

Preamble

Before Siemens MD approves oils for use in FLENDER helical-, bevel-, and planetary gear units, the oil manufacturer has to warrant that the oils are of CLP quality according to DIN 51517-3 (except tests acc. ISO 6247 and DIN ISO 1817). In addition the application specific properties listed in the table below must be demonstrated. All tests are to be conducted in the lowest viscosity or at most one grade above the lowest viscosity of the oils for which approval is applied for. The exception to this rule is the Flender foam test which has to be tested in the highest viscosity grade applied for. All test data submitted must be carried out on oil samples of the same composition according to the formulation table which has to be enclosed. In addition to the testing and performance requirements, the material safety data sheet (MSDS) and technical data sheets (TDS) including the temperature-viscosity curves for each viscosity grade shall be submitted for approval. The lubricants shall be identified by submission of an IR reference spectrum and ICP reference values for the viscosity grades requested for approval.

All test data must be generated within a Siemens approved laboratory for the application specific testing detailed in the table below, test data generated in unapproved laboratory will not be accepted. The list of approved laboratories and contact details are to be found using the following link <http://support.automation.siemens.com/WW/view/en/44240585>. For the approval of a viscosity range, oil manufacturers must guarantee that the performance level obtained in a test on a specific oil are consistent for that product independent of production location or viscosity grade across the viscosity range. In addition, the oil manufacturer has to warrant that the required properties do not only apply to fresh oil but that they also do not deteriorate within permissible tolerances through the entire period of use. The period of use for mineral oils shall be at least 10,000 operating hours or two years maximum, and for synthetic oils at least 20,000 operating hours or four years maximum, assuming an average operating temperature of the oil of 80 °C.

The formulations tested and approved by Siemens MD must be identical to the oils produced commercially under the approved fluid name. Any changes to the approved formulations beyond permissible tolerances within production must be notified in writing to Siemens MD. Unacceptable changes will result in the approval being void and the oil brand removed from the approved lubricant list.

The qualification testing and submission of the approval documentation has to be conducted by the oil manufacturer / marketer. Users of gear boxes cannot request an approval. Lubricants that fulfil the qualification testing of this specification do not automatically become approved for use. Siemens MD reserve the right to review and approve the lubricant before listing the oil or oil series in the approved lubricant list. The approval or recommendation of oil brand, or the listing in the lubricant selection table by Siemens MD is made without any legal obligation and does not mean that Siemens MD assumes any liability for such lubricants. The approval of a lubricant is, on principle, limited to five years.

Proofs of performance / laboratories / minimum requirements

item	Suitability proofs of performance to be established by test results	Quantity of test oil [Litre]	Approved laboratories	Mineral oils	PG oils	Other oils
1	FZG scuffing test in accordance with DIN ISO 14635-1 (A/8.3/90)	≈ 5	1)	A	A	A
		Criteria: failure load stage > 12				
2	FE-8 rolling bearing test in accordance with DIN 51819-3 (D-7,5/80-80)	≈ 5	1)	A	A	A
		roller wear < 30 mg ; Cage wear: report				
3	Compatibility with internal coating (P22-8050 , Nuvopur Aqua Primer 510.1.6.1400)	2 + 2	Walter Mäder 1)	A	A	A
		Test and evaluation are carried out by the paint manufacturer				
4	Compatibility with liquid sealing compound (Loctite 128068)	1	1)	A	A	A
		Test and evaluation are carried out by the sealing compound manufacturer				
5	FLENDER- oil foam test - Original oil - with mixtures of 2% and 4% I: Castrol Alpha SP 220 S running-in oil II: Tribol 1390 running-in oil	3	1)	A	A	A
				A	—	A
Test in Flender foam tester		Total volume 1 minute after motor was switched off: ≤ 115% Air-oil dispersion 5 min. after motor was switched off: ≤ 110%				

item	Suitability proofs of performance to be established by test results	Quantity of test oil [Litre]	Approved laboratories	Mineral oils	PG oils	Other oils
6	FVA grey staining test Two tests are to be carried out on the working and non-working flanks of a gear pair, tooth form C, in accordance with the FVA project no. 54, at 90 °C oil injection temperature, on the FZG gear test rig.	70	1)	A	A	A
	Criterion: failure load stage ≥ 10 / Micropitting load capacity = high					
7	Compatibility with elastomer shaft seals - Static test (≈ DIN ISO 1817) a) 72 NBR 902 b) 75 FKM 585 c) 75 FKM 260466 - Dynamic test (≈ DIN 3761) a) 72 NBR 902 b) 75 FKM 585 / 2 radial shaft seals c.) 75 FKM 585 / 3 radial shaft seals d) 75 FKM 260466 / 2 radial shaft seals Test to be carried out in accordance with the static storage test to DIN ISO 1817 and the dynamic suitability test on two shaft seals to DIN 3761.	(10)	1)	A	A	A
		1				
		1				
		1				
		2				
		2				
3						
2						
Test and evaluation are carried out by the elastomer manufacturer according to test no. FB 73 11 008 "Static and dynamic compatibility tests of oils with Freudenberg Simmer rings for the approval of use in Flender gear units", use always in the latest version,						
8	Flender grey staining test (One-stage test on FZG gear test rig) - 2 time Short-time tests (each 100 hrs) - Long-time test (add. 300 hrs)	2,5	1)	B	B	B
	Two short time tests and a long time test are to be carried out on the working and non working flanks of a gear pair, tooth form C with crowned profile, at 90 °C oil sump temperature, on the FZG gear test rig All gear unit types must reach load carrying class II in accordance with the Flender report GG-V 378.					
9	Double speed FZG scuffing test on the basis of DIN ISO 14635-1 (A/16.6/90)	2,5	1)	B	B	B
	criteria stage above 12					

(A) = required, (B) = by agreement, (—) = not required

1) Contact details of the approved test laboratories:

See link <http://support.automation.siemens.com/WW/view/en/44240585>

Changes in comparison with the previous revision

Rev. 13

- second approval criterion for the foaming test has been added.
- temperature-viscosity curves for each viscosity grade have to be submitted
- wording was changed