



Test Monitoring Center

Carnegie Mellon University
6555 Penn Avenue, Pittsburgh, PA 15206, USA

<http://astmtmc.cmu.edu>
412-365-1000

Sequence IIIG Information Letter 11-2
Sequence No. 32
July 20, 2011

ASTM consensus has not been obtained on this information letter. An appropriate ASTM ballot will be issued in order to achieve such consensus.

TO: Sequence III Mailing List

SUBJECT: 1. Changes to Engine Build
2. Part Number Update
3. Part Rating Manual Update

1. During the June 2, 2011 Surveillance Panel meeting, the panel agreed to adopt a number of changes recommended as a result of a recent Unified Engine Build. Sections 9.3, 9.5.3, 9.9.5, 9.10.1 and 9.12 have been revised to address these changes. In addition, for clarity, Sections 9.5.3, 9.9.5, 9.10.1 and 9.12 have been expanded to separate some of the existing sections into subsections.
2. As a result of the Unified Engine Build, a review of the engine parts used for Sequence III tests occurred and Annex Tables A2.1 and A2.2 have been updated to reflect the current hardware.
3. The Parts Rating Manual is now available from ASTM. Section 12.4.2 has been revised to show Manual 20 is now available from ASTM. Manual 20 has also been added to the reference documents under Other ASTM Documents and Footnote 2 has been deleted. Also, the responsibility for the Rating Workshop has been transferred to TMC. Section 12.4.3.4 has been revised accordingly. For clarity, Section 12.4.2 has been broken into Section 12.4.2 and 12.4.2.1

The attached changes to Test Method D 7320 are effective July 1, 2011.

Bruce Matthews
Engine Oil Test Development and Support
GM Powertrain Materials Engineering

Frank M. Farber
Administrator
ASTM Test Monitoring Center

Attachments

c: ftp://ftp.astmtmc.cmu.edu/docs/gas/sequenceiii/procedure_and_ils/IIIG/IL11-2.pdf

Distribution: Electronic Mail

Modifies Test Method D7320-11

as amended by Information Letters 10-5 and 11-1

2.4 Other ASTM Documents

ASTM Deposit Rating Manual 20 (Formerly CRC Manual 20)⁹

⁹ ASTM Deposit Rating Manual 20, available from ASTM Customer Relations, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

Renumber subsequent footnotes accordingly

9.3 *Cleaning of Engine Parts*—Clean all engine parts (other than the connecting rods, block and heads; see 9.4, 9.5 and 9.6) thoroughly prior to engine assembly. Degrease the parts (any reusable parts that come into contact with test oil as shown in Table A2.2), and then soak them in parts cleaning agent (7.5.1) for a period of at least 30 min but shall not exceed 24 h. Immediately remove the cleaner by spraying with hot tap water. Blow-dry the parts with clean, dry shop air (**Warning**—For technical use only) and immediately coat them with a 50/50 mixture of build-up oil and degreasing solvent.

9.5.3 Thoroughly clean the block prior to honing as follows: For new and used blocks, remove the crankshaft, main bearings, and bearing caps. In addition, remove all bushings, bearings, and oil gallery plugs prior to cleaning.

9.5.3.1 With either a new or a used block, prevent cleaner or oil from entering the engine coolant passages. (See Sequence IIIG Engine Assembly Manual, Section 1 Sheet 4.)

Renumber existing sections 9.5.3.1 through 9.5.3.4 accordingly.

9.9.5 Use the honing torque plates B-H-J GM 3.8L/3E-R-s_t-HT^{10,1} to pre-stress the engine block for honing. Install the torque plates with the proper hardened washers (supplied with the honing torque plates), single washers on top row and double washers on bottom row, to establish proper fastener depth.

9.9.5.1 Clean the threaded bores for the cylinder head attachment fasteners using a bottoming tap before each installation of the torque plates.

9.9.5.2 The torque plates require the use of new head gaskets, SPO Part No. 24503802 left head and 24503801 right head, along with cylinder head, torque-to-yield fasteners, SPO Part No. 25527831 (long).

9.9.5.3 Clean all sealing and thread locking compounds from the fasteners for the torque plate installation. Lightly lubricate the fasteners (head bolts) during this operation with EF-411.

9.10.1 *Piston Rings*—The rings are pre-sized for each run; check the gap in the cylinder bore for each test. The top ring gap shall be (0.635 ± 0.051) mm. The bottom ring gap shall be (1.067 ± 0.051) mm. The top ring gap shall be smaller than the bottom ring gap and the difference between the two ring gaps shall be between 0.330 mm and 0.533 mm. If the ring gap difference is below 0.330 mm, contact the Test Procedure Developer.

¹The sole source of supply of the apparatus known to the committee at this time is B-H-J Products Inc., 37530 Enterprise Court, Newark, CA 94560.

9.10.1.1 Check the ring gap with a Starrett Ring Taper Gage No. 270 with the ring positioned in the cylinder bore using a piston ring depth gage (drawing RX-118602-B). Remove the torque plates and position the rings 23.67 mm below the cylinder-block deck surface during gap measurement.

9.10.1.2 Record the top and bottom ring gaps on Form 12, Hardware Information, in the standardized report form set (see Annex A5). Record and report ring gaps in millimeters.

9.12 *Camshaft Bearing Installation*—Install the main bearing caps (see 9.14.2) before installing the camshaft bearings. The camshaft tunnel is specially processed and uses oversize bearings provided through the CPD. Install the camshaft bearings according to the Sequence IIIG Engine Assembly Manual Section, 3 Sheet 4.

9.12.1 Always inspect the lifter and main bearing oil galleries for splintered babbitt materials that might have been shaved from the outside diameter of the bearings during installation. Remove any materials from the oil galleries with clean dry shop air.

12.4.2 Rate each piston top groove, 2nd groove, oil ring groove, 2nd land, and undercrown area (where the horizontal and vertical planes meet) for deposits using ASTM Deposit Rating Manual No. 20 rating techniques and breakdown methods. Carbon deposit ratings will consist of only two levels: Heavy (0.00 merit value) or Light (0.75 merit value).

12.4.2.1 Perform these ratings in a rating booth, using a 20-segment piston-rating cap, a piston rating stand, and a 22 W circular rating lamp.

Renumber existing Sections 12.4.2.1 and 12.4.2.2 accordingly.

12.4.3.4 All raters of Sequence IIIG engine pistons shall attend a TMC Light Duty Rating Workshop every 12 months \pm 30 days and produce data that meet the definition of Blue, Red, or White for piston deposits. If a rater is unable to meet this requirement, the rater can continue to rate Sequence IIIG pistons after the completion of the workshop for a grace period of 45 days and can follow the procedure described in 12.4.3.5 to generate data that meet the TMC definitions of Blue, Red, or White.

Delete footnote 27 and renumber subsequent footnotes

Part number changes are shown in red. Struck through items are to be deleted.

TABLE A2.1 Parts to be Replaced Every Test

Part Description	Part Number
Arm, Rocker with Pivot Bearing	OHT3F-058-1
BEARING, KIT, ENGINE	OHT3F-042-2
KIT INCLUDES:	
BEARING, CONNECTING ROD, KIT, UPPER AND LOWER, OH-106 ASSY	3F042-01
MAIN BEARING KIT, OH101 ASSY, INCLUDES:	3F042-02
Bearing, Balance Shaft Front (part of 24502388)	SKF6205-2ZNRJEM
BEARING, MAIN, LOWER, #1 AND 3	OH-102
BEARING, MAIN, LOWER, #4	OH-103
BEARING, MAIN, LOWER, FLANGE, #2	OH-104
BEARING, MAIN, UPPER, FLANGE, #2	OH-105
BEARING, CAM BUSHING, POSITIONS 1 & 4	3F028-09
BEARING, CAM BUSHING, POSITIONS 2 & 3	3F028-10
Bolt, Camshaft Sp rocket	24501366
Bolt, Cylinder Head, Long	25527831
Bolt, Cylinder Head, Short	25533811 or 88891770
Bolt, Flywheel	24505092
Bolt, Main Cap	24503056
Bolt, Main Cap, Side	24505576
Bolt, Rocker Arm, Special Test	3F-058-02
Bolt/Screw, Thrust Plate retainer	25519242
Camshaft, Special Test, including Manganese-phosphate coating	OHT3F-008-8
Cap, Valve Spring Retainer	24502257
Chain, Timing	24504668
Clip, Retainer, Piston Pin	OHT3F-012-1
COOLER, OIL, NICKEL PLATED, BYPASS CLOSED	OHT3F-030-2
Damper, Timing Chain (includes bolt, retaining ring)	24503893
FILTER, PRO TEC	OHT3F-057-3
Gasket kit, Intake Manifold lower	89017816
Gasket, Cylinder Head, left	24503802
Gasket, Cylinder Head, right	24503801
Gasket, Front Cover	12587003
Gasket, Oil Filter Adapter	25534742
Gasket, Oil Pan	OHT3G-093-1
Gasket, Oil Pan	OHT3G-093-2
Gasket, Oil Suction Tube	24501259 or 12581570
Gasket, Rear Cover Housing	24507388
Gasket, Rocker Cover	25532619
Gasket, Water Outlet	24502433
Gasket, Water Pump	24501565
Head, Cylinder	24502260B
Key, Camshaft Sprocket	24500618
Key, Valve Stem Keeper	10166345
Lifter, Test ACI w/Flat (25338738A)	OHT3F-029-3
PIN, PISTON WRIST, PKG. OF 6	OHT3F-014-1
PISTON, TEST, RUNS 1 & 2, GRADE 12	OHT3F-053-1

Part Description	Part Number
PISTON, TEST, RUNS 3 & 4, GRADE 34	OHT3F-054-1
PISTON, TEST, RUNS 5 & 6, GRADE 56	OHT3F-055-1
PLATE, CAMSHAFT THRUST, .1520 in. THICKNESS	OHT3F-011-2
Plug, Engine Block Core Hole	24500867
Plug, Cylinder Head Core Hole	3835577—Installed in head
Plug, Cylinder Head Cup	24502262
Plug, Engine Block, Oil Gallery	3835577
Plug, Ignition Spark	NGK TR-6
Plunger, Oil Relief	25530949
PUSHROD, SPECIAL LENGTH, PKG. OF 12	OHT3F-007-1
RETAINER CLIP, PISTON PIN PKG. OF 12	OHT3F-012-1
1 EA. RING, PISTON, RUN 1, ENGINE SET	OHT3F-050-RUN1
1 EA. RING, PISTON, RUN 2, ENGINE SET	OHT3F-050-RUN2
1 EA. RING, PISTON, RUN 3, ENGINE SET	OHT3F-051-RUN3
1 EA. RING, PISTON, RUN 4, ENGINE SET	OHT3F-051-RUN4
1 EA. RING, PISTON, RUN 5, ENGINE SET	OHT3F-052-RUN5
1 EA. RING, PISTON, RUN 6, ENGINE SET	OHT3F 052 RUN6
ROCKER ARM ASSEMBLY (Includes: 3F058-02)	OHT3F-058-1
Rod, Connecting (powdered metal)	12593374
Seal, Crankshaft Front Oil (24504098)	OHT3G-092-1
Seal, Crankshaft Rear Oil (25534760)	OHT3G-091-1
SEAL, EXHAUST VALVE STEM	OHT3F-061-1
SEAL, INTAKE VALVE STEM	OHT3F-060-1
Spring, Oil Relief Valve	1262505
SPRING, VALVE Special Test (COLOR CODE PINK)	OHT3G-059-1
Sprocket, Camshaft	24505306
Valve, Exhaust (STD)	12579949
Valve, Intake (STD)	12569550

TABLE A2.2 Parts to be Replaced As Needed

Part Description	Part Number
ADAPTER, BLOWBY BREATHER TUBE	OHT3F-040-1
ADAPTER, OIL FILTER	OHT3F-035-1
Adapter, Oil Filter, with External Bypass	OHT3F-080-1
Adapter, Throttle Body, Air Inlet	OHT3F-001-2
Balancer, Harmonic (24507058 or 12563265) (1997-2003)	12563265
Bearing, Balance Shaft Front (part of 24502388)	SKF6205-2ZNRJEM
Block, Engine Assembly	24502286
Bolt, Connecting Rod	11610158
Bolt, Counter Balance Gear	24501367
Bolt, Counter Balance Shaft retainer	24500055
Bolt, Engine Front Cover	24504712
Bolt, Harmonic Balancer	24504736
Bolt, Lower Intake	9440227
Bolt, Oil Filter Adapter	24504713

Part Description	Part Number
Bolt, Oil Pan	11610052
Bolt, Oil Suction Tube	24505570
Bolt, Rear Cover Housing	11518075
Bolt, Rocker Cover	24502164
Bolt, Screw Camshaft Sensor	25526395
Bolt, Screw, Oil Gearotor, Cover	25519242
Bolt, Stud Type, Front Cover & Crankshaft Sensor (long)	24504718
Bolt, Stud Type, Front Cover & Crankshaft Sensor (short)	24504717
Bolt, Upper Intake Long	24505205
Bolt, Upper Intake Short	24506498
Bolt, Upper Intake, Stud	24502453
BRACKET, BREATHER TUBE	OHT3F-041-1
BREATHER TUBE, S.S. MATERIAL	OHT3F-075-1
Bushing, Balance Shaft Rear	24503193
BUSHING, ROCKER COVER	OHT3F-028-1
BUSHING, ROCKER COVER	OHT3F-028-2
Coil, Ignition	10472401 or 89056799
CONNECTOR, MODIFIED FOR LENGTH, GM PN 24502883	OHT3F-039-2
COVER, FRONT, IMPREGNATED	OHT3G-085-1
COVER, Rear, crankshaft rear seal housing	OHT3G-088-1
Cover, Oil Gearotor	25521935
Cover, Rocker Arm Valve Cover Left Side Plastic	12590366
Crankshaft	24502168
DIP STICK, METRIC, EXTENDED LENGTH	OHT3G-064-1
FITTING, OIL FILTER ADAPTER	OHT3F-043-1
FLYWHEEL, MANUAL, MODIFIED P.N. 24503285	OHT3F-020-2
GASKET, EXHAUST, END PLATE	OHT3F-009-1
GASKET, EXHAUST, FLANGE, METAL	OHT3F-018-1
Gasket, Manifold, Upper Intake	89017556
GASKET, OIL COOLER, PKG. OF 50	OHT3F-074-1
GASKET, OIL FILTER, PKG. OF 50	OHT3F-062-1
Gear, Balanceshaft Drive	24504792
Gear, Balanceshaft Driven	24503524
Gear, Counter Balance Drive	24504792
Gear, Counter Balance Shaft	24503524
Grommet, Rocker Arm Valve cover bolt	25534749
HARNESS, COIL PACK SEGMENT	3F022-2
HARNESS, FUEL INJECTOR SEGMENT	3F022-1
HARNESS, WIRING, DYNO W/ OHT3F-056-1 SENSOR	OHT3F-022-1
HOUSING, ASSEMBLY, BYPASS VALVE	OHT3F-084-1
Injector, Fuel	17120601
Key, Crankshaft	12563282
Magnet, Camshaft Position Sensor	10456195
MANIFOLD, CAST IRON	OHT3F-003-0
MANIFOLD, EXHAUST, WATER COOLED ASSY (ONE BANK)	OHT3F-003-1
ASSEMBLY INCLUDES:	
1 EA. RUNNER, EXHAUST MANIFOLD	OHT3F-004-1
1 EA. PLATE, REAR, EXHAUST MANIFOLD	OHT3F-005-1

Part Description	Part Number
1 EA. ELBOW, EXHAUST, MODIFIED	OHT3F-005A-1
1 EA. PLATE, FRONT, EXHAUST MANIFOLD	OHT3F-006-1
2 EA. GASKET, EXHAUST, END PLATE	OHT3F-009-1
1 EA. GASKET, EXHAUST, FLANGE, METAL	OHT3F-018-1
Manifold, Lower Intake	24508923
Manifold Kit, Upper Intake	89017272
METER, BLOWBY	RX-116169-A1 REV N
Module, Coil Pack	12617924
MOUNT FRONT ENGINE W/ BOLT PATTERN FOR COIL PACK	OHT3F-026-1
MOUNT, REAR ENGINE HOUSING W/AIR STARTER, MUFFLER & SHIM PACK	OHT3F-025-1
ASSEMBLY INCLUDES:	
STARTER, AIR	3F025-03
MUFFLER, STARTER, AIR	3F025-04
SHIM PACK, STARTER, AIR	3F025-05
MUFFLER, STARTER, AIR	3F025-04
Nut, Throttle Body Fuel Rail Retainer	3530297
Nut, Throttle body Retainer	3530297
OIL FILTER HOUSING ASSEMBLY, NO BYPASS, IMPREGNATED	OHT3G-080-1
OUTLET, COOLANT	OHT3F-034-1
PAN, IIF TEST, NICKEL PLATED	OHT3F-073-1
PCM, SPECIAL	OHT3F-021-1
PCV, DUMMY	OHT3F-002-1
Pin, Cylinder Head Locating	25536320
Pin, Front Cover Lower	25536323
Pin, Front Cover Upper	25536323
Pin, Transmission Locating	12338076
PLATE, EGR BLOCKOFF	OHT3F-024-1
PLATE, FRONT, EXHAUST MANIFOLD	OHT3F-006-1
PLATE, REAR, EXHAUST MANIFOLD	OHT3F-005-1
PLATE, WATER PUMP HOUSING	OHT3F-031-1
Plug, Auto Hex, Socket, (Main Oil Gallery Block Off)	444777
PLUG, DIP STICK	OHT3F-065-1
PLUG, DRAIN, MODIFIED	OHT3F-063-1
Pump, Oil, Gearoter Set	24505433
Rail, Fuel	17098211
Rail, Fuel Injector	12587077
REAMER, DIP STICK AND DIP STICK HOLE PLUG	OHT3F-071-1
Regulator, Fuel Pressure, on Rail	89017530 or 89060416
Retainer, Counter Balance, Timing Chain Oiler	24500374
Retainer, Rocker arm (replace after 6 tests)	24502278
RUNNER, EXHAUST MANIFOLD	OHT3F-004-1
Screen, Oil pump (w/suction pipe)	24505569
Seal, Ignition Coil	1989579
Seal, oil pan drain plug (o ring)	3536966
Sensor, Camshaft Position	10456148
Sensor, Crankshaft Position	10456161
Sensor, MAF	19112543 or 19179715

Part Description	Part Number
Sensor, Mass Air Flow (2 Bolt, Use with Throttle Body 24507235)	24503983
Sensor, Mass Air Flow (3 Bolt, Use with Throttle Body 24507230)	24504302
SENSOR, MODIFIED COOLANT TEMPERATURE	OHT3F-056-1
Shaft Assembly, Counter Balance	24506557
Shield, Crankshaft Position Sensor	24506440 or 12591982
SHIM PACK, STARTER, AIR	3F025-05
SHIM, STEEL, 0.127 mm THICK, 10 PER PKG.	OHT3F-072-005
SHIM, STEEL, 0.254 mm THICK, 10 PER PKG.	OHT3F-072-010
SHIM, STEEL, 0.381 mm THICK, 10 PER PKG.	OHT3F-072-015
SHIM, STEEL, 0.508 mm THICK, 10 PER PKG.	OHT3F-072-020
SHIM, STEEL, 0.787 mm THICK, 10 PER PKG.	OHT3F-072-031
SLEEVE, VALVE STEM PROTECTORS (PKG. OF 100)	OHT3F-070-1
SPROCKET, CRANKSHAFT, SPECIAL 2 PC	OHT3F-036-1
STARTER, AIR	3F025-03
Stud, front cover (2)	24504717
Stud, front cover (2)	24504718
Support, throttle body	24504697
Throttle Body (2 Bolt Mass Air Flow Sensor)	24507235
Throttle Body (3 Bolt Mass Air Flow Sensor)	24504302
TOOL, CAMSHAFT BUSHING INSTALLATION	OHT3F-019-2
TOOL, OIL PUMP PRIMER	OHT3F-038-1
Tube, throttle body to fuel pressure regulator	24505671