

### 33. L-33-1 LTMS Requirements

The following are the specific L-33-1 calibration test requirements.

#### A. Reference Oils and Critical Parameter

The critical parameter is Final Rust. The reference oils required for test stand and test laboratory calibration are reference oils accepted by the ASTM L-33-1 Surveillance Panel. The mean and standard deviations for the current reference oils for the critical parameter are presented below.

FINAL RUST  
Unit of Measure: Merits  
Gear Versions V99.1 & V01.1

| Reference Oil | Mean  | Standard Deviation |
|---------------|-------|--------------------|
| 123           | 8.560 | 0.230              |
| 123-2         | 8.740 | 0.260              |
| 151-3         | 9.640 | 0.250              |
| 155           | 9.580 | 0.250              |
| 155-1         | 9.580 | 0.250              |

FINAL RUST  
Unit of Measure: Merits  
Gear Version AAM K2XX & T1XX & 31XX

| Reference Oil | Mean | Standard Deviation |
|---------------|------|--------------------|
| 123-2         | 8.51 | 0.35               |
| 126*          | 8.90 | 0.27               |
| 155-1         | 9.47 | 0.16               |
| 155-2         | 9.47 | 0.16               |

\*Oil 126 not approved for use on K2XX hardware only.

#### B. Acceptance Criteria

##### 1. New Test Stand

- A minimum of two (2) operationally valid calibration tests, and/or matrix tests, with no Level 3  $e_i$  or level 2  $Z_i$  alarms after the second operationally valid test must be conducted in a new stand on any approved reference oils.
- Note that industry matrix runs may be included, as well as reference runs, at the discretion of the surveillance panel.

- Following the necessary tests, check the status of the control charts and follow the prescribed actions.

## 2. Existing Test Stand

- The stand must have previously been accepted into the system by meeting the LTMS requirements.
- Existing test stands that have run an acceptable reference in the past 10 months may calibrate with 1 test.
- Following the necessary tests, check the status of the control charts and follow the prescribed actions.

## 3. Reference Oil Assignment

Once test stands have been accepted into the system, the TMC will assign reference oils for continuing calibration according to the following reference oil mix:

- 50% of the scheduled calibration tests should be conducted on reference oil 123 or 126 or subsequent approved rebends.
- 50% of the scheduled calibration tests should be conducted on reference oil 151-3 or 155 or subsequent approved rebends.

## 4. Control Charts

In Section 1, the construction of the control charts that constitute the Lubricant Test Monitoring System is outlined. For the L-33-1 test,  $Z_0 = \text{Mean } Y_i$  of first two operationally valid tests in the stand. The constants used for the construction of the control charts for the L-33-1, and the response necessary in the case of control chart limit alarms, are depicted below. Note that control charting for the rust parameter is required.

LUBRICANT TEST MONITORING SYSTEM CONSTANTS

|             |            | EWMA Chart |             | Stand Prediction Error |             |
|-------------|------------|------------|-------------|------------------------|-------------|
|             |            | Severity   |             | Severity               |             |
| Chart Level | Limit Type | Lambda     | Alarm       | Limit Type             | Limit       |
| Stand       | Level 1    | 0.3        | 0.000       | Level 1                | N/A         |
|             | Level 2    |            | $\pm 1.800$ | Level 2                | $\pm 1.734$ |
|             |            |            |             | Level 3                | $\pm 2.066$ |
| Industry    | Level 1    | 0.2        | $\pm 0.775$ | --                     | --          |
|             | Level 2    |            | $\pm 0.859$ | --                     | --          |

The following are the steps that must be taken in the case of exceeding control chart limits. The steps are listed in order of priority, although charts should be studied simultaneously to determine the cause(s) of a problem. In the case of multiple alarms, contact the TMC for guidance. The laboratory always has the option of removing any stand from the system.

- Exceed Stand chart of Prediction Error ( $e_i$ ) Rust parameter

#### Level 3:

- Immediately conduct one additional reference test in the stand that triggered the alarm. Do not update the control charts until the follow up reference test is completed and Excessive Influence (refer to Section 1.A.5) has been performed.

#### Level 2:

- The Level 2 limit applies in situations that have been pre-determined by the surveillance panel to have a potential impact on test results. These situations may include the introduction of new critical parts, reference oil rebends, or other test components. When these conditions have been met and a Level 2 alarm is triggered, immediately conduct one additional reference test in the stand that triggered the alarm.

- Exceed Stand EWMA of Standardized Test Result ( $Z_i$ )

#### Level 2 (Rust parameter):

- Conduct one additional reference test in the stand that triggered the alarm. The stand that triggered the alarm is not qualified for non-reference tests until the Level 2 alarm is cleared.
- In instances where surveillance panel has deemed that industry-wide circumstances are impacting the Level 2 alarm, the TMC may be asked to review stand calibration status in accordance with the surveillance panel's findings.

#### Level 1 (Rust Parameter):

- The Level 1 limit applies to all reference tests that are control charted, even when other alarms have been triggered. Level 1 uses  $Z_i$  to determine the stand severity adjustment (SA). Calculate the stand SA as follows and confirm the calculation with the TMC:

$$\text{Final Rust : SA} = (-Z_i) \times (0.25)$$

- Exceed Industry EWMA of Standardized Test Result ( $Z_i$ )

#### Level 2:

- TMC informs the surveillance panel that the limit has been exceeded. The surveillance panel then investigates and pursues resolution of the alarm.

Level 1:

- The TMC investigates whether severity adjustments are adequately addressing the trend, investigates the possible causes, and communicates as appropriate with industry.

### 39. Oil Seal Compatibility Test LTMS Requirements

The following are the specific Oil Seal Compatibility Test calibration test requirements.

#### A. Reference Oils and Critical Parameters

The critical parameters are Elongation, Shore Hardness, and Volume Change. The reference oils required for test stand and test laboratory calibration are the reference oils accepted by the ASTM Oil Seal Compatibility Test Surveillance Panel. The means and standard deviations for the current reference oils for the critical parameters are presented below.

#### ELONGATION Unit of Measure: Percent

| Reference Oil | Elastomer       | Mean    | Standard Deviation |
|---------------|-----------------|---------|--------------------|
| 160-1         | Polyacrylate    | 23.04   | 14.289             |
| 160-1         | Fluoroelastomer | -47.65  | 5.506              |
| 161-1         | Polyacrylate    | 68.88   | 17.850             |
| 161-1         | Fluoroelastomer | -34.57  | 6.989              |
| 161-1         | Nitrile         | 10.43   | 10.691             |
| 162           | Nitrile         | -65.35  | 7.330              |
| 168           | Nitrile         | -74.52  | 6.965              |
| 169           | Polyacrylate    | 49.2    | 21.82              |
| 169           | Fluoroelastomer | -39.5   | 6.99               |
| 169           | Nitrile         | -16.2   | 10.69              |
| 170           | Nitrile         | -70.68  | 3.007              |
| 170-1         | Nitrile         | -44.0   | 4.027              |
| 171           | Polyacrylate    | 25.090  | 11.415             |
| 171           | Fluoroelastomer | -47.949 | 5.947              |
| 171-1         | Polyacrylate    | 25.090  | 11.415             |
| 171-1         | Fluoroelastomer | -47.949 | 5.947              |
| 172           | Nitrile         | -17.4   | 8.34               |
| 172           | Fluoroelastomer | -40.3   | 10.44              |
| 172           | Polyacrylate    | 26.1    | 12.10              |

SHORE HARDNESS  
Unit of Measure: Points

| Reference Oil | Elastomer       | Mean   | Standard Deviation |
|---------------|-----------------|--------|--------------------|
| 160-1         | Polyacrylate    | -1.8   | 1.16               |
| 160-1         | Fluoroelastomer | 1.6    | 1.36               |
| 161-1         | Polyacrylate    | -24.9  | 2.83               |
| 161-1         | Fluoroelastomer | 1.6    | 1.30               |
| 161-1         | Nitrile         | -16.1  | 2.18               |
| 162           | Nitrile         | 2.0    | 2.03               |
| 168           | Nitrile         | 3.0    | 1.89               |
| 169           | Polyacrylate    | -16.0  | 2.83               |
| 169           | Fluoroelastomer | 0.1    | 1.30               |
| 169           | Nitrile         | -8.6   | 2.18               |
| 170           | Nitrile         | 1.500  | 0.718              |
| 170-1         | Nitrile         | -0.508 | 1.848              |
| 171           | Polyacrylate    | 0.223  | 1.858              |
| 171           | Fluoroelastomer | 0.987  | 1.664              |
| 171-1         | Polyacrylate    | 0.223  | 1.858              |
| 171-1         | Fluoroelastomer | 0.987  | 1.664              |
| 172           | Nitrile         | -5.6   | 0.61               |
| 172           | Fluoroelastomer | -2.3   | 0.99               |
| 172           | Polyacrylate    | -8.5   | 0.76               |

VOLUME CHANGE  
Unit of Measure: Percent

| Reference Oil | Elastomer       | Mean   | Standard Deviation |
|---------------|-----------------|--------|--------------------|
| 160-1         | Polyacrylate    | 0.343  | 0.4473             |
| 160-1         | Fluoroelastomer | 2.053  | 0.4075             |
| 161-1         | Polyacrylate    | 19.624 | 1.4348             |
| 161-1         | Fluoroelastomer | 6.199  | 0.7080             |
| 161-1         | Nitrile         | 18.444 | 1.7057             |
| 162           | Nitrile         | 2.460  | 1.5821             |
| 168           | Nitrile         | 1.326  | 1.4730             |
| 169           | Polyacrylate    | 13.1   | 1.43               |
| 169           | Fluoroelastomer | 4.4    | 0.71               |
| 169           | Nitrile         | 11.8   | 1.71               |
| 170           | Nitrile         | 2.325  | 0.341              |
| 170-1         | Nitrile         | 2.591  | 0.271              |
| 171           | Polyacrylate    | -0.088 | 1.096              |
| 171           | Fluoroelastomer | 2.167  | 1.201              |
| 171-1         | Polyacrylate    | -0.088 | 1.096              |
| 171-1         | Fluoroelastomer | 2.167  | 1.201              |
| 172           | Nitrile         | 7.6    | 0.62               |
| 172           | Fluoroelastomer | 4.6    | 0.50               |
| 172           | Polyacrylate    | 7.9    | 1.20               |

## B. Acceptance Criteria

### 1. New Test Stand

- For each elastomer type, an operationally valid calibration test, with no Shewhart severity alarms, must be conducted on each of the two approved reference oils.

### 2. Existing Test Stand

- The test stand must have been TMC calibrated prior to LTMS introduction or previously accepted into the system by meeting LTMS calibration requirements.

### 3. Reference Oil Assignment

Once test stands have been accepted into the system, the TMC will assign reference oils for continuing calibration according to the following reference oil mix:

| Elastomer Type | Oil Assignments                                                                                                |
|----------------|----------------------------------------------------------------------------------------------------------------|
| PA             | Assign reference oils 160, 161, 169, 171, or 172 (or subsequent reblends) for every calibration sequence.      |
| FL             | Assign reference oils 160, 161, 169, 171, or 172 (or subsequent reblends) for every calibration sequence.      |
| NI             | Assign reference oils 161, 162, 168, 169, 170, or 172 (or subsequent reblends) for every calibration sequence. |

### 4. Control Charts

In Section 1, the construction of the control charts that constitute the Lubricant Test Monitoring System is outlined. The constants used for the construction of the control charts for the Oil Seal Compatibility Test, and the response necessary in the case of control chart limit alarms, are depicted below.

#### LUBRICANT TEST MONITORING SYSTEM CONSTANTS

|             |            | EWMA Chart |          |           |          | Shewhart Chart |          |
|-------------|------------|------------|----------|-----------|----------|----------------|----------|
|             |            | LAMBDA     |          | K         |          | K              |          |
| Chart Level | Limit Type | Precision  | Severity | Precision | Severity | Precision      | Severity |
| Stand       | Action     | --         | --       | --        | --       | --             | 2.20     |
| Lab         | Warning    | --         | --       | --        | --       | --             | --       |
|             | Action     | --         | --       | --        | --       | --             | --       |
| Industry    | Warning    | 0.15       | 0.15     | 2.24      | 2.49     | --             | --       |
|             | Action     | 0.15       | 0.15     | 2.88      | 3.03     | --             | --       |

The following are steps that must be taken in the case of exceeding control chart limits.

#### 49. D6795 Engine Oil Filterability Test (EOFT) LTMS Requirements

The following are the specific Engine Oil Filterability Test calibration test requirements.

##### A. Calibration Details

The Engine Oil Filterability Test is calibrated at the laboratory level. No individual instruments are identified in the test method.

##### B. Reference Oils and Critical Parameters

The critical parameter is the 20 – 25 mL Average Change in Flow Rate, reported in milliliters per second. The reference oils required for instrument calibration are the reference oils accepted by the ASTM EOFT Surveillance Panel. The mean, standard deviation, and acceptance band for the current reference oil for Average Change In Flow Rate are presented below.

20 – 25 mL AVERAGE CHANGE IN FLOW RATE (CIFA)  
Unit of Measure: mL/s

| Reference Oil | Mean  | Standard Deviation | Acceptance Band <sup>A</sup> |
|---------------|-------|--------------------|------------------------------|
| 79            | 36.58 | 4.56               | 27.64 – 45.51                |
| 88            | 8.250 | 5.059              | -1.66 – 18.16                |

<sup>A</sup>Test results are compared to the Acceptance Bands

##### C. Acceptance Criteria

###### 1. New Laboratory

- a) A minimum of two (2) operationally valid calibration tests which fall within the acceptance bands for the oils assigned are required to calibrate a laboratory for the first time. These must be simultaneous or consecutive runs, though exceptions can be made at the sole discretion of the TMC for operational fails for reasons that would be considered to have had no bearing on the operational performance of the laboratory for subsequent tests.
- b) Passing two back-to-back consecutive TMC calibrations places the laboratory's EOFT process in TMC calibrated status. Both tests must pass on operational and statistical criteria.
- c) TMC calibrated status of a laboratory's EOFT process is valid for no more than 30 days from the completion date of a valid TMC calibration. To renew the calibration at the end of the calibration period, see Section 2 (Existing Laboratory).

###### 2. Existing Laboratory

- e) An existing TMC calibrated laboratory, or one where the TMC calibration status had expired within the past 30 days, can renew its TMC calibrated status by demonstrating a successful calibration on another single TMC calibration audit. The test must pass on both operational and statistical criteria.

- f) TMC calibrated status of an existing laboratory is valid for no more than 30 days from date completed of a valid TMC calibration. Laboratories that exceed the 30-day grace period are considered to be Out of Calibration for TMC monitoring purposes.
- g) A laboratory that has been Out of Calibration for more than 30 days from the prior TMC calibration expiration date will require New Laboratory calibration as listed in C.1.a through C.1.c. of this document.
- h) A laboratory must pass the TMC calibration within two operationally valid test runs. If a laboratory cannot produce a calibration test that falls into the acceptance bands for the assigned oil within two operationally valid runs, renewing calibration will require the two-test calibration as listed in C.1.a through C.1.c.

## 5. Calibration Status Tracking and Reporting Lab ID's

Calibration status will be tracked using a laboratory's two letter Lab ID, Date Completed and the results of calibration test assignments.

## 6. Reference Oil Assignment

Once a laboratory has been accepted into the system, the TMC will assign reference oils 79 and 88, or subsequent approved reblends, for continuing calibration.

## 5. Control Charts

In Section 1, the construction of the control charts that constitute the Lubricant Test Monitoring System is outlined. The constants used for the construction of the control charts for the Engine Oil Filterability Test, and the response necessary in the case of control chart limit alarms, are depicted below. The Shewhart Chart is used to initially determine the Acceptance Band on a new reference oil, prior to rounding those results to establish the official Acceptance Band for that reference oil.

LUBRICANT TEST MONITORING SYSTEM CONSTANTS

|             |            | EWMA Chart |          |           |          | Shewhart Chart |          |
|-------------|------------|------------|----------|-----------|----------|----------------|----------|
|             |            | LAMBDA     |          | K         |          | K              |          |
| Chart Level | Limit Type | Precision  | Severity | Precision | Severity | Precision      | Severity |
| Stand       | Action     | --         | --       | --        | --       | --             | 1.96     |

The following are steps that must be taken in the case of a result outside the Acceptance Band.

- Result outside the Acceptance Band (all parameters)
  - Conduct an additional calibration test(s) as needed to meet the calibration requirements as described in Sections C.1 and C.2..

| Oil Seal Compatibility Test Reference Oil Targets |     |                 |                   |                 |            |                    |                |                   |               |                     |
|---------------------------------------------------|-----|-----------------|-------------------|-----------------|------------|--------------------|----------------|-------------------|---------------|---------------------|
| Oil                                               | n   | Elastomer       | Effective Dates   |                 | Elongation |                    | Shore Hardness |                   | Volume Change |                     |
|                                                   |     |                 | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$  | s                  | $\bar{X}$      | s                 | $\bar{X}$     | s                   |
| 160 <sup>3</sup>                                  | --  | Polyacrylate    | 11-18-94          | ***             | 23.04      | 14.289             | -1.8           | 1.16              | 0.343         | 0.4473              |
|                                                   | --  | Fluoroelastomer | 11-18-94          | ***             | -47.65     | 5.506              | 1.6            | 1.36              | 2.053         | 0.4075              |
| 160-1                                             | 144 | Polyacrylate    | 11-18-94          | ***             | 23.04      | 14.289             | -1.8           | 1.16              | 0.343         | 0.4473              |
|                                                   | 141 | Fluoroelastomer | 11-18-94          | ***             | -47.65     | 5.506              | 1.6            | 1.36              | 2.053         | 0.4075              |
| 161 <sup>4</sup>                                  | --  | Polyacrylate    | 11-18-94          | ***             | 68.88      | 17.850             | -24.9          | 2.83              | 19.624        | 1.4348              |
|                                                   | --  | Fluoroelastomer | 11-18-94          | ***             | -34.57     | 6.989              | 1.6            | 1.30              | 6.199         | 0.7080              |
|                                                   | --  | Nitrile         | 11-18-94          | ***             | 10.43      | 10.691             | -16.1          | 2.18              | 18.444        | 1.7057              |
| 161-1                                             | 144 | Polyacrylate    | 11-18-94          | ***             | 68.88      | 17.850             | -24.9          | 2.83              | 19.624        | 1.4348              |
|                                                   | 141 | Fluoroelastomer | 11-18-94          | ***             | -34.57     | 6.989              | 1.6            | 1.30              | 6.199         | 0.7080              |
|                                                   | 119 | Nitrile         | 11-18-94          | ***             | 10.43      | 10.691             | -16.1          | 2.18              | 18.444        | 1.7057              |
| 162                                               | 119 | Nitrile         | 11-18-94          | ***             | -65.35     | 7.330              | 2.0            | 2.03              | 2.460         | 1.5821              |
| 168                                               | 13  | Nitrile         | 7-7-06            | 2-28-09         | -74.22     | 2.422              | 3.0            | 1.49              | 1.424         | 0.1295              |
|                                                   | 38  | Nitrile         | 3-1-09            | 3-10-09         | -74.52     | 1.599              | 3.0            | 0.79              | 1.326         | 0.1388              |
|                                                   | 38  | Nitrile         | 3-11-09           | ***             | -74.52     | 6.965 <sup>5</sup> | 3.0            | 1.89 <sup>5</sup> | 1.326         | 1.4730 <sup>5</sup> |
| 169                                               | 19  | Polyacrylate    | 3-7-12            | ***             | 49.2       | 21.82              | -16.0          | 2.83 <sup>6</sup> | 13.1          | 1.430 <sup>6</sup>  |
|                                                   | 18  | Fluoroelastomer | 3-7-12            | ***             | -39.5      | 6.99 <sup>6</sup>  | 0.1            | 1.30 <sup>6</sup> | 4.4           | 0.71 <sup>6</sup>   |
|                                                   | 22  | Nitrile         | 3-7-12            | ***             | -16.2      | 10.69 <sup>6</sup> | -8.6           | 2.18 <sup>6</sup> | 11.8          | 1.710 <sup>6</sup>  |
| 170                                               | 12  | Nitrile         | 1-24-16           | 8-20-18         | -72.75     | 3.416              | 1.500          | 0.674             | 2.275         | 0.449               |
|                                                   | 32  | Nitrile         | 8-21-18           | 9-9-24          | -70.68     | 3.007              | 2.325          | 0.341             | 1.500         | 0.718               |
|                                                   | 32  | Nitrile         | 9-10-24           | ***             | -70.68     | 3.007              | 1.500          | 0.718             | 2.325         | 0.341               |

| Oil Seal Compatibility Test Reference Oil Targets (cont.) |    |                 |                   |                 |            |        |                |       |               |       |
|-----------------------------------------------------------|----|-----------------|-------------------|-----------------|------------|--------|----------------|-------|---------------|-------|
| Oil                                                       | n  | Elastomer       | Effective Dates   |                 | Elongation |        | Shore Hardness |       | Volume Change |       |
|                                                           |    |                 | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$  | s      | $\bar{X}$      | s     | $\bar{X}$     | s     |
| 170-1                                                     | 8  | Nitrile         | 8-26-26           | ***             | -44.0      | 4.027  | -0.508         | 1.848 | 2.591         | 0.271 |
| 171                                                       | 3  | Polyacrylate    | 8-21-18           | 5-26-20         | 24.167     | 20.929 | 0.333          | 0.577 | -0.233        | 0.306 |
| 171                                                       | 3  | Fluoroelastomer | 8-21-18           | 5-26-20         | -42.6      | 4.2    | -0.667         | 0.577 | 1.467         | 0.306 |
| 171                                                       | 40 | Polyacrylate    | 5-27-20           | ***             | 25.090     | 11.415 | 0.223          | 1.858 | -0.088        | 1.096 |
| 171                                                       | 39 | Fluoroelastomer | 5-27-20           | ***             | -47.949    | 5.947  | 0.987          | 1.664 | 2.167         | 1.201 |
| 171-1                                                     | 40 | Polyacrylate    | 9-10-25           | ***             | 25.090     | 11.415 | 0.223          | 1.858 | -0.088        | 1.096 |
| 171-1                                                     | 39 | Fluoroelastomer | 9-10-25           | ***             | -47.949    | 5.947  | 0.987          | 1.664 | 2.167         | 1.201 |
| 172                                                       | 8  | Nitrile         | 8-26-26           | ***             | -17.4      | 8.34   | -5.6           | 0.61  | 7.6           | 0.62  |
| 172                                                       | 8  | Fluoroelastomer | 8-26-26           | ***             | -40.3      | 10.44  | -2.3           | 0.99  | 4.6           | 0.50  |
| 172                                                       | 10 | Polyacrylate    | 8-26-26           | ***             | 26.1       | 12.10  | -8.5           | 0.76  | 7.9           | 1.20  |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

3 Targets based on oil 160-1.

4 Targets based on oil 161-1.

5 Standard deviation based on oil 162 (n=138).

6 Standard deviation based on oil 161-1.

| D5133 (GI) Test Reference Oil Targets |    |                   |                 |                |       |
|---------------------------------------|----|-------------------|-----------------|----------------|-------|
| Oil                                   | n  | Effective Dates   |                 | Gelation Index |       |
|                                       |    | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$      | s     |
| 1009                                  | 16 | 20030715          | ***             | 7.3            | 0.68  |
| 51                                    | 10 | 19960401          | 19961231        | 65.4           | 12.6  |
| 51                                    | 35 | 19970101          | 20010702        | 63.3           | 12.01 |
| 52                                    | 11 | 19960401          | 19961231        | 4.4            | 0.20  |
| 52                                    | 35 | 19970101          | 20030714        | 4.5            | 0.24  |
| 53                                    | 11 | 19960401          | 19961231        | 45.3           | 3.70  |
| 53                                    | 37 | 19970101          | 20030714        | 44.7           | 4.64  |
| 55                                    | 10 | 19960401          | 19961231        | 22.6           | 5.10  |
| 55                                    | 36 | 19970101          | 20010702        | 22.3           | 4.84  |
| 58                                    | 17 | 20011024          | 20200930        | 5.8            | 0.69  |
| 58 <sup>3</sup>                       | 17 | 20201001          | ***             | <6.0           | N/A   |
| 62                                    | 10 | 19960401          | 19961231        | 15.7           | 4.70  |
| 62                                    | 35 | 19970101          | 20231108        | 17.0           | 3.90  |
| GIA17                                 | 18 | 20190409          | ***             | 19.0           | 1.87  |
| GIC18                                 | 13 | 20221027          | 20240521        | 10.3           | 1.21  |
| GIC18                                 | 76 | 20240522          | ***             | 11.0           | 1.69  |

<sup>1</sup> Effective for all tests completed on or after this date.

<sup>2</sup> \*\*\* = currently in effect.

<sup>3</sup> Discrimination Oil

| D5800 Volatility by Noack Test Reference Oil Targets |    |                   |                 |                         |                   |
|------------------------------------------------------|----|-------------------|-----------------|-------------------------|-------------------|
| Oil                                                  | n  | Effective Dates   |                 | Sample Evaporation Loss |                   |
|                                                      |    | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$               | s                 |
| 51                                                   | NA | ***               | 20000925        | 18.13                   | 0.42              |
| 52                                                   | NA | ***               | 20000925        | 13.39                   | 0.40              |
|                                                      | 59 | 20000926          | 20030720        | 13.61                   | 0.49              |
|                                                      | 33 | 20030721          | 20131011        | 13.75                   | 0.61              |
| 53                                                   | NA | ***               | 20000925        | 22.30                   | 0.55              |
| 54                                                   | NA | ***               | 20000925        | 23.54                   | 0.67              |
| 55                                                   | NA | ***               | 20000925        | 16.21                   | 0.48              |
|                                                      | 60 | 20000926          | 20030720        | 16.39                   | 0.66              |
|                                                      | 32 | 20030721          | 20131011        | 17.09                   | 0.76              |
| 58                                                   | 59 | 20000926          | 20030720        | 14.46                   | 0.52              |
|                                                      | 37 | 20030721          | 20131011        | 15.20                   | 0.72              |
| VOLC12                                               | 24 | 20130918          | 20191104        | 14.19                   | 0.73 <sup>3</sup> |
| VOLD12                                               | 27 | 20130918          | 20191104        | 12.52                   | 0.73 <sup>3</sup> |
| VOLE12                                               | 27 | 20130918          | 20191104        | 16.74                   | 0.73 <sup>3</sup> |
| VOLC12                                               | 24 | 20191105          | ***             | 2.6523 <sup>4</sup>     | 0.0465            |
| VOLD12                                               | 27 | 20191105          | ***             | 2.5264 <sup>4</sup>     | 0.0465            |
| VOLE12                                               | 27 | 20191105          | ***             | 2.8175 <sup>4</sup>     | 0.0465            |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

3 based on a pooled standard deviation of data from 2014-2016.

4 D5800 moved to EWMA calibration management with natural log transformation of Evaporative Loss Results.

| D6082 High Temperature Foam Test Reference Oil Targets |     |                   |                 |               |       |                |       |
|--------------------------------------------------------|-----|-------------------|-----------------|---------------|-------|----------------|-------|
| Oil                                                    | n   | Effective Dates   |                 | Foam Tendency |       | Foam Stability |       |
|                                                        |     | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s     | $\bar{X}$      | s     |
| 1002                                                   | 32  | 19000101          | 20020617        | 410.63        | 58.78 | 37.81          | 45.41 |
| 1007                                                   | 28  | 19981112          | 20060327        | 65.71         | 19.28 | 0              | 0     |
|                                                        | 28  | 20060328          | ***             | 66            | 19    | 0              | 0     |
| FOAMB18                                                | 18  | 20180807          | 20240602        | 54            | 9     | 0              | 0     |
| FOAMB18                                                | 131 | 20240603          | ***             | 48.8          | 7.4   | 0              | 0     |
| 66 <sup>3</sup>                                        |     | 20030721          | ***             | >100          |       | 0              |       |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

3 Discrimination oil

| D6335 (TEOST) Thermo-Oxidation Engine Oil Simulation Test<br>Reference Oil Targets |    |                   |                 |                |      |
|------------------------------------------------------------------------------------|----|-------------------|-----------------|----------------|------|
| Oil                                                                                | N  | Effective Dates   |                 | Total Deposits |      |
|                                                                                    |    | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$      | s    |
| 71                                                                                 | 27 | 19900101          | 20130414        | 51.79          | 4.79 |
| 71-1 <sup>3</sup>                                                                  |    | 20090113          | 20130414        | 51.79          | 4.79 |
| 72                                                                                 | 27 | 19000101          | 20130414        | 26.72          | 3.46 |
| 72-1 <sup>4</sup>                                                                  |    | 20090113          | 20130414        | 26.72          | 3.46 |
| 75                                                                                 | 14 | 20110108          | 20130414        | 55.16          | 5.68 |
| 75                                                                                 | 30 | 20130415          | 20210831        | 53.66          | 6.56 |
| 75-1                                                                               | 16 | 20190404          | 20211102        | 56.9           | 5.02 |
| 75-1                                                                               | 51 | 20211103          | ***             | 54.8           | 6.75 |
| 75-2 <sup>5</sup>                                                                  |    | 20240901          | ***             | 54.8           | 6.75 |
| 435-2                                                                              | 15 | 20110108          | 20130414        | 26.95          | 2.86 |
| 435-2                                                                              | 30 | 20130415          | ***             | 28.71          | 4.76 |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

3 Targets carried over from oil 71

4 Targets carried over from oil 72

5 Targets carried over from oil 75

| D6417 Volatility by Gas Chromatography Test Reference Oil Targets |    |                   |                 |                  |      |
|-------------------------------------------------------------------|----|-------------------|-----------------|------------------|------|
| Oil                                                               | n  | Effective Dates   |                 | Area % Volatized |      |
|                                                                   |    | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$        | s    |
| 52                                                                | 18 | 20001002          | ***             | 6.97             | 0.31 |
| 55                                                                | 18 | 20001002          | ***             | 11.68            | 0.51 |
| 58                                                                | 18 | 20001002          | ***             | 5.61             | 0.3  |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7097 (MTEOS) Moderately High Temperature Piston Deposits by Thermo- Oxidation Engine Oil Simulation Test Reference Oil Targets |    |                   |                 |                |      |
|---------------------------------------------------------------------------------------------------------------------------------|----|-------------------|-----------------|----------------|------|
| Oil                                                                                                                             | n  | Effective Dates   |                 | Total Deposits |      |
|                                                                                                                                 |    | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$      | s    |
| 74                                                                                                                              | 7  | 20000801          | 20010531        | 15.6           | 5.5  |
|                                                                                                                                 | 20 | 20010601          | 20031031        | 16.84          | 5.28 |
|                                                                                                                                 | 14 | 20031101          | 20050629        | 13.59          | 3.97 |
|                                                                                                                                 | 17 | 20050630          | 20060730        | 12.74          | 4.6  |
|                                                                                                                                 | 30 | 20060731          | 20130204        | 12.85          | 5.59 |
| 432                                                                                                                             | 7  | 20000801          | 20010531        | 50.51          | 5.5  |
|                                                                                                                                 | 18 | 20010601          | 20031031        | 50.13          | 4.88 |
|                                                                                                                                 | 8  | 20040218          | 20050629        | 45.18          | 2.73 |
|                                                                                                                                 | 14 | 20050630          | 20060730        | 47.99          | 3.67 |
|                                                                                                                                 | 30 | 20060731          | 20090125        | 47.04          | 4.5  |
|                                                                                                                                 | 30 | 20090126          | 20090412        | 47.04          | 4.5  |
|                                                                                                                                 | 30 | 20090413          | ***             | 47.04          | 4.5  |
| 433                                                                                                                             | 7  | 20000801          | 20010531        | 52.56          | 5.5  |
|                                                                                                                                 | 18 | 20010601          | 20031031        | 50.28          | 5.26 |
|                                                                                                                                 | 14 | 20031101          | 20050111        | 42.1           | 5.34 |
| 434                                                                                                                             | 8  | 20050112          | 20050629        | 30.51          | 2.89 |
|                                                                                                                                 | 11 | 20050630          | 20060730        | 27.68          | 5.57 |
|                                                                                                                                 | 30 | 20060731          | ***             | 27.37          | 6.57 |
| 434-3                                                                                                                           | 8  | 20191127          | ***             | 28.39          | 6.46 |
| 1006                                                                                                                            | 7  | 20000801          | 20010531        | 34.94          | 5.5  |
|                                                                                                                                 | 24 | 20010601          | 20031031        | 34.53          | 5.93 |
|                                                                                                                                 | 14 | 20031101          | 20050111        | 42.43          | 6.1  |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7528 ROBO Test Reference Oil Targets |    |                   |                 |             |         |
|---------------------------------------|----|-------------------|-----------------|-------------|---------|
| Oil                                   | N  | Effective Dates   |                 | LN(EOT MRV) |         |
|                                       |    | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$   | s       |
| 434-1                                 | 13 | 20080801          | 20200901        | 10.6599     | 0.1672  |
| 434-2                                 | 5  | 20170713          | 20180727        | 10.941      | 0.1672  |
|                                       | 36 | 20180728          | ***             | 10.9284     | 0.1551  |
| 434-3                                 | 13 | 20191101          | 20211031        | 10.8411     | 0.1342  |
|                                       | 22 | 20210201          | ***             | 10.8172     | 0.1389  |
| 435                                   | 15 | 20080801          | 20110928        | 11.4895     | 0.2932  |
| 435-1                                 | 22 | 20100408          | ***             | 11.0416     | 0.20295 |
| 436                                   | 17 | 20210429          | 20211020        | 10.3437     | 0.1605  |
|                                       | 36 | 20211021          | ***             | 10.3319     | 0.1290  |
| 438                                   | 14 | 20080801          | 20210930        | 10.2676     | 0.2037  |
| 438-2                                 | 10 | 20190221          | 20191031        | 10.4421     | 0.2322  |
|                                       | 19 | 20191101          | 20210930        | 10.5404     | 0.2596  |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D874 Test Reference Oil Targets |    |                   |                 |                      |       |
|---------------------------------|----|-------------------|-----------------|----------------------|-------|
| Oil                             | n  | Effective Dates   |                 | Sulfated Ash, mass % |       |
|                                 |    | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$            | s     |
| 90                              | 27 | 20070206          | ***             | 1.07                 | 0.080 |
| 91                              | 27 | 20070726          | ***             | 0.82                 | 0.050 |
| 92                              | 20 | 20250514          | ***             | 1.02                 | 0.053 |
| 830-2                           | 27 | 20070726          | ***             | 1.57                 | 0.080 |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D6794 Engine Oil Water Tolerance Test (EOWT) Reference Oil Targets |    |                   |                 |                                   |       |               |
|--------------------------------------------------------------------|----|-------------------|-----------------|-----------------------------------|-------|---------------|
| Oil                                                                | n  | Effective Dates   |                 | Average Change in Flow Rate, mL/s |       | Water, mass % |
|                                                                    |    | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$                         | s     |               |
| 77                                                                 | 12 | 20000501          | ***             | -24.90                            | 5.680 | 0.6           |
|                                                                    | 12 | 20000501          | ***             | -17.94                            | 5.450 | 1.0           |
|                                                                    | 12 | 20000501          | ***             | -17.96                            | 8.477 | 2.0           |
|                                                                    | 12 | 20000501          | ***             | -18.23                            | 6.830 | 3.0           |
| 77-1                                                               | -- | 20000501          | 20081214        | -24.90                            | 5.680 | 0.6           |
|                                                                    | -- | 20000501          | 20081214        | -17.94                            | 5.450 | 1.0           |
|                                                                    | -- | 20000501          | 20081214        | -17.96                            | 8.477 | 2.0           |
|                                                                    | -- | 20000501          | 20081214        | -18.23                            | 6.830 | 3.0           |
|                                                                    | 60 | 20081215          | ***             | -19.70                            | 3.680 | 0.6           |
|                                                                    | 63 | 20081215          | ***             | -13.46                            | 4.220 | 1.0           |
|                                                                    | 62 | 20081215          | ***             | -14.67                            | 4.060 | 2.0           |
|                                                                    | 59 | 20081215          | ***             | -14.74                            | 4.340 | 3.0           |
| 77-2                                                               | 9  | 20121119          | 20130626        | -12.38                            | 3.530 | 0.6           |
|                                                                    | 9  | 20121119          | 20130626        | -10.77                            | 3.970 | 1.0           |
|                                                                    | 9  | 20121119          | 20130626        | -12.49                            | 4.350 | 2.0           |
|                                                                    | 9  | 20121119          | 20130626        | -13.80                            | 3.220 | 3.0           |
|                                                                    | 47 | 20130627          | ***             | -11.91                            | 3.300 | 0.6           |
|                                                                    | 47 | 20130627          | ***             | -11.00                            | 3.390 | 1.0           |
|                                                                    | 47 | 20130627          | ***             | -12.11                            | 3.470 | 2.0           |
|                                                                    | 47 | 20130627          | ***             | -14.43                            | 3.450 | 3.0           |
| 77-3                                                               | 11 | 20160801          | 20170319        | -9.75                             | 3.380 | 0.6           |
|                                                                    | 11 | 20160801          | 20170319        | -7.97                             | 3.340 | 1.0           |
|                                                                    | 11 | 20160801          | 20170319        | -10.22                            | 2.850 | 2.0           |
|                                                                    | 11 | 20160801          | 20170319        | -10.29                            | 2.390 | 3.0           |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D6794 Engine Oil Water Tolerance Test (EOWT) Reference Oil Targets |     |                   |                 |                                   |       |               |
|--------------------------------------------------------------------|-----|-------------------|-----------------|-----------------------------------|-------|---------------|
| Oil                                                                | n   | Effective Dates   |                 | Average Change in Flow Rate, mL/s |       | Water, mass % |
|                                                                    |     | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$                         | s     |               |
| 77-3                                                               | 32  | 20170320          | 20170831        | -10.08                            | 3.28  | 0.6           |
|                                                                    | 32  | 20170320          | 20170831        | -8.64                             | 2.69  | 1.0           |
|                                                                    | 31  | 20170320          | 20170831        | -9.79                             | 2.82  | 2.0           |
|                                                                    | 31  | 20170320          | 20170831        | -10.91                            | 2.79  | 3.0           |
|                                                                    | 140 | 20170901          | ***             | -10.23                            | 2.78  | 0.6           |
|                                                                    | 140 | 20170901          | ***             | -7.82                             | 2.34  | 1.0           |
|                                                                    | 140 | 20170901          | ***             | -8.80                             | 2.47  | 2.0           |
|                                                                    | 140 | 20170901          | ***             | -10.15                            | 2.21  | 3.0           |
| 78                                                                 | 12  | 20000501          | ***             | 10.870                            | 6.160 | 0.6           |
|                                                                    | 12  | 20000501          | ***             | 7.540                             | 6.150 | 1.0           |
|                                                                    | 12  | 20000501          | ***             | 5.170                             | 5.330 | 2.0           |
|                                                                    | 12  | 20000501          | ***             | -0.540                            | 4.520 | 3.0           |
| 78-1                                                               | 14  | 20060404          | 20060723        | 30.25                             | 4.330 | 0.6           |
|                                                                    | 13  | 20060404          | 20060723        | 24.63                             | 7.040 | 1.0           |
|                                                                    | 14  | 20060404          | 20060723        | 24.89                             | 4.770 | 2.0           |
|                                                                    | 14  | 20060404          | 20060723        | 22.97                             | 5.250 | 3.0           |
|                                                                    | 31  | 20060724          | ***             | 31.95                             | 5.480 | 0.6           |
|                                                                    | 34  | 20060724          | ***             | 29.56                             | 6.470 | 1.0           |
|                                                                    | 32  | 20060724          | ***             | 26.81                             | 4.890 | 2.0           |
|                                                                    | 31  | 20060724          | ***             | 25.03                             | 4.910 | 3.0           |
| 78-2                                                               | 9   | 20110606          | 20111211        | 29.06                             | 8.640 | 0.6           |
|                                                                    | 9   | 20110606          | 20111211        | 27.18                             | 7.690 | 1.0           |
|                                                                    | 9   | 20110606          | 20111211        | 22.62                             | 7.640 | 2.0           |
|                                                                    | 9   | 20110606          | 20111211        | 19.31                             | 7.540 | 3.0           |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D6794 Engine Oil Water Tolerance Test (EOWT) Reference Oil Targets |     |                   |                 |                                   |       |               |
|--------------------------------------------------------------------|-----|-------------------|-----------------|-----------------------------------|-------|---------------|
| Oil                                                                | n   | Effective Dates   |                 | Average Change in Flow Rate, mL/s |       | Water, mass % |
|                                                                    |     | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$                         | s     |               |
| 78-2                                                               | 72  | 20111212          | ***             | 27.57                             | 5.67  | 0.6           |
|                                                                    | 74  | 20111212          | ***             | 24.70                             | 5.49  | 1.0           |
|                                                                    | 77  | 20111212          | ***             | 21.15                             | 6.16  | 2.0           |
|                                                                    | 75  | 20111212          | ***             | 17.72                             | 6.04  | 3.0           |
| 79                                                                 | 9   | 20150112          | 20150222        | 14.05                             | 2.000 | 0.6           |
|                                                                    | 9   | 20150112          | 20150222        | 12.15                             | 3.020 | 1.0           |
|                                                                    | 9   | 20150112          | 20150222        | 7.97                              | 4.780 | 2.0           |
|                                                                    | 9   | 20150112          | 20150222        | 6.14                              | 2.440 | 3.0           |
|                                                                    | 21  | 20150223          | 20150730        | 16.67                             | 6.950 | 0.6           |
|                                                                    | 20  | 20150223          | 20150730        | 14.09                             | 6.380 | 1.0           |
|                                                                    | 21  | 20150223          | 20150730        | 11.19                             | 8.590 | 2.0           |
|                                                                    | 21  | 20150223          | 20150730        | 9.40                              | 7.790 | 3.0           |
|                                                                    | 104 | 20150731          | ***             | 15.64                             | 4.980 | 0.6           |
|                                                                    | 104 | 20150731          | ***             | 13.74                             | 4.840 | 1.0           |
|                                                                    | 105 | 20150731          | ***             | 10.16                             | 5.810 | 2.0           |
|                                                                    | 103 | 20150731          | ***             | 7.83                              | 5.450 | 3.0           |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D6795 Engine Oil Filtration Test (EOFT) Reference Oil Targets |    |                   |                 |                                   |       |
|---------------------------------------------------------------|----|-------------------|-----------------|-----------------------------------|-------|
| Oil                                                           | n  | Effective Dates   |                 | Average Change in Flow Rate, mL/s |       |
|                                                               |    | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$                         | s     |
| 77                                                            | 12 | 20000501          | ***             | -45.55                            | 4.36  |
| 78                                                            | 12 | 20000501          | ***             | 15.74                             | 6.87  |
| 78-1                                                          | 6  | 20060410          | 20060723        | 56.37                             | 9.18  |
| 78-1                                                          | 18 | 20060724          | ***             | 53.42                             | 7.96  |
| 78-2                                                          | 9  | 20110609          | 20111211        | 44.26                             | 7.13  |
| 78-2                                                          | 68 | 20111212          | ***             | 44.52                             | 5.22  |
| 79                                                            | 8  | 20150112          | 20150315        | 34.14                             | 3.20  |
| 79                                                            | 21 | 20150316          | 20150730        | 36.11                             | 5.17  |
| 79                                                            | 70 | 20150731          | ***             | 36.58                             | 4.56  |
| 88                                                            | 19 | 20260821          | ***             | 8.250                             | 5.059 |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D6557 Ball Rust Test (BRT) Reference Oil Targets |    |                   |                 |                      |      |
|--------------------------------------------------|----|-------------------|-----------------|----------------------|------|
| Oil                                              | n  | Effective Dates   |                 | Avg Gray Value (AGV) |      |
|                                                  |    | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$            | s    |
| 1006                                             | 12 | 20000801          | ***             | 128                  | 7.21 |
| 82                                               | 12 | 20030915          | 20190905        | 47.5                 | 11.5 |
| 82-1                                             | 25 | 20160515          | ***             | 49.2                 | 16.4 |
| 86                                               | 12 | 20180801          | 20190131        | 116.2                | 13.7 |
|                                                  | 30 | 20190201          | 20190629        | 120.0                | 11.8 |
|                                                  | 65 | 20190630          | ***             | 119.6                | 10.3 |
| 87                                               | 12 | 20180801          | 20181226        | 119.5                | 10.8 |
|                                                  | 30 | 20181227          | 20190614        | 121.8                | 9.1  |
|                                                  | 56 | 20190615          | ***             | 121.8                | 8.5  |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D6594 High Temperature Corrosion Bench Test (HTCBT) Reference Oil Targets |     |                   |                 |                                 |        |                           |         |
|---------------------------------------------------------------------------|-----|-------------------|-----------------|---------------------------------|--------|---------------------------|---------|
| Oil                                                                       | n   | Effective Dates   |                 | LN(Copper Concentration Change) |        | Lead Concentration Change |         |
|                                                                           |     | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$                       | S      | $\bar{X}$                 | s       |
| 42                                                                        | 9   | 11980113          | 19990315        | 3.857                           | 0.2490 | 89.73                     | 19.71   |
|                                                                           | 55  | 19990316          | 20050309        | 3.2232                          | 0.5828 | 107.813                   | 23.7695 |
| 44                                                                        | 30  | 20060201          | 20081121        | 4.4803                          | 0.3426 | 54.1                      | 15.3    |
| 44-1                                                                      | 9   | 20090505          | 20091108        | 4.8820                          | 0.1061 | 41.3                      | 10.3    |
|                                                                           | 168 | 20091109          | 20120522        | 4.8349                          | 0.1351 | 46.3                      | 11.2    |
| 44-2                                                                      | 15  | 20100505          | 20141202        | 4.8808                          | 0.1349 | 43.9                      | 11.1    |
| 44-3                                                                      | 11  | 20130124          | 20130421        | 4.8052                          | 0.1447 | 43.8                      | 6.7     |
|                                                                           | 34  | 20130422          | 20190722        | 4.8107                          | 0.1038 | 40.3                      | 8.2     |
| 44-4                                                                      | 21  | 20170429          | 20170429        | 4.9778                          | 0.0939 | 34.7                      | 11.6    |
|                                                                           | 177 | 20170430          | 20190630        | 4.9961                          | 0.1069 | 31.5                      | 9.0     |
|                                                                           | 177 | 20190701          | ***             | 4.9961                          | 0.1069 | 31.5                      | 9.0     |
| 44-5                                                                      | 16  | 20230303          | 20231102        | 4.7446                          | 0.2071 | 33.0                      | 6.3666  |
|                                                                           | 49  | 20231103          | ***             | 4.8268                          | 0.3608 | 32.76                     | 7.6520  |
| 1005                                                                      | 8   | 19980113          | 19990315        | 2.0740                          | 0.2490 | 25.43                     | 6.0100  |
|                                                                           | 60  | 19990316          | 20100224        | 2.2554                          | 0.1409 | 32.2317                   | 13.0282 |
| 1005-1                                                                    | 8   | 20091221          | 20110920        | 2.5986                          | 0.1069 | 56.2                      | 6.8     |
| 1005-3                                                                    | 15  | 20100505          | 20181005        | 1.8469                          | 0.1794 | 18.3                      | 7.1     |
| 1005-5                                                                    | 12  | 20151104          | 20151220        | 1.8005                          | 0.1831 | 10.3                      | 5.8     |
|                                                                           | 30  | 20151221          | 20160619        | 1.8740                          | 0.2137 | 11.4                      | 9.1     |
|                                                                           | 138 | 20160620          | 20190630        | 1.8497                          | 0.3363 | 9.5                       | 7.5     |
|                                                                           | 138 | 20190701          | ***             | 1.8497                          | 0.3363 | 9.5                       | 7.5     |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7216 Engine Oil Elastomer Compatibility (EOEC) Test Reference Oil Targets |     |                   |                   |                 |               |      |                |      |                  |      |            |       |
|----------------------------------------------------------------------------|-----|-------------------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|-------|
| Oil                                                                        | n   | Elastomer         | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Elongation |       |
|                                                                            |     |                   | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    | $\bar{X}$  | s     |
| 1006-1                                                                     | --  | Fluoroelastomer   |                   | 20230118        | 0.61          | 0.15 | 7.30           | 2.20 | -69.28           | 5.35 | -58.69     | 8.99  |
| 1006-2                                                                     | --  | Fluoroelastomer   |                   | 20230118        | 0.61          | 0.15 | 7.30           | 2.20 | -69.28           | 5.35 | -58.69     | 8.99  |
| SL107                                                                      | 17  | Fluoroelastomer   | 20200108          | 20250929        | 0.44          | 0.15 | 8.04           | 2.20 | -71.32           | 5.35 | -58.48     | 8.99  |
| SL107                                                                      | 30  | Fluoroelastomer   | 20250930          | ***             | 0.53          | 0.21 | 6.72           | 1.09 | -69.52           | 3.91 | -64.89     | 5.05  |
| 1006-1                                                                     | --  | Nitrile           |                   | 20211013        | 0.72          | 0.84 | 1.67           | 1.77 | -27.47           | 7.33 | -50.86     | 6.72  |
| 1006-2                                                                     | --  | Nitrile           |                   | 20211013        | 0.72          | 0.84 | 1.67           | 1.77 | -27.47           | 7.33 | -50.86     | 6.72  |
| SL107                                                                      | 18  | Nitrile           | 20200108          | 20211013        | -0.08         | 0.84 | 1.83           | 1.77 | 2.80             | 7.33 | -33.69     | 6.72  |
| SL107                                                                      | 18  | Nitrile           | 20211014          | ***             | 1.74          | 0.84 | 1.83           | 1.77 | 2.80             | 7.33 | -33.69     | 6.72  |
| 1006-1                                                                     | --  | Polyacrylate      |                   | 20230118        | 0.84          | 0.76 | -1.51          | 1.80 | 0.84             | 8.04 | -18.07     | 8.94  |
| 1006-2                                                                     | --  | Polyacrylate      |                   | 20230118        | 0.84          | 0.76 | -1.51          | 1.80 | 0.84             | 8.04 | -18.07     | 8.94  |
| SL107                                                                      | 16  | Polyacrylate      | 20200108          | 20260506        | 0.20          | 0.76 | -0.01          | 1.80 | 0.36             | 8.04 | -22.58     | 8.94  |
| SL107                                                                      | 783 | Polyacrylate      | 20260507          | ***             | 1.62          | 0.46 | -0.01          | 1.80 | 0.36             | 8.04 | -22.58     | 8.94  |
| 1006-1                                                                     | --  | Ethylene Acrylate |                   | 20121010        | 17.82         | 2.34 | -8.09          | 0.95 | -23.55           | 6.76 | -27.12     | 12.28 |
| 1006-1                                                                     | --  | Ethylene Acrylate | 20121011          | 20230118        | 20.99         | 1.49 | -9.32          | 0.95 | -13.19           | 4.84 | -24.51     | 7.40  |
| 1006-2                                                                     | --  | Ethylene Acrylate |                   | 20121010        | 17.82         | 2.34 | -8.09          | 0.95 | -23.55           | 6.76 | -27.12     | 12.28 |
| 1006-2                                                                     | --  | Ethylene Acrylate | 20121011          | 20230118        | 20.99         | 1.49 | -9.32          | 0.95 | -13.19           | 4.84 | -24.51     | 7.40  |
| SL107                                                                      | 17  | Ethylene Acrylate | 20200108          | ***             | 18.54         | 1.49 | -7.48          | 0.95 | -15.33           | 4.84 | -34.96     | 7.40  |
| SL107                                                                      | 25  | HNBR              | 20241017          | ***             | 4.13          | 0.16 | -1.63          | 0.52 | 7.78             | 4.94 | 2.87       | 9.26  |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7216 Engine Oil Elastomer Compatibility (EOEC) Test Reference Oil Targets |   |           |                   |                 |               |      |                |      |                  |      |            |      |            |
|----------------------------------------------------------------------------|---|-----------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|------|------------|
| Oil                                                                        | n | Elastomer | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Elongation |      | Batch Code |
|                                                                            |   |           | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    | $\bar{X}$  | s    |            |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | 12         |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | 13         |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | 14         |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC13    |
| 1006-1                                                                     |   | Silicone  | 20140305          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ-12     |
| 1006-1                                                                     |   | Silicone  | 20140305          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ-13     |
| 1006-1                                                                     |   | Silicone  | 20140305          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ-14     |
| 1006-1                                                                     |   | Silicone  | 20140305          | 20230118        | 32.03         | 2.95 | -21.50         | 2.40 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-10    |
| 1006-1                                                                     |   | Silicone  | 20140305          | 20230118        | 32.03         | 2.95 | -21.50         | 2.40 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-11    |
| 1006-1                                                                     |   | Silicone  | 20140305          | 20230118        | 26.38         | 2.27 | -18.55         | 2.04 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ-11     |
| 1006-1                                                                     |   | Silicone  | 20140305          | 20230118        | 32.03         | 2.95 | -21.50         | 2.40 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-12    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | 11         |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | 10         |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | 9          |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BC1        |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BC2        |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BC3        |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BC4        |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BC5        |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BC-5       |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BC-6       |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BC-7       |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BC-8       |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BC 9       |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BC-9       |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BC-10      |

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2 \*\*\* = currently in effect.

| D7216 Engine Oil Elastomer Compatibility (EOEC) Test Reference Oil Targets |   |           |                   |                 |               |      |                |      |                  |      |            |      |            |
|----------------------------------------------------------------------------|---|-----------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|------|------------|
| Oil                                                                        | n | Elastomer | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Elongation |      | Batch Code |
|                                                                            |   |           | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    | $\bar{X}$  | s    |            |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BATCH 1    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BATCH 8    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BATCH 9    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC-4    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC-5    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC-6    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC-7    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC-8    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 32.03         | 2.95 | -21.50         | 2.40 | -32.86           | 3.70 | -23.82     | 6.25 | VMQBC-9    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 32.03         | 2.95 | -21.50         | 2.40 | -32.86           | 3.70 | -23.82     | 6.25 | VMQBC-1    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.04 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC5     |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 32.03         | 2.95 | -21.50         | 2.40 | -32.86           | 3.70 | -23.82     | 6.25 | VMQBC6     |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC7     |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC8     |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC9     |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC10    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC11    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC12    |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQC11     |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | BC-2       |
| 1006-1                                                                     |   | Silicone  |                   | 20140310        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC1     |
| 1006-1                                                                     |   | Silicone  | 20130821          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-13    |
| 1006-1                                                                     |   | Silicone  | 20140915          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-14    |
| 1006-1                                                                     |   | Silicone  | 20141201          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-15    |
| 1006-1                                                                     |   | Silicone  | 20140315          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-16    |
| 1006-1                                                                     |   | Silicone  | 20150701          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-17    |
| 1006-1                                                                     |   | Silicone  | 20151001          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-18    |

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2 \*\*\* = currently in effect.

| D7216 Engine Oil Elastomer Compatibility (EOEC) Test Reference Oil Targets |   |           |                   |                 |               |      |                |      |                  |      |            |      |            |
|----------------------------------------------------------------------------|---|-----------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|------|------------|
| Oil                                                                        | n | Elastomer | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Elongation |      | Batch Code |
|                                                                            |   |           | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    | $\bar{X}$  | s    |            |
| 1006-1                                                                     |   | Silicone  | 20160101          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-19    |
| 1006-1                                                                     |   | Silicone  | 20160301          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-20    |
| 1006-1                                                                     |   | Silicone  | 20160301          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-21    |
| 1006-1                                                                     |   | Silicone  | 20160601          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-22    |
| 1006-1                                                                     |   | Silicone  | 20160801          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-23    |
| 1006-1                                                                     |   | Silicone  | 20161201          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-24    |
| 1006-1                                                                     |   | Silicone  | 20161201          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-25    |
| 1006-1                                                                     |   | Silicone  | 20170101          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-26    |
| 1006-1                                                                     |   | Silicone  | 20170401          | 20230118        | 32.03         | 2.95 | -21.50         | 2.40 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-27    |
| 1006-1                                                                     |   | Silicone  | 20170601          | 20230118        | 32.03         | 2.95 | -21.50         | 2.40 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-28    |
| 1006-1                                                                     |   | Silicone  | 20170907          | 20230118        | 26.38         | 2.27 | -18.55         | 2.04 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-29    |
| 1006-1                                                                     |   | Silicone  | 20171201          | 20230118        | 32.03         | 2.95 | -21.50         | 2.40 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-30    |
| 1006-1                                                                     |   | Silicone  | 20180101          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-31    |
| 1006-1                                                                     |   | Silicone  | 20180801          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-33    |
| 1006-1                                                                     |   | Silicone  | 20181201          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-34    |
| 1006-1                                                                     |   | Silicone  | 20181201          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-35    |
| 1006-1                                                                     |   | Silicone  | 20200201          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-36    |
| 1006-1                                                                     |   | Silicone  | 20200201          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-37    |
| 1006-1                                                                     |   | Silicone  | 20200201          | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQ1-38    |
| 1006-2                                                                     |   | Silicone  |                   | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 |            |
| 1006-2                                                                     |   | Silicone  |                   | 20230118        | 26.38         | 2.27 | -18.55         | 2.40 | -13.60           | 4.27 | -23.25     | 6.95 | VMQBC5     |
| 1006-2                                                                     |   | Silicone  | 20160201          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-18    |
| 1006-2                                                                     |   | Silicone  | 20160301          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-19    |
| 1006-2                                                                     |   | Silicone  | 20160301          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-21    |
| 1006-2                                                                     |   | Silicone  | 20160601          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-22    |
| 1006-2                                                                     |   | Silicone  | 20160301          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-20    |
| 1006-2                                                                     |   | Silicone  | 20160801          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-23    |

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2 \*\*\* = currently in effect.

| D7216 Engine Oil Elastomer Compatibility (EOEC) Test Reference Oil Targets |    |           |                   |                 |               |      |                |      |                  |      |            |      |            |
|----------------------------------------------------------------------------|----|-----------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|------|------------|
| Oil                                                                        | n  | Elastomer | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Elongation |      | Batch Code |
|                                                                            |    |           | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    | $\bar{X}$  | s    |            |
| 1006-2                                                                     |    | Silicone  | 20161201          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-24    |
| 1006-2                                                                     |    | Silicone  | 20161201          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-25    |
| 1006-2                                                                     |    | Silicone  | 20170101          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-26    |
| 1006-2                                                                     |    | Silicone  | 20170401          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-27    |
| 1006-2                                                                     |    | Silicone  | 20170601          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-28    |
| 1006-2                                                                     |    | Silicone  | 20170907          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-29    |
| 1006-2                                                                     |    | Silicone  | 20171201          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-30    |
| 1006-2                                                                     |    | Silicone  | 20180101          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-31    |
| 1006-2                                                                     |    | Silicone  | 20180501          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-32    |
| 1006-2                                                                     |    | Silicone  | 20180601          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-33    |
| 1006-2                                                                     |    | Silicone  | 20181201          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-34    |
| 1006-2                                                                     |    | Silicone  | 20181201          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-35    |
| 1006-2                                                                     |    | Silicone  | 20200201          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-36    |
| 1006-2                                                                     |    | Silicone  | 20200201          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-37    |
| 1006-2                                                                     |    | Silicone  | 20200201          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-38    |
| 1006-2                                                                     |    | Silicone  | 20200201          | 20230118        | 32.03         | 2.95 | -21.50         | 2.04 | -32.86           | 3.70 | -23.82     | 6.25 | VMQ1-39    |
| SL107                                                                      | 15 | Silicone  | 20200108          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.70 | -24.81     | 6.25 | VMQ1-35    |
| SL107                                                                      | 15 | Silicone  | 20200108          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.70 | -24.81     | 6.25 | VMQ1-36    |
| SL107                                                                      | 15 | Silicone  | 20200108          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.70 | -24.81     | 6.25 | VMQ1-37    |
| SL107                                                                      | 15 | Silicone  | 20200108          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.70 | -24.81     | 6.25 | VMQ1-38    |
| SL107                                                                      | 15 | Silicone  | 20200108          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.70 | -24.81     | 6.25 | VMQ1-39    |
| SL107                                                                      | 15 | Silicone  | 20221101          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.70 | -24.81     | 6.25 | VMQ1-40    |
| SL107                                                                      | 15 | Silicone  | 20230607          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.70 | -24.81     | 6.25 | VMQ1-41    |
| SL107                                                                      | 15 | Silicone  | 20240327          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.70 | -24.81     | 6.25 | VMQ1-42    |
| SL107                                                                      | 15 | Silicone  | 20250520          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.70 | -24.81     | 6.25 | VMQ1-43    |
| SL107                                                                      | 15 | Silicone  | 20260122          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.70 | -24.81     | 6.25 | VMQ1-44    |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |    |                   |                   |                 |               |      |                |      |                  |      |            |
|----------------------------------------------------------------------------------------|----|-------------------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|
| Oil                                                                                    | n  | Elastomer         | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Batch Code |
|                                                                                        |    |                   | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    |            |
| 1006-1                                                                                 | 18 | Ethylene Acrylate | 20081202          | 20100714        | 25.05         | 0.49 | -13.13         | 0.72 | -15.74           | 2.69 | 1          |
| 1006-1                                                                                 | 42 | Ethylene Acrylate | 20100715          | 20230118        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | 1          |
| 1006-1                                                                                 | 18 | Ethylene Acrylate | 20081202          | 20100714        | 25.05         | 0.49 | -13.13         | 0.72 | -15.74           | 2.69 | 2          |
| 1006-1                                                                                 | 42 | Ethylene Acrylate | 20100715          | 20230118        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | 2          |
| 1006-1                                                                                 | 18 | Ethylene Acrylate | 20081202          | 20100714        | 25.05         | 0.49 | -13.13         | 0.72 | -15.74           | 2.69 | 3          |
| 1006-1                                                                                 | 42 | Ethylene Acrylate | 20100715          | 20230118        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | 3          |
| 1006-1                                                                                 | 18 | Ethylene Acrylate | 20081202          | 20100714        | 25.05         | 0.49 | -13.13         | 0.72 | -15.74           | 2.69 | 4          |
| 1006-1                                                                                 | 42 | Ethylene Acrylate | 20100715          | 20230118        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | 4          |
| 1006-1                                                                                 | 18 | Ethylene Acrylate | 20081202          | 20100714        | 25.05         | 0.49 | -13.13         | 0.72 | -15.74           | 2.69 | 5          |
| 1006-1                                                                                 | 42 | Ethylene Acrylate | 20100715          | 20230118        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | 5          |
| 1006-1                                                                                 | 42 | Ethylene Acrylate | 20100715          | 20230118        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | 6          |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20100715          | 20230118        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | 7          |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20120327          | 20140831        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | 8          |
| 1006-1                                                                                 | 10 | Ethylene Acrylate |                   | 20230118        | 25.5          | 0.88 | -14.3          | 0.67 | -17.59           | 1.22 | 8          |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20120327          | 20140831        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | 9          |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20130226          | 20140831        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | 10         |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20130900          | 20140831        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | 11         |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20130900          | 20140831        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | 12         |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20140901          | 20230118        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | AEM1-8     |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20140901          | 20230118        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | AEM1-9     |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20140901          | 20230118        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | AEM1-10    |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20140901          | 20230118        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | AEM1-11    |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20140901          | 20230118        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | AEM1-12    |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20141201          | 20150121        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | AEM1-13    |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20150122          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-13    |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20141201          | 20150121        | 24.85         | 0.77 | -12.43         | 0.91 | -15.3            | 3.87 | AEM1-14    |
| 1006-1                                                                                 |    | Ethylene Acrylate | 20150122          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-14    |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |   |                   |                   |                 |               |      |                |      |                  |      |            |
|----------------------------------------------------------------------------------------|---|-------------------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|
| Oil                                                                                    | n | Elastomer         | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Batch Code |
|                                                                                        |   |                   | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    |            |
| 1006-1                                                                                 | 0 | Ethylene Acrylate | 20150122          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-16    |
| 1006-1                                                                                 | 0 | Ethylene Acrylate | 20151201          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-17    |
| 1006-1                                                                                 | 0 | Ethylene Acrylate | 20160501          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-18    |
| 1006-1                                                                                 | 0 | Ethylene Acrylate | 20161101          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-19    |
| 1006-1                                                                                 | 0 | Ethylene Acrylate | 20170601          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-20    |
| 1006-1                                                                                 | 0 | Ethylene Acrylate | 20170801          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-21    |
| 1006-1                                                                                 | 0 | Ethylene Acrylate | 20180201          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-22    |
| 1006-1                                                                                 | 0 | Ethylene Acrylate | 20180701          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-23    |
| 1006-1                                                                                 | 0 | Ethylene Acrylate | 20180701          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-24    |
| 1006-1                                                                                 | 0 | Ethylene Acrylate | 20180701          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-25    |
| 1006-1                                                                                 | 0 | Ethylene Acrylate | 20180701          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-26    |
| 1006-2                                                                                 | 0 | Ethylene Acrylate | 20160201          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-16    |
| 1006-2                                                                                 | 0 | Ethylene Acrylate | 20160201          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-17    |
| 1006-2                                                                                 | 0 | Ethylene Acrylate | 20160501          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-18    |
| 1006-2                                                                                 | 0 | Ethylene Acrylate | 20161101          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-19    |
| 1006-2                                                                                 | 0 | Ethylene Acrylate | 20170601          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-20    |
| 1006-2                                                                                 | 0 | Ethylene Acrylate | 20170801          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-21    |
| 1006-2                                                                                 | 0 | Ethylene Acrylate | 20180201          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-22    |
| 1006-2                                                                                 | 0 | Ethylene Acrylate | 20180701          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-23    |
| 1006-2                                                                                 | 0 | Ethylene Acrylate | 20180701          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-24    |
| 1006-2                                                                                 | 0 | Ethylene Acrylate | 20180701          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-25    |
| 1006-2                                                                                 | 0 | Ethylene Acrylate | 20180701          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-26    |
| 1006-2                                                                                 | 0 | Ethylene Acrylate | 20180701          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-27    |
| 1006-2                                                                                 | 0 | Ethylene Acrylate | 20180701          | 20230118        | 26.29         | 0.77 | -14.4          | 0.91 | -15.3            | 3.87 | AEM1-28    |

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2 \*\*\* = currently in effect.

| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |    |                   |                   |                 |               |      |                |      |                  |      |            |
|----------------------------------------------------------------------------------------|----|-------------------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|
| Oil                                                                                    | n  | Elastomer         | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Batch Code |
|                                                                                        |    |                   | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    |            |
| SL107                                                                                  | 16 | Ethylene Acrylate | 20200108          | ***             | 24.2          | 0.77 | -12.73         | 0.91 | -16.84           | 3.87 | AEM1-25    |
| SL107                                                                                  | 16 | Ethylene Acrylate | 20200108          | ***             | 24.2          | 0.77 | -12.73         | 0.91 | -16.84           | 3.87 | AEM1-26    |
| SL107                                                                                  | 16 | Ethylene Acrylate | 20200108          | ***             | 24.2          | 0.77 | -12.73         | 0.91 | -16.84           | 3.87 | AEM1-27    |
| SL107                                                                                  | 16 | Ethylene Acrylate | 20200108          | ***             | 24.2          | 0.77 | -12.73         | 0.91 | -16.84           | 3.87 | AEM1-28    |
| SL107                                                                                  | 16 | Ethylene Acrylate | 20200108          | ***             | 24.2          | 0.77 | -12.73         | 0.91 | -16.84           | 3.87 | AEM1-29    |
| SL107                                                                                  | 16 | Ethylene Acrylate | 20200108          | ***             | 24.2          | 0.77 | -12.73         | 0.91 | -16.84           | 3.87 | AEM1-30    |
| SL107                                                                                  | 16 | Ethylene Acrylate | 20200108          | ***             | 24.2          | 0.77 | -12.73         | 0.91 | -16.84           | 3.87 | AEM1-31    |
| SL107                                                                                  | 16 | Ethylene Acrylate | 20240805          | ***             | 24.2          | 0.77 | -12.73         | 0.91 | -16.84           | 3.87 | AEM1-32    |
| SL107                                                                                  | 16 | Ethylene Acrylate | 20250611          | ***             | 24.2          | 0.77 | -12.73         | 0.91 | -16.84           | 3.87 | AEM1-33    |
| SL107                                                                                  | 16 | Ethylene Acrylate | 20260501          | ***             | 24.2          | 0.77 | -12.73         | 0.91 | -16.84           | 3.87 | AEM1-34    |
| 1006-1                                                                                 | 18 | Silicone          | 20081202          | 20100714        | 32.69         | 2.67 | -20.77         | 2.52 | -40.18           | 3.02 | 1          |
| 1006-1                                                                                 | 39 | Silicone          | 20100715          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | 1          |
| 1006-1                                                                                 | 18 | Silicone          | 20081202          | 20100714        | 32.69         | 2.67 | -20.77         | 2.52 | -40.18           | 3.02 | 2          |
| 1006-1                                                                                 | 39 | Silicone          | 20100715          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | 2          |
| 1006-1                                                                                 | 18 | Silicone          | 20081202          | 20100714        | 32.69         | 2.67 | -20.77         | 2.52 | -40.18           | 3.02 | 3          |
| 1006-1                                                                                 | 39 | Silicone          | 20100715          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | 3          |
| 1006-1                                                                                 | 18 | Silicone          | 20081202          | 20100714        | 32.69         | 2.67 | -20.77         | 2.52 | -40.18           | 3.02 | 4          |
| 1006-1                                                                                 | 39 | Silicone          | 20100715          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | 4          |
| 1006-1                                                                                 | 18 | Silicone          | 20081202          | 20100714        | 32.69         | 2.67 | -20.77         | 2.52 | -40.18           | 3.02 | 5          |
| 1006-1                                                                                 | 39 | Silicone          | 20100715          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | 5          |
| 1006-1                                                                                 | 39 | Silicone          | 20100715          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | 6          |
| 1006-1                                                                                 |    | Silicone          | 20100715          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | 7          |
| 1006-1                                                                                 |    | Silicone          | 20120315          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | 8          |
| 1006-1                                                                                 | 10 | Silicone          |                   | 20230118        | 33.16         | 1.15 | -21            | 2.36 | -32.5            | 3.33 | 8          |
| 1006-1                                                                                 |    | Silicone          | 20120315          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | 9          |
| 1006-1                                                                                 |    | Silicone          | 20130220          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | 10         |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |   |           |                   |                 |               |      |                |      |                  |      |            |
|----------------------------------------------------------------------------------------|---|-----------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|
| Oil                                                                                    | n | Elastomer | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Batch Code |
|                                                                                        |   |           | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    |            |
| 1006-1                                                                                 |   | Silicone  | 20130900          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | 11         |
| 1006-1                                                                                 |   | Silicone  | 20130900          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | 12         |
| 1006-1                                                                                 |   | Silicone  | 20140600          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | 13         |
| 1006-1                                                                                 |   | Silicone  | 20140901          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-8     |
| 1006-1                                                                                 |   | Silicone  | 20140901          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-9     |
| 1006-1                                                                                 |   | Silicone  | 20140901          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-10    |
| 1006-1                                                                                 |   | Silicone  | 20140901          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-11    |
| 1006-1                                                                                 |   | Silicone  | 20140901          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-12    |
| 1006-1                                                                                 |   | Silicone  | 20140901          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-13    |
| 1006-1                                                                                 |   | Silicone  | 20140915          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-14    |
| 1006-1                                                                                 |   | Silicone  | 20140915          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-15    |
| 1006-1                                                                                 |   | Silicone  | 20150301          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-16    |
| 1006-1                                                                                 |   | Silicone  | 20150715          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-17    |
| 1006-1                                                                                 |   | Silicone  | 20151201          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-18    |
| 1006-1                                                                                 |   | Silicone  | 20160101          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-19    |
| 1006-1                                                                                 |   | Silicone  | 20160301          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-20    |
| 1006-1                                                                                 |   | Silicone  | 20160301          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-21    |
| 1006-1                                                                                 |   | Silicone  | 20160301          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-22    |
| 1006-1                                                                                 |   | Silicone  | 20160801          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-23    |
| 1006-1                                                                                 |   | Silicone  | 20161101          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-24    |
| 1006-1                                                                                 |   | Silicone  | 20161001          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-25    |
| 1006-1                                                                                 |   | Silicone  | 20170101          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-26    |
| 1006-1                                                                                 |   | Silicone  | 20170101          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-27    |
| 1006-1                                                                                 |   | Silicone  | 20170601          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-28    |
| 1006-1                                                                                 |   | Silicone  | 20170901          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-29    |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |   |           |                   |                 |               |      |                |      |                  |      |            |
|----------------------------------------------------------------------------------------|---|-----------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|
| Oil                                                                                    | n | Elastomer | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Batch Code |
|                                                                                        |   |           | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    |            |
| 1006-1                                                                                 |   | Silicone  | 20171101          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-30    |
| 1006-1                                                                                 |   | Silicone  | 20180201          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-31    |
| 1006-1                                                                                 |   | Silicone  | 20180401          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-32    |
| 1006-1                                                                                 |   | Silicone  | 20180601          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-33    |
| 1006-1                                                                                 |   | Silicone  | 20181201          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-34    |
| 1006-1                                                                                 |   | Silicone  | 20200201          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-36    |
| 1006-1                                                                                 |   | Silicone  | 20200201          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-37    |
| 1006-2                                                                                 |   | Silicone  | 20160301          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-18    |
| 1006-2                                                                                 |   | Silicone  | 20160301          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-19    |
| 1006-2                                                                                 |   | Silicone  | 20160601          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-20    |
| 1006-2                                                                                 |   | Silicone  | 20160501          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-21    |
| 1006-2                                                                                 |   | Silicone  | 20160601          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-22    |
| 1006-2                                                                                 |   | Silicone  | 20160801          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-23    |
| 1006-2                                                                                 |   | Silicone  | 20161101          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-24    |
| 1006-2                                                                                 |   | Silicone  | 20161001          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-25    |
| 1006-2                                                                                 |   | Silicone  | 20170101          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-26    |
| 1006-2                                                                                 |   | Silicone  | 20170101          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-27    |
| 1006-2                                                                                 |   | Silicone  | 20170601          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-28    |
| 1006-2                                                                                 |   | Silicone  | 20170901          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-29    |
| 1006-2                                                                                 |   | Silicone  | 20171101          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-30    |
| 1006-2                                                                                 |   | Silicone  | 20180201          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-31    |
| 1006-2                                                                                 |   | Silicone  | 20180401          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-32    |
| 1006-2                                                                                 |   | Silicone  | 20180601          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-33    |
| 1006-2                                                                                 |   | Silicone  | 20181201          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-34    |
| 1006-2                                                                                 |   | Silicone  | 20190712          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-35    |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |    |           |                   |                 |               |      |                |      |                  |      |            |
|----------------------------------------------------------------------------------------|----|-----------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|
| Oil                                                                                    | n  | Elastomer | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Batch Code |
|                                                                                        |    |           | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    |            |
| 1006-2                                                                                 |    | Silicone  | 20200201          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-36    |
| 1006-2                                                                                 |    | Silicone  | 20200201          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-37    |
| 1006-2                                                                                 |    | Silicone  | 20200201          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-38    |
| 1006-2                                                                                 |    | Silicone  | 20200201          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-39    |
| 1006-2                                                                                 |    | Silicone  | 20221101          | 20230118        | 32.99         | 2.67 | -21.56         | 2.04 | -38.06           | 3.79 | VMQ1-40    |
| SL107                                                                                  | 15 | Silicone  | 20200108          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.7  | VMQ1-35    |
| SL107                                                                                  | 15 | Silicone  | 20200108          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.7  | VMQ1-36    |
| SL107                                                                                  | 15 | Silicone  | 20200108          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.7  | VMQ1-37    |
| SL107                                                                                  | 15 | Silicone  | 20200108          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.7  | VMQ1-38    |
| SL107                                                                                  | 15 | Silicone  | 20200108          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.7  | VMQ1-39    |
| SL107                                                                                  | 15 | Silicone  | 20221101          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.7  | VMQ1-40    |
| SL107                                                                                  | 15 | Silicone  | 20230607          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.7  | VMQ1-41    |
| SL107                                                                                  | 15 | Silicone  | 20240327          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.7  | VMQ1-42    |
| SL107                                                                                  | 15 | Silicone  | 20250317          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.7  | VMQ1-43    |
| SL107                                                                                  | 15 | Silicone  | 20260122          | ***             | 32.17         | 2.95 | -21.68         | 2.04 | -33.75           | 3.7  | VMQ1-44    |
| 1006-1                                                                                 | 18 | Nitrile   | 20081202          | 20100422        | 1.58          | 0.19 | -1.36          | 0.87 | -3.07            | 4.71 | 1          |
| 1006-1                                                                                 | 28 | Nitrile   | 20100423          | 20100714        | 1.29          | 0.6  | -1.04          | 0.92 | -0.9             | 5    | 1          |
| 1006-1                                                                                 | 48 | Nitrile   | 20100715          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | 1          |
| 1006-1                                                                                 | 18 | Nitrile   | 20081202          | 20100422        | 1.58          | 0.19 | -1.36          | 0.87 | -3.07            | 4.71 | 2          |
| 1006-1                                                                                 | 28 | Nitrile   | 20100423          | 20100714        | 1.29          | 0.6  | -1.04          | 0.92 | -0.9             | 5    | 2          |
| 1006-1                                                                                 | 48 | Nitrile   | 20100715          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | 2          |
| 1006-1                                                                                 | 18 | Nitrile   | 20081202          | 20100422        | 1.58          | 0.19 | -1.36          | 0.87 | -3.07            | 4.71 | 3          |
| 1006-1                                                                                 | 28 | Nitrile   | 20100423          | 20100714        | 1.29          | 0.6  | -1.04          | 0.92 | -0.9             | 5    | 3          |
| 1006-1                                                                                 | 48 | Nitrile   | 20100715          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | 3          |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |    |           |                   |                 |               |      |                |      |                  |      |            |
|----------------------------------------------------------------------------------------|----|-----------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|
| Oil                                                                                    | n  | Elastomer | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Batch Code |
|                                                                                        |    |           | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    |            |
| 1006-1                                                                                 | 18 | Nitrile   | 20081202          | 20100422        | 1.58          | 0.19 | -1.36          | 0.87 | -3.07            | 4.71 | 4          |
| 1006-1                                                                                 | 28 | Nitrile   | 20100423          | 20100714        | 1.29          | 0.6  | -1.04          | 0.92 | -0.9             | 5    | 4          |
| 1006-1                                                                                 | 48 | Nitrile   | 20100715          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | 4          |
| 1006-1                                                                                 | 18 | Nitrile   | 20081202          | 20100422        | 1.58          | 0.19 | -1.36          | 0.87 | -3.07            | 4.71 | 5          |
| 1006-1                                                                                 | 28 | Nitrile   | 20100423          | 20100714        | 1.29          | 0.6  | -1.04          | 0.92 | -0.9             | 5    | 5          |
| 1006-1                                                                                 | 48 | Nitrile   | 20100715          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | 5          |
| 1006-1                                                                                 | 48 | Nitrile   | 20100715          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | 6          |
| 1006-1                                                                                 |    | Nitrile   | 20100715          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | 7          |
| 1006-1                                                                                 |    | Nitrile   | 20120310          | 20140831        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | 8          |
| 1006-1                                                                                 | 10 | Nitrile   |                   | 20230118        | 1.31          | 0.42 | -1.55          | 0.82 | -1.31            | 3.88 | 8          |
| 1006-1                                                                                 |    | Nitrile   | 20120310          | 20140831        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | 9          |
| 1006-1                                                                                 |    | Nitrile   | 20130200          | 20140831        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | 10         |
| 1006-1                                                                                 |    | Nitrile   | 20130900          | 20140831        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | 11         |
| 1006-1                                                                                 |    | Nitrile   | 20140300          | 20140831        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | 12         |
| 1006-1                                                                                 |    | Nitrile   | 20140901          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-08   |
| 1006-1                                                                                 |    | Nitrile   | 20140901          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-09   |
| 1006-1                                                                                 |    | Nitrile   | 20140901          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-10   |
| 1006-1                                                                                 |    | Nitrile   | 20140901          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-11   |
| 1006-1                                                                                 |    | Nitrile   | 20140901          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-12   |
| 1006-1                                                                                 |    | Nitrile   | 20140901          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-13   |
| 1006-1                                                                                 |    | Nitrile   | 20150301          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-14   |
| 1006-1                                                                                 |    | Nitrile   | 20150901          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-15   |
| 1006-1                                                                                 |    | Nitrile   | 20160101          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-16   |
| 1006-1                                                                                 |    | Nitrile   | 20160601          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-17   |
| 1006-1                                                                                 |    | Nitrile   | 20160701          | 20230118        | 1.11          | 0.6  | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-18   |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |   |           |                   |                 |               |     |                |      |                  |      |            |
|----------------------------------------------------------------------------------------|---|-----------|-------------------|-----------------|---------------|-----|----------------|------|------------------|------|------------|
| Oil                                                                                    | n | Elastomer | Effective Dates   |                 | Volume Change |     | Shore Hardness |      | Tensile Strength |      | Batch Code |
|                                                                                        |   |           | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s   | $\bar{X}$      | s    | $\bar{X}$        | s    |            |
| 1006-1                                                                                 |   | Nitrile   | 20170201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-19   |
| 1006-1                                                                                 |   | Nitrile   | 20170601          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-20   |
| 1006-1                                                                                 |   | Nitrile   | 20171201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-21   |
| 1006-1                                                                                 |   | Nitrile   | 20180201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-22   |
| 1006-1                                                                                 |   | Nitrile   | 20180701          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-23   |
| 1006-1                                                                                 |   | Nitrile   | 20190201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-24   |
| 1006-1                                                                                 |   | Nitrile   | 20190201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-25   |
| 1006-1                                                                                 |   | Nitrile   | 20190201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-26   |
| 1006-2                                                                                 |   | Nitrile   | 20160401          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-12   |
| 1006-2                                                                                 |   | Nitrile   | 20160201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-15   |
| 1006-2                                                                                 |   | Nitrile   | 20160301          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-16   |
| 1006-2                                                                                 |   | Nitrile   | 20160601          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-17   |
| 1006-2                                                                                 |   | Nitrile   | 20160701          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-18   |
| 1006-2                                                                                 |   | Nitrile   | 20170201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-19   |
| 1006-2                                                                                 |   | Nitrile   | 20170601          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-20   |
| 1006-2                                                                                 |   | Nitrile   | 20171201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-21   |
| 1006-2                                                                                 |   | Nitrile   | 20180201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-22   |
| 1006-2                                                                                 |   | Nitrile   | 20180701          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-23   |
| 1006-2                                                                                 |   | Nitrile   | 20190201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-24   |
| 1006-2                                                                                 |   | Nitrile   | 20190201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-25   |
| 1006-2                                                                                 |   | Nitrile   | 20190201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-26   |
| 1006-2                                                                                 |   | Nitrile   | 20190201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-27   |
| 1006-2                                                                                 |   | Nitrile   | 20190201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-28   |
| 1006-2                                                                                 |   | Nitrile   | 20190201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-29   |
| 1006-2                                                                                 |   | Nitrile   | 20190201          | 20230118        | 1.11          | 0.6 | -1.15          | 0.87 | -2.08            | 4.87 | HNBR1-30   |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |    |                 |                   |                 |               |      |                |      |                  |      |            |
|----------------------------------------------------------------------------------------|----|-----------------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|
| Oil                                                                                    | n  | Elastomer       | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Batch Code |
|                                                                                        |    |                 | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    |            |
| SL107                                                                                  | 18 | Nitrile         | 20200108          | 20260526        | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-18   |
| SL107                                                                                  | 18 | Nitrile         | 20200108          | 20260526        | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-19   |
| SL107                                                                                  | 18 | Nitrile         | 20200108          | 20260526        | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-20   |
| SL107                                                                                  | 18 | Nitrile         | 20200108          | 20260526        | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-21   |
| SL107                                                                                  | 18 | Nitrile         | 20200108          | 20260526        | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-22   |
| SL107                                                                                  | 18 | Nitrile         | 20200108          | 20260526        | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-23   |
| SL107                                                                                  | 18 | Nitrile         | 20200108          | 20260526        | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-24   |
| SL107                                                                                  | 18 | Nitrile         | 20200108          | 20260526        | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-25   |
| SL107                                                                                  | 18 | Nitrile         | 20200108          | 20260526        | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-26   |
| SL107                                                                                  | 18 | Nitrile         | 20200108          | 20260526        | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-27   |
| SL107                                                                                  | 18 | Nitrile         | 20200108          | 20260526        | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-28   |
| SL107                                                                                  | 18 | Nitrile         | 20200108          | 20260526        | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-29   |
| SL107                                                                                  | 18 | Nitrile         | 20200108          | 20260526        | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-30   |
| SL107                                                                                  | 18 | Nitrile         | 20230816          | ***             | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-31   |
| SL107                                                                                  | 18 | Nitrile         | 20240404          | ***             | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-32   |
| SL107                                                                                  | 18 | Nitrile         | 20250103          | ***             | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-33   |
| SL107                                                                                  | 18 | Nitrile         | 20251101          | ***             | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-34   |
| SL107                                                                                  | 18 | Nitrile         | 20260526          | ***             | 0.32          | 0.6  | -1.18          | 0.87 | 5.97             | 4.87 | HNBR1-35   |
| 1006-1                                                                                 | 18 | Fluoroelastomer | 20081202          | 20100714        | 0.68          | 0.18 | 3.85           | 1.04 | -54.92           | 3.91 | 1          |
| 1006-1                                                                                 | 38 | Fluoroelastomer | 20100715          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | 1          |
| 1006-1                                                                                 | 18 | Fluoroelastomer | 20081202          | 20100714        | 0.68          | 0.18 | 3.85           | 1.04 | -54.92           | 3.91 | 2          |
| 1006-1                                                                                 | 38 | Fluoroelastomer | 20100715          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | 2          |
| 1006-1                                                                                 | 18 | Fluoroelastomer | 20081202          | 20100714        | 0.68          | 0.18 | 3.85           | 1.04 | -54.92           | 3.91 | 3          |
| 1006-1                                                                                 | 38 | Fluoroelastomer | 20100715          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | 3          |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |    |                 |                   |                 |               |      |                |      |                  |      |            |
|----------------------------------------------------------------------------------------|----|-----------------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|
| Oil                                                                                    | n  | Elastomer       | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Batch Code |
|                                                                                        |    |                 | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    |            |
| 1006-1                                                                                 | 18 | Fluoroelastomer | 20081202          | 20100714        | 0.68          | 0.18 | 3.85           | 1.04 | -54.92           | 3.91 | 4          |
| 1006-1                                                                                 | 38 | Fluoroelastomer | 20100715          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | 4          |
| 1006-1                                                                                 | 18 | Fluoroelastomer | 20081202          | 20100714        | 0.68          | 0.18 | 3.85           | 1.04 | -54.92           | 3.91 | 5          |
| 1006-1                                                                                 | 38 | Fluoroelastomer | 20100715          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | 5          |
| 1006-1                                                                                 | 38 | Fluoroelastomer | 20100715          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | 6          |
| 1006-1                                                                                 |    | Fluoroelastomer | 20100715          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | 7          |
| 1006-1                                                                                 |    | Fluoroelastomer | 20120500          | 20140831        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | 8          |
| 1006-1                                                                                 | 10 | Fluoroelastomer |                   | 20230118        | 0.57          | 0.25 | 3.2            | 1.03 | -50.15           | 4.88 | 8          |
| 1006-1                                                                                 |    | Fluoroelastomer | 20120500          | 20140831        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | 9          |
| 1006-1                                                                                 |    | Fluoroelastomer | 20130226          | 20140831        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | 10         |
| 1006-1                                                                                 |    | Fluoroelastomer | 20130900          | 20140831        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | 11         |
| 1006-1                                                                                 |    | Fluoroelastomer | 20140500          | 20140831        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | 12         |
| 1006-1                                                                                 |    | Fluoroelastomer | 20140901          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-8     |
| 1006-1                                                                                 |    | Fluoroelastomer | 20140901          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-9     |
| 1006-1                                                                                 |    | Fluoroelastomer | 20140901          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-10    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20140901          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-11    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20140901          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-12    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20141101          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-13    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20150501          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-14    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20151101          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-15    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20160401          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-16    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20160401          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-17    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20161201          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-18    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20170601          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-19    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20171001          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-20    |

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| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |    |                 |                   |                 |               |      |                |      |                  |      |            |
|----------------------------------------------------------------------------------------|----|-----------------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|
| Oil                                                                                    | n  | Elastomer       | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Batch Code |
|                                                                                        |    |                 | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    |            |
| 1006-1                                                                                 |    | Fluoroelastomer | 20180301          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-21    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20180301          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-22    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20190315          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-23    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20191209          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-24    |
| 1006-1                                                                                 |    | Fluoroelastomer | 20191209          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-25    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20160601          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-14    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20160201          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-15    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20160201          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-16    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20160201          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-17    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20161201          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-18    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20170601          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-19    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20171001          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-20    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20180301          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-21    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20180301          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-22    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20190315          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-23    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20191209          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-24    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20191209          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-25    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20191209          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-26    |
| 1006-2                                                                                 |    | Fluoroelastomer | 20191209          | 20230118        | 0.69          | 0.15 | 3.47           | 1.01 | -52.28           | 4.34 | FKM1-27    |
| SL107                                                                                  | 19 | Fluoroelastomer | 20200108          | ***             | 0.68          | 0.15 | 4.1            | 1.01 | -57.4            | 4.34 | FKM1-21    |
| SL107                                                                                  | 19 | Fluoroelastomer | 20200108          | ***             | 0.68          | 0.15 | 4.1            | 1.01 | -57.4            | 4.34 | FKM1-24    |
| SL107                                                                                  | 19 | Fluoroelastomer | 20200108          | ***             | 0.68          | 0.15 | 4.1            | 1.01 | -57.4            | 4.34 | FKM1-25    |
| SL107                                                                                  | 19 | Fluoroelastomer | 20200108          | ***             | 0.68          | 0.15 | 4.1            | 1.01 | -57.4            | 4.34 | FKM1-26    |
| SL107                                                                                  | 19 | Fluoroelastomer | 20200108          | ***             | 0.68          | 0.15 | 4.1            | 1.01 | -57.4            | 4.34 | FKM1-27    |
| SL107                                                                                  | 19 | Fluoroelastomer | 20200108          | ***             | 0.68          | 0.15 | 4.1            | 1.01 | -57.4            | 4.34 | FKM1-28    |

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2 \*\*\* = currently in effect.

| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |    |                 |                   |                 |               |      |                |      |                  |      |            |
|----------------------------------------------------------------------------------------|----|-----------------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|
| Oil                                                                                    | n  | Elastomer       | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Batch Code |
|                                                                                        |    |                 | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    |            |
| SL107                                                                                  | 19 | Fluoroelastomer | 20230706          | ***             | 0.68          | 0.15 | 4.1            | 1.01 | -57.4            | 4.34 | FKM1-29    |
| SL107                                                                                  | 19 | Fluoroelastomer | 20240700          | ***             | 0.68          | 0.15 | 4.1            | 1.01 | -57.4            | 4.34 | FKM1-30    |
| SL107                                                                                  | 19 | Fluoroelastomer | 20250400          | ***             | 0.68          | 0.15 | 4.1            | 1.01 | -57.4            | 4.34 | FKM1-31    |
| SL107                                                                                  | 19 | Fluoroelastomer | 20260106          | ***             | 0.68          | 0.15 | 4.1            | 1.01 | -57.4            | 4.34 | FKM1-32    |
| 1006-1                                                                                 | 18 | Polyacrylate    | 20081202          | 20100714        | 4.17          | 0.17 | -5.24          | 0.61 | -4.47            | 4.95 | 1          |
| 1006-1                                                                                 | 42 | Polyacrylate    | 20100715          | 20230118        | 4.21          | 0.32 | -5.33          | 1.03 | -4.82            | 6.85 | 1          |
| 1006-1                                                                                 | 18 | Polyacrylate    | 20081202          | 20100714        | 4.17          | 0.17 | -5.24          | 0.61 | -4.47            | 4.95 | 2          |
| 1006-1                                                                                 | 42 | Polyacrylate    | 20100715          | 20230118        | 4.21          | 0.32 | -5.33          | 1.03 | -4.82            | 6.85 | 2          |
| 1006-1                                                                                 | 18 | Polyacrylate    | 20081202          | 20100714        | 4.17          | 0.17 | -5.24          | 0.61 | -4.47            | 4.95 | 3          |
| 1006-1                                                                                 | 42 | Polyacrylate    | 20100715          | 20230118        | 4.21          | 0.32 | -5.33          | 1.03 | -4.82            | 6.85 | 3          |
| 1006-1                                                                                 | 42 | Polyacrylate    | 20100715          | 20230118        | 4.21          | 0.32 | -5.33          | 1.03 | -4.82            | 6.85 | 4          |
| 1006-1                                                                                 | 18 | Polyacrylate    | 20081202          | 20100714        | 4.17          | 0.17 | -5.24          | 0.61 | -4.47            | 4.95 | 5          |
| 1006-1                                                                                 | 11 | Polyacrylate    | 20100715          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | 5          |
| 1006-1                                                                                 | 11 | Polyacrylate    | 20100715          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | 6          |
| 1006-1                                                                                 |    | Polyacrylate    | 20100715          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | 7          |
| 1006-1                                                                                 |    | Polyacrylate    | 20120315          | 20140831        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | 8          |
| 1006-1                                                                                 | 10 | Polyacrylate    |                   | 20230118        | 2.5           | 0.37 | -3.2           | 1.23 | -1.02            | 7.31 | 8          |
| 1006-1                                                                                 |    | Polyacrylate    | 20120315          | 20140831        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | 9          |
| 1006-1                                                                                 |    | Polyacrylate    | 20130226          | 20140831        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | 10         |
| 1006-1                                                                                 |    | Polyacrylate    | 20130900          | 20140831        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | 11         |
| 1006-1                                                                                 |    | Polyacrylate    | 20130900          | 20140831        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | 12         |
| 1006-1                                                                                 |    | Polyacrylate    | 20140901          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-8     |
| 1006-1                                                                                 |    | Polyacrylate    | 20140901          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-9     |
| 1006-1                                                                                 |    | Polyacrylate    | 20140901          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-10    |
| 1006-1                                                                                 |    | Polyacrylate    | 20140901          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-11    |

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2 \*\*\* = currently in effect.

| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |    |              |                   |                 |               |      |                |      |                  |      |            |
|----------------------------------------------------------------------------------------|----|--------------|-------------------|-----------------|---------------|------|----------------|------|------------------|------|------------|
| Oil                                                                                    | n  | Elastomer    | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |      | Batch Code |
|                                                                                        |    |              | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s    |            |
| 1006-1                                                                                 |    | Polyacrylate | 20140901          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-12    |
| 1006-1                                                                                 |    | Polyacrylate | 20141101          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-13    |
| 1006-1                                                                                 |    | Polyacrylate | 20150101          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-14    |
| 1006-1                                                                                 |    | Polyacrylate | 20151201          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-15    |
| 1006-1                                                                                 |    | Polyacrylate | 20160201          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-16    |
| 1006-1                                                                                 |    | Polyacrylate | 20160401          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-17    |
| 1006-1                                                                                 |    | Polyacrylate | 20160401          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-18    |
| 1006-1                                                                                 |    | Polyacrylate | 20170101          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-19    |
| 1006-1                                                                                 |    | Polyacrylate | 20170401          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-20    |
| 1006-1                                                                                 |    | Polyacrylate | 20170701          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-21    |
| 1006-1                                                                                 |    | Polyacrylate | 20170901          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-22    |
| 1006-1                                                                                 |    | Polyacrylate | 20190401          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-23    |
| 1006-1                                                                                 | 18 | Polyacrylate | 20200108          | 20230118        | 2.05          | 0.66 | -0.21          | 1.54 | 2.58             | 8.44 | ACM1-24    |
| 1006-2                                                                                 |    | Polyacrylate | 20160201          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-15    |
| 1006-2                                                                                 |    | Polyacrylate | 20160201          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-16    |
| 1006-2                                                                                 |    | Polyacrylate | 20160401          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-17    |
| 1006-2                                                                                 |    | Polyacrylate | 20160401          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-18    |
| 1006-2                                                                                 |    | Polyacrylate | 20170101          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-19    |
| 1006-2                                                                                 |    | Polyacrylate | 20170401          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-20    |
| 1006-2                                                                                 |    | Polyacrylate | 20170701          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-21    |
| 1006-2                                                                                 |    | Polyacrylate | 20170901          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-22    |
| 1006-2                                                                                 |    | Polyacrylate | 20190401          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-23    |
| 1006-2                                                                                 |    | Polyacrylate | 20190401          | 20230118        | 2.88          | 0.66 | -1.82          | 1.54 | 4.19             | 8.44 | ACM1-24    |
| SL107                                                                                  | 18 | Polyacrylate | 20200108          | ***             | 2.05          | 0.66 | -0.21          | 1.54 | 2.58             | 8.44 | ACM1-22    |
| SL107                                                                                  | 18 | Polyacrylate | 20200108          | ***             | 2.05          | 0.66 | -0.21          | 1.54 | 2.58             | 8.44 | ACM1-23    |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D7216 Light-Duty Engine Oil Elastomer Compatibility (LDEOC) Test Reference Oil Targets |     |                     |                   |                 |               |      |                |      |                  |       |            |
|----------------------------------------------------------------------------------------|-----|---------------------|-------------------|-----------------|---------------|------|----------------|------|------------------|-------|------------|
| Oil                                                                                    | n   | Elastomer           | Effective Dates   |                 | Volume Change |      | Shore Hardness |      | Tensile Strength |       | Batch Code |
|                                                                                        |     |                     | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$     | s    | $\bar{X}$      | s    | $\bar{X}$        | s     |            |
| SL107                                                                                  | 18  | Polyacrylate        | 20200108          | ***             | 2.05          | 0.66 | -0.21          | 1.54 | 2.58             | 8.44  | ACM1-24    |
| SL107                                                                                  | 18  | Polyacrylate        | 20200108          | ***             | 2.05          | 0.66 | -0.21          | 1.54 | 2.58             | 8.44  | ACM1-25    |
| SL107                                                                                  | 18  | Polyacrylate        | 20200108          | ***             | 2.05          | 0.66 | -0.21          | 1.54 | 2.58             | 8.44  | ACM1-26    |
| SL107                                                                                  | 18  | Polyacrylate        | 20241112          | ***             | 2.05          | 0.66 | -0.21          | 1.54 | 2.58             | 8.44  | ACM1-27    |
| SL107                                                                                  | 120 | Ethylene Acrylate-2 | 20240326          | ***             | 20.98         | 1.13 | 7.76           | 1.34 | -42.01           | 3.92  | AEM2-1     |
| SL107                                                                                  | 120 | Ethylene Acrylate-2 | 20250205          | ***             | 20.98         | 1.13 | 7.76           | 1.34 | -42.01           | 3.92  | AEM2-2     |
| SL107                                                                                  | 120 | Ethylene Acrylate-2 | 20250205          | ***             | 20.98         | 1.13 | 7.76           | 1.34 | -42.01           | 3.92  | AEM2-3     |
| SL107                                                                                  | 120 | Ethylene Acrylate-2 | 20260226          | ***             | 20.98         | 1.13 | 7.76           | 1.34 | -42.01           | 3.92  | AEM2-4     |
| SL107                                                                                  | 120 | Ethylene Acrylate-3 | 20240326          | ***             | 8.28          | 1.19 | -0.44          | 2.50 | -38.17           | 6.01  | AEM3-1     |
| SL107                                                                                  | 120 | Ethylene Acrylate-3 | 20250205          | ***             | 8.28          | 1.19 | -0.44          | 2.50 | -38.17           | 6.01  | AEM3-2     |
| SL107                                                                                  | 120 | Ethylene Acrylate-3 | 20250205          | ***             | 8.28          | 1.19 | -0.44          | 2.50 | -38.17           | 6.01  | AEM3-3     |
| SL107                                                                                  | 120 | Fluoroelastomer-3   | 20240326          | ***             | 0.75          | 0.46 | 4.00           | 0.88 | -50.39           | 11.61 | FKM3-1     |
| SL107                                                                                  | 120 | Fluoroelastomer-3   | 20250205          | ***             | 0.75          | 0.46 | 4.00           | 0.88 | -50.39           | 11.61 | FKM3-2     |
| SL107                                                                                  | 120 | Fluoroelastomer-3   | 20251101          | ***             | 0.75          | 0.46 | 4.00           | 0.88 | -50.39           | 11.61 | FKM3-3     |
| SL107                                                                                  | 120 | Polyacrylate-2      | 20240326          | ***             | 10.95         | 0.71 | -2.09          | 1.65 | -14.10           | 3.77  | ACM2-1     |
| SL107                                                                                  | 120 | Polyacrylate-2      | 20250205          | ***             | 10.95         | 0.71 | -2.09          | 1.65 | -14.10           | 3.77  | ACM2-2     |
| SL107                                                                                  | 120 | Polyacrylate-2      | 20250617          | ***             | 10.95         | 0.71 | -2.09          | 1.65 | -14.10           | 3.77  | ACM2-3     |
| SL107                                                                                  | 120 | Polyacrylate-2      | 20260226          | ***             | 10.95         | 0.71 | -2.09          | 1.65 | -14.10           | 3.77  | ACM2-4     |

1 Effective for all tests completed on or after this date.

2 \*\*\* = currently in effect.

| D8665 Engine Oil Gelation Test (EOGT) Reference Oil Targets |    |                   |                 |                      |      |
|-------------------------------------------------------------|----|-------------------|-----------------|----------------------|------|
| Oil                                                         | n  | Effective Dates   |                 | Sulfated Ash, mass % |      |
|                                                             |    | From <sup>1</sup> | To <sup>2</sup> | $\bar{X}$            | s    |
| F                                                           | 12 | 20260508          | ***             | 10.0                 | 6.45 |
| M                                                           | 12 | 20260508          | ***             | 50.8                 | 9.15 |

3 Effective for all tests completed on or after this date.

4 \*\*\* = currently in effect.

History of Industry Correction Factors  
Appendix B

| Test Area | Effective |          | Condition                             |                          |          | Description                                                       |
|-----------|-----------|----------|---------------------------------------|--------------------------|----------|-------------------------------------------------------------------|
|           | From      | To       |                                       |                          |          |                                                                   |
| L-33-1    | 20200102  | ***      | AAM K2XX, T1XX & 31XX                 |                          |          | Add +1 to rated areas 2 and 3. Do not exceed 10.                  |
| L37       | 20010612  | ***      | V1L686/P4L626A<br>Non-reference       | MNP-Coated Ring          | Canadian | Ridging add 0.9922                                                |
|           | 20040825  | ***      | V1L686/P4L626A<br>Non-reference       | MNP-Coated Pinion & Ring | Canadian | Ridging add 0.6065                                                |
|           | ***       | ***      | L247/T758A<br>Non-reference           | MNP-Coated Pinion        | Canadian | Ridging add 0.5878, Pitting/Spalling add 0.7340                   |
|           | ***       | 20130514 | V1L528/P4T883A<br>Non-reference       | Uncoated Pinion          | Standard | Ridging add 0.3365, Rippling add 0.3365                           |
|           |           |          |                                       |                          | Canadian | Rippling add 0.7885                                               |
|           |           |          |                                       | MNP-Coated Pinion        | Standard | Ridging add 0.3365                                                |
|           | 20130515  | ***      | V1L528/P4T883A<br>Non-reference       |                          | Canadian | Ridging add 0.5878, Rippling add 0.5878                           |
|           |           |          |                                       | MNP-Coated Ring          | Canadian | Ridging add 0.3365                                                |
|           |           |          |                                       | Uncoated Pinion          | Standard | Ridging add 0.3365, Rippling add 0.3365                           |
|           |           |          |                                       |                          | Canadian | Rippling add 0.7566                                               |
|           |           |          |                                       | MNP-Coated Pinion        | Standard | Ridging add 0.3365                                                |
|           |           |          |                                       |                          | Canadian | Ridging add 0.5878, Rippling add 0.5878                           |
|           |           |          |                                       | MNP-Coated Ring          | Canadian | Ridging add 0.3365                                                |
| L-37-1    | None      | ***      | All Tests                             |                          |          | None                                                              |
| L-42      | 20140529  | ***      | All reference oil tests using oil 117 |                          |          | Add 6% to pinion scoring result and add 4% to ring scoring result |
| L-60-1    | 20151001  | ***      | All tests                             |                          |          | Add 0.6 merits to ACV                                             |
| HTCT      |           |          | None                                  |                          |          | None                                                              |
| OSCT      |           |          | None                                  |                          |          | None                                                              |

APPENDIX D  
REFERENCE OIL VISCOSITY GRADES

| Oil   | SAE Viscosity Grade | Date Received <sup>1</sup> |
|-------|---------------------|----------------------------|
| 44    | 15W-40              | 20041116                   |
| 44-1  | 15W-40              | 20080603                   |
| 44-2  | 15W-40              | 20100201                   |
| 44-3  | 15W-40              | 20120131                   |
| 44-4  | 15W-40              | 20150522                   |
| 44-5  | 15W-40              | 20220310                   |
| 52    | 15W-40              | 19950830                   |
| 55    | 10W-30              | 19950918                   |
| 58    | 5W-30               | 19981001                   |
| 62    | 10W-40              | 19960304                   |
| 66    | 15W-40              | 20020418                   |
| 75    | 5W-30               | 20101007                   |
| 75-1  | 5W-30               | 20161104                   |
| 75-2  | 5W-30               | 20240429                   |
| 77-1  | 15W-40              | 20061215                   |
| 77-2  | 15W-40              | 20110128                   |
| 77-3  | 15W-40              | 20150128                   |
| 79    | 15W-40              | 20141111                   |
| 82-1  | 5W-40               | 20080514                   |
| 82-2  | 5W-40               | 20250425                   |
| 86    | 5W-30               | 20170901                   |
| 87    | 5W-30               | 20170906                   |
| 88    | 5W-40               | 20260224                   |
| 90    | 15W-40              | 20050922                   |
| 91    | 5W-20               | 20060814                   |
| 92    | 15W-40              | 20211211                   |
| 112   | 90                  | 19940221                   |
| 112-1 | 90                  | 19940621                   |
| 112-2 | 90                  | 19951127                   |
| 113   | 90                  | 20021113                   |
| 114   | 90                  | 19940222                   |
| 114-1 | 90                  | 19970617                   |
| 115   | 80W-90              | 19971103                   |
| 116   | 80W-90              | 20050415                   |