

**2018 ENGINE****Engine Mechanical - 3.6L (LFY) - Specifications - Traverse****SPECIFICATIONS****FASTENER SPECIFICATIONS****Single Use Non-Threaded Fasteners/Components****NOTE:**

***All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.***

| Application                              |
|------------------------------------------|
| Camshaft Cover Gasket                    |
| Camshaft Cover Grommet                   |
| Camshaft Position Actuator Seal          |
| Connecting Rod Bearing                   |
| Crankshaft Lower Bearing                 |
| Crankshaft Thrust Upper Bearing          |
| Crankshaft Upper Bearing                 |
| Crankshaft Front Oil Seal                |
| Crankshaft Rear Oil Seal Housing         |
| Cylinder Head Gasket                     |
| Engine Coolant Thermostat Housing Gasket |
| Fuel Feed Intermediate Pipe              |
| Fuel Injector Nozzle Housing Seal        |
| Fuel Injector Retainer                   |
| Fuel Injector Spacer                     |
| Fuel Pump Gasket                         |
| Fuel Pump O-Ring                         |
| Intake Manifold Gasket                   |
| Lower Intake Manifold Gasket             |
| Oil Filter Adapter Gasket                |
| Oil Level Indicator Tube Seal            |
| Piston Pin Retainer                      |
| Plastic Compression Limiter              |
| Spark Plug Shield Seal                   |
| Timing Chain Tensioner Gasket            |
| Throttle Body Gasket                     |
| Water Pump Gasket                        |
| Water Pump Seal                          |

**Single Use Threaded Fastener/Component Tightening Specifications****NOTE:**

***All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.***

| Application                            | Specification    |
|----------------------------------------|------------------|
|                                        | Metric (English) |
| Automatic Transmission Flex Plate Bolt |                  |

**NOTE:**

***All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.***

| Application                         | Specification      |
|-------------------------------------|--------------------|
|                                     | Metric (English)   |
| • First Pass:                       | 30 N.m (22 lb ft)  |
| • Final Pass:                       | 45 degrees         |
| Connecting Rod Bolt                 |                    |
| • First Pass:                       | 25 N.m (18 lb ft)  |
| • Final Pass:                       | 110 degrees        |
| Crankshaft Balancer Bolt            |                    |
| • First Pass:                       | 100 N.m (74 lb ft) |
| • Final Pass:                       | 150 degrees        |
| Crankshaft Bearing Cap Bolt - Inner |                    |
| • First Pass:                       | 20 N.m (15 lb ft)  |
| • Final Pass:                       | 80 degrees         |
| Crankshaft Bearing Cap Bolt - Outer |                    |
| • First Pass:                       | 15 N.m (11 lb ft)  |
| • Final Pass:                       | 110 degrees        |
| Crankshaft Bearing Cap Bolt - Side  |                    |
| • First Pass:                       | 30 N.m (22 lb ft)  |
| • Final Pass:                       | 60 degrees         |
| 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        |

**NOTE:**

***All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.***

| Application                                                                                            | Specification     |
|--------------------------------------------------------------------------------------------------------|-------------------|
|                                                                                                        | Metric (English)  |
| Fuel Feed Intermediate Pipe Nut                                                                        | 28 N.m (21 lb ft) |
| Fuel Pump Bolt                                                                                         |                   |
| • First Pass:                                                                                          | 15 N.m (11 lb ft) |
| • Final Pass:                                                                                          | 60 degrees        |
| Oil Filter                                                                                             |                   |
| • 3/4 to 1 full turn after gasket makes contact with the sealing surface on the filter mounting flange |                   |
| Water Pump Bolt                                                                                        |                   |
| • First Pass:                                                                                          | 10 N.m (89 lb in) |
| • Second Pass:                                                                                         | 10 N.m (89 lb in) |
| • Final Pass:                                                                                          | 45 degrees        |

### Reusable Threaded Fastener Tightening Specifications

**NOTE:**

***All fasteners listed in this table can be reused after removal.***

| Application                         | Specification     |
|-------------------------------------|-------------------|
|                                     | Metric (English)  |
| Camshaft Bearing Cap Bolt M6 x 43.4 |                   |
| • First Pass:                       | 6 N.m (53 lb in)  |
| • Final Pass:                       | 45 degrees        |
| Camshaft Bearing Cap Bolt M6 x 43.4 |                   |
| • Final Pass:                       | 60 degrees        |
| • First Pass:                       | 6 N.m (53 lb in)  |
| Camshaft Carrier Bolt M6 x 60       |                   |
| • First Pass:                       | 6 N.m (53 lb in)  |
| • Final Pass:                       | 45 degrees        |
| Camshaft Cover Bolt                 | 10 N.m (89 lb in) |
| Camshaft Position Actuator Bolt     | 58 N.m (43 lb ft) |

**NOTE:**

*All fasteners listed in this table can be reused after removal.*

| Application                                                   | Specification      |
|---------------------------------------------------------------|--------------------|
|                                                               | Metric (English)   |
| Camshaft Position Actuator Solenoid Valve Bolt                | 10 N.m (89 lb in)  |
| Camshaft Position Sensor Bolt                                 | 10 N.m (89 lb in)  |
| Coolant Drain Plug                                            | 50 N.m (37 lb ft)  |
| Coolant Drain Plug                                            | 75 N.m (55 lb ft)  |
| Crankshaft Position Sensor Bolt                               | 10 N.m (89 lb in)  |
| Crankshaft Rear Oil Seal Housing Bolt                         | 10 N.m (89 lb in)  |
| Cylinder Head Core Hole Plug                                  | 15 N.m (11 lb ft)  |
| Cylinder Head Water Jacket Hole Plug                          | 75 N.m (55 lb ft)  |
| Drive Belt Tensioner Bolt                                     | 25 N.m (18 lb ft)  |
| Engine Block Oil Gallery Plug M14                             | 50 N.m (37 lb ft)  |
| Engine Block Oil Gallery Plug M20                             | 75 N.m (55 lb ft)  |
| Engine Coolant Temperature Sensor                             | 22 N.m (16 lb ft)  |
| Engine Coolant Thermostat Housing Bolt                        | 10 N.m (89 lb in)  |
| Engine Front Cover Bolt M6                                    | 15 N.m (11 lb ft)  |
| Engine Front Cover Bolt M8                                    |                    |
| <ul style="list-style-type: none"> <li>First Pass:</li> </ul> | 20 N.m (15 lb ft)  |
| <ul style="list-style-type: none"> <li>Final Pass:</li> </ul> | 60 Degrees         |
| Engine Front Cover Bolt M12                                   | 65 N.m (48 lb ft)  |
| Engine Front Cover Stud                                       | 15 N.m (11 lb ft)  |
| Engine Lift Bracket                                           | 58 N.m (43 lb ft)  |
| Engine Mount @ Engine Mount Bracket Bolt                      | 100 N.m (74 lb ft) |
| Engine Mount @ Body Bolt                                      | 58 N.m (43 lb ft)  |
| Engine Mount Brace Bolt                                       | 22 N.m (16 lb ft)  |
| Engine Oil Level Indicator Switch Bolt                        | 10 N.m (89 lb in)  |
| Engine Oil Pressure Sensor                                    | 20 N.m (15 lb ft)  |
| Evaporative Emission Canister Purge Solenoid Valve Bolt       | 10 N.m (89 lb in)  |
| Exhaust Crossover Pipe Nut                                    | 34 N.m (25 lb ft)  |
| Exhaust Manifold Bolt                                         | 20 N.m (15 lb ft)  |
| Exhaust Manifold Heat Shield Bolt                             | 10 N.m (89 lb in)  |
| Exhaust Manifold Stud                                         | 6 N.m (53 lb in)   |
| Fuel Feed Intermediate Pipe Bolt                              | 28 N.m (21 lb ft)  |
| Fuel Feed Pipe Bolt                                           | 50 N.m (37 lb ft)  |
| Fuel Injection Fuel Feed and Return Pipe Retainer Bolt        | 50 N.m (37 lb ft)  |
| Fuel Injection Fuel Rail Bolt                                 | 25 N.m (18 lb ft)  |
| Fuel Rail Support Bracket                                     | 10 N.m (89 lb in)  |
| Ground Strap Bolt                                             | 45 N.m (33 lb ft)  |
| Heater Inlet and Outlet Pipe Bolt                             | 10 N.m (89 lb in)  |
| Idler Pulley                                                  | 30 N.m (22 lb ft)  |
| Ignition Coil Bolt                                            | 10 N.m (89 lb in)  |
| Lower Intake Manifold Bolt                                    | 7 N.m (62 lb in)   |
| Upper Intake Manifold Bolt                                    | 25 N.m (18 lb ft)  |
| Knock Sensor Bolt                                             | 25 N.m (18 lb ft)  |
| Manifold Absolute Pressure Sensor Bolt                        | 4 N.m (35 lb in)   |

**NOTE:**

***All fasteners listed in this table can be reused after removal.***

| Application                            | Specification      |
|----------------------------------------|--------------------|
|                                        | Metric (English)   |
| Oil Filter Adapter Bolt                | 23 N.m (17 lb ft)  |
| Oil Level Indicator Tube Bolt          | 10 N.m (89 lb in)  |
| Oil Pan Bolt M6                        | 10 N.m (89 lb in)  |
| Oil Pan Bolt M8                        | 25 N.m (18 lb ft)  |
| Oil Pan Drain Plug                     | 25 N.m (18 lb ft)  |
| Oil Pan Baffle Bolt                    | 10 N.m (89 lb in)  |
| Oil Pump Bolt                          | 25 N.m (18 lb ft)  |
| Oil Pump Suction Pipe Bolt             | 10 N.m (89 lb in)  |
| Oxygen Sensor Pump Converter Pipe      | 42 N.m (31 lb ft)  |
| PCV Tube Bracket Bolt/Ball Stud        | 10 N.m (89 lb in)  |
| Piston Oil Cooling Nozzle Bolt         | 10 N.m (89 lb in)  |
| Spark Plug                             | 18 N.m (13 lb ft)  |
| Starter Bolt                           | 58 N.m (43 lb ft)  |
| Starter Nut                            | 12 N.m (106 lb in) |
| Timing Chain Guide Bolt                | 25 N.m (18 lb ft)  |
| Timing Chain Idler Sprocket Shaft Bolt | 58 N.m (43 lb ft)  |
| Timing Chain Tensioner Bolt            |                    |
| First Pass:                            | 5 N.m (44 lb in)   |
| Final Pass:                            | 25 N.m (18 lb ft)  |
| Throttle Body Bolt                     | 10 N.m (89 lb in)  |
| Torque Converter Bolt                  | 60 N.m (44 lb ft)  |
| Water Pump Pulley Bolt                 | 10 N.m (89 lb in)  |
| Water Outlet Bolt                      | 10 N.m (89 lb in)  |

**APPROXIMATE FLUID CAPACITIES**

| Application                                 | Specification |            |
|---------------------------------------------|---------------|------------|
|                                             | Metric        | English    |
| 3.0L (LFW) and 3.6L (LFX, LFR, LFY and LLT) |               |            |
| • Oil Capacity - with Filter                | 5.7 Liters    | 6.0 Quarts |
| • Oil Capacity - without Filter             | 5.2 Liters    | 5.5 Quarts |

**ENGINE MECHANICAL SPECIFICATIONS**

| Application    | Specification |           |
|----------------|---------------|-----------|
|                | Metric        | English   |
| General        |               |           |
| • Engine Type  | V-6           |           |
| • Displacement | 3.6 Liter     | 220 cu in |
| • RPO          | LFY           |           |

| Application                                                       | Specification      |                    |
|-------------------------------------------------------------------|--------------------|--------------------|
|                                                                   | Metric             | English            |
| • VIN                                                             | W                  |                    |
| • Bore                                                            | 94 mm              | 3.7008 in          |
| • Stroke                                                          | 85.6 mm            | 3.37 in            |
| • Compression Ratio                                               | 11.5:1             |                    |
| • Firing Order                                                    | 1-2-3-4-5-6        |                    |
| • Spark Plug Gap                                                  | 0.95 - 1.10 mm     | 0.0375 - 0.0433 in |
| Block                                                             |                    |                    |
| • Crankshaft Main Bearing Bore Diameter                           | 72.867 - 72.881 mm | 2.8688 - 2.8693 in |
| • Cylinder Bore Diameter                                          | 93.992 - 94.008 mm | 3.7005 - 3.7011 in |
| • Cylinder Bore Out-of-Round - Production Max.                    | 0.026 mm           | 0.001 in           |
| • Cylinder Bore Taper                                             | 0.020 mm           | 0.0008 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                                               | 0.072 - 0.490 mm   | 0.0028 - 0.0190 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                                    | 42.425 - 42.725 mm | 1.6703 - 1.6821 in |
|                                                                   |                    |                    |

| Application                                                | Specification      |                     |
|------------------------------------------------------------|--------------------|---------------------|
|                                                            | Metric             | English             |
| • 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 - 0.0026 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 | 24.021 mm          | 0.9457 in           |
| • Connecting Rod Length - Center to Center                 | 152.400 mm         | 6.0000 in           |
| • Connecting Rod Side Clearance                            | 0.095 - 0.355 mm   | 0.00037 - 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  |
|                                                            |                    |                     |

| Application                              | Specification      |                    |
|------------------------------------------|--------------------|--------------------|
|                                          | Metric             | English            |
| • 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      | 0.031 - 0.069 mm   | 0.0012 - 0.0027 in |
| • Crankshaft Main Journal Diameter       | 67.992 - 68.008 mm | 2.6768 - 2.6775 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 |
|                                          |                    |                    |

| Application                                       | Specification      |                    |
|---------------------------------------------------|--------------------|--------------------|
|                                                   | Metric             | English            |
| • Crankshaft Rear Flange Runout                   | 0.025 mm           | 0.0010 in          |
| • Crankshaft Reluctor Ring Runout - Maximum       | 1.500 mm           | 0.0591 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 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 - 0.250 mm   | 0.0059 - 0.0098 in |
| • First Compression Ring - Maximum, Ring in Bore  | 0.290 mm           | 0.0114 in          |
| • Second Compression Ring - Nominal               | 0.300 - 0.450 mm   | 0.0118 - 0.0177 in |
| • Second Compression Ring - Maximum, Ring in Bore | 0.490 mm           | 0.0193 in          |
|                                                   |                    |                    |

| Application                                                               | Specification      |                    |
|---------------------------------------------------------------------------|--------------------|--------------------|
|                                                                           | Metric             | English            |
| • Oil Control Ring                                                        | 0.150 - 0.350 mm   | 0.0059 - 0.0138 in |
| • Piston Ring to Groove Clearance                                         |                    |                    |
| • First Compression Ring                                                  | 0.030 - 0.075 mm   | 0.0012 - 0.0030 in |
| • Second Compression Ring                                                 | 0.015 - 0.060 mm   | 0.0006 - 0.0024 in |
| • Oil Control Ring                                                        | 0.030 - 0.170 mm   | 0.0012 - 0.0067 in |
| • Piston Ring Thickness                                                   |                    |                    |
| • First Compression Ring                                                  | 0.975 - 0.990 mm   | 0.0384 - 0.0390 in |
| • Second Compression Ring                                                 | 1.170 - 1.195 mm   | 0.0461 - 0.0470 in |
| • Oil Control Ring                                                        | 1.360 - 1.480 mm   | 0.0535 - 0.0583 in |
| Pistons and Pins                                                          |                    |                    |
| • Piston                                                                  |                    |                    |
| • Piston Diameter - Measured Over Skirt Coating                           | 93.976 - 94.014 mm | 3.6998 - 3.7013 in |
| • Piston Diameter - Service Limit Minimum w/more than 10K miles           | 93.926 mm          | 3.6979 in          |
| • Piston Pin Bore Diameter                                                | 24.004 - 24.009 mm | 0.9450 - 0.9452 in |
| • Piston Ring Groove Width - First Compression Ring                       | 1.020 - 1.050 mm   | 0.0402 - 0.0413 in |
| • Piston Ring Groove Width - Second Compression Ring                      | 1.210 - 1.230 mm   | 0.0476 - 0.0484 in |
| • Piston Ring Groove Width - Oil Control Ring                             | 1.510 - 1.530 mm   | 0.0594 - 0.0602 in |
| • Piston to Bore Clearance - Production; Measured at Skirt Coating        | 0.022 - 0.032 mm   | 0.0009 - 0.0013 in |
| • Piston to Bore Clearance - Service Limit Maximum, w/more than 10K miles | 0.050 mm           | 0.0020 in          |

| Application                                                     | Specification               |                             |
|-----------------------------------------------------------------|-----------------------------|-----------------------------|
|                                                                 | Metric                      | English                     |
| • Pin                                                           |                             |                             |
| • Piston Pin Clearance to Connecting Rod Bore - Production      | 0.009 - 0.022 mm            | 0.0004 - 0.0009 in          |
| • Piston Pin Clearance to Connecting Rod Bore - Service Maximum | 0.030 mm                    | 0.0012 in                   |
| • Piston Pin Clearance to Piston Pin Bore - Production          | 0.004 - 0.012 mm            | 0.0002 - 0.0005 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                                             | 52.600 - 53.100 mm          | 2.0709 - 2.0906 in          |
| Valve System                                                    |                             |                             |
| • Valves                                                        |                             |                             |
| • Valve Face Angle                                              | 44.25 degrees               |                             |
| • Valve Face Runout                                             | 0.0500 mm                   | 0.0020 in                   |
| • Valve Face Width - Exhaust                                    | DO NOT GRIND, REPLACE VALVE | DO NOT GRIND, REPLACE VALVE |
| • Valve Face Width - Intake                                     | DO NOT GRIND, REPLACE VALVE | DO NOT GRIND, REPLACE VALVE |
| • Valve Head Diameter - Exhaust                                 | 30.470 - 30.730 mm          | 1.1996 - 1.2098 in          |
| • Valve Head Diameter - Intake                                  | 38.170 - 38.430 mm          | 1.5028 - 1.5130 in          |
| • Valve Installed Height                                        | 35.23 - 36.69 mm            | 1.3870 - 1.4445 in          |
| • Valve Length - Exhaust                                        | 95.11 mm                    | 3.74 in                     |
| • Valve Length - Intake                                         | 100.630 mm                  | 3.9618 in                   |
| • Valve Seat Angle - Seating Surface                            | 45 degrees                  |                             |
|                                                                 |                             |                             |

| Application                                                 | Specification      |                    |
|-------------------------------------------------------------|--------------------|--------------------|
|                                                             | Metric             | English            |
| • 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           | 0.0031 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                              | 5.945 - 5.965 mm   | 0.2341 - 0.2348 in |
| • Valve Stem-to-Guide Clearance - Exhaust                   | 0.035 - 0.075 mm   | 0.0014 - 0.0030 in |
| • Valve Stem-to-Guide Clearance - Intake                    | 0.035 - 0.075 mm   | 0.0014 - 0.0030 in |
| • Valve Lifters - Stationary Hydraulic Lash Adjuster (SHLA) |                    |                    |
| • Valve Lifter (SHLA) Diameter                              | 11.989 - 12.000 mm | 0.4720 - 0.4724 in |
| • Valve Lifter (SHLA)-to-Bore Clearance                     | 0.008 - 0.041 mm   | 0.0003 - 0.0016 in |
| • Rocker Arms                                               |                    |                    |
| • Valve Rocker Arm Ratio                                    | 1.68 to 1          |                    |
| • Valve Rocker Arm Roller Diameter                          | 17.750 - 17.800 mm | 0.6988 - 0.7008 in |
| • Valve Springs                                             |                    |                    |
| • Valve Spring Coil Thickness                               | 3.250 x 3.900 mm   | 0.1280 x 0.1535 in |
|                                                             |                    |                    |

| Application                              | Specification      |                    |
|------------------------------------------|--------------------|--------------------|
|                                          | Metric             | English            |
| • Valve Spring Diameter - Inside Top     | 12.200 - 12.700 mm | 0.4803 - 0.5000 in |
| • Valve Spring Diameter - Outside Top    | 20.250 mm          | 0.7972 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               | 42.500 - 45.500 mm | 1.6732 - 1.7913 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       |

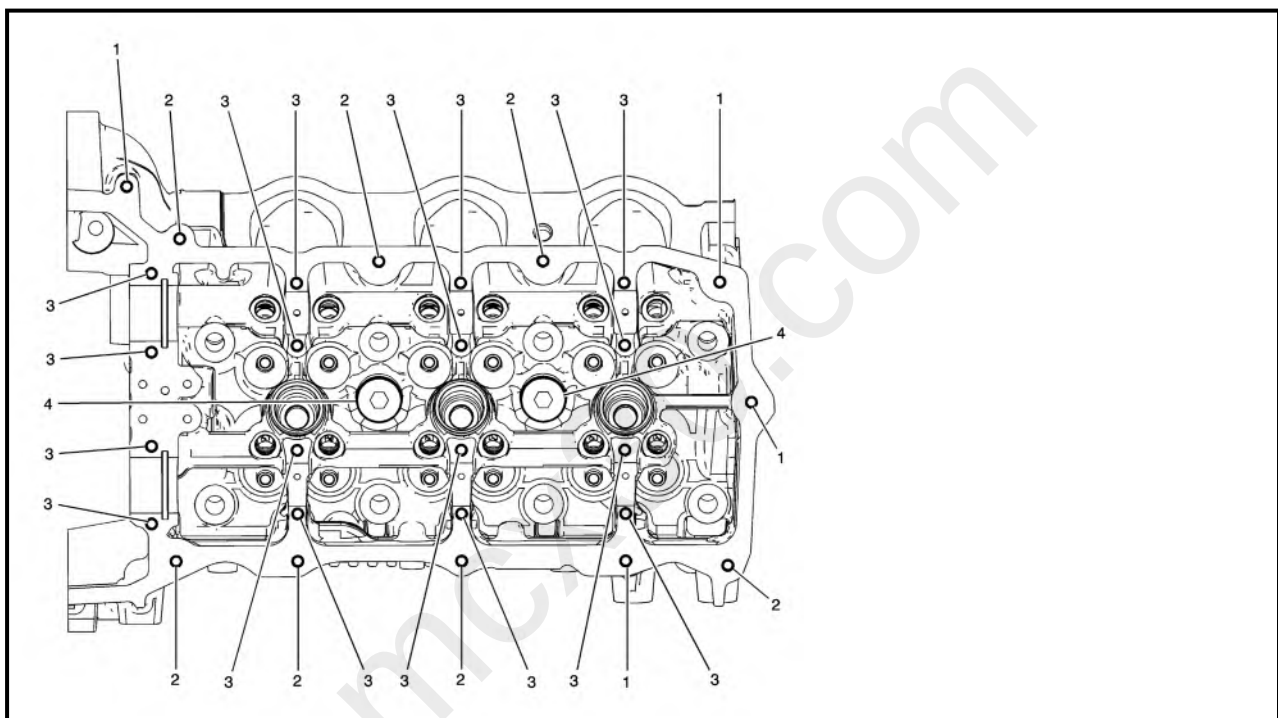
## ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

| 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                                            | Threadlocker     | 12345382                        | 10953489 |
| Coolant and Oil Plug Threads                                       | Sealant          | 12346004                        | 10953480 |
| Crankshaft Bearing Surfaces                                        | 5W-30            | 19293000                        | 19286321 |
| Crankshaft Connecting Rod Bearing Journal                          | 5W-30            | 19293000                        | 19286321 |
| Crankshaft Prelube                                                 | 5W-30            | 19293000                        | 19286321 |
| Crankshaft Rear Oil Seal Housing*                                  | Sealant          | 12378521                        | 88901148 |
| Engine Front Cover/Split Lines*                                    | Sealant          | 12378521                        | 88901148 |
| Engine Oil                                                         | 5W-30            | 19293000                        | 19386321 |
| Fuel Injection Fuel Rail Fuel Pressure Sensor Sealing Cone/Threads | 5W-30            | 19293000                        | 19286321 |
| Fuel Rail Sealing Cone/Threads                                     | 5W-30            | 19293000                        | 19286321 |
| Ignition Coils                                                     | Lubricant        | 19260901                        | 19260902 |
| Oil Gallery Threaded Plug                                          | Sealant          | 12346004                        | 10953480 |
| Oil Pan, Engine Front Cover, Crankshaft Rear Oil Seal Housing*     | Sealant          | 12378521 (150g cartridge)       | 88901148 |
|                                                                    |                  | 88861417 (75 gram squeeze tube) | 88861418 |
| Piston Pin Bores                                                   | 5W-30            | 19293000                        | 19286321 |

| Application                                                                                                                                       | Type of Material | GM Part Number |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|----------|
|                                                                                                                                                   |                  | United States  | Canada   |
| Positive Crankcase Ventilation (PCV) Orifice                                                                                                      | Sealant          | 12378521       | 88901148 |
| Stationary Hydraulic Lash Adjuster (SHLA)                                                                                                         | 5W-30            | 19293000       | 19286321 |
| SHLA Bores in Cylinder Head                                                                                                                       | 5W-30            | 19293000       | 19286321 |
| SHLA Pivot Spheres                                                                                                                                | 5W-30            | 19293000       | 19286321 |
| Thread Repair                                                                                                                                     | Cleaner          | 88862650       | 88901247 |
|                                                                                                                                                   | Threadlocker     | 89021297       | 10953488 |
| Thread Repair Cutting Oil                                                                                                                         | Lubricant        | 1052864        | 992881   |
| Valve Stem/Guide ID                                                                                                                               | 5W-30            | 19293000       | 19286321 |
| *Ensure proper use of room temperature vulcanizing (RTV) sealant. <a href="#">Use of Room Temperature Vulcanizing (RTV) and Anaerobic Sealant</a> |                  |                |          |

## THREAD REPAIR SPECIFICATIONS

### Left Cylinder Head Camshaft Cover Face

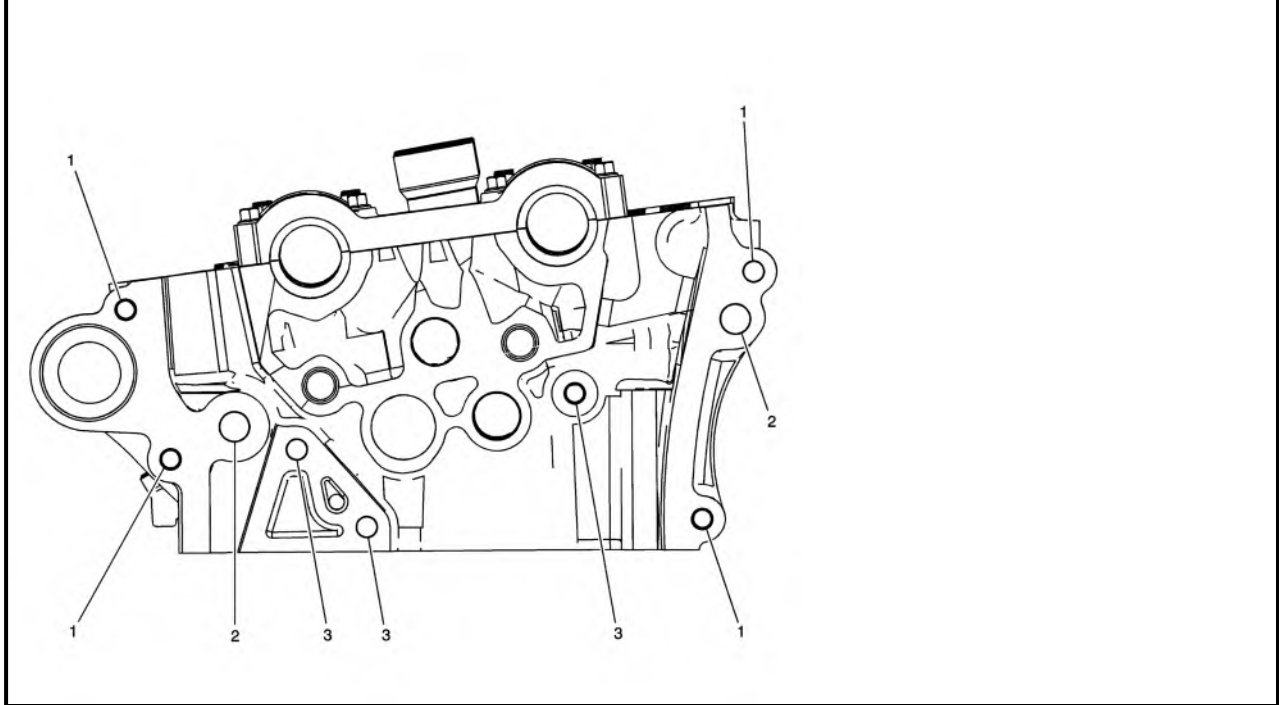


### Left Cylinder Head Camshaft Cover Face

| 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                | 0.7087 |
| 2             | M6 x 1.0    | 201   | 202               | N/A         | 203 | 204    | 205    | THRU                  |        | THRU                |        |
| 3             | M6 x 1.0    | 701   | N/A               | N/A         | 203 | 204    | 205    | 28.5                  | 1.1220 | 24.0                | 0.9449 |
| 4             | M20 x 1.5   | 715   | 716               | N/A         | 717 | 718    | 719    | 25.0                  | 0.9842 | 17.0                | 0.6693 |

### Left Cylinder Head Front Face

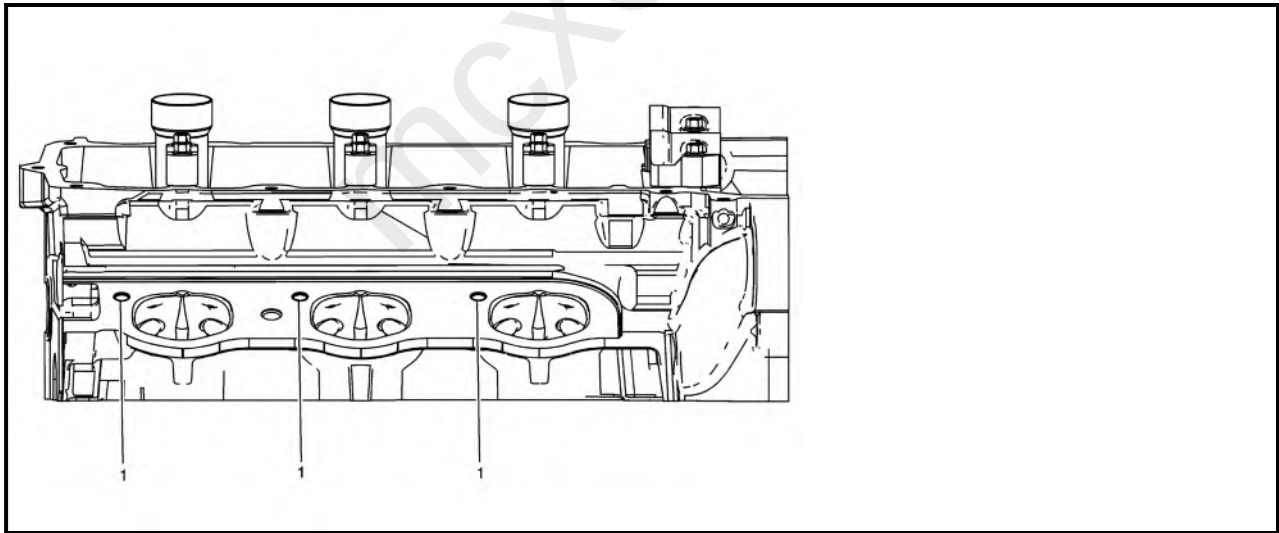




Left Cylinder Head Front Face

| 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 |

Left Cylinder Head Intake Face

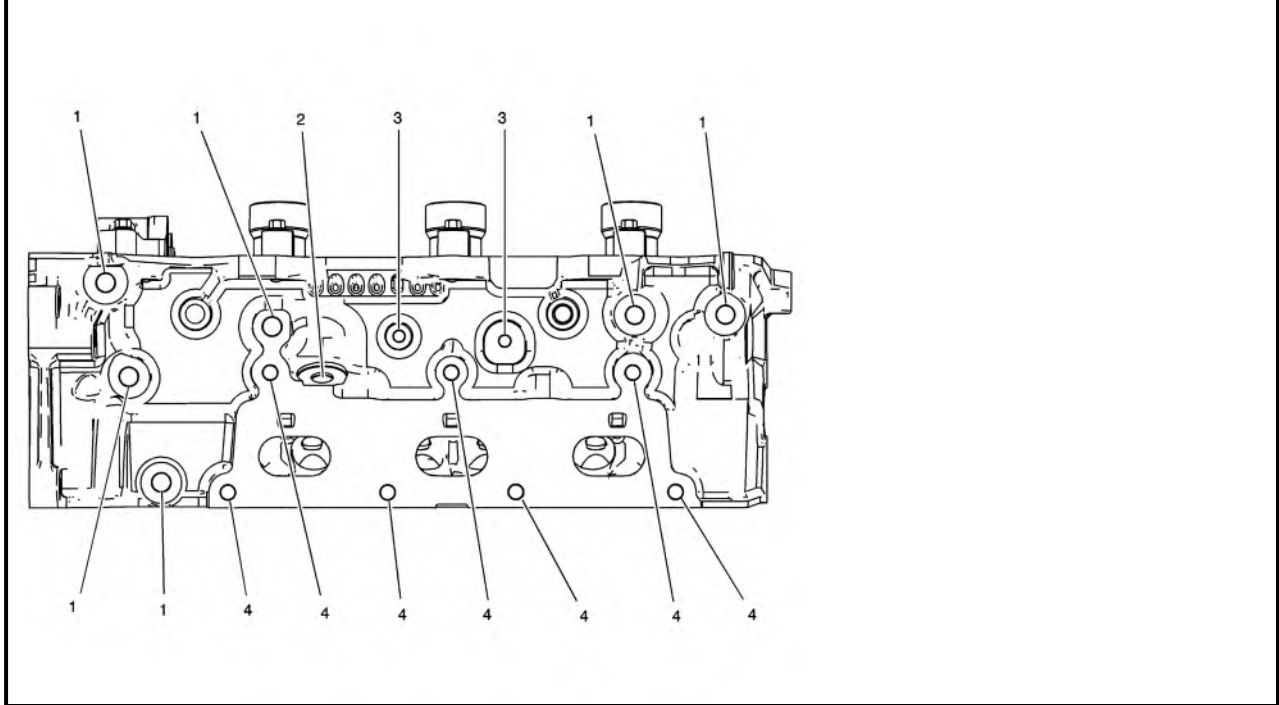


Left Cylinder Head Intake Face

| 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 |

Left Cylinder Head Exhaust Face

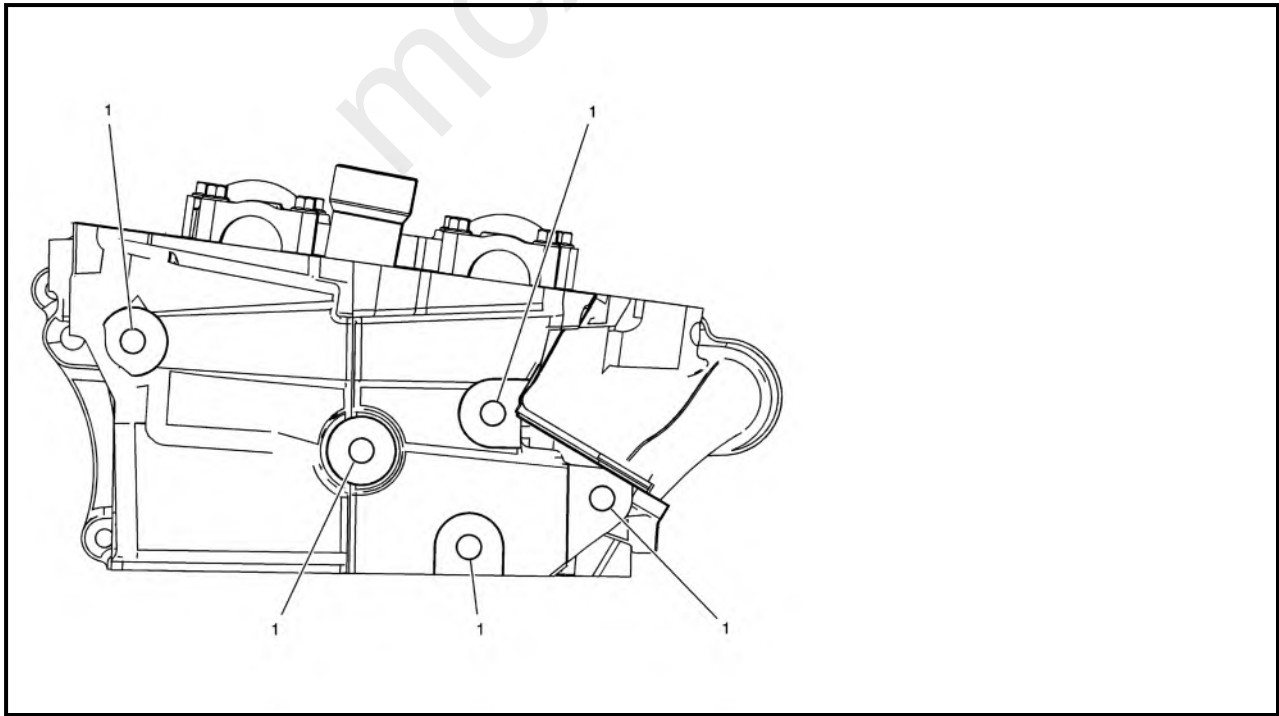




Left Cylinder Head Exhaust Face

| 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             | M10 x 1.5   | 211   | 212               | N/A         | 213 | 214    | 215    | 33.5                  | 1.3189 | 27.0                | 1.0630 |
| 2             | M12 x 1.5   | 705   | 706               | N/A         | 707 | 708    | 709    | 27.5                  | 1.0827 | 13.0                | 0.5118 |
| 3             | M6 x 1.0    | 201   | 202               | N/A         | 203 | 204    | 205    | 22.5                  | 0.8858 | 18.0                | 0.0000 |
| 4             | M8 x 1.25   | 206   | 207               | N/A         | 208 | 209    | 210    | 28.5                  | 1.1220 | 23.0                | 0.9055 |

Left Cylinder Head Rear Face

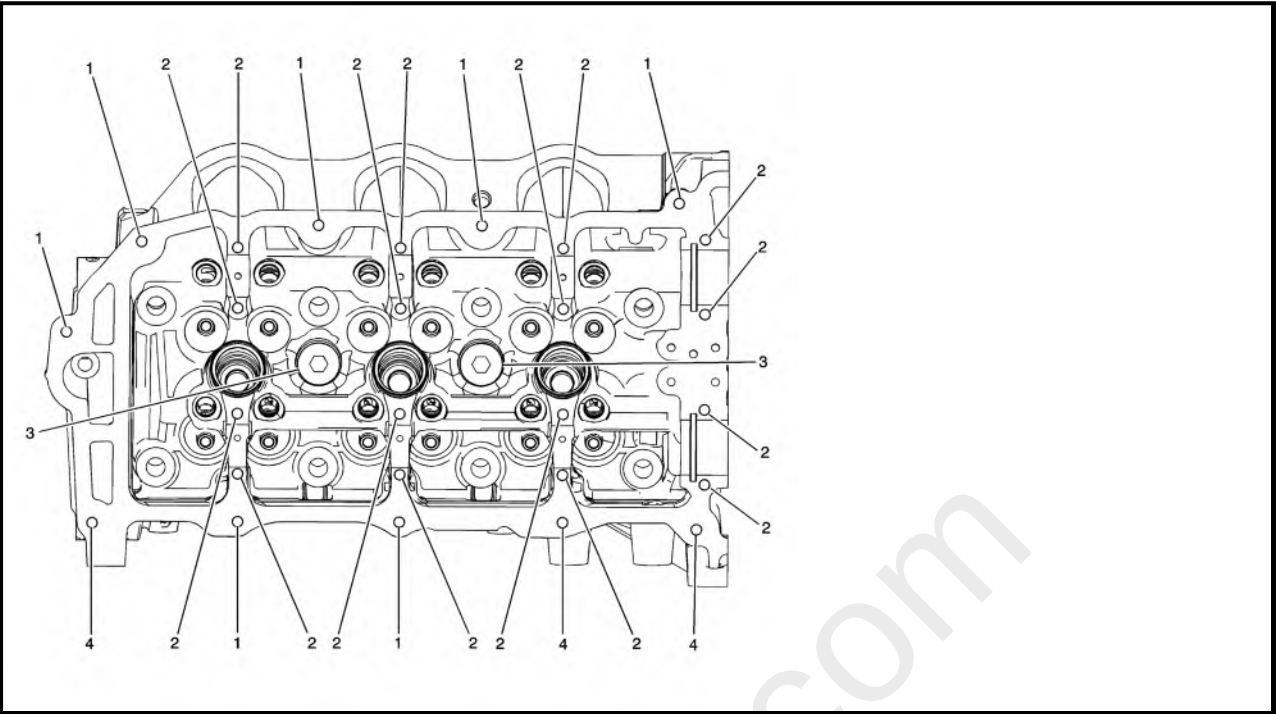


Left Cylinder Head Rear Face

| 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) |

| 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 |

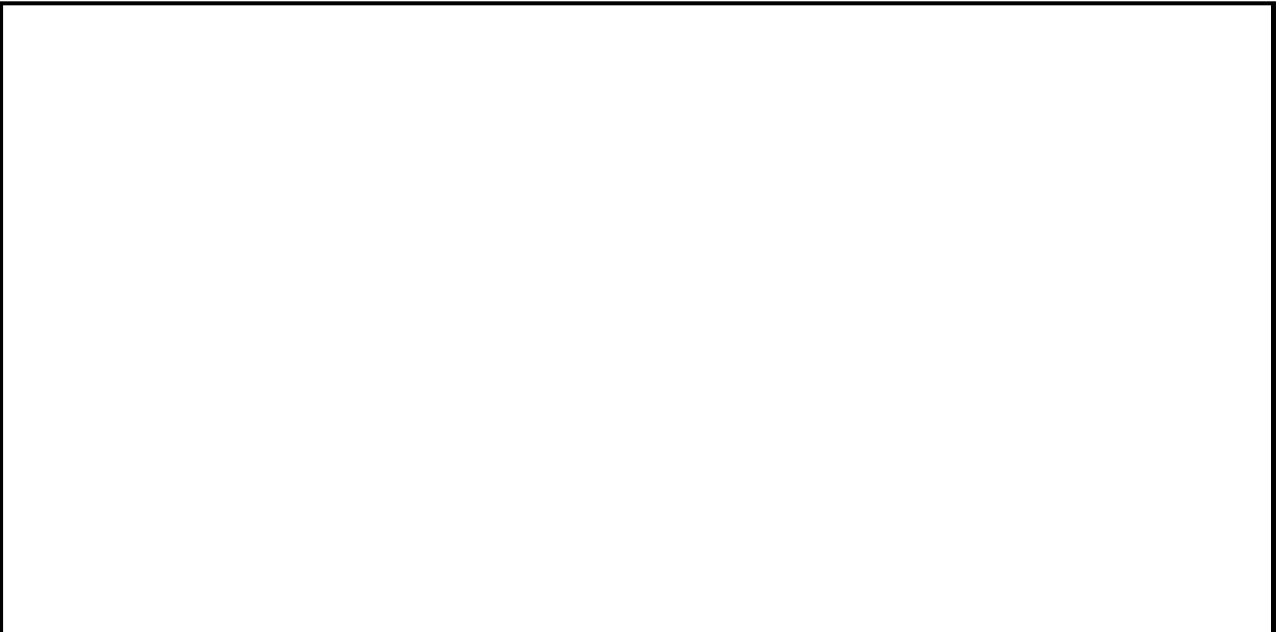
Right Cylinder Head Camshaft Cover Face

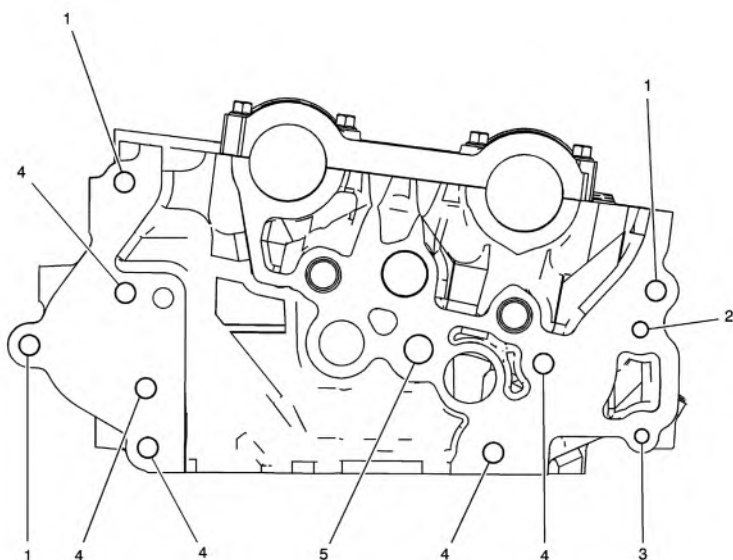


Right Cylinder Head Camshaft Cover Face

| Hole Location | Thread Size | Drill | Counter Bore Tool | Stop Collar | Tap | Driver | Insert | Drill Depth (Maximum) |        | Tap Depth (Minimum) |        |
|---------------|-------------|-------|-------------------|-------------|-----|--------|--------|-----------------------|--------|---------------------|--------|
| J 42385 -     |             |       |                   |             |     |        |        | MM                    | (IN)   | MM                  | (IN)   |
| 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 |

Right Cylinder Head Front Face

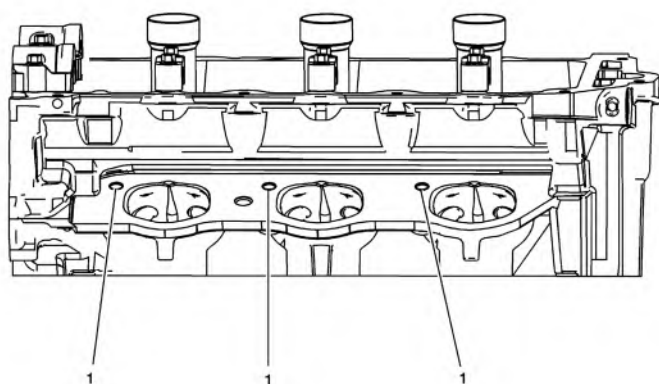




### Right Cylinder Head Front Face

| 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             | 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 |

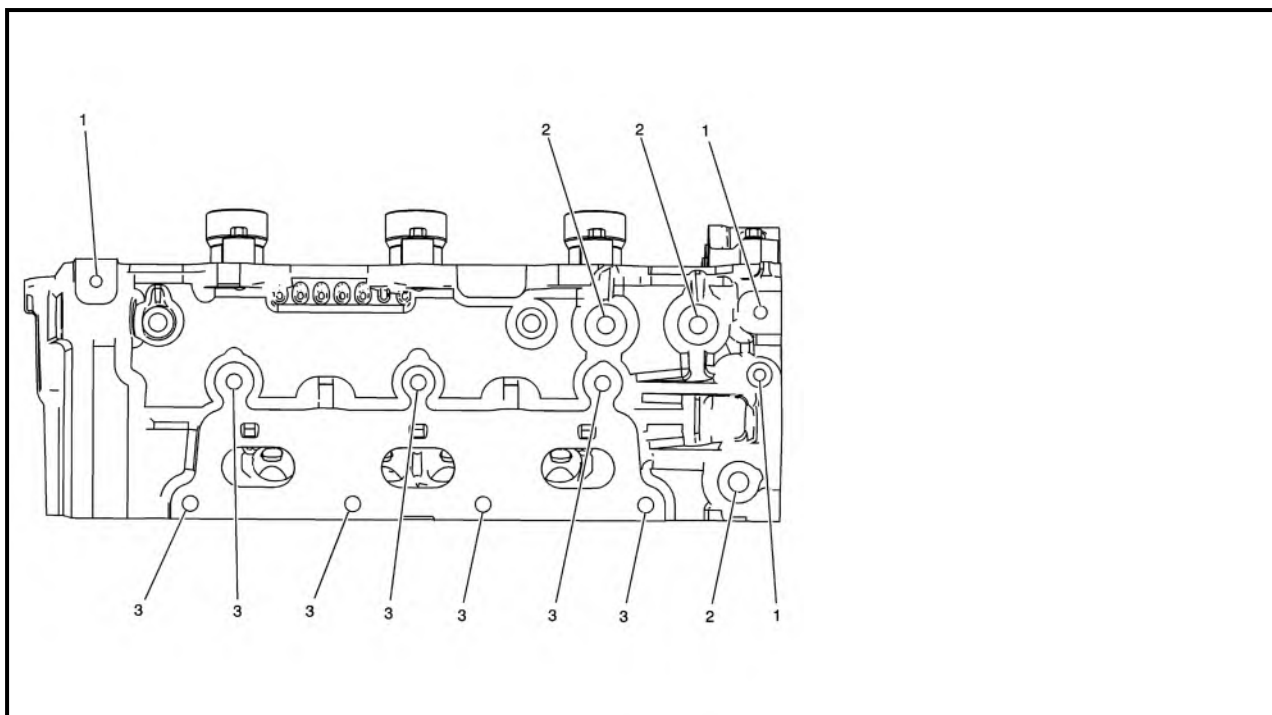
### Right Cylinder Head Intake Face



### 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 |

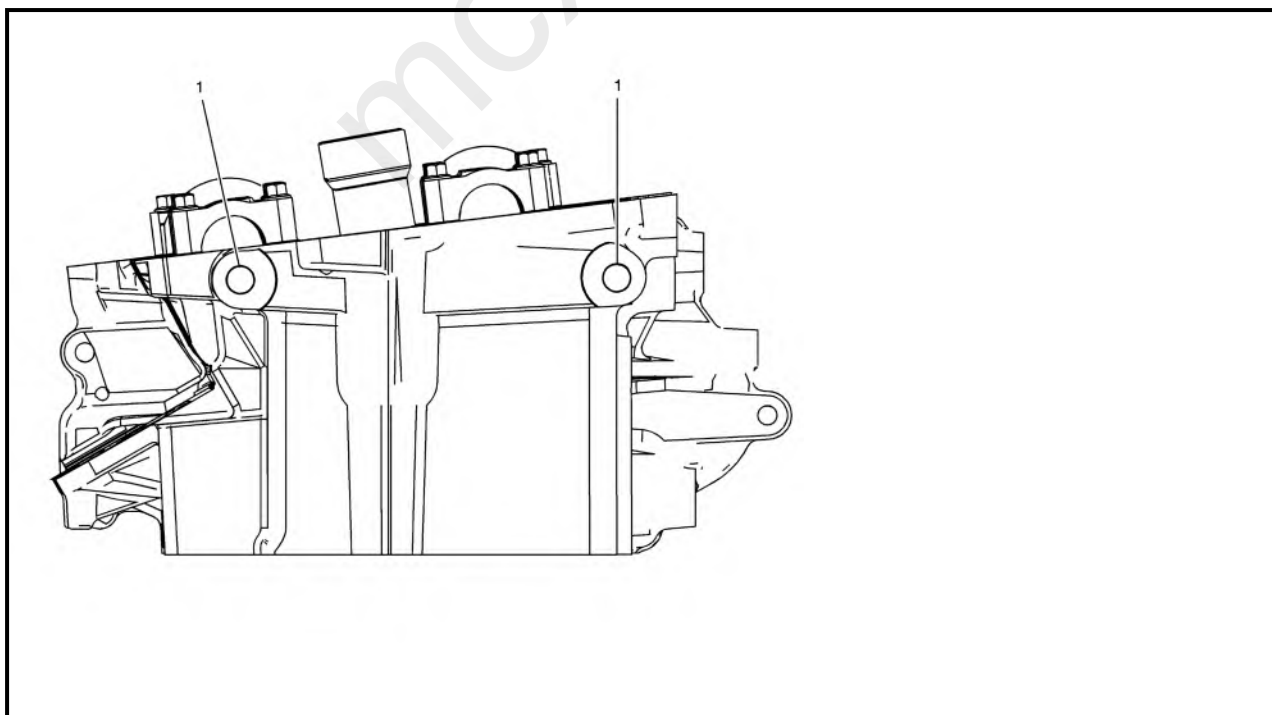
### Right Cylinder Head Exhaust Face



### 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 |

### Right Cylinder Head Rear Face

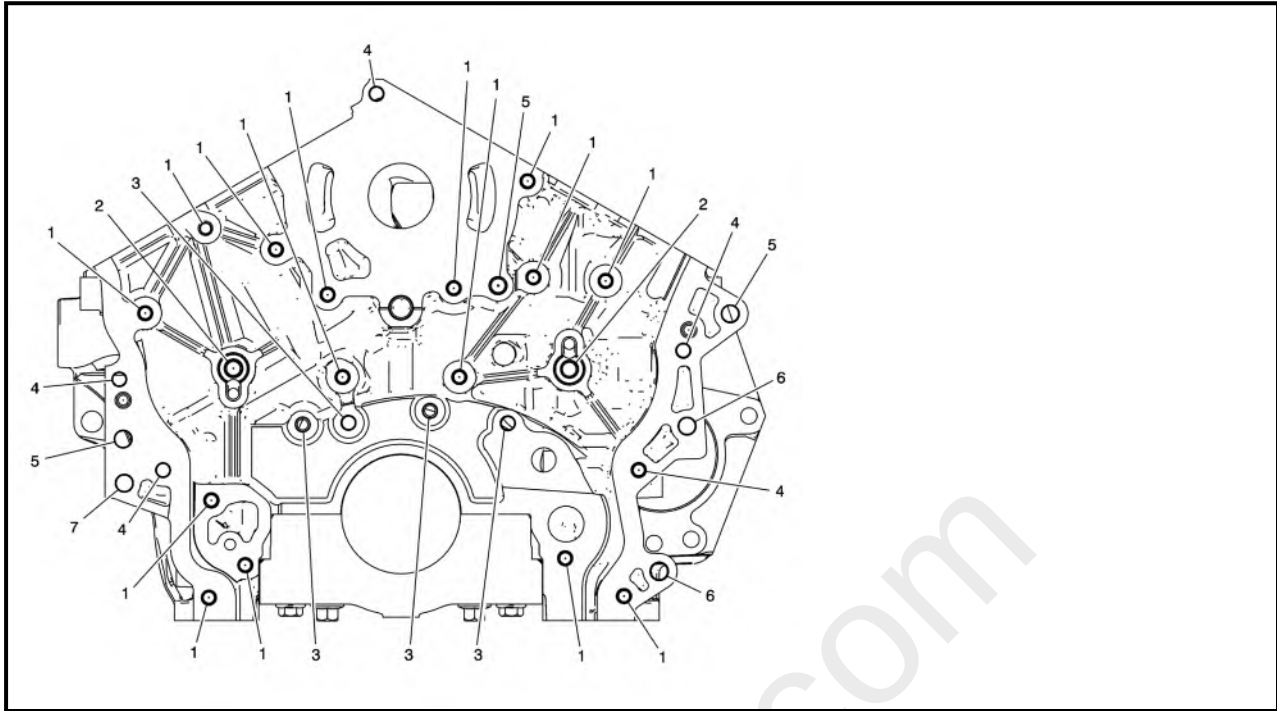


### Right Cylinder Head Rear Face

| 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) |

| 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 |

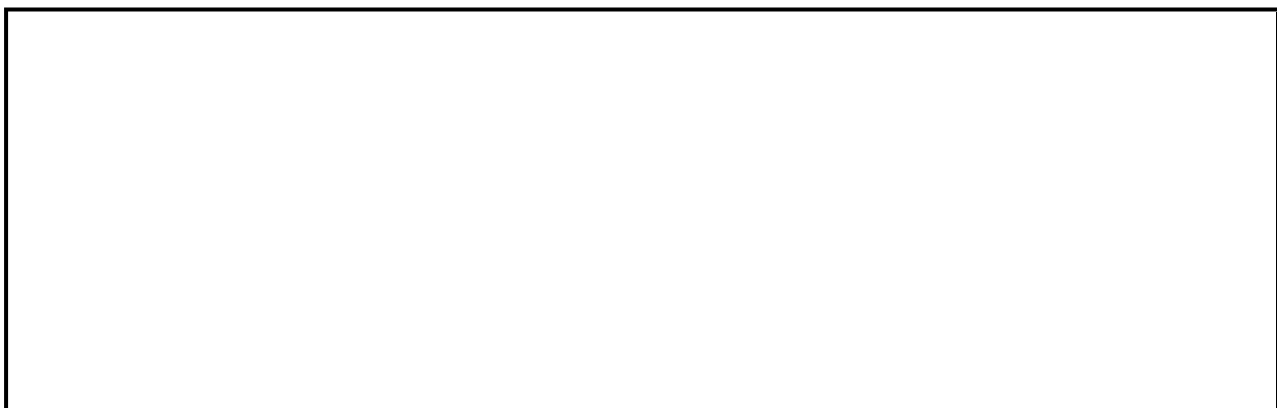
### Engine Block Front

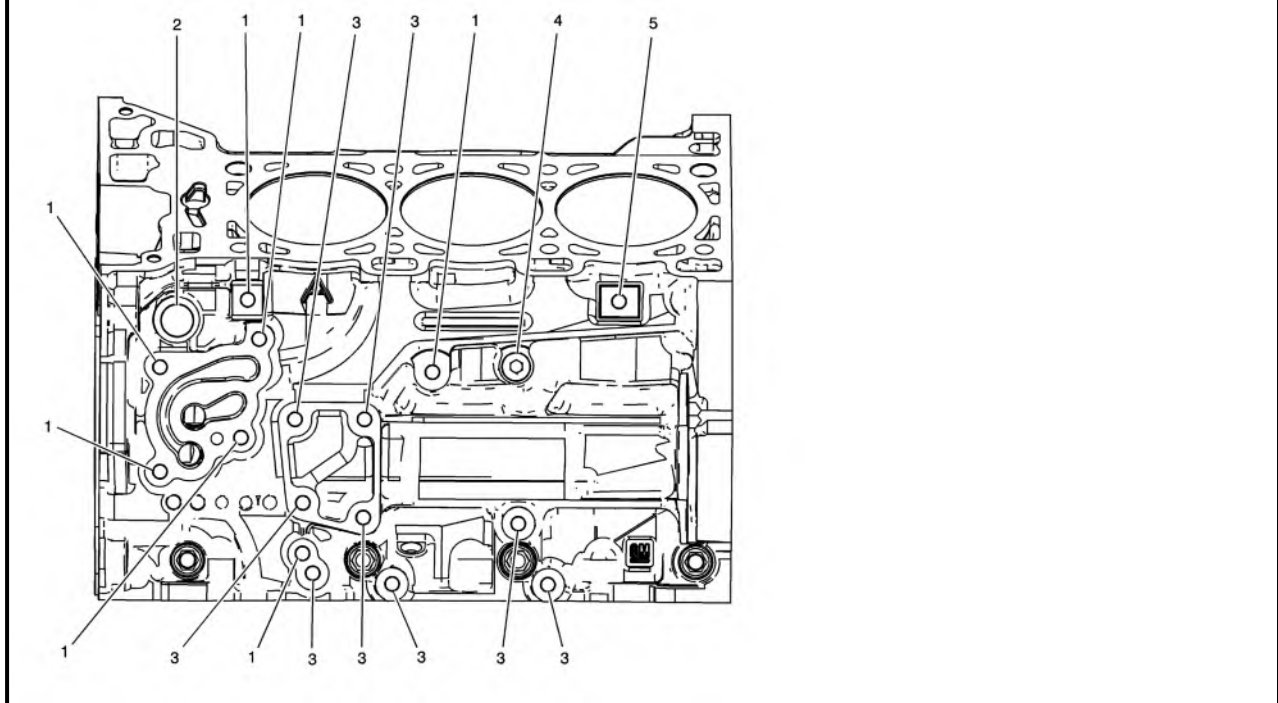


### Engine Block Front

| 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             | 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                  |        | 23.0                | 0.9055 |
| 4             | M8 x 1.25   | 206   | 207               | N/A         | 208 | 209    | 210    | THRU                  |        | THRU                |        |
| 5             | M10 x 1.5   | 211   | 212               | N/A         | 213 | 214    | 215    | 28.0                  | 1.1024 | 28.0                | 1.1024 |
| 6             | M10 x 1.5   | 211   | 212               | N/A         | 213 | 214    | 215    | THRU                  |        | 20.0                | 0.7874 |
| 7             | M10 x 1.5   | 211   | 212               | N/A         | 213 | 214    | 215    | THRU                  |        | 28.0                | 1.1024 |

### Engine Block Left Side

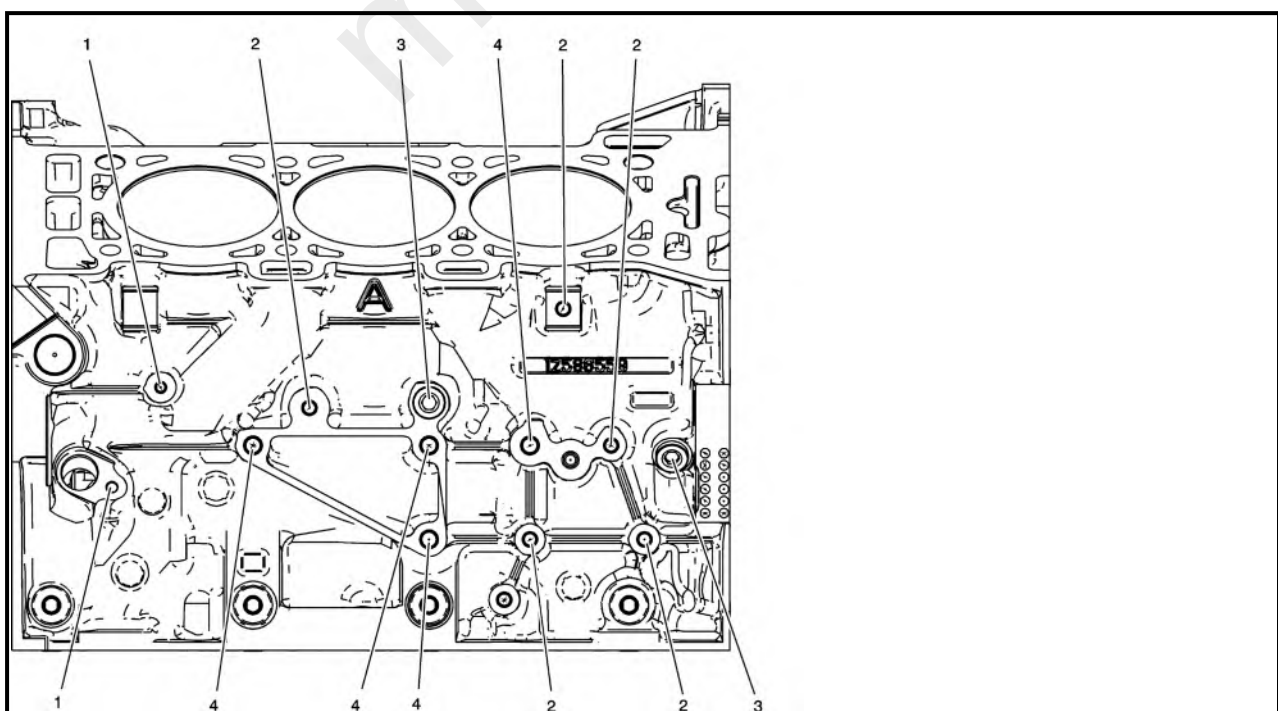




**Engine Block Left Side**

| 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             | 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 |

**Engine Block Right Side**

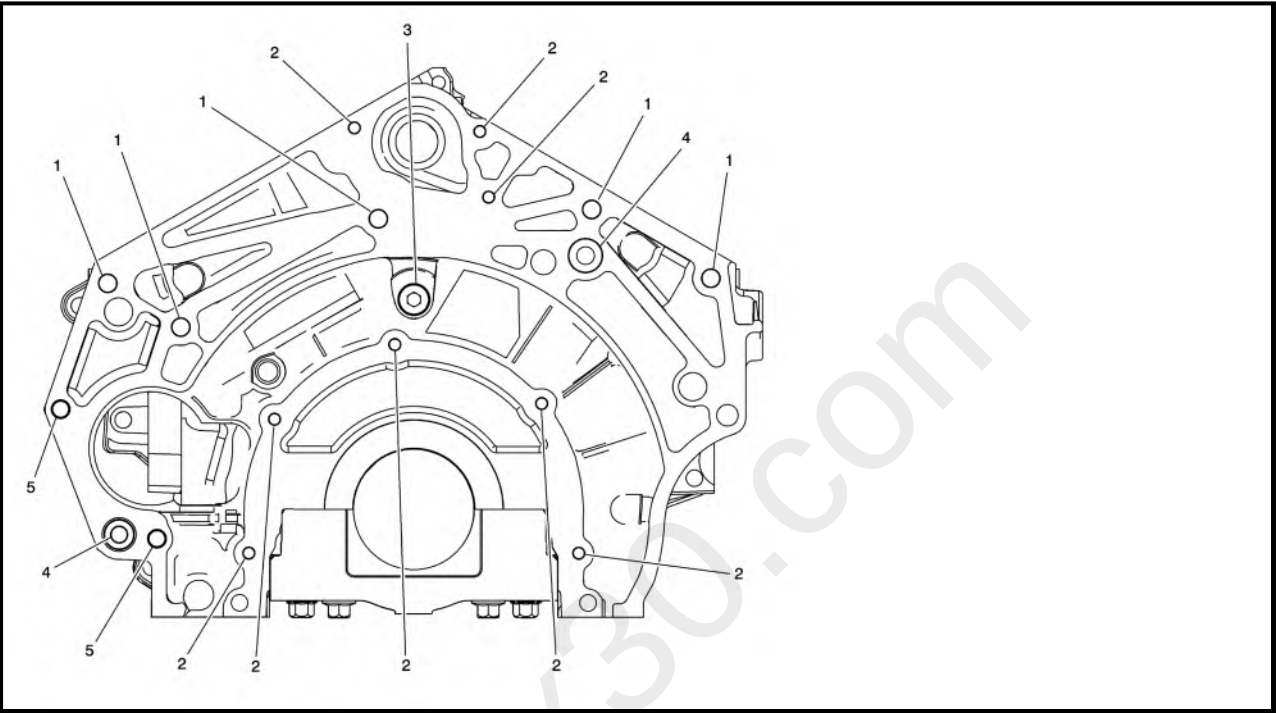


**Engine Block Right Side**

| Hole Location | Thread Size | Drill | Counter Bore Tool | Stop Collar | Tap | Driver | Insert | Drill Depth (Maximum) |  | Tap Depth (Minimum) |  |
|---------------|-------------|-------|-------------------|-------------|-----|--------|--------|-----------------------|--|---------------------|--|
|---------------|-------------|-------|-------------------|-------------|-----|--------|--------|-----------------------|--|---------------------|--|

| 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                | 0.7087 |
| 2             | M8 x 1.25   | 206   | 207               | N/A         | 208 | 209    | 210    | 28.5                  | 1.1220 | 23.0                | 0.9055 |
| 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    | 215    | 33.5                  | 1.3190 | 27.0                | 1.0630 |

Engine Block Rear

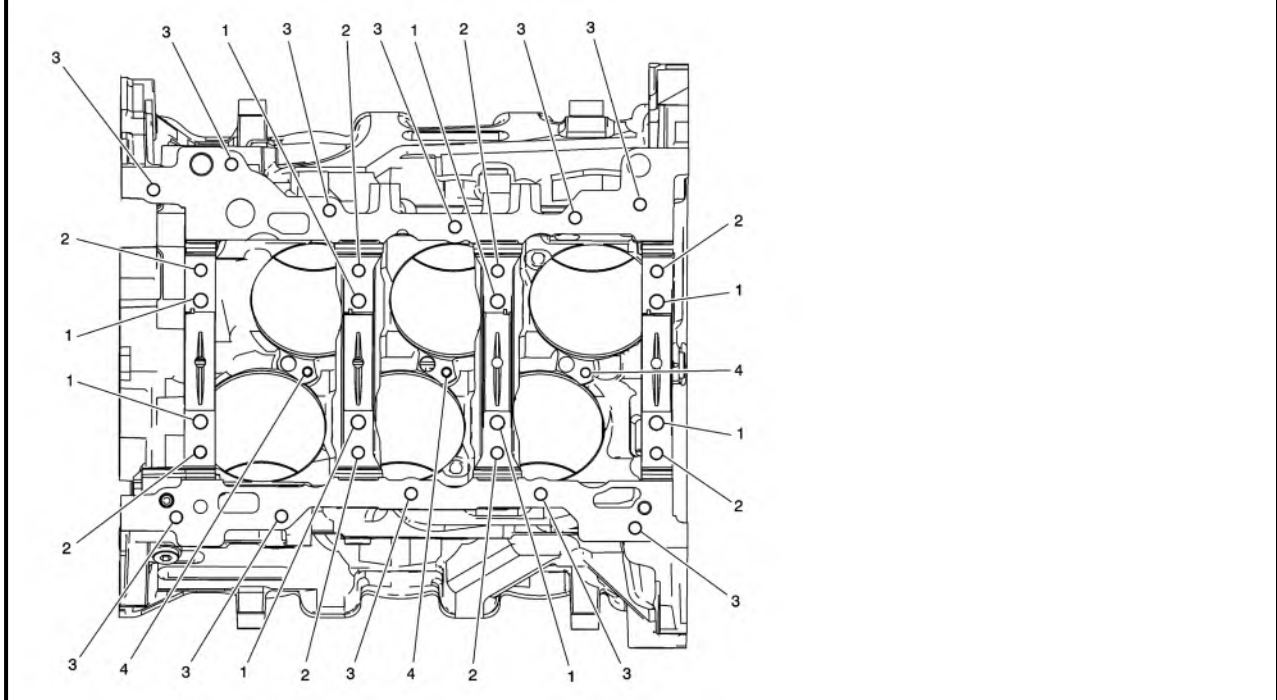


Engine Block Rear

| 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                  | 1.3190 | 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                |        |

Engine Block Bottom

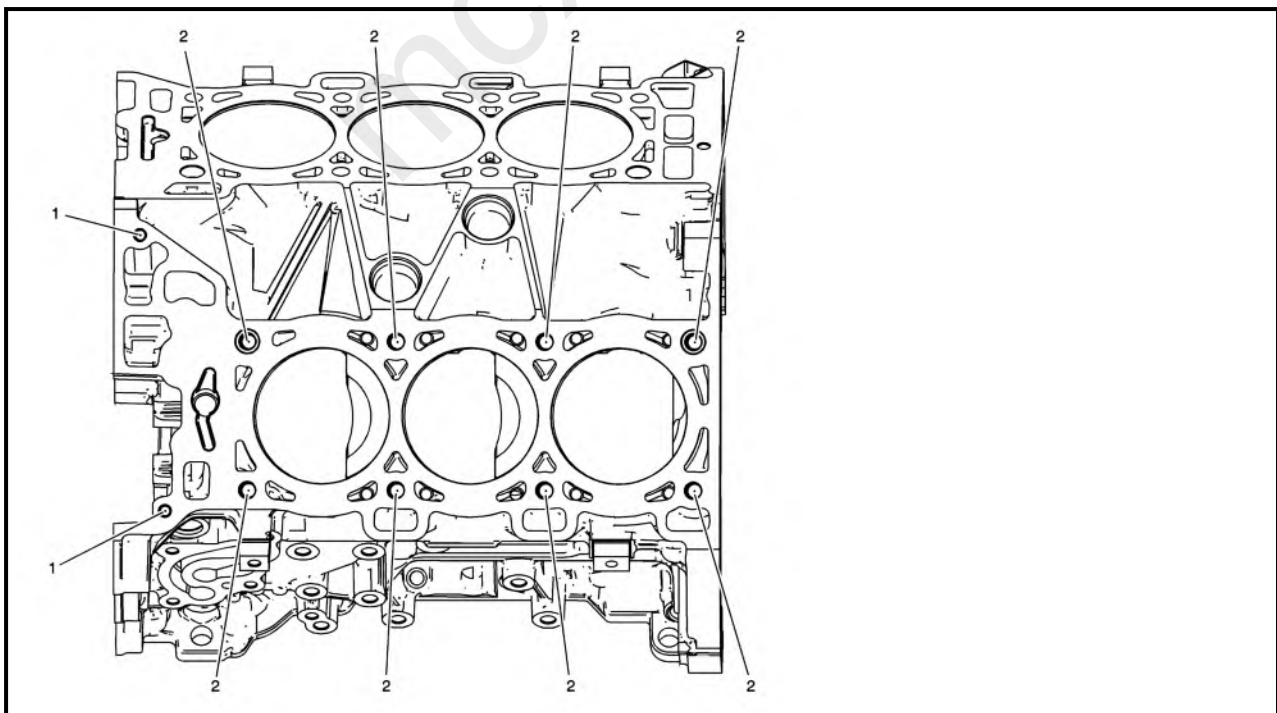




### Engine Block Bottom

| 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                |        |

### Engine Block Left Deck Face

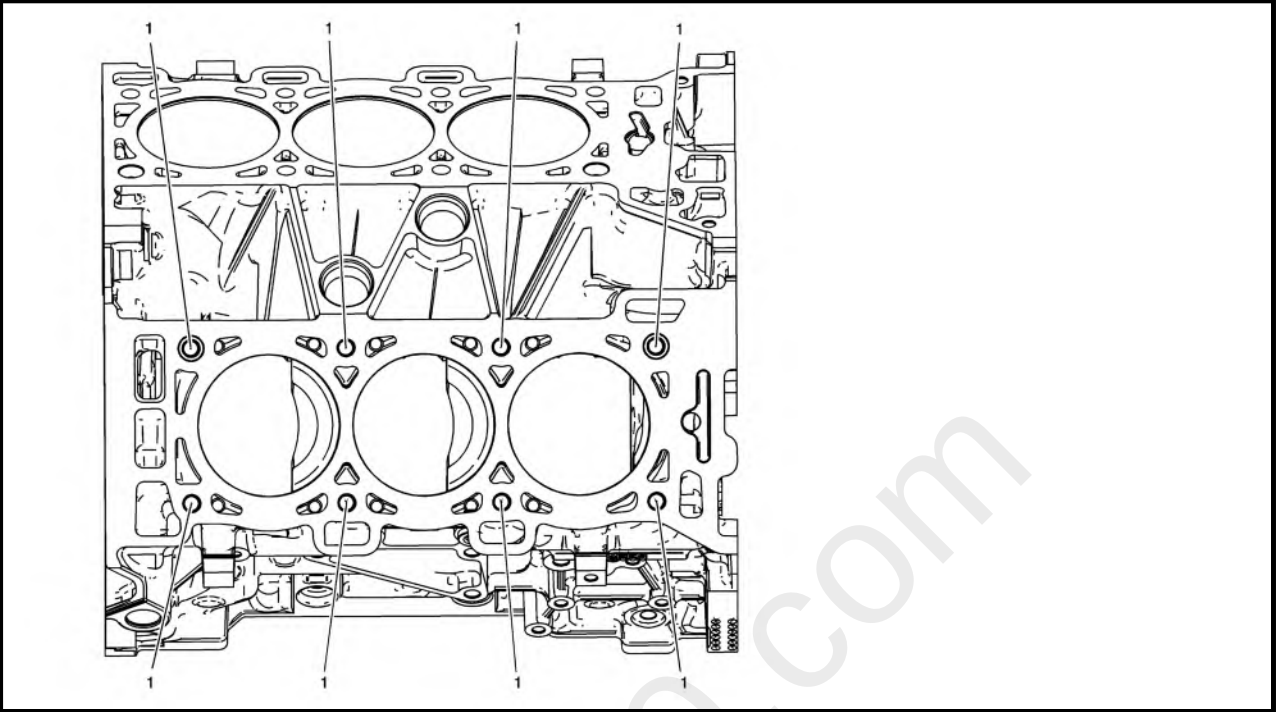


### Engine Block Left Deck Face

| 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) |

| 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 |

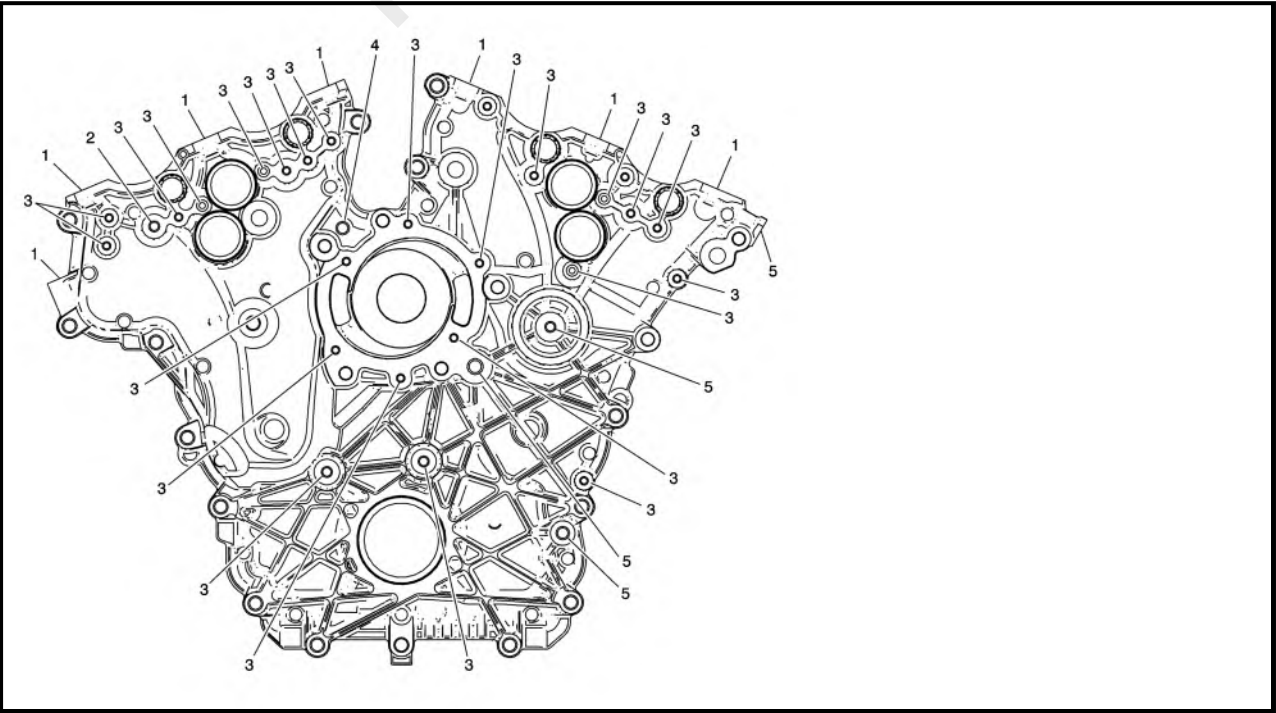
Engine Block Right Deck Face



Engine Block Right Deck 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             | M11 x 2.0   | 723   | N/A               | N/A         | 724 | 725    | 108    | 102.5                 | 4.0354 | 94.0                | 3.7008 |

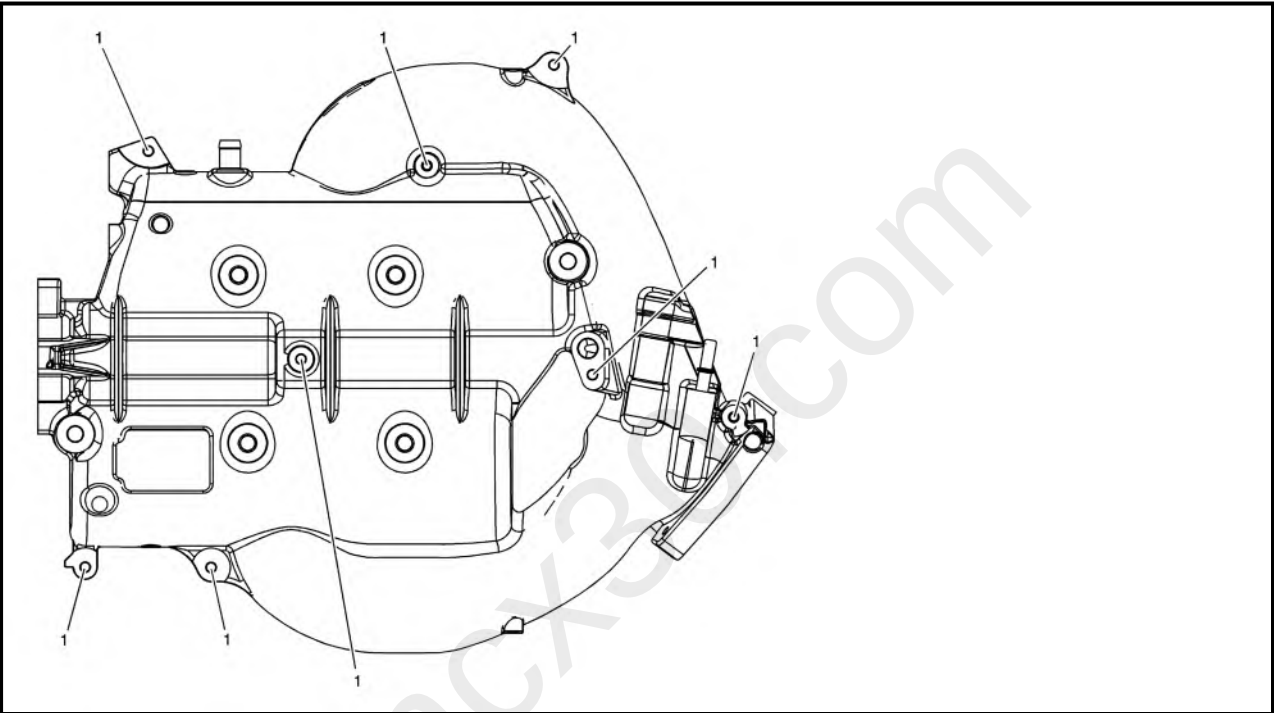
Engine Front Cover



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 |

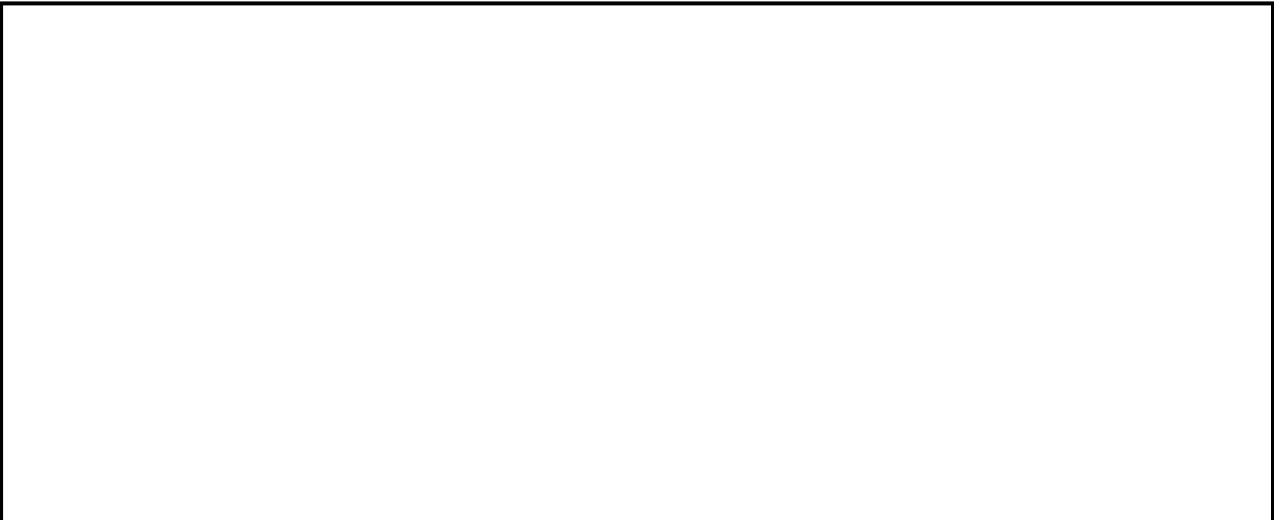
Upper Intake Manifold - Top

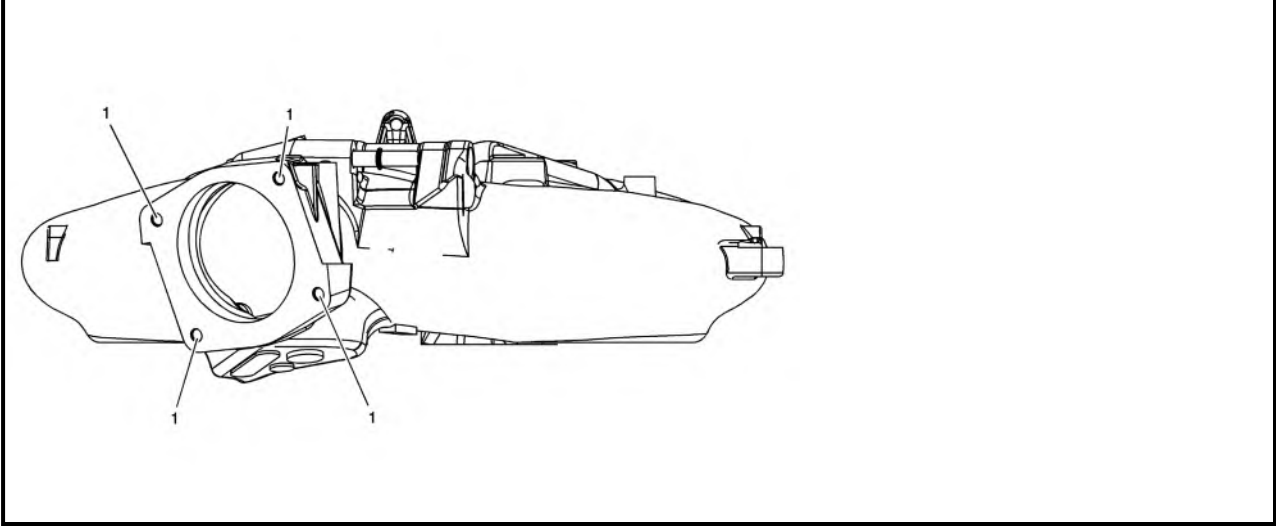


Upper Intake Manifold - Top

| 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                |      |

Upper Intake Manifold - Front

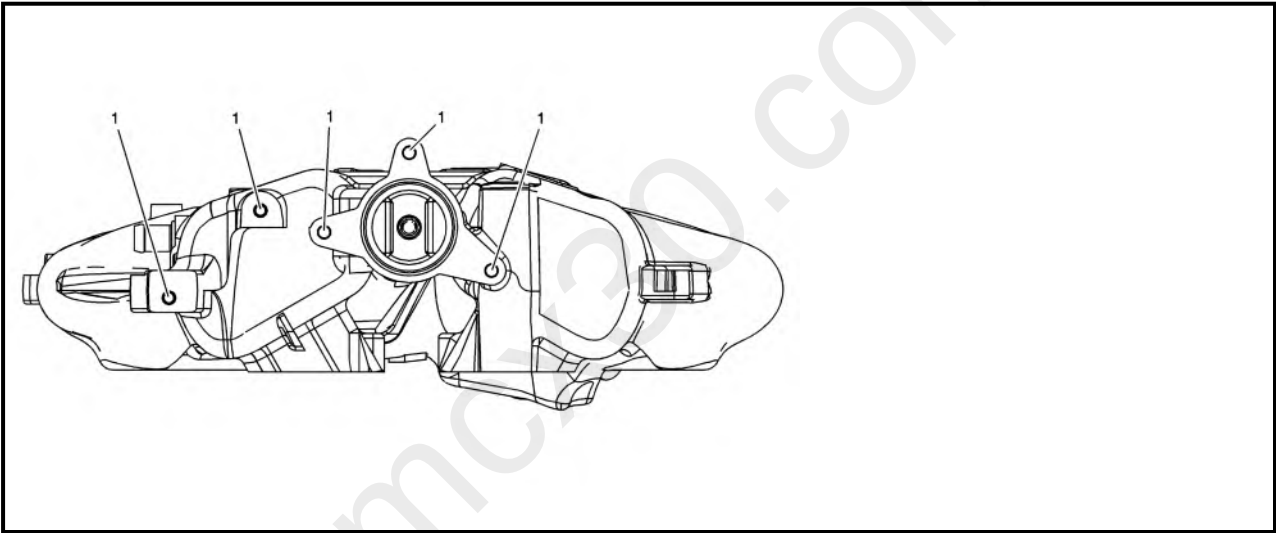




Upper Intake Manifold - Front

| 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                |      |

Upper Intake Manifold - Rear

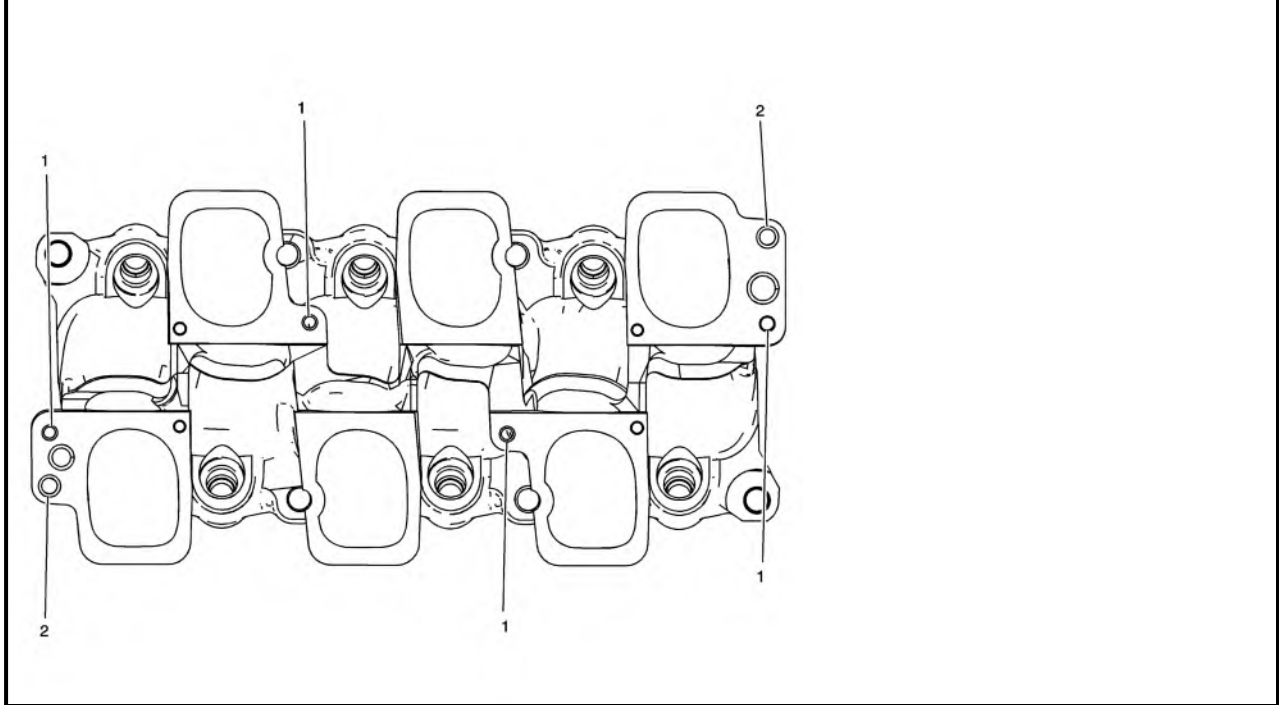


Upper Intake Manifold - Rear

| 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             | M6 x 1.0    | 201   | 202               | N/A         | 203 | 204    | 205    | THRU                  |      | THRU                |      |

Lower Intake Manifold - Top

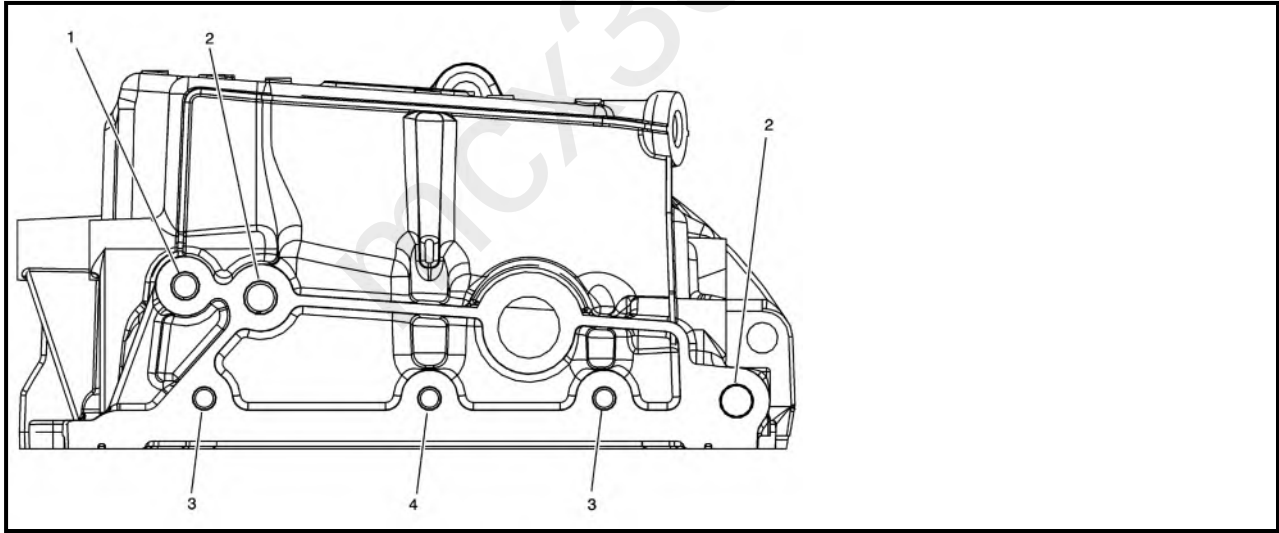




**Lower Intake Manifold - Top**

| 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    | THRU                  |      | THRU                |      |

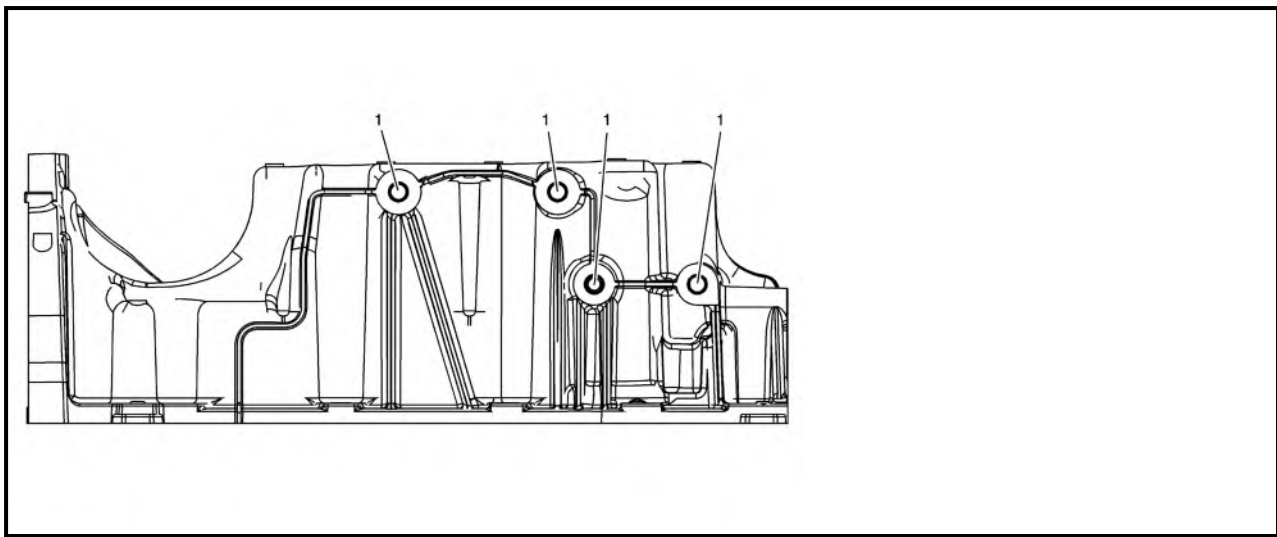
**Oil Pan Front**



**Oil Pan Front**

| 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 |
| 2             | M12 x 1.75  | 856   | 857               | N/A         | 858 | 859    | 416    | 39.5                  | 1.5551 | 32.0                | 1.2598 |
| 3             | M8 x 1.25   | 206   | 207               | N/A         | 208 | 209    | 210    | 28.5                  | 1.1220 | 23.0                | 0.9055 |
| 4             | M8 x 1.25   | 610   | N/A               | N/A         | 208 | 209    | 620    | 37.5                  | 1.4764 | 32.0                | 1.2598 |

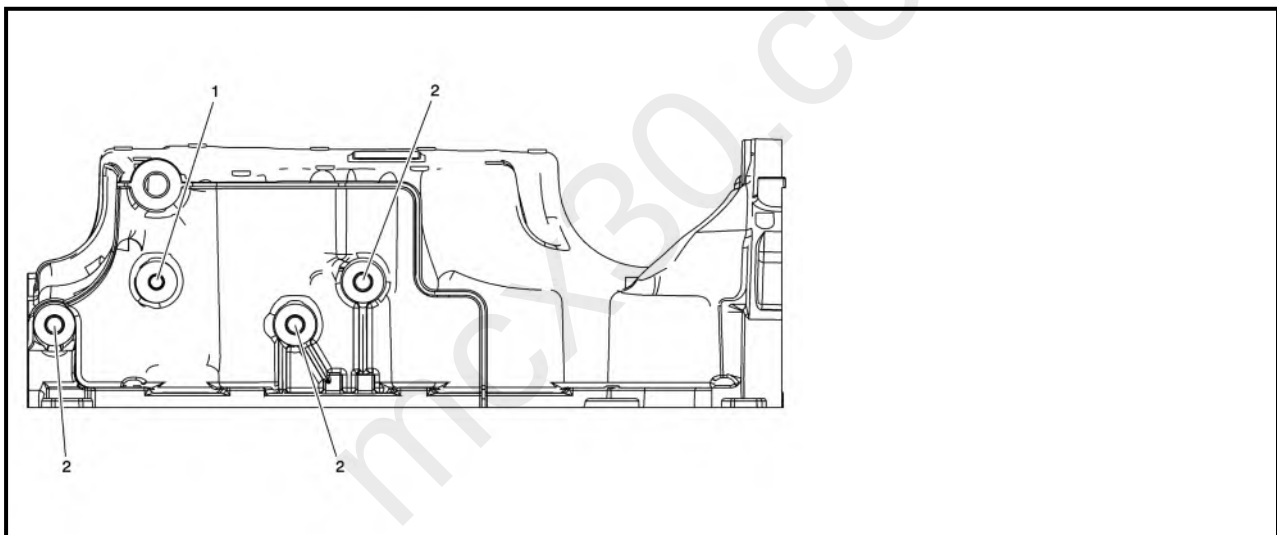
## Oil Pan Left Side



## 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 |

## Oil Pan Right Side

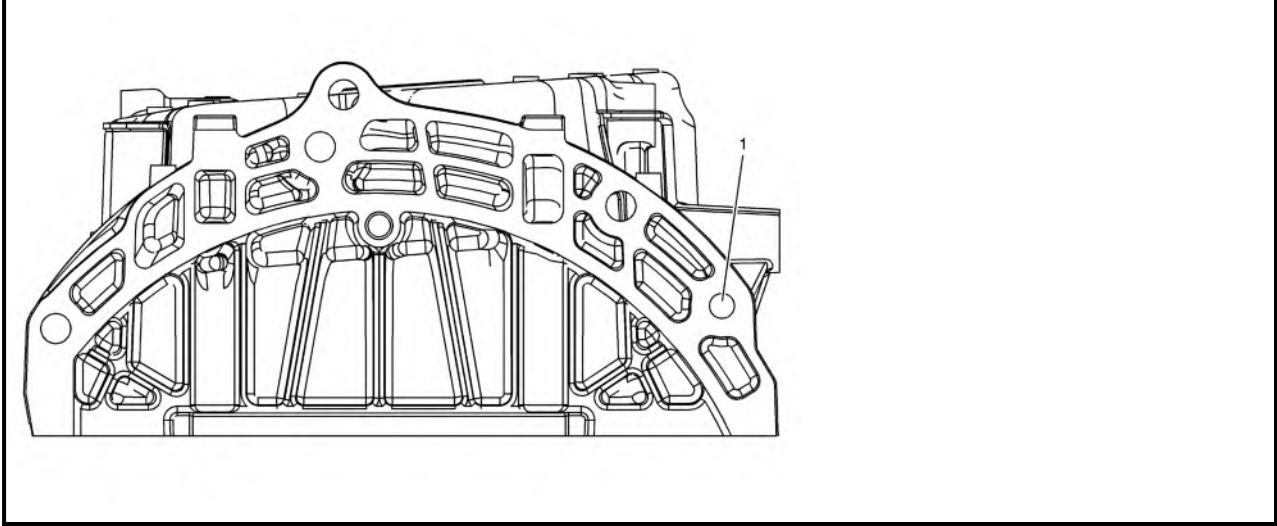


## Oil Pan Right Side

| 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             | 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    | 420    | 33.5                  | 1.3189 | 27.0                | 1.0630 |

## Oil Pan Rear

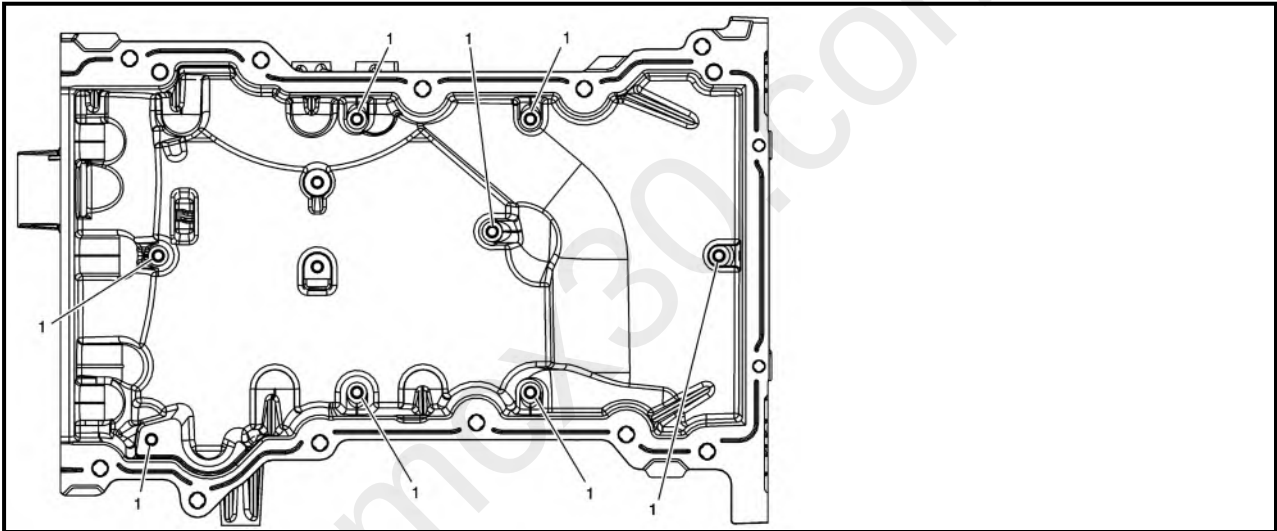




**Oil Pan Rear**

| 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 |

**Oil Pan Top**



**Oil Pan Top**

| 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    | 701   | N/A               | N/A         | 203 | 204    | 205    | 28.0                  | 1.1024 | 23.5                | 0.9252 |