Thermal Conductivity according to EN 12667

Test report No: F.2-1529a/08

Applicant: **ODE YALITIM SANAYI VE TICARET A.S., ISTANBUL, Türkei**

Name of the product: **" ODE R FLEX ST "**

Product identification: (as given by applicant)
Sheets of flexible closed celled foam on the basis of synthetic rubber.
Thickness: 19 mm
Colour: black

Sampling:
Shipped by applicant on October 2008
Arrival no.: 0304 on 24.10.2008

Test equipment:
Guarded hot plate apparatus according to EN 12667:
Metering section 400 x 400 mm with guard section 800 x 800 mm

Preparation:
Tested thickness[+]: 0.0205 m
Surface area tested: 0.2500 m²
Mass[+]: 0.2250 kg
Density[+]: 43.9 kg/m³

Remarks:
The specimens were installed with a thickness of 20.5 mm in the testing apparatus. The thickness was reduced for each measuring point in dependence of the contraction of the material.

Experimental data:

Test	Heat flow rate	Temperature of the Warm Side	Temperature of the Cold Side	Average temperature of the specimen	Temperature-difference of the specimen	Thermal Conductivity
No	W	°C	°C	°C	K	W/(m·K)
1	5.210	-15.9	-25.6	-20.8	9.7	0.0343
2	5.740	5.9	-4.6	0.7	10.5	0.0358
3	5.719	39.6	29.9	34.8	9.7	0.0385
4	6.257	63.5	53.9	58.7	9.6	0.0431
5	-----	-----	-----	-----	-----	-----
Uncertainty: < 2%						

Properties of the material after conductivity-measurement up to 63.5 °C warm side:

[+] Mean values (two specimens)

Thickness[+]: 0.0205 m
Density[+]: 43.9 kg/m³
Mass[+]: 0.2250 kg
Change in mass: 0.0 %

Remarks: --

Results:

Mean temperature °C	-30	-20	0	20	40	50	60	---	---
Thermal conductivity W/(m·K)	0.034	0.035	0.036	0.037	0.039	0.041	0.043	---	---

Final remarks: These thermal conductivity values refer to the material in a dry state and represent thermal conductivity values $\lambda_{Lab,P}$ as specified in the guidelines VDI 2055.

Gräfelfing, 24.11.08

Department Specialist
Dipl.-Ing. R. Alberti

Tester
A. Bergler

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Thermal conductivity according to DIN EN ISO 8497

Test report No: G.2-211a/08

Applicant:	**ODE YALITIM SANAYI VE TICARET A.S., ISTANBUL, Türkei**		
Material:	**ODE R FLEX ST 19*28**		
Labeling: (as given by producer)	-----		
Material identification: (as given)	Insulation tube of closed cell flexible foam on the basis of synthetic rubber, colour: black		
Nominal dimensions:	Internal diameter: 28 mm	Insulation thickness: 19 mm	Length: 1000 mm
Nominal density:	----- kg/m³		
Sampling:	sent by applicant		
Goods Receipt:	No. 304		
Test equipment:	Test pipe with calculated end caps according to DIN EN ISO 8497 Diameter 31 mm, horizontal, Length 2000 mm		
Preparation:	Experimental data according to DIN 52275 part 2:		
	Internal diameter: ---- mm	Insulation thickness: ---- mm	Length: ---- mm
	Density: ---- kg/m³		
Installation according to DIN 4140	Internal diameter: 30.7 mm	Insulation thickness: 20 mm	Length: 2295 mm
	Density: *) 54.7 kg/m³	Mass: 0.390 kg	
Remarks:	The insulation tube was built on the test pipe in state of delivery.		

Experimental data:

Test	Heat flow rate	Temperature of the Warm Side	Temperature of the Cold Side	Average temperature of the specimen	Temperature-difference of the specimen	Thermal conductivity
No	W	°C	°C	°C	K	W/(m·K)
1	5.49	-23.5	-35.3	-29.4	11.8	0.0290
2	10.9	16.1	-5.5	5.3	21.6	0.0323
3	10.7	44.9	24.6	34.8	20.3	0.0348
4	17.9	70.6	38.0	54.3	32.6	0.0368
5	-----	-----	-----	-----	-----	-----
Uncertainty: < 3%		Thermal conductivity is calculated for temperature differences on the specimen.				

Properties of the material after conductivity-measurement up to 70.6 °C warm side: (Values at end of the test)

Density: *) 54.7 kg/m³ Mass: 0.390 kg Change in mass: 0.0 %

Remarks: -------

*) The given values of the density refer to the insulation of the specimens installed on the test pipe without facings.

Results:

Mean temperature °C	-30	-20	-10	0	10	20	40	50	60
Thermal conductivity W/(m·K)	0.029	0.030	0.031	0.032	0.033	0.034	0.035	0.036	0.037

These thermal conductivity values refer to the material in a dry state installed as pipe insulation and are related to the mean temperature of the specimen. ($\lambda_{Lab,R}$ as specified in the guidelines VDI-2055)

Final remarks: ---------

Gräfelfing, 01.12.08

Department Specialist

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Thermal conductivity according to DIN EN ISO 8497

Test report No: G.2-210a/08

Applicant:	**ODE YALITIM SANAYI VE TICARET A.S., ISTANBUL, Türkei**		
Material:	**ODE R FLEX EC 19*35**		
Labeling: (as given by producer)	-----		
Material identification: (as given)	Insulation tube of closed cell flexible foam on the basis of synthetic rubber, colour: black		
Nominal dimensions: Nominal density:	Internal diameter: 35 mm ----- kg/m³	Insulation thickness: 19 mm	Length: 1000 mm
Sampling:	sent by applicant		
Goods Receipt:	No. 304		
Test equipment:	Test pipe with calculated end caps according to DIN EN ISO 8497 Diameter 38 mm, horizontal, Length 2000 mm		
Preparation:	Experimental data according to DIN 52275 part 2: Internal diameter: ---- mm Density: ---- kg/m³	Insulation thickness: ---- mm	Length: ---- mm
Installation according to DIN 4140	Internal diameter: 38 mm Density: *) 52.9 kg/m³	Insulation thickness: 19 mm Mass: 0.417 kg	Length: 2280 mm
Remarks:	The insulation tube was built on the test pipe in state of delivery.		

Experimental data:

Test	Heat flow rate	Temperature of the Warm Side	Temperature of the Cold Side	Average temperature of the specimen	Temperature-difference of the specimen	Thermal conductivity
No	W	°C	°C	°C	K	W/(m·K)
1	5.28	-18.0	-26.5	-22.3	8.5	0.0321
2	12.8	13.6	-6.6	3.5	20.2	0.0339
3	12.8	41.4	21.7	31.6	19.7	0.0361
4	12.8	69.5	50.6	60.1	18.9	0.0391
5	-----	-----	-----	-----	-----	-----
Uncertainty: < 3%		Thermal conductivity is calculated for temperature differences on the specimen.				

Properties of the material after conductivity-measurement up to 69.5 °C warm side: (Values at end of the test)

Density: *) 52.9 kg/m³ Mass: 0.417 kg Change in mass: 0.0 %

Remarks: -------

*) The given values of the density refer to the insulation of the specimens installed on the test pipe without facings.

Results:

Mean temperature °C	-30	-20	-10	0	10	20	30	40	50
Thermal conductivity W/(m·K)	0.031	0.032	0.033	0.034	0.035	0.035	0.036	0.037	0.038

These thermal conductivity values refer to the material in a dry state installed as pipe insulation and are related to the mean temperature of the specimen. ($\lambda_{Lab,R}$ as specified in the guidelines VDI-2055)

Final remarks: ---------

Gräfelfing, 01.12.08

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