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2010 //

Light Vehicle Engines

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WARD'S & WARD'S Engine & Vehicle Technology Update

North American Availability & Specifications

ENGINE SYSTEMS AND COMPONENTS //

Piston Systems

Cylinder Components

Valve Train Systems

FILTRATION AND ENGINE PERIPHERALS //

Air Management Systems

Liquid Management Systems

Disp. (L)	Disp. (CC)	Code	Maker	Plant	2009 Engine Volume (1)	Blk./Head/ Cyl. Liner Mat.	Layout (vee°)	Bore x Stroke (mm)	Comp. Ratio	Performance Hp/ RPM	Torque Lb.-Ft. (Nm)/RPM	Fuel system/Valving/ Valve Actuation	2010 Models Installed	Con Rod	Camshaft Type	Intake Manifold Material	MAHLE Components
GENERAL MOTORS																2009 CY TOTAL ENGINE VOLUME	1,883,100
1.4	1364	NA	GM	Flint, MI	1,000	CI/AL	I-4	72.5x82.6	9.5:1	138/ 4900	148 (200)/ 1850	SFI/ETC/DOHC/4vpc/VCT/TRBO	Chevrolet Cruze	FS	1-pc. cast	plastic	✔
1.6	1598	LLQ/LXV	GMDAT	Bupyung, S. Korea; Toluca, Mexico	76,000	CI/AL	I-4	79x81.5	10.8:1	108/ 6400	105 (142)/ 3800	SFI/ETC/DOHC/4vpc/VVT	Chevy (Mexico), Chevy Sedan (Mexico), Chevrolet Aveo	FS	1-pc. cast	plastic	✔
1.8	1796	LUW	GM	Toluca, Mexico	1,000	CI/AL	I-4	80.5x88.2	10.5:1	136/ 6300	123 (167)/ 3800	SFI/ETC/DOHC/4vpc/VCT	Chevrolet Cruze	FPMFS	1-pc. cast	CA	✔
1.8	1798	1ZZ-FED	Toyota	Buffalo, WV	10,100	AL/AL/CIL	I-4	80.5x88.3	10.0:1	132/ 6000	128 (174)/ 4400	SFI/DOHC.4vpc/VVT-i	Pontiac Vibe	FPMFS	1-pc. cast	CA	✔
2.0	1998	LNF	GM	Spring Hill, TN	4,500	AL/AL/CIL	I-4	86x86	9.2:1	250/ 5900-260/ 5300	222 (301)/ 1650-260 (353)/ 2000	DI/DOHC/4vpc/TRBO/Int/VVT/RFF	Chevrolet HHR SS, Cobalt SS	FSFS	1-pc. cast	CA	✔
2.2	2189	LAP	GM	Tonawanda, NY	77,000	AL/AL/CIL	I-4	86x94.6	10.0:1	155/ 6100	150 (203)/ 4900	SFI/ETC/DOHC/4vpc/RFF	Chevrolet Cobalt	FPMFS	1-pc. cast	composite	✔
2.2	2189	LE8	GM	Tonawanda, NY	13,000	AL/AL/CIL	I-4	86x94.6	10.0:1	155/ 6100 [E161/ 6000]	150 (203)/ 4800 [E158 (214)/ 4600]	SFI/ETC/DOHC/4vpc/RFF/E85	Chevrolet HHR	FPMFS	1-pc. cast	composite	✔
2.4	2362	2AZ-FE	Toyota	Georgetown, KY	18,400	AL/AL/CIL	I-4	80.5x96	9.8:1	158/ 6000	162 (220)/ 4000	SFI/DOHC.4vpc/VVT-i	Pontiac Vibe	FPMFS	1-pc. cast	CA	✔
2.4	2384	LAF	GM	Spring Hill, TN	15,200	AL/AL/CIL	I-4	88x98	11.2:1	182/6700	172(233)/4900	DI//ETC/DOHC/4vpc//VVT/RFF	Buick LaCrosse, Chevrolet Equinox; GMC Terrain	FS	1-pc. cast	composite	✔
2.4	2384	LAT	GM	Spring Hill, TN	4,300	AL/AL/CIL	I-4	88x98	10.4:1	164/ 6400	159 (215)5000	SFI/ETC/DOHC/4vpc/RFF/VVT	Chevrolet Malibu Hybrid	Plus 36-Volt DC Alternator/Motor with NiMH Battery Pack.			✔
2.4	2384	LE5	GM	Spring Hill, TN	136,000	AL/AL/CIL	I-4	88x98	10.4:1	169/ 6400	160 (217)/ 4500	SFI/ETC/DOHC/4vpc/VVT/RFF	Chevrolet Malibu	FS	1-pc. cast	composite	✔
2.4	2384	LE9	GM	Spring Hill, TN	42,000	AL/AL/CIL	I-4	88x98	10.4:1	170/ 6200-172/ 5800 [E175/ 6300-E176/ 5800]	158 (214)/ 5200-167 (226)/ 4500 [E170 (230)/ 4700]	SFI/ETC/DOHC/4vpc/VVT/RFF/E85	Chevrolet Malibu, HHR	FS	1-pc. cast	composite	✔
2.8	2792	LAU	GM-Holden	Melbourne, Australia	4,000	AL/AL/CIL	V-6 (60º)	89x74.8	9.5:1	300/ 5500	295 (400)/ 2000	SFI/ETC/TRBO/int/DOHC/4vpc/VVT/RF	Cadillac SRX	FPMFS	FS	AL	✔
2.9	2921	LLV	GM	Tonawanda, NY	16,000	AL/AL/CIL	I-4	95.5x102	10.0:1	185/ 5600	190 (258)/ 2800	SFI/ETC/DOHC/4vpc/VVT/RF	Chevrolet Colorado; GMC Canyon	FPMFS	1-pc. cast	composite	✔
3.0	2997	LF1	GM	St. Catharines, ON, Canada; Ramos Arizpe, Mexico	166,000	AL/AL/CIL	V-6 (60º)	89x80.3	11.7:1	255/ 6900-270/ 7000	217 (294)/ 5100-223 (302)/5700	DI/ ETC/DOHC/4vpc/VVT/RF	Buick LaCrosse; Cadillac CTS, SRX; Chevrolet Equinox; GMC Terrain	FPMFS	1-pc. cast	AL/composite	✔
3.5	3510	LZ4	GM	Ramos Arizpe, Mexico	48,000	CI/AL	V-6 (60º)	99x76	9.8:1	207 219/ 5800	215 (292)-220 (298)/ 4000	SFI/ETC/OHV/VVT/PRR	Chevrolet Impala, Malibu	FPMFS	assembled	CA	✔
3.5	3510	LZE	GM	Ramos Arizpe, Mexico	103,000	CI/AL	V-6 (60º)	99x76	9.8:1	211-221/ 5800 [E217-E227/ 5800]	216 (293)-221 (300)/ 4000 [E218 (296)-E225 (305)/ 4000]	SFI/ETC/OHV/VVT/PRR/E85	Chevrolet Impala, Malibu; Pontiac G6	FPMFS	assembled	CA	✔
3.6	3564	LY7	GM	Flint, MI; St. Catharines, ON, Canada	23,000	AL/AL/CIL	V-6 (60º)	94x85.6	10.2:1	252/ 6300	251 (340)/ 3200	SFI/DOHC/4vpc/VVVT/RF	Chevrolet Malibu	FPMFS	1-pc. cast	CA	✔
3.6	3564	LLT	GM/GM-Holden	Flint, MI; St. Catharines, ON, Canada; Ramos Arizpe, Mexico; Melbourne, Australia	249,000	AL/AL/CIL	V-6 (60º)	94x85.6	11.3:1	281/ 6300-304/ 6400	266 (361)/ 3400-273 (370)/ 5200	DI/DOHC/4vpc/VVVT/RF	Buick LaCrosse (Allure), Enclave; Cadillac CTS, STS; Chevrolet Camaro, Traverse; GMC Acadia	FPMFS	1-pc. cast	CA	✔
3.7	3651	LLR	GM	Tonawanda, NY	17,500	AL/AL/CIL	I-5	95.5x102	10.0:1	242/ 5600	242 (328)/ 4600	SFI/ETC/DOHC/4vpc/VVT/RF	Chevrolet Colorado; GMC Canyon	FPMFS	1-pc. cast	composite	✔
3.9	3880	LGD	GM	Ramos Arizpe, Mexico	97,000	CI/AL	V-6 (60º)	99x84	9.8:1	227-230/ 5700 [E236/ 5700]	235 (319)/ 3200-237 (321)/ 3200 [E239 (324)/ 3200]	SFI/ETC/OHV/VVT/PRR/E85	Buick Lucerne; Chevrolet Impala	FPMFS	assembled	CA	✔
3.9	3880	LZ9	GM	Ramos Arizpe, Mexico	18,700	CI/AL	V-6 (60º)	99x84	9.8:1	219/ 5700	234 (317)/ 3200	SFI/ETC/OHV/VVT/PRR	Buick Lucerne	FPMFS	assembled	CA	✔
4.3	4300	LU3	GM	Romulus, MI	74,000	CI/CI	V-6 (90º)	101.6x88.4	9.2:1	195/ 4600	260 (353)/ 2800	SFI/ETC/OHV/PRR	Chevrolet Express, Silverado; GMC Savana, Sierra	FPMFS	steel	CA-lower; compoaite-upper	✔
4.6	4565	LD8	GM	Livonia, MI	14,100	AL/AL/CIL	V-8 (90º)	93x84	10.0:1	275/ 6000	295 (400)/ 4400	SFI/ETC/DOHC/4vpc/RF	Cadillac DTS, Limousine	FPMFS	1-pc. cast	composite	✔
4.6	4565	L37	GM	Livonia, MI	3,000	AL/AL/CIL	V-8 (90º)	93x84	10.0:1	292/ 6300	288 (390)/ 4500	SFI/ETC/DOHC/4vpc/RF	Buick Lucerne Super; Cadillac DTS	FPMFS	1-pc. cast	composite	✔
4.6	4565	LH2	GM	Livonia, MI	1,000	AL/AL/CIL	V-8 (90º)	93x84	10.5:1	320/ 6400	315 (427)/ 4400	SFI/ETC/DOHC/4vpc/RF/VVT	Cadillac STS	FPMFS	1-pc. cast	composite	✔
4.8	4807	L20	GM	Romulus, MI; St. Catharines, ON, Canada	101,000	CI/AL	V-8 (90º)	96x83	8.8:1	260/ 4600-302/ 5600	295 (400)/ 4500-305 (414)/ 4600	SFI/ETC/OHV/PRR/VVT	Chevrolet Express, Silverado, Tahoe; GMC Savana, Sierra, Yukon	FPMFS	HS	composite	✔
5.3	5328	LC9	GM	Romulus, MI; St. Catharines, ON, Canada	251,000	AL/AL/CIL	V-8 (90º)	96x92	9.9:1	315/ 5200-320/ 5400 [E326/ 5300]	334 (453)/ 4500 [E348 (472)/ 4400]	SFI/ETC/OHV/PRR/CD/VVT/E85	Chevrolet Silverado, Suburban, Tahoe; GMC Sierra, Yukon, Yukon XL	FPMFS	HS	composite	✔
5.3	5328	LH9	GM	Romulus, MI	2,100	AL/AL/CIL	V-8 (90º)	96x92	9.7:1	300/ 5200	320 (434)/ 4000	SFI/ETC/OHV/VVT/PRR	Chevrolet Colorado; GMC Canyon	FPMFS	HS	composite	✔
5.3	5328	LMF	GM	Romulus, MI; St. Catharines, ON, Canada	6,000	CI/AL	V-8 (90º)	96x92	9.9:1	310/ 5200 [E320/ 5300]	334 (453)/ 4500 [E348 (472)/ 4400]	SFI/ETC/OHV/PRR/VVT/E85	Chevrolet Express; GMC Savana	FPMFS	HS	composite	✔
5.3	5328	LMG	GM	Romulus, MI; St. Catharines, ON, Canada	102,000	CI/AL	V-8 (90º)	96x92	9.9:1	315/ 5200-320/ 5400 [E326/ 5300]	334 (453)/ 4500 [E348 (472)/ 4400]	SFI/ETC/OHV/PRR/CD/VVT/E85	Chevrolet Avalanche, Silverado, Suburban, Tahoe; GMC Sierra, Yukon, Yukon XL	FPMFS	HS	composite	✔
6.0	5967	LZ1	GM	Silao, Mexico	10,500	AL/AL/CIL	V-8 (90º)	101.6x92	10.78:1	332/ 5100	367 (498)/ 4100	SFI/ETC/OHV/PRR/VVT/CD/ESI	Cadillac Escalade Hybrid; Chevrolet Silverado Hybrid, Tahoe Hybrid; GMC Sierra Hybrid, Yukon Hybrid	Plus 2 transmission-intigrated 60-KW (81-hp) perm. electric motors powered by 300-volt NiMH battery pack.			✔
6.0	5967	L96	GM	Romulus, MI; St. Catharines, ON, Canada; Silao, Mexico	12,500	CI/AL	V-8 (90º)	101.6x92	9.6:1	323 /4600-360/ 5400	373 (506)/ 4400-382 (518)/ 4200	SFI/ETC/OHV/PRR/VVT/E85	Chevrolet Express, Suburban HD; GMC Savana, Yukon XL	FPMFS	HS	composite	✔
6.2	6162	L94	GM	Romulus, MI	36,500	AL/AL/CIL	V-8 (90º)	103.3x92	10.4:1	403/ 5700	417 (565)/ 4300	SFI/ETC/OHV/RRA/VVT/E85	Cadillac Escalade, Escalade ESV, Escalade EXT; GMC Yukon Denali, Yukon XL Denali	FPMFS	HS	composite	✔
6.2	6162	L9H	GM	Romulus, MI	13,000	AL/AL/CIL	V-8 (90º)	103.3x92	10.4:1	393-403/ 5700	417 (565)/ 4300	SFI/ETC/OHV/RRA/VVT/E85	Chevrolet Silverado; GMC Sierra, Yukon XL	FPMFS	HS	composite	✔
6.2	6162	LS3	GM	St. Catharines, ON, Canada	63,000	AL/AL/CIL	V-8 (90º)	103.3x92	10.7:1	426- 436/ 5900	420 (569)-428 (580)/ 4600	SFI/ETC/OHV/RRA	Chevrolet Camaro, Corvette	FPMFS	HS	composite	✔
6.2	6162	LSA	GM	Silao, Mexico	1,200	AL/AL/CIL	V-8 (90º)	103.3x92	9.1:1	556/ 6100	551 (747)/ 3800	SFI/ETC/SPR/Int/OHV/RFF	Cadillac CTS-V	FSFS	HS	composite	✔
6.2	6162	LS9	GM-PBC*	Wixom, MI	200	AL/AL/CIL	V-8 (90º)	103.3x92	9.1:1	638 / 6500	604 (819) / 3800	SFI/ETC/SPR/Int/OHV/PRR	Chevrolet Corvette ZR-1	FT	HS	CA	✔
6.6	6599	LGH/ LML	DMAX	Moraine, OH	50,700	CI/AL	V-8 (90º)	103x99	16.8:1	250-365/ 3200	460 (624)-660 (895)/ 1600	DI/OHV/TRBO/PRR	Chevrolet Express HD, Silverado HD; GMC Savana HD, Sierra HD	FSFS	steel	CA	✔
7.0	7008	LS7	GM-PBC*	Wixom, MI	600	AL/AL/CIL	V-8 (90º)	104.8x101.6	11.0:1	505/ 6300	470 (637)/ 4800	SFI/ETC/OHV/PRR	Chevrolet Corvette Z06	FT	HS	composite	✔
FORD																2009 CY TOTAL ENGINE VOLUME	1,790,200
1.6	1596	NA	Ford	Taubate, Brazil	500	AL/AL/CIL	I-4	79x81.4	11.0:1	119/ 6000	109 (148)/4250	SFI/DOHC/4vpc/VCT	Fiesta	FPMFS	1-pc. cast		✔
2.0	1999	99N	Ford	Dearborn, MI	140,300	AL/AL/CIL	I-4	87.4x83.1	10.0:1	140-143/ 6000	136 (184)/ 4250	SFI/DOHC/4vpc/BT	Focus	FPMFS	1-pc. cast	CA	✔
2.5	2488	NA	Ford	Chihuahua, Mexico	174,500	AL/AL/CIL	I-4	88.9x100.1	9.7:1	175/ 6000	172 (233)/ 4500	SFI/DOHC/4vpc/BT	Fusion; Mercury Milan	FPMFS	1-pc. cast	composite	✔
2.3	2261	99D	Ford	Dearborn, MI	35,000	AL/AL/CIL	I-4	87.5x94	9.7:1	143/ 5250	154 (209)/ 3750	SFI/DOHC/4vpc/VCT/BT	Ranger	FPMFS	1-pc. cast	composite	✔
2.5	2488	NA	Ford	Chihuahua, Mexico	32,500	AL/AL/CIL	I-4	89x100.1	9.7:1	171/ 4500	171 (232)/ 4500	SFI/DOHC/4vpc/BT	Escape; Mercury Mariner	FPMFS	1-pc. cast	composite	✔
2.5	2488	NA	Ford	Chihuahua, Mexico	35,000	AL/AL/CIL	I-4	89x100.1	12.3:1	155/ 6000	136 (184)/ 4500	SFI/DOHC/4vpc/BT/AC	Escape Hybrid; Mercury Mariner Hybrid	Plus 70 KW (94 hp) perm. magnet electric motor with 330-volt NiMH battery pack.			✔
3.0	2967	992	Ford	Cleveland #2, OH	87,500	AL/AL/CIL	V-6 (60º)	88.9x79.5	10.3:1	240/ 6550	223 (302/ 4300	SFI/DOHC/4vpc/RF	Fusion; Mercury Milan	FPMFS	assembled	CA	✔
3.0	2967	99S	Ford	Cleveland #2, OH	195,000	AL/AL/CIL	V-6 (60º)	88.9x79.5	10.0:1	240/ 6550	223 (302/ 4300	SFI/DOHC/4vpc/RF	Escape; Mercury Mariner	FPMFS	assembled	CA	✔
3.5	3496	NA	Ford	Lima, OH	214,000	AL/AL/CIL	V-6 (60º)	92.5x88.7	10.3:1	262-273/ 6250	248 (336)-250 (339)/ 4500	SFI/DOHC/4vpc/VCT/PRR	Edge, Flex, Fusion, Taurus; Lincoln MKX, MKZ	FPMFS	1-pc. cast	composite	✔
3.5	3496	NA	Ford	Cleveland #2, OH	32,000	AL/AL/CIL	V-6 (60º)	92.5x88.7	10.0:1	355/ 5700-365/ 5500	350 (475)/ 3500	DI/DOHC/4vpc/VCT/2Turbo/PRR	Flex, Taurus; Lincoln MKS, MKT	FPMFS	3 Cast / 1 AS	composite	✔
3.7	3731	NA	Ford	Cleveland #2, OH	2,000	AL/AL/CIL	V-6 (60º)	95.5x86.7	10.5:1	305/ 6500	280/ 4250	SFI/DOHC/4vpc/VCT/VI/PRR	Mustang	FPMFS	1-pc. cast	composite	✔
3.7	3726	NA	Ford	Lima, OH	35,000	AL/AL/CIL	V-6 (60º)	92.5x88.7	10.3:1	268-273/ 6250	270 (366)/ 4250	SFI/DOHC/4vpc/VCT/VI/PRR	Lincoln MKS, MKT	FPMFS	1-pc. cast	composite	✔
4.0	4009	99E/99K	Ford	Cologne, Germany	124,200	CI/AL	V-6 (60º)	100.4x84.4	9.7:1	207/ 5250-210/ 5300	238 (323)/ 3000- 244 (354)/ 3700	SFI/SOHC/RF	Mustang, Explorer, Ranger; Mercury Mountaineer	FS	1-pc. cast	composite	✔
4.6	4605	99W	Ford	Romeo #2, MI	55,000	CI/AL	V-8 (90º)	90.2x89.9	(a)9.0:1	225/ 4800-248/ 5750	286 (388)/ 3500-294 (399)/ 4000	SFI/SOHC/RRA	F-150, Econoline	FPMFS	assembled	RP	✔
4.6	4605	99W	Ford	Romeo #2, MI	84,700	CI/AL	V-8 (90º)	90.2x89.9	9.4:1	224/ 4800-239/ 4900	272 (369)/ 4000-287 (389)/ 4100	SFI/SOHC/RRA/E85	Crown Victoria; Lincoln Town Car; Mercury Gr. Marquis	FPMFS	assembled	RP	✔
4.6	4605	99W	Ford	Romeo #2, MI	4,000	AL/AL/CIL	V-8 (90º)	90.2x89.9	9.8:1	315/ 6000	325 (441)/ 4250	SFI/SOHC/3vpc/VCT	Mustang GT	FPMFS	assembled	composite	✔
4.6	4605	99H	Ford	Romeo #2, MI	54,000	AL/AL/CIL	V-8 (90º)	90.2x89.9	9.8:1	292/ 5000	315 (427)/ 4000	SFI/SOHC/RRA/3vpc	Explorer, Sport Trac, F150; Mercury Mountaineer	FPMFS	assembled	RP	✔
5.0	4951	NA	Ford	Windsor (Essex), ON, Canada	2,000	AL/AL	V-8 (90º)	92.2x92.7	11.0:1	412/ 6500	390 (529)/ 4250	SFI/DOHC/4vpc/VCT/VI/PRR	Mustang	FS	assembled	RP	✔
5.4	5409	99L	Ford	Windsor #2, ON, Canada	220,000	CI/AL	V-8 (90º)	90.2x105.8	9.0:1	255/ 4500	350 (474)/ 2500	SFI/SOHC/RRA	Econoline, F150	FPMFS	assembled	RP	✔
5.4	5409	995-3	Ford	Windsor #2, ON, Canada	26,000	CI/AL	V-8 (90º)	90.2x105.8	9.8:1	310/ 5000 [E320/ 5200]	365 (495)/ 35000 [E390 (525)/ 3500]	SFI/SOHC/3vpc/VCT/RFF/E85	Expedition, F-150; Lincoln Navigator	FPMFS	assembled	composite	✔
5.4	5409	995-3	Ford	Windsor #2, ON, Canada	500	CI/AL	V-8 (90º)	90.2x105.8	9.8:1	310/ 5000-320/ 5200	360 (488)-390 (529)/ 3500	SFI/SOHC/3vpc/VCT/RFF	F-150 SVT Raptor	FPMFS	assembled	composite	✔
5.4	5409	995-3	Ford	Windsor #2, ON, Canada	38,000	CI/AL	V-8 (90º)	90.2x105.8	9.8:1	300/ 5000	365 (495)/ 3750	SFI/SOHC/3vpc/VCT/RFF	F-Super Duty	FPMFS	assembled	composite	✔
5.4	5409	NA	Ford	Romeo #2, MI	1,000	CI/AL	V-8 (90º)	90.2x105.8	8.4:1	540/ 6250	510 (691)/ 4500	SFI/DOHC/4vpc/SPR/Int	Mustang Shelby GT500	FSFS	assembled	CA	✔
6.0	5954	NA	Navistar	Indianapolis, IN	29,500	CI/CI	V-8 (90º)	95x104.9	18.0:1	235/ 3150	440 (597)/ 1600	DI/OHV/4vpc/TRBO/RFA	Econoline	FPMFS	1-pc. forged	CA	✔
6.2	6210	NA	Ford	Romeo #2, MI	500	CI/AL	V-8 (90º)	NA	9.8:1	NA	NA	SFI/SOHC/VCT/RR/E85	F-Super Duty	FPMFS	assembled	RP	✔
6.4	6400	NA	Navistar	Indianapolis, IN	150,000	CI/CI	V-8 (90º)	98x1.04.9	17.1:1	350/ 3000	650 (881)/ 2000	DI/OHV/4vpc/TRBO/RFA	F-Super Duty	FPMFS	1-pc. forged	CA	✔
6.7	6651	NA	Ford	Chihuahua, Mexico	500	CGI/AL	V-8 (90º)	NA	16.1L1	NA	NA	DI/OHV/4vpc/TRBO/B20	F-Super Duty	FS	1-pc. forged		✔
6.8	6802	99S	Ford	Windsor Annex, ON, Canada	10,000	CI/AL	V-10 (90º)	90.2x105.8	9.0:1	305/ 4250	420 (569)/ 3250	SFI/SOHC/RF	Econoline	FPMFS	assembled	RP	✔
6.8	6802	99Y	Ford	Windsor Annex, ON, Canada	7,000	CI/AL	V-10 (90º)	90.2x105.8	9.2:1	362/ 4750	457 (620)/ 3250	SFI/SOHC/3vpc/RF	F-Super Duty	FPMFS	assembled	RP	✔
CHRYSLER																2009 CY TOTAL ENGINE VOLUME	953,700
2.0	1998	ECN	Chrysler	Dundee, MI	42,000	AL/AL/CIL	I-4	86x86	10.5:1	158/ 6400	141 (191)/ 5000	SFI/DOHC/4vpc/VVT	Dodge Caliber; Jeep Compass, Patroit	FPMFS	1-pc. cast	RP	✔
2.4	2360	ECN	Chrysler	Dundee, MI	90,000	AL/AL/CIL	I-4	88x97	10.5:1	173/ 6000	166 (225)/ 4400	SFI/DOHC/4vpc/VVT	Chrysler Sebring; Dodge Avenger, Caliber, Journey; Jeep Patriot, Compass	FPMFS	1-pc. cast	RP	✔
2.4	2429	EDZ	Chrysler	Saltillo, Mexico	15,000	CI/AL	I-4	87.5x101	9.5:1	150/ 5100	165 (224)/ 4000	SFI/DOHC/4vpc/RF	Chrysler PT Cruiser	FPMFS	1-pc. cast	RP	✔
2.7	2736	EER	Chrysler	Kenosha, WI	31,000	AL/AL/CIL	V-6 (60º)	86x78.5	9.9:1	186/ 5500	191 (259)/ 4000	SFI/DOHC/4vpc/RF/E85	Dodge Avenger; Chrysler Sebring	FPMFS	assembled	RP	✔
2.7	2736	EER	Chrysler	Kenosha, WI	21,000	AL/AL/CIL	V-6 (60º)	86x78.5	9.9:1	178/ 5500	190 (258)/ 4000	SFI/DOHC/4vpc/RF	Chrysler 300; Dodge Charger	FPMFS	assembled	RP	✔
3.3	3301	EGV	Chrysler	Trenton, MI	79,200	CI/AL	V-6 (60º)	93x81	9.4:1	175/ 5000	205 (278)/ 4000	SFI/OHV/PRA/RT/E85	Chrysler Town & Country; Dodge Grand Caravan	FSFS	1-pc. cast	CA/RP	✔
3.5	3518	EGF	Chrysler	Kenosha, WI	40,500	AL/AL/CIL	V-6 (60º)	96x81	9.8:1	235/ 6400	232 (315)/ 4000	SFI/SOHC/4vpc/RRA	Chrysler Sebring; Dodge Avenger, Journey	FSFS	1-pc. cast	CA/RP	✔
3.5	3518	EGG	Chrysler	Kenosha, WI	19,000	AL/AL/CIL	V-6 (60º)	96x81	9.8:1	250/ 6400	250 (340)/ 3800	SFI/SOHC/4vpc/RRA	Chrysler 300; Dodge Challenger, Charger	FSFS	1-pc. cast	CA/RP	✔
3.7	3701	EKG	Chrysler	Detroit, MI	171,000	CI/AL	V-6 (90º)	93x90.8	(b)9.7:1	210-215/ 5200	235 (319)/ 4000	SFI/SOHC/RF	Dodge Dakota, Nitro; Ram Pickup; Jeep Commander, Gr. Cherokee, Liberty	FPMFS	assembled	RP	✔
3.8	3778	EGL	Chrysler	Trenton, MI	105,200	CI/AL	V-6 (60º)	96x87	9.7:1	197/ 5200	230 (312)/ 4000	SFI/OHV/PRA/RT	Chrysler Town & Country; Dodge Grand caravan	FSFS	1-pc. cast	CA/RP	✔
3.8	3778	EGT	Chrysler	Trenton, MI	89,000	CI/AL	V-6 (60º)	96x87	9.6:1	202/ 5000	237 (321)/ 4000	SFI/OHV/PRA/RT	Jeep Wrangler, Wrangler Unlimited	FSFS	1-pc. cast	CA/RP	✔
4.0	3952	EGQ	Chrysler	Trenton, MI	18,000	AL/AL/CIL	V-6 (60º)	96x91	10.3:1	251-260/ 6000	259-265 (351)/ 4200	SFI/SOHC/4vpc/RRA	Chrysler Town & Country; Dodge Grand Caravan, Nitro	FSFS	1-pc. cast	CA/RP	✔
4.7	4701	EVA	Chrysler	Detroit, MI	16,400	CI/AL	V-8 (90º)	93x86.5	9.0:1	302/ 5650	329 (446)/ 3950	SFI/ETC/SOHC/RRA	Dodge Dakota	FSFS	assembled	RP	✔
4.7	4701	EVA	Chrysler	Detroit, MI	70,400	CI/AL	V-8 (90º)	93x86.5	9.8:1	310/ 5650	330 (447)/ 3950	SFI/ETC/SOHC/RRA/E85	Ram Pickup	FSFS	assembled	RP	✔
5.7	5654	EZB	Chrysler	Satillo, Mexico	96,000	CI/AL	V-8 (90º)	99.5x90.9	10.5:1	360-375/ 5200	389 -410 (542)/ 4300	SFI/ETC/OHV/VCT/PRA/RT/CD	Chrysler 300; Dodge Challenger, Charger; Jeep Commander, Grand Cherokee; Ram Pickup	FPMFS	1-pc. cast	RP	✔
5.7	5654	EZA	Chrysler	Satillo, Mexico	9,600	CI/AL	V-8 (90º)	99.5x90.9	9.6:1	383-390/ 5600	400-407 (542)/ 4000	SFI/ETC/OHV/VCT/PRA/RT	Ram HD Pickup	FPMFS	1-pc. cast	RP	✔
6.1	6059	NA	Chrysler	Satillo, Mexico	4,000	CI/AL	V-8 (90º)	103.0x90.9	10.3:1	420-425/ 6000	420 (569)/ 4800	SFI/ETC/OHV/4vpc/PRA/RT	Chrysler 300 SRT8; Dodge Challenger SRT8, Charger SRT8	FPMFS	1-pc. cast	CA	✔
6.7	6690	NA	Cummins	Columbus, IN	36,000	CI/CI	I-6	107X124	17.3:1	305-350/ 3000	610-650 (881)/ 1400-1600	DI/OHV/TRBO/RFA	Ram HD Pickup	FSFS	1-pc. cast	CA	✔
8.4	8437	EWC	Chrysler	Detroit, MI	400	AL/AL/CIL	V-10 (90º)	103x100.6	10.2:1	600/ 6000	560 (760)/ 5100	SFI/OHV/PRR	Viper	FPMFS	Cam-InCam	CA	✔
BMW																2009 CY TOTAL ENGINE VOLUME	279,800
1.6	1598	N12	BMW	N. Warwickshire, England	23,800	AL/AL	I-4	77x85.8	11.0:1	118/ 6000	114 (155)/ 4250	DI/DOHC/4vpw/VVTL	Mini Cooper		assembled		✔
1.6	1598	N14	BMW	N. Warwickshire, England	22,100	AL/AL	I-4	77x85.8	10.5:1	172/ 5500	177 (240)/ 1600	DI/DOHC/4vpc/TRBO/VVTL	Mini Cooper S		assembled		✔
3.0	2996	N52	BMW	Steyr, Austria	167,300	MAL/AL/CIL	I-6	85x88	10.7:1	230/ 6500-260/ 6600	200 (271)-225 (305)/ 2750	SFI/DOHC/4vpc/VVT	128i, 328i, 528i, Z4, X3, X5	FSFS	assembled	RP	✔
3.0	2979	N54	BMW	Steyr, Austria	12,500	AL/AL/CIL	I-6	84x89.6	10.2:1	300/ 5800	300 (407)/ 1400	DI/DOHC/4vpc/VVT/2TRBO/Int	135i, 335i, 535i, Z4	FSFS	assembled	RP	✔
3.0	2993	N57	BMW	Steyr, Austria	4,000	CI/AL	I-6	84x90	16.5:1	265/ 4200	425 (580)/ 1750	DI//DOHC/4vpc/TRBO/Int	335d, X5	FSFS	assembled		✔
4.0	3999	S54	BMW	Munich, Germany	2,000	AL/AL/CIL	V-8 (90º)	92x75.2	12.0:1	414/ 8300	295 (400)/ 3900	DI/DOHC/4vpc/VVT	M3	FPMFS	1-pc. cast		✔
4.4	4395	N63	BMW	Munich, Germany	800	AL/AL/CIL	V-8 (90º)	89x88.3	9.3:1	555/ 6000	500 (678)/ 1800	DI/DOHC/4vpc/VVT/ 2TRBO/Int	X5 M, X6 M	FPMFS	assembled		✔
4.4	4395	NA	BMW	Munich, Germany	800	AL/AL/CIL	V-8 (90º)	89x88.3	10.0:1	400/ 5500	450 (610)/ 1800	DI/DOHC/4vpc/VVT/2TRBO/Int	750i	FPMFS	assembled		✔
4.8	4799	N62	BMW	Munich, Germany	41,500	AL/AL/CIL	V-8 (90º)	93x88.3	10.5:1	350-360/ 6300	350 (474)-360 (488)/ 3400	SFI/DOHC/4vpc/VVT	550i, 650i, X5	FPMFS	assembled		✔
5.0	4999	S65	BMW	Munich, Germany	3,000	AL/AL/CIL	V-10 (60º)	90x75.2	11.3:1	500/ 7750	383 (500)/ 6100	DI/DOHC/4vpc/VVTL	M5, M6	FSFS	1-pc. cast		✔
6.0	5972	NA	BMW	Munich, Germany	500	AL/AL/CIL	V-12 (60º)	89x80	10.0:1	595/ 5200	550 (746)/ 1500	DI/DOHC/4vpc/VVTL/ 2TRBO/Int	760i	FSFS	assembled		✔
6.6	6590	NA	BMW	Munich, Germany	500	AL/AL/CIL	V-12 (60º)	89x88.3	10.0:1	563/ 5250	575 (780)/ 1500	DI/DOHC/4vpc/VVTL/2TRBO/Int	Rolls-Royce Ghost	FSFS	assembled		✔
6.8	6750	N74	BMW	Munich, Germany	1,000	AL/AL/CIL	V-12 (60º)	91.9x84.6	11.0:1	453/ 5350	531 (720)/ 3500	DI/DOHC/4vpc/VVTL	Rolls-Royce Phantom	FSFS	assembled		✔
DAIMLER																2009 CY TOTAL ENGINE VOLUME	238,700
1.0	999	NA	MB/Mitsubishi	Japan	18,000	AL/AL	I-3	72x81.8	9.8:1	70/ 5800	68 (92)/ 4500	SFI/DOHC/4vpc	Smart Fortwo				
3.0	2996	M212	MB	Bad Cannstatt, Germany	42,000	AL/AL/SAL	V-6 (90º)	86x82.1	11.3:1	228/ 6000	221 (300)/ 2700	SFI/ETC/SOHC/3vpc/VI	Mercedes C300, SLK300	FS	FS	magnesium	✔
3.0	2987	M272	MB	Bad Cannstatt, Germany	21,500	AL/AL/CIL	V-6 (90º)	83x92	16.5:1	210/ 3800	398 (540)/ 1400-400 (542)/ 1600	DI/DOHC/4vpc/TRBO/Int	Mercedes ML350 BTC; GL350 BTC, R350 BTC	FS	assembled	CA	✔
3.5	3498	M112 E35D	MB	Bad Cannstatt, Germany	92,000	AL/AL/CIL	V-6 (90º)	92.9x86	10.7:1	268/ 6000	258 (350)/ 2400	SFI/DOHC/4vpc/VI	Mercedes C350, E350, GLK350, ML350, R350	FSFS	assembled	magnesium	✔
3.5	3498	M112 E35D	MB	Bad Cannstatt, Germany	400	AL/AL/CIL	V-6 (90º)	92.9x86	10.7:1	275/ 6000	258 (350)/30\00	SFI/DOHC/4vpc/VI/AC	Mercedes ML350 Hybrid	Plus two transmission-integral electric motors rated at 83-hp, 173 lb.-ft. (000 Nm) front and 80-hp, 172 -lb.-ft. (000 Nm) rear with liquid-cooled 288-volt nickel-metal hydride battery pack.			✔
3.5	3498	M112 E35D	MB	Bad Cannstatt, Germany	100	AL/AL/CIL	V-6 (90º)	92.9x86	10.7:1	275/ 6000	258 (350)/30\00	SFI/DOHC/4vpc/VI/AC	Mercedes S400 Hybrid	Plus a 20-hp, 118 lb.-ft. (000 Nm) 3-phase electric motor with a 144-volt lithium-ion battery pack.			✔
3.5	3498	M112 E35D	MB	Bad Cannstatt, Germany	800	AL/AL/SAL	V-6 (90º)	92.9x86	11.7:1	300/ 6500	265 (359)/4900	SFI/DOHC/4vpc	Mercedes SLK350	assembled	assembled	magnesium	✔
4.7	4663	NA	MB	Bad Cannstatt, Germany	2,200	AL/AL/SAL	V-8 (90º)	92.9x86	10.7:1	335/ 6000	339 (460)/ 2700	SFI/ETC/SOHC/3vpc/VI	GL450	FS	FS	magnesium	✔
5.4	5439	M113E55AMG	AMG	Affalterbach, Germany	100	AL/AL/SAL	V-8 (90º)	97x92	9.0:1	500/ 6100	516 (700)/ 2750	SFI/ETC/SOHC/3vpc/SPR/2int	Mercedes G55 AMG	FS	assembled	magnesium	✔
5.4	5439	M113E55AMG	AMG	Affalterbach, Germany	200	AL/AL/SAL	V-8 (90º)	97x92	11.0:1	355/ 5750	376 (510)/ 4000	SFI/ETC/SOHC/3vpc	Mercedes SLK55 AMG	FS	assembled	magnesium	✔
5.5	5461	NA	MB	Bad Cannstatt, Germany	51,400	AL/AL/CIL	V-8 (90º)	98x90.5	10.7:1	382/ 6000	391 (530)/ 2800	SFI/ETC/SOHC/3vpc/VI	Mercedes CL550, CLS550, E550, G550, GL550, ML550, S550, SL550	FS	FS	magnesium	✔
5.5	5513	M285	MB	Berlin, Germany	4,000	AL/AL/SAL	V-12 (60º)	82x87	9.0:1	510/ 5000-550/ 5250	612 (830)/ 1800-664 (900)/ 2300	SFI/SOHC/2spark/3vpc/2TRBO/2Int	Maybach 57, Maybach 62; Mercedes CL600, S600, SL600	FS	assembled	magnesium	✔
6.0	5980	M275 AMG	AMG	Affalterbach, Germany	1,200	AL/AL/SAL	V-12 (60º)	82.6x93	9.0:1	604/ 4800-612/ 4800	738 (1000)/ 2000	SFI/SOHC/3vpc/2TRBO/2Int	Maybach 57 S, Mercedes CL65 AMG, S65 AMG, SL65 AMG	FS	assembled		✔
6.2	6208	NA	AMG	Affalterbach, Germany	4,800	AL/AL/CIL	V-8 (90º)	102.2x94.6	11.3:1	475-518/ 6800	443 (601)/ 5000-465 (630)/ 5200	SFI/ETC/DOHC/4vpc/VI	Mercedes C63 AMG, CLS63 AMG, E63 AMG, ML63 AMG, S63 AMG, SL63 AMG	1-pc. cast	1-pc. cast	magnesium	✔
FUJI HEAVY INDUSTRIES																2009 CY TOTAL ENGINE VOLUME	240,400
2.5	2457	EJ25	Subaru	Gumma, Japan; Lafayette, IN	162,000	AL/AL/CIL	Bxr-4	99.5x79	10.0:1	170/ 6000	170 (230)/ 4400	SFI/ETC/SOHC/4vpc/VVL	Subaru Forester, Impreza, Legacy, Outback	FS	assembled	CA	
2.5	2457	EJ25	Subaru	Gumma, Japan; Lafayette, IN	9,400	AL/AL/CIL	Bxr-4	99.5x79	8.2:1	305/ 6000	290 (393)/ 4400	SFI/ETC/DOHC/4vpc/VVT/TRBO/Int	Subaru Impreza Sti	FS	assembled	CA	
2.5	2457	EJ25	Subaru	Gumma, Japan; Lafayette, IN	41,800	AL/AL/CIL	Bxr-4	99.5x79	8.4:1	224/ 5200-265/ 6000	226 (306)/ 2800-258 (350)/ 2000	SFI/ETC/DOHC/4vpc/VVT/TRBO/Int	Subaru Forester, Impreza, Legacy	FS	assembled	CA	
3.6	3630	EJ36	Subaru	Gumma, Japan	27,200	AL/AL/CIL	Bxr-6	92x91	10.5:1	256/ 6000	247 (335)/ 4400	SFI/ETC/DOHC/4vpc/VVTL	Subaru Legacy, Outback, Tribeca	FSFS	assembled	CA	
HONDA																2009 CY TOTAL ENGINE VOLUME	1,082,700
1.3	1339	NA	Honda	Suzuka, Japan	21,200	AL/AL/CIL	I-4	73x80	10.8:1	98/ 5800	123 (167)/ 1000	SFI/SOHC/2vpc/i-VTEC	Insight	Plus 13 hp, 58 lb.-ft., (79 Nm) torque perm. magnet motor with 100-volt NiMH battery			
1.3	1339	NA	Honda	Suzuka, Japan	15,600	AL/AL/CIL	I-4	73x80	10.8:1	110/ 6000	123 (167)/ 1000	SFI/SOHC/2vpc/i-VTEC	Civic Hybrid	Plus 20 hp, 76 lb.-ft., (103 Nm) torque perm. magnet motor with 144-volt NiMH battery			
1.5	1497	L15A	Honda	Suzuka, Japan	82,700	AL/AL/CIL	I-4	73x 89.4	10.4:1	117/ 6600	106 (144)/ 4800	SFI/ETC/SOHC/4vpc/i-VTEC/RRA	Fit	FS	1-pc. cast	CA	✔
1.8	1799	R18A	Honda	Anna, OH; Alliston, ON, Canada	245,800	AL/AL/CIL	I-4	81x87.3	10.5:1	140/ 6300	128 (174)/ 4300	SFI/ETC/SOHC/4vpc/i-VTEC/RRA	Civic	FS	1-pc. cast	CA	✔
1.8	1799	NA	Honda	Anna, OH	2,000	AL/AL/CIL	I-4	81x87.3	12.5:1	113/ 6300	109 (148)/ 4300	SFI/ETC/SOHC/4vpc/i-VTEC/RRA/Nat. Gas	Civic GX	FS	1-pc. cast	CA	✔
2.0	1998	K20Z3	Honda	Anna, OH	20,600	AL/AL/CIL	I-4	86x86	11.1:1	197/ 7800	139 (188)/ 6100	SFI/ETC/DOHC/4vpc/i-VTEC	Civic Si	FS			
2.3	2300	NA	Honda	Anna, OH	8,400	AL/AL/FRM	I-4	86x99	8.8:1	240/ 6000	260 (353)/ 4500	DI/ETC/DOHC/4vpc/i-VTEC/TRBO/Int	Acura RDX	FS	1-pc. cast	CA	
2.4	2354	K24A	Honda	Anna, OH	12,800	AL/AL/CIL	I-4	87x99	9.7:1	166/ 5800	161 (218)/ 4200	SFI/ETC/DOHC/4vpc/i-VTEC	Element	FS	1-pc. cast	CA	✔
2.4	2354	K24A	Honda	Anna, OH	171,500	AL/AL/CIL	I-4	87x99	10.5:1	180/ 6800	161 (218)/ 4400	SFI/ETC/DOHC/4vpc/i-VTEC	CR-V	FS	1-pc. cast	CA	✔
2.4	2354	K24A	Honda	Anna, OH	221,800	AL/AL/CIL	I-4	87x99	10.5:1	177/ 6500-190/ 7000	161 (219)/ 4300-162 (220)/ 4400	SFI/ETC/DOHC/4vpc/i-VTEC	Accord	FS	1-pc. cast	CA	✔
2.4	2354	K24A	Honda	Sayama, Japan	28,000	AL/AL/CIL	I-4	87x99	11.0:1	201/ 7000	170 (230)/ 4300-172 (233)/ 4400	SFI/DOHC/4vpc/i-VTEC	Acura TSX	FS	1-pc. cast	CA	
3.5	3471	J35A6	Honda	Lincoln, AL	105,500	AL/AL/CIL	V-6 (60º)	89x93	10.0:1	244/ 5750-250/ 5700	240 (319/ 5000-247 (327)/ 4300	SFI/ETC/SOHC/4vpc/VTEC	Odyssey, Ridgeline	FPMFS	1-pc. cast	CA	✔
3.5	3471	J35A7	Honda	Lincoln, AL	43,000	AL/AL/CIL	V-6 (60º)	89x93	10.0:1	244-250/ 5700	245 (331)/ 4900-253 (343)/ 4800	SFI/ETC/SOHC/4vpc/i-VTEC/CD	Odyssey EX-L & Touring, Pilot	FPMFS	1-pc. cast	CA	✔
3.5	3471	J35A7	Honda	Anna, OH; Lincoln, AL	42,600	AL/AL/CIL	V-6 (60º)	89x93	10.0:1	271/ 6200	251 (340)-254 (344)/ 5000	SFI/ETC/SOHC/4vpc/i-VTEC/CD	Accord, Accord Crosstour	FPMFS	1-pc. cast	CA	
3.5	3471	J35A	Honda	Anna, OH	25,000	AL/AL/CIL	V-6 (60º)	89x93	11.2:1	280/ 6200	254 (344)/ 5000	SFI/SOHC/4vpc/VTEC	Acura TL	FSFS	1-pc. cast	CA	✔
3.7	3664	NA	Honda	Sayama, Japan; Anna, OH	36,200	AL/AL/CIL	V-6 (60º)	86x99	11.2:1	300-305/ 6300	270 (366)/ 4500-273 (370)/ 5000	SFI/SOHC/4vpc/VTEC	Acua MDX, RL, TL SH-AWD, ZDX	FSFS	1-pc. cast	CA	
HUMMER																2009 CY TOTAL ENGINE VOLUME	5,000
3.7	3651	LLR	GM	Flint, MI	3,300	AL/AL/CIL	I-5	95.5x102	10.0:1	239/ 5600	241 (327)/ 4600	SFI/ETC/DOHC/4vpc/VVT/RF	Hummer H3	FPMFS	1-pc. CNI	composite	✔
5.3	5328	LH8	GM	Romulus, MI	1,600	AL/AL/CIL	V-8 (90º)	96x92	9.9:1	300/ 5200	320 (434)/ 4000	SFI/ETC/OHV/PRR	Hummer H3 Alpha	FPMFS	HS	composite	✔
6.2	6162	L94	GM	Romulus, MI	100	AL/AL/CIL	V-8 (90º)	103.3x92	10.4:1	393/ 5700	414 (563)/ 4300	SFI/ETC/OHV/RRA/VVT	Hummer H2	FPMFS	HS	composite	✔
HYUNDAI																2009 CY TOTAL ENGINE VOLUME	538,300
1.6	1595	Alpha II	Hyundai	Ulsan, S. Korea	65,700	CI/AL	I-4	76.5x87	10.0:1	110/ 6000	106 (144)/ 4500	SFI/DOHC/4vpc/VVT	Accent	FS	1-pc. cast	Plastic/Nylon	✔
2.0	1975	Beta	Hyundai	Ulsan, S. Korea	130,000	CI/AL	I-4	82x93.5	10.3:1	138/ 6000	136 (183)/ 4600	SFI/DOHC/4vpc/VVT	Elantra	FS	1-pc. cast	CA	
2.4	2359	Theta II	Hyundai	Asan, S. Korea; Montgomery, AL	62,500	AL/AL/CIL	I-4	88x97	10.5:1	168/ 4000-175/ 6000	163 (221)-168 (228)/ 4000	SFI/DOHC/4vpc/VVT	Sonata, Santa Fe	FS	1-pc. cast	Plastic/Nylon	✔
2.4	2359	Theta II GDi	Hyundai	Asan, S. Korea; Montgomery, AL	18,300	AL/AL/CIL	I-4	88x97	10.5:1	176-200/ 6300	168 (228)- 186 (252)/ 4250	DI/DOHC/4vpc/VVT	Sonata, Santa Fe, Tuscon	FS	assembled	Plastic/Nylon	✔
3.3	3342	Lambda	Hyundai	Asan, S. Korea; Montgomery, AL	155,300	AL/AL/CIL	V-6 (60º)	92x83.8	10.0:1	234-249/ 6000	226 (306)-229 (310)/ 3500	SFI/DOHC/4vpc/VVT	Azera, Sonata	FPMFS	1-pc. cast	Plastic/Nylon	✔
3.5	3470	Lambda II	Hyundai	Asan, S. Korea, Montgomery, AL	20,500	AL/AL/CIL	V-6 (60º)	92x87	10.4:1	276/ 6300-290/ 6600	248 (336)-338 (458)/ 5000	SFI/DOHC/4vpc/VVT	Azera, Sante Fe	FPMFS	1-pc. cast	Plastic/Nylon	✔
3.8	3778	Lambda	Hyundai	Asan, S. Korea	58,500	AL/AL/CIL	V-6 (60º)	96x87	10.4:1	263/ 6000-290/ 6200	257 (349)/ 5500-264 (358)/ 4500	SFI/DOHC/4vpc/VVT	Azera, Genesis, Veracruz	FPMFS	1-pc. cast	Plastic/Nylon	
4.6	4627	TAU	Hyundai	Ulsan, S. Korea	27,500	AL/AL/CIL	V-8 (60º)	92x87	10.4:1	368-375/ 6500	324 (439)-333 (452)/ 3500	SFI/DOHC/4vpc/VVT	Genesis	FPMFS	1-pc. cast	Plastic/Nylon	✔
JAGUAR																2009 CY TOTAL ENGINE VOLUME	12,000
4.2	4196	AJ34	Jaguar	Ford-Bridgend, Wales	4,500	AL/AL/CIL	V-8 (90º)	86x90.3	11.0:1	300/ 6000	303 (411)/ 4100	SFI/ETC/DOHC/4vpc/VCT	Jaguar XF, XK, XJ	FPMFS	1-pc. cast	RP	✔
5.0	5000	NA	Jaguar	Ford-Bridgend, Wales	5,500	AL/AL/CIL	V-8 (90º)	92.5x93.0	11.5:1	385/ 6500	380 (515)/ 3500	DI/ETC/DOHC/4vpc/VCT	Jaguar XF, XK, XJ	FPMFS	1-pc. cast	RP	✔
5.0	5000	NA	Jaguar	Ford-Bridgend, Wales	2,000	AL/AL/CIL	V-8 (90º)	92.5x93.0	9.5:1	510/ 6000	461 (625)/ 2500	DI/ETC/DOHC/4vpc/SPR VCT	Jaguar XF, XFR, XK, XJR	FPMFS	1-pc. cast	RP	✔
KIA																2009 CY TOTAL ENGINE VOLUME	346,200
1.6	1595	Alpha II	Hyundai	Hwasung, S. Korea;	34,600	CI/AL	I-4	76.5x87	10.0:1	110/ 6000	107 (145)/ 4500	SFI/DOHC/4vpc/VVT	Rio, Rio5	FS	1-pc. cast	Plastic/Nylon	✔
1.6	1591	GAMMA	Hyundai	Hwasung, S. Korea;	26,000	CI/AL	I-4	76.5x87	10.5:1	122/ 6300	115 (154)/ 4200	SFI/DOHC/4vpc/VVT	Soul	FS	1-pc. cast	Plastic/Nylon	
2.0	1975	Beta	Hyundai	Hwasung, S. Korea;	31,000	CI/AL	I-4	82x93.5	10.5:1	140-142/ 6000	136 (184)/ 4500-137 (186)/ 4600	SFI/DOHC/4vpc/VVT	Soul, Sportage	FS	1-pc. cast	CA	
2.0	1998	Beta II	Hyundai	Hwasung, S. Korea;	72,000	CI/AL	I-4	86x86	10.5:1	156/ 6200	144 (195)/ 4300	SFI/DOHC/4vpc/VVT	Forte	FS	1-pc. cast	CA	
2.4	2359	Theta II	Hyundai	Hwasung, S. Korea; Montgomery, AL	83,500	AL/AL/CIL	I-4	86.5x100	10.5:1	173-175/6000	168 (228)-169 (229)/ 4000	SFI/DOHC/4vpc	Forte, Optima, Rondo	FS	1-pc. cast	Plastic/Nylon	✔
2.4	2359	Theta II GDi	Hyundai	Asan, S. Korea; Montgomery, AL	15,500	AL/AL/CIL	I-4	88x97	10.5:1	175/ 6000	169 (229)/ 3750	DI/DOHC/4vpc/VVT	Sorento, Sportage		assembled	Plastic/Nylon	✔
2.7	2656	Delta	Hyundai	Asan, S. Korea	18,000	AL/AL/CIL	V-6 (60º)	86.7x75	10.4:1	173-194/ 6000	178 (241)-184 (249)/ 4000	SFI/DOHC/4vpc	Optima, Rondo, Sportage	FPMFS	1-pc. cast	CA	
3.5	3470	Lambda II	Hyundai	Sohari, S. Korea; Montgomery, AL	27,600	AL/AL/CIL	V-6 (60º)	92x87	10.4:1	290/6600	338 (458)/5000	SFI/DOHC/4vpc/VVT	Sorento	FPMFS	1-pc. cast	Plastic/Nylon	✔
3.8	3778	Lambda	Hyundai	Ulsan, S. Korea	38,000	AL/AL/CIL	V-6 (60º)	96x87	10.4:1	244/ 6000	253 (343)/ 3500	SFI/DOHC/4vpc	Sedona	FPMFS	1-pc. cast	Plastic/Nylon	✔
LAND ROVER																2009 CY TOTAL ENGINE VOLUME	26,300
3.2	3192	NA	Volvo	Skovde, Sweden	4,300	AL/AL	I-6	84x96	10.8:1	230/ 6300	234 (320)/ 3200	SFI/DOHC/4vpc/VVT	Land Rover LR2	FSFS	assembled	CA	✔
5.0	5000	NA	Jaguar	Ford-Bridgend, Wales	19,400	AL/AL/CIL	V-8 (90º)	92.5x93.0	11.5:1	375/ 6500	375 (508)/ 3500	DI/ETC/DOHC/4vpc/VCT	Land Rover LR4, Range Rover HSE; Range Rover Sport HSE	FPMFS	1-pc. cast	RP	✔
5.0	5000	NA	Jaguar	Ford-Bridgend, Wales	2,600	AL/AL/CIL	V-8 (90º)	92.5x93.0	9.5:1	510/ 6000	461 (625)/ 2500	DI/ETC/DOHC/4vpc/SPR VCT	Land Rover Range Rover S/C; Range Rover Sport S/C	FPMFS	1-pc. cast	RP	✔
MAZDA																2009 CY TOTAL ENGINE VOLUME	299,200
1.3	1308	RENESIS	Mazda	Japan	2,800	AL/NA	Rotary	NA	10.0:1	212/ 7500-232/ 8500	159 (216)/ 5500	SFI/2-rotor	RX-8	--	--	--	
2.0	1999	LFX	Mazda	Japan	134,300	AL/AL/CIL	I-4	87.5x83.1	10.0:1	148/ 6500	135 (183)/ 4500	SFI/DOHC/4vpc/VVT	Mazda3	FPMFS	1-pc. cast	CA	
2.0	1999	LFX	Mazda	Japan	8,500	AL/AL/CIL	I-4	87.5x83.1	10.8:1	158/ 6700-167/ 7000	140 (192)/ 5000	SFI/DOHC/4vpc/VVT	MX-5	FPMFS	1-pc. cast	CA	

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5.0	5000	NA	Jaguar	Ford-Bridgend, Wales	19,400	AL/AL/CIL	V-8 (90º)	92.5x93.0	11.5:1	375/ 6500	375 (508)/ 3500	DI/ETC/DOHC/4vpc/VCT	Land Rover LR4, Range Rover HSE; Range Rover Sport HSE	FPMFS	1-pc. cast	RP	✔
5.0	5000	NA	Jaguar	Ford-Bridgend, Wales	2,600	AL/AL/CIL	V-8 (90º)	92.5x93.0	9.5:1	510/ 6000	461 (625)/ 2500	DI/ETC/DOHC/4vpc/SPR VCT	Land Rover Range Rover S/C; Range Rover Sport S/C	FPMFS	1-pc. cast	RP	✔
MAZDA																2009 CY TOTAL ENGINE VOLUME	299,200
1.3	1308	RENESIS	Mazda	Japan	2,800	AL/NA	Rotary	NA	10.0:1	212/ 7500-232/ 8500	159 (216)/ 5500	SFI/2-rotor	RX-8	--	--	--	
2.0	1999	LFX	Mazda	Japan	134,300	AL/AL/CIL	I-4	87.5x83.1	10.0:1	148/ 6500	135 (183)/ 4500	SFI/DOHC/4vpc/VVT	Mazda3	FPMFS	1-pc. cast	CA	
2.0	1999	LFX	Mazda	Japan	8,500	AL/AL/CIL	I-4	87.5x83.1	10.8:1	158/ 6700-167/ 7000	140 (192)/ 5000	SFI/DOHC/4vpc/VVT	MX-5	FPMFS	1-pc. cast	CA	
2.3	2261	L3-VDT	Mazda/Ford	Japan	26,100	AL/AL/CIL	I-4	87.5x94	9.7:1	153/ 6500	148 (201)/ 4500	DI/DOHC/4vpc/VVT	Mazda5	FS	1-pc. cast		
2.3	2261	L3-VDT	Mazda/Ford	Japan	33,000	AL/AL/CIL	I-4	87.5x94	9.5:1	244/ 5000-263/ 5500	258 (350)/ 2500-280 (380)/ 3000	DI/DOHC/4vpc/TRBO/Int/VVT	CX-7, MazdaSpeed3	FS	1-pc. cast		
2.5	2488	NA	Ford	Chihuahua, Mexico, Japan	45,000	AL/AL/CIL	I-4	89x100.1	9.7:1	161/ 6000-171/ 6000	148 (201)-171 (232)/ 4500	SFI/DOHC/4vpc/BT	CX-7, Mazda3, Mazda6, Tribute	FPMFS	1-pc. cast	composite	✔
2.5	2488	NA	Ford	Chihuahua, Mexico	2,500	AL/AL/CIL	I-4	89x100.1	12.3:1	153/ 6000	136 (184)/ 4500	SFI/DOHC/4vpc/BT/AC	Tribute Hybrid	Plus 70 KW (94 hp) perm. magnet electric motor with 330-volt NiMH battery pack.			✔
3.0	2967	99S	Ford	Cleveland #2, OH	15,500	AL/AL/CIL	V-6 (60º)	88.9x79.5	10.0:1	240/ 6550	223 (302/ 4300	SFI/DOHC/4vpc/RF	Tibute	FPMFS	assembled	CA	✔
3.7	3726	NA	Mazda	Japan	31,500	AL/AL/CIL	V-6 (60º)	95.5x86.7	10.3:1	272-273/ 6250	269 (365)/ 4250-270 (366)/ 4500	SFI/DOHC/4vpc/VVT	CX-9, Mazda6	FPMFS	1-pc. cast	CA	
MITSUBISHI																2009 CY TOTAL ENGINE VOLUME	85,600
2.0	1998	4B11	Mitsubishi	Shiga, Japan	6,500	AL/AL/CIL	I-4	86x86	9.0:1	237/ 6000	253 (343)/ 2500	SFI/SOHC/4vpc/VVT/TRBO/Int	Lancer Sportback Ralliart	FS	1-pc. cast	CA	✔
2.0	1998	4B11 T/C	Mitsubishi	Shiga, Japan	1,000	AL/AL/CIL	I-4	86x86	9.0:1	291/ 6500	300 (407)/ 4400	SFI/SOHC/4vpc/RF/TRBO/Int	Lancer Evolution	FS	1-pc. cast	CA	✔
2.4	2378	4G69	Mitsubishi	Shiga, Japan	48,700	CI/AL	I-4	87x100	9.5:1	155/ 4000-167/ 4100	157 (213)-162 (220)/ 4000	SFI/SOHC/4vpc/VVT/RF	Lancer, Lancer Sportback, Galant, Eclipse	FS	1-pc. cast	CA	
2.4	2360	4B12	Mitsubishi	Shiga, Japan	6,600	AL/AL/CIL	I-4	88x97	10.5:1	168/ 6000	167 (226)/ 4100	SFI/SOHC/4vpc/VVT/RF	Outlander	FS	1-pc. cast	CA	✔
3.0	2998	6B31	Mitsubishi	Japan	7,300	AL/AL	V-6 (60º)	87.6x82.9	10.5:1	230 / 6250	215 (292)/ 3750	SFI/SOHC/4vpc/VVT/RF	Outlander	FS	1-pc. cast	CA	✔
3.8	3828	6G75	Mitsubishi	Japan	15,500	CI/AL	V-6 (60º)	95x90	10.5:1	225/ 5000-265/ 5750	255 (346)/ 4000-262 (355)/ 4500	SFI/SOHC/4vpc	Eclipse, Endeavor	FS	1-pc. cast	CA	✔
NISSAN																2009 CY TOTAL ENGINE VOLUME	942,700
1.6	1597	HR16DE	Nissan	Aguascalientes, Mexico	8,500	AL/AL/CIL	I-4	78x83	9.8:1	107/ 6000	111 (151)/ 4600	SFI/DOHC/4vpc	Versa	FS	1-pc. cast	CA	✔
1.8	1798	MR18DE	Nissan	Aguascalientes, Mexico	119,000	AL/AL/CIL	I-4	84x81.1	9.9:1	122/ 5200	125 (172)/ 4800	SFI/DOHC/4vpc/VVT	Versa	FS	1-pc. cast	CA	✔
2.0	1995	MR20DE	Nissan	Aguascalientes, Mexico	185,000	AL/AL/CIL	I-4	84x90.1	9.7:1	140/ 5100	147 (199)/ 4800	SFI/DOHC/4vpc/VVT	Sentra	FS	1-pc. cast	Plastic/Nylon	✔
2.0	1995	QR20DE	Nissan	Yokahama, Japan	45,000	AL/AL/CIL	I-4	84x90.1	9.7:1	140/ 5100	147 (199)/ 4800	SFI/DOHC/4vpc/VVT	Rogue	FS	1-pc. cast	Plastic/Nylon	✔
2.5	2488	QR25DE	Nissan	Yokahama, Japan	55,000	AL/AL/CIL	I-4	89x100	9.6:1	170/ 6000-175/ 5600	175 (237)-180 (244)/ 4400	SFI/DOHC/4vpc/VVT	Rogue	FS	1-pc. cast	Plastic/Nylon	✔
2.5	2488	QR25DE	Nissan	Decherd, TN	37,000	AL/AL/CIL	I-4	89x100	9.6:1	158/ 5200	162 (220)/ 2800	SFI/DOHC/4vpc/VVT	Altima Hybrid	Plus 40 hp, perm. magnet motor with 245-volt NiMH battery pack.			✔
2.5	2488	QR25DE	Nissan	Decherd, TN	196,000	AL/AL/CIL	I-4	89x100	9.6:1	170/ 6000-175/ 5600	175 (237)-180 (244)/ 4400	SFI/DOHC/4vpc/VVT	Altima	FS	1-pc. cast	Plastic/Nylon	✔
2.5	2488	QR25DE	Nissan	Decherd, TN	39,400	AL/AL/CIL	I-4	89x100	9.5:1	152/ 5200-177/ 6000	171 (233)/ 4400	SFI/DOHC/4vpc/VVT	Frontier, Sentra SE-R	FS	1-pc. cast	Plastic/Nylon	✔
2.5	2488	QR25DE	Nissan	Aguascalientes, Mexico	2,000	AL/AL/CIL	I-4	89x100	10.5:1	200/ 6600	180 (244)/ 5200	SFI/DOHC/4vpc/VVT	Sentra SE-R Spec V	FS	1-pc. cast	Plastic/Nylon	✔
3.5	3498	VQ35DE	Nissan	Iwaki, Japan, Decherd, TN	73,000	AL/AL/CIL	V-6 (60º)	95.5x81.4	10.3:1	265-270/ 6000	248 (336)-258 (350)/ 4400	SFI/DOHC/4vpc/VVT	Altima, Murano	FS	1-pc. cast	Plastic/Nylon	✔
3.5	3498	VQ35	Nissan	Iwaki, Japan	1,200	AL/AL/CIL	V-6 (60º)	95.5x81.4	10.6:1	290/ 6400-303/ 6800	253 (343)/ 4400-262 (355)/ 4800	SFI/DOHC/4vpc/VVT	Maxima; Infiniti EX35, FX35, M35	FS	1-pc. cast	Plastic/Nylon	✔
3.7	3696	VQ37VHR	Nissan	Iwaki, Japan	66,000	AL/AL/CIL	V-6 (60º)	95.5x86	11.0:1	330-332/ 7000	270 (366)/ 5200	SFI/DOHC/4vpc/VVT	370Z; Infiniti G37	FS	1-pc. cast	Plastic/Nylon	✔
3.8	3799	VR38DETT	Nissan	Yokohama, Japan	1,700	AL/AL/CIL	V-6 (60º)	95.5x88.4	9.0:1	485/ 6400	434 (588)/ 3200	SFI/DOHC/4vpc/VVT	GT-R	FS	1-pc. cast	CA	✔
4.0	3954	VQ40DE	Nissan	Decherd, TN	66,500	AL/AL/CIL	V-6 (60º)	95.5x92	9.7:1	261-266/ 5600	281 (381)-288 (390)/ 4000	SFI/DOHC/4vpc/VVT	Frontier, Pathfinder, Xterra	FS	1-pc. cast	Plastic/Nylon	✔
4.5	4494	VK45DE	Nissan	Yokahama, Japan	6,500	AL/AL/CIL	V-8 (90º)	93x82.7	10.5:1	325/ 6400	336 (456)/ 4000	SFI/DOHC/4vpc/VV	Infiniti M45	FS	1-pc. cast	Plastic/Nylon	✔
5.0	5026	VK50VE	Nissan	Yokahama, Japan	5,000	AL/AL/CIL	V-8 (90º)	95.5x87.7	10.9:1	390/ 6500	369 (500)/ 4400	SFI/DOHC/4vpc/VVT	Infiniti FX50	FS	1-pc. cast	Plastic/Nylon	✔
5.6	5552	VK56DE	Nissan	Decherd, TN	27,000	AL/AL/CIL	V-8 (90º)	98x92	9.8:1	310/ 5200-320/ 4900	385 (522)-393 (533)/ 3600	SFI/DOHC/4vpc/VVT	Armada, Pathfinder, Titan; Infiniti QX56	FS	1-pc. cast	Plastic/Nylon	✔
5.6	5552	VK56DE	Nissan	Decherd, TN	8,900	AL/AL/CIL	V-8 (90º)	98x92	9.8:1	317/ 5200	385 (522)/ 3400	SFI/DOHC/4vpc/VVT/E85	Armada, Titan	FS	1-pc. cast	Plastic/Nylon	✔
PORSCHE																2009 CY TOTAL ENGINE VOLUME	22,000
2.9	2893	NA	Porsche	Zuffenhausen, Germany	2,500	AL/AL/SAL	Bxr-6	88.9x78.7	11.5:1	255 /6400-265/ 7200	214 (290)-221 (300)/ 4400	SFI/DOHC/4vpc/VVT	Boxster, Cayman	FSFS	1-pc. cast	RP	✔
3.4	3436	NA	Porsche	Zuffenhausen, Germany	2,100	AL/AL/SAL	Bxr-6	96.5x78.7	12.5:1	310/ 6400-320/ 7200	266 (361)/ 4400-273 (370)/ 4750	DI/DOHC/4vpc/VVT	Boxster S, Cayman S	FSFS	1-pc. cast	RP	✔
3.6	3598	NA	Porsche	Zuffenhausen, Germany	3,900	CI/AL	DOHC V-6	89x96.4	12.3:1	290/ 6200	273 (370)/ 3000	DI/ETC/DOHC/4vpc/VVTL/VI	Cayenne		1-pc. cast		✔
3.6	3614	NA	Porsche	Zuffenhausen, Germany	4,800	AL/AL/SAL	Bxr-6	97x81.5	12.5:1	345/ 6500	288 (390)/ 4400	DI/DOHC/4vpc/VVT/VI	911 Carrera, Carrera 4, Targa 4	FSFS	1-pc. cast	CA	✔
3.8	3800	NA	Porsche	Zuffenhausen, Germany	800	AL/AL/SAL	Bxr-6	102x77.5	9.8:1	500/ 6000	480 (000)/ 1950	DI/ETC/2TRBO/DOHC/4vpc/VCT	911 Turbo	FSFS	1-pc. cast	CA	✔
3.8	3800	NA	Porsche	Zuffenhausen, Germany	500	AL/AL/SAL	Bxr-6	102x77.5	12.0:1	435/ 7600	317 (000)/ 4500	DI/DOHC/4vpc/VVT	GT3	FS	1-pc. cast	CA	✔
4.8	3598	NA	Porsche	Zuffenhausen, Germany	4,500	AL/AL	DOHC V-8	96x83	12.5:1	385/ 6200-400/ 6500	369 (500)/ 3500	DI/ETC/DOHC/4vpc/VCT/VI	Cayenne S, Panamera S, Panamera 4S		1-pc. cast		✔
4.8	3598	NA	Porsche	Zuffenhausen, Germany	2,900	AL/AL	DOHC V-8	96x83	10.5:1	500/ 6000	516 (700)/ 2250-568 (000)/ 3000	DI/ETC/2TRBO/DOHC/4vpc/VVTL/VI	Cayenne Turbo, Panamera Turbo, Panamera Turbo Chrono		1-pc. cast		✔
SUZUKI																2009 CY TOTAL ENGINE VOLUME	51,800
2.0	1995	J20A	Suzuki	Sagara, Japan	28,500	AL/AL/CIL	I-4	84x90	10.5:1	143/ 5800-150/6200	136 (184)-140 (190)/ 3500	SFI/DOHC/4vpc	SX4, SX4 Crossover	FS	1-pc. cast		
2.4	2393	J24B	Suzuki	Sagara, Japan	7,500	AL/AL/CIL	I-4	92x90	10.0:1	166/ 6000-185/ 6500	162 (220)-170 (230)/ 4000	SFI/DOHC/4vpc	Grand Vitara, Kizashi	FS	1-pc. cast		
2.5	2488	QR25DE	Nissan	Decherd, TN	2,500	AL/AL/CIL	I-4	89x100	9.7:1	152/ 5200	174 (236)/ 4400	SFI/DOHC/4vpc/VVT	Equator	FS	1-pc. cast	Plastic/Nylon	✔
3.2	3195	N32A	Suzuki	Sagara, Japan	13,300	AL/AL/CIL	V-6	89x85.6	10.0:1	230/ 6200	213 (289)/ 3500	SFI/DOHC/4vpc/RF	Grand Vitara	FS	1-pc. cast		
4.0	3954	VQ40DE	Nissan	Decherd, TN	500	AL/AL/CIL	V-6 (60º)	95.5x92	9.7:1	261/ 5600	281 (385)/ 4000	SFI/DOHC/4vpc/VVT	Equator	FS	1-pc. cast	Plastic/Nylon	✔
TOYOTA																2009 CY TOTAL ENGINE VOLUME	1,860,400
1.5	1497	1NZ-FE	Toyota	Japan	101,000	AL/AL/CIL	I-4	75x84.7	10.5:1	106/ 6000	103 (140)/ 4200	SFI/DOHC/4vpc/VVT-i	Yaris	FS	1-pc. cast	Plastic/Nylon	
1.8	1798	1ZR-FXE	Toyota	Japan	140,000	AL/AL/CIL	I-4	80.5x88.4	13.0:1	98 /5200	105 (142)/ 4000	SFI/DOHC/4vpc/VVT-i	Prius	Plus 80-hp, 153 -b.-ft.(207-Nm) perm. magnet electric synchronous motor with NiMH battery pack.			
1.8	1794	2ZR-FE	Toyota	Buffalo, WV; Cambridge, ONT; Shimoyama, Japan	352,000	AL/AL/CIL	I-4	79x91.5	10.0:1	132/ 6000	128 (174)/ 4400	SFI/DOHC/4vpc/VVT-i	Corolla, Matrix	FS	1-pc. cast	CA	
1.8	1797	N/A	Toyota	Shimoyama, Japan	14,500	AL/AL/CIL	I-4	80.5x88.3	10.0:1	128/ 5000	125 (170)/ 4400	SFI/DOHC/4vpc/VVT-i	Scion xD	FS	1-pc. cast	CA	
2.4	2362	2AZ-FE	Toyota	Georgetown, KY; Japan	103,500	AL/AL/CIL	I-4	88.4x96	9.8:1	158-161/ 6000	161 (218)-162 (220)/ 4000	SFI/DOHC/4vpc/VVT-i	Corolla, Matrix; Scion xB, tC	FS	1-pc. cast	CA	✔
2.4	2362	2AZ-FXE	Toyota	Georgetown, KY; Japan	22,900	AL/AL/CIL	I-4	88.4x96	12.5:1	147/ 6000	138 (187)/ 6000	SFI/DOHC/4vpc/VVT-i	Camry Hybrid	Plus 141-hp, 199-lb.-ft.(270-Nm) perm. magnet electric motor with 244.8-volt NiMH battery pack.			✔
2.5	2494	2AR-FE	Toyota	Georgetown, KY; Japan	370,000	AL/AL/CIL	I-4	89.9x98	10.4:1	169-179/ 6000	167 (226)/ 6200-172 (233)/ 4000	DI/DOHC/4vpc/VVT-i	Camry, Rav4	FS	1-pc. cast		
2.5	2499	4GR-FSE	Toyota	Japan	19,400	AL/AL/CIL	I-4	83x77	12.0:1	204/ 6400	185 (251)/ 4800	DI/DOHC/4vpc/VVT-i	Lexus IS 250	FS	1-pc. cast		
2.7	2672	1AR-FE	Toyota	Japan	12,400	AL/AL/CIL	I-4	89.9x104.9	10.0:1	182-187/ 5800	182 (247)-186 (252)/ 4200	SFI/DOHC/4vpc/VVT-i	Highlander, Venza	FS	1-pc. cast		
2.7	2693	3RZ-FE	Toyota	Japan	19,400	CI/AL	I-4	95X95	9.6:1	159/ 5200	180 (244)/ 3800	SFI/DOHC/4vpc/VVT-i	Tacoma	FS	1-pc. cast		
3.3	3310	3MZ-FE	Toyota	Kamigo, Japan	25,600	AL/AL/CIL	V-6 (60º)	92x83	10.8:1	209/ 5600	212 (287)/ 3600	SFI/DOHC/4vpc/VVT-i	Highlander Hybrid; Lexus RX 400H	Plus two AC 650-volt perm. magnet electric motors. Front-167 hp/ 4500 rpm, 247 lb.-ft. (335 Nm)/ 4650 1500 rpm torque. Rear- (AWD only) 68 hp/ , 96 lb.-ft. (130 Nm)/ 610 rpm torque.			✔
3.5	3456	2GR-FE	Toyota	Georgetown, KY; Buffalo, WV	366,000	AL/AL/CIL	V-6 (60º)	94x83.1	10.8:1	265-275/ 6200	245 (332)-257 (348)/ 4700	SFI/DOHC/4vpc/VVT-i/RRA	Avalon, Camry, Highlander, RAV4, Sienna, Venza; Lexus ES 350, RX 350	FPMSC	1-pc. cast	CA	✔
3.5	3456	2GR-FSE	Toyota	Japan	6,600	AL/AL/CIL	V-6 (60º)	94x83.1	11.5:1	303/ 6200	274 (371)/ 4800	SFI/ETC/DOHC/4vpc/VVT-i	Lexus GS 350	FPMSC	1-pc. cast	CA	
3.5	3456	2GR-FSE	Toyota	Japan	21,300	AL/AL/CIL	V-6 (60º)	94x83.1	11.8:1	306/ 6400	277 (376)/ 4800	DI-SFI/DOHC/4vpc/VVT-i	Lexus IS 350	FPMSC	1-pc. cast	CA	
3.5	3456	2GR-FSE	Toyota	Japan	500	AL/AL/CIL	V-6 (60º)	94x83.1	11.8:1	292/ 6400	267 (362)/ 4800	DI-SFI/DOHC/4vpc/VVT-i	Lexus GS 450h	Plus 167-hp, AC 650-volt perm. magnet electric motor with 288-volt NiMH battery pack.			
4.0	3955	1GR-FE	Toyota	Tahara, Japan; Huntsville, AL	164,000	AL/AL/CIL	V-6 (60º)	94x95	10.4:1	236/ 5200-270/ 5600	266 (361)/ 3800- 278 (377)/ 3700	SFI/DOHC/4vpc/BT	4Runner, FJ Cruiser, Tacoma, Tundra	FPMSC	1-pc. cast	CA	
4.3	4292	3UZ-FE	Toyota	Japan	1,000	AL/AL/CIL	V-8 (90º)	91x82.5	10.5:1	288/ 5600	317 (430)/ 3400	SFI/ETC/DOHC/4vpc/VVT-i	Lexus SC 430	FPMSC	1-pc. cast		
4.6	4608	1UR-FSE	Toyota	Huntsville, AL; Tahara, Japan	59,000	AL/AL/CIL	V-8 (90º)	94x83.1	10.2:1	310/ 5600	339 (460)/ 3600-367 (498)/ 4100	SFI/ETC/DOHC/4vpc/VVT-i	Sequoia, Tundra	FPMSC	1-pc. cast	CA	✔
4.6	4608	1UR-FSE	Toyota	Huntsville, AL; Tahara, Japan	12,600	AL/AL/CIL	V-8 (90º)	94x83.1	11.8:1	357-380/ 6400	344(422)-367 (498/ 4100	SFI/ETC/DOHC/4vpc/VVT-i	Lexus GS 460, LS 460	FPMSC	1-pc. cast	CA	✔
5.0	4969	2UR-FSE	Toyota	Tahara, Japan	300	AL/AL/CIL	V-8 (90º)	94x89.5	11.8:1	389/ 6400	385 (522)/ 4100	DI-SFI/ETC/DOHC/4vpc/VVT-i/VI	Lexus LS 600h	Plus 221-hp, AC 650-volt perm. magnet electric motor with 288-volt NiMH battery pack.			
5.0	4969	2UR-GSE	Toyota	Tahara, Japan	600	AL/AL/CIL	V-8 (90º)	94x89.5	11.8:1	416/ 6600	371 (503)/ 5200	DI-SFI/DOHC/4vpc/VVT-i/ETC	Lexus LS IS-F	FPMSC	1-pc. cast	CA	
5.7	5663	3UR-FE	Toyota	Huntsville, AL; Tahara, Japan	47,800	AL/AL/CIL	V8	94x102	10.5:1	381-383/ 5600	401 (544)/ 3200-403 (546)/ 3600	SFI/DOHC/4vpc/VVT-i/ETC	Land Cruiser, Sequoia, Tundra; Lexus LX 570	FPMSC	1-pc. cast		✔
VOLKSWAGEN																2009 CY TOTAL ENGINE VOLUME	322,100
1.8	1781	EA827	VW	Puebla, Mexico	4,000	CI/AL	I-4	81x86	NA	175/ 5500	174 (325)/ 1950	MPI/DOHC/5vpc/TRBO/int	Jetta A4, New Beetle	FS	1-pc. cast		✔
2.0	1984	EA113	VW	Puebla, Mexico	20,000	CI/AL	I-4	82.5x92.8	NA	115/ 5400	122 (165)/ 2800	MPI/SOHC/2vpc	Jetta A4, New Beetle, Jetta NF	FS	1-pc. cast	RP	✔
2.0	1968	NA	VW	Germany	36,400	CI/AL	I-4	81x95.5	16.5:1	140/ 4000	236 (320)/ 1750	DI/SOHC/4vpc/TRBO/int	Golf TDI, Jetta TDI; Audi A3	FS	assembled	CA	✔
2.0	1984	NA	VW	Germany	99,800	CI/AL	I-4	82.5x92.8	9.6:1	200/ 5100	207 (280)/ 1800	DI/SOHC/4vpc/TRBO/int/BT	CC, Eos, GTi, Jetta GLI, Passat, Tiguan; Audi A3, TT	FS	1-pc. cast	CA	✔
2.0	1984	NA	VW	Germany	23,500	CI/AL	I-4	82.5x92.8	9.6:1	211/ 4300	258 (350)/ 1500	DI/ETC/SOHC/4vpc/TRBO/int/BT	Audi A4, A5	FS	1-pc. cast	CA	✔
2.0	1984	NA	VW	Germany	1,500	CI/AL	I-4	82.5x92.8	9.8:1	265/ 6000	258 (350)/ 2500	DI/SOHC/4vpc/TRBO/int	Audi TTS	FS	1-pc. cast	CA	✔
2.5	2480	EA113	VW	Puebla, Mexico	106,000	CI/AL	I-5	82.5x92.8	9.5:1	150/ 5000-170/ 5700	170 (228)/ 3750-177 (240)/ 4250	SFI/DOHC/4vpc/BT	Beetle, Golf, Jetta	FS	assembled	CA	✔
3.0	2967	NA	VW	Salzgitter, Germany	2,000	CI/AL	V-6 (11º)	83x91.4	18.8:1	225/ 3750	406 (550)/ 1750	DI/DOHC/4vpc/TRBO/VVT/BT	Touareg TDI; Audi Q7 TDI	FSFS	1-pc. cast	CA	✔
3.0	2995	NA	VW	Salzgitter, Germany	3,100	CI/AL	V-6 (11º)	84.5x89	10.5:1	300/ 5100	310 (420)/ 2500	DI/DOHC/4vpc/SPR/VVT/BT	Audi A6	FSFS	1-pc. cast	CA	✔
3.0	2995	NA	VW	Salzgitter, Germany	3,300	CI/AL	V-6 (11º)	84.5x89	10.3:1	333/ 5500	325 (441)/ 2900	DI/DOHC/4vpc/SPR/VVT/BT	Audi S4, S5	FSFS	1-pc. cast	CA	✔
3.2	3123	NA	VW	Salzgitter, Germany	38,500	CI/AL	V-6 (11º)	84.5x92.8	12.5:1	265-270/ 6500	243 (330)/ 3000-243 (330)/ 3250	DI/DOHC/4vpc/VVT/BT	Audi A5, A6, Q5	FSFS	assembled	CA	✔
3.6	3597	NA	VW	Salzgitter, Germany	18,000	CI/AL	V-6 (11º)	89x96.4	12.0:1	280/ 6200	266(360)/ 2750	DI/ETC/DOHC/4vpc/EVVTL/VI	CC, Touareg; Audi Q7	FSFS	assembled	RP	✔
3.8	3778	EGH	Chrysler	Trenton, MI	10,400	CI/AL	V-6 (60º)	96x87	9.7:1	197/ 5200	230 (312)/ 4000	SFI/OHV/PRA/RT	Routan	FSFS	1-pc. cast	CA/RP	✔
4.0	3952	EGQ	Chrysler	Trenton, MI	6,900	AL/AL/CIL	V-6 (60º)	96x91	10.3:1	251/ 6000	259 (351)/ 4200	SFI/SOHC/4vpc/RRA	Routan	FSFS	1-pc. cast	CA/RP	✔
4.2	4172	NA	Audi	Gyor, Hungary	4,100	AL/AL/CIL	V-8 (90º)	84.5x93	12.5:1	350/ 6800-420/ 7800	317 (430)/ 6000-325 (340)/ 3500	DI/ETC/DOHC/4vpc/VVT/BT	Audi A6, A8, Q7, R8	FSFS			✔
4.2	4172	NA	Audi	Gyor, Hungary	800	AL/AL/CIL	V-8 (90º)	84.5x93	11.4:1	354/ 7000	325 (441)/ 3500	DI/ETC/DOHC/5vpc/VVT/BT	Audi S5	FSFS			✔
6.0	5998	NA	VW	Salzgitter, Germany	1,000	CI/AL	W-12 (72º)	84x90.2	11.0:1	450/ 6200	428 (580)/ 4000	SFI/ETC/DOHC/4vpc/VVT/BT/VI	Audi A8	FSFS	assembled	composite	✔
6.0	5998	NA	VW/Bentley	Crewe, England	2,000	CI/AL	W-12 (72º)	84x90.2	9.0:1	552/ 6100-621/ 6000	479 (650)/ 1600-590 (800)/ 1700	SFI/ETC/DOHC/4vpc/VVT/2TRBO/BT/VI	Bentley Continental GT, GTC, Flying Spur, Flying Spur Speed	FSFS	assembled	composite	✔
6.8	6752	NA	Bentley	Crewe, England	1,200	CI/AL	V-8	104x99	7.8:1	450/ 4100-530/ 4000	645 (875)/ 1800-774 (1050)/ 3250	SFI/OHV/2vpc/2TRBO/int	Bentley Arnage, Azure T, Brooklands	FSFS	steel	composite	✔
VOLVO																2009 CY TOTAL ENGINE VOLUME	68,800
2.4	2435	B5244S4/ B5244S7	Volvo	Skovde, Sweden	6,600	AL/AL	I-5	83.3x90	10.3:1	168/ 6000	170 (230)/ 4400	SFI/DOHC/4vpc	Volvo S40, V50	FSFS	1-pc. cast	CA	✔
2.5	2521	B5254T3	Volvo	Skovde, Sweden	13,600	AL/AL	I-5	83x93.2	9.0:1	227/ 5000	236 (320)/ 1500	SFI/DOHC/4vpc/VVT/TRBO/Int	Volvo C30, C70 T5, S40 T5, V50 T5	FSFS	1-pc. cast	CA	✔
3.0	2953	B6304T2	Ford	Bridgend, UK	19,800	AL/AL	I-6	84x96	9.3:1	281/ 5600	295 (400)/ 1500	SFI/DOHC/4vpc/VVT/TRBO/Int	Volvo S80 T6, XC 60, XC70 T6	FSFS	assembled	composite	✔
3.2	3192	B6324S	Ford	Bridgend, UK	18,800	AL/AL	I-6	84x96	10.8:1	235/ 6200	236 (320)/ 3200	SFI/DOHC/4vpc/VVT	Volvo S80, V70, XC70, XC90	FSFS	assembled	composite	✔
4.4	4414	B8444S	Yamaha	Iwata, Japan	10,000	AL/AL	V-8 (90º)	94x79.5	10.4:1	311/ 5850-311/ 5959	325 (441)/ 3900-325 (441)/ 3950	SFI/DOHC/4vpc	Volvo S80, XC90				

LEGEND FOR NORTH AMERICAN ENGINES 2010

AC Atkinson Cycle
AL aluminum
BT bucket tappets
CA cast aluminum
CI cast iron
CD cylinder deactivation
CIFS cast iron, fracture split
CIL cast iron liners
CPM cast powder metal
CS cast steel
DDV direct drive valvetrain
DI direct injection
DOHC double-overhead-cam
EFI electronic fuel injection
ETC electronic throttle control
ESI engine stop at idle
FPMFS forged powdered metal fracture split
FPMSC forged powdered metal saw cut
FRM fiber-reinforced metal
FS forged steel
FSFS forged steel fracture split
FT forged titanium
HS hollow steel
IDI indirect injection
INT intercooler
MAL magnesium-aluminum composite
NA information not available at press time
OHV overhead-valve
PRA push rods, rocker arms
PRR push rods, roller rockers
RF roller followers
RFF roller finger followers
RP reinforced plastic
RRA roller rocker arms
RT roller tappets
SAL silicon aluminum alloy liners
SFS sinter fordged steel
SFI sequential fuel injection
SOHC single-overhead-cam
SPR supercharger
TRBO turbocharger
VI variable intake
VTEC variable valve timing and lift electronic control
i-VTEC intelligent variable valve timing and lift electronic control
VCT variable cam timing
VVL variable valve lift
VVT variable valve timing
VVTL variable valve timing and lift control

*Note: Horsepower and torque values in [ ] preceeded by an E indicate values when operating on E85. *PBC: Performance Build Center. (a) 9.4:1 in F-150; (b) 9.6:1 in Jeep Commander, Grand Cherokee; 9.8:1 in Ram Pickup; (t) 10.5:1 in GS460. (tt) 10.0:1 in GX 470. (1) Engine volumes are estimates for the calendar year based on vehicles built in North America and imports sold in North America. Estimates for North American-built vehicles are based on calendar year 2009 production, including export output; imports are based on 2009 North American sales.*