21st October 2021

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Gazpromneft Turbine Oil F Synth EP-32

Lubrizol can confirm that the turbine oil:

Brand name: Gazpromneft Turbine Oil F Synth EP-32
Oil Code: [redacted]

Blended with:

[redacted]

[redacted]

Meets the following performance levels:

DIN	**51515-1, -2**
ISO 8068:2006	**L-TSA/TGA & L-TSE/TGE**
GEK	**101941A, 121608, 32568K & 107395A**
Siemens	**TLV 901304 & TLV 901305**

The above is invalidated if the formulation deviates from Lubrizol's recommendations.

Regards

Jagraj Sidhu
Product Manager, Industrial

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Gazpromneft Turbine Oil F Synth EP-46

Lubrizol can confirm that the turbine oil:

Brand name: Gazpromneft Turbine Oil F Synth EP-46
Oil Code: [redacted]

Blended with:

[redacted] [redacted]

Meets the following performance levels:

DIN	**51515-1, -2**
ISO 8068:2006	**L-TSA/TGA & L-TSE/TGE**
GEK	**101941A, 121608, 32568K & 107395A**
Siemens	**TLV 901304 & TLV 901305**

The above is invalidated if the formulation deviates from Lubrizol's recommendations.

Regards

Jagraj Sidhu
Product Manager, Industrial

Appendix

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Section 1	Formulation Summary

		Gazpromneft Turbine Oil F Synth EP-32	Gazpromneft Turbine Oil F Synth EP-46
		[redacted]	[redacted]
		% wt	% wt
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

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Section 2	GEK 101941A Geared Data – ISO 32 Performance Data

Physical & Chemical Properties	Method	Requirements ISO VG 32	Gazpromneft Turbine Oil F Synth EP-32 [redacted]
Viscosity @ 40°C, mm^2/s	ASTM D445	28.8-35.2	32.8
Viscosity Index	ASTM D2270	≥ 98	130
API Gravity	ASTM D287	29-33.5	36
Pout Point, °C	ASTM D97	≤ -12	-33
Flash Point, °C	ASTM D92	≥ 215	234
Color	ASTM D1500	≤ 2.0	L0.5
Air Release @ 50°C, min	ASTM D3427	≤ 5.0	1.6
Water content, % max	ASTM E203	≤ 0.02	0.00
Carbon Residue Ramsbottom	ASTM D524	≤ 0.1	0.0
Foam	ASTM D892		
Sequence I, ml		≤ 50-0	0-0
Sequence II, ml		≤ 50-0	0-0
Sequence III, ml		≤ 50-0	0-0
Zinc Content, ppm	ASTM D4951	< 5	1
Acid Number, mg KOH/g	ASTM D974	≤ 0.2	0.1
Copper Corrosion, 3 hrs at 100°C	ASTM D130	≤ 1	1B
Oxidation Stability, min	ASTM D2272	≥ 500	3249
% Retention of Oxidation Stability	ASTM D2272	≥85	98
Rust Prevention (Distilled Water)	ASTM D665B	Pass	Pass
Oxidation Resistance, hours to TAN 2.0	ASTM D943	≥ 3000	>10000
Load Carrying FZG	ASTM D5182	≥ 8	9

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Section 2	GEK 121608 (2018) Geared Data – ISO 32 Performance Data

Physical & Chemical Properties	Method	Requirements ISO VG 32	Gazpromneft Turbine Oil F Synth EP-32 [redacted]
Color	ASTM D1500	≤ 2.0	L0.5
Pour Point, °C	ASTM D97	≤ -12	-33
Viscosity @ 40°C, mm^2/s	ASTM D2270	28.8-35.2	32.8
Viscosity Index	ASTM D2270	≥ 95	130
Acid Number, mg KOH/g	ASTM D974	≤ 0.2	0.1
Rust Prevention	ASTM D665B	Pass	Pass
Flash Point, °C	ASTM D92	≥ 215	234
Copper Corrosion, 3 hrs at 100°C	ASTM D130	≤ 1B	1B
Foam	ASTM D892		
Sequence I, ml		≤ 50-0	0-0
Sequence II, ml		≤ 50-0	0-0
Sequence III, ml		≤ 50-0	0-0
Turbine Oil Oxidation Test, hours	ASTM D943	≥ 7000	>10000
RPVOT Oxidation Stability	ASTM D2272		
Standard, mins.		≥ 750	3249
Retention, %		≥ 85	98
Air Release @ 50°C, min	ASTM D3427	≤ 5.0	1.6
Demulsibility, min at 54°C	ASTM D1401	≤ 30	10
Water content, % max	ASTM D6304	≤ 0.02	0.00
Specific Gravity	ASTM D4052	0.81 - 0.88	0.84
Zinc Content, ppm	ASTM D5185	≤ 5	1
FZG A/8.3/90, damage stage	ASTM D5182	≥ 8	9
Filterability	ISO 13357-2		
Stage I Dry, %		≥ 93	94.1
Stage II Dry, %		≥ 85	89.5

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Section 2	GEK 32568K (2016) Un-Geared Data – ISO 32 Performance Data

Physical & Chemical Properties	Method	Requirements ISO VG 32	Gazpromneft Turbine Oil F Synth EP-32 [redacted]
API Gravity	ASTM D287	29-39	36
Color	ASTM D1500	≤ 2.0	L0.5
Pour Point, °C	ASTM D97	≤ -12	-33
Kinematic Viscosity at 40°C, cSt	ASTM D445	28.8 – 35.2	32.8
Acid Number, mg KOH/g	ASTM D974	≤ 0.2	0.1
Steel Corrosion (Distilled Water)	ASTM D665A	Pass	Pass
Flash Point (open cup), °C	ASTM D92	≥ 215	234
Copper Corrosion (3hrs 100°C)	ASTM D130	≤ 1B	1B
Foam Properties	ASTM D892		
Sequence I, mls		≤ 50-0	0-0
Sequence II, mls		≤ 50-0	0-0
Sequence III, mls		≤ 50-0	0-0
Oxidation Stability (TOST)	ASTM D943		
Time to Δ2.0mg KOH/g, hrs		≥ 5000	>10000
RPVOT Oxidation Stability	ASTM D2272		
Standard, mins.		≥ 500	3249
Retention, %		≥ 85	98
Air Release (50°C), mins.	ASTM D3427	≤ 5	1.6
Viscosity Index	ASTM D2270	≥ 95	130

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Section 2	GEK 107395A (2001) Un-Geared Data* – ISO 32 Performance Data

Physical & Chemical Properties	Method	Requirements ISO VG 32	Gazpromneft Turbine Oil F Synth EP-32 [redacted]
API Gravity	ASTM D287	29-39	36
Color	ASTM D1500	≤ 2.0	L0.5
Pour Point, °C	ASTM D97	≤ -12	-33
Kinematic Viscosity at 40°C, cSt	ASTM D445	28.8 – 35.2	32.8
Acid Number, mg KOH/g	ASTM D974	≤ 0.2	0.1
Steel Corrosion (Salt Water)	ASTM D665B	Pass	Pass
Flash Point (open cup), °C	ASTM D92	≥ 215	234
Copper Corrosion (3hrs 100°C)	ASTM D130	≤ 1B	1B
Carbon Residue Ramsbottom	ASTM D524	≤ 0.1	0.0
Foam Properties	ASTM D892		
Sequence I, mls		≤ 50-0	0-0
Sequence II, mls		≤ 50-0	0-0
Sequence III, mls		≤ 50-0	0-0
Oxidation Stability (TOST)	ASTM D943		
Time to Δ2.0mg KOH/g, hrs		≥ 5000	>10000
RPVOT Oxidation Stability	ASTM D2272		
Standard, mins.		≥ 500	3249
Retention, %		≥ 85	98
Air Release (50°C), mins.	ASTM D3427	≤ 5	1.6
Viscosity Index	ASTM D2270	≥ 95	130
Demulsibility, min at 54°C	ASTM D1401	≤ 30	10
Water content, % max	ASTM E203	≤ 0.02	0.00
Specific Gravity	ASTM D1298	0.83 - 0.88	0.85
Evaporation Loss, %wt at 149°C	ASTM D972	≤ 6	1.0
Autoignition Temperature, min	ASTM E659	≥ 357	364
Volatility Oil Thickening**	DIN 51356	Report	-
Thermal Stability**	CM Thermal Test A	Report	-
Coking Value**	Panel Coker Test FTM (791a-3462)	Report	-

*Note, GEK107395A specification is obsolete and has been replaced by GEK121608
**Note, test is now obsolete

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