



The Quality Center (Thailand) Co., Ltd.

## ***CERTIFICATE OF ACCREDITATION***

The Quality Center (Thailand) Co., Ltd. has assessed the Laboratory of:

**FOCUSLAB LTD**

120/41-42 King Kaew Road 21/2

Rajateva, Bangplee, Samutprakan 10540 Thailand.

has met the requirements set forth in Laboratory's policies and procedures, all requirements ISO /IEC 17025:2005  
"General Requirements for the competence of testing and calibration laboratories.\*"

The accredited laboratory has demonstrated technical competence to a defined "Scope of Accreditation" and the operation of a laboratory quality management system.

(Mr. Angcapol Chamchawalit)

Managing Director/Auditor

(Mr. Montri Phomettha)

Lab Quality and ISO/IEC 17025-Specialist/Auditor

**Initial Accreditation Date:** March 1, 2017

**Issue Date:** March 1, 2017

**Expiration Date:** March 1, 2020

**Certificate No.** TQC-17025-001

\* See the laboratory's Scope of Accreditation for details of accredited parameter

# CERTIFICATE OF ACCREDITATION TO ISO/IEC 17025:2005



TQC (Thailand)

**FOCUSLAB Ltd.**

120/41-42 King Kaew Road 21/2

Rajateva, Bangplee, Samutprakan 10540 Thailand

Tel: +66 (2) 7504187 E-mail: focuslab@focuslab.co.th

In recognition of the successful completion of the TQC evaluation process, accreditation is granted to this laboratory to perform the following tests on petroleum products including lubricating oils and insulating oils:

Issue Date: March 1, 2017

Certificate No. TQC-17025-001

Accreditation valid through: March 1, 2020

| FIELD OF TEST   | MATERIALS OR PRODUCTS TESTED | SPECIFIC TESTS  | STANDARD METHOD OR TECHNIQUE USED            | RANGE / DETECTION LIMIT                             |
|---|------------------------------|---|--|---|
| Chemical  | Lubricating Oils             | RDE Emission Spectroscopy                               | ASTM D 6595                                  | Varies by Element                                   |
|   |                              | RFS Rotrode Filter Spectroscopy                         | ASTM D 6595M                                 | Varies by Element                                   |
|   |                              | Kinematic Viscosity                                     | ASTM D 445                                   | ≤ 3000 cSt @ 40 °C<br>≤ 300 cSt @ 100 °C            |
|   |                              | Pore Blockage Particle Count                            | Pore Blockage Method                         | NAS Class 00 to Class 12<br>ISO Class 1 to Class 24 |
|   |                              | Optical Particle Count                                  | ISO11500                                     | NAS Class 00 to Class 12<br>ISO Class 1 to Class 24 |
|   |                              | FTIR  | ASTM D 7414A                                 | Varies by item tested                               |
|   |                              | Oxidation, Nitration, Sulfation, Water, soot Fuel, ZDDP | ASTM D 7415A<br>ASTM D 7624A<br>ASTM E 2412M |   |
|   |                              | Ferrographic Analysis                                   | ASTM D 7690                                  | 0 to 1000 um  |
|   |                              | Coulometric Karl Fischer Titration                      | ASTM D 6304                                  | 0.0010 - 2.5000 %wt.                                |
|   |                              | Volumetric Karl Fischer Titration                       | ASTM D 1744                                  | 0.0050 - 0.1000 %wt.                                |
|   |                              | Total Acid Number                                       | ASTM D 974                                   | ≤ 15.0 mgKOH/g                                      |
|   |                              | Total Base Number                                       | ASTM D 4739                                  | ≤ 100 mgKOH/g                                       |
|   |                              | Gravimetric Analysis                                    | ASTM D 4898                                  | N/A   |
|   |                              | Membrane Patch Colorimetry (MPC)                        | ASTM D 7843                                  | N/A   |
|   |                              | Ruler   | ASTM D 6810                                  | ≤ 100 % remaining                                   |
| Phenol, Amine, ZDDP   | ASTM D 6971                  |   |  |   |
| Oxidation Stability of Steam Turbine Oils by Rotating Pressure Vessel (RPVOT) | ASTM D 2272                  | 0 to 5400 Mins  |  |   |

(Mr. Angcapol Chamchawalit)  
Managing Director/Auditor

(Mr. Montri Phomettha)  
Lab Quality and ISO/IEC 17025-Specialist

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|---|------------------------------|--|---|---|
| Chemical                                  | Insulating Oils              | Dissolved Gases Analysis by GC                 | ASTM D 3612C                            | Varies by Gas                                       |
|   |                              | Moisture by Coulometric Karl Fischer Titration | ASTM D 1533                             | 0.0 to 2000.0 ppm                                   |
|   |                              | Dielectric Breakdown Voltage                   | ASTM D 877A<br>ASTM D 1816<br>IEC 60156 | 0.0 to 75.0 kV<br>0.0 to 75.0 kV<br>0.0 to 75.0 kV  |
|   |                              | Furanic Compounds by HPLC                      | ASTM D 5837                             | Varies by Compound                                  |
|   |                              | Corrosive Sulfur                               | ASTM D 1275B<br>IEC 62535               | 1A to 4C<br>(Noncorrosive to Corrosive)             |
|   |                              | Liquid Power Factor                            | ASTM D 924                              | 1x10 <sup>-6</sup> to 4%                            |
|   |                              | Oxidation Inhibitor                            | ASTM D 2668                             | ≤ 0.5 %   |
|   |                              | Total Acid Number                              | ASTM D 974                              | ≤ 15.0 mgKOH/g                                      |
|   |                              | ASTM Color                                     | ASTM D 1500                             | L0.5 to D8.0  |
|   |                              | Kinematic Viscosity                            | ASTM D 445                              | ≤ 3000 cSt @ 40 °C                                  |
|   |                              | Optical Particle Count                         | ASTM D 6786                             | NAS Class 00 to Class 12<br>ISO Class 1 to Class 24 |
|   |                              | Interfacial Tension                            | ASTM D 971                              | <300 mN/m   |
|   |                              | Passivator-Irgamet39 Type                      | IEC 60666                               | N/A   |
|   |                              | Passivator-BTA Type                            | IEC 60666                               | N/A   |
|   |                              | Specific Gravity by Hydrometer                 | ASTM D 1298                             | 0.790 to 0.900 and<br>0.940 to 1.070                |
| Specific Gravity by Digital Density Meter | ASTM D 4052                  | 0.000-3.000                                    |   |   |

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