

AUTOMOTIVE INDUSTRY
Molding, black**Air intake hose****Replacement of carbon black N-990 by Neuburg Siliceous Earth
60 Shore A, EPDM, sulfur cure / injection molding**

Guide formulations of HOFFMANN MINERAL M 625.1	CB N-990	AKTIFIT AM	SILFIT Z 91	SILLITIN Z 86	SILLITIN N 82
	21	32	12	10	11
Keltan 5469	200.00	200.00	200.00	200.00	200.00
Zinkoxyd aktiv	5.00	5.00	5.00	5.00	5.00
Stearic acid	1.00	1.00	1.00	1.00	1.00
Omya BSH	50.00	50.00	50.00	50.00	50.00
Corax N 550/30	115.00	115.00	115.00	115.00	115.00
MT N-990	150.00	---	---	---	---
AKTIFIT AM	---	180.00	---	---	---
SILFIT Z 91	---	---	180.00	---	---
SILLITIN Z 86	---	---	---	180.00	---
SILLITIN N 82	---	---	---	---	180.00
Evolute N 375 (ex Sunthene 4240)	25.00	25.00	25.00	25.00	25.00
TEA 98 %	0.90	0.90	0.90	0.90	0.90
Rhenogran DPG-80	0.50	0.50	0.50	0.50	0.50
Rhenogran TP-50	2.00	2.00	2.00	2.00	2.00
Rhenogran ZBEC-70	2.00	2.00	2.00	2.00	2.00
Rhenogran MBTS-80	1.30	1.30	1.30	1.30	1.30
Rhenogran CLD-80	1.00	1.00	1.00	1.00	1.00
Vulkalent E/C	0.50	0.50	0.50	0.50	0.50
Rhenogran TBBS-80	0.63	0.63	0.63	0.63	0.63
Rhenogran S-80	0.75	0.75	0.75	0.75	0.75
Total phr	555.58	585.58	585.58	585.58	585.58

- the replacement of carbon black N-990 in the EPDM air intake compound by Neuburg Siliceous Earth fillers leads to a very similar property profile
- **AKTIFIT AM** allows to exactly reproduce the scorch behavior of carbon black N-990, and in addition to obtain a shorter time to full cure along with a cost reduction of more than 5 %
- **SILFIT Z 91** as well as **SILLITIN Z 86** and **SILLITIN N 82** lead to a cost reduction of over 10 %
- **AKTIFIT AM** and **SILFIT Z 91** impress by good processing properties and the absence of mold fouling
- Neuburg Siliceous Earth fillers offer the advantage of unlimited availability and reliable delivery

Conclusion: Carbon black N-990 can be replaced by Neuburg Siliceous Earth with cost advantages and without technical drawbacks

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VM-3/1014/03.2018

Guide formulation - page 2 of 3

			M 625.1	CB N-990 21	AKTIFIT AM 32	SILFIT Z 91 12	SILLITIN Z 86 10	SILLITIN N 82 11
Mooney Viscosity								
ML (1+4) 100°C	DIN 53523, T3	MU		80	69	81	78	78
ML (1+4) 120°C	DIN 53523, T3	MU		68	59	69	66	67
Mooney Scorch								
ML (5 MU) 120°C	DIN 53523, T4	min		13	11	13.3	16.2	18.7
Rotorless curemeter, 180°C								
Mmin	DIN 53529, T3	Nm		0.16	0.13	0.14	0.14	0.14
Mmax	DIN 53529, T3	Nm		0.66	0.55	0.54	0.55	0.54
Cure rate	DIN 53529, T3	Nm/min		0.50	0.49	0.37	0.37	0.34
Time to max. cure rate		min		0.84	0.83	1.24	1.30	1.43
t ₅	DIN 53529, T3	min		0.42	0.44	0.61	0.65	0.72
t ₁₀	DIN 53529, T3	min		0.52	0.53	0.74	0.83	0.92
t ₉₀	DIN 53529, T3	min		3.6	2.9	3.0	3.9	4.2
Physical properties								
Press cure 5 min (2 mm) or 10 min (6 mm) @ 180°C								
Density	DIN EN ISO 1183-1	g/cm ³		1.284	1.397	1.398	1.396	1.396
Hardness	DIN ISO 7619-1	Shore A		62	61	61	60	61
Modulus 100 %	DIN 53504, S2	MPa		2.5	3.0	2.2	2.2	2.4
Tensile strength	DIN 53504, S2	MPa		8.3	8.2	8.1	7.7	8.0
Elongation at break	DIN 53504, S2	%		508	446	520	508	501
Rebound	DIN 53512	%		35	37	35	35	36
Compression set	DIN ISO 815-1, B							
70 h @ 23°C, 25 % deflection		%		10.2	9.4	8.1	10.3	10.8
70 h @ 120°C, 25 % deflection		%		52	60	59	61	62
Air aging, 168 h @ 130°C								
Hardness		Shore A		72	72	73	72	74
Modulus 100 %		MPa		5.0	6.2	4.9	4.9	5.2
Tensile strength		MPa		9.7	11.0	8.5	8.3	9.3
Elongation at break		%		237	216	290	275	271
Rebound		%		39	41	39	38	39
Δ Hardness		Shore A		+10	+11	+12	+12	+13
Δ Modulus 100 %		%		+99	+104	+120	+123	+121
Δ Tensile strength		%		+18	+34	+5	+8	+16
Δ Elongation at break		%, rel.		-53	-52	-44	-46	-46
Δ Rebound		%, rel.		+11	+11	+11	+9	+8

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Guide formulation - page 3 of 3

	M 625.1	CB N-990	AKTIFIT AM	SILFIT Z 91	SILLITIN Z 86	SILLITIN N 82
Immersion in reference oil IRM 903, 168 h @ 130°C						
Hardness	Shore A	24	23	22	20	20
Modulus 100 %	MPa	2.1	2.2	1.4	1.4	1.4
Tensile strength	MPa	5.5	5.4	5.6	4.8	4.9
Elongation at break	%	323	308	349	317	329
Δ Hardness	Shore A	-38	-38	-39	-40	-41
Δ Modulus 100 %	%	-19	-28	-37	-38	-42
Δ Tensile strength	%	-34	-34	-30	-38	-40
Δ Elongation at break	%, rel.	-37	-31	-33	-38	-35
Δ Volume	%	+101	+113	+106	+113	+111

More information on this topic is available in this technical report:

[Air Intake Hose EPDM - Replacement of Carbon Black N 990 with Neuburg Siliceous Earth](#)

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