AV '21 CONFERENCE ASPHALT PAVEMENTS 2021

Rulyfalt® : A new Mastic Asphalt Technology

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Improving the cost/environmental profile of an old paving technique

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I – Mastic Asphalt

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Mastic Asphalt is an Old Bitumen Technique

Composition

- Mixture of bitumen, filler, sand and sometimes aggregates
- Rich in bitumen (7% Minimum)

Manufacturing

- Adapted hot mix plants and transport trucks

Laying

- No compaction
- Hand work most of the time
- Adapted paving machinery for larger jobs

Properties

- Low void content
- Stable to deformations even under dynamic loads

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Some applications

Bridges

Paving

Sidewalks

Roofs

Flooring

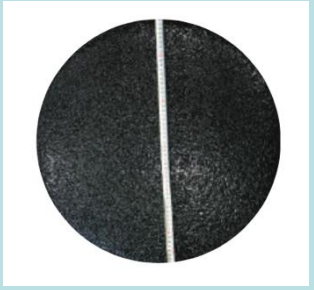
EN 13108-6, Bituminous Mixtures - Material Specifications - Mastic Asphalt

Technical performance

- Coating and homogeneity: visual
- Indentation: EN 12697-21 ➜ 15 to 40 1/10 mm
- Thermal shrinkage: Invar Mold

Workability

- Bucket test
- 68 cm min.



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THE BUCKET TEST

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Mastic Asphalt Advantages

- Waterproofing
- Noise and heat insulation
- Fireproofing
- Long-lasting grip
- Radon protection
- High loads resistance
- Abrasion resistance
- Roots resistance
- De-icing salts resistance
- Good life cycle balance due to high durability and low maintenance
- Bottom-top crack propagation limitation

Disadvantages

- High temperature laying (200°C – 250°C in most cases)
- Careful selection of bitumen
- Careful selection of fillers

II – Rulyfalt®

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Environmental/Health/Economical drivers

➥ **Need for improvement**

While maintaining good workability and overal technical performances:

- Reduce CO_2 generation and environmental footprint
- Increase bitumen versatility (paraffinic vs. Naphtenic)
- Extend the range of fillers usable

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What is Rulyfalt® ?

- Bitumen Additivation Technology*

- Lab Formulation Method that implies Bitumen and filler only

*Based on Patent WO 2018/193207 A1 – Priority 18/04/2017

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Minimizing CO_2 Contribution

Major factors

- Source of bitumen (Regional vs. ~~Transregional~~)
- %Bitumen ↘
- Production Temp. ↘

Bitumen treated with Rulyfalt® = (%Bitumen) * (Production Temperature) ↘

- Option 1 ↘ (Production Temp.) with constant (%Bitumen)
- Option 2 ↘ (%Bitumen) with constant (Production Temp.)
- Option 3 ↘ (Production Temp.) and ↘ (%Bitumen)

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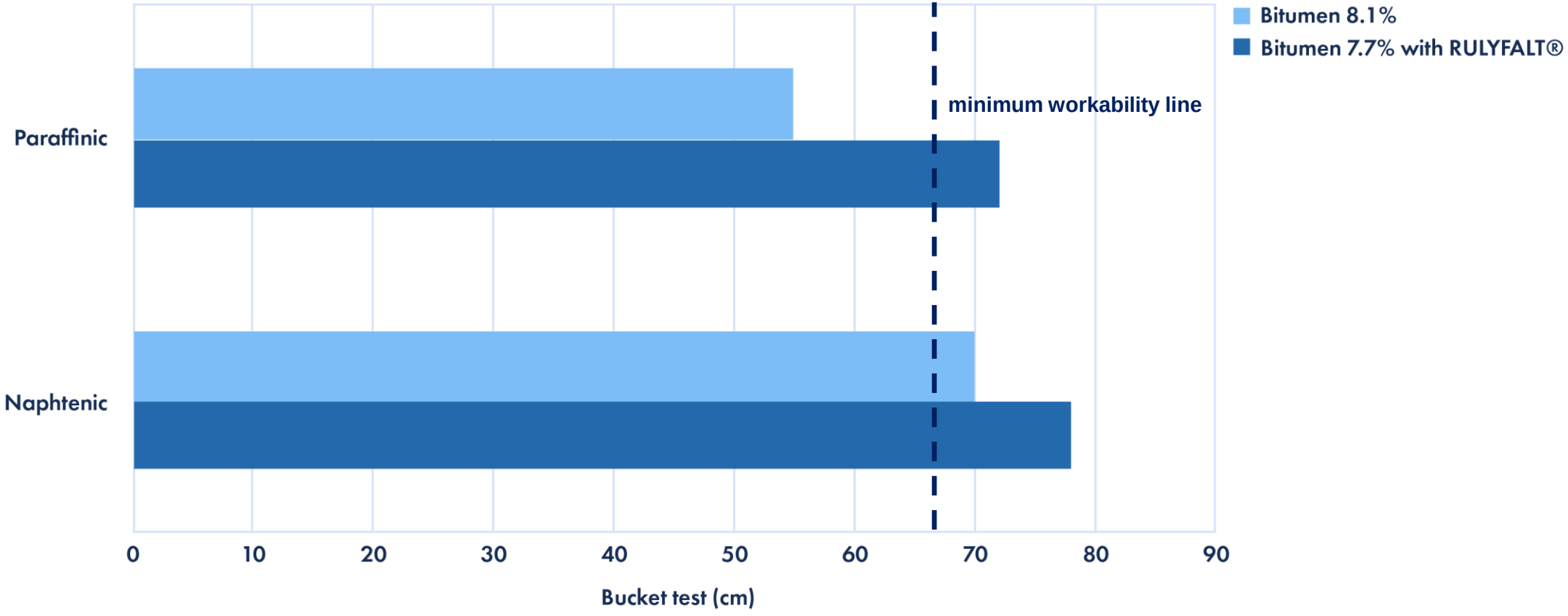
Reducing %Bitumen



Both Naphtenic and Paraffinic bitumen treated with Rulyfalt® Technology show an improved workability at 200°C with reduced %Bitumen

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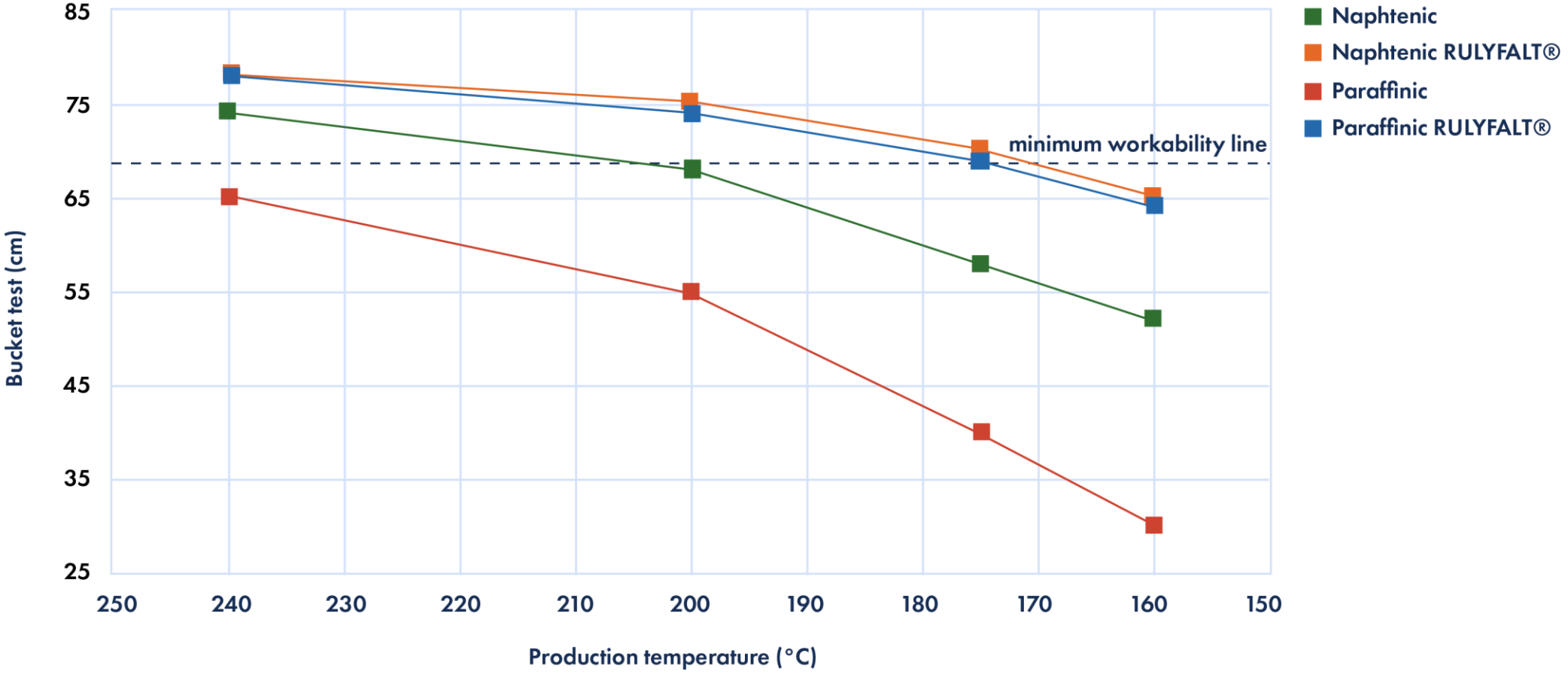
Reducing Production Temp.



Both Naphtenic and Paraffinic bitumen treated with Rulyfalt® Technology are workable at 170°C with 7.7% bitumen

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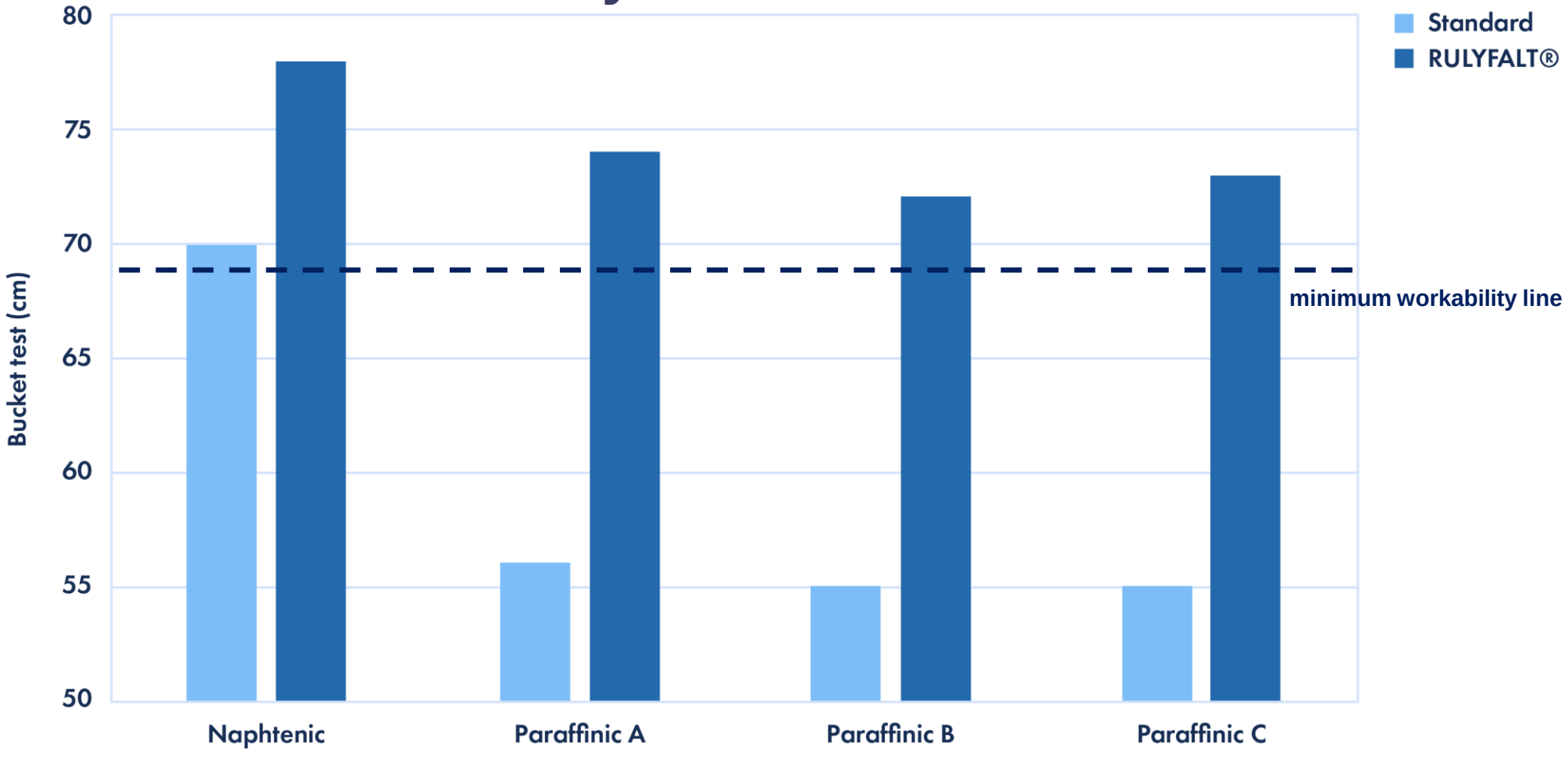
Bitumen Versatility



Regional paraffinic bitumen treated with Rulyfalt® Technology can be employed for Mastic Asphalt manufacturing without loss of workability

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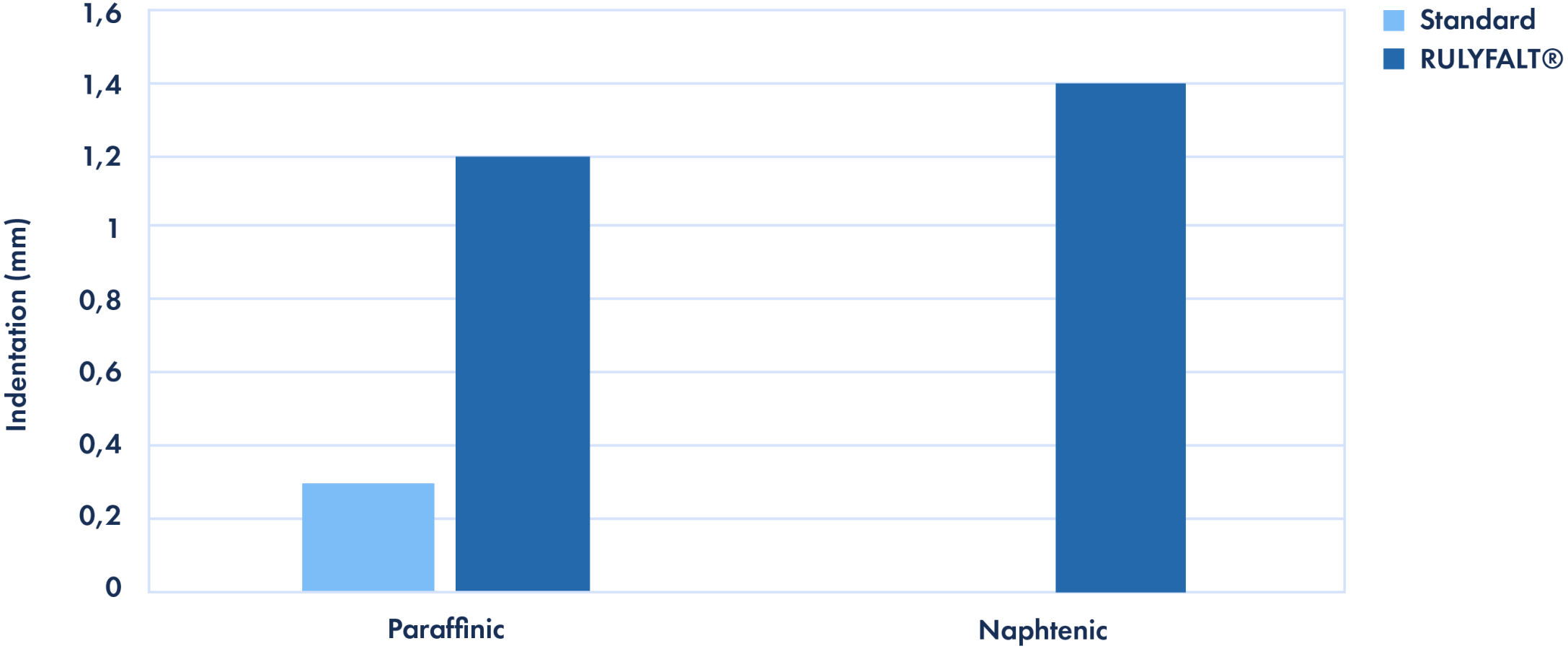
Indentation



Rulyfalt® Technology increases indentation, but it is still within the specification limits

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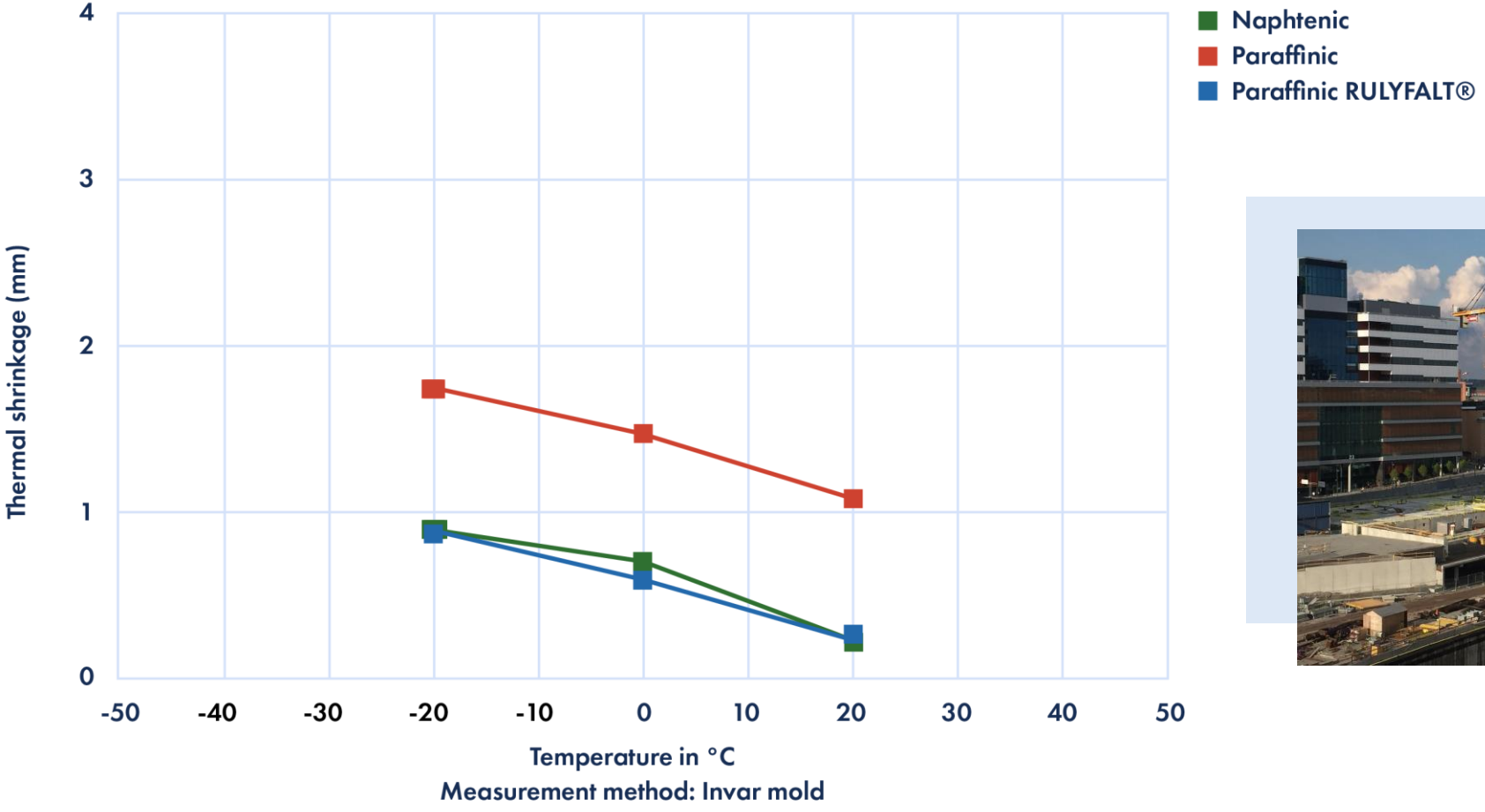
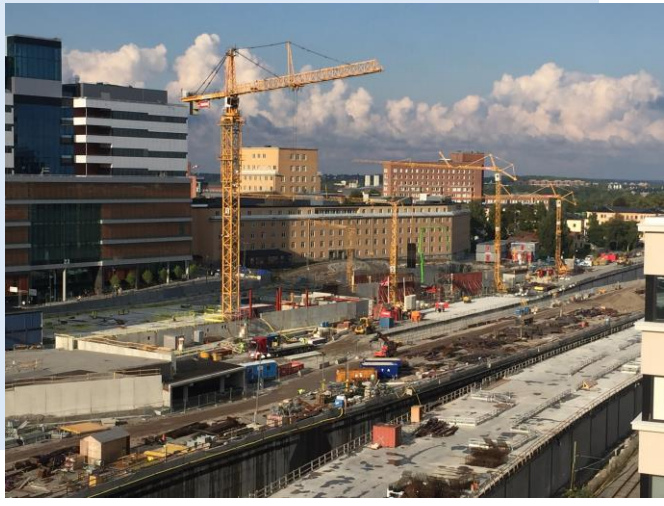
Thermal shrinkage





Use of Rulyfalt® Technology allows a siginficant reduction of thermal schrinkage

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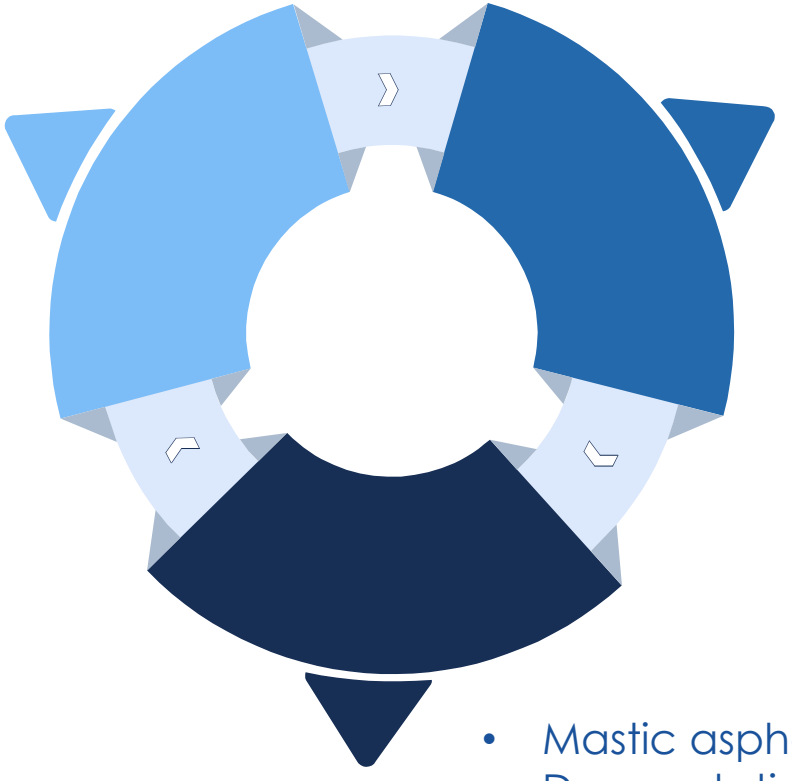
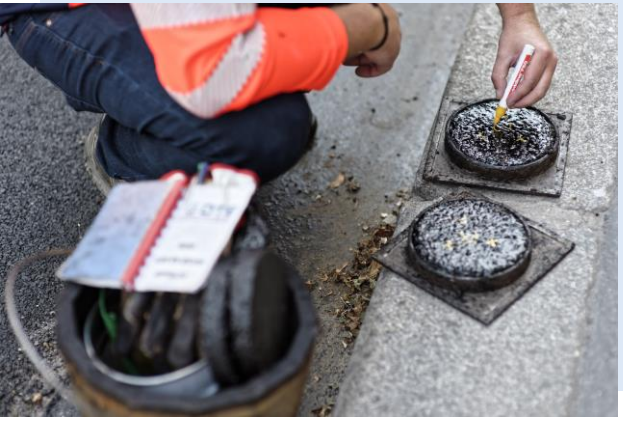
III – Industrialization

Technical assessment

- More than 250 works assessed in 2017 with client satisfaction



- Shiny aspect
- Application temperatures in target (180 - 200° C)



- Mastic asphalt workable
- Does not stick to tools
- Satisfactory indentation

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Technical success

2016

- Lab formulation
- Follow-up and validation of binder production
- Test trial

2017

- Production check and transport for field trial

2018

- 14 000 tons (270 000 m²) of mastic asphalt.
- 1 100 tons of binder.

2019

- 15 500 tons (300 000 m²) of mastic asphalt.
- 1 200 tons of binder.

2020

- 10 000 tons (193 000 m²) of mastic asphalt.
- 860 tons of binder.

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Industrial feed-back

- Paris (Eurovia) since 2018
- East (SMAC and Eurovia)

SEVERAL LOCATIONS IN FRANCE

- Mastic asphalt dedicated plant
- Standard adapted asphalt mix plant

SEVERAL TYPES OF EQUIPMENT

- Dosage tune up
- Easy to put into practice
- Storage resistant
- Regular stirring of treated bitumen

WHAT DO PRODUCTION PEOPLE SAY?

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IMPACT ON FUMES

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WITHOUT RULYFALT®: DOWNTOWN PARIS 2002

WITH RULYFALT®: NANCY (EAST FRANCE) 2020

IV – Conclusions

With Rulyfalt®, Mastic Asphalt meets the new challenges

Fit with environmental, sustainability and cost requirements

- Reduction of carbon footprint
- Flexibility vs. raw materials
- Durability and waterproofing
- Low maintenance
- Self-leveling

Easier Formulation at the lab scale

- Only bitumen and filler
- Cheap equipment and quick test