AV '17 KONFERENCE ASFALTOVÉ VOZOVKY 2017

Standardization of Cold Mixed Asphalt in Europe

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Motto: Asfaltové vozovky – bezpečná cesta k prosperitě

SDRUŽENÍ PRO VÝSTAVBU SILNIC

ČESKÁ SILNIČNÍ SPOLEČNOST CZECH ROAD SOCIETY

EAPA

PRAGOPROJEKT

Overview

1. Introduction
2. Standardization in Austria / Germany
3. Testing methods in Austria
4. Reactive Cold Mixed Asphalt

1. Introduction

- No uniform standardization in Europe
- In Austria and in Germany there is already a draft of a standarization
- A lot of different Cold Mixed Asphalts in Europe
  - Bitumen emulsions
  - flux bitumen
  - reactive binders

2. Standardization in Austria / Germany (I)

Austria

- Valid just for Cold Mixed Asphalts
- Performance oriented test methods
- Different quality classes (declaration matrix)

Germany

- Valid for Cold and Hot Mixed Asphalts
- Standard test methods
- No declaration matrix

2. Standardization in Austria / Germany (II)

Austria

- Obligated declaration
- First test by an accredited laboratory
- Factury production control
- Once a year a control by external auditor

Germany

- No obligated declaration
- Fist test by an accredited laboratory
- Factury production control
- Once per year a control by external auditor
- Site job regulation
- Claims of the customer

2. Standardization in Austria / Germany – Differentiation of Cold Mixed Asphalts

Presumably it will be differentiated between following Cold Mixed Asphalts

Austria

- KMG-DD
- KMG-FL
- KMG-LM
- KMG-RE

Germany

- KMG-DSK
- KMG-F
- KMG-L
- KMG-R
- KMG-E
- HMG
- WMG

2. Standardization in Austria – Characteristic Values (I)

Technical

- Aggregate classification (delivery agreement)
- Binder content
- Marshallstability at 60°C
- Loss of aggregates at -20°C (Cantabric test)
- Tensile splitting strength after storage in water at 25 °C
- Increase of binder viscosity at 60°C

2. Standardization in Austria – Characteristic Values (II)

Application-specific

- Void content
- Flowability at 0°C
- Shelf life
- Workability

2. Standardization in Austria – Characteristic Values (III)

Environmental

- Content of renewable raw materials
- Content of volatile organic carbon (VOC)

2. Standardization in Germany – Characteristic Values

- Grain size distribution
- Binder content
- Softening point Ring and Ball of the recovered binder
- Volume density
- Void content
- Depth of stamp penetration
- Marshallstability at 60°C

3. Standard test methods in Austria – binder content

Extraction of binder by a suitable solvent

$$BM(\%) = \frac{EW_{tr} - (AW_{tr} + H_2O)}{EW_{tr}} * 100$$

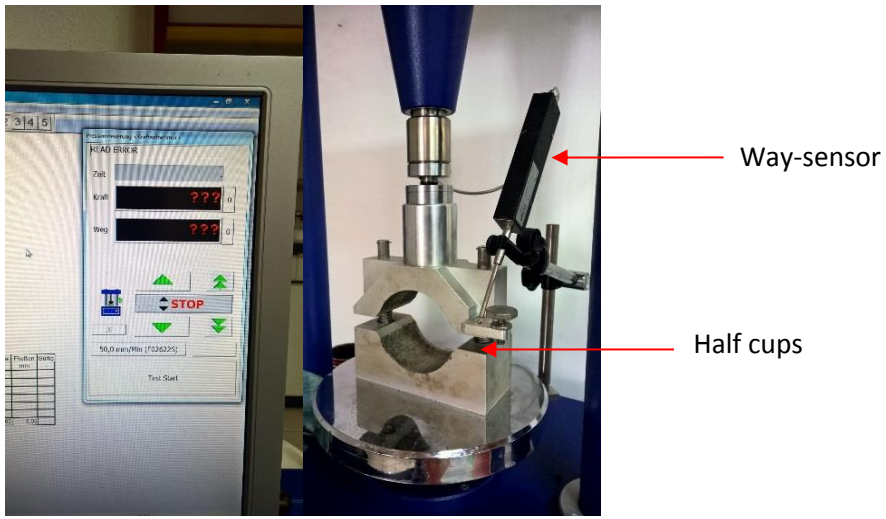
EW_{tr} …… dry weigth before extraction

AW_{tr} …… dry weigth after extraction

H_2O ……. weight of water

3. Standard test methods in Austria – Marshall stability

- Storage of Marshall body in water bath at 60°C
- Force and deformation are recorded
- Marshall stability / Flowing value



3. Standard test methods in Austria – Cantabric test

- Determination of grain loss at -20 °C
- 300 Rounds with 30-33 rounds per minute
- Weigh Marshall body before and afer the test

$$PL = 100 * \frac{W1 - W2}{W1}$$

PL …. Grainloss (%)
W1 … Weight before test (g)
W2 … Weight after test (g)

3. Standard test methods in Austria – Tensile splitting strength

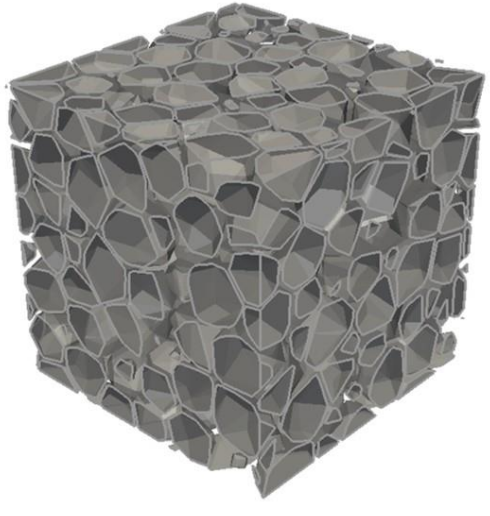
- Marshall body is placed into the Marshall press
- The pressure is raised till the body brakes
- Tensile splitting strength is calculated

$$\beta_{SZ} = \frac{2F}{dl\pi}$$

F …. Force when the body brakes
d … diameter of the body
l … length of the body

3. Standard test methods in Austria – Void Content

- Determine particle density
- Determine bulk density
- Ratio → void content

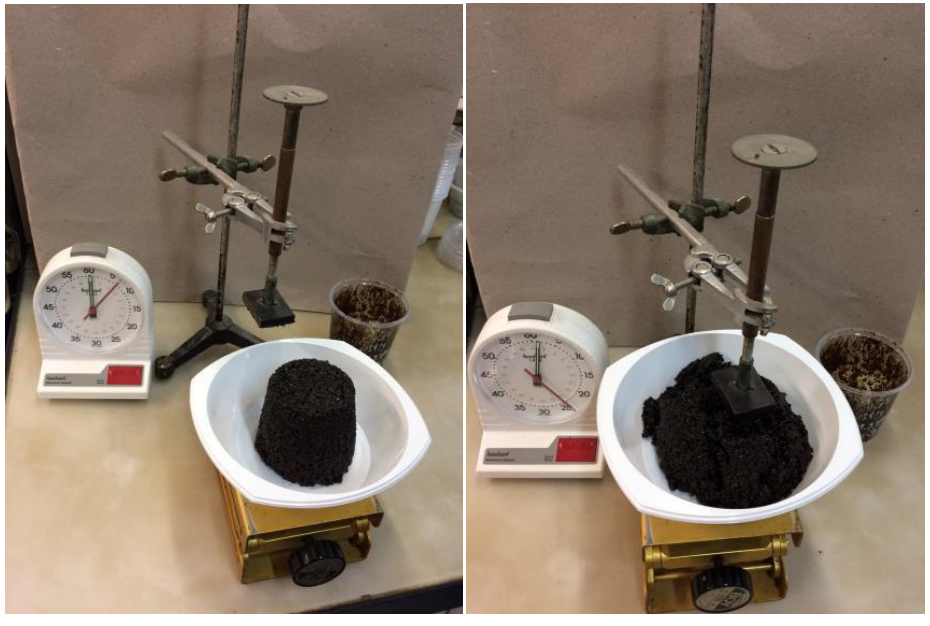


$$H = \frac{\rho_R - \rho_A}{\rho_R} * 100$$

H …. **Void content**
ρ_R … **raw density**
ρ_A … **bulk density**

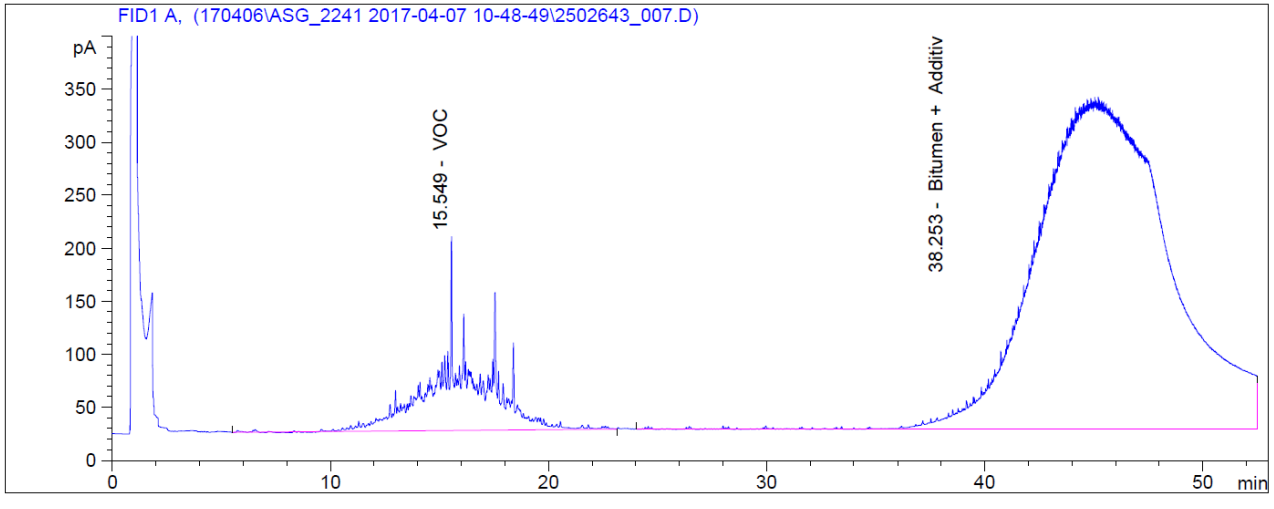
3. Standard test methods in Austria – Void Content

- Measurement at 0 °C or 7 °C
- After 60 seconds a stamp (300 g) is put on top
- After 4 minutes another 500 g is put on top



3. Standard test methods in Austria – Volatile organic carbon content

- Testing method: GC with FID
- Solvent: CS_2
- Determination of VOC`s up to 300 °C
  (related to the binder)



4. Reactive Cold Mixed Asphalt

- New technology
- Reactive – chemical hardening reaction
- Fast and economical repair-method

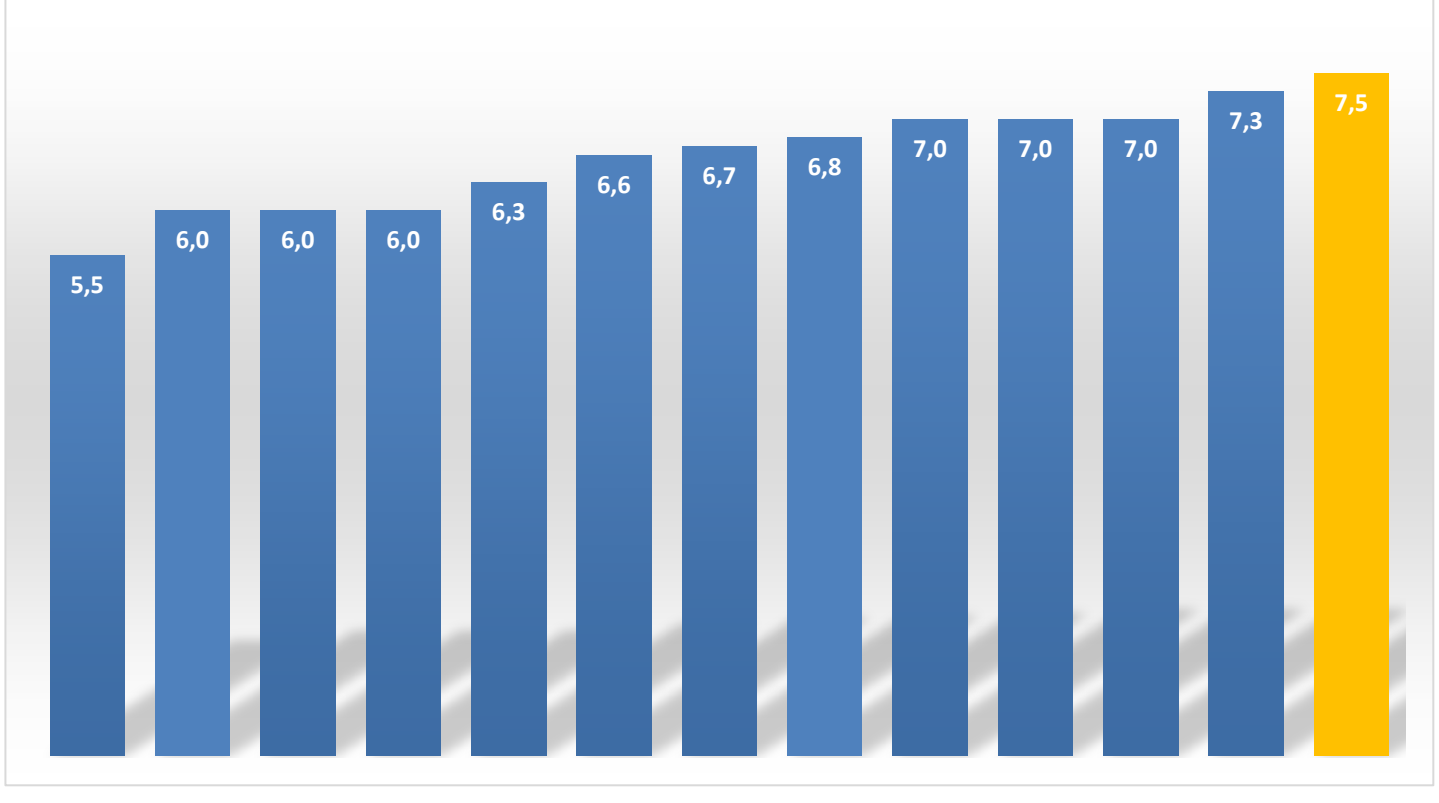
4. Reactive Cold Mixed Asphalt - Rephalt

- Chemical hardening reaction with water
- Compaction of the Rephalt
- Hardens within one hour
- No difference in performance to hot mixed asphalt

4. Reactive Cold Mixed Asphalt - Rephalt

- **High binder content (extraction)**
- Low void content (densities)
- Good flowability (flowability test)
- High Marshall stability (Marshall test)
- Low abrasion (catabric test)
- 0 % of volatile organic carbon (environment)

4. Rephalt – Binder content [M-%]



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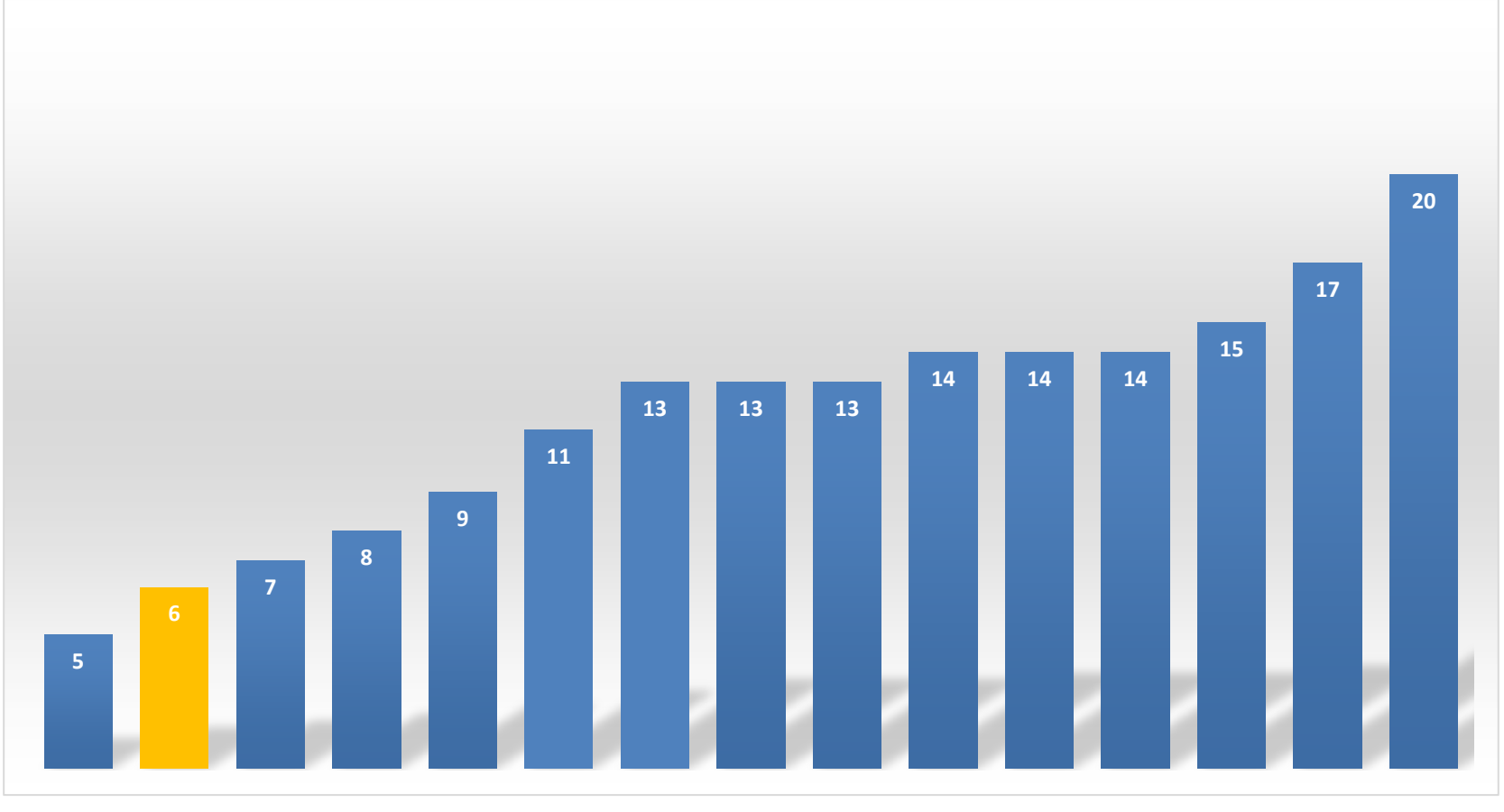
4. Rephalt – Void content [V-%]



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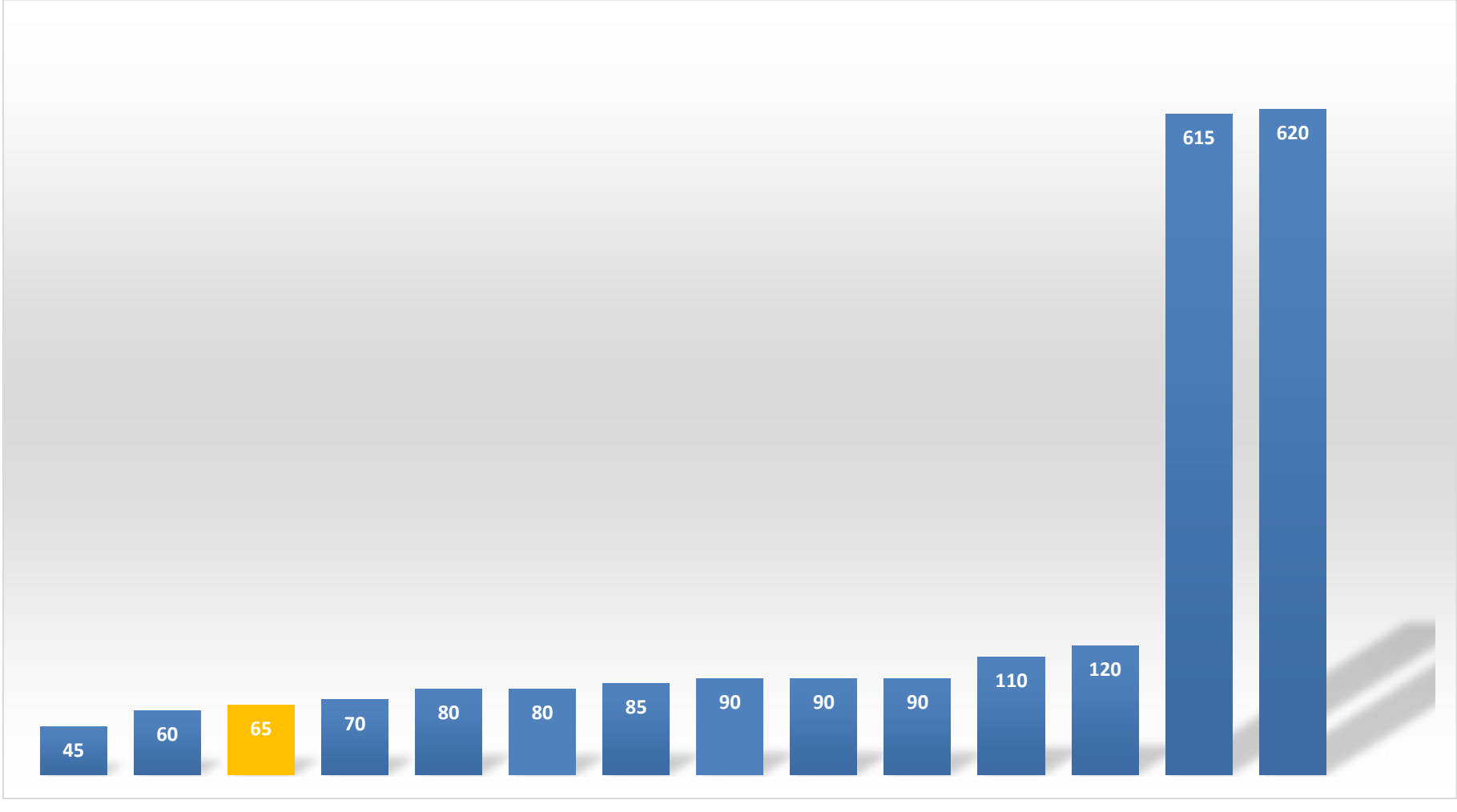
4. Rephalt – Flowability [s]



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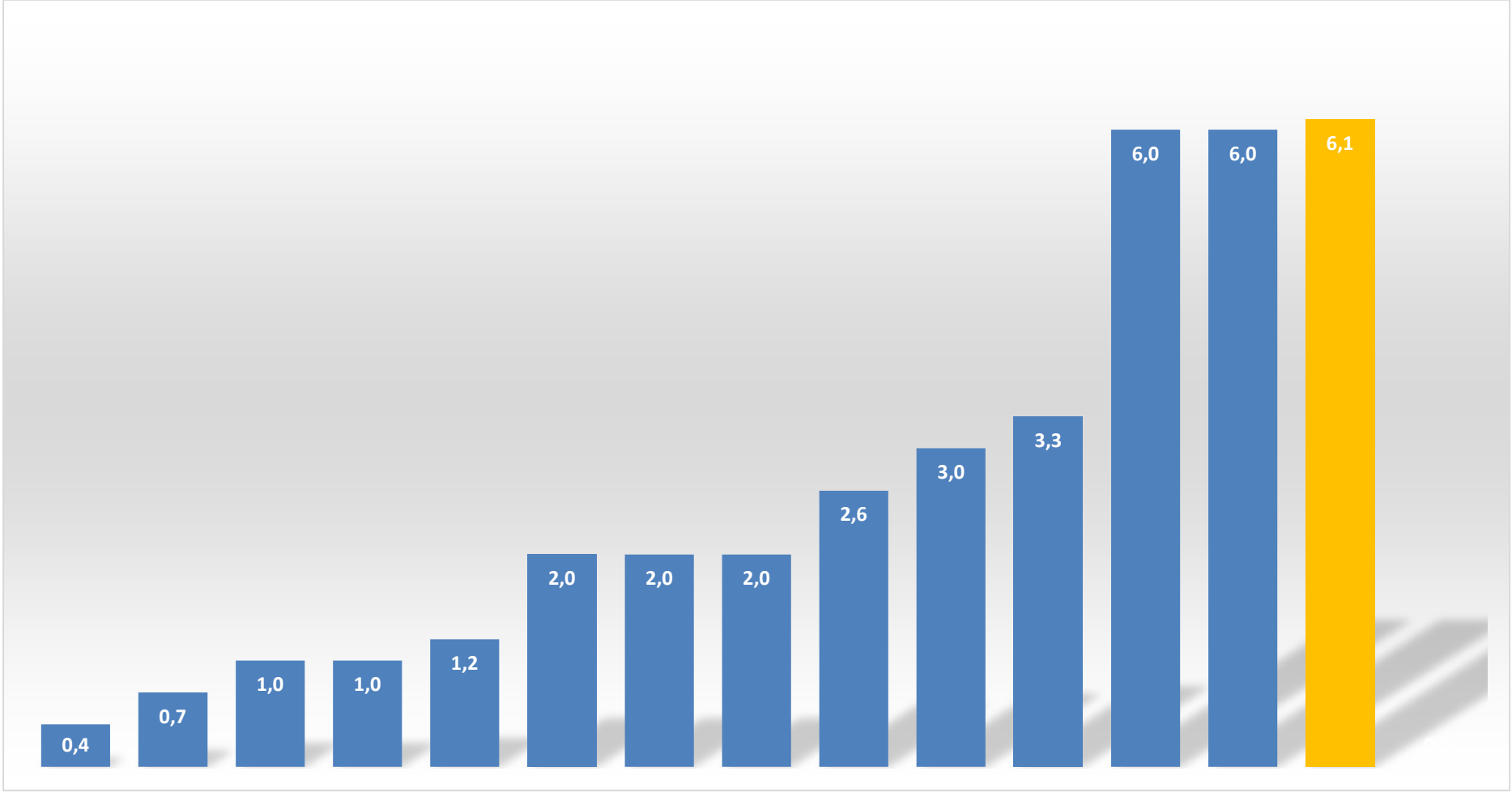
4. Rephalt – Marshall stability [kN]



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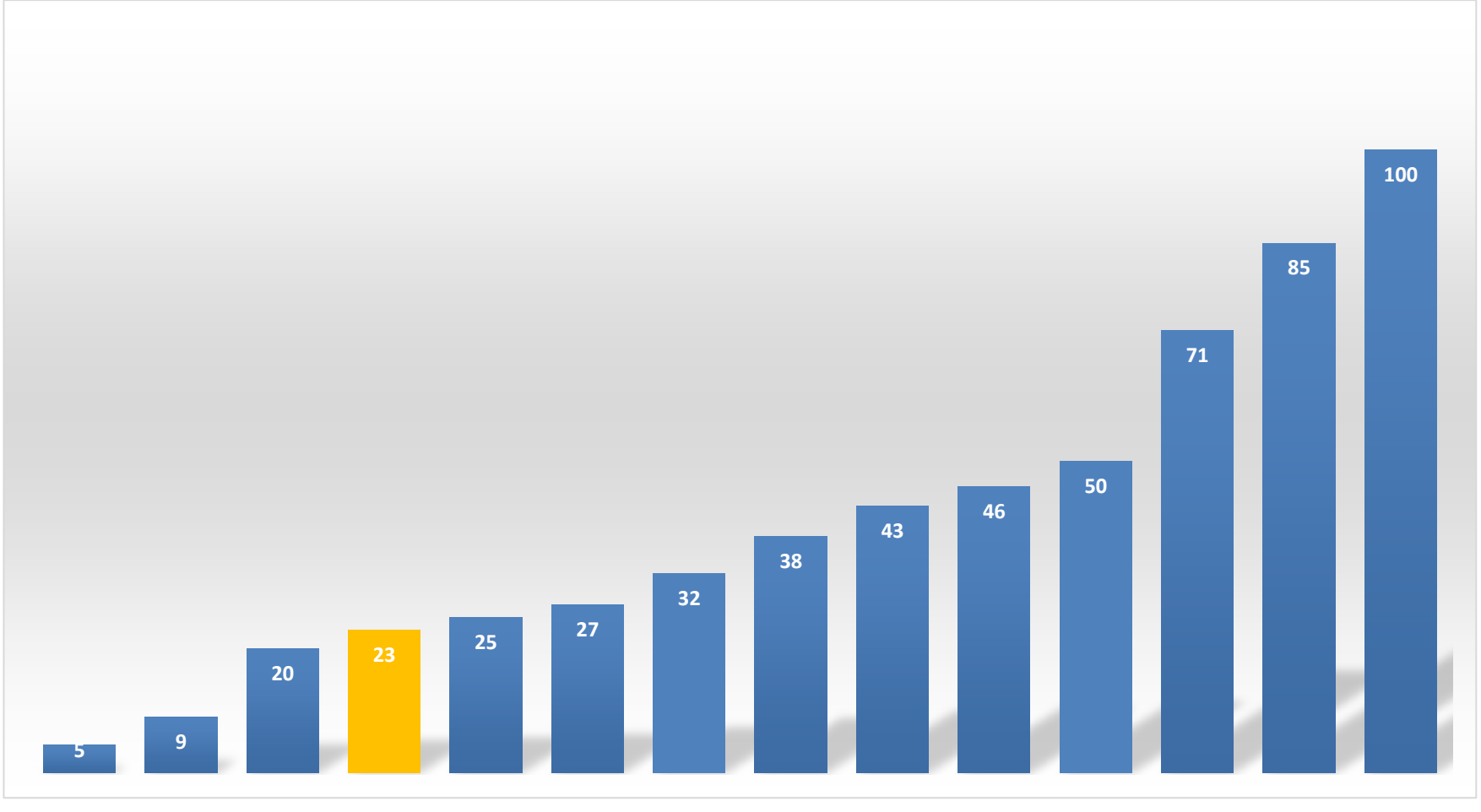
4. Rephalt – Abrasion [M-%]



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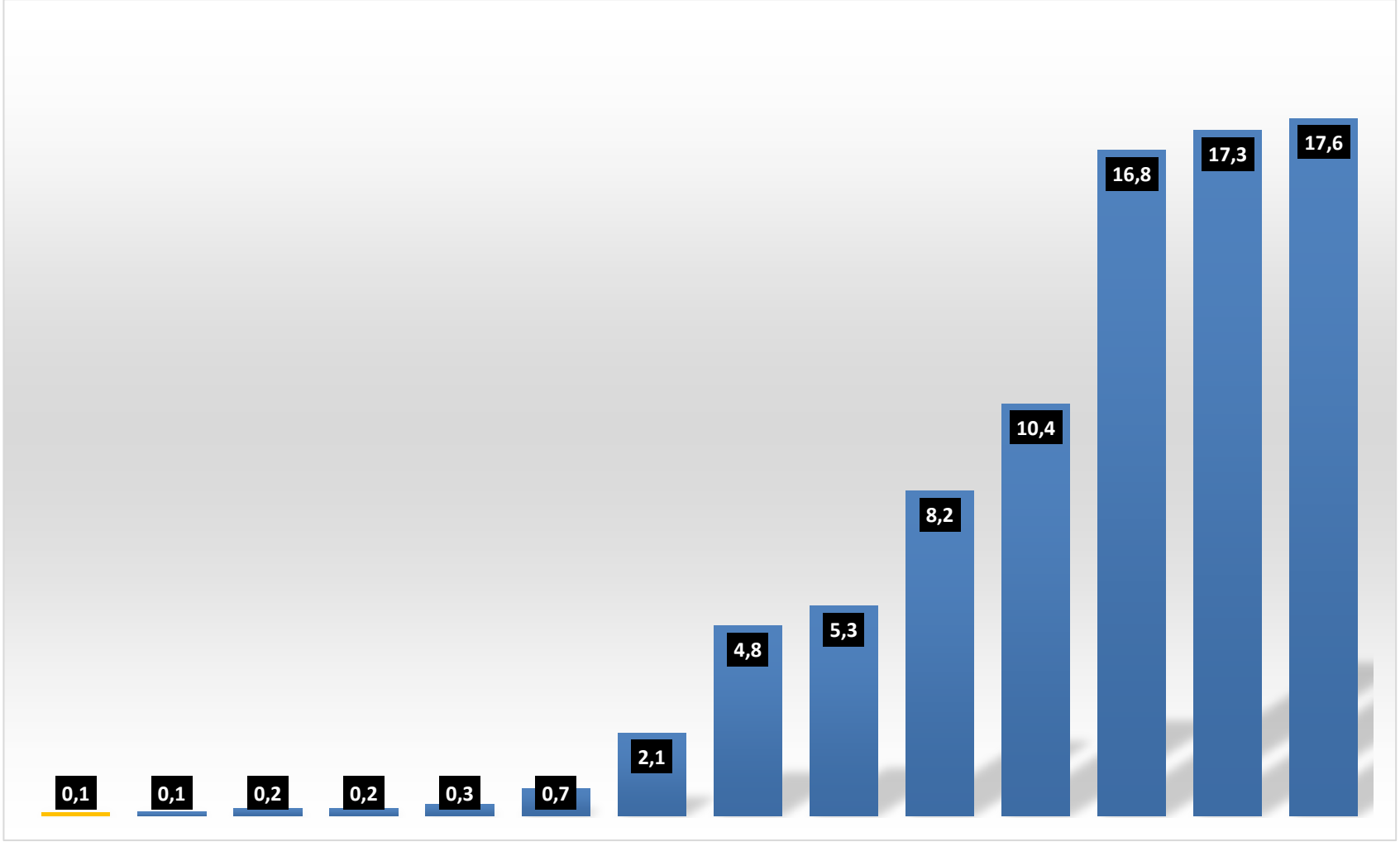
- **0 % of volatile organic carbon (environment)**

4. Rephalt – Volatile organic carbon content [M-% of the binder]



4. Reactive products of Vialit – Road repair

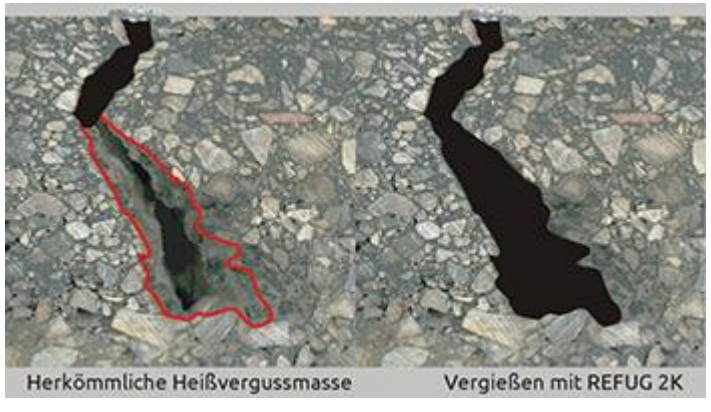
- **Rephalt**

- **Repatch**

4. Reactive products of Vialit – Joint sealing

- **Refug 100**

- **Refug 2 K**



4. Reactive products of Vialit – Sealing buildings

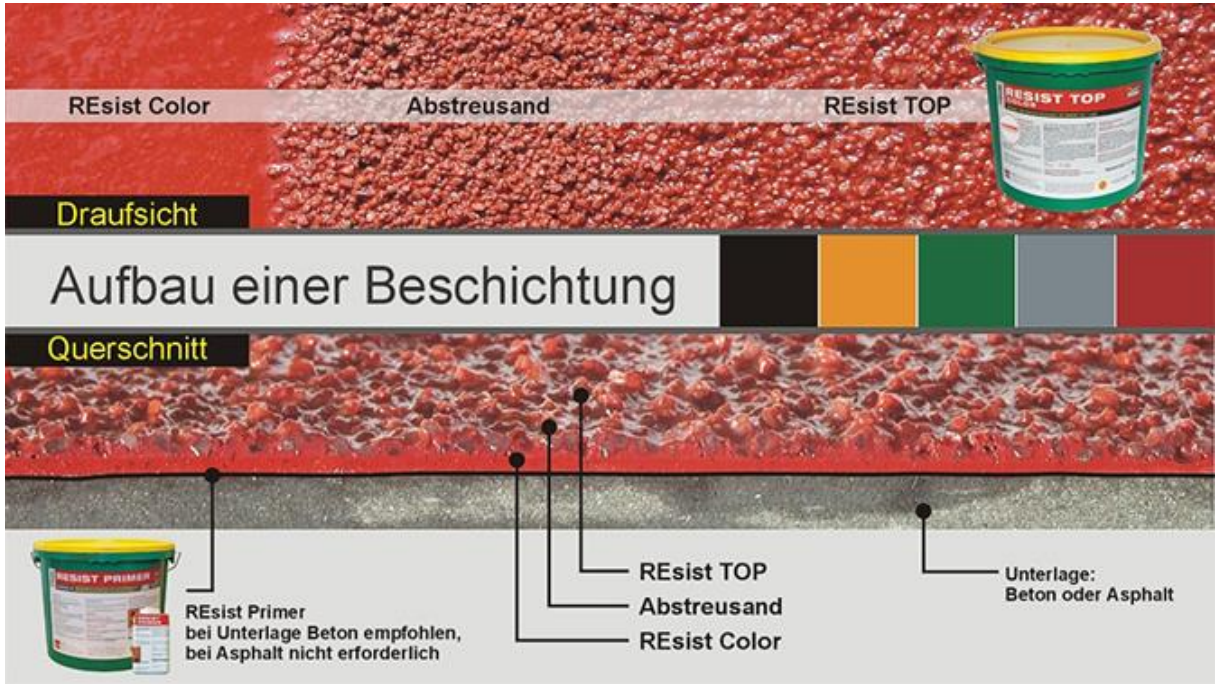
- **Rebond KMB**

4. Reactive products of Vialit - Coatings

- Resist 2 K

- Resist Top Color

- Resist Top Coat



Thank you for your attention

it's Vialit ASPHALT