Technical Data Sheet

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Tunnelling and Civil Engineering

WilkitFoam T

Uses:

Rapidly reacting, strongly expanding foam filler, suitable for spray-on application, CFC-free

This resin is designed for
- **rapid filling of cavities**
- **consolidation and sealing in strata and soil**
- **stopping of water intrusions**
- **stabilisation of cavities caused by rock falls in tunnelling**

Applicable at ambient temperatures between 10 °C and 40 °C.
At an product temperature < 10 °C it can become to flocculations.

WilkitFoam T is resistant against water, diluted acids and alkaline brines. It does not absorb water. WilkitFoam T does not affect groundwater quality.

Technical Data:

The data below are laboratory data. They may vary in practice due to thermal exchange between resin and strata, shear of the resin in cracks, pressure, and other factors.

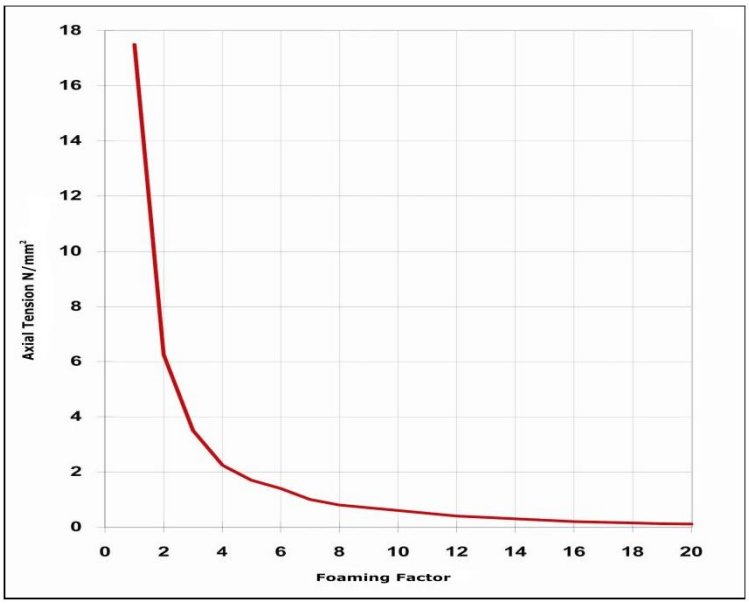
Reaction Data:

Starting temperature	Start of foaming	End of foaming	Foaming factor
5 °C	37 s ± 15 s	1 min 45 s ± 30 s	approx. 13
10 °C	25 s ± 15 s	1 min 20 s ± 30 s	approx. 25
15 °C	20 s ± 15 s	1 min 10 s ± 30 s	approx. 23
20 °C	15 s ± 5 s	50 s ± 20 s	approx. 25
25 °C	10 s ± 4 s	40 s ± 15 s	approx. 30
30 °C	8 s ± 3 s	35 s ± 15 s	approx. 35
35 °C	7 s ± 3 s	29 s ± 10 s	approx. 43
40 °C	5 s ± 2 s	25 s ± 10 s	approx. 60

Material Data:

		WilkitFoam T Comp. A	WilkitFoam T Comp. B
Density at 25 °C	kg/m³	1310 ± 30	1230 ± 30
Colour		colourless	brown
pH-Value		11	-
Flash Point	°C	-	> 170
Viscosity at 5 °C	mPa*s	43 ± 15	1440 ± 150
Viscosity at 10 °C	mPa*s	25 ± 10	930 ± 125
Viscosity at 15 °C	mPa*s	20 ± 10	560 ± 100
Viscosity at 20 °C	mPa*s	17 ± 10	370 ± 75
Viscosity at 25 °C	mPa*s	15 ± 10	220 ± 50
Viscosity at 30 °C	mPa*s	13 ± 5	160 ± 50
Viscosity at 35 °C	mPa*s	11 ± 5	110 ± 30
Viscosity at 40°C	mPa*s	9 ± 5	40 ± 15

Mechanical Data:



Composition and Properties:

Components:
WilkitFoam T, Comp. A is a modified water glass, and component B is a modified isocyanate. At the bottom of the cans, some minor flocking may be seen, which does not affect the processability. Neither component contains any volatile organic compounds or plasticisers

System:
After mixing the resin starts producing carbon dioxide gas and water vapour within a few seconds, thus forming a light-weight foam. In free-rise foaming, the surface has a brittle touch in the beginning ("sanding off"), but after some hours, the foam becomes semielastic throughout.
Presence of water does not affect the reaction; the foam floats in water.

Final Product:
When WilkitFoam T is injected into wet soil, no compounds are released in traceable amounts. It meets the requirements of the German Institute for Construction Technology (DIBt) for the "Evaluation of the effect of building products on soil and groundwater". [1,2]
The foam is predominantly closed cell. It is not soluble in water, acids or alkaline brines.

Processing:

The two WilkitFoam T components, A and B, are pumped via a dual component pump, e. g. Minova SK 90, at the volumetric ratio 1 : 1, then they are mixed passing a static in-line mixer prior to either free discharge from the injection pipe or being sprayed from a discharge nozzle. Thus, WilkitFoam T may be applied to vertical and overhead surfaces.
After leaving the mixer, the liquid resin shall not undergo major shear forces (flow through narrow cracks). This would lead to a decrease of the foam factor. Free discharge from a nozzle provides an optimum foam factor. If the rising foam is hit by a beam of liquid resin, the foam factor is decreased considerably.
For flushing the B-side of the pump, we recommend water free oil. For the A-side, however, we recommend water with a surfactant (e. g. dishwashing agent). Oil affects the formation of foam.

Recommendation:
We recommend that before processing, the product be stored for at least 12 hours at a minimum temperature of 15 °C to achieve the recommended processing temperature of between 15 °C to 30 °C. When the material is warmed up, local overheating, e. g. at the container wall, must be avoided by any means.

Summary and evaluation:

In order to examine the resistance character of the "Wilkit Foam T" system, specimens were manufactured from the plastic systems and stored for 18 months in four different fluids (deionised water, an acid solution with a pH-value of approx. 4, an alkaline solution with a pH-value of approx. 13 and a sulphate solution with 5,000 mg/l SO_4^{-2}) at a temperature of 45°C.
According to an established test plan, samples were taken after 3 and after 6 months and their compression strength and form changes were determined by examination. These tests and measurements served to establish whether and to what extent the properties examined are influenced by the storage conditions mentioned.
From the test results of the parameters examined, it can be concluded that there is no clear proof of damage to the material after a 3- or 6-month storage. In some specimens, there are signs for possible influence on the material by the storage as these specimens show length changes and slight losses in compression strength.
As the foaming factor is high, slightly worse results compared to a low-foaming system of a similar composition would have to be expected for a test period of 18 months.[3]

Risk and safety phrases for handling WilkitFoam T:

Observe the general safety regulations when handling chemicals.
When used in spray applications, persons within the spray cloud must wear a full face mask (filter A/ P2).

Component A:
Symbol: Xi (irritating)
R36/38 Irritates human eyes and skin. S24/25 Avoid contact with skin and eyes. S26 In case of contact with the eyes rinse thoroughly with water and consult a doctor. S27/28 After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water. S37/39 Wear suitable protective gloves and goggles or face masks at work.

Component B:
Symbol: Xn (harmful)
R20 Harmful by inhalation. R36/37/38 Irritating to eyes, respiratory system and skin. R40 Limited evidence of a carcinogenic effect. R42/43 May cause sensitization by inhalation and skin contact. R48/20 Harmful: Danger of serious damage to health by prolonged exposure through inhalation.
S9 Keep container in a well-ventilated place. S23 Do not breathe fumes/aerosol. S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S36/37 Wear suitable protective clothing and gloves. S45 In case of accident or if you feel unwell, seek medical advice immediately (show label where possible). S60 This material and its container must be disposed of as hazardous waste.
Z1 Contains isocyanates: See information supplied by the manufacturer.

Packing:

All forms of packing are approved to the danger goods regulation road (German GGVS). The quantities of the individual components correspond to the mixing ratio (1 : 1 by volume).

Component A:
25.0 kg in a tin can
32 kg in a PE pail
250 kg in a drum
1325 kg in a cubitainer

Component B:
23.5 kg in a tin can
30 kg in a PE pail
230 kg in a drum
1225 kg in a cubitainer

Other packing units on request.

Storage, shelf life:

At least six months from date of delivery or twelve months from date of production when stored in a dry place between 10 °C and 30 °C. Frost may damage the A-component (flocculation; consult Minova CarboTech GmbH).
When this time is exceeded, we recommend having the material checked by Minova CarboTech GmbH for compliance with specification.
The local legislation on storage has to be observed.

Disposal:

Follow local regulations.
We recommend either to dispose of liquid residues in an incineration plant (EU disposal code 06 02 05 resp. 08 05 01) or to cure the liquids and dispose of the cured foam in a domestic waste landfill or an incineration plant (EU disposal code 20 01 39).
Empty cans should be cleared of liquid by punching a hole through the edge of the cover and turn them upside down, until no liquid flows out any longer.

Expertise and Test Reports:

1 Test report groundwater hygiene (Labo Consult Milano, 2002)
2 Test report on groundwater and drinking water compatibility DIBt data sheet (Hygiene-Institut, Gelsenkirchen, 2003)
3 Durability test of WilkitFoam T P 070301 (LPI Ingenieurgesellschaft mbH, 2008)
4 Report triaxial tests according to DIN 18 137 Part 2 (Erdbaulaboratorium Essen, 2006)
5 Test certificate gravel 8-16 solidified with WilkitFoam T (DMT Essen, 2010)

The data in this sheet conform to our best knowledge and experience at the date of printing, which is indicated below. The state of knowledge and experience are evolving constantly. Please pay attention therefore, that you always refer to the current version of this data sheet.

The description of the product application in this sheet cannot take the special conditions and circumstances into account emerging from the individual case. Please check our product therefore in any case prior to use for its aptitude in the actual application. Application, use and processing of our product occur outside of our control capabilities. That is why they as well as the processing result achieved based on our information are exclusively subject to your own responsibility.

No data in this sheet constitute a guarantee in a legal sense. It is clarified that our liability is limited to the contractual acknowledgements for the purchase of this product.

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