Foamed Bitumen Binder Requirements

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SARF Course BSMs

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Stellenbosch

60th anniversary SARF Founded in 1950

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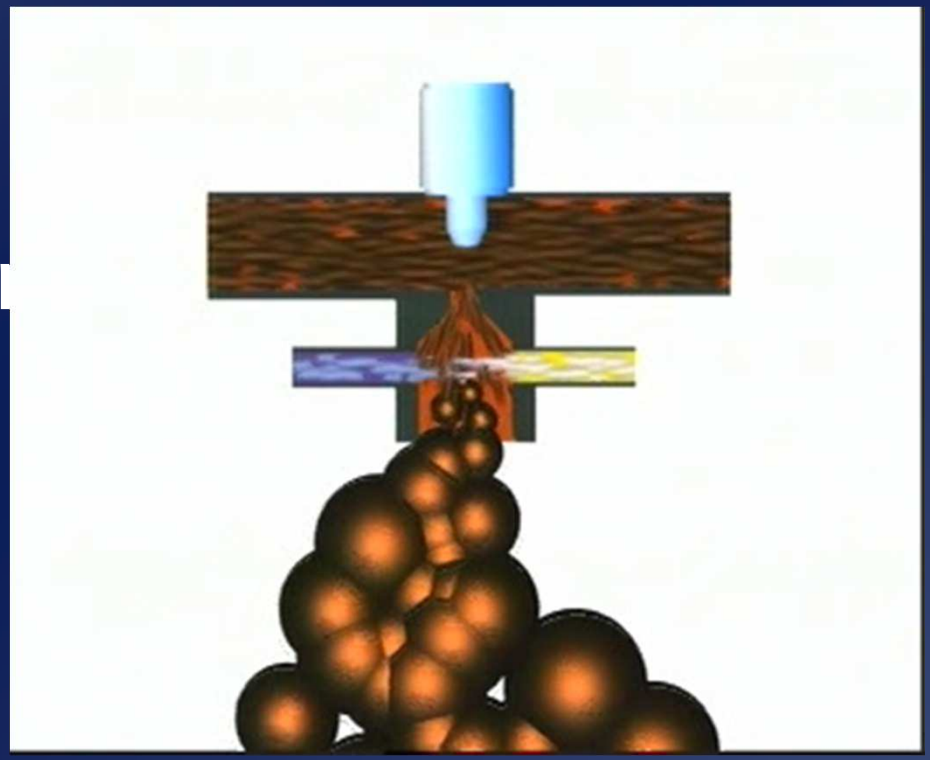
Foamed Bitumen

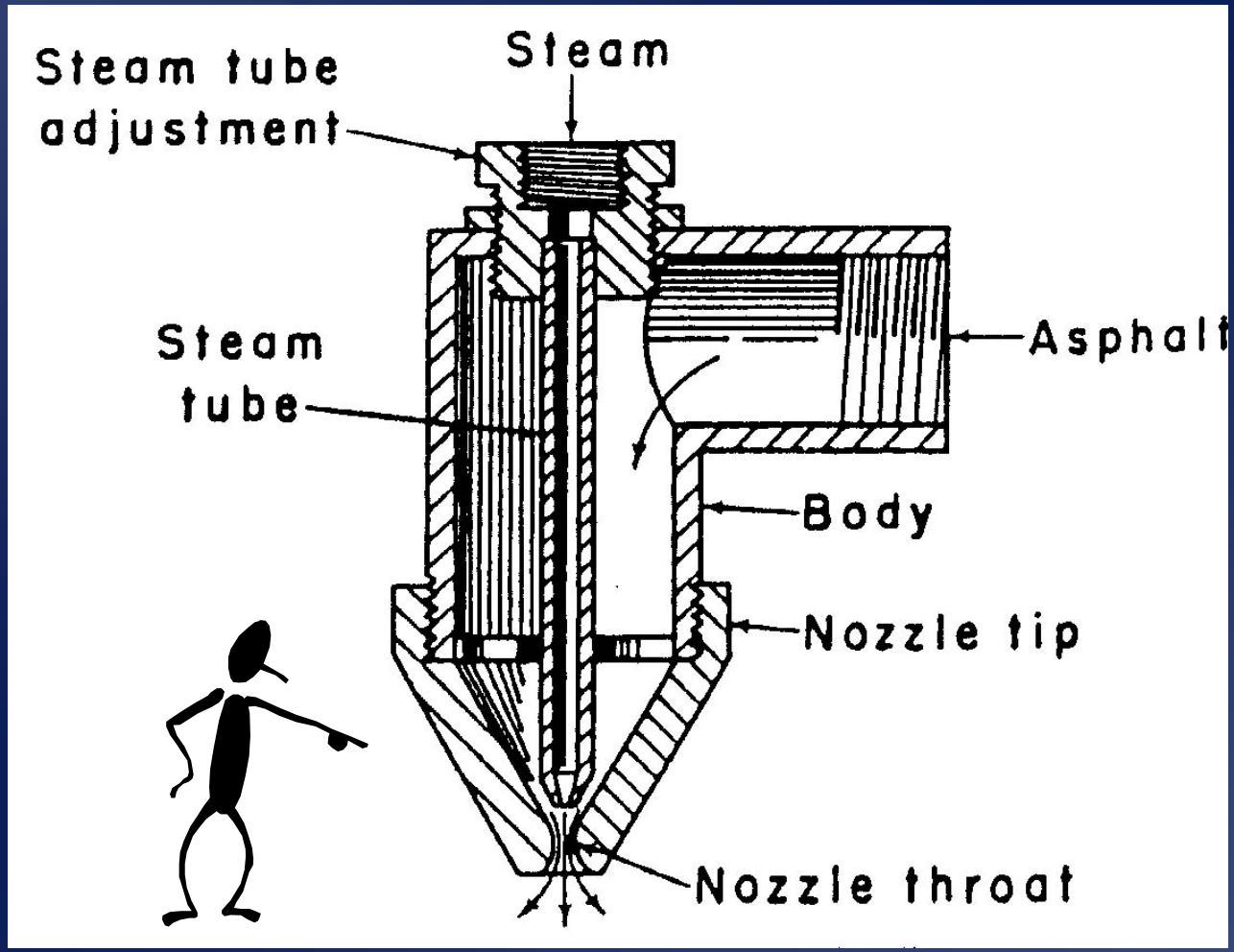
Foam Properties:

Need Expansion for lower viscosity

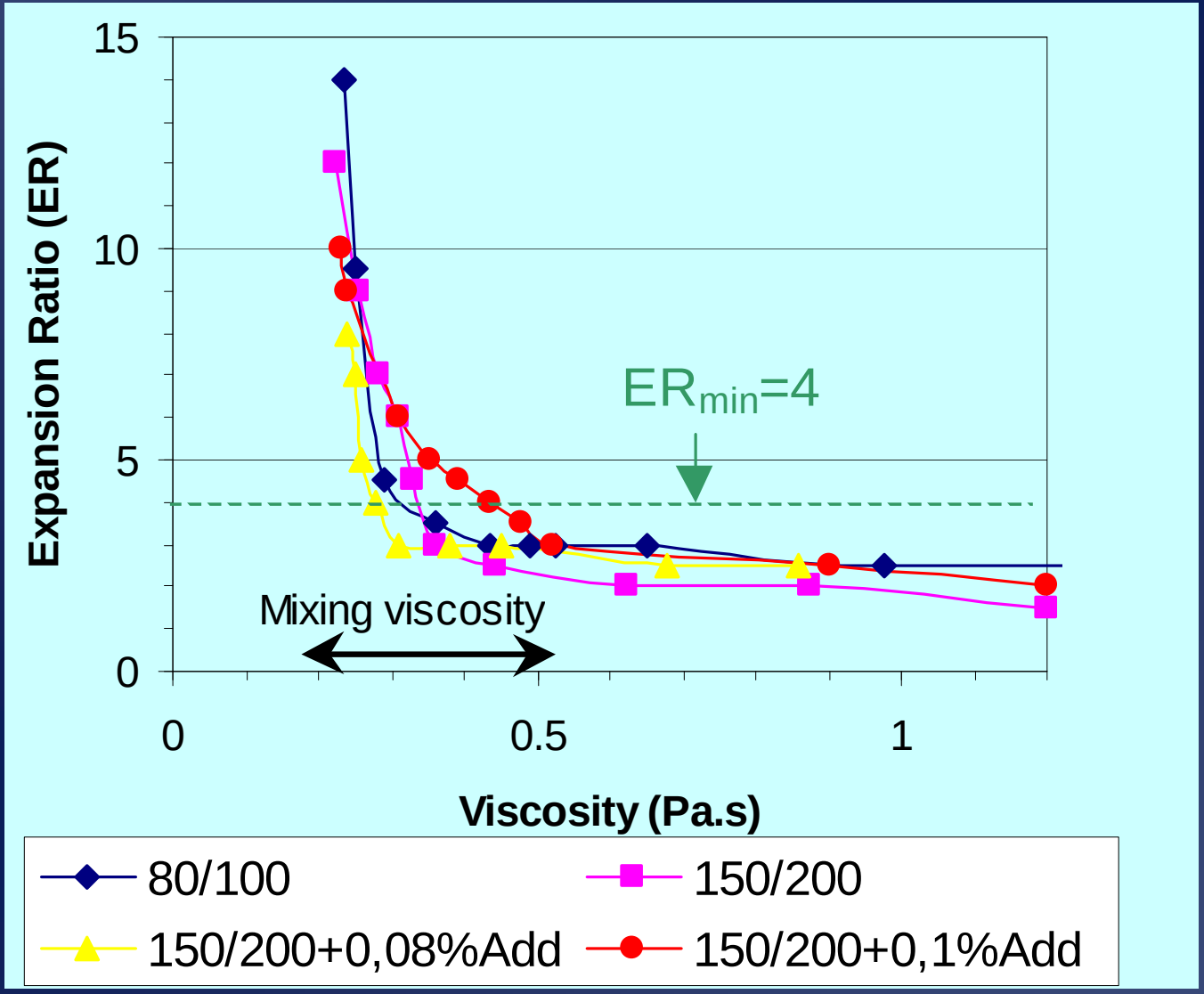
Need Half-life for stability during mixing



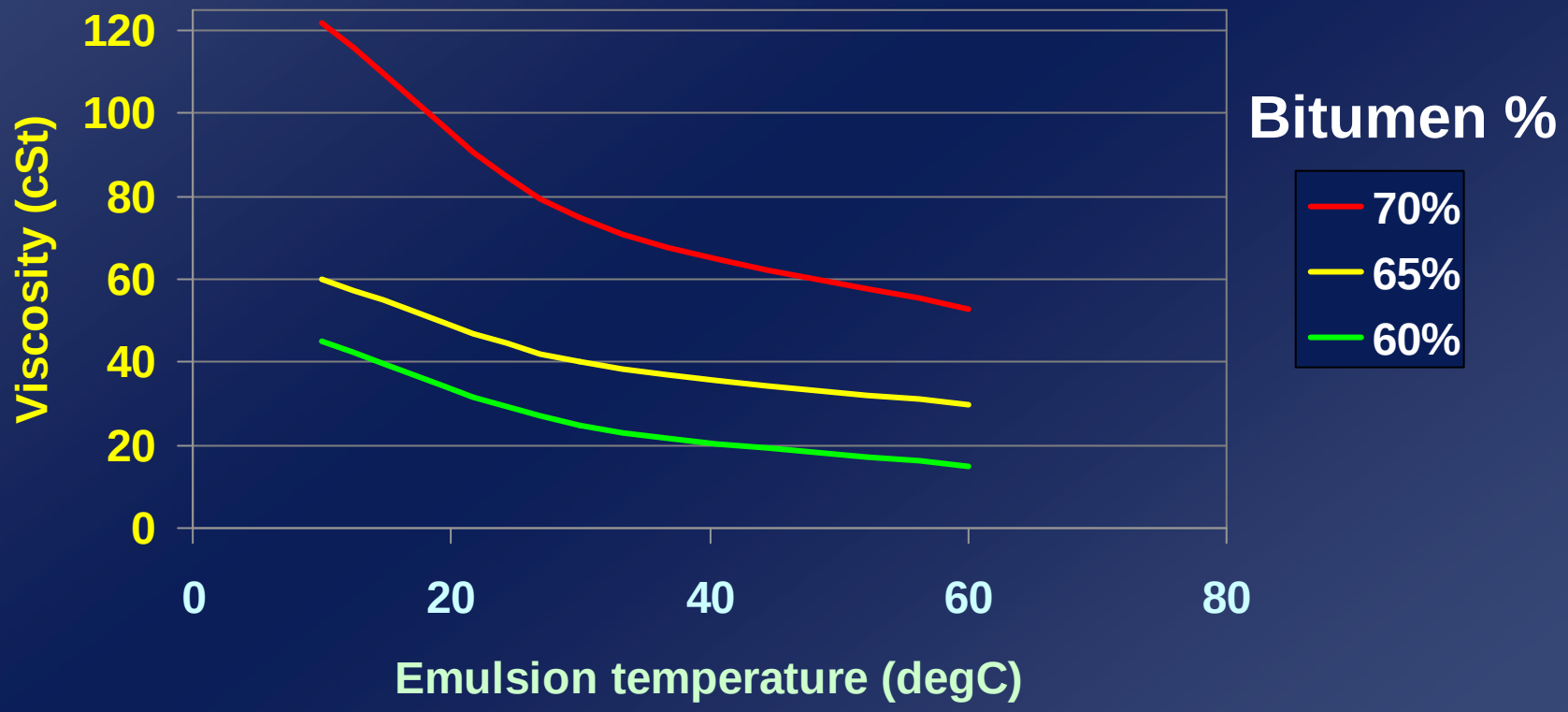
Original Foam Nozzle (Csanyi, 1957)



Viscosity of foamed bitumen



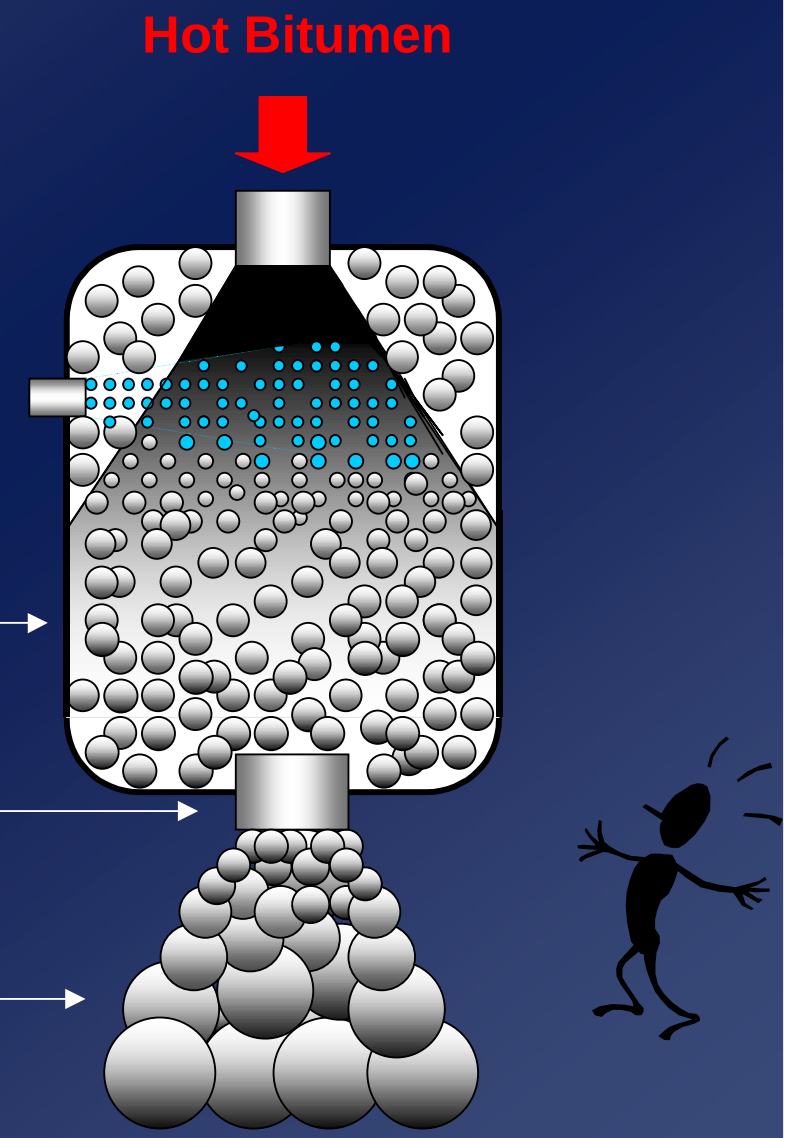
Temperature effects on emulsion viscosity



180/220 penetration base bitumen

What is Foamed Bitumen?

Current Foam Nozzle Configuration



$$PV = nRT$$

Foaming in laboratory

Foamed bitumen characteristics

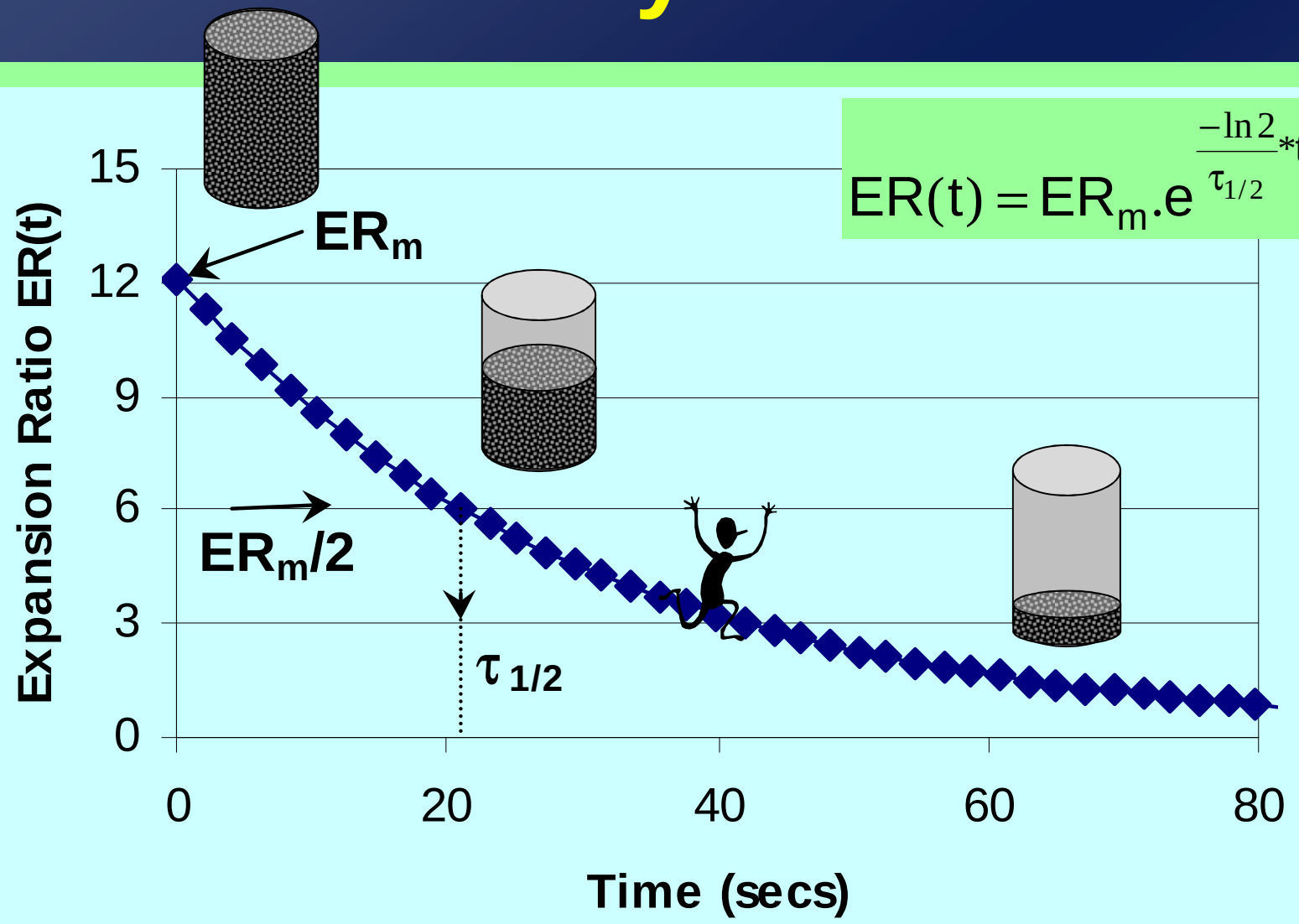
Expansion Ratio

- **maximum volume of foam relative to the original volume of bitumen**
- **a measure of the viscosity of the foam**
- **indicates how the bitumen will disperse**

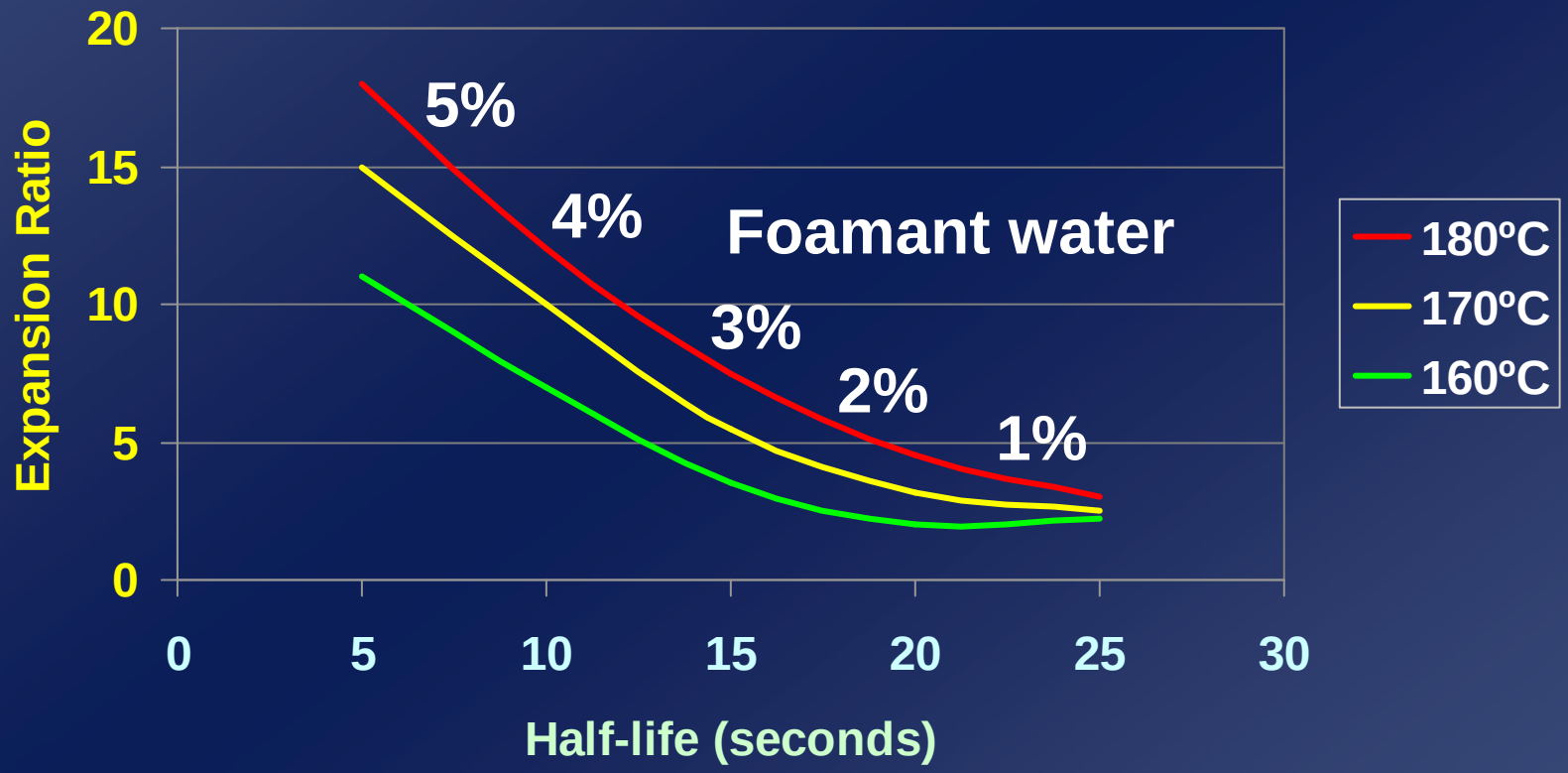
Half-life

- time (seconds) for the foam to collapse to half of its maximum volume
- measure of the stability of the foam

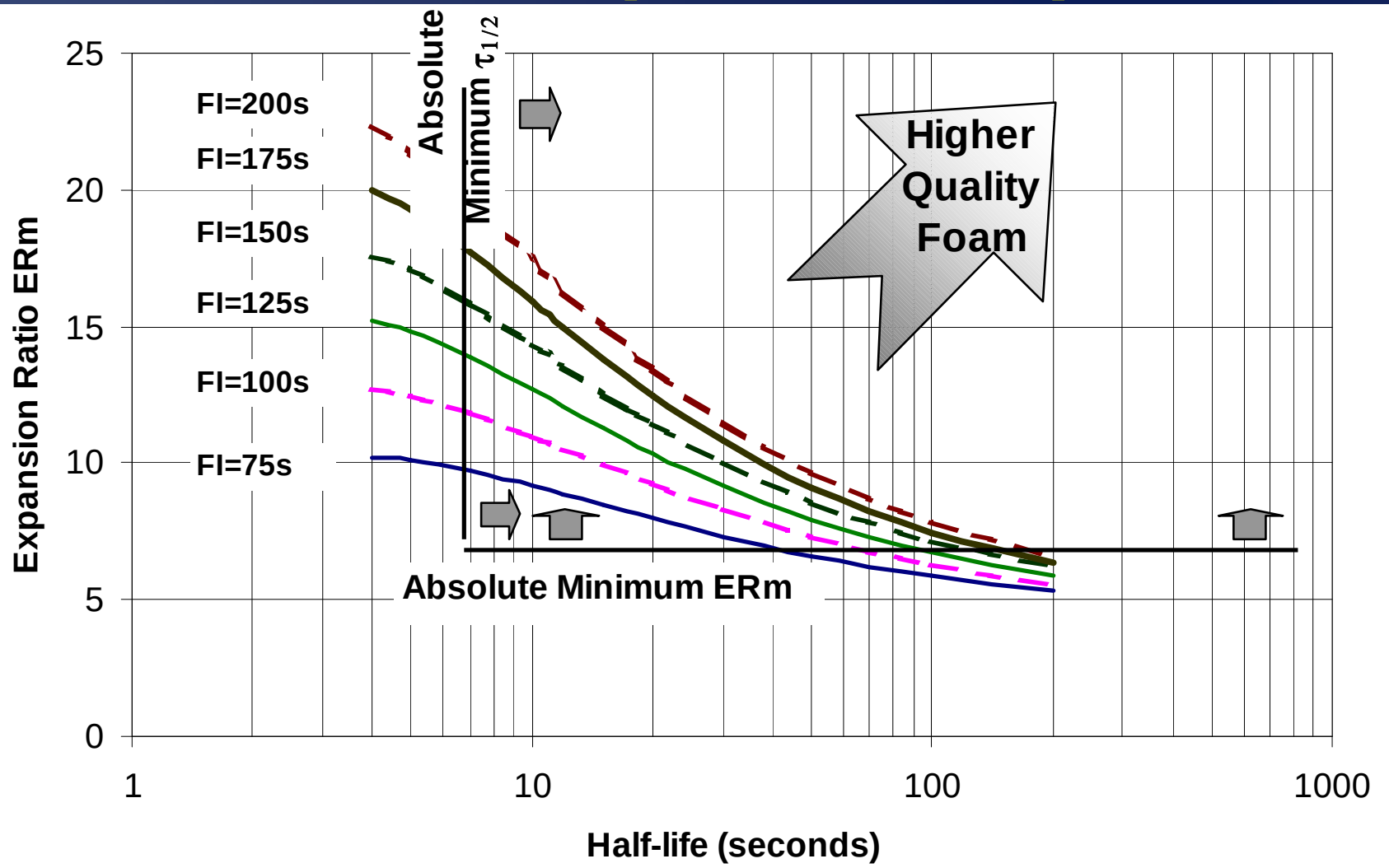
Foam decay curve



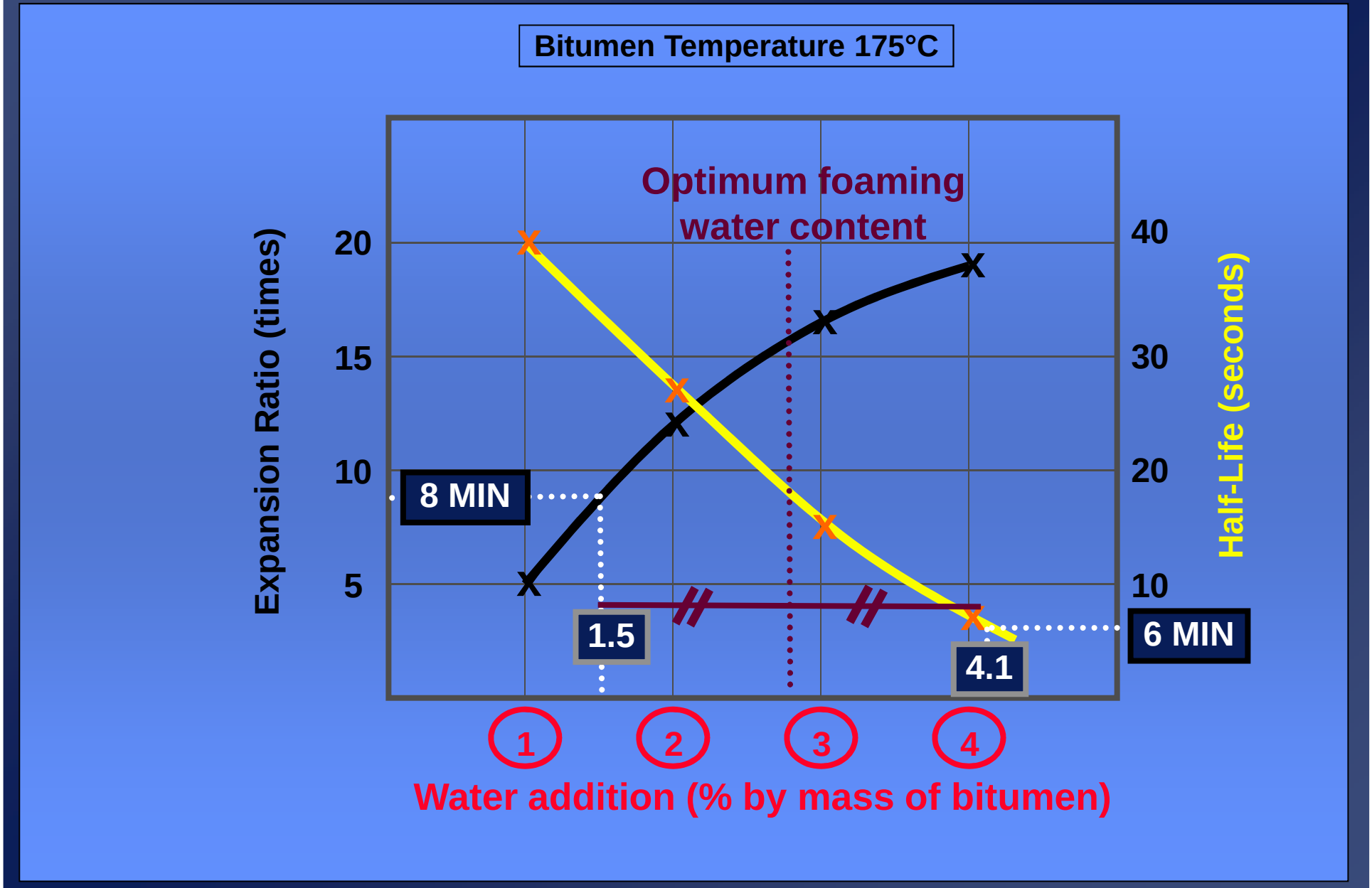
Temperature effects on foam



Foam requirements – old version (TG2, 2002)



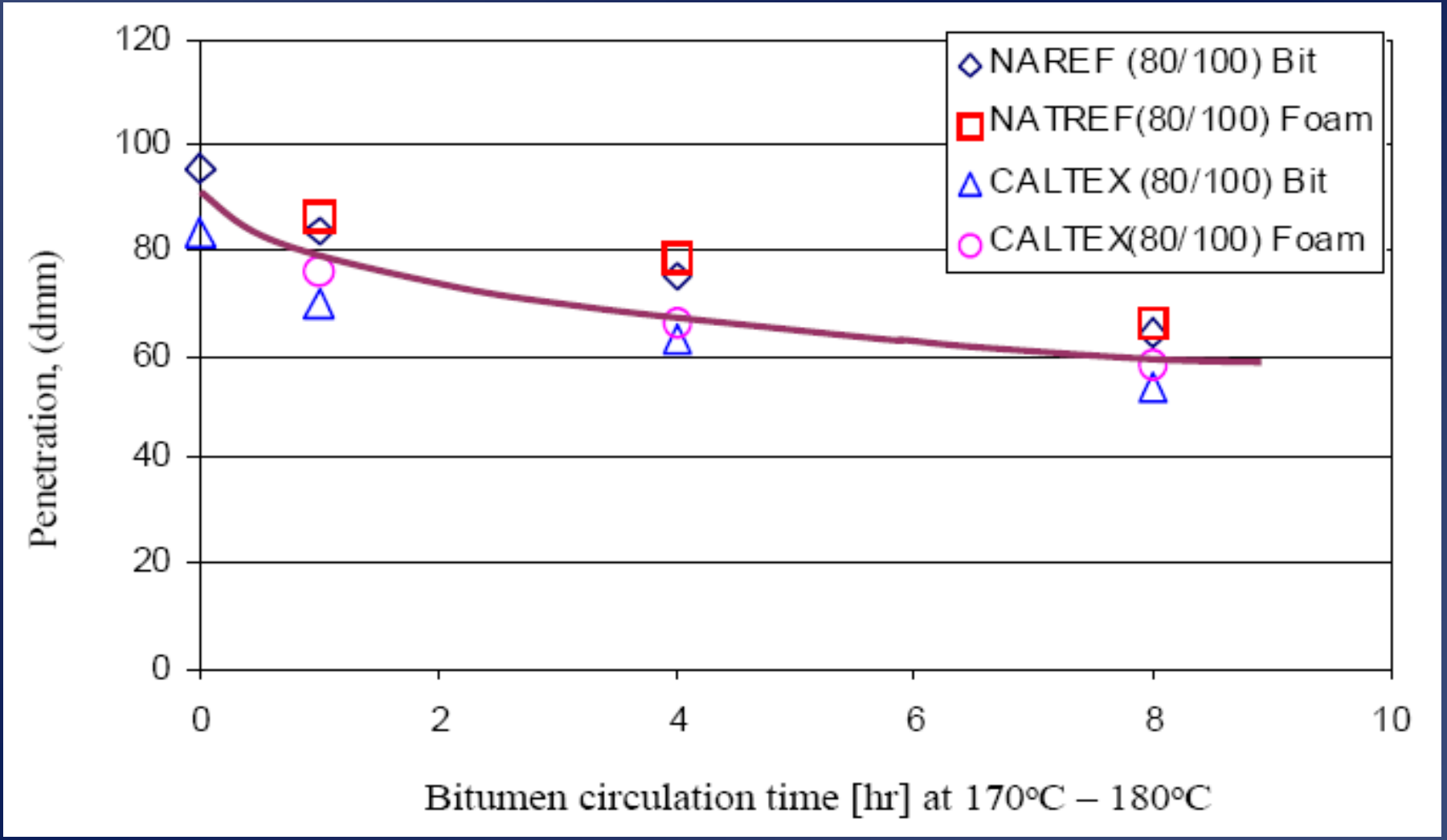
FOAMING CHARACTERISTICS



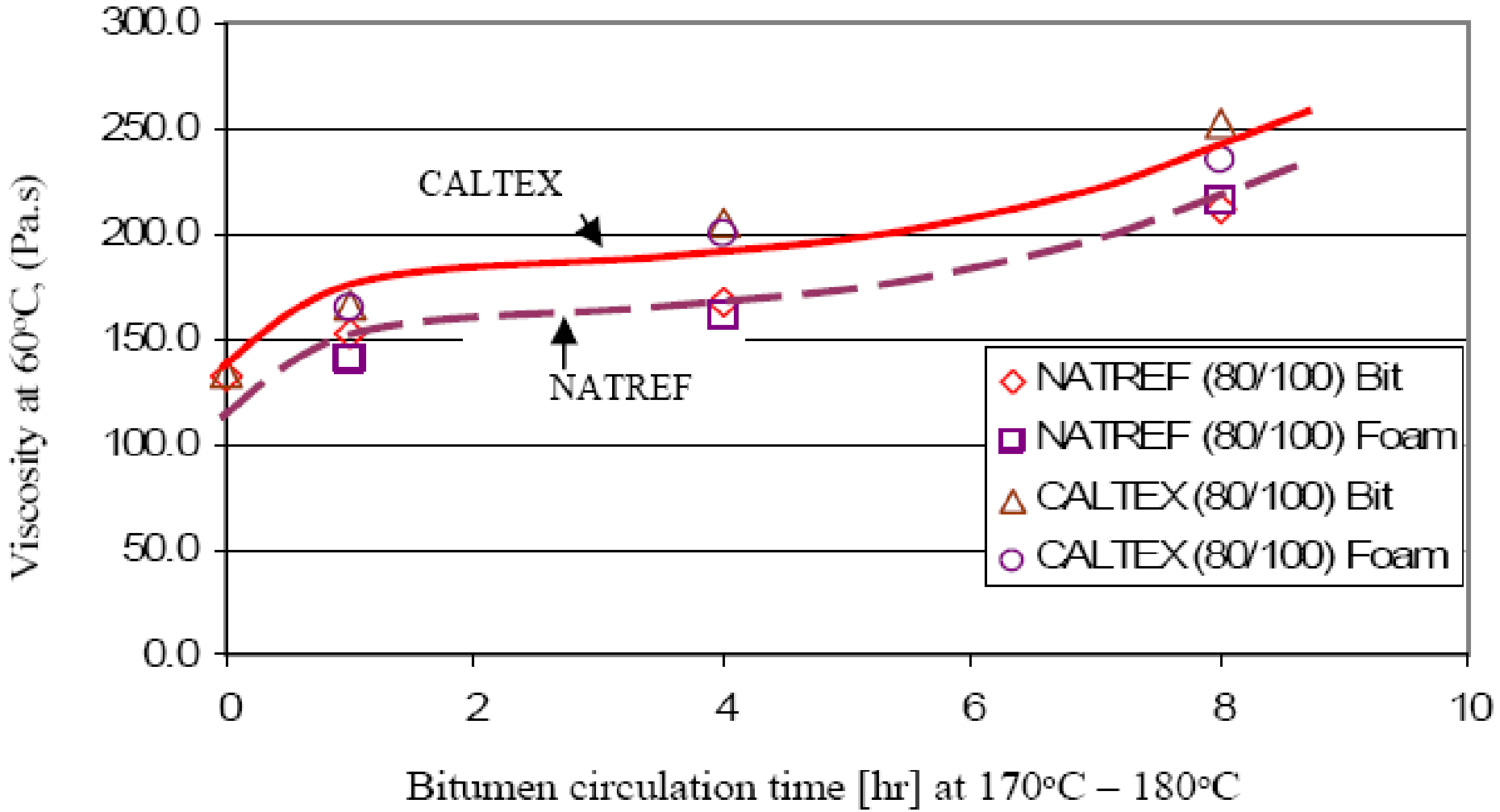
Bitumen specs for foam

- Up to 600 penetration binder has been used (Norway)
- Initially 150/200 pen used for foam in South Africa
- Currently only 70/100 bitumen is available in SA for use as foam
- Nynas in Europe markets a special binder for foam (ER and $\tau_{½}$)

Findings-short term ageing
Pen vs. time for (80/100) foam



Findings short term ageing
Viscosity vs. time for (80/100) foam



Conclusions

- Softer bitumen can be used for foam
- Follow laboratory procedure carefully (heat container, repeats etc)
- Don’t circulate the bitumen for more than 2 hours
- Check foaming characteristics on site for every batch

Viscosity….and break

There is no other way out!