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accredited for TESTING
SR EN ISO/IEC 17025:2018
ACCREDITATION CERTIFICATE
LI 1216

CLEANLINESS TEST REPORT

F-KL-08_En

Version 5.0

Report No: PER-232001-O9P

1. Sample details

Customer:	***Customer*** **Address**
Fluid type:	Mobil DTE 25 Hydraulic Oil
Fluid description:	400 ml sample, packed appropriately in two 250-ml laboratory bottle
Sampling point:	Tank #4
Date of sample reception:	17/02/2021

Note 1. Sampling is the customer's responsibility.
Note 2. Information about the fluid type and sampling point is provided by the customer.

2. Filtration

Procedure:	Particle mass determination by gravimetric analysis – industrial fluids
Reference documents:	PL-KL-02
Equipment, materials and measurement parameters:	Pall PCC60 Cleanliness cabinet, including filtration equipment with vacuum pump Memmert UN55 drying oven (30 min, 110°C) + Sicco Desiccator (30 min) 100 ml graduated cilinder, precision Membrane filter 1.2 µm, 47 mm diameter Filtration volum: 100 ml Solvent: Renoclean ISO
Date of analysis:	18/02/2021
Blank test:	Ok, according to blank report no. 12/ 2021

3. Gravimetric results

Method:	Particle mass determination by gravimetric analysis – industrial fluids
Reference documents:	ISO 4405:1991 PL-KL-02
Equipment, materials and measurement parameters:	Kern & Sohn ABT 220-5DNM 5-digit analysis balance (0.01 mg) Ionizer Kern YBI-01A
Date of analysis:	18/02/2021
Compliance specification:	N/A
Results:	Initial weight: 111.58 mg Final weight: 113.95 mg Residue weight: 2.37 mg/ 100 ml
Compliance of the results:	N/A

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4. Granulometric results

Method:	Determining and coding the level of particle contamination using the principle of light extinction	
Reference documents:	IEC 60970:2007, ISO 4406:2021 PL-KL-08	
Equipment, materials and measurement parameters:	PALL PFC400 W Automatic particle counter Elmasonic S180 Ultrasonic bath Validation and mediation of the results obtained after three tests	
Date of analysis:	18/02/2021	
Compliance specification:	N/A	
Results:	ISO 4406 Cleanliness code:	**17/16/13**

Particle size distribution - Particles/100 ml fluid					
>4 µm(c)	>6 µm(c)	>10 µm(c)	>14 µm(c)	>30 µm(c)	>70 µm(c)
105220	34747	11320	5273	1263	7

Compliance of the results:	N/A

Note 3. Each additional purity class means doubling the number of particles contained in the unit of fluid tested.
Note 4. The notation “µm (c)” means that the results were obtained with a particle counter calibrated according to ISO 11171: 2016.

5. Microscopic results

Method:	Particle sizing and counting by microscopic analysis
Reference documents:	PL-KL-07
Equipment, materials, and measurement parameters:	Jomesa HDF4 optical microscope Scale: 4.7 µm/pixel Diameter of effective filtration area: 44 mm Fiber criterion: length: width ratio> 10
Date of analysis:	18/02/2021
Compliance specification:	N/A

Results – Microscopic images of contaminants

Img. 1. L x l: 110 µm X 64 µm
Largest metallic shinny particle

Img. 2. L x l: 104 µm X 56 µm
Second largest metallic particle

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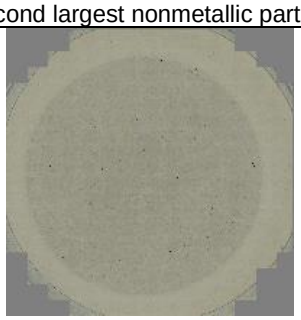
 Img. 3. L x l: 454 µm X 91 µm Largest nonmetallic particle	 Img. 4. L x l: 327 µm X 146 µm Second largest nonmetallic particle
 Img. 5. L: 1999 µm Longest fiber	 Img. 6. Image overview Membrane occupancy: 0.12%
Compliance of the results:	N/A

Note 5. The obtained results are referring exclusively to the analyzed sample and do not take into account the calculated measurement uncertainty.

Date of report: 19/02/2021

Issued:	Approved:
Dipl. Ing. **Alexandra Matei** Oil & Parts Cleanliness Analyst Klarwin® Scientific & Laboratory	Dipl. Ing. **Nicoleta Rascol** Laboratory Manager Klarwin® Scientific & Laboratory

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Annex: ISO 4406 detailed cleanliness levels for particle size distribution

Particles in 100 ml tested fluid		Cleanliness level
More than	Up to and including	
8000000	16000000	24
4000000	8000000	23
2000000	4000000	22
1000000	2000000	21
500000	1000000	20
250000	500000	19
130000	250000	18
64000	130000	17
32000	64000	16
16000	32000	15
8000	16000	14
4000	8000	13
2000	4000	12
1000	2000	11
500	1000	10
250	500	9
130	250	8
64	130	7
32	64	6
16	32	5
8	16	4
4	8	3
2	4	2
1	2	1

~ End of test report ~