INDUSTRIAL TEST REPORT

Innovative Cold Blending Technology

CCBL® JET

CCBL® JET supplier: GQOIL Innovation Europe sp z o.o
CCBL® test holder: PRISTA OIL HOLDING EAD

RUSE July, 2016

1. **INTRODUCTION**
   a. OBJECTIVE:

      The objective of the industrial test was to verify the ability of the CCBL® JET designed as single cavitation column to blend lubes without using mechanical blending. In addition, the test shall verify the effectiveness of the CCBL® JET mixing during normal and regular production of lubricants (engine oils and industrial oils).

   b. PLACE OF THE TEST:
      The test has been run at PRISTA blending plant, located in Bulgaria, Ruse.

2. **TEST EQUIPMENT:**
   a. CCBL® JET – GQOIL provided CCBL® JET unit, which was installed and connected to 10 cubic meter tank.
   b. PRISTA BLENDING TANK – PRISTA provided 1 tank 10 cubic meters, which was connected to the CCBL® JET.

3. **PRISTA LABORATORY –**
   PRISTA provided laboratory test control at site. PRISTA laboratory is accredited as per EN ISO/IEC 17025:2006. The same is organizational member of ASTM INTERNATIONAL

4. **GENERAL DESCRIPTION OF THE TEST**
   The test included following steps:

1. Dosing of components (base oil and additives)
   a. Dosing was done through fixed lines, equipped with flow meters. The receiving tank of 10 cubic meters was equipped with loading cells (tensio-metric sensors).
   b. Temperature of the incoming base oils: at ambient temperature – 20 – 25° C
   c. Temperature of the incoming additives: – 40 – 50 ° C
2. Blending through CCBL® JET
   a. Blending trough CCBL® JET was made by using driving gear pump with capacity of 25 cubic meter per hour.
   b. Pump sucked the dosed base oils and additives from the tank and push the product through CCBL® JET, afterwards the blended product was directed through fix line back to the same tank.
3. Lab test of each batch of production

Operational test parameters monitored during the test:
- Temperature of the dosed raw materials;
- Temperature after CCBL® JET blending;
- Electrical consumption of the driving pump;
- Time of CCBL® blending and total time including dosing
- Production capacity per hour.

Physical and chemical parameters of the produced lubricants:
For each type of lubricant, parameters were tested as per the technical specification.

Picture CCBL® JET unit.

Schematic diagram with integrated CCBL® JET unit.

PRISTA OIL Blending Plant at Ruse (Bulgaria).
The 10 cubic metric tank with integrated CCBL® JET unit.

TEST NO 1

Lube oil: multi-grade engine oil "PRISTA® SUPER BENZIN 10 W 40 "
15W40 API SL/CF, ACEA A3/B3

Components	% rate
SN 150	54,80%
4 cst.	25,00%
Add 1	9,90%
Add 2 VII	10,00%
Add 3 PPD	0,30%
	100,00%

DESCRIPTION OF THE TEST
As per the general procedure, described in point 4 above.
Purpose: to compare the lab results of lube oil blended through CCBL® JET with the PRISTA product specification.
Volume: 3 MT

Dosing of base oils and additives by feeding 10 cubic meter tank. Feeding the tank took 10 min.
When the feed volume reached 30 % (1 MT) the driving pump was switched on. The blending through CCBL® JET has started in pre-mix mode. In parallel with blending, dosing/feeding the tank with the rest 70 % (2 MT) of the volume continue. After 100% loading the tank the blending through CCBL® JET has started in main mode.
Main blending time through CCBL® JET took 10 minutes.

After completion of the blending samples were taken from the tank.
The first sample was taken immediately after completion and the second after 30 minutes.

Operational parameters:

- Temperature of the composition of base oils and additives: +32.2˚C
- Temperature after blending through CCBL®: +34.1˚C
- El. Consumption at CCBL®: 3.97 KWh
- Total time: dosing and blending: 20 minutes
- Volume: 3 MT

CONCLUSION
The blended lube oil through CCBL® JET is in conformity with the PRISTA manufacturing specification.
The finish lube oil is well homogenized, without any need for corrections.

ATTACHMENTS
1. Certificate of analysis

Accredited Laboratory,
Certificate of Accreditation
REG. No. 31-ЛИ/09.12.2015,
Effective until 09.12.2019
Issued by BAS, as per the requirements of EN ISO/IEC 17025:2006

TEST REPORT
№ 086 / 21.07.2016

1. Motor Oils- Motor Oil "PRISTA ® SUPER BENZIN 10W- 40"- sample № 1
/name of the product under test (type, brand, etc.), product code/

2. Name of the requester:
"GQ Oil Inovation", Poland, Warszawa, ul."Topazova" 26; Mr.Sergey Mediansky; Request №014/20.07.2016 of PPTL; Representative sample is taken with sampling certificate 12/0073/20.07.2016 from "BULGARCONTROLA"AD- representation Ruse, from expert Kamelia Anastasova, according to EN ISO 3170.
/name and address of the requester (who placed the order for the analysis), date of sampling, protocol №, letter accompanying the request/

3. Standard Methods:
3.1 ASTM D445 – Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)- **Kinematic Viscosity**
3.2 ASTM D2270- Standard Practice for Calculating Viscosity Index from Kinematic Viscosity at 40° and 100°C - **Viscosity Index**
3.3 ASTM D92- Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester - **Flash Point Open Cup**
3.4 ASTM D97- Standard Test Method for Pour Point of Petroleum Products - **Pour Point**
3.5 ASTM D5293- Standard Test Method for Apparent Viscosity of Engine Oils and Base Stocks between –5° and –35°C using Cold-Cranking Simulator – **CCS- Apparent Viscosity at Low Temperatures**
3.6 ASTM D2896- Standard Test Method for Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration. – **Total Base Number by Potentiometric Perchloric Acid Titration**
3.7 BDS ISO 3733- Petroleum Products. Determination of Water Content. - **Water Content**
3.8 ASTM D892- Standard Test Method for Foaming Characteristics of Lubricating Oils - **Foaming Properties**
3.9 ASTM D1298- Standard Test Method for Density, Relative Density or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method – **Density**
3.10 ASTM D6278-Standard Test Method for Shear Stability of Polymer Containing Fluids Using a European Diesel Injector Apparatus .- **Shear Stability**
3.11 ASTM D5800- Standard Test Method for Evaporation Loss of Lubricating Oils by the Noack Method- **Evaporation Loss by Noack**
3.12 ASTM D874- Standard Test Method for Sulfated Ash from Lubricating Oils and Additives- **Sulfated Ash**
3.13 ASTM D4951- Standard Test Method for Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry- **Calcium, Zinc, Phosphorus Content**
/identifications and number of the standard test methods or validated test methods, parameters/

4. Target of the test:

PETROLEUM PRODUCTS TESTING LABORATORY PPTL

Chief of the PPTL Dimova P.....
/family,signature,stamp/

Determination of parameters, according to the technical requirements of the requester, given at the Request №014/20.07.2016 of PPTL

5. Date of Receipt of the Sample in the Laboratory: 20.07.2016

6. Sample Quantity:
2 glass bottles of 1.0 ℓ /sealed, labeled and marked/, with representative sample motor oil **„PRISTA ® Super Benzin 10W-40",** batch № 1607167 CCBL- R67, sample № 1, taken, from R67 on production site of the firm. The representative sample is taken with sampling certificate № 12/0073/20.07.2016 of "BULGARCONTROLA" AD- representation Ruse. The sample is taken from expert Kamelia Anastasova according to EN ISO 3170.
/ sample quantity, mass, package, quantity of batches, date of producing/

7. Date of executing the testing: 20.07.2016-21.07.2016

PETROLEUM PRODUCTS TESTING LABORATORY * PPTL *

Chief of the PPTL Dimova P.....
/family, signature, stamp/

8. TEST RESULTS

8.1 Tests (analyses) in the scope of accreditation

No.	Parameters	Units of measure ment	Test methods/ standards, validated methods	Motor Oil "PRISTA ® SUPER BENZIN 10W-40"– batch № 1607167 CCBL- R67 20.07.2016- **Sample № 1**	Parameter value and value tolerances of parameter FTS M 005/2016-07-07
1	2	3	4	5	6
1.	Kinematic Viscosity at 40 °C	mm^2/s	ASTM D445-15a	101.90	report
2.	Kinematic Viscosity at 100 °C	mm^2/s	ASTM D445-15a	15.286	14-16
3.	Viscosity Index	-	ASTM D2270-10(2016)	158	min 140
4.	Flash Point Open Cup	°C	ASTM D92-16	242	min 200
5.	Pour Point	°C	ASTM D97-16	below minus 39	max minus 30
6.	CCS- Apparent Viscosity at minus 25°C	mPa.s	ASTM D5293-15	5950	max 7000
7.	Total Base Number by Potentiometric Perchloric Acid Titration	mg KOH/g	ASTM D2896-15	8.16	min 8.0
8.	Water Content	%	BDS ISO 3733:2003	none	max 0.05
9.	Foaming Properties (Foaming Tendency: - Sequence I at /24.0 ± 0.5/ °C - Sequence II at /93.5 ± 0.5/ °C - Sequence III at /24.0 ± 0.5/ °C after Sequence II at /93.5 ± 0.5/ °C Foaming Stability: - Sequence I at /24.0 ± 0.5/ °C - Sequence II at /93.5 ± 0.5/ °C - Sequence III at /24.0 ± 0.5/ °C after Sequence II at /93.5 ± 0.5/ °C)	ml	ASTM D892-13e1	 0 0 0 0 0 0	max 10 50 10 0 0 0
10.	Density at 20°C	g/ml	ASTM D1298-12b	0.8709	report
11.	Shear Stability after 30 cycles (-Kinematic Viscosity at 100 °C)	mm^2/s	ASTM D6278-12e1 ASTM D445-15a	 14.389	 min 12.5
12.	Evaporation Loss by Noack	%	ASTM D5800-15a	12.2	max 13
13.	Sulfated Ash	%	ASTM D874-13a	1.06	max 1.1

Chief of the PPTL Dimova P.....
(/family,signature,stamp/

PETROLEUM PRODUCTS TESTING LABORATORY * PPTL *

14.	Calcium Content	%	ASTM D4951-14	0.261	min 0.23
15.	Zinc Content	%	ASTM D4951-14	0.092	min 0.09
16.	Phosphorus Content	%	ASTM D4951-14	0.086	min 0.08

Note: The results apply only for the tested samples. It is not allowed to make copies of parts of the test report without the prior written permission of the testing laboratory.

Analyst:

1. Ilieva ..... /family name, signature/
2. Bileva ..... /family name, signature/
3. I.Ivanova ..... /family name, signature/
4. Kerim ..... /family name, signature/
5. eng.Petkov ..... /family name, signature/
6. Pesheva ..... /family name, signature/
7. eng.Mirchev ..... /family name, signature/
8. Milusheva ..... /family name, signature/

Chief of the PPTL Dimova P..... /family, signature, stamp/

PETROLEUM PRODUCTS TESTING LABORATORY * PPTL *

Accredited Laboratory,
Certificate of Accreditation
REG. No. 31-ЛИ/09.12.2015,
Effective until 09.12.2019
Issued by BAS, as per the requirements of EN ISO/IEC 17025:2006

TEST REPORT
№ 087 / 21.07.2016

1. Motor Oils- Motor Oil "PRISTA ® SUPER BENZIN 10W- 40"- sample № 2
/name of the product under test (type, brand, etc.), product code/

2. Name of the requester:
"GQ Oil Inovation", Poland, Warszawa, ul."Topazova" 26; Mr.Sergey Mediansky; Request №014/20.07.2016 of PPTL; Representative sample is taken with sampling certificate 12/0074/20.07.2016 from "BULGARCONTROLA"AD- representation Ruse, from expert Kamelia Anastasova, according to EN ISO 3170.
/name and address of the requester (who placed the order for the analysis), date of sampling, protocol №, letter accompanying the request/

3. Standard Methods:
3.1 ASTM D445 – Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)- **Kinematic Viscosity**
3.2 ASTM D2270- Standard Practice for Calculating Viscosity Index from Kinematic Viscosity at 40° and 100°C - **Viscosity Index**
3.3 ASTM D92- Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester - **Flash Point Open Cup**
3.4 ASTM D97- Standard Test Method for Pour Point of Petroleum Products - **Pour Point**
3.5 ASTM D5293- Standard Test Method for Apparent Viscosity of Engine Oils and Base Stocks between –5° and –35°C using Cold-Cranking Simulator – **CCS- Apparent Viscosity at Low Temperatures**
3.6 ASTM D2896- Standard Test Method for Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration. – **Total Base Number by Potentiometric Perchloric Acid Titration**
3.7 BDS ISO 3733- Petroleum Products. Determination of Water Content. - **Water Content**
3.8 ASTM D892- Standard Test Method for Foaming Characteristics of Lubricating Oils - **Foaming Properties**
3.9 ASTM D1298- Standard Test Method for Density, Relative Density or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method – **Density**
3.10 ASTM D6278-Standard Test Method for Shear Stability of Polymer Containing Fluids Using a European Diesel Injector Apparatus .- **Shear Stability**
3.11 ASTM D5800- Standard Test Method for Evaporation Loss of Lubricating Oils by the Noack Method- **Evaporation Loss by Noack**
3.12 ASTM D874- Standard Test Method for Sulfated Ash from Lubricating Oils and Additives- **Sulfated Ash**
3.13 ASTM D4951- Standard Test Method for Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry- **Calcium, Zinc, Phosphorus Content**
/identifications and number of the standard test methods or validated test methods, parameters/

PETROLEUM PRODUCTS TESTING LABORATORY

Chief of the PPTL Dimova .....
/family,signature,stamp/

4. Target of the test:
Determination of parameters, according to the technical requirements of the requester, given at the Request №014/20.07.2016 of PPTL

5. Date of Receipt of the Sample in the Laboratory: 20.07.2016

6. Sample Quantity:
2 glass bottles of 1.0 ℓ /sealed, labeled and marked/, with representative sample motor oil **„PRISTA ® Super Benzin 10W-40",** batch № 1607167 CCBL- R67, sample № 2, taken, from R67 on production site of the firm. The representative sample is taken with sampling certificate № 12/0074/20.07.2016 of "BULGARCONTROLA" AD- representation Ruse. The sample is taken from expert Kamelia Anastasova according to EN ISO 3170.
/ sample quantity, mass, package, quantity of batches, date of producing/

7. Date of executing the testing: 20.07.2016-21.07.2016

Chief of the PPTL Dimova P.....
/family, signature, stamp/

8. TEST RESULTS

8.1 Tests (analyses) in the scope of accreditation

No.	Parameters	Units of measure ment	Test methods/ standards, validated methods	Motor Oil "PRISTA ® SUPER BENZIN 10W-40"– batch № 1607167 CCBL- R67 20.07.2016- **Sample № 2**	Parameter value and value tolerances of parameter FTS M 005/2016-07-07
1	2	3	4	5	6
1.	Kinematic Viscosity at 40 °C	mm^2/s	ASTM D445-15a	102.46	report
2.	Kinematic Viscosity at 100 °C	mm^2/s	ASTM D445-15a	15.351	14-16
3.	Viscosity Index	-	ASTM D2270-10(2016)	158	min 140
4.	Flash Point Open Cup	°C	ASTM D92-16	240	min 200
5.	Pour Point	°C	ASTM D97-16	below minus 39	max minus 30
6.	CCS- Apparent Viscosity at minus 25°C	mPa.s	ASTM D5293-15	5950	max 7000
7.	Total Base Number by Potentiometric Perchloric Acid Titration	mg KOH/g	ASTM D2896-15	8.17	min 8.0
8.	Water Content	%	BDS ISO 3733:2003	none	max 0.05
9.	Foaming Properties (Foaming Tendency: - Sequence I at /24.0 ± 0.5/ °C - Sequence II at /93.5 ± 0.5/ °C - Sequence III at /24.0 ± 0.5/ °C after Sequence II at /93.5 ± 0.5/ °C Foaming Stability: - Sequence I at /24.0 ± 0.5/ °C - Sequence II at /93.5 ± 0.5/ °C - Sequence III at /24.0 ± 0.5/ °C after Sequence II at /93.5 ± 0.5/ °C)	ml	ASTM D892-13e1	 0 0 0 0 0 0	max 10 50 10 0 0 0
10.	Density at 20°C	g/ml	ASTM D1298-12b	0.8709	report
11.	Shear Stability after 30 cycles (-Kinematic Viscosity at 100 °C)	mm^2/s	ASTM D6278-12e1 ASTM D445-15a	 14.566	 min 12.5
12.	Evaporation Loss by Noack	%	ASTM D5800-15a	12.1	max 13
13.	Sulfated Ash	%	ASTM D874-13a	1.06	max 1.1

Chief of the PPTL Dimova P.....
/family,signature,stamp/

PETROLEUM PRODUCTS TESTING LABORATORY * PPTL *

14.	Calcium Content	%	ASTM D4951-14	0.263	min 0.23
15.	Zinc Content	%	ASTM D4951-14	0.093	min 0.09
16.	Phosphorus Content	%	ASTM D4951-14	0.087	min 0.08

Note: The results apply only for the tested samples. It is not allowed to make copies of parts of the test report without the prior written permission of the testing laboratory.

Analyst:

1. Ilieva ..... /family name, signature/
2. Bileva ..... /family name, signature/
3. I.Ivanova ..... /family name, signature/
4. Kerim ..... /family name, signature/
5. eng.Petkov ..... /family name, signature/
6. Pesheva ..... /family name, signature/
7. eng.Mirchev ..... /family name, signature/
8. Milusheva ..... /family name, signature/

Chief of the PPTL Dimova P..... /family, signature, stamp/

PETROLEUM PRODUCTS TESTING LABORATORY * PPTL *

TEST NO 2

Lube oil: Marine cylinder oil "PRISTA® MARINE CM 50/70 "

Components	% rate
Brst	28,75%
SN 500	49,15%
Add 1	22,00%
Add 2 PPD	0,10%
	100,00%

DESCRIPTION OF THE TEST
As per the general procedure, described in point 4 above.
Purpose: to compare the lab results of lube oil blended through CCBL® JET with the PRISTA product specification.
Volume: 6 MT

Dosing of base oils and additives by feeding 10 cubic meter tank. Feeding the tank took 20 min.
When the feed volume reached 30 % (1,8 MT) the driving pump was switched on. The blending through CCBL® JET has started in premix mode. In parallel with mixing, dosing/feeding the tank with the rest 70 % (4,2 MT) of the volume continued. After 100% loading the tank the blending through CCBL® JET has started in main mode.
Main blending time through CCBL® JET took 20 minutes.

After completion of the mixing samples were taken from the tank.
The first sample was taken immediately after completion and the second after 30 minutes

Operational parameters:

- Pre-mix temperature: +31.6˚C
- Temperature after CCBL®: +33.8˚C
- El. Consumption at CCBL®: 7.94 KWh
- Total time for dosing & blending: 40 minutes
- Volume: 6MT

CONCLUSION
The lab results of sample 1 and sample 2 are practically identical. The marine cylinder oil was produced within the target specification, without the need for any correction measures like additional additive treatment and mechanical blending. The product can be released for further operation like drumming or deliveries in bulk.

ATTACHMENTS
1. Certificate of analysis

Accredited Laboratory,
Certificate of Accreditation
REG. No. 31-ЛИ/09.12.2015,
Effective until 09.12.2019,
Issued by BAS, as per the requirements of EN ISO/IEC 17025:2006

TEST REPORT
№ 088 / 21.07.2016

1. Motor Oils- Marine Oil "PRISTA ® MARINE CM 50/70"- sample № 1
/name of the product under test (type, brand, etc.), product code/

2. Name of the requester:
"GQ Oil Inovation", Poland, Warszawa, ul."Topazova" 26; Mr.Sergey Mediansky; Request №015/20.07.2016 of PPTL; Representative sample is taken with sampling certificate 12/0075/20.07.2016 from "BULGARCONTROLA"AD- representation Ruse, from expert Kamelia Anastasova, according to EN ISO 3170.
/name and address of the requester (who placed the order for the analysis), date of sampling, protocol №, letter accompanying the request/

3. Standard Methods:
3.1 ASTM D445 – Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)- **Kinematic Viscosity**
3.2 ASTM D2270- Standard Practice for Calculating Viscosity Index from Kinematic Viscosity at 40° and 100°C - **Viscosity Index**
3.3 ASTM D92- Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester - **Flash Point Open Cup**
3.4 ASTM D97- Standard Test Method for Pour Point of Petroleum Products - **Pour Point**
3.5 ASTM D2896- Standard Test Method for Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration. – **Total Base Number by Potentiometric Perchloric Acid Titration**
3.6 BDS ISO 3733- Petroleum Products. Determination of Water Content. - **Water Content**
3.7 ASTM D892- Standard Test Method for Foaming Characteristics of Lubricating Oils- **Foaming Properties**
3.8 ASTM D1298- Standard Test Method for Density, Relative Density or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method – **Density**
3.9 ASTM D874- Standard Test Method for Sulfated Ash from Lubricating Oils and Additives- **Sulfated Ash**
3.10 ASTM D4951- Standard Test Method for Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry- **Calcium Content**
/identifications and number of the standard test methods or validated test methods, parameters/

4. Target of the test:
Determination of parameters, according to the technical requirements of the requester, given at the Request №015/20.07.2016 of PPTL

5. Date of Receipt of the Sample in the Laboratory: 20.07.2016

PETROLEUM PRODUCTS TESTING LABORATORY PPTL

Chief of the PPTL Dimova P. .....
/family,signature,stamp/

6. Sample Quantity:

2 glass bottles of 1.0 ℓ /sealed, labeled and marked/, with representative sample **Marine Oil "PRISTA ® MARINE CM 50/70"** batch № 1607171 CCBL- R67, sample № 1, taken, from R67 on production site of the firm. The representative sample is taken with sampling certificate № 12/0075/20.07.2016 of "BULGARCONTROLA" AD- representation Ruse. The sample is taken from expert Kamelia Anastasova according to EN ISO 3170.

/ sample quantity, mass, package, quantity of batches, date of producing/

7. Date of executing the testing: 20.07.2016-21.07.2016

PETROLEUM PRODUCTS TESTING LABORATORY PPTL

Chief of the PPTL Dimova P.....

/ /family, signature, stamp/

8. TEST RESULTS

8.1 Tests (analyses) in the scope of accreditation

No.	Parameters	Units of measure ment	Test methods/ standards, validated methods	Test Results Marine Oil "PRISTA ® MARINE CM 50/70"– batch № 1607171 CCBL- R67 20.07.2016 Sample № 1	Parameter value and value tolerances of parameter FTS K 002/2015-08-10
1	2	3	4	5	6
1.	Kinematic Viscosity at 40 °C	mm^2/s	ASTM D445-15a	215.43	18.5 – 20.5
2.	Kinematic Viscosity at 100 °C	mm^2/s	ASTM D445-15a	19.493	report
3.	Viscosity Index	-	ASTM D2270-10(2016)	103	min 90
4.	Flash Point Open Cup	°C	ASTM D92-16	254	min 220
5.	Pour Point	°C	ASTM D97-16	minus 24	max minus 3
6.	Total Base Number by Potentiometric Perchloric Acid Titration	mg KOH/g	ASTM D2896-15	70.9	65.9-76.3
7.	Water Content	%	BDS ISO 3733:2003	none	max 0.1
8.	Foaming Properties (Foaming Tendency: - Sequence I at /24.0 ± 0.5/ °C - Sequence II at /93.5 ± 0.5/ °C - Sequence III at /24.0 ± 0.5/ °C after Sequence II at /93.5 ± 0.5/ °C Foaming Stability: - Sequence I at /24.0 ± 0.5/ °C - Sequence II at /93.5 ± 0.5/ °C - Sequence III at /24.0 ± 0.5/ °C after Sequence II at /93.5 ± 0.5/ °C)	ml	ASTM D892-13e1	 0 0 0 0 0 0	max 50 50 50 0 0 0
9.	Density at 20°C	g/ml	ASTM D1298-12b	0.9273	report
10.	Sulfated Ash	%	ASTM D874-13a	8.92	report
11.	Calcium Content	%	ASTM D4951-14	2.821	2.511 – 2.907

Note: The results apply only for the tested samples. It is not allowed to make copies of parts of the test report without the prior written permission of the testing laboratory.

Analyst: 1. Markova ..... /family name, signature/
2. Bileva ..... /family name, signature/
3. Ivanova ..... /family name, signature/
4. Pesheva ..... /family name, signature/

Chief of the PPTL Dimova P. ..... /family, signature stamp/

PETROLEUM PRODUCTS TESTING LABORATORY PPTL

Accredited Laboratory,
Certificate of Accreditation
REG. No. 31-ЛИ/09.12.2015,
Effective until 09.12.2019
Issued by BAS, as per the requirements of EN ISO/IEC 17025:2006

TEST REPORT
№ 089 / 21.07.2016

1. Motor Oils- Marine Oil "PRISTA ® MARINE CM 50/70"- sample № 2
/name of the product under test (type, brand, etc.), product code/

2. Name of the requester:
"GQ Oil Inovation", Poland, Warszawa, ul."Topazova" 26; Mr.Sergey Mediansky; Request №015/20.07.2016 of PPTL; Representative sample is taken with sampling certificate 12/0076/20.07.2016 from "BULGARCONTROLA"AD- representation Ruse, from expert Kamelia Anastasova, according to EN ISO 3170.
/name and address of the requester (who placed the order for the analysis), date of sampling, protocol №, letter accompanying the request/

3. Standard Methods:
3.1 ASTM D445 – Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)- **Kinematic Viscosity**
3.2 ASTM D2270- Standard Practice for Calculating Viscosity Index from Kinematic Viscosity at 40° and 100°C - **Viscosity Index**
3.3 ASTM D92- Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester - **Flash Point Open Cup**
3.4 ASTM D97- Standard Test Method for Pour Point of Petroleum Products - **Pour Point**
3.5 ASTM D2896- Standard Test Method for Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration. – **Total Base Number by Potentiometric Perchloric Acid Titration**
3.6 BDS ISO 3733- Petroleum Products. Determination of Water Content. - **Water Content**
3.7 ASTM D892- Standard Test Method for Foaming Characteristics of Lubricating Oils- **Foaming Properties**
3.8 ASTM D1298- Standard Test Method for Density, Relative Density or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method – **Density**
3.9 ASTM D874- Standard Test Method for Sulfated Ash from Lubricating Oils and Additives- **Sulfated Ash**
3.10 ASTM D4951- Standard Test Method for Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry- **Calcium Content**
/identifications and number of the standard test methods or validated test methods, parameters/

4. Target of the test:
Determination of parameters, according to the technical requirements of the requester, given at the Request №015/20.07.2016 of PPTL

5. Date of Receipt of the Sample in the Laboratory: 20.07.2016

PETROLEUM PRODUCTS TESTING LABORATORY PPTL

Chief of the PPTL Dimova P..... .....
/family,signature,stamp/

6. Sample Quantity:
2 glass bottles of 1.0 ℓ /sealed, labeled and marked/, with representative sample **Marine Oil "PRISTA ® MARINE CM 50/70"** batch № 1607171 CCBL- R67, sample № 2, taken, from R67 on production site of the firm. The representative sample is taken with sampling certificate № 12/0076/20.07.2016 of "BULGARCONTROLA" AD- representation Ruse. The sample is taken from expert Kamelia Anastasova according to EN ISO 3170.

/ sample quantity, mass, package, quantity of batches, date of producing/

7. Date of executing the testing: 20.07.2016-21.07.2016

PETROLEUM PRODUCTS TESTING LABORATORY PPTL

Chief of the PPTL Dimova /.....
/family, signature, stamp/

8. TEST RESULTS

8.1 Tests (analyses) in the scope of accreditation

No.	Parameters	Units of measure ment	Test methods/ standards, validated methods	Test Results Marine Oil "PRISTA ® MARINE CM 50/70"– batch № 1607171 CCBL- R67 20.07.2016 Sample № 2	Parameter value and value tolerances of parameter FTS K 002/2015-08-10
1	2	3	4	5	6
1.	Kinematic Viscosity at 40 °C	mm^2/s	ASTM D445-15a	215.63	18.5 – 20.5
2.	Kinematic Viscosity at 100 °C	mm^2/s	ASTM D445-15a	19.385	report
3.	Viscosity Index	-	ASTM D2270-10(2016)	102	min 90
4.	Flash Point Open Cup	°C	ASTM D92-16	256	min 220
5.	Pour Point	°C	ASTM D97-16	minus 24	max minus 3
6.	Total Base Number by Potentiometric Perchloric Acid Titration	mg KOH/g	ASTM D2896-15	70.5	65.9-76.3
7.	Water Content	%	BDS ISO 3733:2003	none	max 0.1
8.	Foaming Properties (Foaming Tendency:	ml			max
	- Sequence I at /24.0 ± 0.5/ °C			0	50
	- Sequence II at /93.5 ± 0.5/ °C			0	50
	- Sequence III at /24.0 ± 0.5/ °C			0	50
	after Sequence II at /93.5 ± 0.5/ °C		ASTM D892-13e1		
	Foaming Stability:				
	- Sequence I at /24.0 ± 0.5/ °C			0	0
	- Sequence II at /93.5 ± 0.5/ °C			0	0
	- Sequence III at /24.0 ± 0.5/ °C			0	0
	after Sequence II at /93.5 ± 0.5/ °C)				
9.	Density at 20°C	g/ml	ASTM D1298-12b	0.9273	report
10.	Sulfated Ash	%	ASTM D874-13a	8.94	report
11.	Calcium Content	%	ASTM D4951-14	2.811	2.511 – 2.907

Note: The results apply only for the tested samples. It is not allowed to make copies of parts of the test report without the prior written permission of the testing laboratory.

Analyst: 1. Markova ..... /family name, signature/

2. Bileva ..... /family name, signature/

3. Ivanova ..... /family name, signature/

4. Pesheva ..... /family name, signature/

Chief of the PPTL Dimova P. ..... /family,signature,stamp/

TEST No 3

Lube oil: MWF (Metal Working Fluid) PRISTA REZINOL HD 22

Components	% rate
SN 100	90,00%
ADD 1	4 %
ADD 2	4 %
ADD 3	2 %
	100,00%

DESCRIPTION OF THE TEST
Purpose: to evaluate the effectiveness of CCBL® JET for blending metal working fluid.
Volume: 3 MT

As per the general procedure, described in point 4 above.
Purpose: to compare the lab results of lube oil blended through CCBL® JET with the PRISTA product specification.
Volume: 3 MT

Dosing of base oils and additives by feeding 10 cubic meter tank. Feeding the tank took 20 min.
When the feed volume reached 30 % (1 MT) the driving pump was switched on. The blending through CCBL® JET has started in pre-mix mode. In parallel with mixing, dosing/feeding the tank with the rest 70 % (2 MT) of the volume continue. After 100% loading the tank the blending through CCBL® JET has started in main mode.
Main blending time through CCBL® took 30 minutes.

After completion of the blending samples were taken from the tank.
The first sample was taken immediately after completion and the second after 30 minutes.

Operational parameters:

- Pre-mix temperature: +29.3˚C
- Temperature after CCBL®: +31.5˚C
- El. Consumption at CCBL®: 9,92 KWh
- Total time dosing and blending: 50 minutes
- Volume: 3 MT

CONCLUSION
The lab results of sample 1 and sample 2 are practically identical. This verifies that the CCBL® JET blending process can homogenized in full finish MWF as per the required specification.

ATTACHMENTS
1. Certificate of analysis

Accredited Laboratory,
Certificate of Accreditation
REG. No. 31-ЛИ/09.12.2015,
Effective until 09.12.2019,
Issued by BAS, as per the requirements of EN ISO/IEC 17025:2006

TEST REPORT
№ 090 / 21.07.2016

1. Metal working fluids- Neat cutting oil "PRISTA REZINOL HD 22"- sample №1; sample №2
/name of the product under test (type, brand, etc.), product code/

2. Name of the requester:
"GQ Oil Inovation", Poland, Warszawa, ul."Topazova" 26; Mr.Sergey Mediansky; Request №016/21.07.2016 of PPTL; Representative samples, taken with sampling certificate 12/0077/21.07.2016; 12/0078/21.07.2016 from "BULGARCONTROLA"AD- representation Ruse, from expert Kamelia Anastasova, according to EN ISO 3170.
/name and address of the requester (who placed the order for the analysis), date of sampling, protocol №, letter accompanying the request/

3. Standard Methods:
3.1 Visual- Appearance
3.2 ASTM D445 – Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)- **Kinematic Viscosity**
3.3 BDS ISO 3733- Petroleum Products. Determination of Water Content. - **Water Content**
3.4 ASTM D1298- Standard Test Method for Density, Relative Density or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method – **Density**
/identifications and number of the standard test methods or validated test methods, parameters/

4. Target of the test:
Determination of parameters, according to the technical requirements of the requester, given at the Request №016/21.07.2016 of PPTL

5. Date of Receipt of the Sample in the Laboratory: 21.07.2016

6. Sample Quantity:
2 glass bottles of 1.0 ℓ each /sealed, labeled and marked/, with representative samples Metal working fluids- Neat cutting oil "**PRISTA REZINOL HD 22**", batch № 1607182 CCBL- R67, sample № 1 and sample № 2, taken, from R67 on production site of the firm. The representative samples are taken with sampling certificates 12/0077/21.07.2016; 12/0078/21.07.2016 of "BULGARCONTROLA" AD- representation Ruse. The sample is taken from expert Kamelia Anastasova according to EN ISO 3170.
/ sample quantity, mass, package, quantity of batches, date of producing/

7. Date of executing the testing: 21.07.2016

PETROLEUM PRODUCTS TESTING LABORATORY * PPTL *

Chief of the PPTL Dimova P. .....
/family,signature,stamp/

8. TEST RESULTS

8.1 Tests (analyses) in the scope of accreditation

No.	Parameters	Units of measurement	Test methods/ standards, validated methods	Neat cutting oil "PRISTA REZINOL HD 22", batch № 1607182 CCBL- R67, 21.07.2016, sample № 1	Neat cutting oil "PRISTA REZINOL HD 22", batch № 1607182 CCBL- R67, 21.07.2016, sample № 2	Parameter value and value tolerances of parameter FTS SOT M 012/ 2016-01-25
1	2	3	4	5		6
1.	Appearance	-	Visual	Liquid with light opalescence	Liquid with light opalescence	clear liquid, without mechanical impurities
2.	Kinematic Viscosity at 40 °C	mm^2/s	ASTM D445-15a	22.71	22.74	19.8-24.2
3.	Water Content	%	BDS ISO 3733:2003	none	none	max 0.05
4.	Density at 20°C	g/ml	ASTM D1298-12b	0.8723	0.8723	report

Note: The results apply only for the tested samples. It is not allowed to make copies of parts of the test report without the prior written permission of the testing laboratory.

Analyst: 1. Velkova ..... 2. Pesheva .....
/family name, signature/ /family name, signature/

PETROLEUM PRODUCTS TESTING LABORATORY PPTL

Chief of the PPTL Dimova P. .....
/family,signature,stamp/

Accredited Laboratory,
Certificate of Accreditation
REG. No. 31-ЛИ/09.12.2015,
Effective until 09.12.2019,
Issued by BAS, as per the requirements of EN ISO/IEC 17025:2006

TEST REPORT
№ 091 / 21.07.2016

1. Metal working fluids- Neat cutting oil "PRISTA REZINOL HD 22"- sample №3
/name of the product under test (type, brand, etc.), product code/

2. Name of the requester:
"GQ Oil Inovation", Poland, Warszawa, ul."Topazova" 26; Mr.Sergey Mediansky; Request №016/21.07.2016 of PPTL; Representative sample is taken with sampling certificate 12/0079/21.07.2016 from "BULGARCONTROLA"AD- representation Ruse, from expert Kamelia Anastasova, according to EN ISO 3170.
/name and address of the requester (who placed the order for the analysis), date of sampling, protocol №, letter accompanying the request/

3. Standard Methods:
3.1 Visual- Appearance
3.2 ASTM D445 – Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)- **Kinematic Viscosity**
3.3 ASTM D92- Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester - **Flash Point Open Cup**
3.4 ASTM D97- Standard Test Method for Pour Point of Petroleum Products - **Pour Point**
3.5 ASTM D2896- Standard Test Method for Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration. – **Total Base Number by Potentiometric Perchloric Acid Titration**
3.6 BDS ISO 3733- Petroleum Products. Determination of Water Content. - **Water Content**
3.7 ASTM D1298- Standard Test Method for Density, Relative Density or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method – **Density**
3.8 ASTM D1500- Standard Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)- **Color**
3.9 ASTM D4172- Standard Test Method for Wear Preventive Characteristics of Lubricating Fluid (Four-Ball Method)- **Scar Diameter**
3. ASTM D2783- Standard Test Method for Measurement of Extreme-Pressure Properties of Lubricating Fluids (Four-Ball Method)- **Weld Point**
/identifications and number of the standard test methods or validated test methods, parameters/

4. Target of the test:
Determination of parameters, according to the technical requirements of the requester, given at the Request №016/21.07.2016 of PPTL

5. Date of Receipt of the Sample in the Laboratory: 21.07.2016

PETROLEUM PRODUCTS TESTING LABORATORY PPTL

Chief of the PPTL Dimova P. .....
/family,signature,stamp/

6. Sample Quantity:
2 glass bottles of 1.0 ℓ /sealed, labeled and marked/, with representative sample Metal working fluids- Neat cutting oil "**PRISTA REZINOL HD 22**", batch № 1607182 CCBL- R67, sample № 3, taken, from R67 on production site of the firm. The representative sample is taken with sampling certificate № 12/0079/21.07.2016 of "BULGARCONTROLA" AD- representation Ruse. The sample is taken from expert Kamelia Anastasova according to EN ISO 3170.

/ sample quantity, mass, package, quantity of batches, date of producing/

7. Date of executing the testing: 21.07.2016

PETROLEUM PRODUCTS TESTING LABORATORY

Chief of the PPTL Dimova P. ..PPTL.....
/family, signature, stamp/

8. TEST RESULTS

8.1 Tests (analyses) in the scope of accreditation

No.	Parameters	Units of measurement	Test methods/ standards, validated methods	Neat cutting oil "PRISTA REZINOL HD 22", batch № 1607182 CCBL- R67, 21.07.2016, sample № 3	Parameter value and value tolerances of parameter FTS SOT M 012/ 2016-01-25
1	2	3	4	5	6
1.	Appearance	-	Visual	clear liquid	clear liquid, without mechanical impurities
2.	Kinematic Viscosity at 40 °C	mm^2/s	ASTM D445-15a	22.60	19.8-24.2
3.	Flash Point Open Cup	°C	ASTM D92-16	198	min 150
4.	Pour Point	°C	ASTM D97-16	minus 24	max minus 12
5.	Total Base Number by Potentiometric Perchloric Acid Titration	mg KOH/g	ASTM D2896-15	16.9	min 16
6.	Water Content	%	BDS ISO 3733:2003	none	max 0.05
7.	Density at 20°C	g/ml	ASTM D1298-12b	0.8724	report
8.	Color	-	ASTM D1500-12	L 2.5	max 3
9.	Scar Diameter	mm	ASTM D4172-94 (2016)	0.63	report
10.	Weld Point	daN	ASTM D2783-03 (2014)	800	min 800

Note: The results apply only for the tested samples. It is not allowed to make copies of parts of the test report without the prior written permission of the testing laboratory.

Analyst:

1. Velkova ..... /family name, signature/
2. Krumova ..... /family name, signature/
3. Atanasova ..... /family name, signature/
4. eng.Petkov ..... /family name, signature/
5. Pesheva ..... /family name, signature/

Chief of the PPTL Dimova P..... /family,signature,stamp/

TEST No 4

Lube oil: MWF (Metal Working Fluid) PRISTA EMULSOL B

Components	% rate
SN 150	78,00%
ADD 1	20,00%
ADD 2	2,00%
	100,00%

DESCRIPTION OF THE TEST
Purpose: to evaluate the effectiveness of CCBL® JET for mixing metal working fluid.
Volume: 3 MT

As per the general procedure, described in point 4 above.
Purpose: to compare the lab results of lube oil blended through CCBL® JET with the PRISTA product specification.
Volume: 3 MT

Dosing of base oils and additives by feeding 10 cubic meter tank. Feeding the tank took 20 min.
When the feed volume reached 30 % (1 MT) the driving pump was switched on. The blending through CCBL® JET has started in pre-mix mode. In parallel with mixing, dosing/feeding the tank with the rest 70 % (2 MT) of the volume continue. After 100% loading the tank the blending through CCBL® JET has started in main mode.
Main blending time through CCBL® took 30 minutes.

After completion of the mixing samples were taken from the tank.
The first sample was taken immediately after completion and the second after 30 minutes.

Operational parameters:

- Pre-mix temperature: +36.1˚C
- Temperature after CCBL®: +38.6˚C
- El. Consumption at CCBL®: 9,92 KWh
- Total time for dosing and blending: 50 minutes
- Volume: 3 MT

CONCLUSION
The lab results of sample 1 and sample 2 are practically identical. All results show conformity with the specification limits.

ATTACHMENTS
1. Certificate of analysis

Accredited Laboratory,
Certificate of Accreditation
REG. No. 31-ЛИ/09.12.2015,
Effective until 09.12.2019,
Issued by BAS, as per the requirements of EN ISO/IEC 17025:2006

TEST REPORT
№ 092 / 22.07.2016

1. Metal working fluids- Metal working fluid "PRISTA EMULSOL B"- sample №1
/name of the product under test (type, brand, etc.), product code/

2. Name of the requester:
"GQ Oil Inovation", Poland, Warszawa, ul."Topazova" 26; Mr.Sergey Mediansky; Request №017/21.07.2016 of PPTL; Representative sample is taken with sampling certificate 12/0080/21.07.2016 from "BULGARCONTROLA"AD- representation Ruse, from expert Kamelia Anastasova, according to EN ISO 3170.
/name and address of the requester (who placed the order for the analysis), date of sampling, protocol №, letter accompanying the request/

3. Standard Methods:
3.1 Visual- Appearance
3.2 ASTM D445 – Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)- **Kinematic Viscosity**
3.3 ASTM D92- Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester - **Flash Point Open Cup**
3.4 BDS 1752- Petroleum products. Determination of acidity and acid number.- **Neutralization number**
3.5 BDS 16749- Chemical Products. Potentiometric method for determination of water solutions pH- **pH**
3.6 BDS 14887- Lubricating-cooling fluids. Method for determination of foaming characteristics of aqueous emulsion and solutions.- **Foaming properties**
3.7 BDS 15014- Metalworking fluids. Determination of emulsion velocity.- **Emulsion velocity**
3.8 ASTM D1298- Standard Test Method for Density, Relative Density or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method – **Density**
/identifications and number of the standard test methods or validated test methods, parameters/

4. Target of the test:
Determination of parameters, according to the technical requirements of the requester, given at the Request №017/21.07.2016 of PPTL

5. Date of Receipt of the Sample in the Laboratory: 21.07.2016

6. Sample Quantity:
2 glass bottles of 1.0 ℓ /sealed, labeled and marked/, with representative sample Metal working fluid "**PRISTA EMULSOL B**", batch № 1607183 CCBL- R67, sample № 1, taken, from R67 on production site of the firm. The representative sample is taken with sampling certificate № 12/0080/21.07.2016 of "BULGARCONTROLA" AD- representation Ruse. The sample is taken from expert Kamelia Anastasova according to EN ISO 3170.
/ sample quantity, mass, package, quantity of batches, date of producing/

7. Date of executing the testing: 21.07.2016-22.07.2016

Chief of the PPTL Dimova P.
/family,signature,stamp/

8. TEST RESULTS

8.1 Tests (analyses) in the scope of accreditation

No.	Parameters	Units of measure ment	Test methods/ standards, validated methods	Metal working fluid "PRISTA EMULSOL B", batch № 1607183 CCBL- R67, 21.07.2016, sample № 1	Parameter value and value tolerances of parameter FTS SOT V 01/ 2016-04-27
1	2	3	4	5	6
1.	Appearance	-	Visual	clear liquid, without mechanical impurities	clear liquid, without mechanical impurities
2.	Kinematic Viscosity at 40 °C	mm^2/s	ASTM D445-15a	39.87	report
3.	Flash Point Open Cup	°C	ASTM D92-16	146	min 130
4.	Neutralization number	mgKOH/g	BDS 1752- 88	6.24	min 4.5
5.	pH	-	BDS 14843-79	9.26	8.5-10
6.	Foaming properties - tendency - time	 ml min	BDS 14887-79	 0 0	max 15 5
7.	Emulsion velocity	s	BDS 15014-80	300	report
8.	Density at 20°C	g/ml	ASTM D1298-12b	0.8922	report

Note: The results apply only for the tested samples. It is not allowed to make copies of parts of the test report without the prior written permission of the testing laboratory.

Analyst:
1. Kerim ..... /family name, signature/
2. Ivanova ..... /family name, signature/
3. I.Ivanova ..... /family name, signature/
4. Pesheva ..... /family name, signature/
5. Minova ..... /family name, signature/

PETROLEUM PRODUCTS TESTING LABORATORY PPTL

Chief of the PPTL Dimova P. .....
/family,signature,stamp/

Accredited Laboratory,
Certificate of Accreditation
REG. No. 31-ЛИ/09.12.2015,
Effective until 09.12.2019,
Issued by BAS, as per the requirements of EN ISO/IEC 17025:2006

TEST REPORT
№ 093 / 22.07.2016

1. Metal working fluids- Metal working fluid "PRISTA EMULSOL B"- sample №2
/name of the product under test (type, brand, etc.), product code/

2. Name of the requester:
"GQ Oil Inovation", Poland, Warszawa, ul."Topazova" 26; Mr.Sergey Mediansky; Request №017/21.07.2016 of PPTL; Representative sample is taken with sampling certificate 12/0081/21.07.2016 from "BULGARCONTROLA"AD- representation Ruse, from expert Kamelia Anastasova, according to EN ISO 3170.
/name and address of the requester (who placed the order for the analysis), date of sampling, protocol №, letter accompanying the request/

3. Standard Methods:
3.1 Visual- Appearance
3.2 ASTM D445 – Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)- **Kinematic Viscosity**
3.3 ASTM D92- Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester - **Flash Point Open Cup**
3.4 BDS 1752- Petroleum products. Determination of acidity and acid number.- **Neutralization number**
3.5 BDS 16749- Chemical Products. Potentiometric method for determination of water solutions pH- **pH**
3.6 BDS 14887- Lubricating-cooling fluids. Method for determination of foaming characteristics of aqueous emulsion and solutions.- **Foaming properties**
3.7 BDS 15014- Metalworking fluids. Determination of emulsion velocity.- **Emulsion velocity**
3.8 ASTM D1298- Standard Test Method for Density, Relative Density or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method – **Density**
/identifications and number of the standard test methods or validated test methods, parameters/

4. Target of the test:
Determination of parameters, according to the technical requirements of the requester, given at the Request №017/21.07.2016 of PPTL

5. Date of Receipt of the Sample in the Laboratory: 21.07.2016

6. Sample Quantity:
2 glass bottles of 1.0 ℓ /sealed, labeled and marked/, with representative sample Metal working fluid **"PRISTA EMULSOL B"**, batch № 1607183 CCBL- R67, sample № 2, taken, from R67 on production site of the firm. The representative sample is taken with sampling certificate № 12/0081/21.07.2016 of "BULGARCONTROLA" AD- representation Ruse. The sample is taken from expert Kamelia Anastasova according to EN ISO 3170.
/ sample quantity, mass, package, quantity of batches, date of producing/

7. Date of executing the testing: 21.07.2016-22.07.2016

Chief of the PPTL Dimova P.....
/family,signature,stamp/

8. TEST RESULTS

8.1 Tests (analyses) in the scope of accreditation

No.	Parameters	Units of measure ment	Test methods/ standards, validated methods	Metal working fluid "PRISTA EMULSOL B", batch № 1607183 CCBL- R67, 21.07.2016, sample № 2	Parameter value and value tolerances of parameter FTS SOT V 01/ 2016-04-27
1	2	3	4	5	6
1.	Appearance	-	Visual	clear liquid, without mechanical impurities	clear liquid, without mechanical impurities
2.	Kinematic Viscosity at 40 °C	mm^2/s	ASTM D445-15a	40.00	report
3.	Flash Point Open Cup	°C	ASTM D92-16	146	min 130
4.	Neutralization number	mgKOH/g	BDS 1752- 88	6.18	min 4.5
5.	pH	-	BDS 14843-79	9.27	8.5-10
6.	Foaming properties - tendency - time	 ml min	BDS 14887-79	 0 0	max 15 5
7.	Emulsion velocity	s	BDS 15014-80	300	report
8.	Density at 20°C	g/ml	ASTM D1298-12b	0.8922	report

Note: The results apply only for the tested samples. It is not allowed to make copies of parts of the test report without the prior written permission of the testing laboratory.

Analyst:
1. Kerim ..... /family name, signature/
2. Ivanova ..... /family name, signature/
3. I.Ivanova ..... /family name, signature/
4. Pesheva ..... /family name, signature/
5. Minova ..... /family name, signature/

PETROLEUM PRODUCTS TESTING LABORATORY * PPTL

Chief of the PPTL Dimova P..... /family,signature,stamp/

TEST No 5

Lube oil: Hydraulic oil PRISTA MHM b
DIN 51524 part II, ISO VG 46

Components	% rate
SN 150	60,189%
SN 500	39,00%
ADD 1	0,50%
ADD 2	0,30%
ADD 3	0,008%
ADD 4	0,003%
	100,00%

DESCRIPTION OF THE TEST
Purpose: to evaluate the effectiveness of the CCBL® JET blending process in production of hydraulic oil.

Purpose: to evaluate the effectiveness of CCBL® JET for blending metal working fluid.
Volume: 3 MT

As per the general procedure, described in point 4 above.
Purpose: to compare the lab results of lube oil blended through CCBL® JET with the PRISTA product specification.
Volume: 3 MT

Dosing of base oils and additives by feeding 10 cubic meter tank. Feeding the tank took 10 min.
When the feed volume reached 30 % (1 MT) the driving pump was switched on. The blending through CCBL® JET has started in pre-mix mode. In parallel with blending, dosing/feeding the tank with the rest 70 % (2 MT) of the volume continue. After 100% loading the tank the blending through CCBL® JET has started in main mode.
Main blending time through CCBL® took 10 minutes.

After completion of the mixing samples were taken from the tank.
The first sample was taken immediately after completion and the second after 30 minutes.
Second sample was taken after 60 min.

Operational parameters:

- Pre-mix temperature: +28.1˚C
- Temperature after CCBL®: +29.6˚C
- El. Consumption at CCBL®: 3.97 KWh
- Total time for dosing and blending: 20 minutes
- Volume: 3 MT

CONCLUSION

The lab results of sample 1 and sample 2 are practically identical. All results show conformity with the specification limits.

ATTACHMENTS

1. Certificate of analysis

Accredited Laboratory,
Certificate of Accreditation
REG. No. 31-ЛИ/09.12.2015,
Effective until 09.12.2019,
Issued by BAS,
As per the requirements of EN ISO/IEC 17025:2006

TEST REPORT
№ 084 / 20.07.2016

1. Hydraulic Oils- Hydraulic Oil "PRISTA ® MHM 46b"– sample №1
/name of the product /s under test (type, brand, etc.), product code/

2. Name of the requester:
"GQ Oil Inovation", Poland, Warszawa, ul."Topazova" 26; Mr.Sergey Mediansky; Request №013/19.07.2016 of PPTL; Representative sample is taken with sampling certificate 12/0071/19.07.2016 from "BULGARCONTROLA"AD- representation Ruse, from expert Kamelia Anastasova, according to EN ISO 3170.
/name and address of the requester (who placed the order for the analysis), date of sampling, protocol №, letter accompanying the request/

3. Standard Methods:
3.1 ASTM D445 – Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)- **Kinematic Viscosity**
3.2 ASTM D2270- Standard Practice for Calculating Viscosity Index from Kinematic Viscosity at 40° and 100°C - **Viscosity Index**
3.3 ASTM D92- Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester - **Flash Point Open Cup**
3.4 ASTM D97- Standard Test Method for Pour Point of Petroleum Products - **Pour Point**
3.5 BDS ISO 3733- Petroleum Products. Determination of Water Content. - **Water Content**
3.6 ASTM D130- Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test – **Corrosion on Copper Strip**
3.7 ASTM D3427- Standard Test Method for Air Release of Petroleum Oils- **Air Release Ability**
3.8 ASTM D892- Standard Test Method for Foaming Characteristics of Lubricating Oils - **Foaming Properties**
3.9 ASTM D1401- Standard Test Method for Water Separability of Petroleum Oils and Synthetic Fluids- **Water Separability**
3.10 ASTM D974- Standard Test Method for Acid and Base Number by Color-Indicator Titration- **Total Acid Number**
3.11 ASTM D1298- Standard Test Method for Density, Relative Density or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method – **Density**
3.12 ASTM D4951- Standard Test Method for Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry- **Zinc Content**
/identifications and number of the standard test methods or validated test methods, parameters/

4. Target of the test:
Determination of parameters, according to the technical requirements of the requester, given at the Request №013/19.07.2016 of PPTL

5. Date of Receipt of the Samples in the Laboratory: 19.07.2016

PETROLEUM PRODUCTS TESTING LABORATORY PPTL

Chief of the PPTL Dimova P.....
/family,signature,stamp/

6. Sample Quantity:
1 glass bottle of 1.0 ℓ by each sample /sealed, labeled and marked/, with representative sample hydraulic oil **„PRISTA ® MHM 46b"**, batch № 1607163 CCBL- R67, sample №1, taken from R67 on production site of the firm. Representative samples are taken with sampling certificates № 12/0071/19.07.2016, from "BULGARCONTROLA" AD- representation Ruse. The sample is taken from expert Kamelia Anastasova according to standard BDS EN ISO 3170.

/ sample quantity, mass, package, quantity of batches, date of producing/

7. Date of executing the testing: 19.07.2016 - 20.07.2016

Chief of the PPTL Dimova R.....
/family, signature, stamp/

8. TEST RESULTS

8.1 Tests (analyses) in the scope of accreditation

No.	Parameters	Units of measure ment	Test methods/ standards, validated methods	Hydraulic Oil "PRISTA ® MHM46b"– batch № 1607163 CCBL- R67 19.07.2016- Sample № 1	Parameter value and value tolerances of parameter FTS X 002/ 2016-02-09
1	2	3	4		6
1.	Kinematic Viscosity at 100°C	mm^2/s	ASTM D445-15a	6.803	report
2.	Kinematic Viscosity at 40°C	mm^2/s	ASTM D445-15a	46.59	41.4 – 50.6
3.	Viscosity Index	-	ASTM D2270-10 (2016)	99	min 95
4.	Flash Point Open Cup	°C	ASTM D92-16	226	min 185
5.	Pour Point	°C	ASTM D97-16	- 36	max minus 15
6.	Water Content	%	BDS ISO 3733:2003	none	max 0.05
7.	Corrosion on Copper Strip	classification	ASTM D130-12	1a	max 2
8.	Air Release Ability	min	ASTM D3427-15	7.1	max 10
9.	Foaming Properties (Foaming Tendency: - Sequence I at /24.0 ± 0.5/°C - Sequence II at /93.5 ± 0.5/°C - Sequence III at /24.0 ± 0.5/°C after Sequence II at /93.5 ± 0.5/°C Foaming Stability: - Sequence I at /24.0 ± 0.5/°C - Sequence II at /93.5 ± 0.5/°C - Sequence III at /24.0 ± 0.5/°C after Sequence II at /93.5 ± 0.5/°C)	ml	ASTM D892-13e1	 0 10 0 0 0 0	max 100 50 100 0 0 0
10.	Water Separability (- time to reach 3 ml emulsion at 54°C)	ml (min)	ASTM D1401-12e1	40-38-2/ (10')	max 30 min
11.	Total Acid Number	mgKOH/g	ASTM D974-14e2	0.17	min 0.10
12.	Density at 20°C	g/ml	ASTM D1298-12b	0.8748	report
13.	Zinc Content	%	ASTM D4951-14	0.0002	report

Note: The results apply only for the tested samples. It is not allowed to make copies of parts of the test report without the prior written permission of the testing laboratory.

Analyst:

1. Ivanova ..... /family name, signature/
2. Markova ..... /family name, signature/
3. Pesheva ..... /family name, signature/
4. eng.Mirchev ..... /family name, signature/
5. Milusheva ..... /family name, signature/

Chief of the PPTL Dimova P. .....
/family name, signature/

PETROLEUM PRODUCTS TESTING LABORATORY

Accredited Laboratory,
Certificate of Accreditation
REG. No. 31-ЛИ/09.12.2015,
Effective until 09.12.2019
Issued by BAS,
As per the requirements of EN ISO/IEC 17025:2006

TEST REPORT
№ 085 / 20.07.2016

1. Hydraulic Oils- Hydraulic Oil "PRISTA ® MHM 46b"– sample №2
/name of the product /s under test (type, brand, etc.), product code/

2. Name of the requester:
"GQ Oil Inovation", Poland, Warszawa, ul."Topazova" 26; Mr.Sergey Mediansky; Request №013/19.07.2016 of PPTL; Representative sample is taken with sampling certificate 12/0072/19.07.2016 from "BULGARCONTROLA"AD- representation Ruse, from expert Kamelia Anastasova, according to EN ISO 3170.
/name and address of the requester (who placed the order for the analysis), date of sampling, protocol №, letter accompanying the request/

3. Standard Methods:
3.1 ASTM D445– Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)- **Kinematic Viscosity**
3.2 ASTM D2270- Standard Practice for Calculating Viscosity Index from Kinematic Viscosity at 40° and 100°C - **Viscosity Index**
3.3 ASTM D92- Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester - **Flash Point Open Cup**
3.4 ASTM D97- Standard Test Method for Pour Point of Petroleum Products - **Pour Point**
3.5 BDS ISO 3733- Petroleum Products. Determination of Water Content. - **Water Content**
3.6 ASTM D130- Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test – **Corrosion on Copper Strip**
3.7 ASTM D3427- Standard Test Method for Air Release of Petroleum Oils- **Air Release Ability**
3.8 ASTM D892- Standard Test Method for Foaming Characteristics of Lubricating Oils - **Foaming Properties**
3.9 ASTM D1401- Standard Test Method for Water Separability of Petroleum Oils and Synthetic Fluids- **Water Separability**
3.10 ASTM D974- Standard Test Method for Acid and Base Number by Color-Indicator Titration- **Total Acid Number**
3.11 ASTM D1298- Standard Test Method for Density, Relative Density or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method – **Density**
3.12 ASTM D4951- Standard Test Method for Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry- **Zinc Content**
/identifications and number of the standard test methods or validated test methods, parameters/

4. Target of the test:
Determination of parameters, according to the technical requirements of the requester, given at the Request №013/19.07.2016 of PPTL

5. Date of Receipt of the Samples in the Laboratory: 19.07.2016

PETROLEUM PRODUCTS TESTING LABORATORY

Chief of the PPTL Dimova P. .....
(/family,signature,stamp/

6. Sample Quantity:
1 glass bottle of 1.0 ℓ by each sample /sealed, labeled and marked/, with representative sample hydraulic oil **„PRISTA ® MHM 46b"**, batch № 1607163 CCBL- R67, sample №1, taken from R67 on production site of the firm. Representative samples are taken with sampling certificates № 12/0071/19.07.2016, from "BULGARCONTROLA" AD- representation Ruse. The sample is taken from expert Kamelia Anastasova according to standard BDS EN ISO 3170.

/ sample quantity, mass, package, quantity of batches, date of producing/

7. Date of executing the testing: 19.07.2016 - 20.07.2016

Chief of the PPTL Dimova P……
/family, signature, stamp/

8. TEST RESULTS

8.1 Tests (analyses) in the scope of accreditation

No.	Parameters	Units of measure ment	Test methods/ standards, validated methods	Hydraulic Oil "PRISTA ® MHM46b"– batch № 1607163 CCBL- R67 19.07.2016- Sample № 2	Parameter value and value tolerances of parameter FTS X 002/ 2016-02-09
1	2	3	4	5	6
1.	Kinematic Viscosity at 100°C	mm^2/s	ASTM D445-15a	6.797	report
2.	Kinematic Viscosity at 40°C	mm^2/s	ASTM D445-15a	46.50	41.4 – 50.6
3.	Viscosity Index	-	ASTM D2270-10 (2016)	99	min 95
4.	Flash Point Open Cup	°C	ASTM D92-16	224	min 185
5.	Pour Point	°C	ASTM D97-16	- 36	max minus 15
6.	Water Content	%	BDS ISO 3733:2003	none	max 0.05
7.	Corrosion on Copper Strip	classification	ASTM D130-12	1a	max 2
8.	Air Release Ability	min	ASTM D3427-15	6.9	max 10
9.	Foaming Properties (Foaming Tendency: - Sequence I at /24.0 ± 0.5/°C - Sequence II at /93.5 ± 0.5/°C - Sequence III at /24.0 ± 0.5/°C after Sequence II at /93.5 ± 0.5/°C Foaming Stability: - Sequence I at /24.0 ± 0.5/°C - Sequence II at /93.5 ± 0.5/°C - Sequence III at /24.0 ± 0.5/°C after Sequence II at /93.5 ± 0.5/°C)	ml	ASTM D892-13e1	 0 10 0 0 0 0	max 100 50 100 0 0 0
10.	Water Separability (- time to reach 3 ml emulsion at 54°C)	ml (min)	ASTM D1401-12e1	40-38-2/(15')	max 30 min
11.	Total Acid Number	mgKOH/g	ASTM D974-14e2	0.17	min 0.10
12.	Density at 20°C	g/ml	ASTM D1298-12b	0.8748	report
13.	Zinc Content	%	ASTM D4951-14	0.0002	report

Note: The results apply only for the tested samples. It is not allowed to make copies of parts of the test report without the prior written permission of the testing laboratory.

Analyst:

1. Ivanova ..... /family name, signature/
2. Markova ..... /family name, signature/
3. Pesheva ..... /family name, signature/
4. eng.Mirchev ..... /family name, signature/
5. Milusheva ..... /family name, signature/

Chief of the PPTL Dimova ..... /family signature stamp/

5. **GENERAL CONCLUSION**.

All tests show that CCBL® JET has the capability to be used as a lube blending tool. The results received during all tests fully satisfied the quality requirements of the lubricants blended, and therefore all the batches produced by CCBL® technology were released for supply to customers.

The tested CCBL® JET can be easily integrated with existing tanks, used for dosing and mechanical blending, as well as new static tanks without mechanical mixers. There is no need of heating during the mixing process. The capacity of each batch depends on max. volume of the tank. In one tank can be produced different size of batches, depending on the demand. That provides very good production flexibility, without losing effectiveness in small production batches. Time for dosing depends on the viscosity of the raw materials. Time for blending depends on the capacity of the driving pump. In general, total time for dosing and blending through CCBL® JET reduce the operational time for production up to 70%, without need of cooling down the product, before filling in different size of packages

Thanks to the innovative blending technology, the CCBL® JET unit can blend automotive, marine and industrial type of lubricants, and **achieves full dispersion and solubility of the additives in base oils, proven by the lab analysis.**

In the name of
GQOIL Innovation Europe Sp. z o.o.

GQOIL INNOVATION EUROPE Sp. z o.o.
ul. Topazowa 26 lok. F17
03-686 Warszawa
NIP: PL5242766961 REGON: 147072162

Andrzej Chodyniecki
General Manager

In the name of
PRISTA OIL HOLDING EAD

PRISTA OIL HOLDING EAD · BULGARIA

Emil Dimov
Chief chemical engineer