



Dynasol
Group

7th E&E CONGRESS
EURASPHALT & EUROBITUME

Styrene-butadiene copolymers
used in **roofing membranes**

Who we are

- One of the biggest industrial groups in México
- Subsidiary of DESC, created in 2007
- Multicultural team of more than 17,000 employees
- Presence in over 70 countries in five continents



- One of the 10 largest oil companies worldwide
- More than 24,000 employees worldwide
- Industry innovator with large investments in R&D
- Presence in more than 50 countries

Production sites & office's locations



ESBR, NBR, SBC & SSBR
Altamira, Mexico
240 KTA



SBC
Santander, Spain
120 KTA



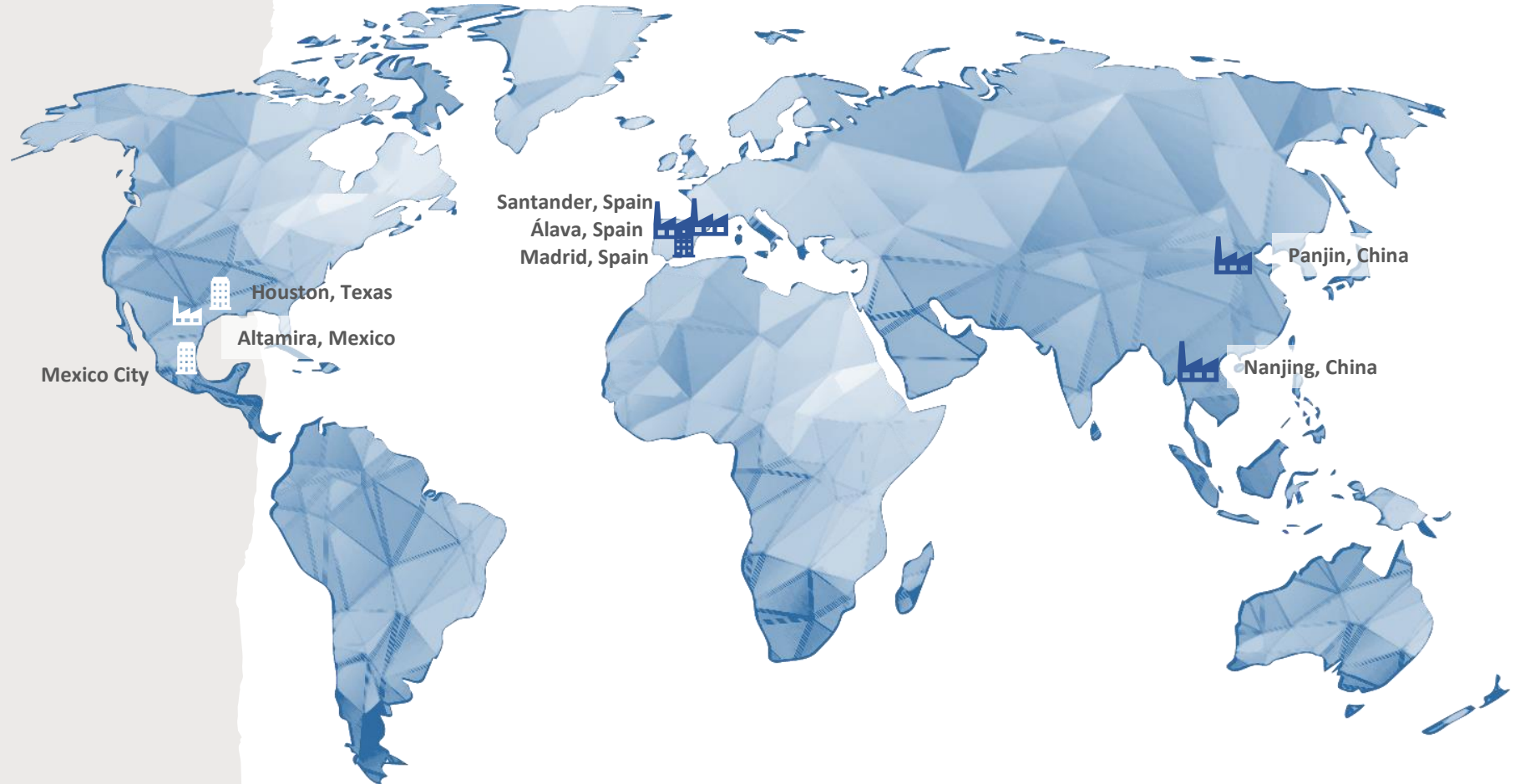
Rubber Chemicals
Alava, Spain 30 KT



SBC & SSBR
Panjin, China
110 KTA



NBR
Nanjing, China
30 KTA





Technical capacities

Two technical assistance centers

- **Location:** Mexico and Spain.
- **Personnel:** more than 20 years experience in PmB
- **Analytical capacities:** equipment to run tests according to American and European customers requirements.



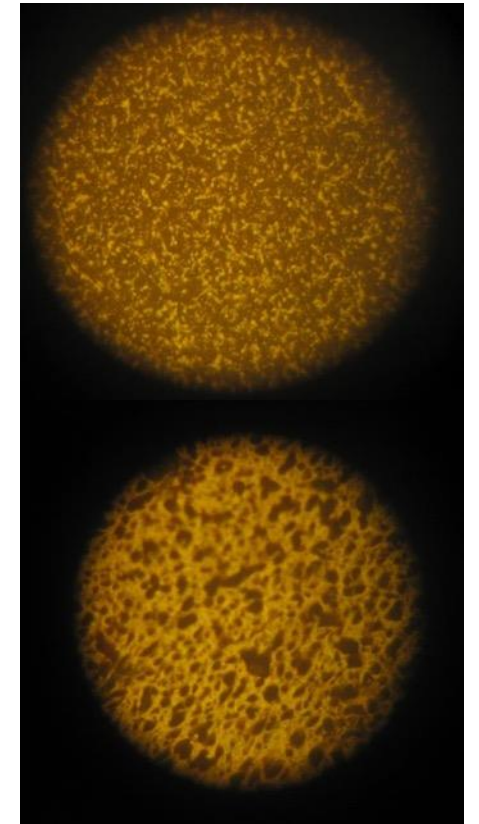
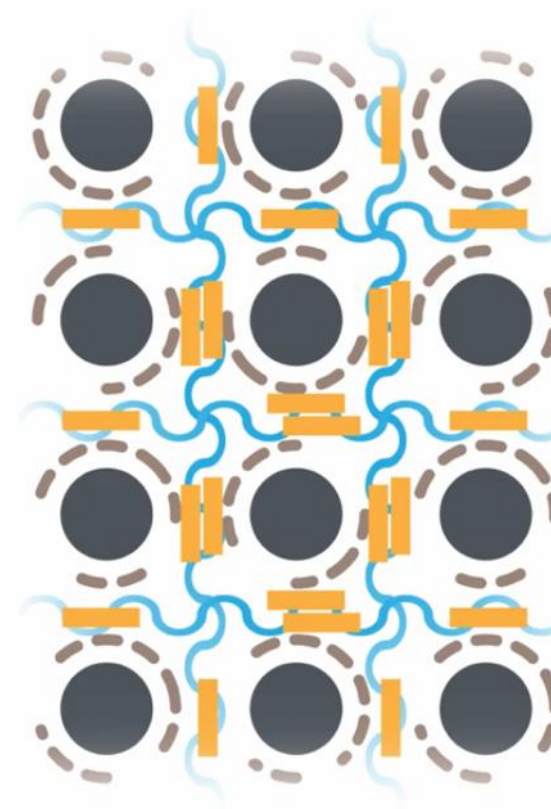
Two R&D centers

- **Location:** Mexico and Spain.
- **Personnel:** more than 10 years experience in PmB
- **Technical capacities:** develop new SB copolymers to satisfy customers needs.



SBS/SEBS blend with PMB

SBS / SEBS polymers creates a proper net into the bitumen to obtain a PmB with superior properties than a virgin bitumen.





Benefits of using **SBS / SEBS** for membranes over other poliolefines

- Better cold bending.
Very good elastic properties.
- Less usage of polymer to reinforce and obtain a high softening point.
- Decrease installation temperature.
Faster application and less emissions.
- Reduction of maintenance costs.

Dynasol recommended grades for the roofing industry.

Dynasol's product portfolio for Roofing Membranes

Within our portfolio we can find several SBS and SEBS for typical roofing membrane applications and special applications.

Table 4. Properties depending on polymer type.

Brand Grade	Structure	Styrene Content, %	TSV, <u>cSt</u>	T ^a R&B	Pen	Cold Bending	Viscosity	Walk-ability	Aging
Calprene 420CX	Radial SBS	37	26	●	●	●	●	●	●
Calprene 412	Radial SBS	31.5	28	●	●	●	●	●	●
Calprene 411	Radial SBS	30	26	●	●	●	●	●	●
Calprene 480X	Radial SBS	33	21.5	●	●	●	●	●	●
Calprene 419	Radial SBS	30	20	●	●	●	●	●	●
Calprene H6420X	Radial SEBS	30	20	●	●	●	●	●	●
Calprene 501	Linear SBS	31	13	●	●	●	●	●	●
Solprene 4318	Linear SBS/SB	32	6,7	●	●	●	●	●	●
Calprene H6120	Linear SEBS	32	1900*	●	●	●	●	●	●

Requirement performance ● Excellent ● Good ● Adequate

Condition test: 50 min mixing, 180°C, 4000 rpm high shear mixer, bitumen 160/220, 10% polymer, no filler is added.

*Brookfield viscosity, cPs.



New **SBS & SEBS** for roofing membranes

Market requirements

To increase compatibility between SBS with bitumen components.
To improve thermal stability/ageing.

To broaden the final window temperature service (R&B and C.B)

Excellent ageing and heat exposure resistance.

Technical Solution

Calprene 480X, high vinyl radial SBS

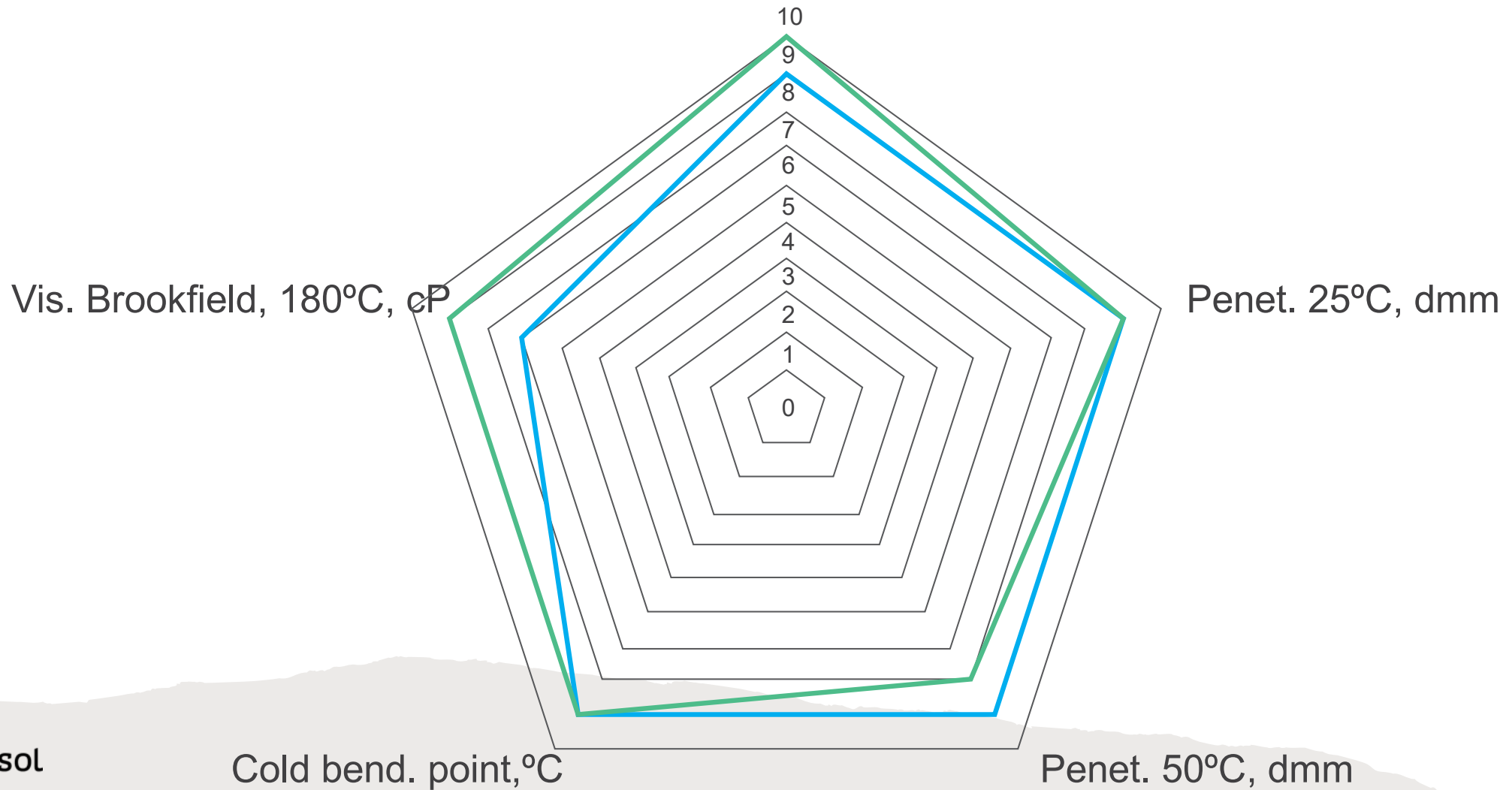
Calprene 420CX, high styrene radial SBS

Calprene H6420X, radial SEBS

10% radial SBS

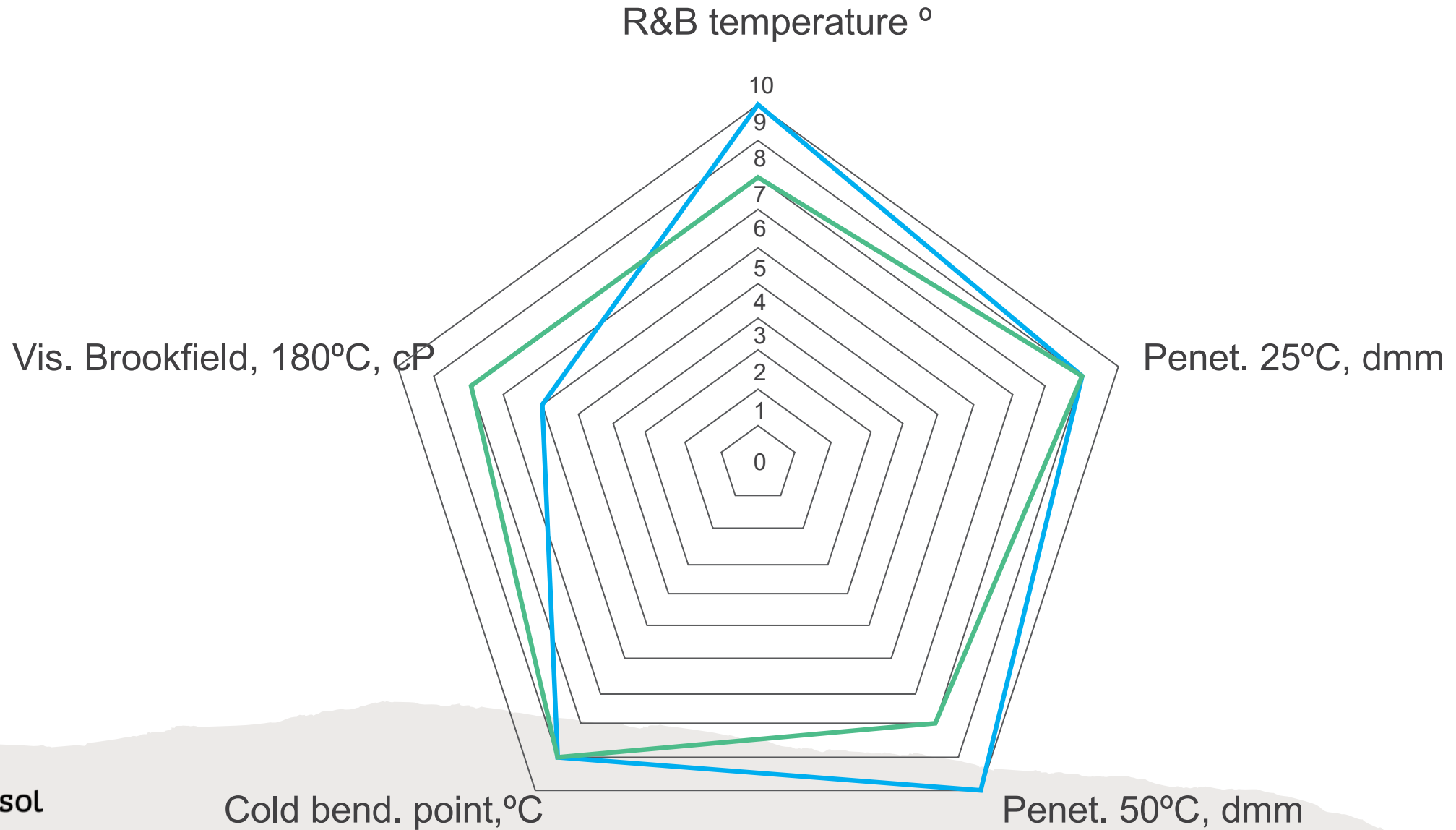
10% Calprene 480X

R&B temperature °



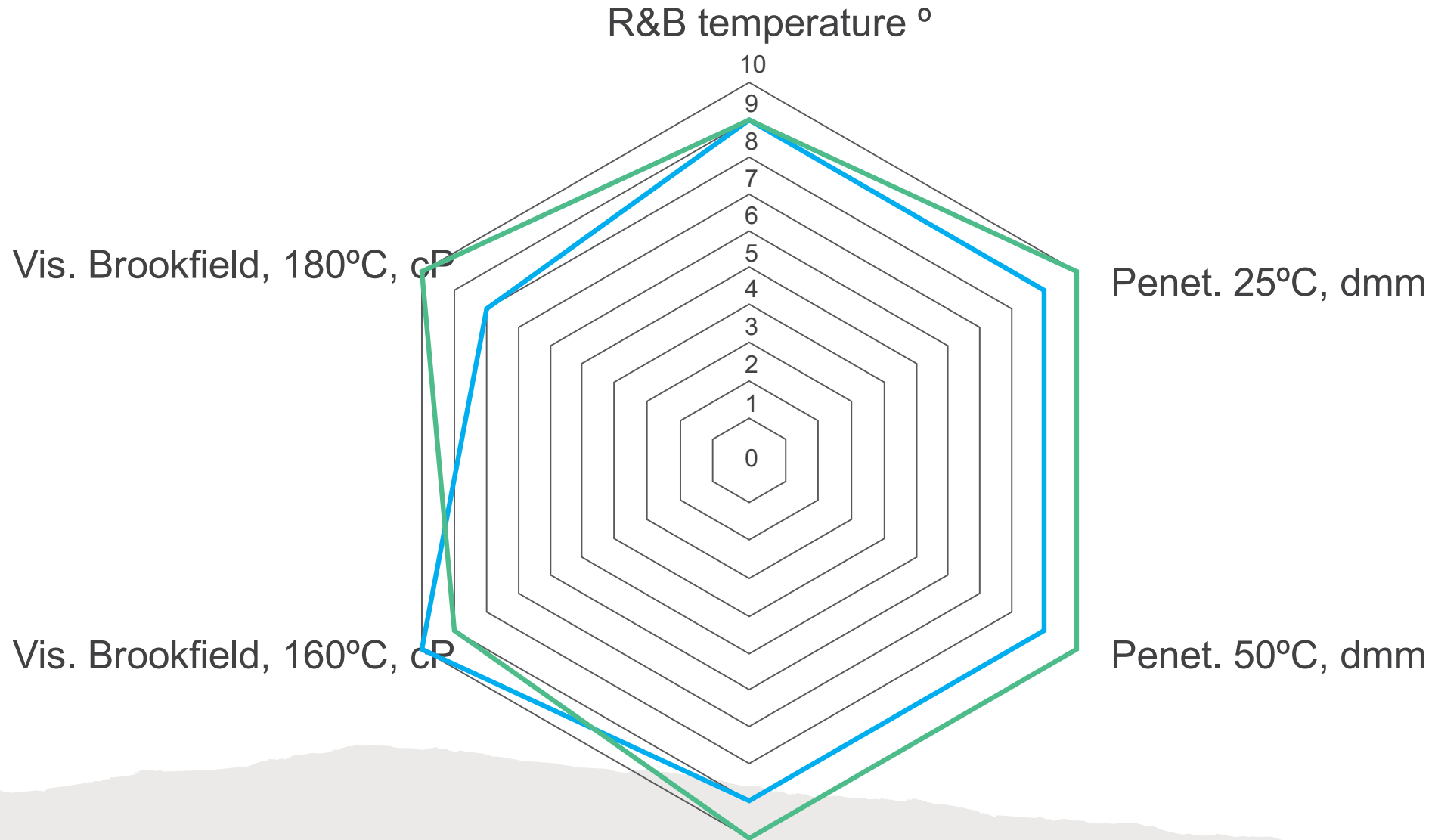
10% Calprene 420CX

10% radial SBS



10% radial SBS

10% Calprene H6420X



Cold bend. point, °C
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Summary

Calprene 480X good aging and compatibility

Calprene 420CX high softening point

Calprene H6420X excellent thermal resistance



Q & A



Thank you



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