

NSE vs. Talc, EPDM, extrusion, peroxide

Author:



Formulation

Ingredients	Description	phr
Vistalon 7700	Ethylene propylene diene rubber ML 1+8 (125 °C): 115 MU	100
Zinkoxyd activ	Zinc oxide active	5
Edenor C18 98-100 GW	Stearic acid	2
Fillers	<i>see next slide</i>	300
Process Oil P 460	Paraffinic mineral oil, plasticizer	70
Kezadol GR	Calcium oxide, desiccant	10
TAC GR 70	Triallyl-cyanurate, 70 %, coagent	2.14
Perkadox 14-40B-pd-s	Di(tert-butylperoxyisopropyl)benzene, 40 %, peroxide	8
Total:		<u>497.14</u>



Filler selection

		Functionalization
Neuburg Siliceous Earth	Sillitin V 88	-
	Sillitin Z 86	-
	Aktisil Q	Methacrylic
	Aktisil VM 56	Vinyl
Talc	Talc	-
	Talc, functionalized	Amino



Compounding and vulcanization

Compounding

Open mill	Ø 150 x 300 mm
Batch weight	approx. 1000 g
Mill temperature	50 °C
Mixing time	approx. 15 min.

Vulcanization

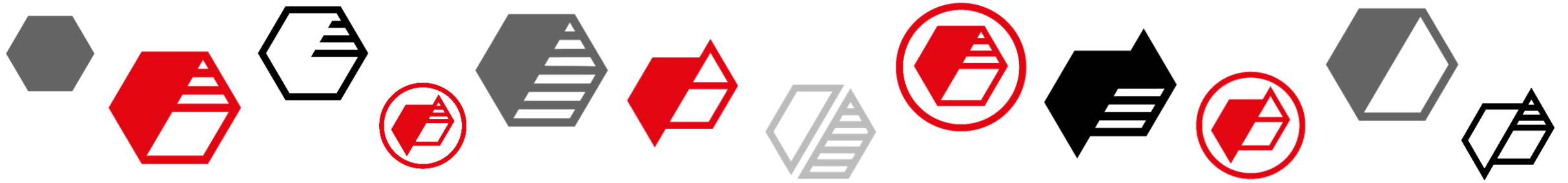
The curing was carried out in a press at 180 °C

Time	5 min. or $t_{90} + 10\%$
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Test standards – overview

Testing	Standard
Tensile test	DIN 53 504, S2
Compression set	DIN ISO 815-1, Type B
Hardness	DIN ISO 7619-1
Tear resistance - Trousers specimen	DIN ISO 34-1, A
Resistance to liquid media	DIN ISO 1817

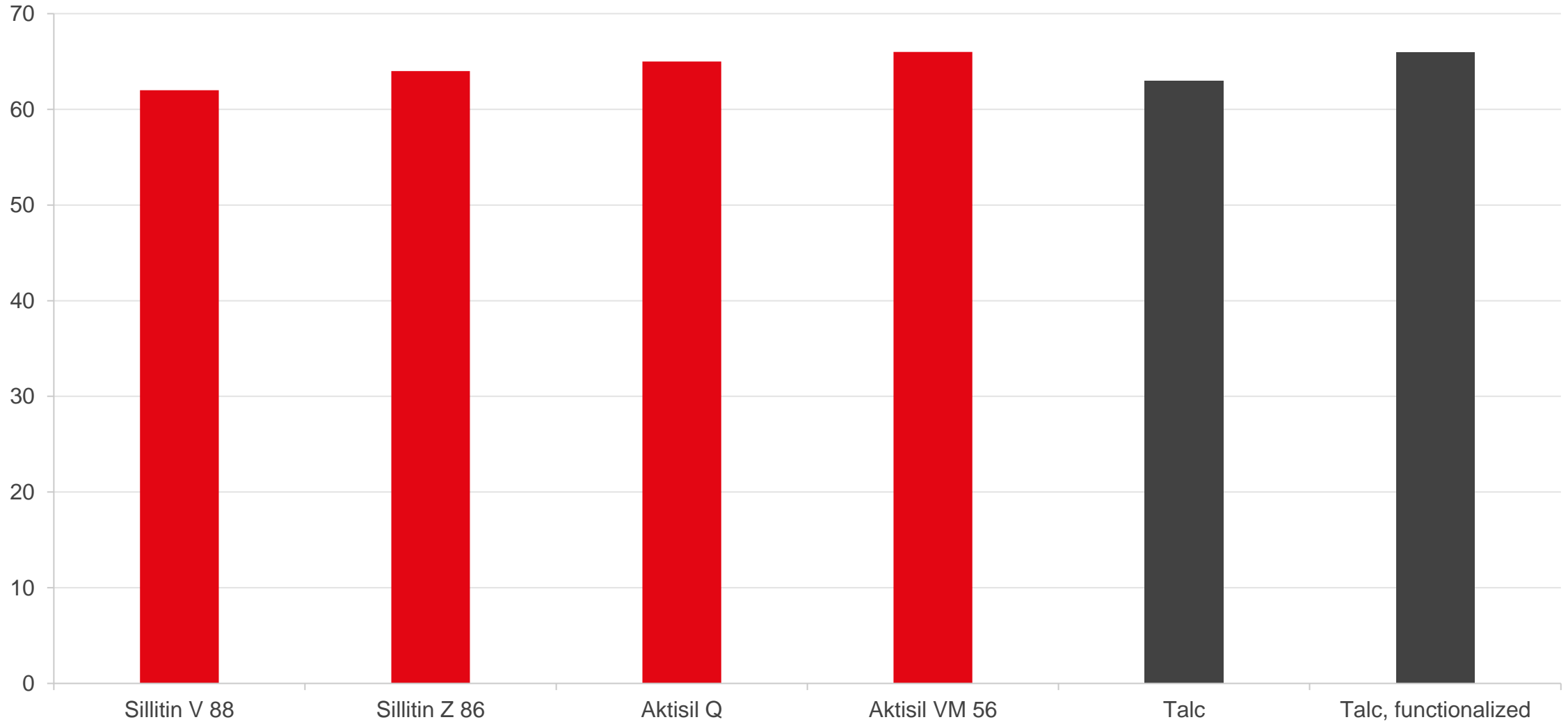


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Properties of vulcanizate

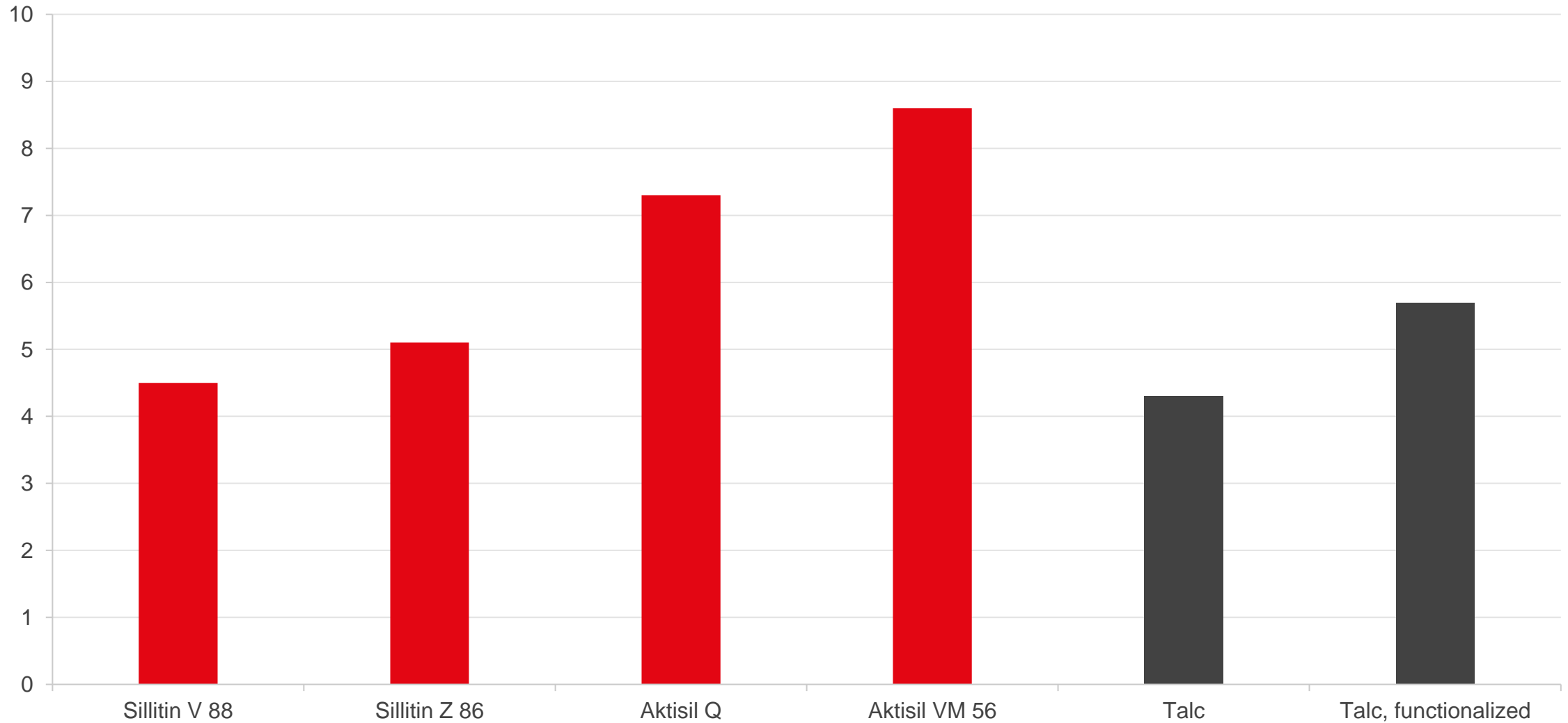


Hardness [Shore A]



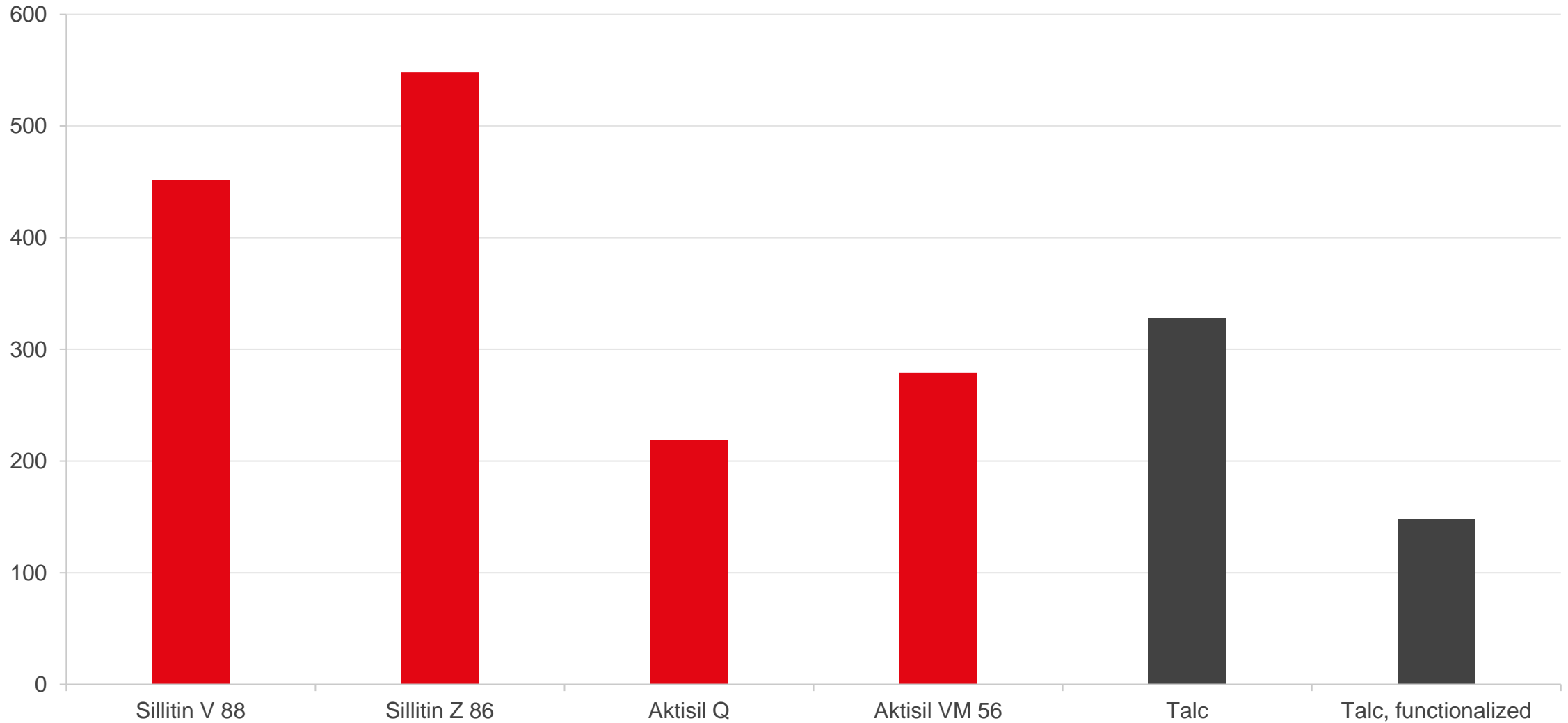


Tensile strength [MPa]



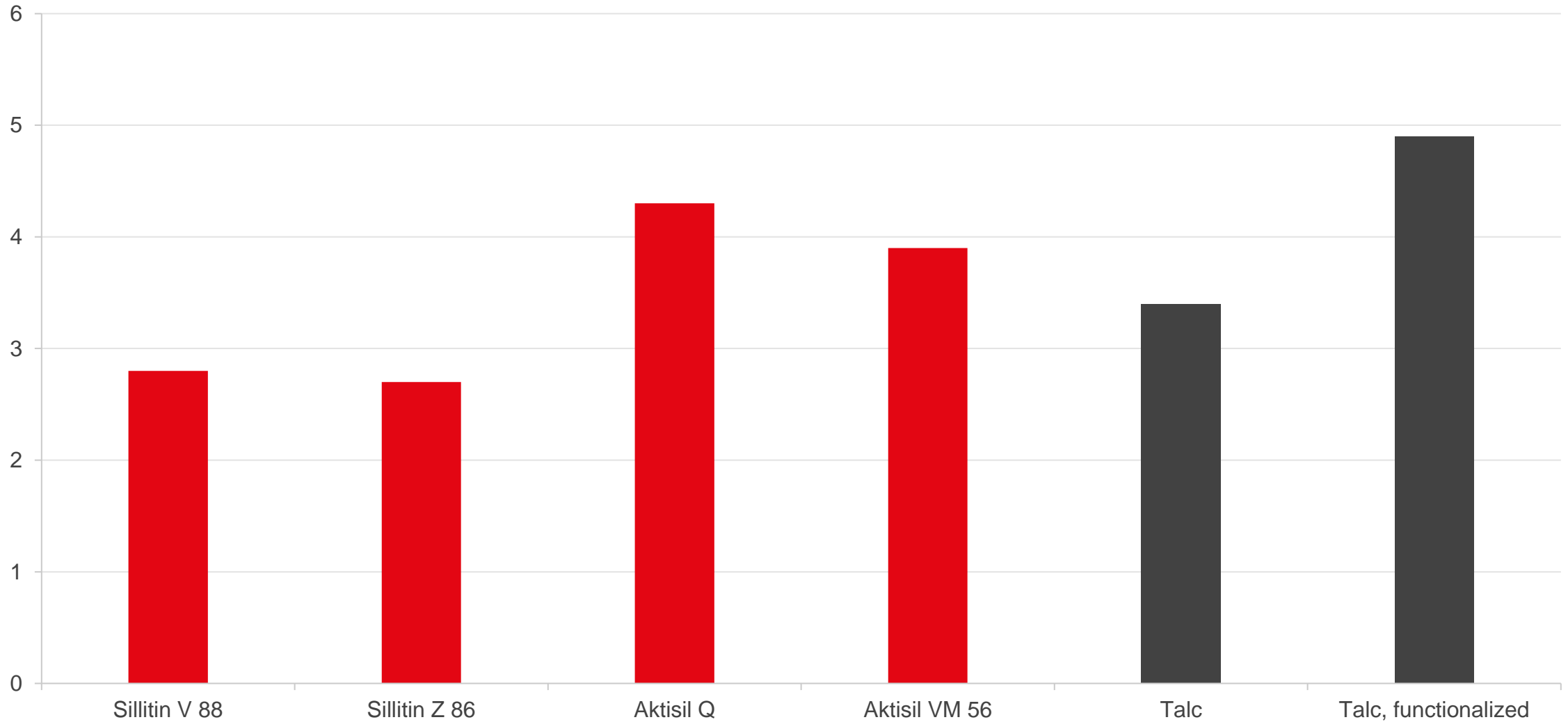


Elongation at break [%]



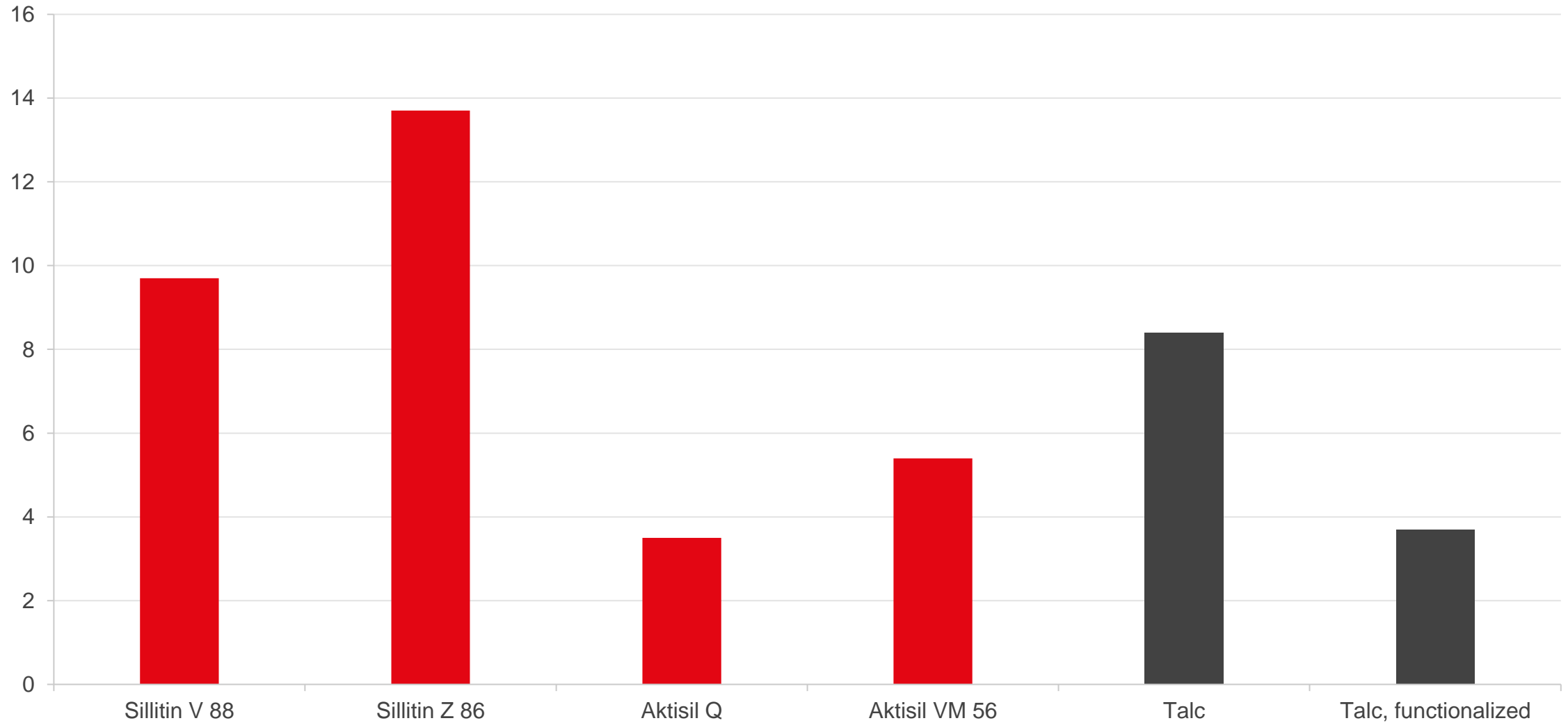


Modulus 100 % [MPa]



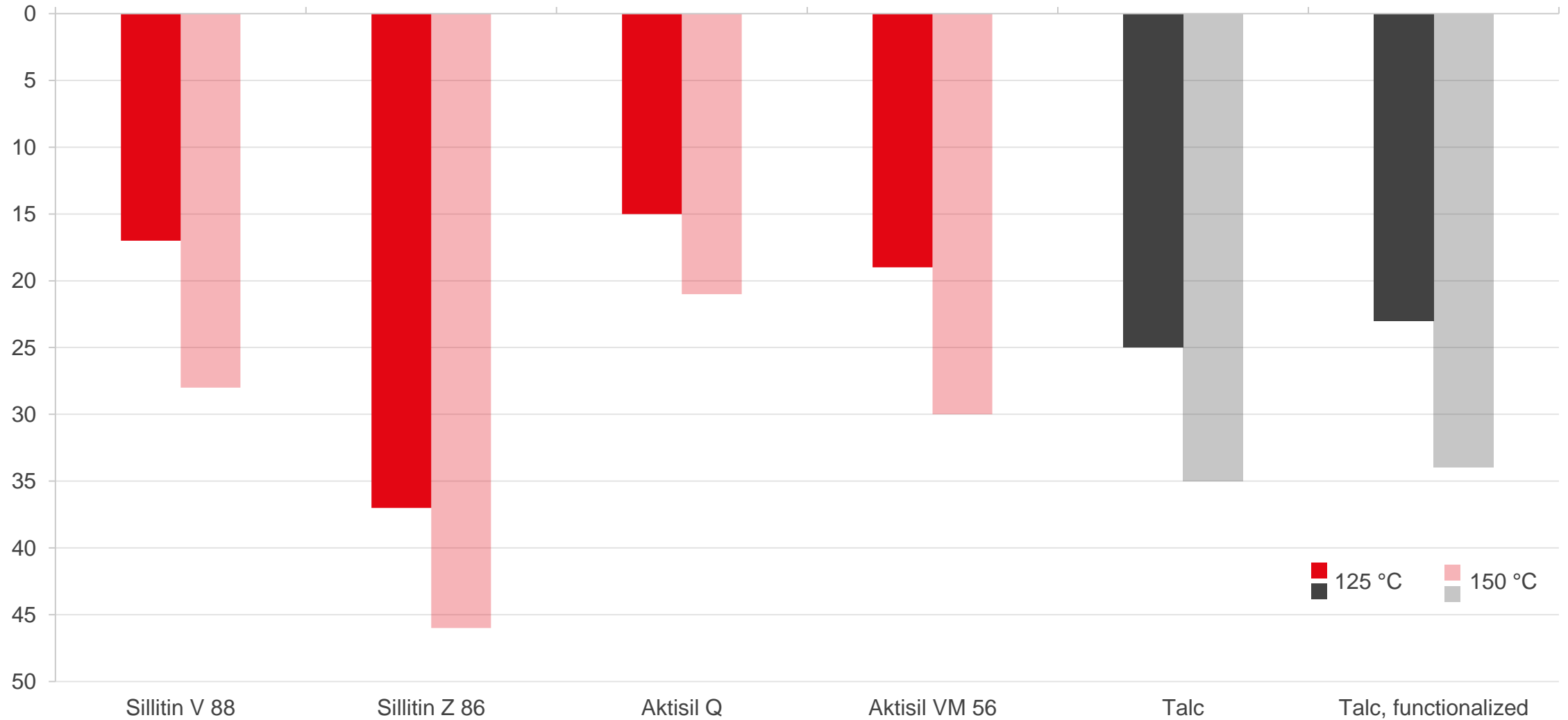


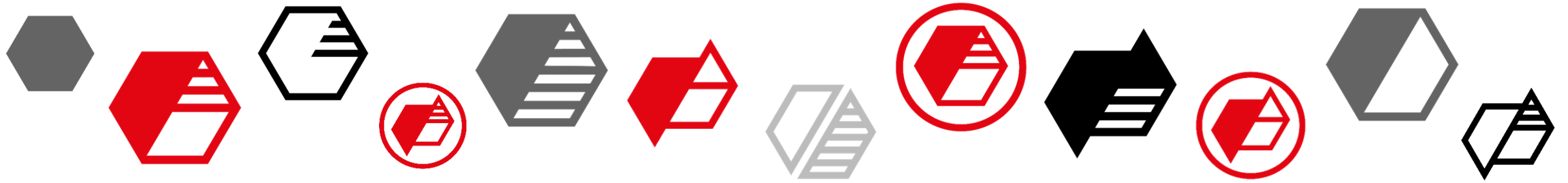
Tear resistance [N/mm]





Compression set, 24 h / xx °C [%]



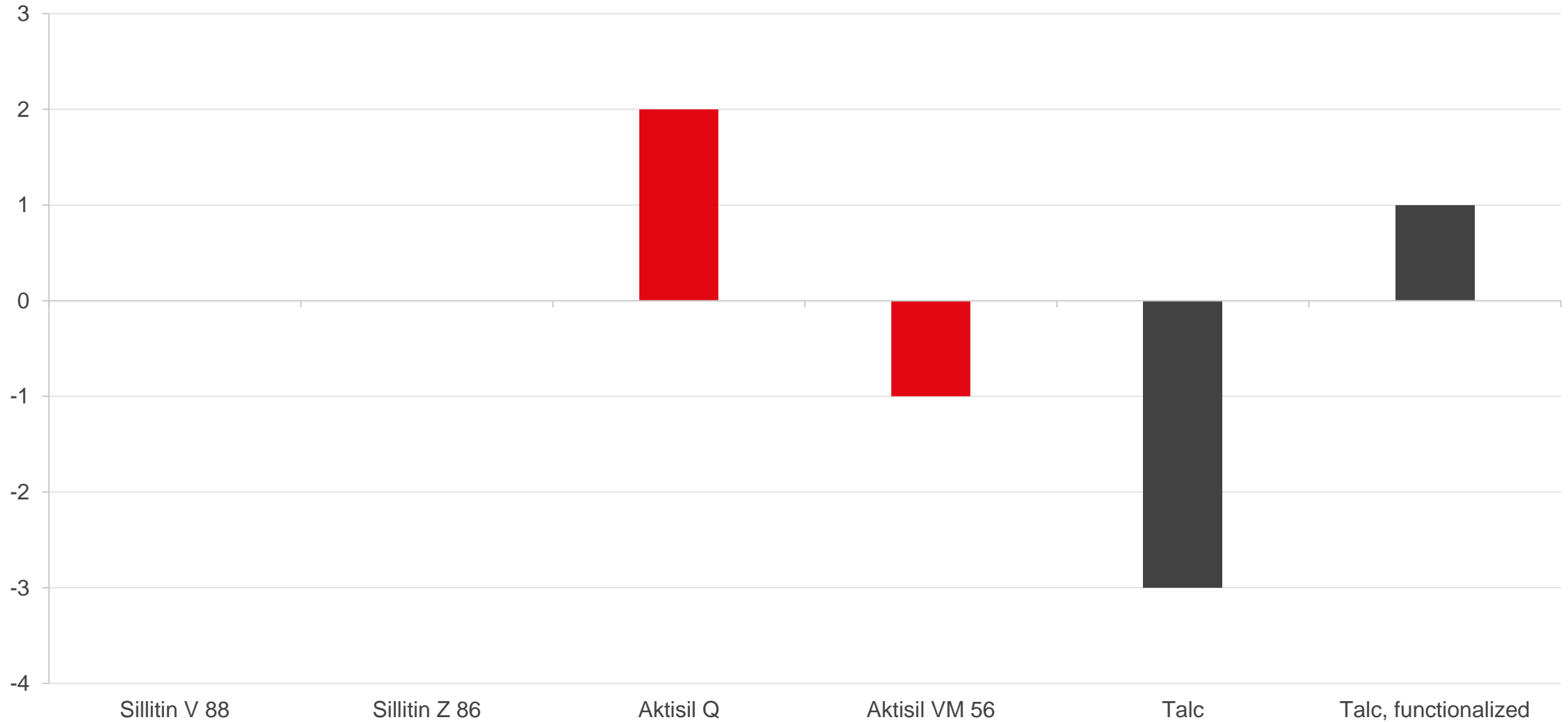


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Immersion in deionized water 168 h / 95 °C

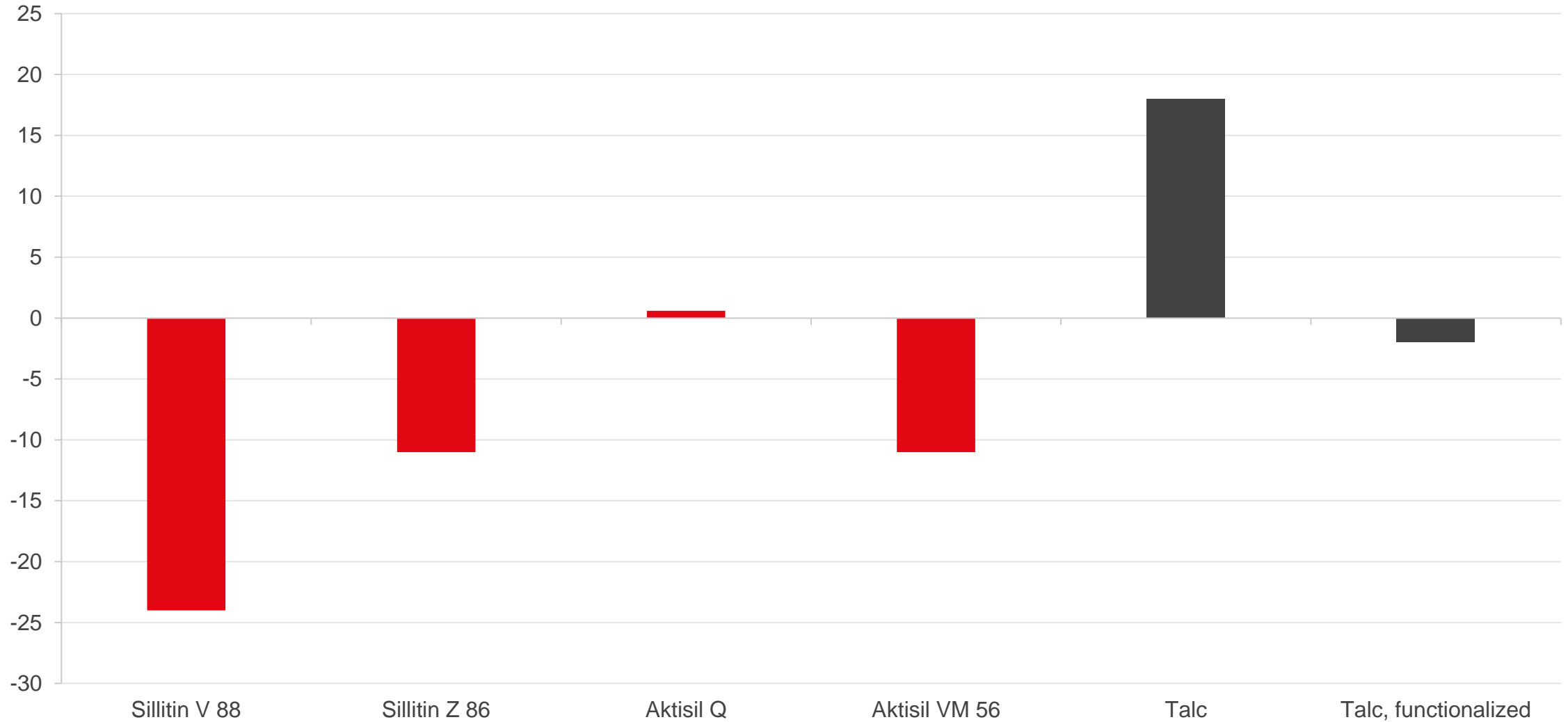


Δ Hardness [Shore A]



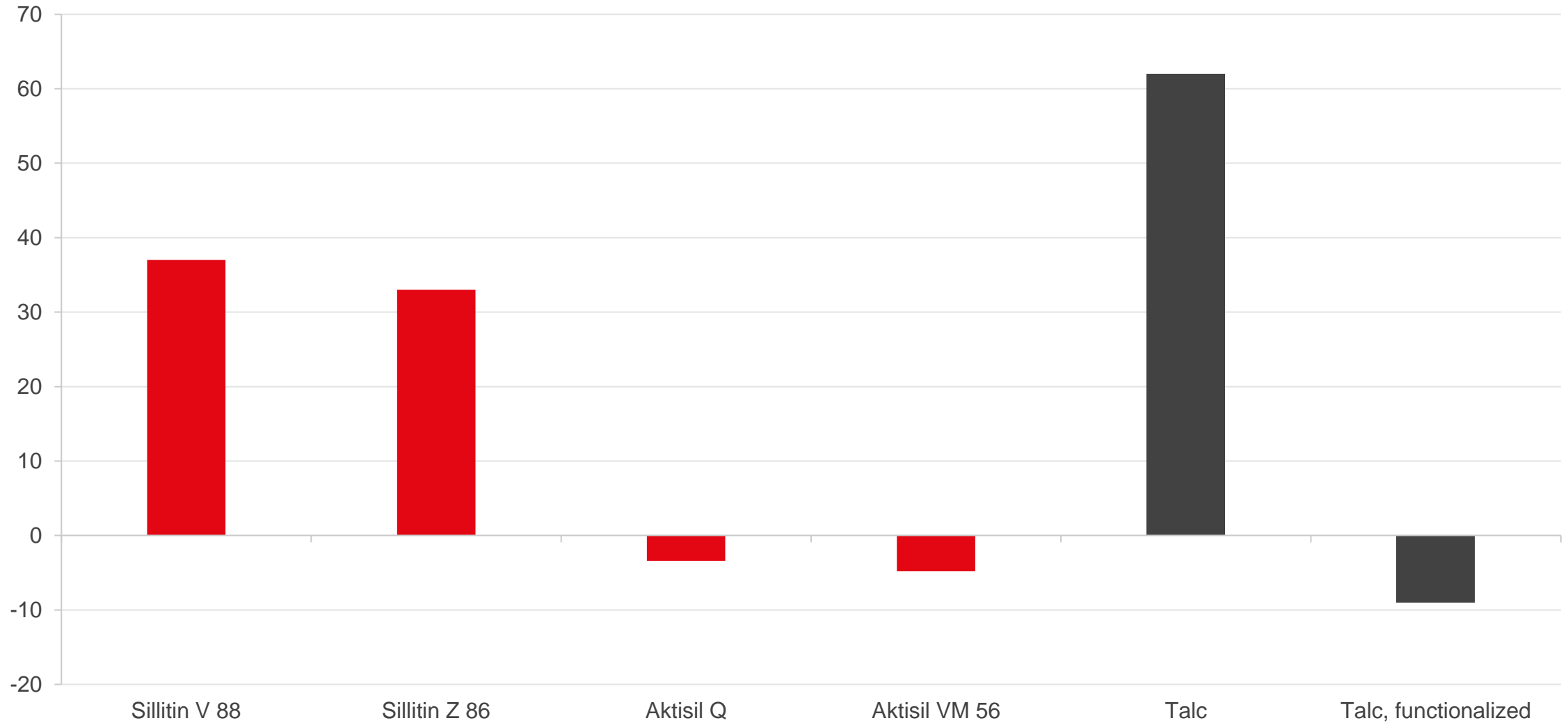


Δ Tensile strength [%]



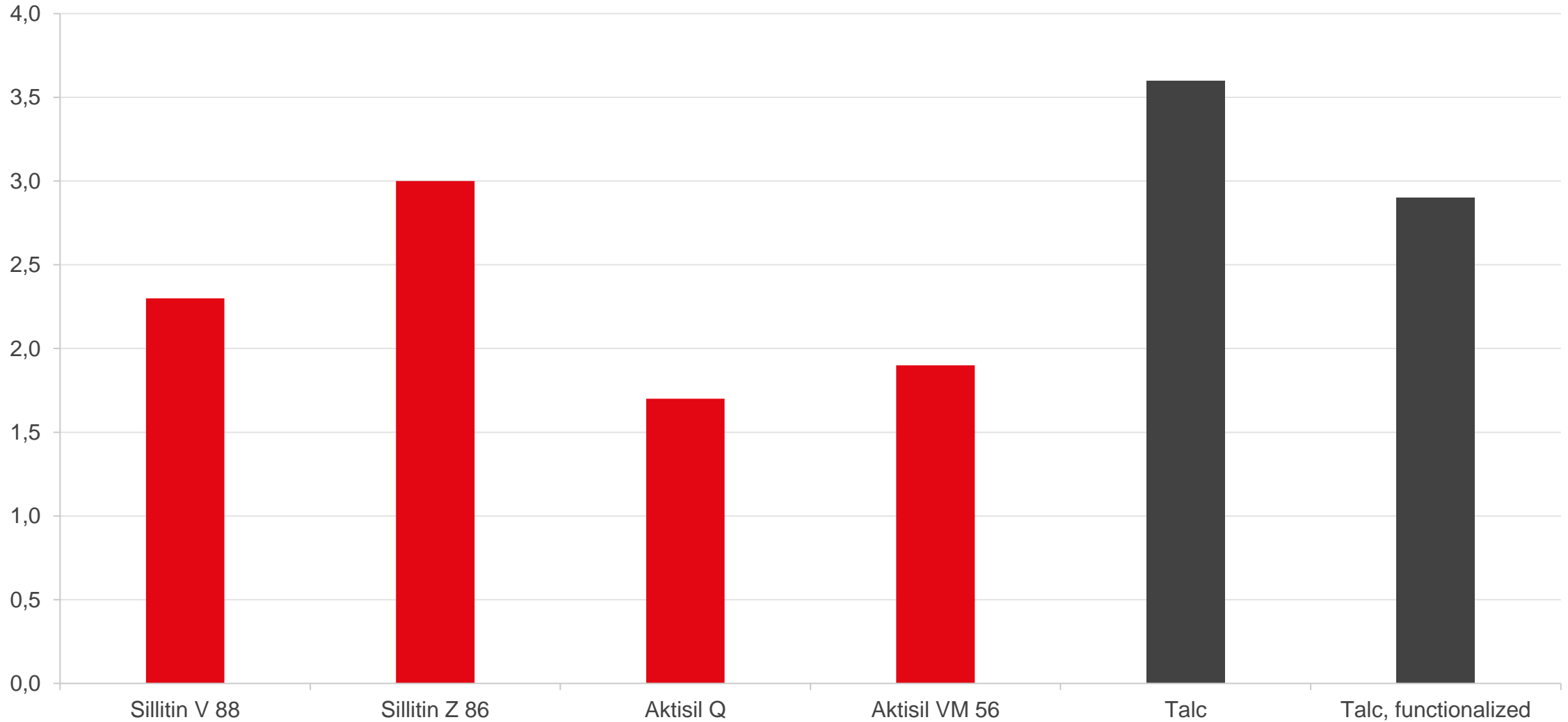


Δ Elongation at break [rel.%]



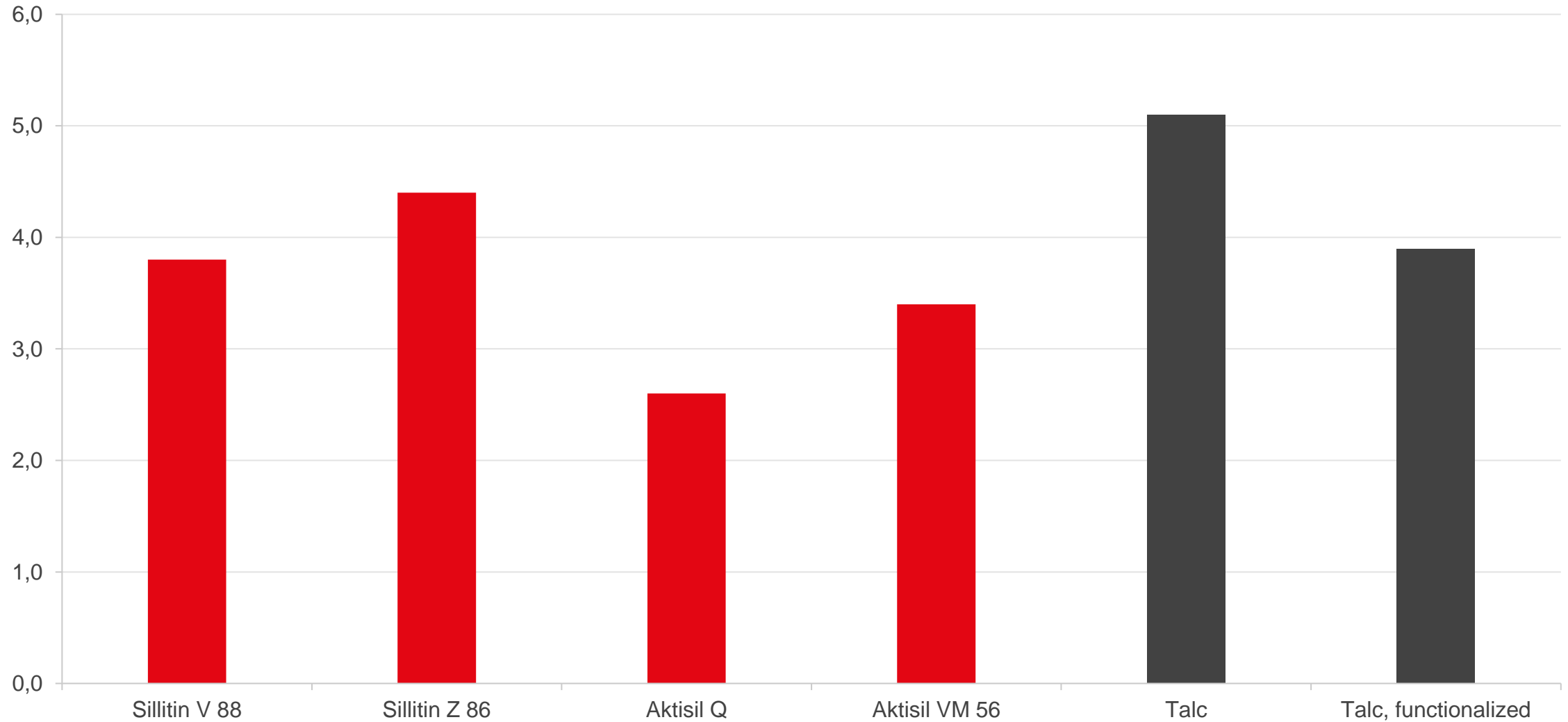


Δ Weight [%]





Δ Volume [%]





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Garvey Extrusion



Formulation for extrusion:

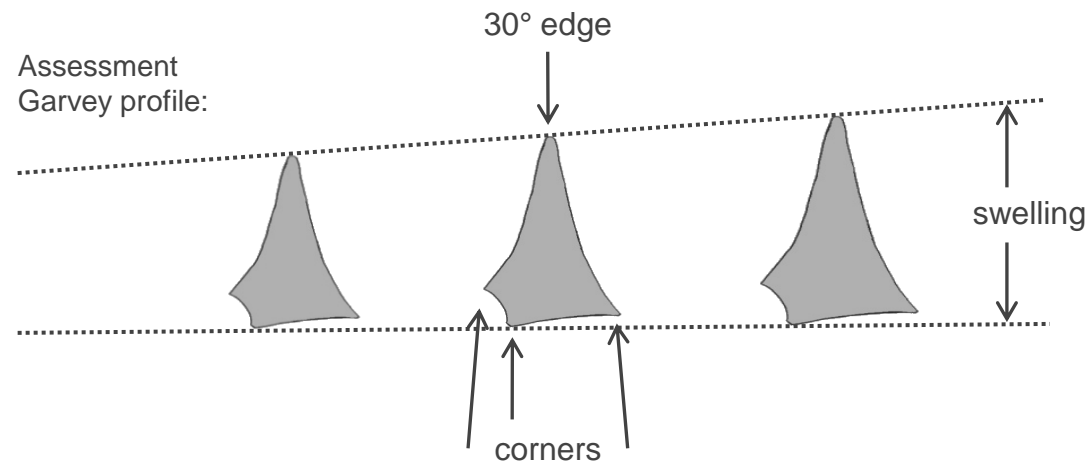
→ Extrusion was carried out without coactivator and cross linker.
In addition, 2 phr of the processing aid Aflux 42 were added

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Vistalon 7700	Ethylene propylene diene rubber ML 1+8 (125 °C): 115 MU	100
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Edenor C18 98-100 GW	Stearic acid	2
Fillers		300
Process Oil P 460	Paraffinic mineral oil, plasticizer	70
Kezadol GR	Calcium oxide, moisture binder	10
Aflux 42	Processing aids	2
Total:		<u>489</u>



Garvey Extrusion

Extruder		Schwabenthan Polyest 30 R
Screw diameter	[mm]	30
Process length	[mm]	450
Temperature set point head / Zone 1 / Zone 2	[°C]	150 / 40 / 40
Feeding strips		cold, untreated

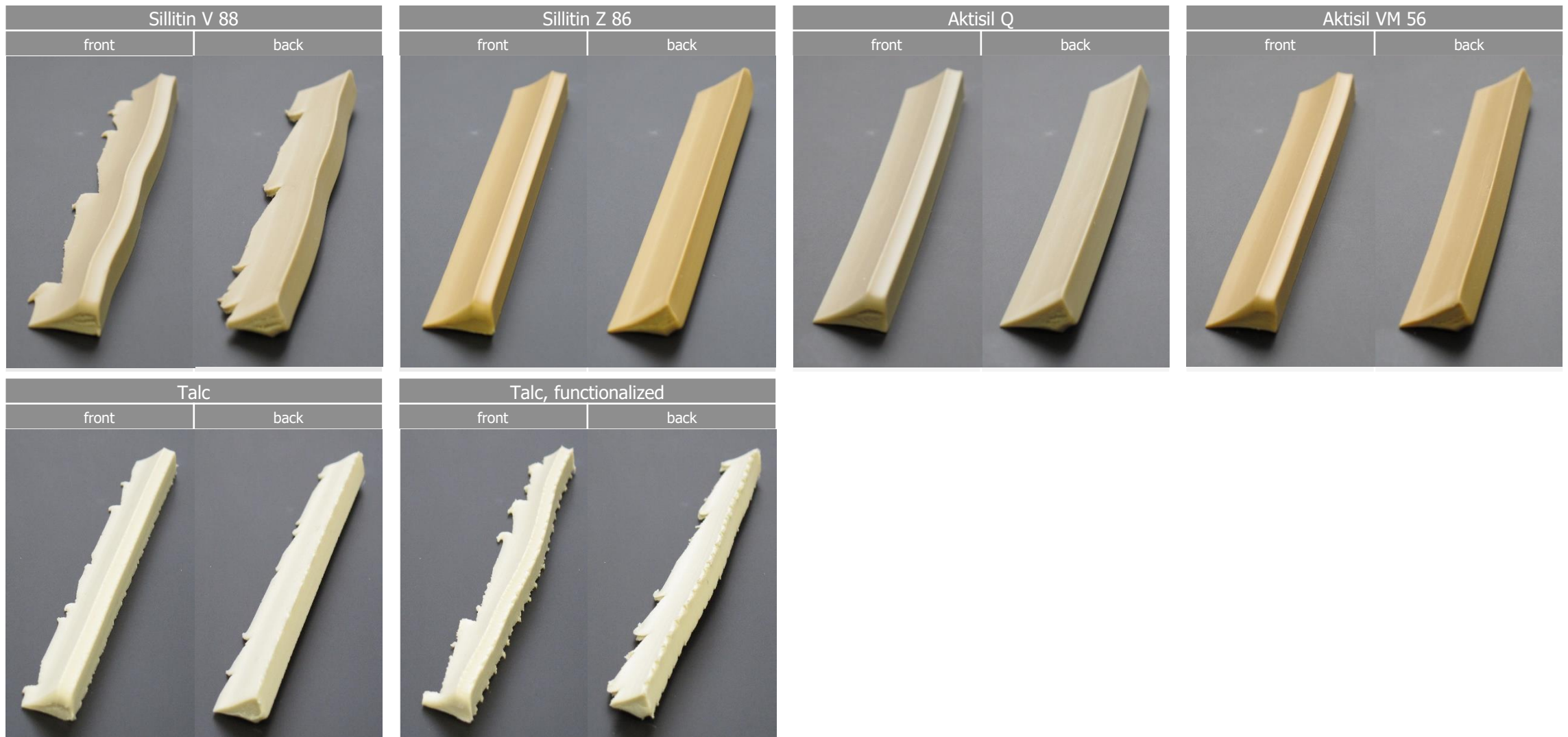


Garvey-die:





Garvey extrusion - extrudates at 2.0 m/min haul-off speed





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