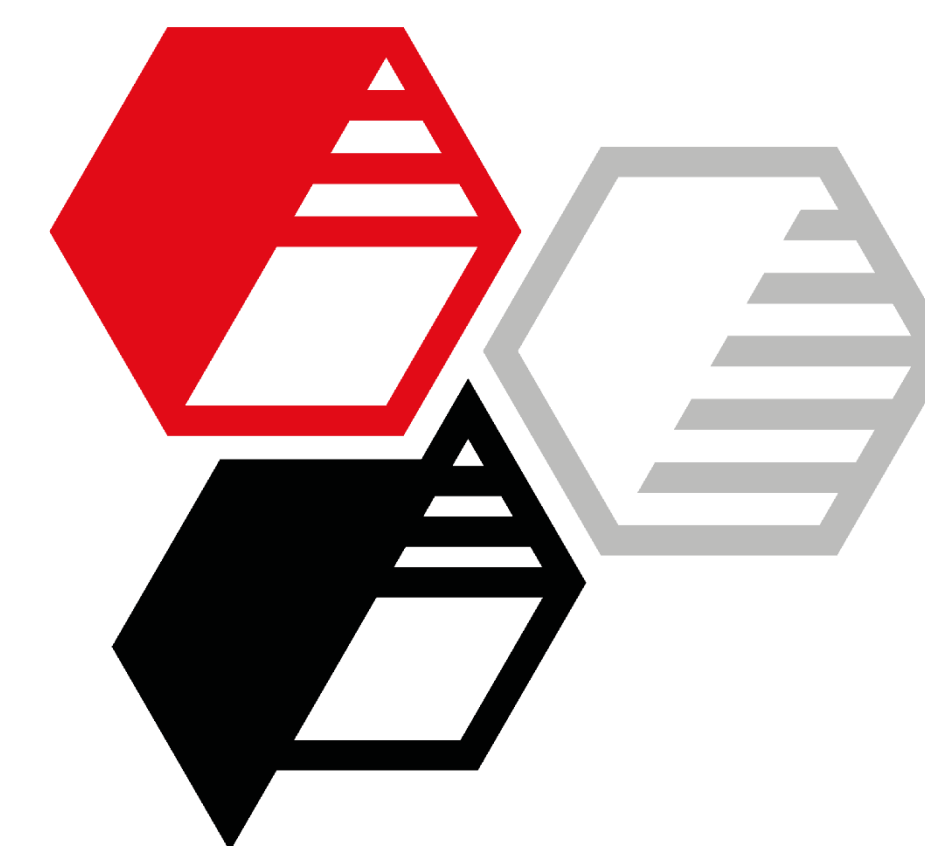


Potable water seal, 70 IRHD, EPDM, E-DIN EN 681-1, partial replacement of carbon black by Neuburg Siliceous Earth



Status quo

Elastomeric seals in contact with drinking water

E-DIN EN 681-1 (draft July 2016)

WB - drinking water supply

WD - non drinking water supply

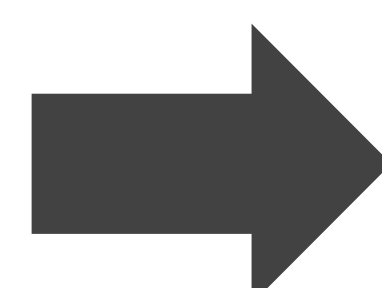
Raw materials must comply with UBA¹ Positive List Part 1 and 2

PAH² content in mixture only 10 % of the limit value of the TrinkwV³ (2011)

Issue

Carbon Black

- high price fluctuations
- long-term rising cost level
- temporary supply bottlenecks
- PAH



Neuburg Siliceous Earth

- slightly long-term price increase
- reliable delivery times
- purity requirements BfR⁴ Part 1 A LII fulfilled
- without PAH -> reduces the PAH concentration in compound

Objective

Partial replacement of Purex HS 45

Cost reduction

by **Sillitin Z 86** or **Aktisil VM 56**

Formulation

Base formulation	phr
Keltan®2650	100
Zinkoxyd aktiv	3
Stearic acid	0.3
Purex HS 45	80
Caldic PIB 190	15
Safic Chem OMB	0.75
Luperox 101-XL 45	5.33
TAC 70	0.7
Total	205.08

Formulation variations in phr

Purex HS 45	Carbon black replacement level	Sillitin Z 86	Aktisil VM 56
80			
60	25 %	40	40
50	37 %	60	60
40	50 %	80	80

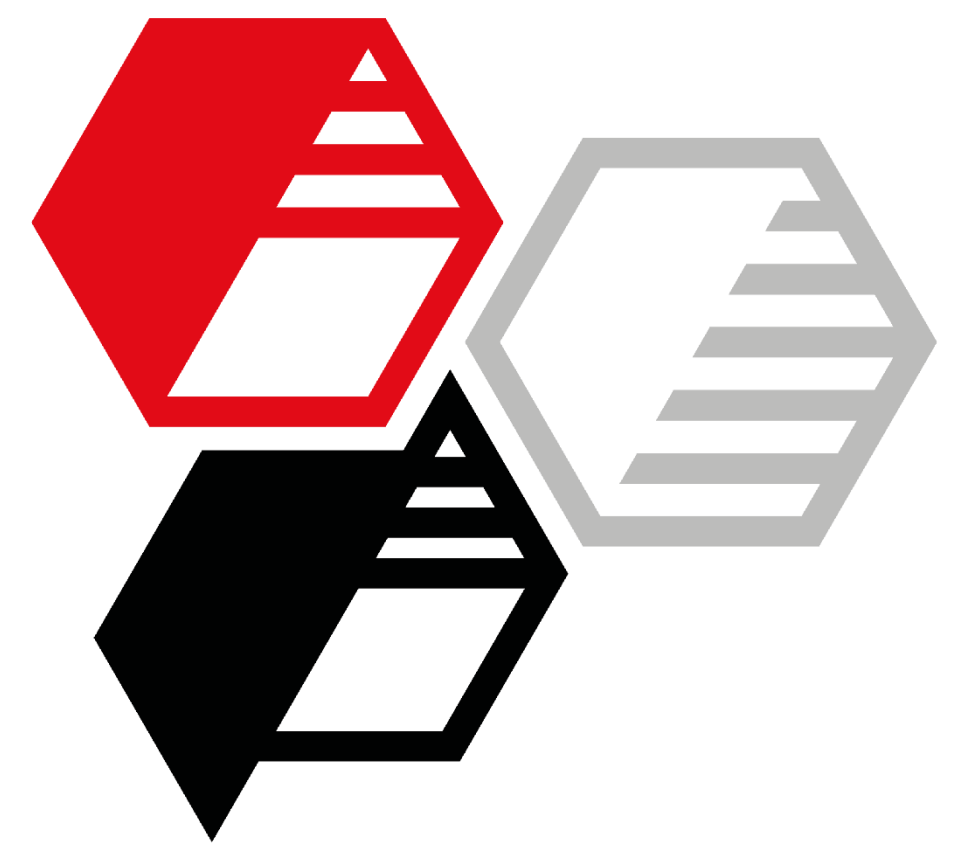
¹ German Federal Environment Agency (UBA)

³ German Drinking Water Ordinance (TrinkwV)

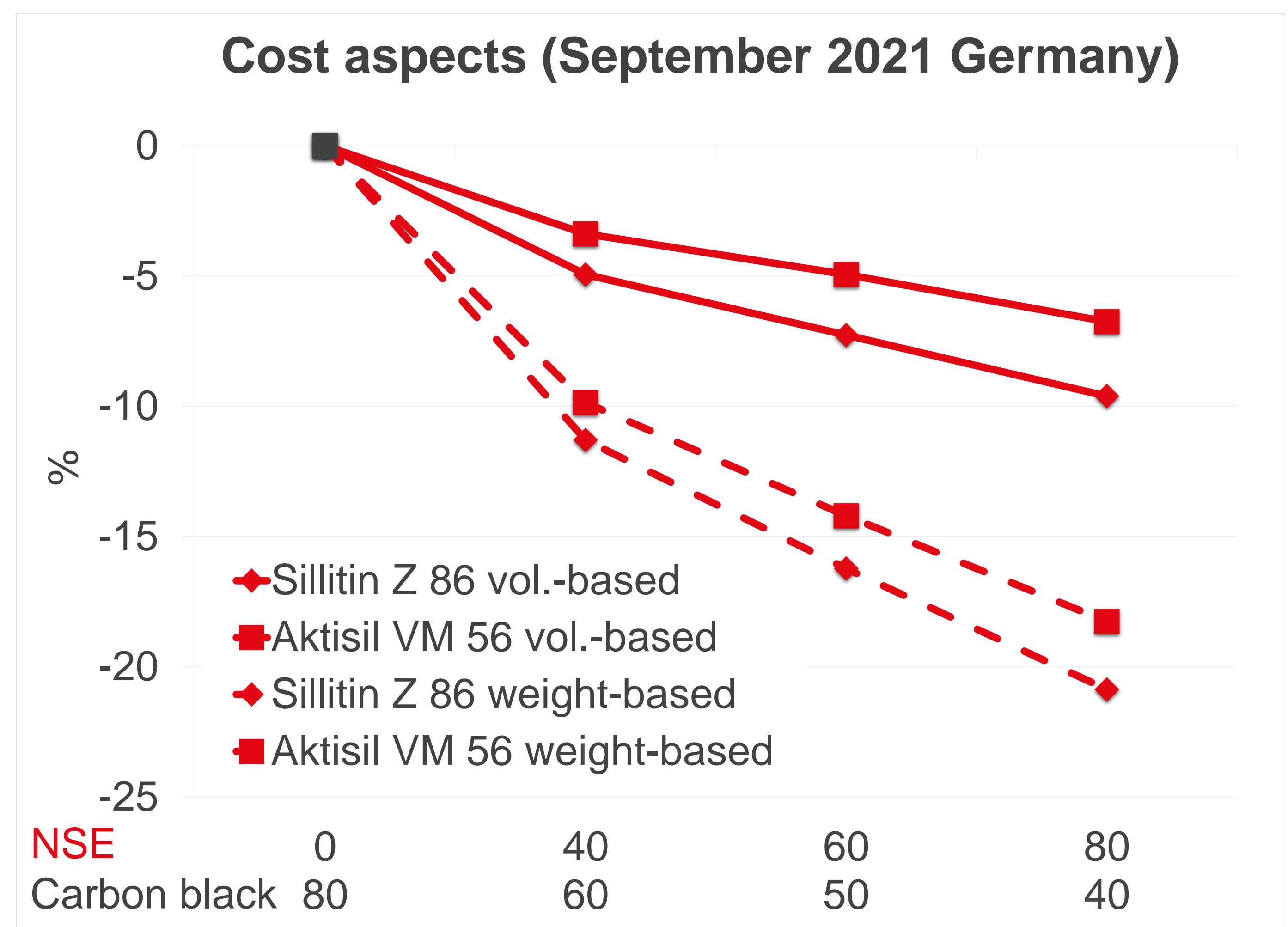
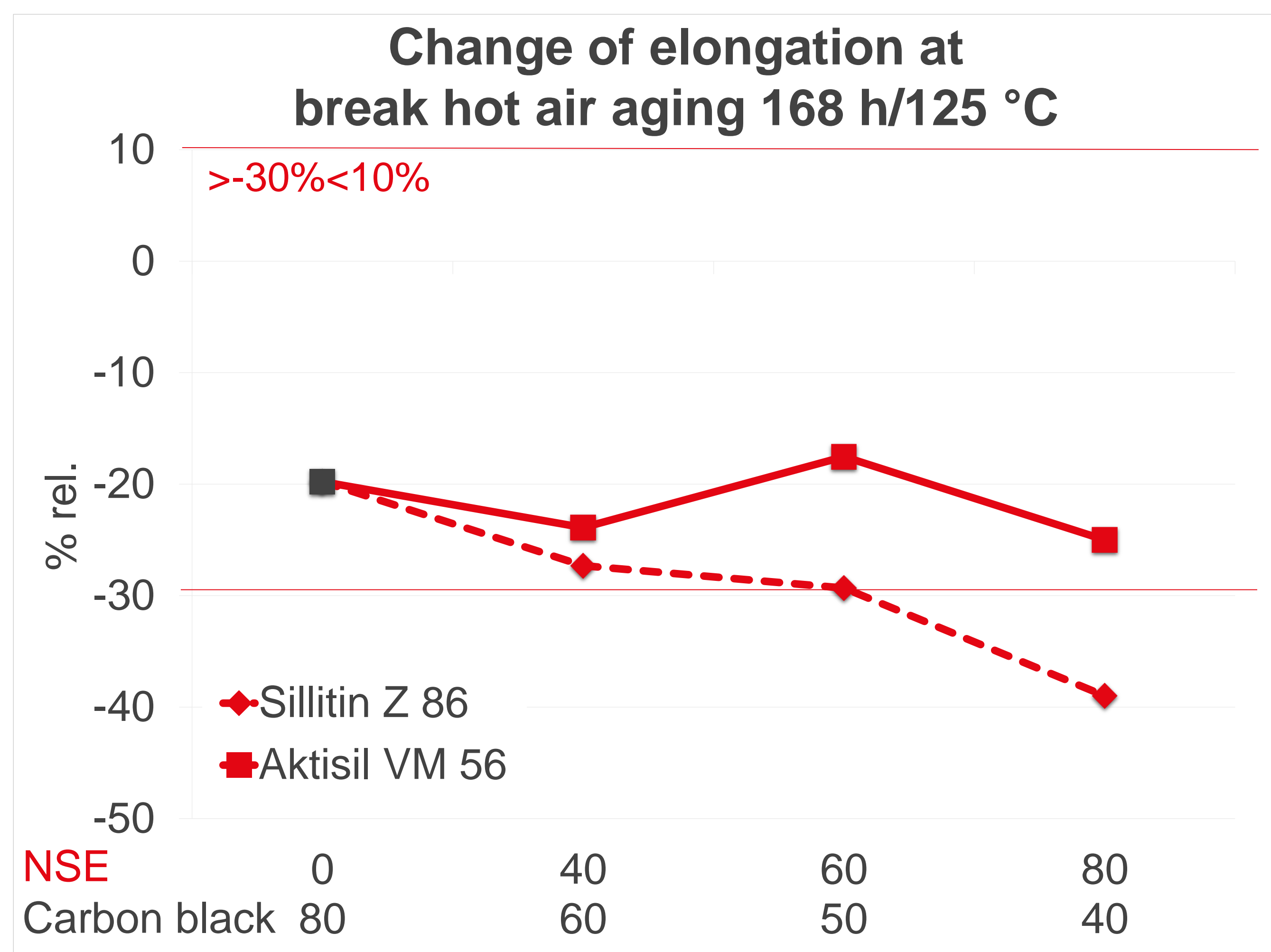
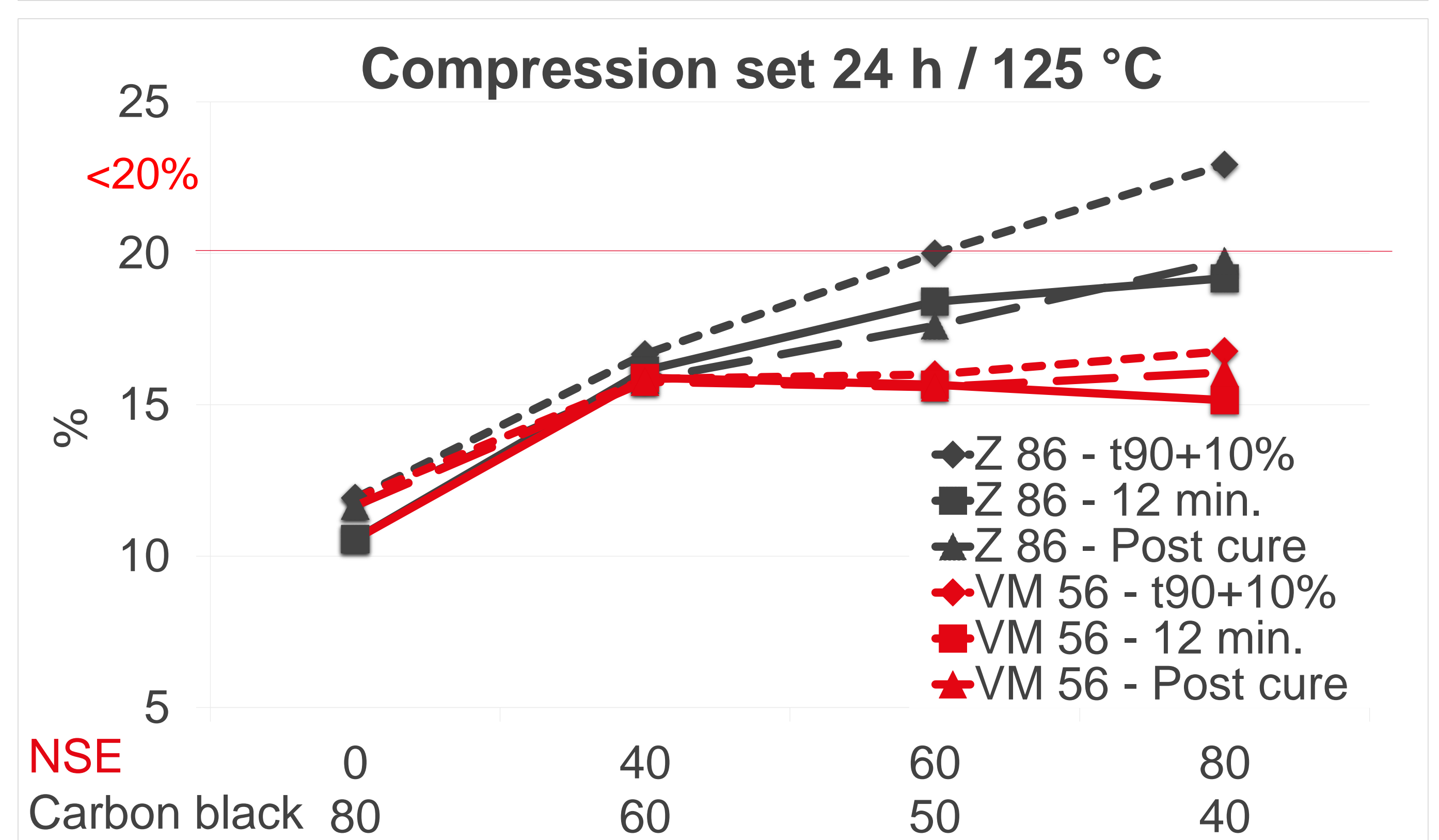
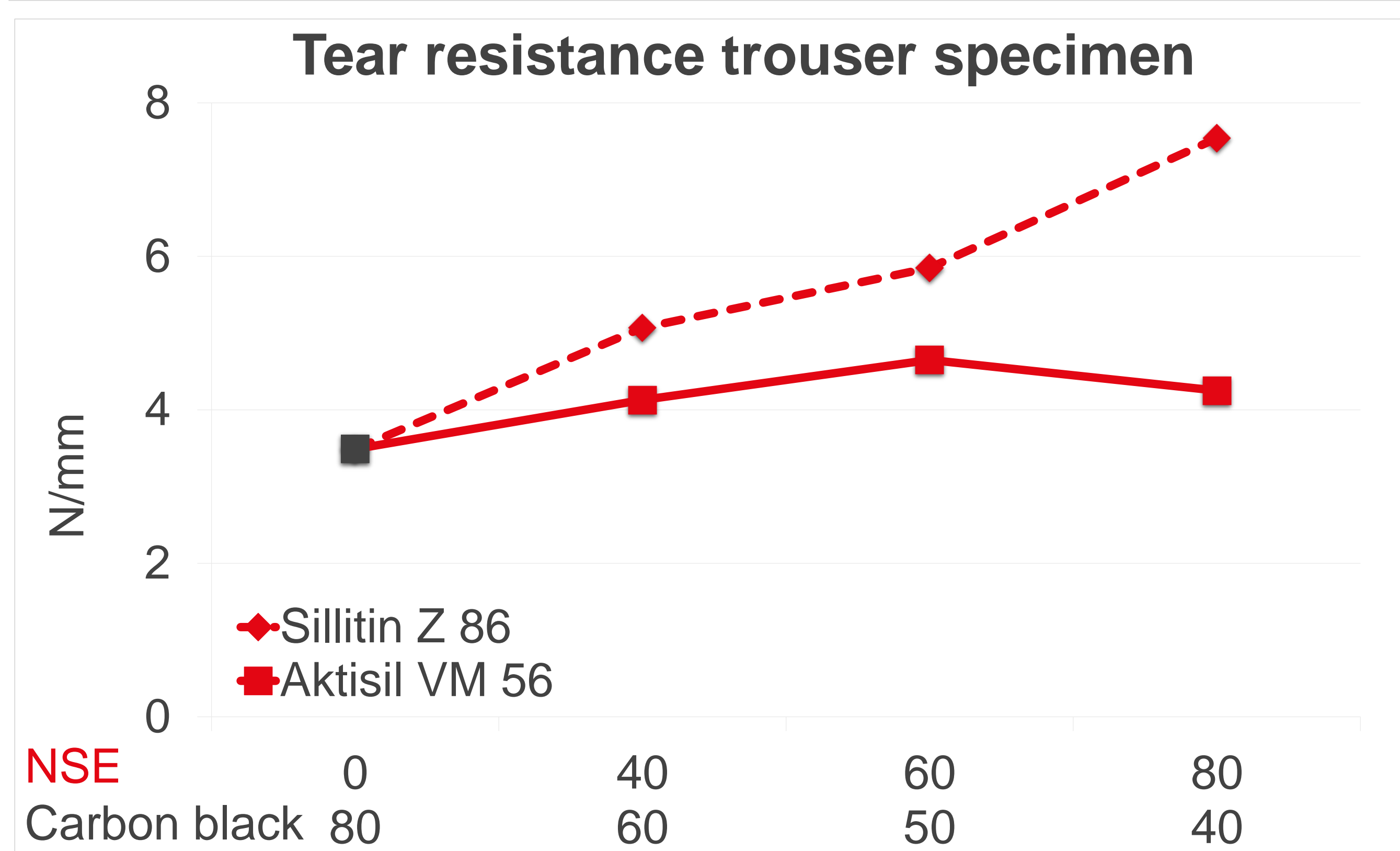
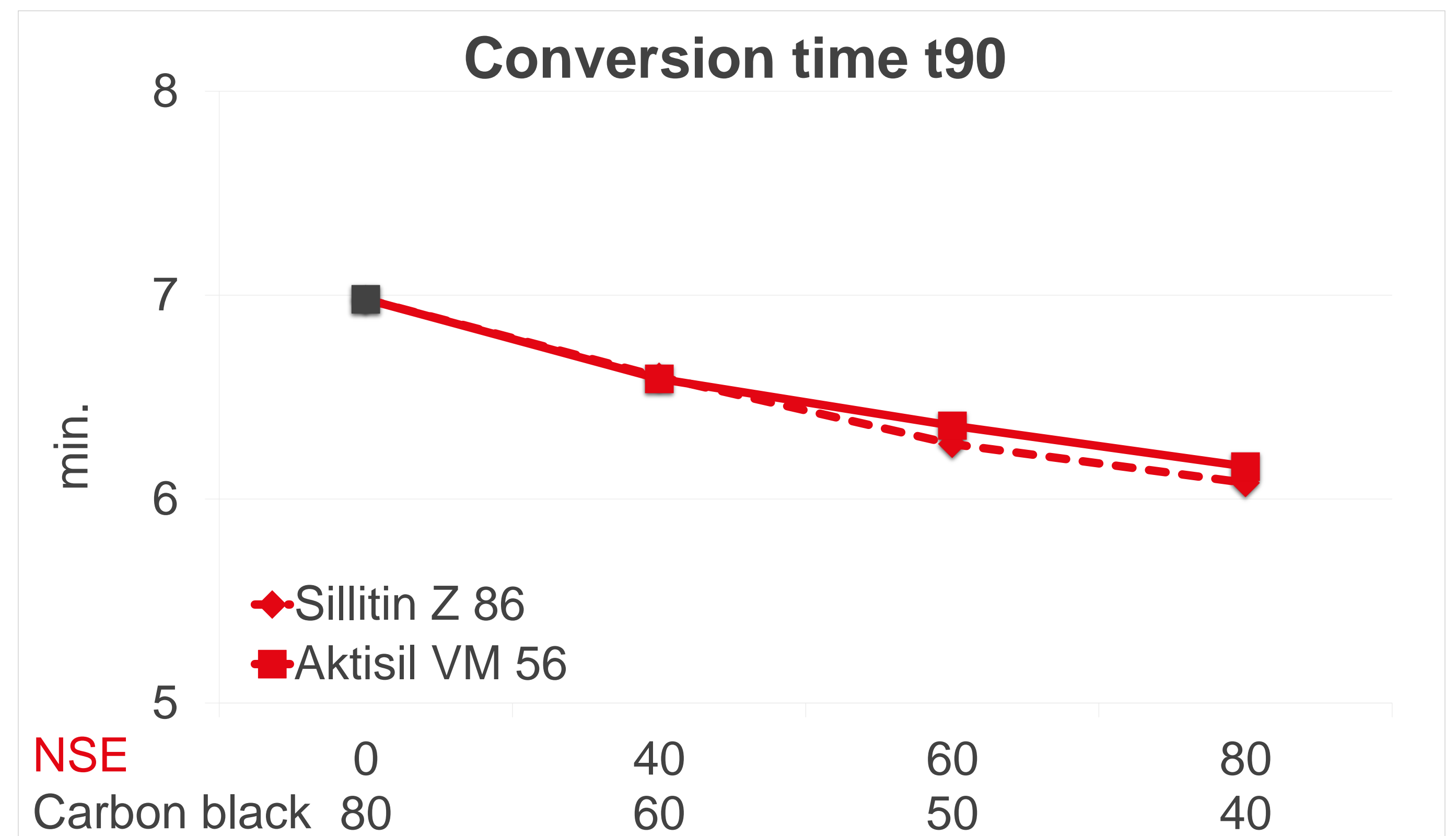
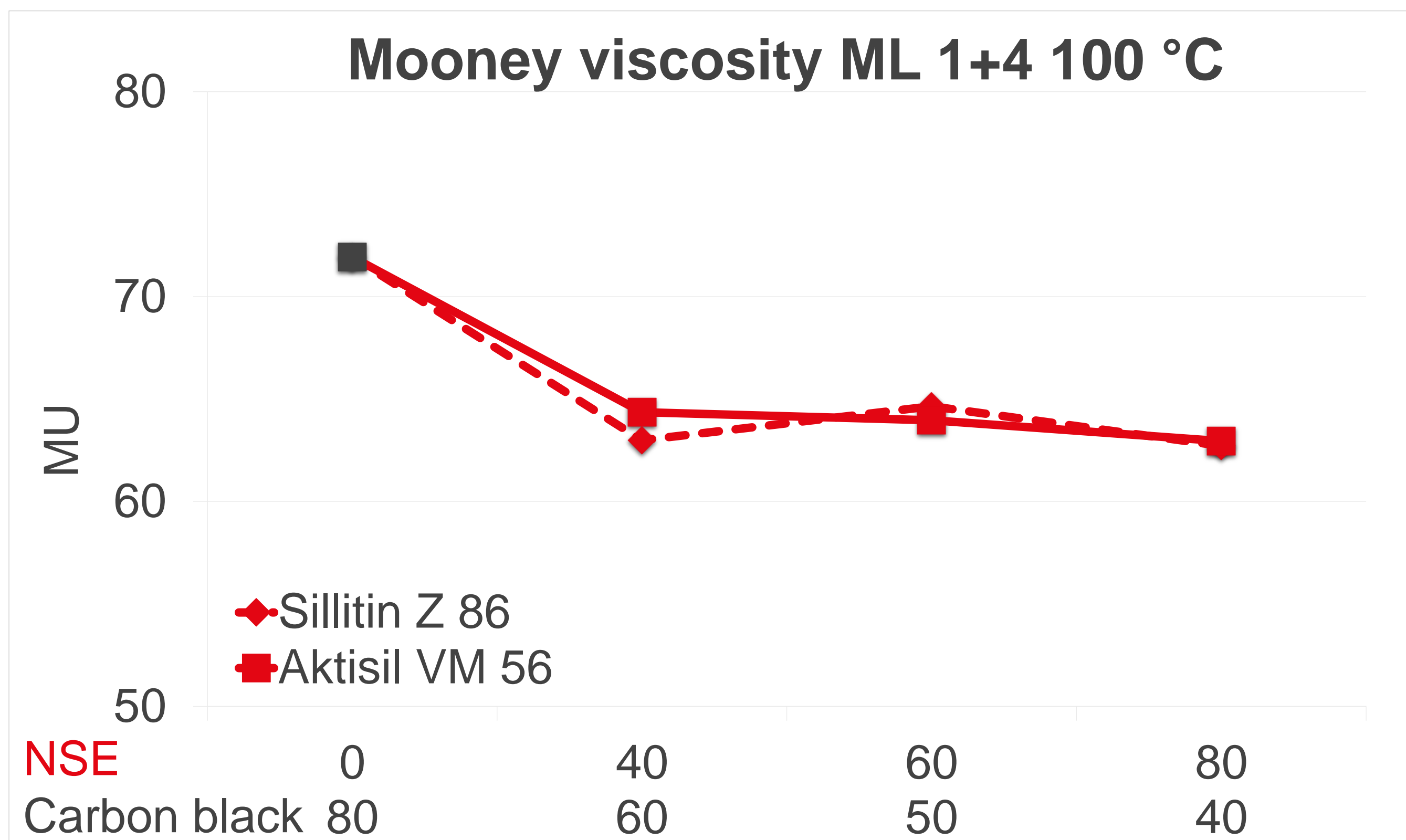
² Polycyclic aromatic hydrocarbons (PAH)

⁴ German Federal Institute for Risk Assessment (BfR)

Potable water seal, 70 IRHD, EPDM, E-DIN EN 681-1, partial replacement of carbon black by Neuburg Siliceous Earth



Results



Summary

Partial replacement of Purex HS 45

by **Sillitin Z 86** results in

- ✓ more significant cost reduction potential
- ✓ lower mooney viscosity
- ✓ shorter conversion time t₉₀
- ✓ positive effect on tear resistance (trouser)
- requirements of E-DIN EN 681-1 are fulfilled with 25 % carbon black replacement, beyond need additional measures

Partial replacement of Purex HS 45

by **Aktisil VM 56** results in

- ✓ significant cost reduction
- ✓ lower mooney viscosity
- ✓ shorter conversion time t₉₀
- requirements of E-DIN EN 681-1 are met even up to 50 % carbon black replacement at a high level