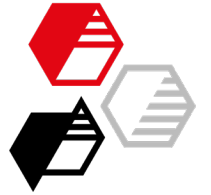
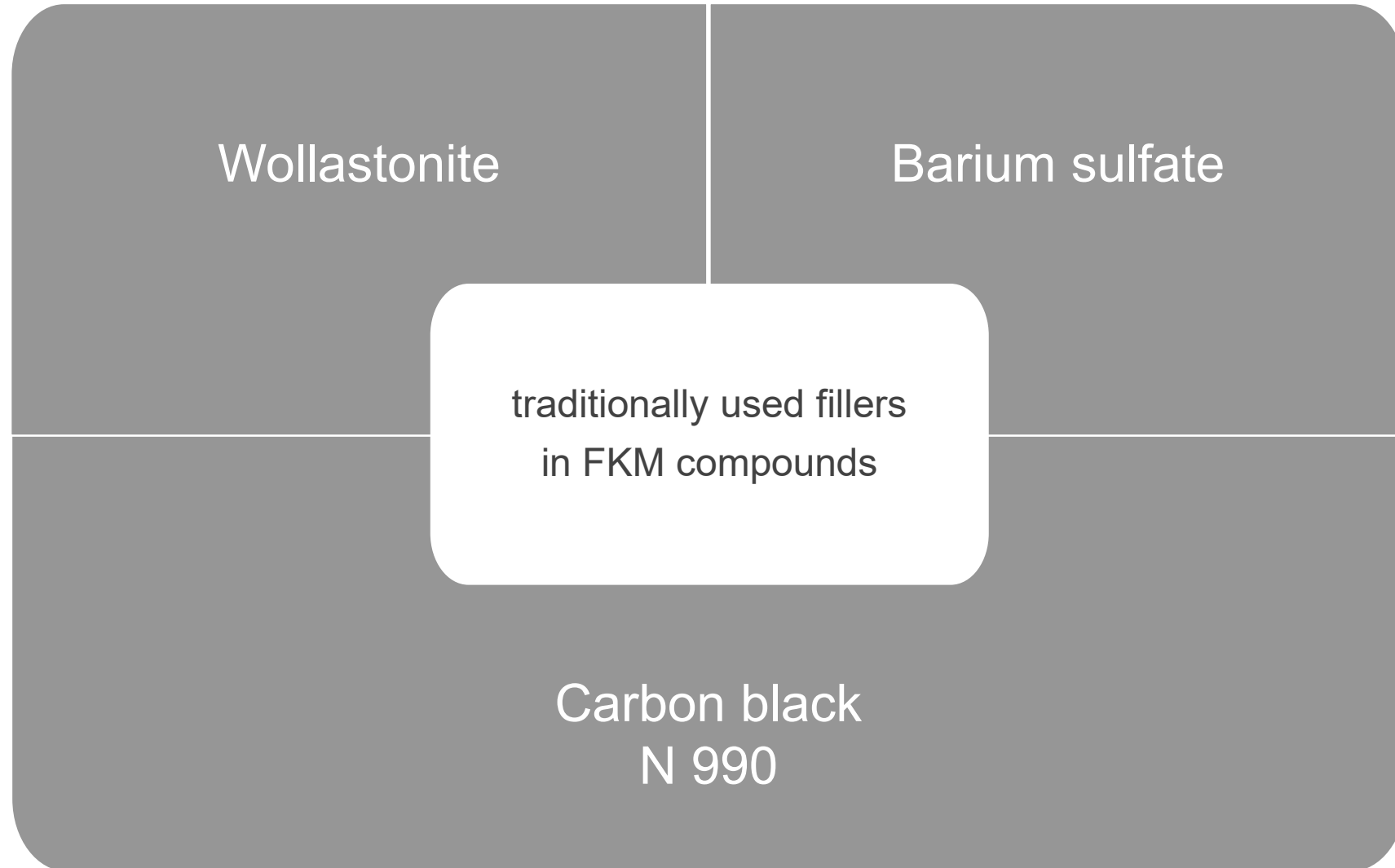


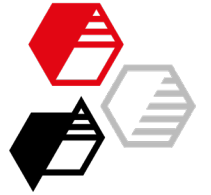
**Neuburg Siliceous Earth**  
**as an acid resistant, tintable alternative to**  
**carbon black N 990 in peroxide cured FKM**



## Status quo

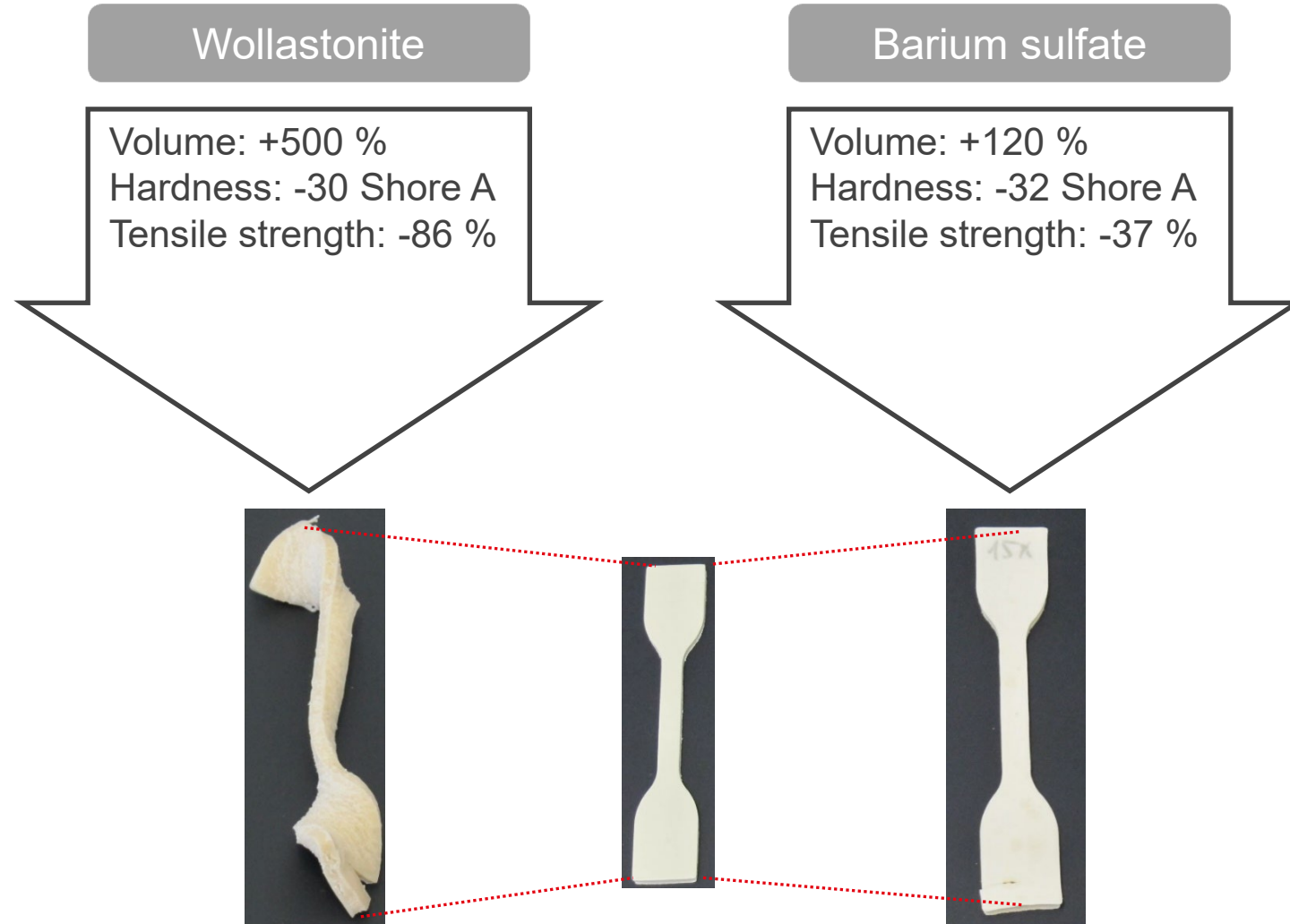
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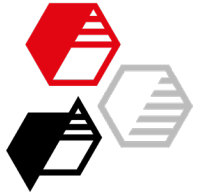
## Status quo

### Acid resistance



## Status quo

### Acid resistance

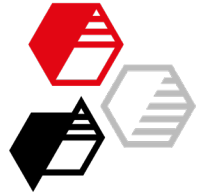


Wollastonite  
very weak

Barium sulfate  
weak

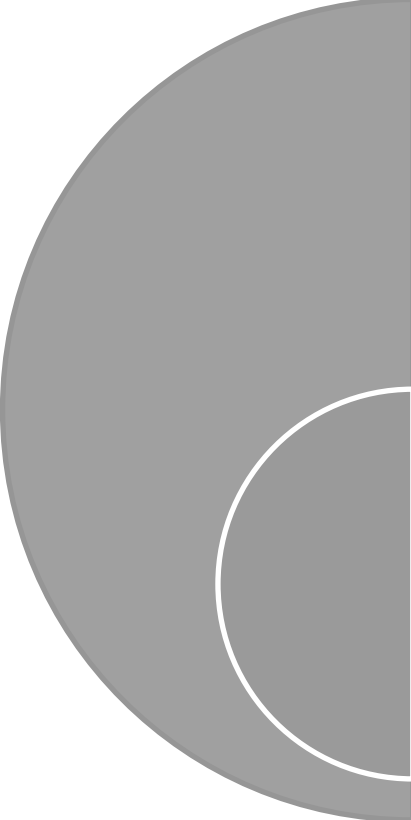
acid resistance in  
peroxide cured FKM

Carbon black N 990  
good, but not tintable



## Objective

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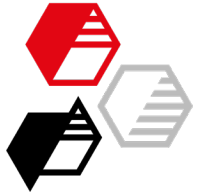


Is **Neuburg Siliceous Earth** an alternative for CB N 990 in

- acid resistant and
- tintable

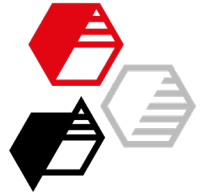
FKM compounds?

Demonstrating the property profile of suitable products.



## Formulation

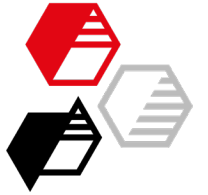
| in phr                |                                                                    | N 990 | NSE |
|-----------------------|--------------------------------------------------------------------|-------|-----|
| <b>Viton GAL-200S</b> | 66 % flourine, 25 MU (ML 1+10, 121 °C)<br>terpolymer (HFP+VFD+TFE) | 100   | 100 |
| <b>Zinkoxyd aktiv</b> | ZnO                                                                | 3     | 3   |
| <b>Diak No. 7</b>     | co-activator TAIC                                                  | 3     | 3   |
| <b>Varox DBPH-50</b>  | 2,5-dimethyl-2,5-di(tertbutylperoxy)-<br>hexane                    | 2     | 2   |
| <b>N 990</b>          | Carbon black                                                       | 30    | -   |
| <b>NSE</b>            | Neuburg Siliceous Earth                                            | -     | 30  |



## Fillers and characteristics

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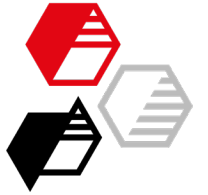
| Filler        | Description                                                    | Functionalization |
|---------------|----------------------------------------------------------------|-------------------|
| N 990         | Carbon black, MT                                               | -                 |
| Sillitin Z 86 | Neuburg Siliceous Earth (NSE),<br>$d_{50}$ : 2.4 $\mu\text{m}$ | -                 |
| Sillitin V 88 | Neuburg Siliceous Earth (NSE),<br>$d_{50}$ : 5.0 $\mu\text{m}$ | -                 |
| Aktisil AM    | Neuburg Siliceous Earth (NSE),<br>$d_{50}$ : 2.4 $\mu\text{m}$ | Amino             |
| Aktisil VM 56 | Neuburg Siliceous Earth (NSE),<br>$d_{50}$ : 2.4 $\mu\text{m}$ | Vinyl             |
| Aktisil Q     | Neuburg Siliceous Earth (NSE),<br>$d_{50}$ : 5.0 $\mu\text{m}$ | Methacrylic       |



## Compound preparation and curing

| Mixing                                                                 |                                                    |
|------------------------------------------------------------------------|----------------------------------------------------|
| Open mill                                                              | Ø 150 x 300 mm                                     |
| Batch weight                                                           | approx. 1 kg                                       |
| Temperature                                                            | 50 °C<br>30 °C for removing the sheet off the mill |
| Mixing time                                                            | approx. 15 min.                                    |
|                                                                        |                                                    |
| Curing and post-cure                                                   |                                                    |
| Cure                                                                   | 7 min. / 177 °C                                    |
| Post-cure                                                              | 2 h / 232 °C                                       |
|                                                                        |                                                    |
| All values shown refer to post-cured specimens unless otherwise noted. |                                                    |



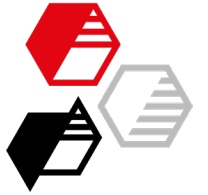


## Tests

| Test                      | Standard               | Conditions                                                                                |
|---------------------------|------------------------|-------------------------------------------------------------------------------------------|
| Mooney Viscosity ML 1+4   | DIN 53 523, part 3     | 100 °C                                                                                    |
| Curemeter testing         | DIN 53 529, part 1 – 4 | 177 °C, 0.2 ° deflection                                                                  |
| Tensile test              | DIN 53 504, S2         |                                                                                           |
| Compression set           | DIN ISO 815-1, type B  | 70 h / 200 °C / 25 % defl.<br>70 h / 232 °C / 25 % defl..                                 |
| Compression set           | VW PV 3307             | 94 h / 23 °C / 50 % defl.. / 5 s<br>94 h / 150 °C / 50 % defl. / 5 s                      |
| Tear resistance           | DIN ISO 34-1, A        |                                                                                           |
| Storage in hot air        | DIN 53 508             | 504 h / 210 °C, measured 30' after exposure<br>94 h / 230 °C, measured 30' after exposure |
| Immersion in liquid media | DIN ISO 1817           | Fuel FAM B, 70 / 23 °C<br>Oil OS206304, 168 h / 150 °C<br>Acetic acid pH3, 168 h / 100 °C |

## Neuburg Siliceous Earth vs. N 990

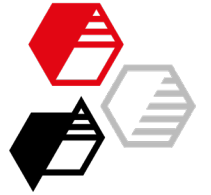
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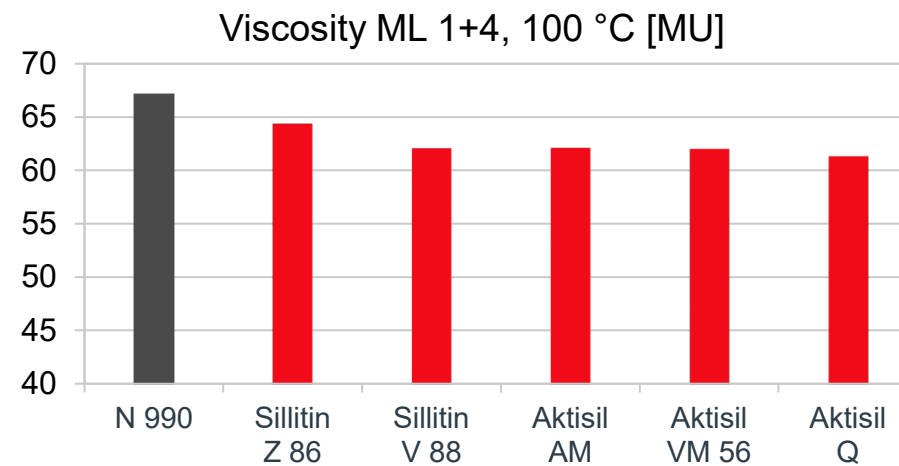
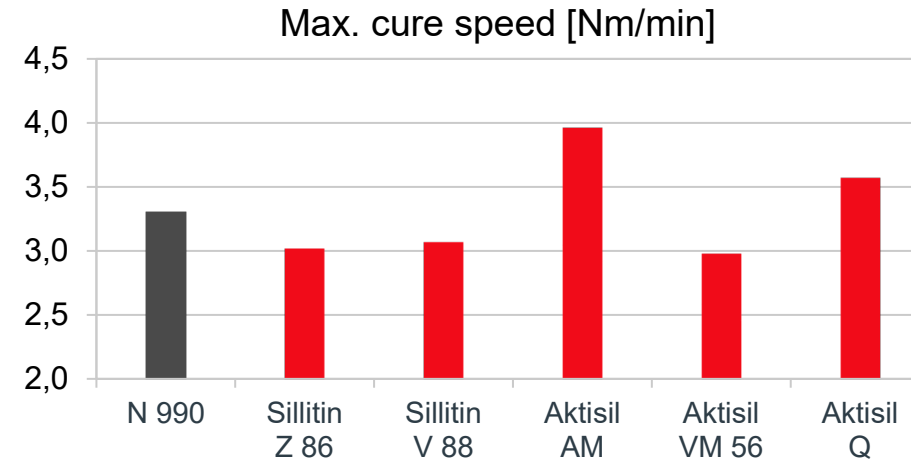
**30 phr N 990**

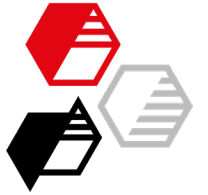
**30 phr NSE**

Hardness range  
65 - 70 Shore A

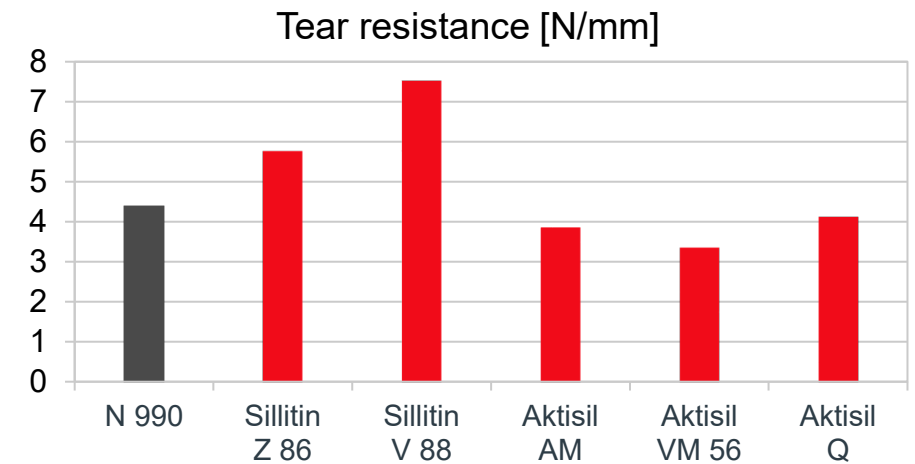
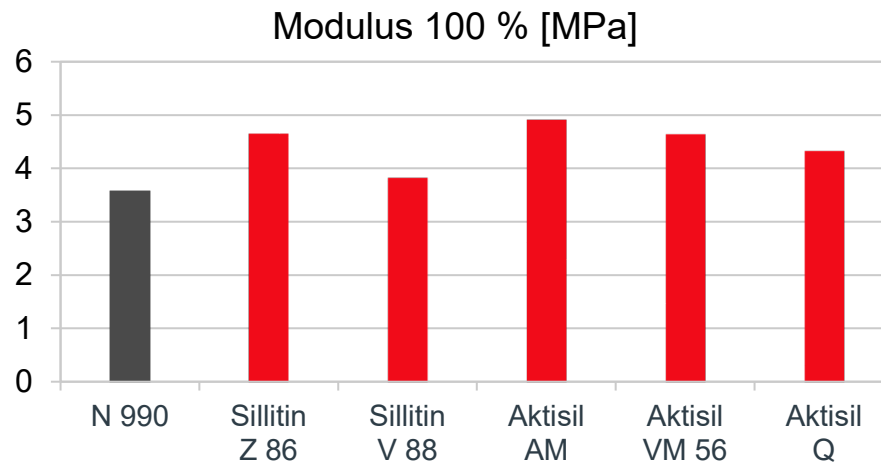
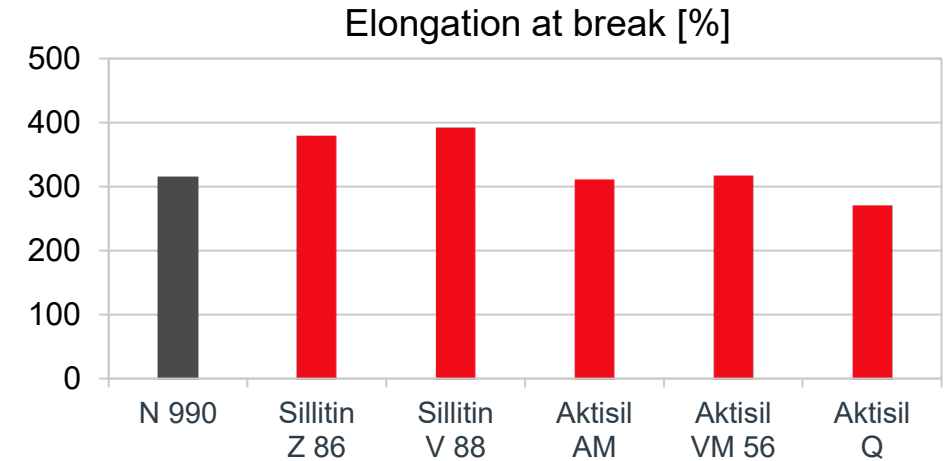
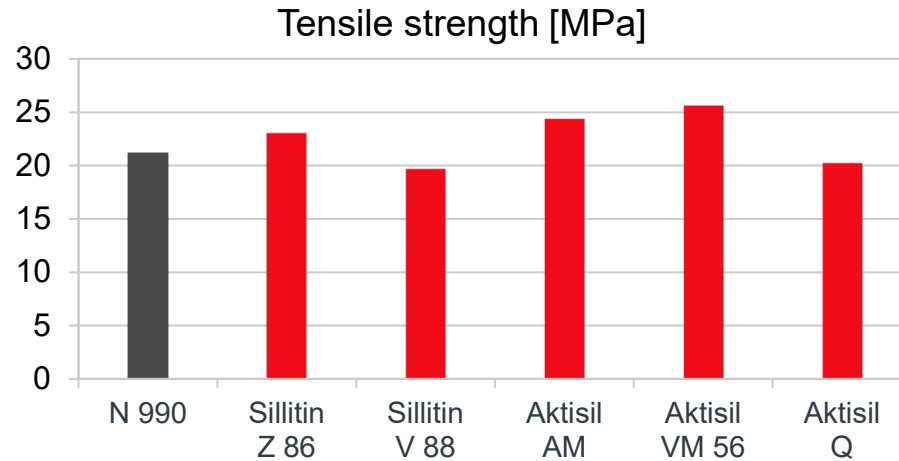


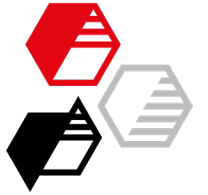
## Rheology



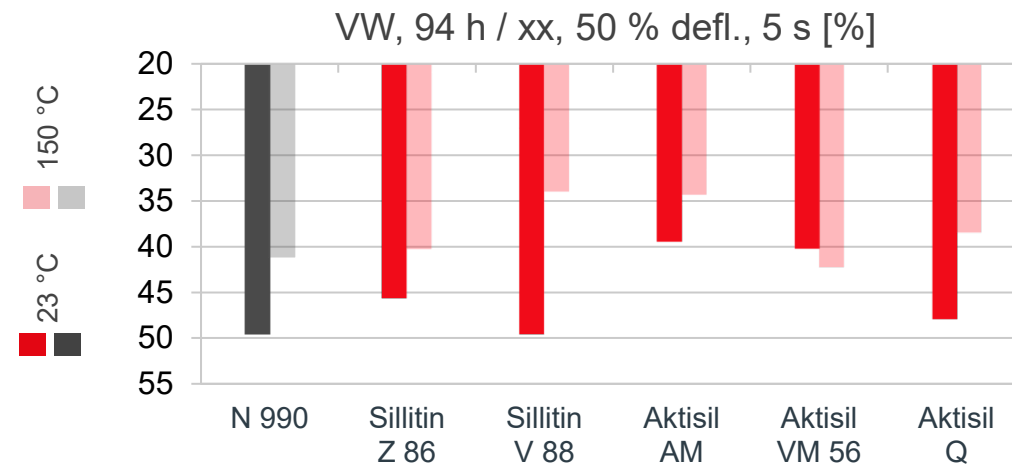
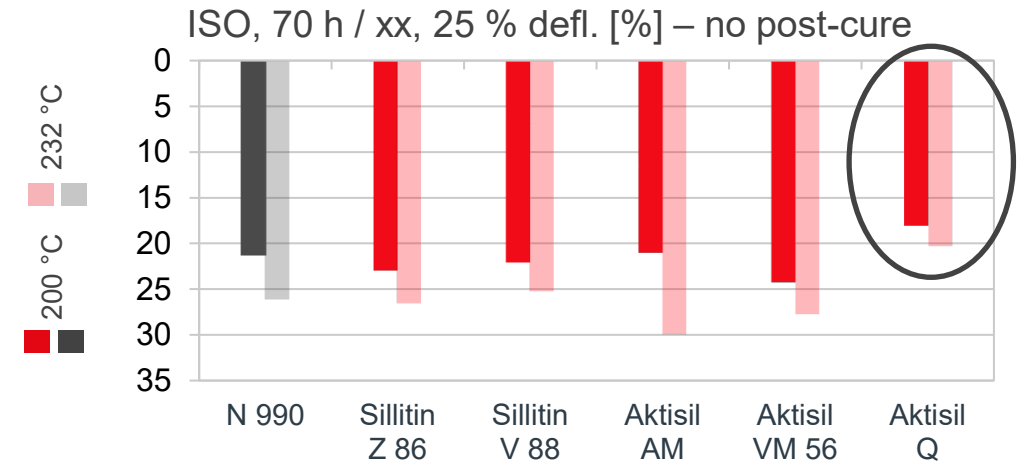
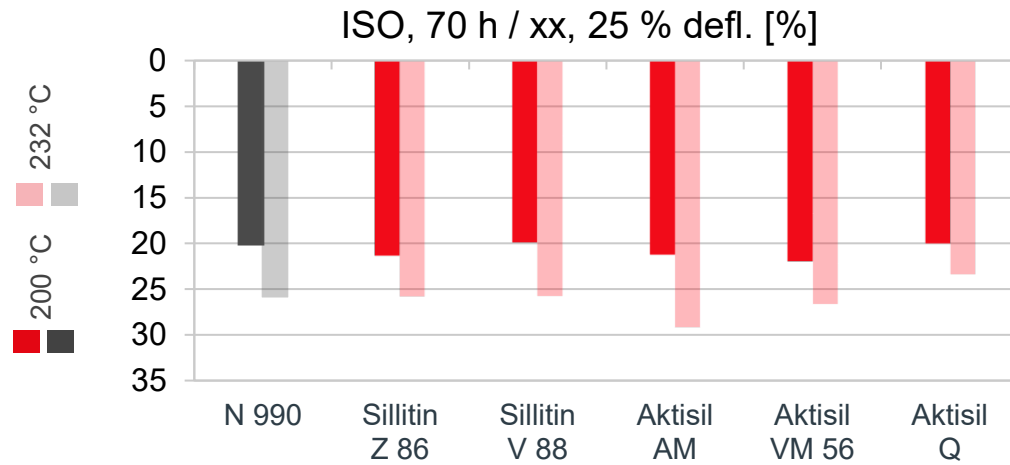


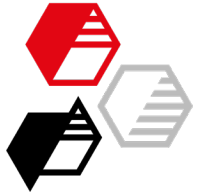
## Tensile properties





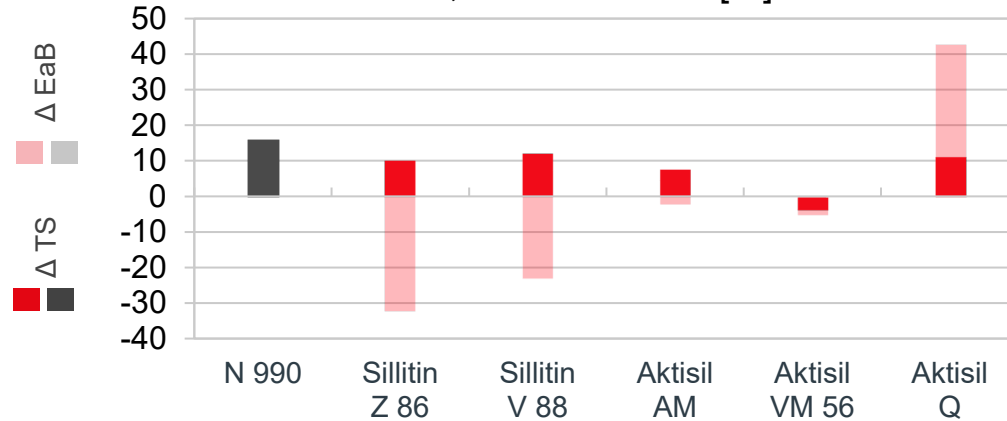
## Compression set



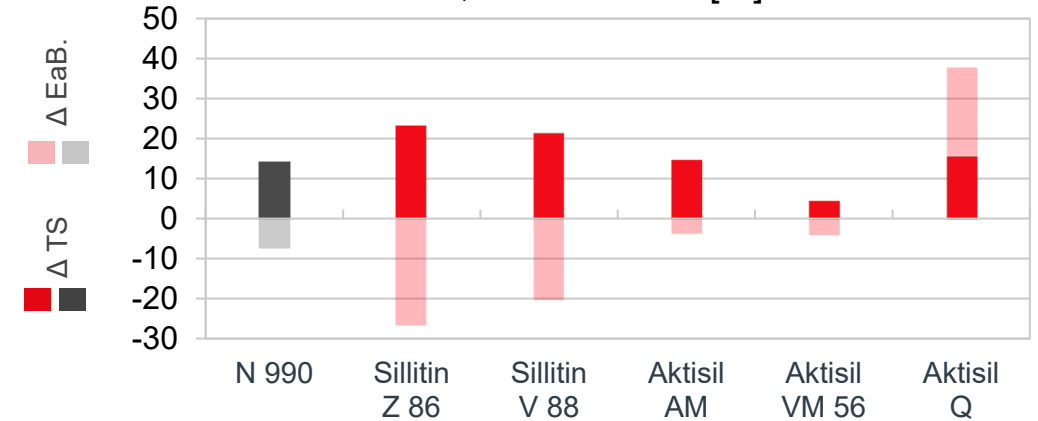


## Resistance to hot air and fuel

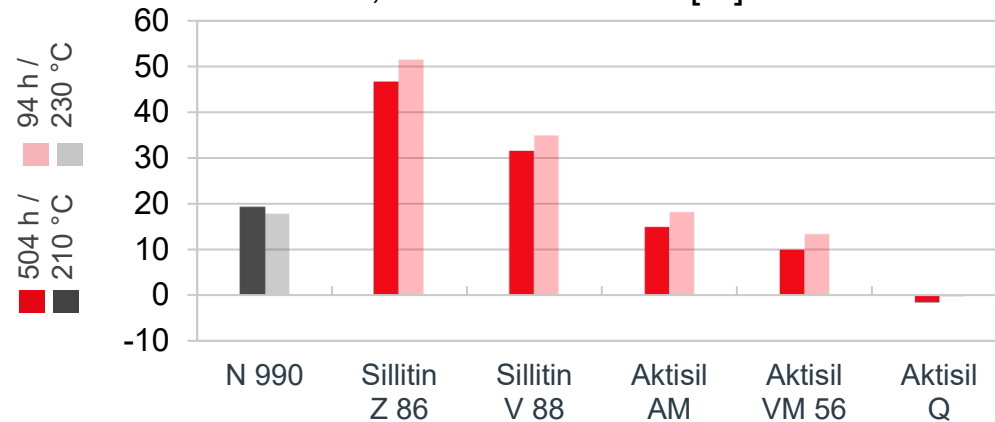
Hot air, 504 h / 210 °C [%]



Hot air, 94 h / 230 °C [%]



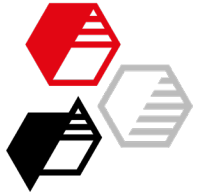
Hot air, Δ modulus 100 % [%]



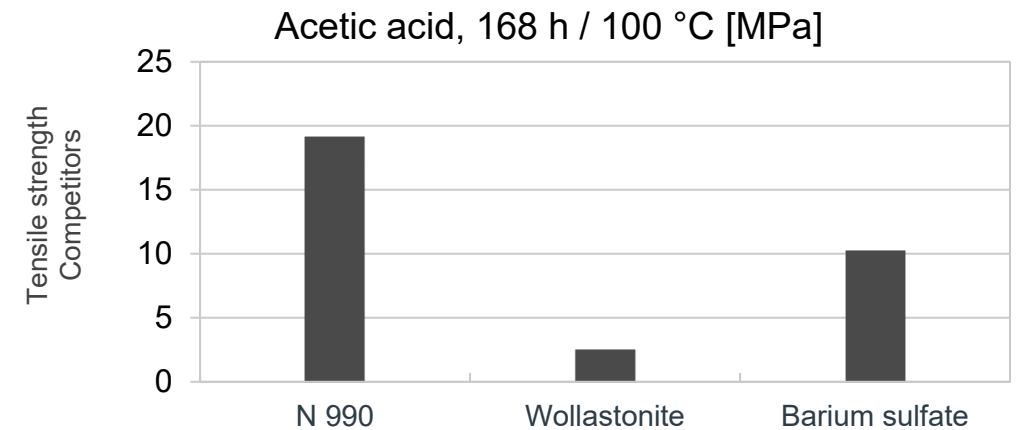
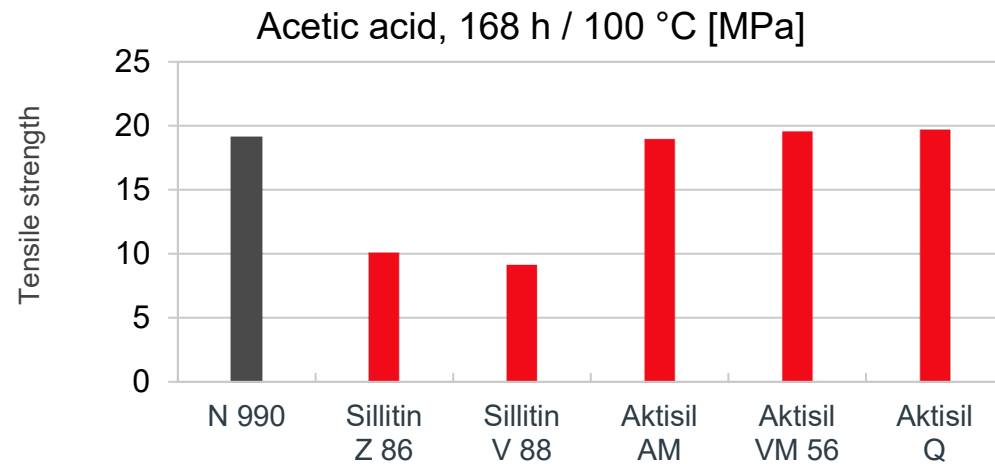
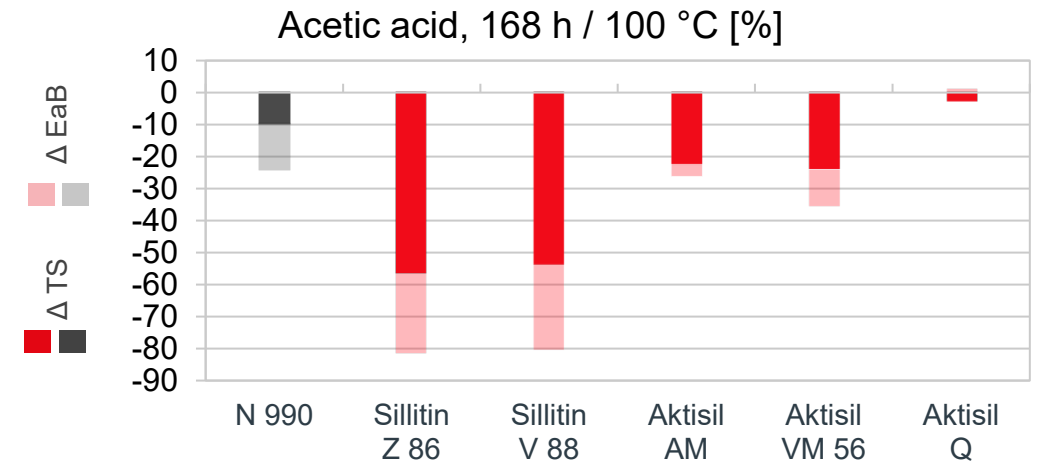
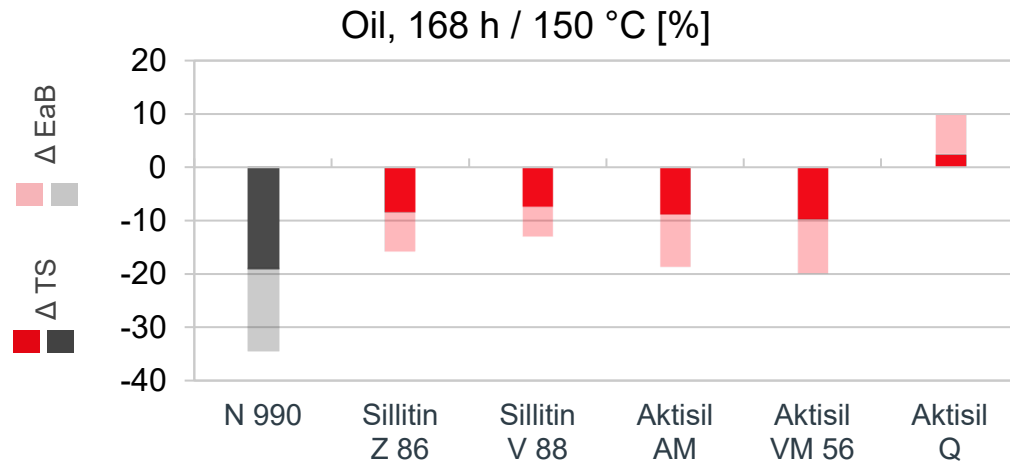
Resistance to fuel with **NSE** comparable to N 990

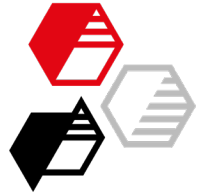
Value ranges:

|                       |                 |
|-----------------------|-----------------|
| Δ Hardness            | -8 ± 1 Shore A  |
| Δ Tensile strength    | -50 ± 10 %      |
| Δ Elongation at break | -20 ± 10 rel. % |
| Δ Weight              | 6.5 – 8.0 %     |
| Δ Volume              | 15 – 20 %       |



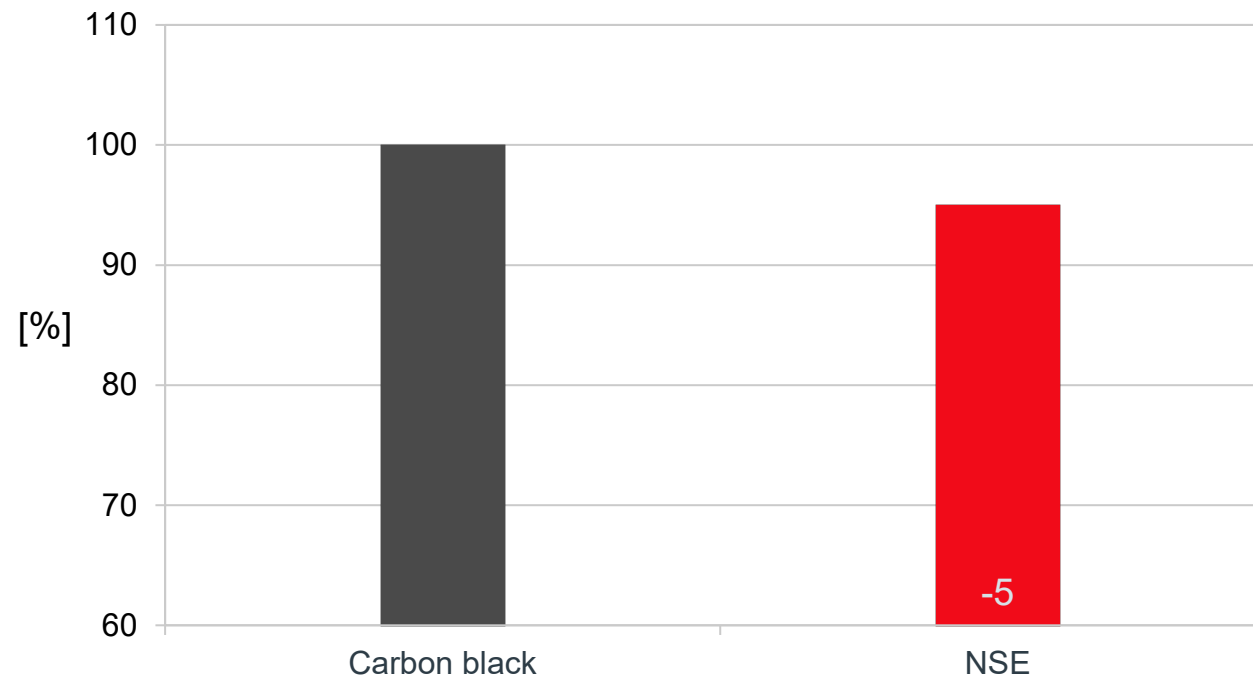
## Resistance to oil and acetic acid



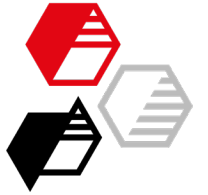


## An additional benefit....

Reduction of CO<sub>2</sub> eq. after replacing CB with NSE, volume based







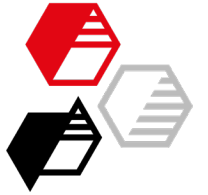
## NSE vs. N 990

| 65 – 70 Shore A              | Sillitin Z 86 | Sillitin V 88 | Aktisil AM | Aktisil VM 56 | Aktisil Q |
|------------------------------|---------------|---------------|------------|---------------|-----------|
| Cure speed                   |               |               | +          |               | +         |
| Viscosity                    | +             | +             | +          | +             | +         |
| Tensile strength             | +             | =             | +          | +             | =         |
| Elongation at break          | +             | +             | =          | =             |           |
| Modulus 100 %                | +             | =             | +          | +             | +         |
| Tear resistance              | +             | +             | =          | =             | =         |
| CS ISO 200 °C                | =             | =             | =          | =             | =         |
| CS ISO 200 °C, no post-cure  | =             | =             | =          | =             | +         |
| CS ISO 232 °C                | =             | =             | =          | =             | =         |
| CS ISO 232 °C, no post-cure  | =             | =             | =          | =             | +         |
| CS VW 23 °C                  | =             | =             | +          | +             | =         |
| CS VW 150 °C                 | =             | +             | +          | =             | =         |
| Resistance to hot air 210 °C |               |               | +          | +             | +         |
| Resistance to hot air 230 °C |               |               | =          | +             | +         |
| Resistance to fuel           | =             | =             | =          | =             | =         |
| Resistance to oil            | +             | +             | +          | +             | +         |
| Resistance to acetic acid    |               |               | =          | =             | +         |



Additional benefits:

- colored parts are possible
- reduction of compound carbon footprint

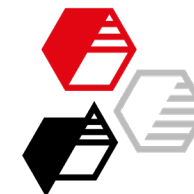


## We supply materials for good ideas!

HOFFMANN MINERAL GmbH  
Muenchener Straße 75  
DE-86633 Neuburg (Donau)

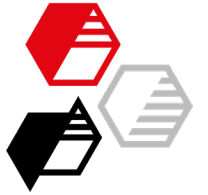
Phone: +49 8431 53-0  
Internet: [www.hoffmann-mineral.com](http://www.hoffmann-mineral.com)  
E-mail: [info@hoffmann-mineral.com](mailto:info@hoffmann-mineral.com)

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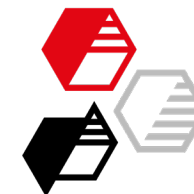
## Results in tabular form

|                                                                    |         | N 990 | Sillitin Z 86 | Sillitin V 88 | Aktisil AM | Aktisil VM 56 | Aktisil Q |
|--------------------------------------------------------------------|---------|-------|---------------|---------------|------------|---------------|-----------|
| <b>Rheology</b>                                                    |         |       |               |               |            |               |           |
| Mooney Viscosity, ML 1+4, 100 °C                                   | MU      | 67    | 64            | 62            | 62         | 62            | 61        |
| Rotorless Curemeter, M <sub>min</sub> , 177 °C                     | Nm      | 0.04  | 0.04          | 0.04          | 0.04       | 0.04          | 0.04      |
| Rotorless Curemeter, V <sub>max</sub> , 177 °C                     | Nm/min  | 3.3   | 3.0           | 3.1           | 4.0        | 3.0           | 3.6       |
| Rotorless Curemeter, t <sub>90</sub> , 177 °C                      | min.    | 0.8   | 0.9           | 0.9           | 0.8        | 0.9           | 0.8       |
| <b>Mechanical properties (cured 7 min. / 177 °C, no post-cure)</b> |         |       |               |               |            |               |           |
| Hardness                                                           | Shore A | 65    | 67            | 64            | 64         | 64            | 63        |
| Tensile strength                                                   | MPa     | 17    | 17            | 14            | 19         | 21            | 16        |
| Elongation at break                                                | %       | 330   | 404           | 390           | 312        | 330           | 257       |
| Modulus 50 %                                                       | MPa     | 1.6   | 1.9           | 1.7           | 1.8        | 1.7           | 1.6       |
| Modulus 100 %                                                      | MPa     | 3.2   | 3.7           | 3.1           | 4.2        | 3.9           | 3.6       |
| Tear resistance                                                    | N/mm    | 4.6   | 6.4           | 6.2           | 4.5        | 3.2           | 4.0       |
| CS ISO 70 h / 200 °C / 25 %                                        | %       | 21    | 23            | 22            | 21         | 24            | 18        |
| CS ISO 70 h / 232 °C / 25 %                                        | %       | 26    | 26            | 25            | 30         | 28            | 20        |



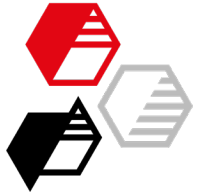
## Results in tabular form

|                                                                              |                 | N 990 | Sillitin Z 86 | Sillitin V 88 | Aktisil AM | Aktisil VM 56 | Aktisil Q |
|------------------------------------------------------------------------------|-----------------|-------|---------------|---------------|------------|---------------|-----------|
| <b>Mechanical properties (cured 7 min. / 177 °C, post-cure 2 h / 232 °C)</b> |                 |       |               |               |            |               |           |
| Hardness                                                                     | Shore A         | 66    | 65            | 65            | 66         | 66            | 65        |
| Tensile strength                                                             | MPa             | 21    | 23            | 20            | 24         | 26            | 20        |
| Elongation at break                                                          | %               | 314   | 379           | 392           | 311        | 318           | 271       |
| Modulus 50 %                                                                 | MPa             | 1.7   | 2.1           | 1.8           | 1.9        | 1.8           | 1.7       |
| Modulus 100 %                                                                | MPa             | 3.6   | 4.6           | 3.8           | 4.9        | 4.6           | 4.3       |
| Tear resistance                                                              | N/mm            | 4.4   | 5.8           | 7.5           | 3.9        | 3.4           | 4.1       |
| CS ISO 70 h / 200 °C / 25 %                                                  | %               | 20    | 21            | 20            | 21         | 22            | 20        |
| CS ISO 70 h / 232 °C / 25 %                                                  | %               | 26    | 26            | 26            | 29         | 27            | 23        |
| CS VW 94 h / 23 °C / 50 %                                                    | %               | 50    | 46            | 50            | 39         | 40            | 48        |
| CS VW 94 h / 150 °C / 50 %                                                   | %               | 41    | 40            | 34            | 34         | 42            | 38        |
| Abrasion loss                                                                | mm <sup>3</sup> | 53    | 80            | 103           | 71         | 64            | 73        |



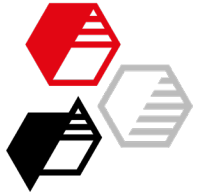
## Results in tabular form

|                                                                   |         | N 990 | Sillitin Z 86 | Sillitin V 88 | Aktisil AM | Aktisil VM 56 | Aktisil Q |
|-------------------------------------------------------------------|---------|-------|---------------|---------------|------------|---------------|-----------|
| <b>Hot air aging, 504 h / 210 °C, measured 30' after exposure</b> |         |       |               |               |            |               |           |
| Hardness                                                          | Shore A | 69    | 70            | 68            | 69         | 68            | 67        |
| Tensile strength                                                  | MPa     | 24    | 25            | 22            | 26         | 25            | 22        |
| Elongation at break                                               | %       | 314   | 257           | 302           | 304        | 312           | 356       |
| Δ Hardness                                                        | Shore A | +3    | +5            | +3            | +3         | +2            | +2        |
| Δ Tensile strength                                                | %       | +16   | +10           | +12           | +7.5       | -3,6          | +11       |
| Δ Elongation at break                                             | rel.%   | 0     | -32           | -23           | -2.3       | -1,6          | +31       |
| <b>Hot air aging, 94 h / 230 °C, measured 30' after exposure</b>  |         |       |               |               |            |               |           |
| Hardness                                                          | Shore A | 69    | 69            | 67            | 68         | 67            | 65        |
| Tensile strength                                                  | MPa     | 24    | 28            | 24            | 28         | 27            | 23        |
| Elongation at break                                               | %       | 292   | 278           | 312           | 299        | 304           | 331       |
| Δ Hardness                                                        | Shore A | +3    | +4            | +2            | +2         | +1            | 0         |
| Δ Tensile strength                                                | %       | +14   | +23           | +21           | +15        | +4,5          | +16       |
| Δ Elongation at break                                             | rel.%   | -7.2  | -27           | -20           | -3,8       | -4.3          | +22       |



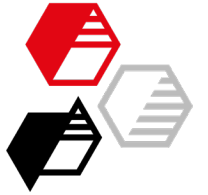
## Results in tabular form

|                                             |         | N 990 | Sillitin Z 86 | Sillitin V 88 | Aktisil AM | Aktisil VM 56 | Aktisil Q |
|---------------------------------------------|---------|-------|---------------|---------------|------------|---------------|-----------|
| <b>Exposure to fuel FAM B, 70 h / 23 °C</b> |         |       |               |               |            |               |           |
| Hardness                                    | Shore A | 59    | 60            | 57            | 58         | 57            | 58        |
| Tensile strength                            | MPa     | 12    | 9.3           | 7.8           | 11         | 13            | 10        |
| Elongation at break                         | %       | 231   | 340           | 331           | 238        | 251           | 206       |
| Δ Hardness                                  | Shore A | -7    | -5            | -8            | -8         | -9            | -7        |
| Δ Tensile strength                          | %       | -44   | -60           | -60           | -53        | -51           | -49       |
| Δ Elongation at break                       | rel.%   | -26   | -10           | -16           | -24        | -21           | -24       |
| Δ Weight                                    | %       | +6.7  | +7.9          | +7.7          | +6.8       | +7.8          | +8.0      |
| Δ Volume                                    | %       | +15   | +19           | +18           | +17        | +19           | +19       |



## Results in tabular form

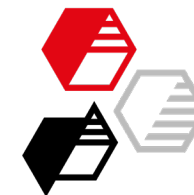
|                                                        |         | N 990 | Sillitin Z 86 | Sillitin V 88 | Aktisil AM | Aktisil VM 56 | Aktisil Q |
|--------------------------------------------------------|---------|-------|---------------|---------------|------------|---------------|-----------|
| <b>Exposure to engine oil OS206304, 168 h / 165 °C</b> |         |       |               |               |            |               |           |
| Hardness                                               | Shore A | 65    | 66            | 64            | 65         | 64            | 64        |
| Tensile strength                                       | MPa     | 17    | 21            | 18            | 22         | 23            | 21        |
| Elongation at break                                    | %       | 266   | 351           | 370           | 281        | 286           | 291       |
| Δ Hardness                                             | Shore A | -1    | +1            | -1            | -1         | -2            | -1        |
| Δ Tensile strength                                     | %       | -19   | -8.4          | -7.4          | -8.8       | -9.7          | +2.3      |
| Δ Elongation at break                                  | rel.%   | -15   | -7.4          | -5.6          | -9.8       | -10           | +7.3      |
| Δ Weight                                               | %       | +0.8  | +0.6          | +0.6          | +0.7       | +0.8          | +0.6      |
| Δ Volume                                               | %       | +1.4  | +1.1          | +0.7          | +1.2       | +1.4          | +0.7      |



## Results in tabular form

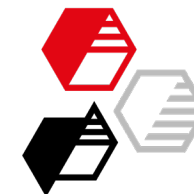
|                                                    |         | N 990 | Sillitin Z 86 | Sillitin V 88 | Aktisil AM | Aktisil VM 56 | Aktisil Q |
|----------------------------------------------------|---------|-------|---------------|---------------|------------|---------------|-----------|
| <b>Exposure to acetic acid pH3, 168 h / 100 °C</b> |         |       |               |               |            |               |           |
| Hardness                                           | Shore A | 54    | 40            | 38            | 47         | 48            | 51        |
| Tensile strength                                   | MPa     | 19    | 10            | 9,1           | 19         | 19            | 20        |
| Elongation at break                                | %       | 268   | 285           | 288           | 300        | 281           | 274       |
| Δ Hardness                                         | Shore A | -12   | -25           | -27           | -19        | -18           | -14       |
| Δ Tensile strength                                 | %       | -9.7  | -56           | -54           | -22        | -24           | -3,0      |
| Δ Elongation at break                              | rel.%   | -15   | -25           | -27           | -3.7       | -12           | +1.2      |
| Δ Weight                                           | %       | +17   | +49           | +36           | +24        | +25           | +23       |
| Δ Volume                                           | %       | +30   | +94           | +68           | +47        | +47           | +43       |





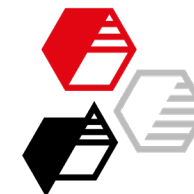
## Results in tabular form – only competitors

|                                                                    |         | N 990 | Wollastonite AST | Wollastonite EST | Barium sulfate |
|--------------------------------------------------------------------|---------|-------|------------------|------------------|----------------|
| <b>Rheology</b>                                                    |         |       |                  |                  |                |
| Mooney Viscosity, ML 1+4, 100 °C                                   | MU      | 67    | 63               | 59               | 66             |
| Rotorless Curemeter, M <sub>min</sub> , 177 °C                     | Nm      | 0.04  | 0.03             | 0.03             | 0.04           |
| Rotorless Curemeter, V <sub>max</sub> , 177 °C                     | Nm/min. | 3.3   | 3.4              | 3.1              | 3.4            |
| Rotorless Curemeter, t <sub>90</sub> , 177 °C                      | min.    | 0.8   | 0.9              | 0.9              | 0.9            |
| <b>Mechanical properties (cured 7 min. / 177 °C, no post-cure)</b> |         |       |                  |                  |                |
| Hardness                                                           | Shore A | 65    | 61               | 63               | 61             |
| Tensile strength                                                   | MPa     | 17    | 18               | 16               | 15             |
| Elongation at break                                                | %       | 330   | 397              | 393              | 421            |
| Modulus 50 %                                                       | MPa     | 1.6   | 1.9              | 1.6              | 1.4            |
| Modulus 100 %                                                      | MPa     | 3.2   | 4.2              | 3.2              | 2.1            |
| Tear resistance                                                    | N/mm    | 4.6   | 6.0              | 5.9              | 4.7            |
| Compression set ISO 70 h / 200 °C / 25 %                           | %       | 21    | 24               | 21               | 22             |
| Compression set ISO 70 h / 232 °C / 25 %                           | %       | 26    | 35               | 28               | 31             |



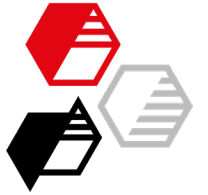
## Results in tabular form – only competitors

|                                                                              |                 | N 990 | Wollastonite AST | Wollastonite EST | Barium sulfate |
|------------------------------------------------------------------------------|-----------------|-------|------------------|------------------|----------------|
| <b>Mechanical properties (cured 7 min. / 177 °C, post-cure 2 h / 232 °C)</b> |                 |       |                  |                  |                |
| Hardness                                                                     | Shore A         | 66    | 64               | 64               | 64             |
| Tensile strength                                                             | MPa             | 21    | 19               | 20               | 16             |
| Elongation at break                                                          | %               | 314   | 337              | 399              | 407            |
| Modulus 50 %                                                                 | MPa             | 1.7   | 1.7              | 1.7              | 1.4            |
| Modulus 100 %                                                                | MPa             | 3.6   | 3.9              | 3.5              | 2.4            |
| Tear resistance                                                              | N/mm            | 4.4   | 6.2              | 6.9              | 6.1            |
| Compression set ISO 70 h / 200 °C / 25 %                                     | %               | 20    | 22               | 18               | 22             |
| Compression set ISO 70 h / 232 °C / 25 %                                     | %               | 26    | 29               | 24               | 28             |
| Compression set VW 94 h / 23 °C / 50 %                                       | %               | 50    | 51               | 51               | 49             |
| Compression set VW 94 h / 150 °C / 50 %                                      | %               | 41    | 35               | 36               | 36             |
| Abrasion loss                                                                | mm <sup>3</sup> | 53    | 104              | 114              | 124            |



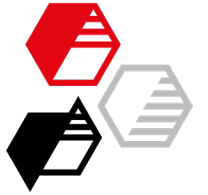
## Results in tabular form – only competitors

|                                                                   |         | N 990 | Wollastonite AST | Wollastonite EST | Barium sulfate |
|-------------------------------------------------------------------|---------|-------|------------------|------------------|----------------|
| <b>Hot air aging, 504 h / 210 °C, measured 30' after exposure</b> |         |       |                  |                  |                |
| Hardness                                                          | Shore A | 69    | 64               | 64               | 65             |
| Tensile strength                                                  | MPa     | 24    | 20               | 21               | 24             |
| Elongation at break                                               | %       | 314   | 331              | 390              | 372            |
| Δ Hardness                                                        | Shore A | +3    | -3               | 0                | -2             |
| Δ Tensile strength                                                | %       | +16   | +6.1             | +3.1             | +43            |
| Δ Elongation at break                                             | rel.%   | 0     | -1.7             | -2.3             | -8.6           |
| <b>Hot air aging, 94 h / 230 °C, measured 30' after exposure</b>  |         |       |                  |                  |                |
| Hardness                                                          | Shore A | 69    | 65               | 65               | 65             |
| Tensile strength                                                  | MPa     | 24    | 22               | 22               | 25             |
| Elongation at break                                               | %       | 292   | 325              | 335              | 353            |
| Δ Hardness                                                        | Shore A | +3    | -2               | +1               | -2             |
| Δ Tensile strength                                                | %       | +14   | +18              | +7.9             | +51            |
| Δ Elongation at break                                             | rel.%   | -7.2  | -3.6             | -16              | -13            |



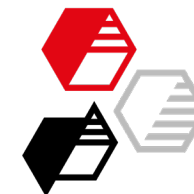
## Results in tabular form – only competitors

|                                             |         | N 990 | Wollastonite AST | Wollastonite EST | Barium sulfate |
|---------------------------------------------|---------|-------|------------------|------------------|----------------|
| <b>Exposure to fuel FAM B, 70 h / 23 °C</b> |         |       |                  |                  |                |
| Hardness                                    | Shore A | 59    | 56               | 55               | 52             |
| Tensile strength                            | MPa     | 12    | 8.6              | 7.0              | 7.7            |
| Elongation at break                         | %       | 231   | 241              | 261              | 329            |
| Δ Hardness                                  | Shore A | -7    | -11              | -9               | -15            |
| Δ Tensile strength                          | %       | -44   | -53              | -66              | -53            |
| Δ Elongation at break                       | rel.%   | -26   | -28              | -35              | -19            |
| Δ Weight                                    | %       | +6.7  | +7.6             | +7.2             | +7.4           |
| Δ Volume                                    | %       | +15   | +19              | +18              | +20            |



## Results in tabular form – only competitors

|                                                        |         | N 990 | Wollastonite AST | Wollastonite EST | Barium sulfate |
|--------------------------------------------------------|---------|-------|------------------|------------------|----------------|
| <b>Exposure to engine oil OS206304, 168 h / 165 °C</b> |         |       |                  |                  |                |
| Hardness                                               | Shore A | 65    | 62               | 62               | 62             |
| Tensile strength                                       | MPa     | 17    | 17               | 13               | 11             |
| Elongation at break                                    | %       | 266   | 286              | 297              | 340            |
| Δ Hardness                                             | Shore A | -1    | -5               | -2               | -5             |
| Δ Tensile strength                                     | %       | -19   | -7.1             | -35              | -34            |
| Δ Elongation at break                                  | rel.%   | -15   | -15              | -26              | -17            |
| Δ Weight                                               | %       | +0.8  | +0.6             | +0.6             | +0.5           |
| Δ Volume                                               | %       | +1.4  | +1.2             | +1.1             | +1.3           |



## Results in tabular form – only competitors

|                                                    |         | N 990 | Wollastonite AST | Wollastonite EST | Barium sulfate |
|----------------------------------------------------|---------|-------|------------------|------------------|----------------|
| <b>Exposure to acetic acid pH3, 168 h / 100 °C</b> |         |       |                  |                  |                |
| Hardness                                           | Shore A | 54    | 37               | non determinable | 35             |
| Tensile strength                                   | MPa     | 19    | 2,6              | 2,8              | 10             |
| Elongation at break                                | %       | 268   | 54               | 84               | 252            |
| Δ Hardness                                         | Shore A | -12   | -30              | non determinable | -32            |
| Δ Tensile strength                                 | %       | -9.7  | -86              | -86              | -37            |
| Δ Elongation at break                              | rel.%   | -15   | -84              | -79              | -38            |
| Δ Weight                                           | %       | +17   | +288             | +227             | +55            |
| Δ Volume                                           | %       | +30   | +593             | +499             | +121           |