED [rpm]	FUEL RATE		TORQUE		TORQUE SPEED [rpm]	FUEL RATE AT MAX TORQUE	
	[kW]	[hp]	[Nm]	[lb-ft]		[mm ³ /h]	[kg/h]	[Nm]	[lb-ft]		[mm ³ /h]	[kg/h]
4M412	46.3	62.0	147	109	3000	3.0	147	3000	40.0	6.7	3.0	
4M412	46.0	61.6	149	110	2950	3.0	149	2950	40.0	6.6	3.0	
4M412	45.7	61.2	150	111	2900	2.9	150	2900	40.0	6.5	2.9	
4M412	45.4	60.8	152	112	2850	2.9	152	2850	40.0	6.4	2.9	
4M412	45.1	60.4	154	113	2800	2.8	154	2800	40.0	6.2	2.8	
4M412	44.9	60.2	156	115	2750	2.8	156	2750	40.5	6.2	2.8	
4M412	44.6	59.8	158	116	2700	2.8	158	2700	40.5	6.1	2.8	
4M412	44.3	59.4	160	118	2650	2.7	160	2650	40.5	6.0	2.7	
4M412	44.0	59.0	162	119	2600	2.7	162	2600	40.5	5.9	2.7	
4M412	43.5	58.3	163	120	2550	2.6	163	2550	40.5	5.8	2.6	
4M412	43.4	58.2	166	122	2500	2.6	166	2500	41.0	5.7	2.6	
4M412	42.8	57.4	167	123	2450	2.5	167	2450	41.0	5.6	2.5	
4M412	42.2	56.5	168	124	2400	2.5	168	2400	41.0	5.5	2.5	
4M412	41.4	55.5	168	124	2350	2.4	168	2350	41.0	5.4	2.4	
4M412	45.8	61.4	190	140	2300	2.7	190	2300	47.0	6.0	2.7	

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4H11C
CONSTANT SPEED

4HZXL3.43C42

ENGINE MODEL	RATED POWER		TORQUE (Nm)	RATED SPEED (rpm)	[mm ³ /H]	FUEL RATE		TORQUE		TORQUE SPEED		FUEL RATE AT MAX. TORQUE	
	[kW]	[hp]				[kg/h]	[kg/h]	[Nm]	[lbm]	[rpm]	[mm ³ /H]	[kg/h]	[kg/h]
4L41C	48.8	65.4	155	3000	42.5	7.1	3.2	155	115	3000	42.5	7.1	3.2
4L41C	48.4	64.9	157	2950	42.5	7.0	3.2	157	116	2950	42.5	7.0	3.2
4L41C	48.1	64.5	158	2900	42.5	6.9	3.1	158	117	2900	42.5	6.9	3.1
4L41C	47.7	63.9	160	2850	42.5	6.8	3.1	160	118	2850	42.5	6.8	3.1
4L41C	47.4	63.5	162	2800	42.5	6.6	3.0	162	119	2800	42.5	6.6	3.0
4L41C	47.0	63.0	163	2750	43.0	6.6	3.0	163	120	2750	43.0	6.6	3.0
4L41C	46.8	62.4	165	2700	43.0	6.5	2.9	165	122	2700	43.0	6.5	2.9
4L41C	46.3	62.0	167	2650	43.0	6.4	2.9	167	123	2650	43.0	6.4	2.9
4L41C	45.9	61.5	169	2600	43.5	6.3	2.9	169	124	2600	43.5	6.3	2.9
4L41C	45.3	60.7	170	2550	43.5	6.2	2.8	170	125	2550	43.5	6.2	2.8
4L41C	44.7	59.9	171	2500	43.5	6.1	2.8	171	126	2500	43.5	6.1	2.8
4L41C	44.1	59.1	172	2450	43.5	5.9	2.7	172	127	2450	43.5	5.9	2.7
4L41C	43.5	58.3	173	2400	43.5	5.8	2.6	173	128	2400	43.5	5.8	2.6
4L41C	42.6	57.1	173	2350	43.5	5.7	2.6	173	128	2350	43.5	5.7	2.6
4L41C	42.0	56.3	173	2300	49.0	6.3	2.9	173	128	2300	49.0	6.3	2.9
4L41C	41.0	54.9	195	2250	49.0	6.1	2.8	195	144	2250	49.0	6.1	2.8
4L41C	40.0	53.6	196	2200	49.0	6.0	2.7	196	144	2200	49.0	6.0	2.7
4L41C	39.0	52.3	196	2150	49.0	5.9	2.7	196	144	2150	49.0	5.9	2.7
4L41C	38.0	50.9	196	2100	49.0	5.7	2.6	196	144	2100	49.0	5.7	2.6
4L41C	37.0	49.6	196	2050	49.0	5.6	2.5	196	144	2050	49.0	5.6	2.5
4L41C	36.0	48.3	196	2000	48.0	5.2	2.4	196	144	2000	48.0	5.2	2.4
4L41C	35.0	47.0	196	1950	48.0	5.1	2.3	196	145	1950	48.0	5.1	2.3
4L41C	34.0	45.7	196	1900	48.0	5.0	2.2	196	145	1900	48.0	5.0	2.2
4L41C	33.0	44.4	196	1850	48.0	4.8	2.2	196	145	1850	48.0	4.8	2.2
4L41C	32.0	43.1	196	1800	48.0	4.8	2.2	196	145	1800	48.0	4.8	2.2

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U-R-034-0055

4L41C
CONSTANT SPEED

4HZXL3.43C42

ENGINE MODEL	RATED POWER		TORQUE		RATED SPEED [rpm]	FUEL RATE		TORQUE		TORQUE SPEED [rpm]	FUEL RATE AT MAX. TORQUE		
	[kW]	[hp]	[Nm]	[lbm]		[mm ³ /hr]	[kg/h]	[Nm]	[lbm]		[mm ³ /hr]	[lbm/hr]	[kg/h]
4L41C	43.9	58.8	140	103	3000	38.5	2.9	140	103	3000	38.5	6.4	2.9
4L41C	43.8	58.4	141	104	2950	38.5	2.9	141	104	2950	38.5	6.3	2.9
4L41C	43.3	58.0	143	105	2900	38.5	2.8	143	105	2900	38.5	6.2	2.8
4L41C	42.9	57.5	144	106	2850	38.5	2.8	144	106	2850	38.5	6.1	2.8
4L41C	42.8	57.1	145	107	2800	38.5	2.7	145	107	2800	38.5	6.0	2.7
4L41C	42.3	56.7	147	108	2750	38.5	2.7	147	108	2750	38.5	5.9	2.7
4L41C	42.0	56.3	149	110	2700	38.5	2.6	149	110	2700	38.5	5.8	2.6
4L41C	41.6	55.7	150	111	2650	38.5	2.6	150	111	2650	38.5	5.7	2.6
4L41C	41.3	55.3	152	112	2600	39.0	2.6	152	112	2600	39.0	5.7	2.6
4L41C	40.8	54.7	153	113	2550	39.0	2.5	153	113	2550	39.0	5.5	2.5
4L41C	40.2	53.9	154	113	2500	39.0	2.5	154	113	2500	39.0	5.4	2.5
4L41C	39.7	53.2	155	114	2450	39.0	2.4	155	114	2450	39.0	5.3	2.4
4L41C	39.2	52.5	156	115	2400	39.0	2.4	156	115	2400	39.0	5.2	2.4
4L41C	38.3	51.3	156	115	2350	39.0	2.3	156	115	2350	39.0	5.1	2.3
4L41C	42.3	56.7	176	130	2300	44.0	2.6	176	130	2300	44.0	5.6	2.6

(CFN)