

2010 ENGINE

Engine Mechanical - 2.8L, 3.0L, 3.2L, or 3.6L - Equinox & Terrain

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Barometric (BARO) Sensor Bolt	10 N.m	89 lb in
Camshaft Cap Bolt	10 N.m	89 lb in
Camshaft Cover Bolt	10 N.m	89 lb in
Camshaft Intermediate Drive Sprocket Bolt - Idler Sprocket	58 N.m	43 lb ft
Camshaft Position Actuator		
• Camshaft Bolt	58 N.m	43 lb ft
• Oil Control Valve Bolt	10 N.m	89 lb in
Camshaft Position Sensor Bolt	10 N.m	89 lb in
Close Out Cover Bolt	10 N.m	89 lb in
Connecting Rod Bolt		
• First Pass	30 N.m	22 lb ft
• Second Pass - Counterclockwise	Back Off to Zero	
• Third Pass	25 N.m	18 lb ft
• Final Pass	110 Degrees	
Coolant Outlet Bolt	10 N.m	89 lb in
Crankshaft Balancer Bolt		
• First Pass	100 N.m	74 lb ft
• Final Pass	150 Degrees	
Crankshaft Main Bearing Bolt		
Inner		
• First Pass	20 N.m	15 lb ft
• Final Pass	80 Degrees	
Outer		
• First Pass	15 N.m	11 lb ft
• Final Pass	110 Degrees	
Side		
• First Pass	30 N.m	22 lb ft
• Final Pass	60 Degrees	

Crankshaft Position Sensor Bolt	10 N.m	89 lb in
Crankshaft Position Sensor/Right Exhaust Manifold Lower Heat Shield		
• M6 - Bolt	10 N.m	89 lb in
• M10 - Bolt	58 N.m	43 lb ft
Crankshaft Rear Oil Seal Housing Bolt	10 N.m	89 lb in
Cylinder Head Bolt - M8		
• First Pass	15 N.m	11 lb ft
• Final Pass	75 Degrees	
Cylinder Head Bolt - M11		
• First Pass	30 N.m	22 lb ft
• Final Pass	150 Degrees	
Cylinder Head Core Hole Plug	75 N.m	55 lb ft
Drive Belt		
• Idler Pulley Bolt	58 N.m	43 lb ft
• Tensioner Bracket Bolt	25 N.m	18 lb ft
Engine Coolant Temperature (ECT) Sensor	30 N.m	22 lb ft
Engine Flywheel Bolt - Flex Plate Auto Trans		
• First Pass	30 N.m	22 lb ft
• Final Pass	45 Degrees	
Engine Front Cover Stud	15 N.m	11 lb ft
Engine Front Cover Bolt - M6	15 N.m	11 lb ft
Engine Front Cover Bolt - M8		
• First Pass	20 N.m	14 lb ft
• Second Pass	20 N.m	14 lb ft
• Final Pass	60 Degrees	
Engine Front Cover Bolt - M12	65 N.m	48 lb ft
Engine Mount to Body Bolt/Nut	62 N.m	46 lb ft
Engine Mount Bracket to Engine Bolts	100 N.m	74 lb ft
Engine Mount to Engine Mount Bracket Bolt	62 N.m	46 lb ft
Evaporative (EVAP) Purge Valve Bolt/Ball Stud	10 N.m	89 lb in
Exhaust Crossover Pipe Nuts	34 N.m	25 lb ft
Exhaust Manifold		
• Bolt	20 N.m	15 lb ft
• Heat Shield Bolt	10 N.m	89 lb in
• Studs	6 N.m	53 lb in
Fuel Rail Bolt	25 N.m	18 lb ft
Fuel Rail Support Bracket	10 N.m	89 lb in

Heater Inlet/Outlet Pipe Assembly Bolt	10 N.m	89 lb in
Ignition Coil Bolt	10 N.m	89 lb in
Intake Manifold		
• Upper-to-Cylinder Head Bolt - Long	25 N.m	18 lb ft
• Upper-to-Cylinder Head Bolt - Short	25 N.m	18 lb ft
• Upper-to-Lower Intake Manifold Bolt	25 N.m	18 lb ft
Knock Sensor Bolt	25 N.m	18 lb ft
Oil Drain Plug	25 N.m	18 lb ft
Oil Filter	25 N.m	18 lb ft
Oil Filter Housing Adapter Bolt	25 N.m	18 lb ft
Oil Gallery Plug	31 N.m	23 lb ft
Oil Level Indicator Tube Bolt	10 N.m	89 lb in
Oil Pan		
• Bolt - Block M8	25 N.m	18 lb ft
• Bolt - Crankshaft Rear Oil Seal Housing M6	10 N.m	89 lb in
• Windage Tray Bolt	10 N.m	89 lb in
Oil Pressure Sender	20 N.m	15 lb ft
Oil Pump		
• Bolt	25 N.m	18 lb ft
• Cover Bolt	13 N.m	115 lb in
PCV Tube Bracket Bolt/Ball Stud	10 N.m	89 lb in
Piston Oil Cooling Nozzle Bolt	10 N.m	89 lb in
Primary Camshaft Drive Chain		
• Left Lower Guide Bolt - Oil Pump - Second Design	25 N.m	18 lb ft
• Tensioner Bolt	25 N.m	18 lb ft
• Upper Guide Bolt	25 N.m	18 lb ft
Secondary Camshaft Drive Chain		
• Guide Bolt	25 N.m	18 lb ft
• Shoe Bolt	25 N.m	18 lb ft
• Tensioner Bolt	25 N.m	18 lb ft
Spark Plug	18 N.m	13 lb ft
Starter Motor		
• Bolt	58 N.m	43 lb ft
• Cable Nut	10 N.m	89 lb in
Suction Screen Bolt	10 N.m	89 lb in
Suction Tube Bolt	10 N.m	89 lb in
Thermostat Housing Bolt	10 N.m	89 lb in

Throttle Body Bolt	10 N.m	89 lb in
Torque Converter Bolt	60 N.m	44 lb ft
Transmission		
• Mount Bolt to Transmission - RPO	60 N.m	45 lb ft
• To Engine Bolt	50 N.m	37 lb ft
• Range Selector Lever Nut	9.5 N.m	84 lb in
Water Pump		
• Bolt	10 N.m	89 lb in
• Pulley Bolt	10 N.m	89 lb in

ENGINE MECHANICAL SPECIFICATIONS (LF1)

Application	Specification	
	Metric	English
General		
• Engine Type	V-6	
• Displacement	3.0 Liter	183 cu in
• RPO	LF1	
• VIN	G-cars/Y-trucks	
• Bore	89 mm	3.5039 in
• Stroke	80.3 mm	3.1614 in
• Compression Ratio	11.7:1	
• Firing Order	1-2-3-4-5-6	
• Spark Plug Gap	1.1 mm	0.0433 in
Block		
• Crankshaft Main Bearing Bore Diameter	72.867-72.881 mm	2.8688-2.8693 in
• Cylinder Bore Diameter	88.992-89.008 mm	3.5036-3.5042 in
• Cylinder Bore Out-of-Round - Production Max.	0.013 mm	0.0005 in
Camshaft		
• Camshaft Bearing Inside Diameter - Front Number 1	35.000-35.020 mm	1.3779-1.3787 in
• Camshaft Bearing Inside Diameter - Middle and Rear Number 2-4	27.000-27.020 mm	1.0630-1.0638 in
• Camshaft End Play	0.045-0.215 mm	0.0018-0.0085 in
• Camshaft Journal Diameter - Front Number 1	34.936-34.960 mm	1.3754-1.3764 in
• Camshaft Journal Diameter - Middle and Rear Number 2-4	26.936-26.960 mm	1.0605-1.0614 in

• Camshaft Journal Out-of-Round	0.006 mm	0.0002 in
• Camshaft Journal to Bore Clearance	0.040-0.084 mm	0.0016-0.0033 in
• Camshaft Lobe Lift - Exhaust	42.456-42.756 mm	1.6715-1.6833 in
• Camshaft Lobe Lift - Intake	42.385-42.685 mm	1.6687-1.6805 in
• Camshaft Runout - Front and Rear Number 1 and 4	0.025 mm	0.0010 in
• Camshaft Runout - Middle 2 and 3	0.050 mm	0.0020 in
• Valve Lift - Exhaust	10.8 mm	0.4252 in
• Valve Lift - Intake	10.8 mm	0.4252 in
Connecting Rod		
• Connecting Rod Bearing Clearance	0.010-0.070 mm	0.0004-0.0028 in
• Connecting Rod Bore Diameter - Bearing End	59.620-59.636 mm	2.3472-2.3479 in
• Connecting Rod Bore Diameter - Pin End - Production	24.009-24.019 mm	0.9452-0.9456 in
• Connecting Rod Bore Diameter - Pin End - Service Maximum	24.007 mm	0.9457 in
• Connecting Rod Length - Center to Center	156.05 mm	6.1437 in
• Connecting Rod Side Clearance	0.095-0.355 mm	0.0037-0.0140 in
• Connecting Rod Width - Bearing End		
• Production	21.775 mm	0.8573 in
• Service	21.725-21.825 mm	0.8553-0.8593 in
• Connecting Rod Width - Pin End		
• Production	21.775 mm	0.8573 in
• Service	21.725-21.825 mm	0.8553-0.8593 in
Crankshaft		
• Connecting Rod Journal Diameter	55.992-56.008 mm	2.2044-2.2050 in
• Connecting Rod Journal Out-of-Round	0.005 mm	0.0002 in
• Connecting Rod Journal Taper	0.005 mm	0.0002 in
• Connecting Rod Journal Width		
• Production	22.000 mm	0.8661 in
• Service	21.920-22.080 mm	0.8630-0.8693 in
• Crankshaft End Play	0.100-0.330 mm	0.0039-0.0130 in
• Crankshaft Main Bearing Clearance	0.010-0.060 mm	0.0004-0.0024 in
• Crankshaft Main Journal Diameter	68.000 mm	2.6772 in
• Crankshaft Main Journal Out-of-Round	0.005 mm	0.0002 in

• Crankshaft Main Journal Taper	0.005 mm	0.0002 in
• Crankshaft Main Journal Thrust Wall		
• Runout	0.000-0.040 mm	0.0000-0.0016 in
• Square	0.000-0.010 mm	0.0000-0.0004 in
• Crankshaft Main Journal Width, #2, 4		
• Production	24.000 mm	0.9449 in
• Service	23.900-24.100 mm	0.9409-0.9488 in
• Crankshaft Main Journal Width, #3		
• Production	24.400 mm	0.9606 in
• Service	24.360-24.440 mm	0.9591-0.9622 in
• Crankshaft Pilot Bearing Bore Diameter	20.965-20.995 mm	0.8254-0.8266 in
• Crankshaft Rear Flange Runout	0.025 mm	0.0010 in
• Crankshaft Reluctor Ring Runout - Maximum	2.000 mm	0.0787 in
• Crankshaft Runout	0.030 mm	0.0012 in
• Crankshaft Thrust Bearing Clearance	0.076-0.305 mm	0.0030-0.0120 in
• Crankshaft Thrust Surface - Height Diameter	95.000 mm	3.7401 in
• Crankshaft Thrust Surface Runout	0.040 mm	0.0016 in
Cylinder Head		
• Valve Guide Bore - Exhaust	6.000-6.020 mm	0.2362-0.2370 in
• Valve Guide Bore - Intake	6.000-6.020 mm	0.2362-0.2370 in
• Valve Guide Installed Height	14.050-14.550 mm	0.5531-0.5728 in
• Valve Lifter Bore Diameter	12.008-12.030 mm	0.4728-0.4736 in
Lubrication System		
• Oil Capacity - With or Without Oil Filter Change	5.7 Liters	6 Quarts
• Oil Pressure - Minimum @ Idle	69 kPa	10 psi
• Oil Pressure - Minimum @ 2,000 RPM	138 kPa	20 psi
• Piston Cooling Jet Valve Opening Pressure	1.7-2.3 bar	25-33 psi
Piston Rings		
• Piston Ring End Gap		
• First Compression Ring - Nominal	0.150-0.300 mm	0.0059-0.0118 in
• First Compression Ring - Maximum, Ring in Bore	0.350 mm	0.1378 in
• Second Compression Ring - Nominal	0.280-0.480 mm	0.0110-0.0189 in
• Second Compression Ring - Maximum, Ring in Bore	0.450 mm	0.0177 in
• Oil Control Ring	0.150-0.600 mm	0.0059-0.0236 in

• Piston Ring to Groove Clearance		
• First Compression Ring	0.030-0.065 mm	0.0012-0.0026 in
• Second Compression Ring	0.015-0.060 mm	0.0006-0.0024 in
• Oil Control Ring	0.030-0.170 mm	0.0012-0.0669 in
• Piston Ring Thickness		
• First Compression Ring	1.175-1.190 mm	0.0463-0.0469 in
• Second Compression Ring	1.470-1.495 mm	0.0579-0.0589 in
• Oil Control Ring	2.360-2.480 mm	0.0929-0.0976 in
Pistons and Pins		
• Piston		
• Piston Diameter - Measured Over Skirt Coating	88.476-89.014 mm	3.4833-3.5045 in
• Piston Diameter - Service Limit Minimum, w/more than 10k miles	88.926 mm	3.5010 in
• Piston Pin Bore Diameter	24.007-24.012 mm	0.9452-0.9454 in
• Piston Ring Groove Width - First Compression Ring	1.220-1.240 mm	0.0480-0.0488 in
• Piston Ring Groove Width - Second Compression Ring	1.510-1.530 mm	0.0595-0.0602 in
• Piston Ring Groove Width - Oil Control Ring	2.510-2.530 mm	0.0988-0.0996 in
• Piston to Bore Clearance - Production; Measured at Skirt Coating	0.022-0.032 mm	0.0008-0.0013 in
• Piston to Bore Clearance - Service Limit Maximum, w/more than 10k miles	0.650 mm	0.0256 in
• Pin		
• Piston Pin Clearance to Connecting Rod Bore - Production	0.007-0.024 mm	0.0003-0.0010 in
• Piston Pin Clearance to Connecting Rod Bore - Service Maximum	0.030 mm	0.0012 in
• Piston Pin Clearance to Piston Pin Bore - Production	0.007-0.015 mm	0.0003-0.0006 in
• Piston Pin Clearance to Piston Pin Bore - Service Maximum	0.015 mm	0.0006 in
• Piston Pin Diameter	23.997-24.000 mm	0.9448-0.9449 in
• Piston Pin Length	60.60-61.10 mm	2.3858-2.4055 in
Valve System		
• Valves		
• Valve Face Angle	44.25 degrees	
• Valve Face Runout	0.038 mm	0.0015 in

• Valve Face Width - Exhaust	2.750 mm	0.1083 in
• Valve Face Width - Intake	2.180 mm	0.0858 in
• Valve Head Diameter - Exhaust	30.470-30.730 mm	1.1996-1.2098 in
• Valve Head Diameter - Intake	35.03-35.29 mm	1.3791-1.3894 in
• Valve Installed Height	35.23-36.69 mm	1.3870-1.4445 in
• Valve Length - Exhaust	97.11 mm	3.8232 in
• Valve Length - Intake	101.23 mm	3.9854 in
• Valve Seat Angle - Seating Surface	45 degrees	
• Valve Seat Angle - Relief Surface	30 degrees	
• Valve Seat Angle - Undercut Surface	60 degrees	
• Valve Seat Roundness- Maximum	0.025 mm	0.0010 in
• Valve Seat Runout - Maximum	0.080 mm	0.0032 in
• Valve Seat Width - Exhaust Seating Surface	1.400-1.800 mm	0.0551-0.0709 in
• Valve Seat Width - Exhaust Relief Surface	0.700-0.900 mm	0.0276-0.0354 in
• Valve Seat Width - Intake Seating Surface	1.000-1.400 mm	0.0394-0.0551 in
• Valve Seat Width - Intake Relief Surface	0.500-0.700 mm	0.0197-0.0276 in
• Valve Stem Diameter - Exhaust	5.945-5.965 mm	0.2341-0.2348 in
• Valve Stem Diameter - Intake	5.955-5.975 mm	0.2344-0.2352 in
• Valve Stem-to-Guide Clearance - Exhaust	0.035-0.075 mm	0.0014-0.0030 in
• Valve Stem-to-Guide Clearance - Intake	0.025-0.065 mm	0.0010-0.0026 in
• Valve Lifters - Stationary Hydraulic Lifter Assembly (SHLA)		
• Valve Lifter (SHLA) Diameter	11.989-12.000 mm	0.4720-0.4724 in
• Valve Lifter (SHLA)-to-Bore Clearance	0.037-0.041 mm	0.0015-0.0016 in
• Rocker Arms		
• Valve Rocker Arm Ratio	1.68 to 1	
• Valve Rocker Arm Roller Diameter	17.740-17.800 mm	0.6987-0.7008 in
• Valve Springs		
• Valve Spring Coil Thickness	3.250 x 3.900 mm	0.1280 x 0.1535 in
• Valve Spring Diameter - Inside Top	12.090-12.590 mm	0.4760-0.4957 in
• Valve Spring Diameter - Outside Top	20.140 mm	0.7929 in
• Valve Spring Diameter - Inside Bottom	17.950-18.450 mm	0.7067-0.7264 in
• Valve Spring Diameter - Outside Bottom	26.000 mm	1.0236 in
• Valve Spring Free Length	42.050-44.850 mm	1.6555-1.7657 in

• Valve Spring Installed Height - Closed	35.000 mm	1.3779 in
• Valve Spring Installed Height - Open	24.000 mm	0.9449 in
• Valve Spring Load - Closed	247-273 N	56-61 lb
• Valve Spring Load - Open	598-662 N	134-149 lb

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number	
		United States	Canada
Block Pan Rail	Sealant	12378521	88901148
Camshaft Prelube	Lubricant	88862586	88862827
Coolant Drain Threaded Plug	Sealant	12346004	10953480
Coolant Expansion Plugs	Sealant	12378521	88901148
Coolant and Oil Plug Threads	Sealant	12346004	10953480
Crankshaft Bearing Surfaces - Upper/Lower	Lubricant	1052367	992869
	Lubricant	12345501	992704
Crankshaft Connecting Rod Bearing Journal	Lubricant	1052367	992869
	Lubricant	12345501	992704
Crankshaft Prelube	Lubricant	1052367	992869
Crankshaft Rear Oil Seal Housing	Sealant	12378521	88901148
Engine Front Cover/Split Lines	Sealant	12378521	88901148
Engine Oil	5W-30 Mineral Oil	12345610	00799389
Fuel Injection Fuel Rail Fuel Pressure Sensor Sealing Cone/Threads	Lubricant	12345610	993193
Fuel Rail Sealing Cone/Threads	Lubricant	12345610	993193
GM Fuel System Treatment Plus	Cleaner	88861011	-
Oil Gallery Threaded Plug	Sealant	12346004	10953480
Oil Pan, Engine Front Cover, Crankshaft Rear Oil Seal Housing, Expansion Plugs	Sealant	12378521 (150g cartridge)	88901148
		88861417 (75 gram squeeze tube)	88861418
Piston Pin Bores	Lubricant	1052367	992869
Positive Crankcase Ventilation (PCV) Orifice	Sealant	12378521	88901148
Stationary Hydraulic Lash Adjuster (SHLA)	Engine Oil	12345610	993193
SHLA Bores in Cylinder Head	Engine Oil	12345610	993193
SHLA Pivot Spheres	Lubricant	12345501	992704
Thread Repair	Cutting Fluid	1052864	992881
	Cleaner	12346139 or 12377981	10953463

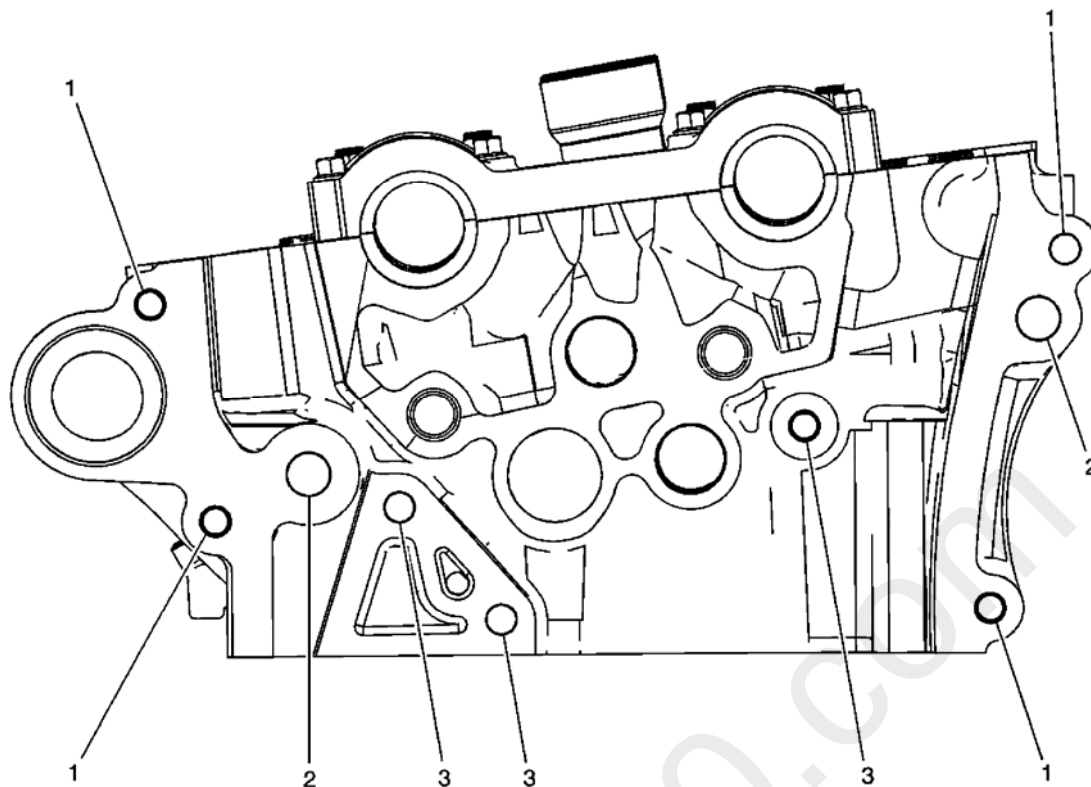


Fig. 2: Left Cylinder Head Front Face
 Courtesy of GENERAL MOTORS CORP.

Left Cylinder Head Front Face

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
		J 42385-						MM	(IN)	MM	(IN)
1	M8 x 1.25	206	207	N/A	208	209	210	THRU		THRU	
2	M12 x 1.75	856	857	N/A	858	859	416	40.0	1.5748	32.5	1.2795
3	M8 x 1.25	206	207	N/A	208	209	210	18.0	0.7087	22.5	0.8858

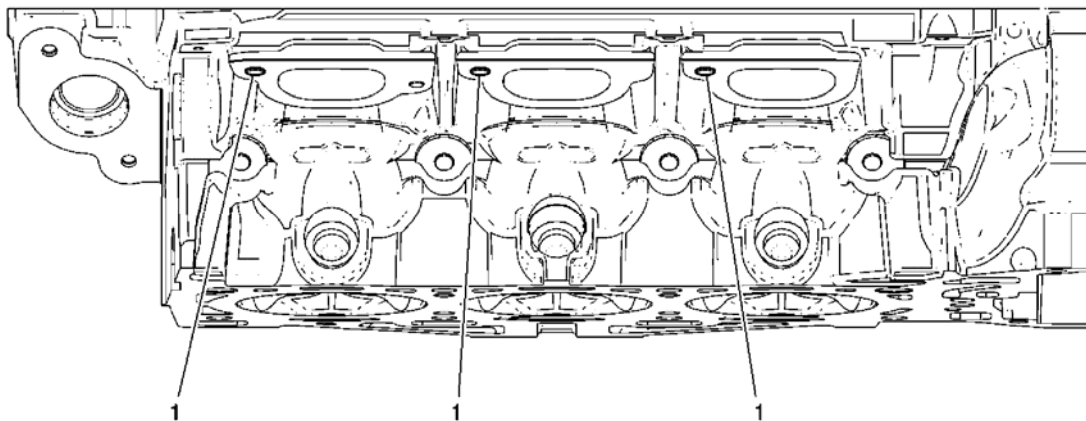


Fig. 3: Left Cylinder Head Intake Face (LF1)
 Courtesy of GENERAL MOTORS CORP.

Left Cylinder Head Intake Face

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
								MM	(IN)	MM	(IN)
J 42385-											
1	M8 x 1.25	206	207	N/A	208	209	210	28.5	1.1220	23.0	0.9055

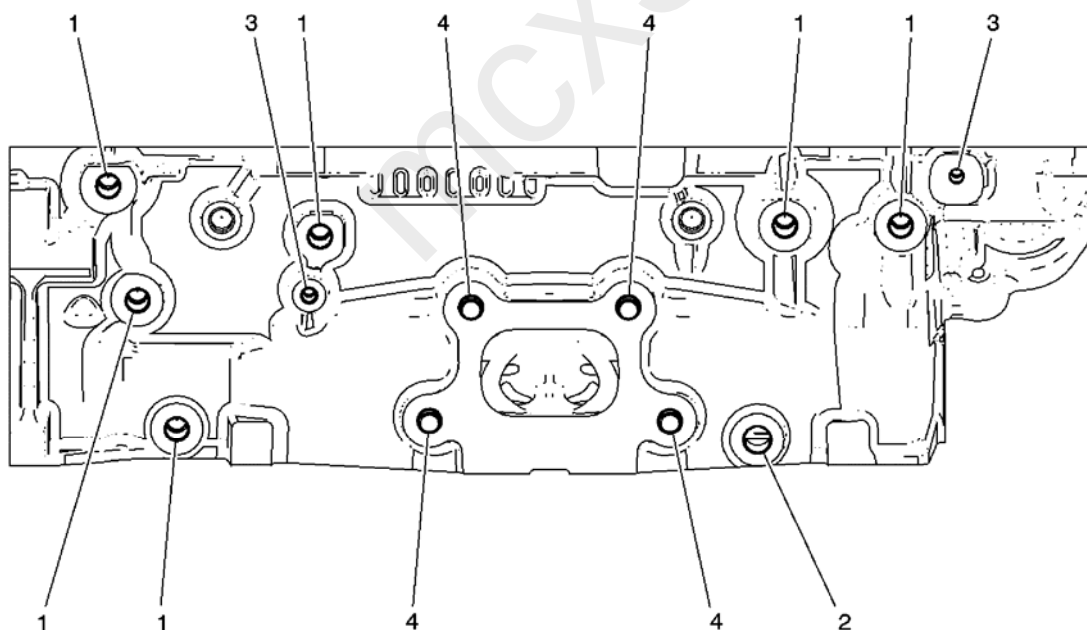


Fig. 4: Left Cylinder Head Exhaust Face (LF1)
 Courtesy of GENERAL MOTORS CORP.

Left Cylinder Head Exhaust Face

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Min)	
J 42385-								MM	(IN)	MM	
1	M10 x 1.5	211	212	N/A	213	214	215	33.5	1.3189	27.0	
2	M12 x 1.5	705	706	N/A	707	708	709	27.5	1.0827	13.0	
3	M6 x 1.0	201	202	N/A	203	204	205	22.5	0.8858	18.0	
4	M10 x 1.5	211	212	N/A	213	214	215	26.5	1.0433	20.0	

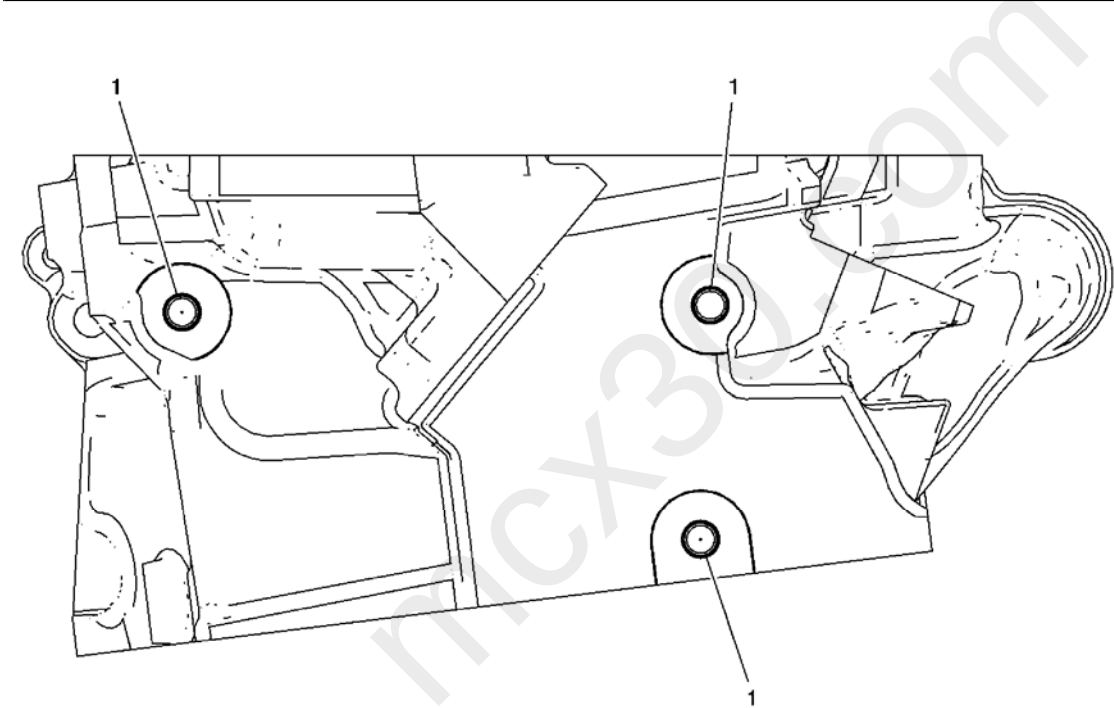


Fig. 5: Left Cylinder Head Rear Face (LF1)
Courtesy of GENERAL MOTORS CORP.

Left Cylinder Head Rear Face

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
J 42385-								MM	(IN)	MM	(IN)
1	M10 x 1.5	211	212	N/A	213	214	215	33.5	1.3189	27.0	1.0630

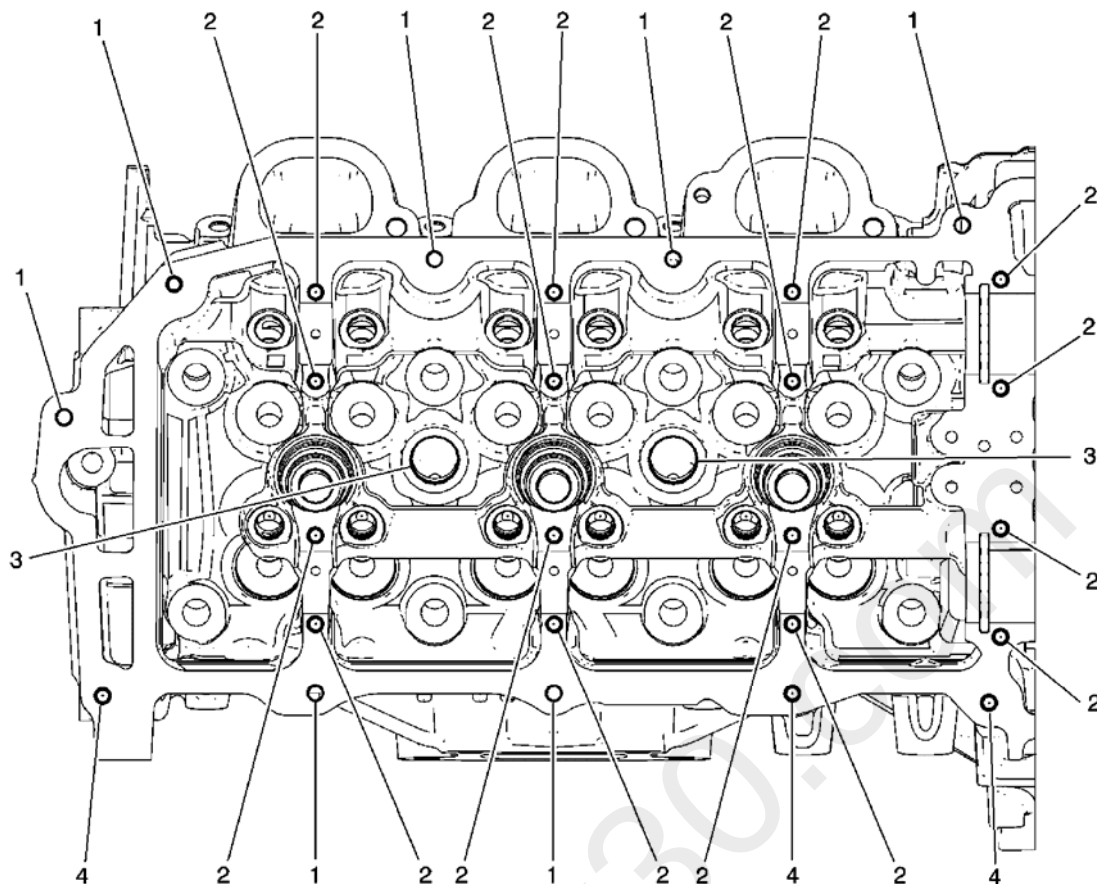


Fig. 6: Right Cylinder Head Camshaft Cover Face
 Courtesy of GENERAL MOTORS CORP.

Right Cylinder Head Camshaft Cover Face

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
								MM	(IN)	MM	(IN)
								J 42385-			
1	M6 x 1.0	201	202	N/A	203	204	205	THRU		THRU	
2	M6 x 1.0	701	N/A	N/A	203	204	205	28.5	1.1220	24.0	0.9449
3	M20 x 1.5	715	716	N/A	717	718	719	25.0	0.9842	17.0	0.6693
4	M6 x 1.0	201	202	N/A	203	204	205	22.5	0.8858	18.0	0.7087

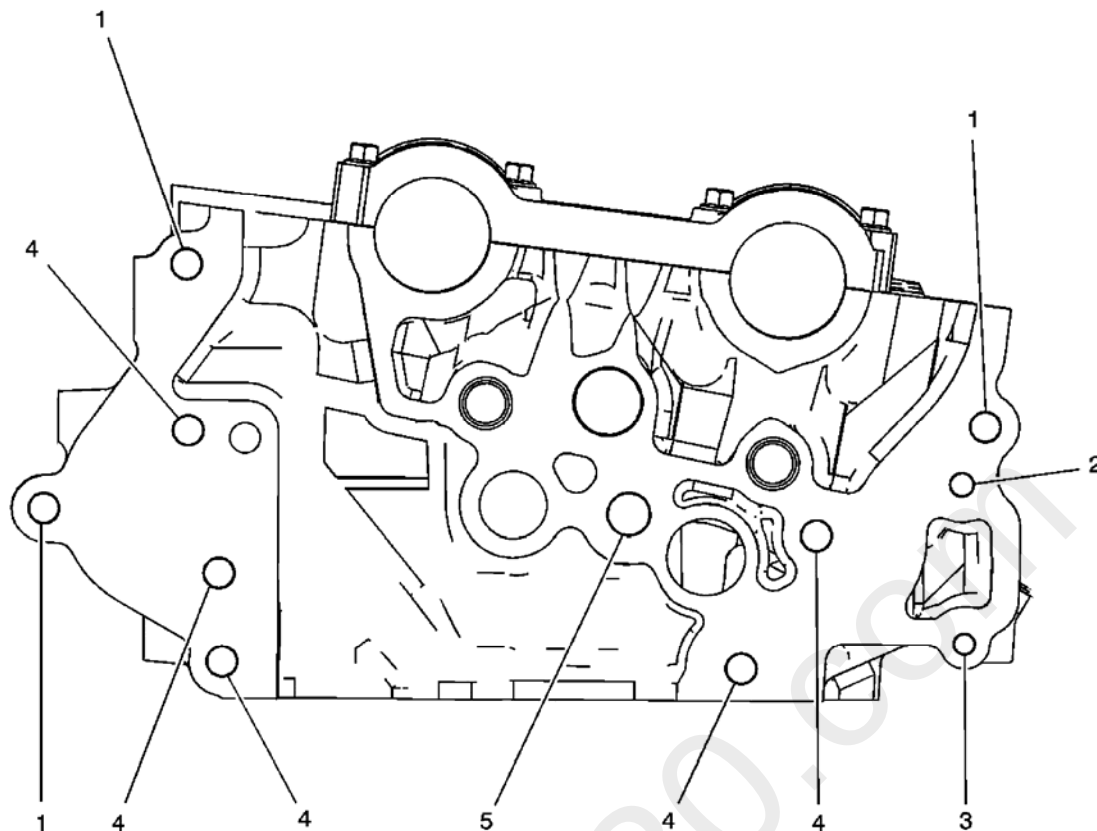


Fig. 7: Right Cylinder Head Front Face
 Courtesy of GENERAL MOTORS CORP.

Right Cylinder Head Front Face

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
								MM	(IN)	MM	(IN)
		J 42385-									
1	M8 x 1.25	206	207	N/A	208	209	210	THRU		THRU	
2	M6 x 1.0	201	202	N/A	203	204	205	22.5	0.8880	18.0	0.7087
3	M6 x 1.0	201	202	N/A	203	204	205	THRU		THRU	
4	M8 x 1.25	206	207	N/A	208	209	210	28.5	1.1220	23.0	0.9055
5	M12 x 1.75	856	857	N/A	858	859	416	40.0	1.5748	32.5	1.2795

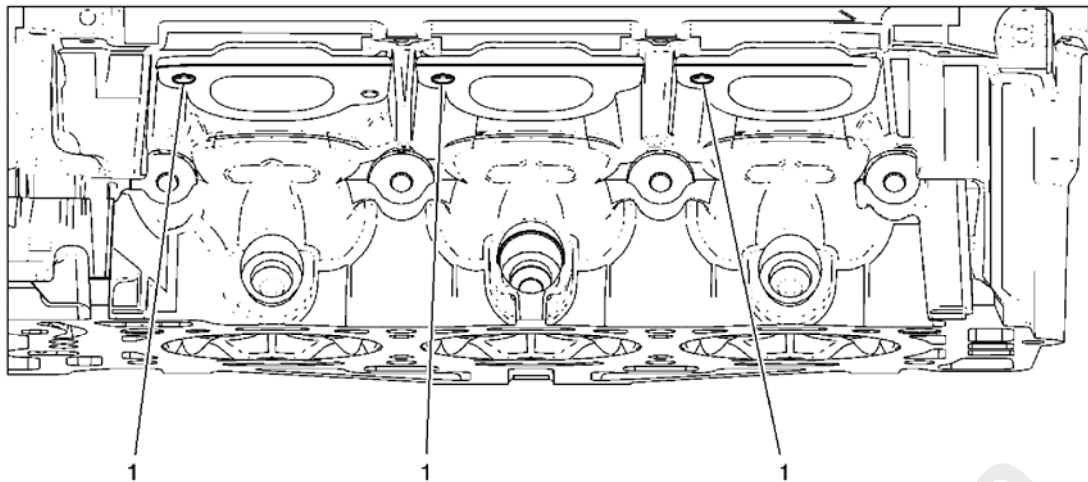
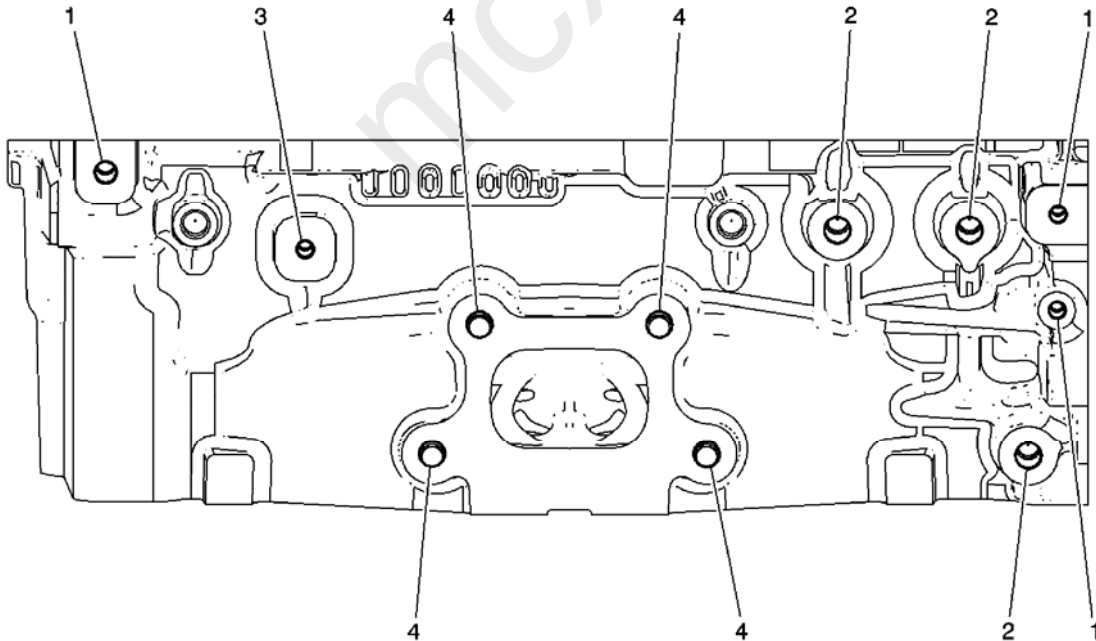


Fig. 8: Right Cylinder Head Intake Face (LF1)
 Courtesy of GENERAL MOTORS CORP.

Right Cylinder Head Intake Face

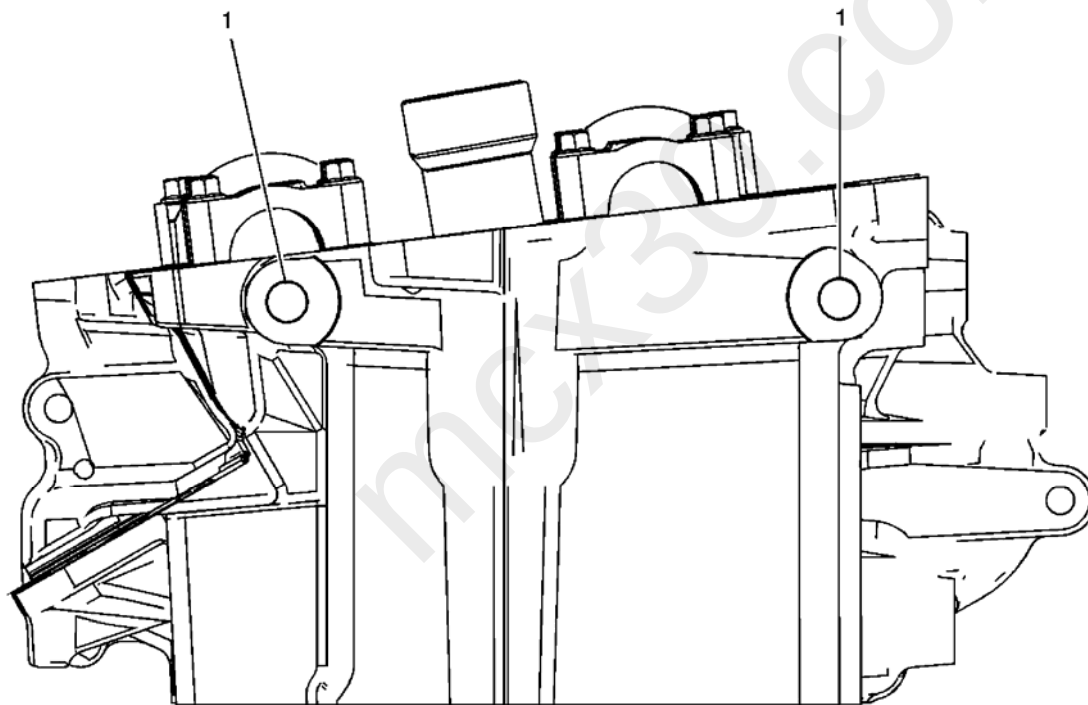
Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
		J 42385-						MM	(IN)	MM	(IN)
1	M8 x 1.25	206	207	N/A	208	209	210	28.5	1.1220	23.0	0.9055



Courtesy of GENERAL MOTORS CORP.

Right Cylinder Head Exhaust Face

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
		J 42385-						MM	(IN)	MM	(IN)
1	M6 x 1.0	201	202	N/A	203	204	205	22.5	0.8858	18.0	0.0000
2	M10 x 1.5	211	212	N/A	213	214	215	33.5	1.3189	27.0	1.0630
3	M8 x 1.25	206	207	N/A	208	209	210	28.5	1.1220	23.0	0.9055
4	M10 x 1.5	211	212	N/A	213	214	215	26.5	1.0433	20.0	0.7874



Courtesy of GENERAL MOTORS CORP.

Right Cylinder Head Rear Face

[illegible]

1	M10 x 1.5	211	212	N/A	213	214	215	33.5	1.3189	27.0	1.0630
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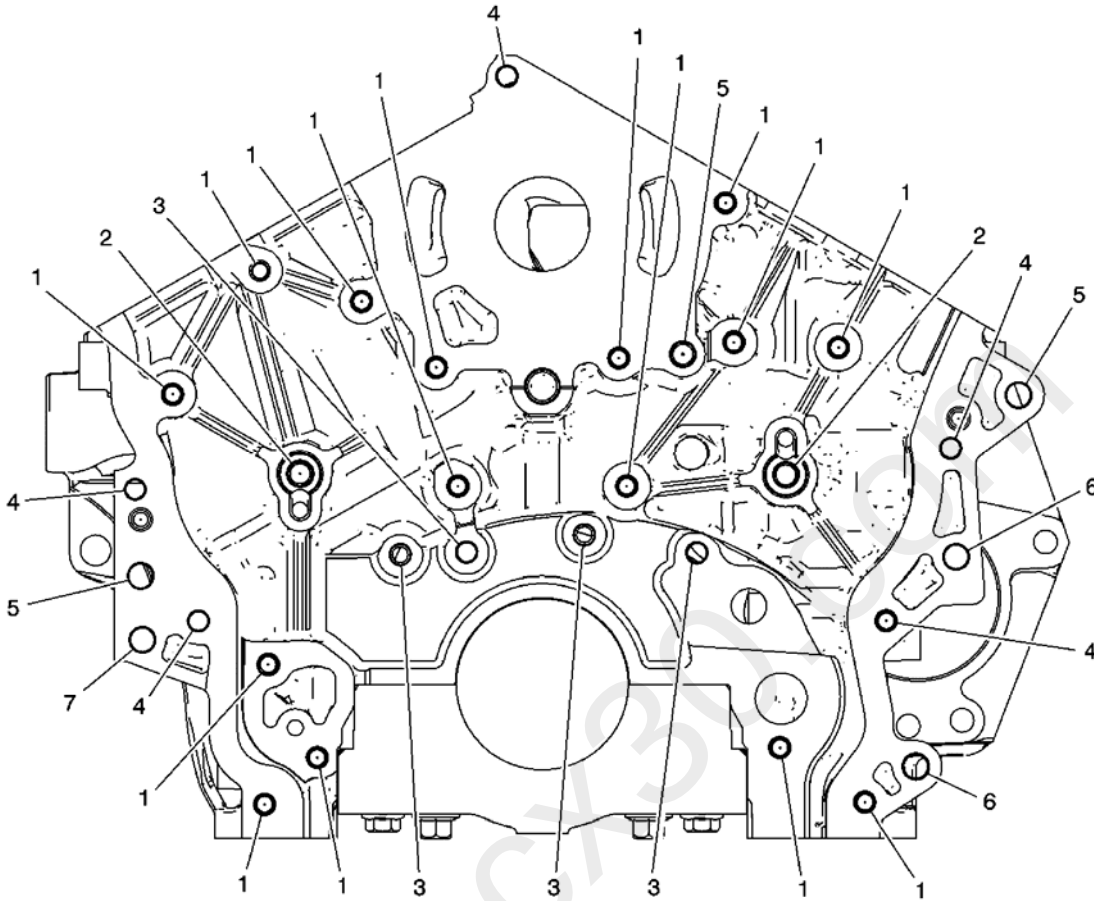


Fig. 11: Engine Block Front
 Courtesy of GENERAL MOTORS CORP.

Engine Block Front

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
								MM	(IN)	MM	(IN)
		J 42385-									
1	M8 x 1.25	206	207	N/A	208	209	210	28.5	1.1220	23.0	0.9055
2	M10 x 1.5	211	212	N/A	213	214	215	33.5	1.3189	27.0	1.0630
3	M8 x 1.25	206	207	N/A	208	209	210	THRU		22.0	0.8661
4	M8 x 1.25	206	207	N/A	208	209	210	THRU		THRU	

1	M8 x 1.25	206	207	N/A	208	209	210	28.5	1.1220	23.0	0.9055
2	M20 x 1.5	715	716	N/A	717	718	719	30.0	1.1810	20.0	0.7874
3	M10 x 1.5	211	212	N/A	213	214	215	33.5	1.3190	27.0	1.0630
4	M14 x 1.5	409	410	N/A	411	412	735	THRU		15.0	0.5905
5	M8 x 1.25	206	207	N/A	208	209	415	16.5	0.6496	11.0	0.4331

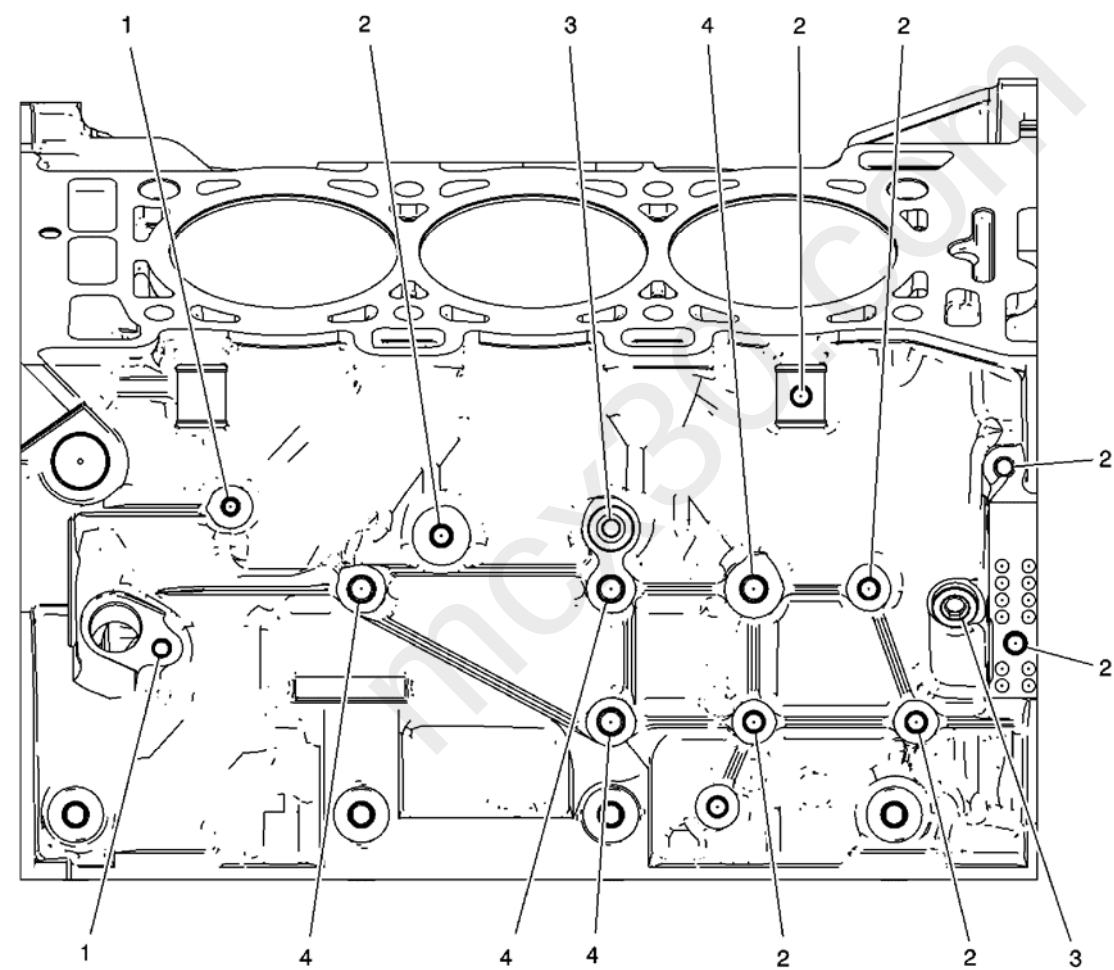


Fig. 13: Engine Block Right Side
 Courtesy of GENERAL MOTORS CORP.

Engine Block Right Side

Hole	Thread		Counter Bore	Stop				Drill Depth	Tap Depth
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J 42385-								MM	(IN)	MM	(IN)
1	M10 x 1.5	211	212	N/A	213	214	420	33.5	1.3190	27.0	1.0630
2	M6 x 1.0	201	202	N/A	203	204	205	22.5	0.8858	18.0	0.7087
3	M14 x 1.5	409	410	N/A	411	412	735	THRU		15.0	0.5905
4	M10 x 1.5	211	212	N/A	213	214	216	39.5	1.5551	33.0	1.2992
5	M10 x 1.5	211	212	N/A	213	214	420	THRU		THRU	

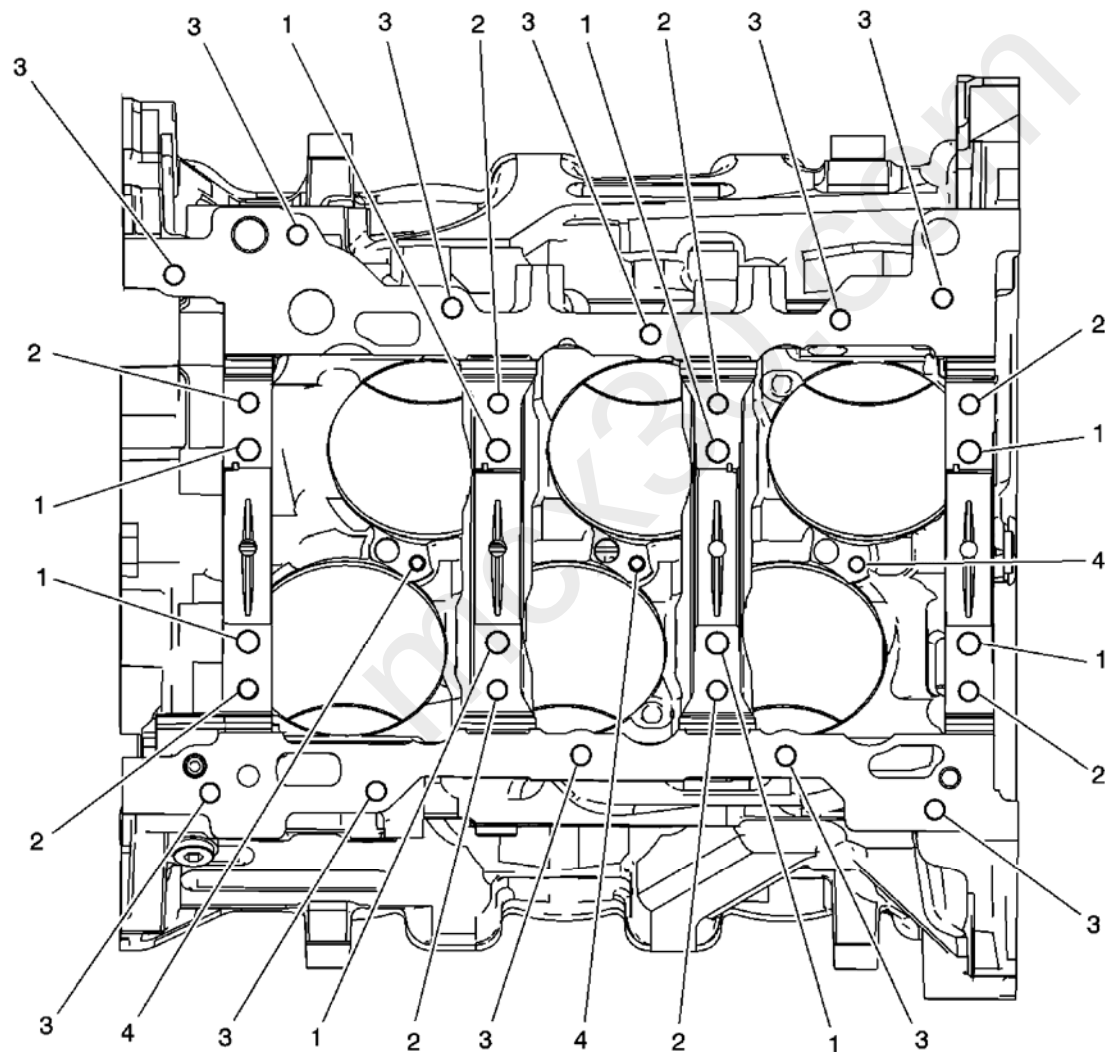


Fig. 15: Engine Block Bottom
 Courtesy of GENERAL MOTORS CORP.

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
		J 42385-						MM	(IN)	MM	(IN)
1	M10 x 2.0	720	N/A	N/A	721	722	104	56.0	2.2047	49.0	1.9291
2	M8 x 1.25	702	N/A	N/A	703	704	620	46.0	1.8110	40.5	1.5945
3	M8 x 1.25	206	207	N/A	208	209	210	28.5	1.1220	23.0	0.9055
4	M6 x 1.0	201	202	N/A	203	204	205	THRU		THRU	

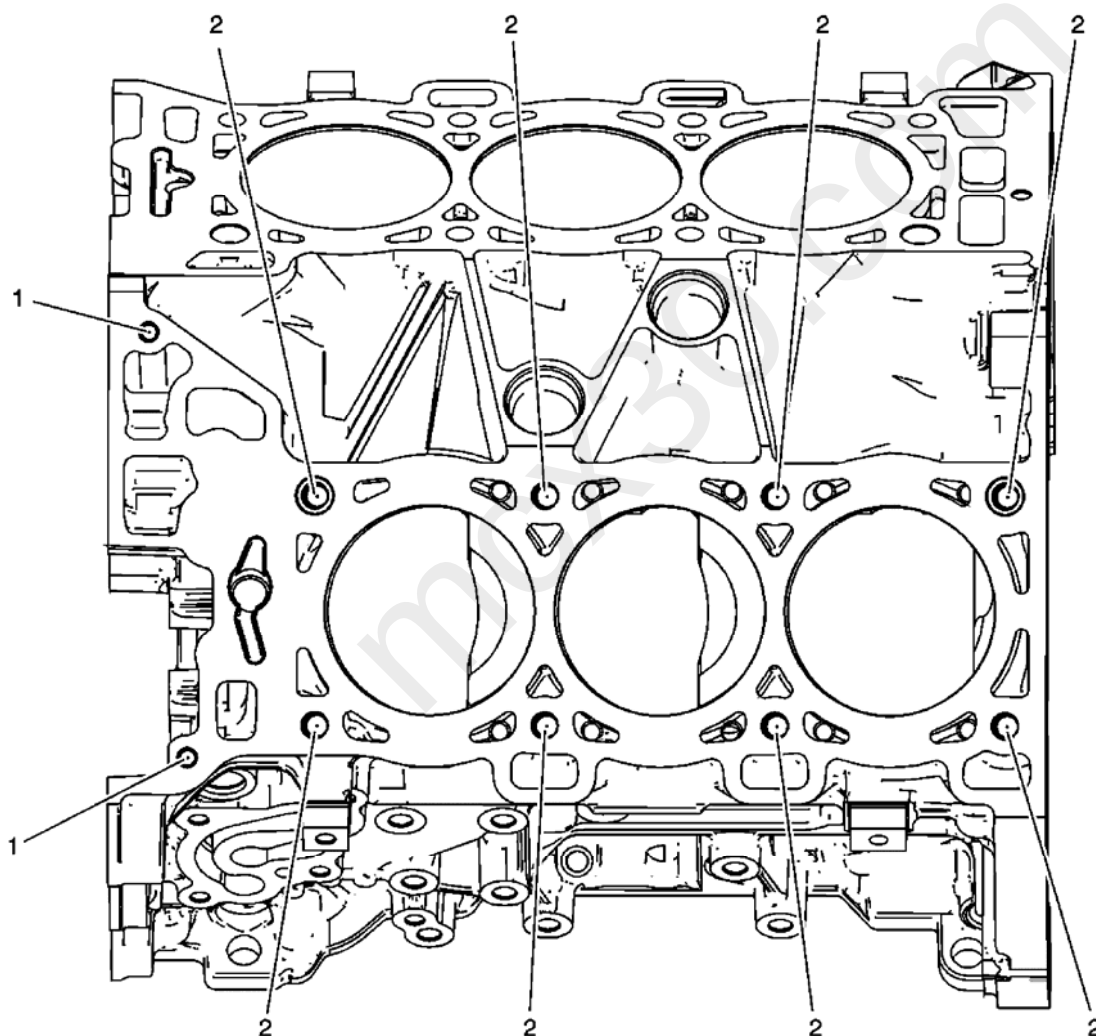


Fig. 16: Engine Block Left Deck Face
 Courtesy of GENERAL MOTORS CORP.

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
		J 42385-						MM	(IN)	MM	(IN)
1	M8 x 1.25	206	207	N/A	208	209	210	28.5	1.1220	23.0	0.9055
2	M11 x 2.0	723	N/A	N/A	724	725	108	102.5	4.0354	94.0	3.7008

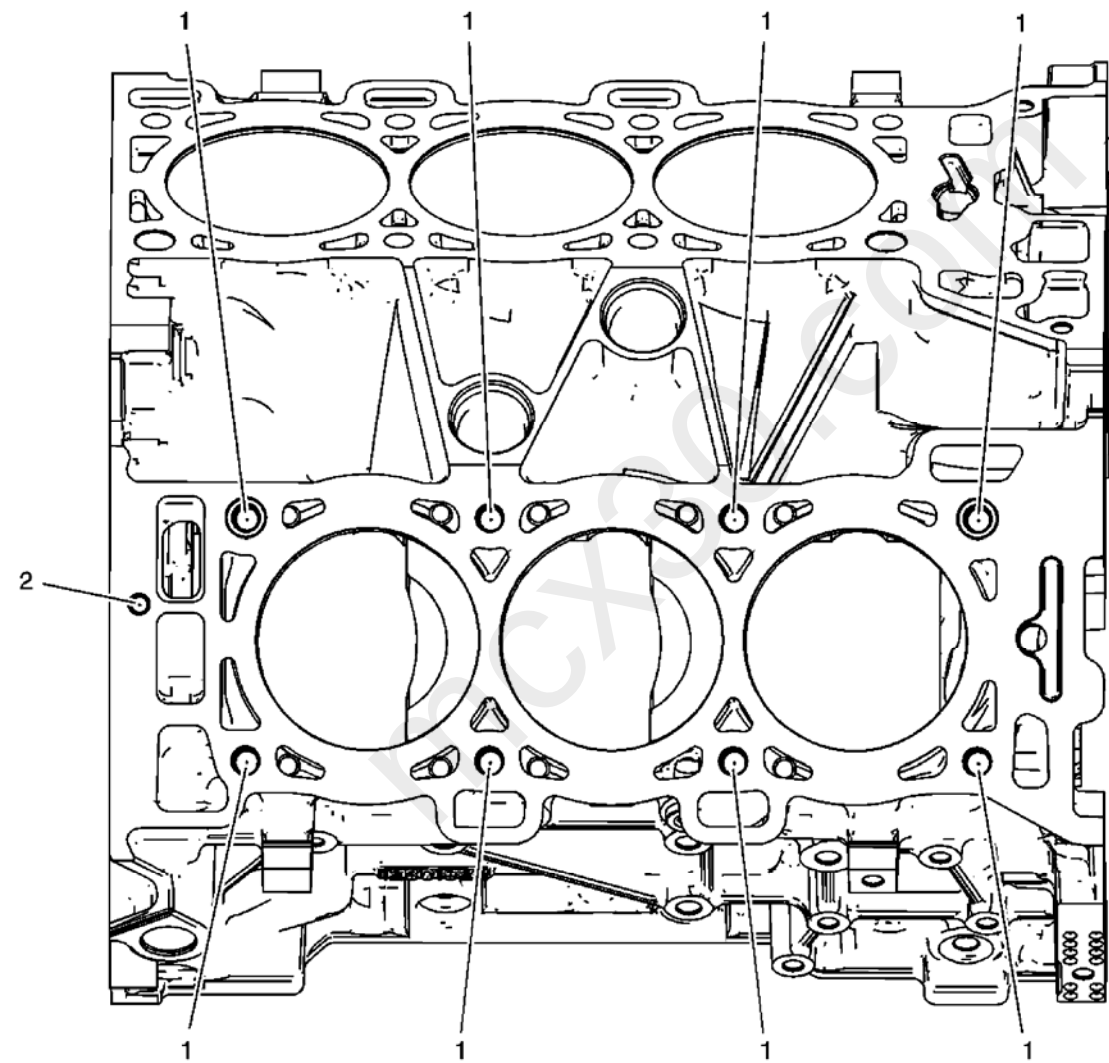


Fig. 17: Engine Block Right Deck Face
 Courtesy of GENERAL MOTORS CORP.

Engine Block Right Deck Face

Hole	Thread		Counter Bore	Stop				Drill Depth	Tap Depth
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Location	Size	Drill	Tool	Collar	Tap	Driver	Insert	(Maximum)		(Minimum)	
		J 42385-						MM	(IN)	MM	(IN)
1	M11 x 2.0	723	N/A	N/A	724	725	108	102.5	4.0354	94.0	3.7008
2	M8 x 1.25	206	207	N/A	208	209	210	28.5	1.1220	23.0	0.9055

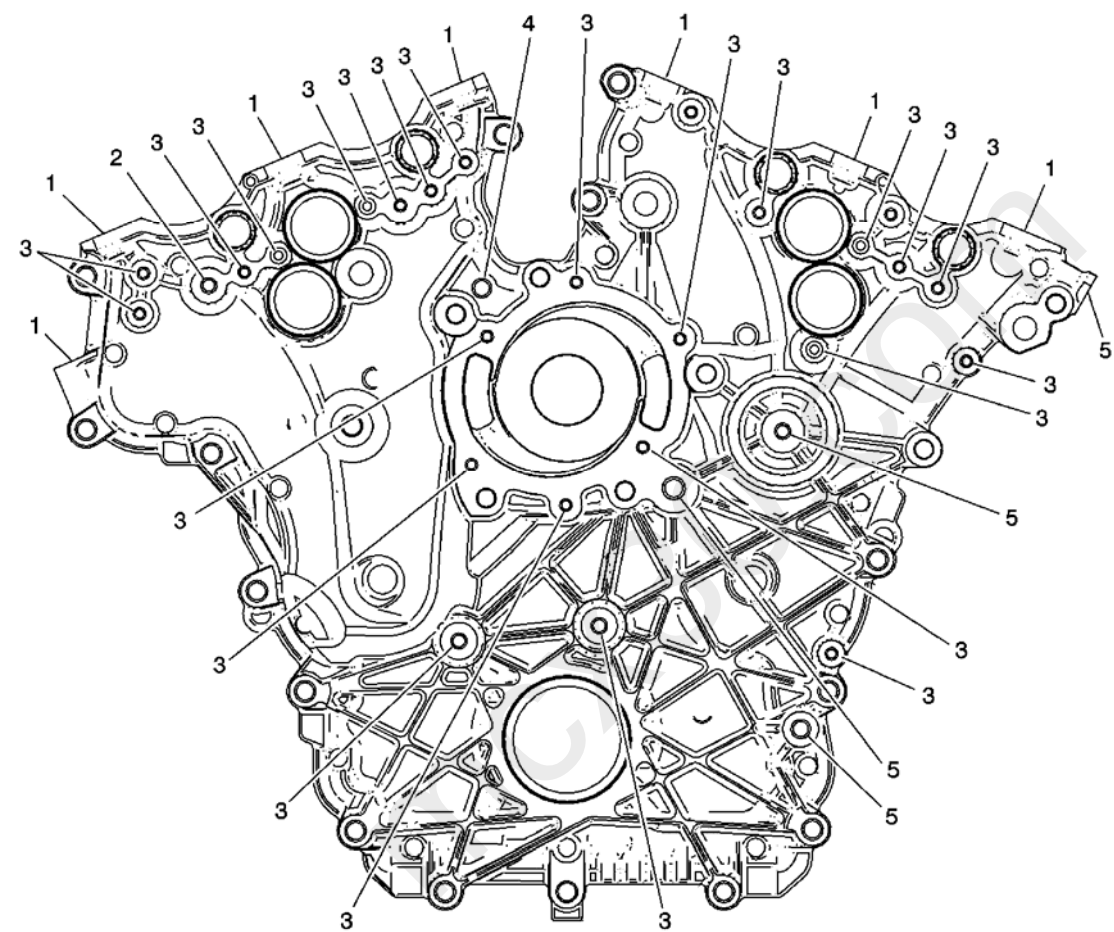


Fig. 18: Engine Front Cover
 Courtesy of GENERAL MOTORS CORP.

Engine Front Cover

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
		J 42385-						MM	(IN)	MM	(IN)
1	M6 x 1.0	201	202	N/A	203	204	205	THRU		THRU	
2	M8 x 1.25	206	207	N/A	208	209	210	28.5	1.1220	23.0	0.9055

3	M6 x 1.0	201	202	N/A	203	204	205	21.5	0.8465	18.0	0.7087
4	M10 x 1.5	211	212	N/A	213	214	215	THRU		THRU	
5	M10 x 1.5	211	212	N/A	213	214	420	32.5	1.2795	27.0	1.0630

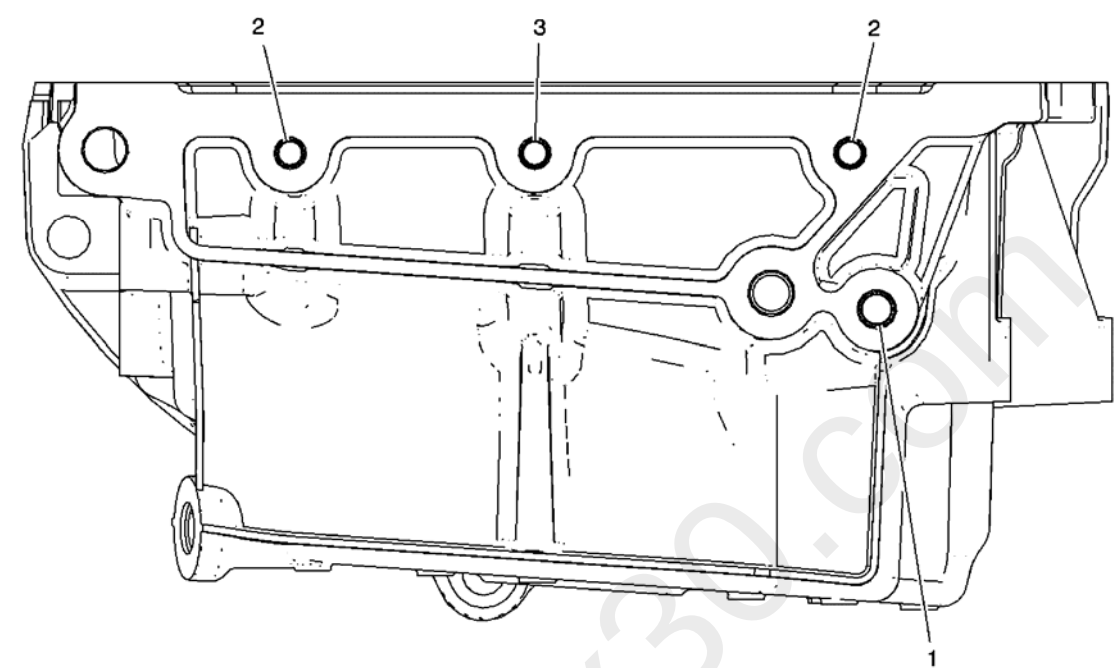


Fig. 19: Oil Pan Front
 Courtesy of GENERAL MOTORS CORP.

Oil Pan Front

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
								MM	(IN)	MM	(IN)
		J 42385-									
1	M8 x 1.25	206	207	N/A	208	209	210	28.5	1.1220	23.0	0.9055
2	M10 x 1.5	211	212	N/A	213	214	215	33.5	1.3189	27.0	1.0630
3	M8 x 1.25	610	N/A	N/A	208	209	620	37.5	1.4764	32.0	1.2598

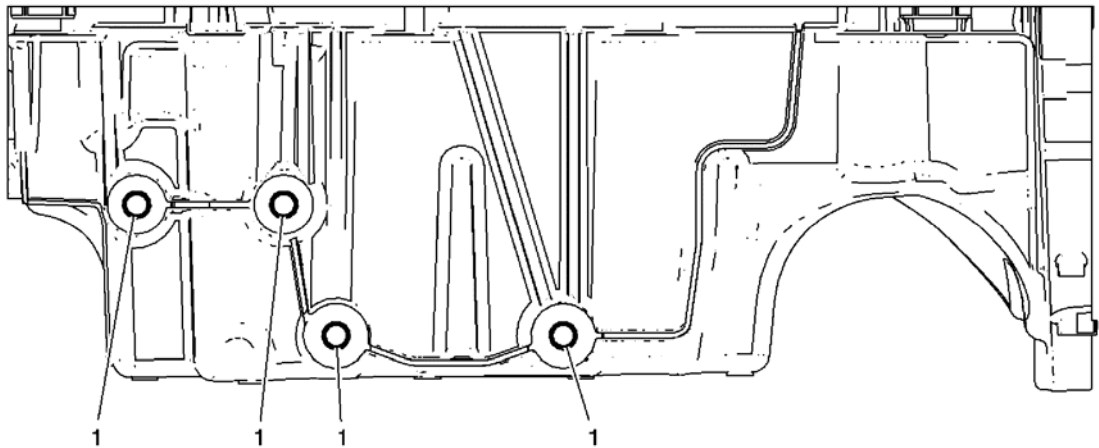


Fig. 20: Oil Pan Left Side
 Courtesy of GENERAL MOTORS CORP.

Oil Pan Left Side

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
		J 42385-						MM	(IN)	MM	(IN)
1	M10 x 1.5	211	212	N/A	213	214	420	33.5	1.3189	27.0	1.0630

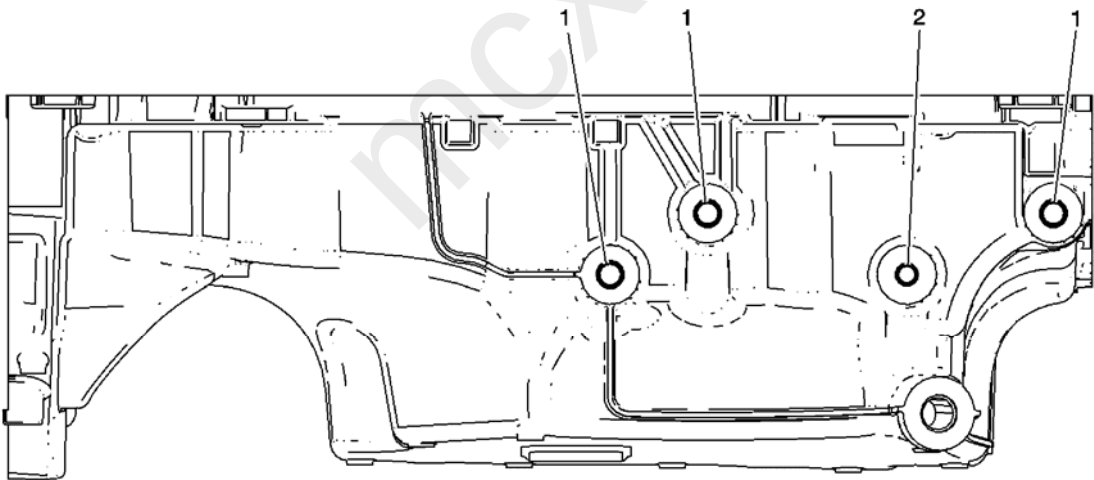


Fig. 21: Oil Pan Right Side
 Courtesy of GENERAL MOTORS CORP.

Oil Pan Right Side

			Counter								
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Hole Location	Thread Size	Drill	Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
		J 42385-						MM	(IN)	MM	(IN)
1	M12 x 1.75	856	857	N/A	858	859	855	39.5	1.5551	32.0	1.2598
2	M12 x 1.75	856	N/A	N/A	858	859	855	39.5	1.5551	32.0	1.2598

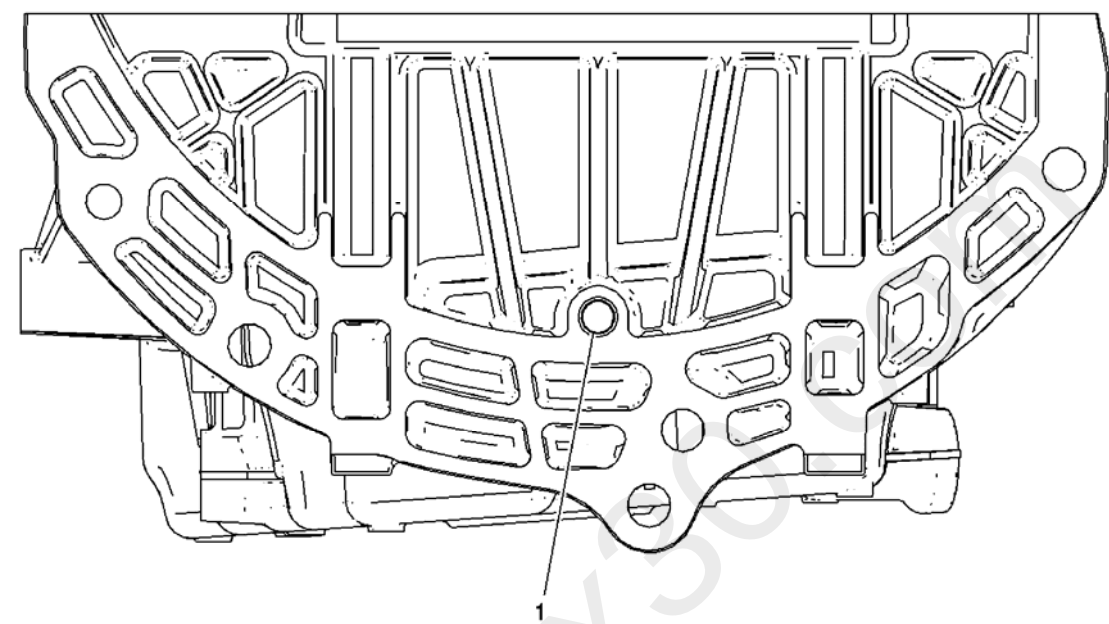


Fig. 22: Oil Pan Rear
 Courtesy of GENERAL MOTORS CORP.

Oil Pan Rear

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
		J 42385-						MM	(IN)	MM	(IN)
1	M10 x 1.5	211	212	N/A	213	214	420	33.5	1.3189	27.0	1.0630

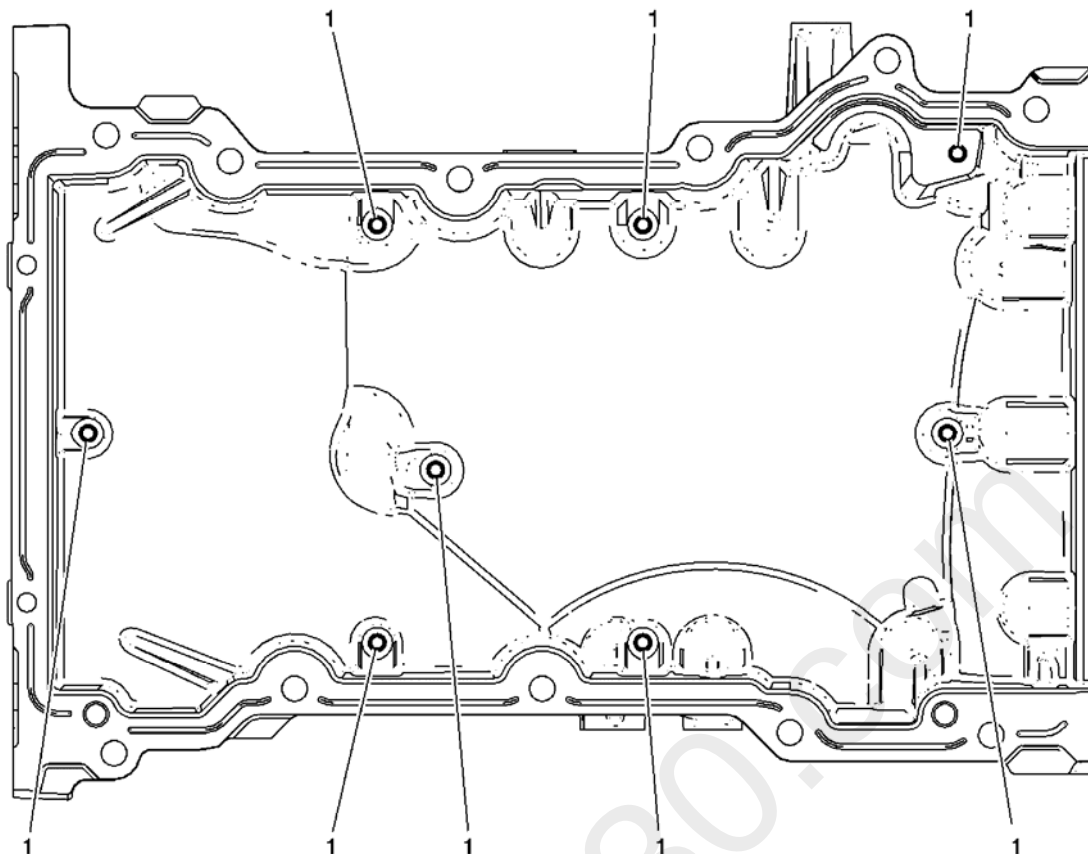


Fig. 23: Oil Pan Top
 Courtesy of GENERAL MOTORS CORP.

Oil Pan Top

Hole Location	Thread Size	Drill	Counter Bore Tool	Stop Collar	Tap	Driver	Insert	Drill Depth (Maximum)		Tap Depth (Minimum)	
								MM	(IN)	MM	(IN)
1	M6 x 1.0	701	N/A	N/A	203	204	205	28.0	1.1024	23.5	0.9252