## 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**

| | | CB N-990 | AKTIFIT AM | SILFIT Z 91 | SILLITIN Z 86 | SILLITIN N 82 |
|---|---|---|---|---|---|---|
| Guide formulations of HOFFMANN MINERAL | M 625.1 | 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 |

)* No longer available. Recommended: SILLITIN N 75

- 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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| | | | CB N-990 | AKTIFIT AM | SILFIT Z 91 | SILLITIN Z 86 | SILLITIN N 82 |
|---|---|---|---|---|---|---|---|
| | | M 625.1 | 21 | 32 | 12 | 10 | 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/cm³ | 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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| | | CB N-990 | AKTIFIT AM | SILFIT Z 91 | SILLITIN Z 86 | SILLITIN N 82 |
|---|---|---|---|---|---|---|
| | M 625.1 | 21 | 32 | 12 | 10 | 11 |
| **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:***

Air Intake Hose EPDM - Replacement of Carbon Black N 990 with Neuburg Siliceous Earth





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