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Test Monitoring Center

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412-365-1000

Sequence VIE Information Letter 22-1
Sequence Number 7
April 21, 2022

TO: Sequence VI Surveillance Panel

SUBJECT: Updates to Test Method D 8114

During conference calls on March 1 and March 10, 2022, the Sequence VI Surveillance Panel agreed to the following changes to Test Method D8114:

1. Sections 6.6.5.11 and 6.13.5 both reference the OHT oil pan. Since 6.6.5.11 deals with how to configure the oil system, section 6.13.5 appears to be a duplicate and can be deleted. A similar situation has been noted in sections 6.5.10 and 6.13.6, in that both call out an OHT water pump adapter. Since 6.5.10 is contained in the engine coolant system configuration, it appears that 6.13.6 is redundant and can be removed.
2. Table 6 of the method identifies instrument calibrations done on a more frequent basis. This table incorrectly states that these calibrations are to be performed with every engine installation, but these calibrations are to be done every three months. Table 6 has been corrected to show every three months.
3. The panel agreed to no longer require a Viking model M475 pump as the scavenge pump and allow any pump that meets the performance specification of a Viking pump. The panel also agreed that changing to a different make and or model pump will require the flush effectiveness evaluation to be performed on the stand. Section 6.6.4.1 has been updated to reflect these changes.
4. The panel agreed to allow the fuel to rail thermocouple to be located within 600 mm of the fuel rail center. Section 6.9.5.7 has been modified to increase the distance and Annex A5.22 has been added to clarify the location of the fuel rail center.
5. The panel also agreed to revise section 6.5.8 to not require FCV-103 when a Variable Frequency Drive (VFD) is used to control the flow.
6. The panel also was informed of several items in Annex A17, short block assembly that are incorrect or are not required. A17.4.20 has been revised to remove the installation of sound deadener since this part is not used and A17.6.3 (2) has been updated to include a statement to install and torque the intake bracket where it is used. Also, a sprocket, part number 12645465 is duplicated in Table A 17.1, so the duplicate entry has been deleted.
7. Several sections contain multiple part and or model numbers for various specified components. The panel agreed to create an annex which contains many of these parts and components, which may be obsolete or superseded, but still may be in service. Annex A20 has been created to show these alternate/additional part numbers and sections 6.4.2.1, 6.5.4.1, 6.5.7.2, 6.5.9, 6.6.4.1, 6.6.4.6, 6.6.5.2, 6.6.5.3(2)(4), 6.6.5.6, 6.10.1.1, 9.4.12.3, Table A7.2 and Table A17.1 have been revised to remove these parts and reference new Annex A20 for additional approved parts.

8. The engine identified in sections 6.13.1 and 9.1 is no longer available from the supplier. A new engine and components are available from GM. Sections 6.13.1 and A7.1 have been updated to reflect the short block engine and assembly kit, while section 9.1 has been removed as it contains redundant information. Section A17.8.2 has been modified to show "or equivalent" since there are a variety of commercially available installation tools for this purpose. Also, the engine supplier information listed in X1.3 has been updated to reflect the correct supplier.
9. Appendix X1 contains numerous sections of supplier information that are obsolete or covered in footnotes elsewhere in the procedure. In addition, there are several references for the same supplier, OH Technologies for a number of components. These components have been consolidated in X1.12 and Sections X1.20, X1.21, X1.23, X1.26 -X1.28, X1.32 and X1.34 can be deleted. Section X1.29 contains supplier information for Penmul, which is not used in the method and this section can be removed. Section X1.30 references degreasing solvent but gives no information and has been deleted. Footnote 20 has been updated to reflect the Suppliers updated title and contact information, allowing Section X1.33 to be removed. Finally a number of sections have footnotes which provide supplier contact information also contained X1.11, X1.13, X1.15-X1.18 and X1.24, which can be deleted.
10. Finally, the panel agreed to address typo's in Section 6.6.5.11 and part number discrepancy in Section 6.14.2.7.

The revised text has been highlighted in red and blue and is included in the attached. These changes are effective with the issuance of this letter.

Aleise Jimenez
Materials Engineer – Fluids & Lubricants
GM Global Propulsion Systems

Frank M. Farber
Director
ASTM Test Monitoring Center

Attachment

c: www.astmtmc.org/ftp/docs/gas/sequencevi/procedure_and_ils/vie/il22-1_vie.pdf

Distribution: Email

Revises D8114-22

6.4.2.1 *Dynamometer Load Cell*—Measure the dynamometer torque by a load cell of 0 kg to 45 kg. The dyno load cell is required to have the following features:
(1) Good temperature stability:
Zero ≤0.0036 % Rated Output per degree Celsius, and
Span ≤0.0036 % Rated Output per degree Celsius.
(2) Nonlinearity ≤0.05 % Rated Output.
(3) Temperature compensation over range expected in laboratory 21 °C to 40 °C. A Lebow Model 3397 ~~or Interface 1500 ASK load cells~~ (see X1.5) ~~have~~ has been found suitable for this application. See Annex A20 for additional approved load cell(s).

6.5.4.1 Approved replacement heat exchangers are listed in A20.~~: ITT Bell and Gossett brazed plate Model BP-420-20, Part No. 5-68606-020-005[11] and ITT Bell and Gossett brazed plate Model BP-422-20, Part No. 5-686-06-020-007.[11]~~

6.5.7.2 Additional approved part numbers are listed in Annex A20. ~~A Badger Meter Model No. 9003TCW36SV3A19L36[13] (air-to-close), or Model No. 9003TCW36SV1A19L36[13] (air-to-open) are also acceptable if the trim package used with these valves has a CV of 16.0.~~

6.5.8 A control valve (FCV-103 in Fig. A5.1 to Fig. A5.3) is required for controlling the coolant flow rate to 80.0 L⁄min ± 4 L⁄min. A Badger Meter Model No. 9003GCW36SV3A19L36,13 2-way globe, 2 in., air-to-close valve is the specified valve. A VFD device (P-1 in Fig. A17.9) would not require this valve.

6.5.9 Use a Viatran model 274/374,[14] ~~Validyne model DP15 or P55,[15] or Rosemount models 1151 or 3051[16] differential pressure transducer~~ for reading the coolant flow rate at the orifice plate (FE-103 in Fig. A5.1 to Fig. A5.3) if orifice plate is used for flow measurement. See Annex A20 for additional approved transducers.

6.6.4.1 A scavenge pump~~, Viking Series 475,17 gear type, close coupled pump, model H475M~~ is required ~~specified~~. The pump shall have an electric motor drive of 1140 r/min to 1150 r/min with a minimum of 0.56 kW. Voltage and phase are optional. A Viking Series 475,17 gear type, close-coupled pump, model H475M has been found suitable. Any pump meeting the specifications of a Viking series 475 may be utilized, however when changing to a different model pump it will be necessary to conduct a new flush effectiveness evaluation, see 11.2.

6.6.4.6 A dump reservoir float switch is required. (FLS-136 in Fig. A5.8~~) The make and model is optional.~~ An OHT-6D00104/ Switch, Level, Gems, high temperature float switch has been found suitable for this application (see X1.23).

6.6.5.2 Use a positive displacement oil circulation pump. A Viking Series 4125,[17] Model G4125~~, G4214A, or G4214B~~, no relief valve, base mounted are specified (X1.15). The pump shall have a V-belt or direct drive electric drive motor of 1140 r⁄min to 1170 r⁄min with a minimum power of 0.56 kW. Voltage and phase are optional. See Annex A20 for additional approved models.

6.6.5.3 Use solenoid valves (FCV-150A, FCV-150C, FCV-150D, and FCV-150E, in Fig. A5.6).
(1) FCV-150F and its related lines/piping are optional.
(2) FCV-150A is a Burkert18 Type 251 piston-operated valve used with a Type 312 solenoid valve ~~(or a Burkert Type 2000 piston-operated valve used with a Type 311, 312, 330, o331 solenoid valve~~ See Annex A 20 for additional approved models) for actuation of air supply to the piston valve, solenoid valve direct-coupled to piston valve, normally closed, explosion proof (left to the discretion of the laboratory),and watertight, 3⁄4 in., 2-way, stainless steel NPT fitting.
(3) FCV-150C is to be Burkert18 Type 2000 with 13 mm orifice and 50 mm actuator. Additionally, flexible hoses to and from FCV-150C are to be size #12 and the internal diameter of all fittings on the

suction side of the engine driven oil pump shall be equal to or greater than 0.50 in. Hose lines to and from FIL-2 are to be size #10.

[20]The sole source of supply of the fuel known to the committee at this time is Haltermann Solutions,1201 South Sheldon Rd. P.O. BOX 429 Channelview, TX 77530-0429 Telephone: (281) 457-2768. If you are aware of alternative suppliers, please provide the information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible committee,1 which you may attend.

(4) FCV-150D and *(4)* FCV-150D and FCV-150E are Burkert18 Type 251 piston-operated valves used with a Type 312 solenoid valve (~~or a Burkert Type 2000 piston-operated valve used with a Type 311, 312, 330, or 331 solenoid valve~~ See Annex A 20 for additional approved models) for actuation of air supply to the piston valve, solenoid valve direct-coupled to the piston valve, normally closed, explosion proof (left to the discretion of the laboratory), and watertight, 1⁄2 in., 2-way, stainless steel NPT fitting.

6.6.5.6 Use an electric heater (EH-5 in Fig. A5.6) for oil heating. The specified heater is a heating element inserted in the liquid Cerrobase or Bolton 255 inside a Labeco oil heater housing (see X1.19). Any heater elements rated at 3000W may be used within the Labeco housing. See Annex A 20 for ~~There are two~~ recommended heating elements~~: (1) a three element with Incaloy sheath, Chromolox Part No. GIC-MTT-330XX, 230 V, single phase; (2) Wiegland Industries/Chromolox, Emerson Electric Model MTS-230A, Part No. 156-019136-014, 240 V single phase~~.

6.6.5.11 *Engine Oil P~~l~~an*—Use oil pan OHT6D-001-2. Oil pan OHT6D-001-2 is oil pan OHT6D-001-1 modified with part number 6E00121 ~~modified~~ oil pan displacement block. A sight glass is provided for monitoring the oil level and determining oil consumption.

6.9.5.7 Fuel to Engine Fuel Rail—Insert the thermocouple into the center of a tee or cross fitting and locate it within ~~550~~ 600 mm from the center point of the fuel rail ~~inlet~~ (See annex A5.22). Locate the thermocouple upstream of the fuel pressure measurement point.

6.10.1.1 Temperature of exhaust gas used by sensor: –7 °C to 900 °C. A Horiba MEXA 110~~, MEXA 700, MEXA 730, and ECM-AFM1000~~ analyzers ~~have~~ has been found suitable for this application (see X1.25). See Annex A20 for additional analyzers which have also been found suitable for this application.

6.13.1 *Test Engine Configuration*—The test engine is equipped with fuel injection, and is a 2012 GM High Feature V6 (HFV6) ~~OHT6E-001-1 or OHT6E-001-2~~ with a displacement of 3.6 L. Purchase the engine GMW400 and assembly kit, GMW402 from GM. See X1.3. The engine is assembled from kit components as detailed in A17~~.~~ ~~the engine as a test ready unit~~ (for procurement, see X1.3)~~.~~ ~~The only changes allowed from the as-received test ready unit is the installation of the fixed timing gears, modified camshaft position actuators, upper intake manifold, and coolant system orifice~~ and items detailed in 6.13.2 through 6.13.8.

~~6.13.5 *Oil Pan*—Use oil pan, Part No. OHT6D-001-2 (see X1.23).~~
~~**6.13.6** *Engine Water Pump Adapter*—Purchase from the CPD, OHT6D-005-1 (see X1.12).~~

6.14.2.7 Coolant Temperature Sensor, Purchase from the CPD, OHT6D-048-~~1~~2.

9.4.12.3 *Fuel Pressure Regulator*—Install a fuel pressure regulator. Paxton Model Number~~s~~ 8F002-004 ~~or 8F002-007 have~~ has been found to be suitable for this application~~. (see X1.35)~~ See Annex A 20 for additional approved models.

TABLE 6 Sequence VIE Instrument Calibrations to Be Performed ~~Before Reference Tests~~ Every Three months

Flows
Fuel Flow, kg/h
Air to Fuel Ratio
Pressures
Exhaust Back Pressure, kPa (absolute)
General
Speed, r/min
Torque, N·m (performed at beginning of every test)

~~9.1 Purchase the engine OHT6E-001-1 as a test ready unit, purchase from CPD.~~

TABLE A7.1 Required VIE Engine Components

PART NUMBER DESCRIPTION

~~OHT6E-001-1 2012, LY7, HFV6 ENGINE, TEST (INCLUDING 4 EACH FIXED CAM GEARS & COOLANT ORIFICE PLUG)~~

~~OHT6E-001-2 2012, LY7, HFV6 ENGINE, TEST (INCLUDING 4 EACH FIXED CAM GEARS & COOLANT ORIFICE PLUG)~~

GMW400 2012 High Feature V6 short block, heads and other related components

GMW402 2012 High Feature V6 lower intake , coils, injectors, gasket kit and additional components.

TABLE A7.2 Supplemental VIE Engine Components

OHT6D-042-1 92068193, INJECTOR FUEL, SEQ. VID
6E001-2-A 12603028, GASKET, LOWER, INTAKE
6E001-2-B 12632479, COIL, (6 EACH PER ENGINE)
6E001-2-C 12571079, MANIFOLD, INTAKE, LOWER[A]
6E001-2-D 89017867, GASKET, UPPER INTAKE MANIFOLD
6E001-2-E 11547135, BOLT, EXHAUST MANIFOLD
6E001-2-F 11588733, BOLT, MOUNT BRACKET
6E001-2-G 12571102, MANIFOLD, EXHAUST, LH
6E001-2-H 12576262, GASKET, EXHAUST MANIFOLD, LH
6E001-2-I 12593211, TUBE, DIPSTICK
6E001-2-J 12608475, GASKET, EXHAUST MANIFOLD, RH
6E001-2-K 12642793, DIPSTICK
6E001-2-L 11518906, BOLT, INTAKE, UPPER
6E001-2-M 11519170, BOLT, INTAKE, LOWER
6E001-2-N 12571101, MANIFOLD, EXHAUST, RH
6E001-2-0 12572886, RAIL, FUEL

[A]Additional approved intake manifold part number are available, see annex A20

New Figure A5.22

A5.22 Location of Fuel Rail Center.

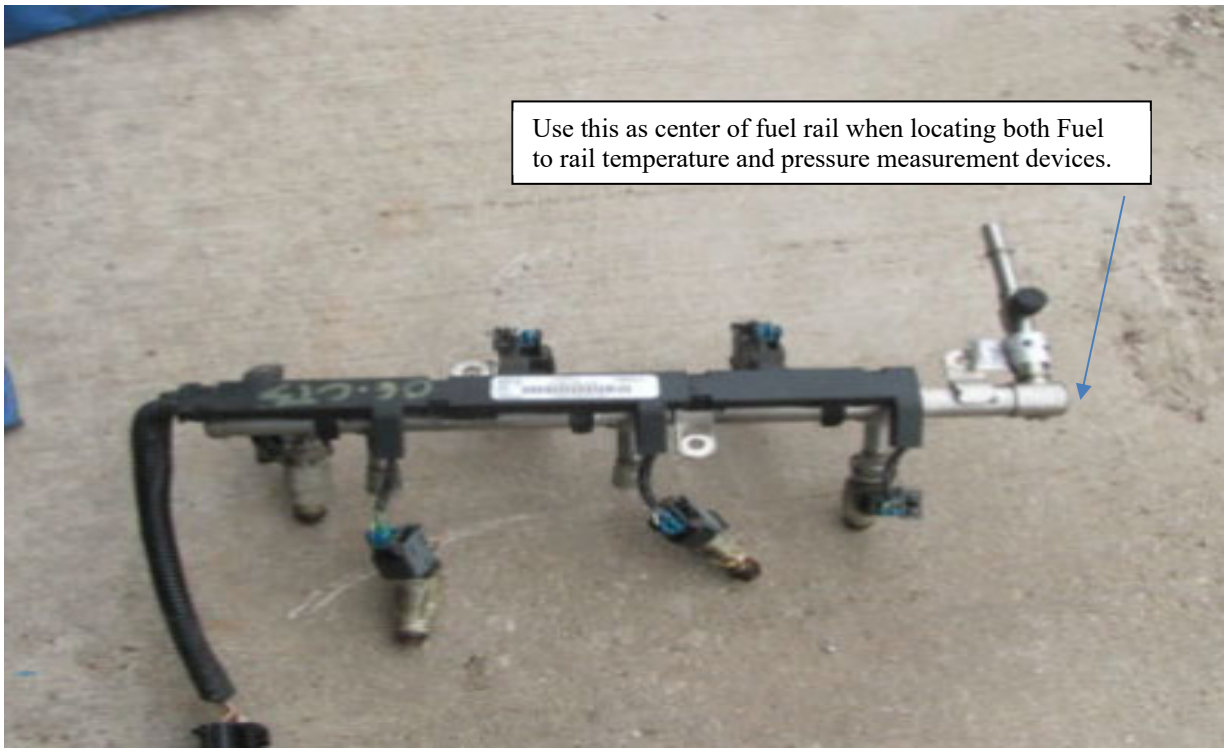

TABLE A17.1 Short Block Engine Parts

Qty	Part Number	Description
1	12650231[A]	Timing Chain Kit
1	12646464	Gasket Kit
1	12645465	SPROCKET-CR/SHF
~~1~~	~~12645465~~	~~SPROCKET~~
1	12641093	HEAD ASM-CYL (W/ VLV)(LH,LY7)
4	12636175	Solenoid
1	12641095	HEAD ASM-CYL (W/ VLV)(RH, LY7)
1	12634318[A]	~~LY7)~~ Oil Filter Gasket
1	12630223	Water Pump Gasket
1	12625923[A]	Thermostat Gasket
1	12623514	GUIDE ASM-TMG CHAIN
1	12623513	GUIDE ASM-TMG CHAIN
1	12622550[A]	Seal, Water Pump
1	12615626[A]	SENSOR ASM-CR/SHF POSN
1	12612839	SPROCKET ASM,TMG CHAIN
1	12612838	IDLER SPROCKET ASM,TMG CHAIN
1	12608750	IDLER Seal, CR/SHF Front (RH) Oil
1	12600462	GUIDE ASM-TMG CHAIN
1	12600461	GUIDE ASM-TMG CHAIN
1	12597417	GUIDE ASM-TMG CHAIN
4	12593717	Seal, CM/SHF Pos Actuator sol valve

1	12576263	Ex Man Gasket
1	12576262	Ex Man Gasket
4	12570326	Pin, Head Location
1	12566837[A]	Oil Pump Pick-up Seal
2	11610796	Bolt
4	11588734	Head Bolt, Short
4	11588279	Bolt
6	11588255	Bolt
1	11588252	Bolt - HVY HX FLG HD Red Body
1	11569873[A]	Crankshaft Balancer Bolt
1	11561751	Plug, Eng Block Oil Gallery
6	11561619	Bolt
16	11518863 [A]	BOLT,CYL HD
1	19206165	Block, Short HFV6
1	12597853	Intake Plenum

[A]See Annex A20 for additional acceptable part numbers

A17.4.20 Loosely install the front cover bolts ~~and install the engine front cover sound deadener~~ **(see Fig.** A17.26).

A17.6.3 Place the intake manifold brace to the engine front cover and intake manifold (see Fig. A17.36 (1)) and tighten to 10 N·m. Install and tighten the intake manifold brace bolt (see Fig. A17.36 (2)) to the engine front cover to 65 N·m. Installation of this brace is not required and is at the discretion of the laboratory

A17.8.2 Use the Kent Moore J-41992-B,[25] or equivalent, nut, bearing and washer to install the crankshaft balancer

New Annex A20

A20 Alternate Approved Parts and or Components

Section	Component/Part	Source	Part Number
6.4.2.1	Load Cell	Interface	1500 ASK
6.5.4.1	Brazed Plate Heat exchanger	ITT Bell and Gosset[11]	BP-420-20 5-686-06-020-005 (see note 2)
6.5.4.1	Brazed Plate Heat exchanger	ITT Bell and Gosset[11]	BP-422-20 5-686-06-020-007 (see note 2)
6.5.7.2	Air to close Control Valve	Badger Meter[13]	9003TCW36SV1A19L36 CV 16.0 Trim
6.5.7.2	Air to open Control Valve	Badger Meter[13]	9003TCW36SV1A19L36 CV 16.0 Trim
6.5.9	Pressure Transducer	Validyne[15]	Model DP15 or P55
6.5.9	Pressure Transducer	Rosemount[16]	Model 1151 or 3051
6.6.5.2	Pump (Oil Circulating)	Viking [17]	Model G4214A, or G4214B
6.6.5.3 (2), (4)	Solenoid Valves	Burket[18]	Model 2000 with Type 311, 312, 330 or 331 solenoid Valve
6.6.5.6	Heater Element	Chromolox	GIC-MTT-330XX, 230 V, single phase
6.6.5.6	Heater Element	Wiegland Industries/Chromolox, Emerson Electric	MTS-230A, Part No. 156-019136-014, 240 V single phase
6.10.1.1	AFR Sensor	Horiba	MEXA 700, MEXA 730
6.10.1.1	AFR Sensor	ECM	AFR1000
9.4.12.3	Fuel Pressure regulator	Paxton	HF002-007
Table A17.1	Timing Chain Kit	GM	12700435

Table A17.1	Oil Filter Gasket	GM	12687466
Table A17.1	Thermostat Gasket	GM	12681140
Table A17.1	Seal, Water Pump	GM	12622550
Table A17.1	SENSOR ASM-CR/SHF POSN	GM	12645465
Table A17.1	Oil Pump Pick-up Seal	GM	12615569 or 12691257
Table A17.1	Bolt, CYL HD	GM	19352499
Table A17.1	Bolt, Crankshaft Balancer	GM	11549124

X1.3 Test Engine is available from:
~~Sequence VIE engines, part 2012 GM (HFV6) OHT6E-001-1~~
~~OH Technologies, Inc.~~
~~9300 Progress Parkway~~
~~P.O. Box 5039~~
~~Mentor, OH 44061-5039~~
~~Telephone: (440) 354-7007~~
~~Fax: (440) 354-7080~~
GM Corporation
Performance Vehicles and Motorsports
Mail Code 482-A25
100 Renaissance Center
Detroit, MI 48265

~~X1.6 Cooling System Pressure Cap:~~
~~A satisfactory coolant system pressure cap (100 kPa, normally closed cap) is available through local distributors~~

~~X1.11 Differential Pressure Transducer (DPT-1):~~
~~The recommended transducers are Viatran Model 274 or Model 374, Validyne Model DP15, and Rosemount model 1151 which may be ordered, respectively, from:~~
~~Viatran~~
~~199 Fire Tower Dr.~~
~~Tonawanda, NY 14150~~
~~or~~
~~Validyne Engineering~~
~~8626 Wilbur Ave.~~
~~Northridge, CA 91324~~
~~or~~
~~Emerson Electric Co.~~
~~8000 West Florissant Ave.~~
~~PO Box 4100~~
~~St. Louis, MO 6313~~

X1.12 ~~Water Pump Plate~~ Various specialty Parts:
The water pump block off plate OHT6D-005-1, Oil Filter Housing Assembly OHT6A-012-2 and Filters (Screen) (FIL-2) Racor 60-micron screen OHT6A-013-3, Modified Oil Filter Adapter Plate OHT6D-003-1, Modified Oil Pan and Modified Oil Pick-Up Tube OHT6D-001-1, Engine Wiring Harness Without Interface OHT6D-011-2, Modified Coolant Inlet, Engine Mounts and parts specified as "available from CPD" may be
purchased from:
OH Technologies, Inc.
9300 Progress Parkway
P.O. Box 5039
Mentor, OH 44061-5039
Telephone: (440) 354-7007

Fax: (440) 354-7080

~~X1.13 Oil Scavenge Pump Viking Series 475 is available from:~~
~~Viking Pumps~~
~~401 State St.~~
~~Cedar Falls, IA 50613~~

~~X1.15 Oil Circulation Pump Viking Series 4125 is available from:~~
~~Viking Pumps~~
~~401 State St.~~
~~Cedar Falls, IA 50613~~

~~X1.16 External Oil System Solenoid Valves (FCV-150A, FCV-150C, FCV-150D, FCV-150E, and FCV-150F) are available from:~~
~~Burkert Fluid Control Systems~~
~~11425 Mt. Holly-Huntersville Rd.~~
~~Huntersville, NC 28078~~

~~X1.17 External Oil System Control Valves (TCV-144 and TCV-145) are available from:~~
~~Badger Meter~~
~~4525 W. Brown Deer Rd.~~
~~PO Box 245036~~
~~Milwaukee, WI 53224~~

~~X1.18 Oil Heat Exchanger (HX-6) is available from:~~
~~ITT (Model 310-20):~~
~~ITT Standard~~
~~175 Standard Parkway~~
~~Buffalo, NY 14227~~
~~or~~
~~Bell & Gossett (Model BP 25-20 or BP 410-020):~~
~~Bell & Gossett ITT~~
~~8200 N. Austin Avenue~~
~~Morton Grove, IL 60053~~

~~X1.20 Oil Filter Housing Assembly OHT6A-012-2 and Filters (Screen) (FIL-2) Racor 60 micron screen OHT6A-013-3 are available from:~~
~~OH Technologies, Inc.~~
~~9300 Progress Parkway~~
~~P.O. Box 5039~~
~~Mentor, OH 44061-5039~~
~~Telephone: (440) 354-7007~~
~~Fax: (440) 354-7080~~
~~X1.21 Modified Oil Filter Adapter Plate OHT6D-003-1 is available from:~~
~~OH Technologies, Inc.~~
~~9300 Progress Parkway~~
~~P.O. Box 5039~~
~~Mentor, OH 44061-5039~~
~~Telephone: (440) 354-7007~~
~~Fax: (440) 354-7080~~

~~X1.24 Fuel Flow Measurement Mass Flow Meter are available from:~~
~~Emerson Electric Co.~~
~~8000 West Florissant Ave.~~
~~PO Box 4100~~
~~St. Louis, MO 63136~~

~~X1.23 Modified Oil Pan and Modified Oil Pick-Up Tube OHT6D-001-1:~~
~~The oil pan and oil level blocking plate may be purchased from:~~
~~OH Technologies, Inc.~~
~~9300 Progress Parkway~~
~~P.O. Box 5039~~
~~Mentor, OH 44061-5039~~
~~Telephone: (440) 354-7007~~
~~Fax: (440) 354-7080~~

~~X1.26 ECU (Engine Control Unit) Revision 3, OHT6D-012-4:~~
~~OH Technologies Inc.~~
~~9300 Progress Parkway~~
~~P.O. Box 5039~~
~~Mentor, OH 44061-5039~~
~~Telephone: (440) 354-7007~~
~~Fax: (440) 354-7080~~

~~X1.27 Engine Wiring Harness Without Interface OHT6D-011-2:~~
~~OH Technologies Inc.~~
~~9300 Progress Parkway~~
~~P.O. Box 5039~~
~~Mentor, OH 44061-5039~~
~~Telephone: (440) 354-7007~~
~~Fax: (440) 354-7080~~

~~X1.28 Modified Coolant Inlet: The coolant inlet may be purchased from:~~
~~OH Technologies Inc.~~
~~9300 Progress Parkway~~
~~P.O. Box 5039~~
~~Mentor, OH 44061-5039~~
~~Telephone: (440) 354-7007~~
~~Fax: (440) 354-7080~~

~~X1.29 Organic Solvent (Penmul L460):~~
~~Penetone Corporation~~
~~74 Hudson Ave.~~
~~Tenafly, NJ 07670~~

~~X1.30 Degreasing Solvent: Available from local suppliers.~~

~~X1.32 Engine Mounts:~~
~~OH Technologies Inc.~~
~~9300 Progress Parkway~~
~~P.O. Box 5039~~
~~Mentor, OH 44061-5039~~

~~Telephone: (440) 354-7007~~
~~Fax: (440) 354-7080~~

~~X1.33 Haltermann Products~~
~~1201 South Sheldon Rd.~~
~~P.O. BOX 429~~
~~Channelview, TX 77530-0429~~
~~Telephone: (281) 457-2768~~

~~X1.34 Order parts specified as "available from CPD" from:~~
~~OH Technologies Inc.~~
~~9300 Progress Parkway~~
~~P.O. Box 5039~~
~~Mentor, OH 44061-5039~~
~~Telephone: (440) 354-7007~~
~~Fax: (440) 354-7080~~