

TECHNICAL CARD

PRODUCT DESIGNATION :

KALCIFIL S

KALCIFIL S 5 - cutting length	5 mm
KALCIFIL S 12 - cutting length	12 mm
KALCIFIL S 22 - cutting length	22 mm
KALCIFIL S 38 - cutting length	38 mm

Designation for concretes with the enhanced fire security is

- KALCIFIL S 22/PO -

CHARACTERISTICS AND PROPERTIES :

KALCIFIL S is product commercial name which is produced under the VÚCHV trade mark and it is designed for application in fibre-cementing composites.

KALCIFIL S is a synthetic fibre produced from isotactic stereospecific polymer – polypropylene with the medium molecular weights. It is produced by melt spinning on the fibres with the circular shape of the cross-cut with the defined diameter in the range **18 - 55 micrometres**. The fibre average in the combination with the cutting length is determining for the fibres number in their one kilogram which is **significant parametre of composites, number of particles – fibrils in cementing matrix**. KALCIFIL S has low specific weight 910 – 950 kg/m³. It is resulted from that low specific weight that these fibres have **the highest specific surface** at the comparable thickness compared to other polymer fibres. One kilogram of KALCIFIL S in 1m³ of cementing composite represents **30 – 420 million fibrils with the surface up to 350 m²**, which is extremely significant for all surface phenomena running during the preparation and the period of fibre lifetime – cementing composites.

KALCIFIL S is produced in the special devices which secure defined physically-mechanic properties and parameters of fibres, especially of **Yang module**. In the process of production, **KALCIFIL S** is submitted by the process which result is **specific (hydrophilic) modification of the fibres surface**. Quality of this surface modification is monitored and controlled by sophisticated methods in accredited testing laboratories.

KALCIFIL S as polypropylene has the melt temperature in the range 165 – 169 °C and it also has the decomposition temperature relatively low, already from 300 °C. **These thermic properties are advantage for cementing composites determined for constructions and parts with enhanced fire resistance** because in the fire, fibres are melt down very fast and burn down, whereby the sluiceways are formed which release forming steam pressure from the evaporated water contained in cementing matrix. Glassing temperature which underlies temperature range of the use, is the lowest from the other polymer fibres at polypropylene, which shows yet the certain value of elasticity at low temperatures too. This fact explains composites impulse tenacity with built-in fibres fibrils in cementing matrix also at low temperatures and predestinates their use also in the demanding (cold) climatic conditions.

KALCIFIL S is produced according to the use purpose **also with additives** such as oxide of titanium - TiO₂, micronized calcite - CaCO₃ or coloured pigments in concentration corresponding to the use purpose.

In the production of KALCIFIL S, many VÚCHV a.s., Svit inventions and patents are applied.

KALCIFIL S does not absorb water from the aqueous environment and also does not

dampen at the increased air humidity. It has got unique, for polypropylene characteristic properties which result is the ability of water molecules migration on the fibrils curved surface. By its chemical gist KALCIFIL S is extremely stabile, resistant against all known acids, organic solvents and it keeps all its mechanical properties in 100% also in alkaline environment namely at increased temperatures. By this fact it is unique among fibres with regard to environment of cementing matrix and heat of hydration forming at the process of concrete setting.

KALCIFIL S is characterized by high resistance against fungi and microbes.

KALCIFIL S is a special polypropylene fibre with the unique combination of properties and parameters which predestinate it for the use to cementing composites for many applications.

APPLICATION :

KALCIFIL S is developed in VÚCHV a.s., Svit, for cementing composites, it is added to concretes of mason mixtures in the amount of 0,6 -2,0 kg/m³ of composite mass, according to forward required technical effect. Mixing time is 1 minute to 1 m³ in general. Mixture stability is to 150 minutes.

Fibre cutting length is chosen with regard to application and used fraction of gravel aggregate and sand, it is at least 1.5 multiple of average, at coarse aggregate it is 1,2 multiple of fraction average gradation. KALCIFIL S fibrils increase cohesion of cementing mixture so we can get the impression of more compact, solid mixture. In most cases in the correct choice of fibre parameters after verification of mixture workableness it is not necessary to add water. If higher slip and mixture in-leak are necessary, it is recommended to prefer the additive of superb plasticizer or additive for water reduction.

By the addition of KALCIFIL S, it does not rise necessity of changes of controlled gaps or connection dimensions of concrete slabs opposite to exerted methods. Addition of KALCIFIL S does not substitute metallic reinforcement. Despite the fact that KALCIFIL mildly increases some concretes strength characteristics, it is not recommended to lower the thickness of design elements against values from calculations. The addition does not substitute used specific additives to concretes. The producer will provide other available information and experience for the proper use of these fibres to every user, in case of interest and according to needs.

TECHNICAL EFFECT OF KALCIFIL S IN CEMENTING COMPOSITES :

1. **Improvement** of cement hydratation regularity, which is documented by mild increase of tensile strength and tensile bending strength.
2. **Decrease** of plastic retraction during composite setting by more than 1%.
3. **Elimination** of formation and dissemination of microfissures – on the level of 95%, which are formed at the plastic concrete retraction in the stage of maturing. It does not prevent formation of macrofissures, which are formed as a result of structural changes in concrete or external forces in excess of constructional dimensions of concrete element.
4. **Principal increase** of impact strength – by about 250%, and together with that improved resistance against kinematical loading including vibrations and seismic loading.
5. **Frost resistance**, then resistance against cyclic temperature variation in the area of 0°C (cca ± 5 °C)
6. **Resistance increase** against humidity and air temperature variation at the concrete setting and ageing.

7. **Smoother surface** with increased resistance against abrasion, decreased dustiness, easier maintenance and connected with it, conjugate prolonged lifetime of concrete surfaces, total decrease of expenses.
8. **Higher resistance** against sea water effect and aggressive water environment.
9. **Higher resistance** against knocks during manipulation and transport of prefabricated elements, increased residual strength.
10. **Concrete resistance** increase against high temperatures forming in the fire, prevention against explosive destruction and tunnel constructions collapse risk decrease.
11. **Improvement of concrete** properties for the application process of their spraying.
12. **Make production** processes of firebricks and fire-brick lining in the metallurgical sector more effective.
13. **Improved adhesion** in the repairing damaged concrete surfaces, increase of repairs lifetime.

***KALCIFIL S* recommended for different applications, where individual abovementioned effects or their combination are used :**

- air- landing areas at the airports (increased impact strength)
- roads (elimination of microfissures)
- bridge and other road constructions (increased impact strength and frost resistance)
- tunnel segments (increased fire safety)
- surface of roads in tunnels (improved abrasion resistance, decreased dustiness)
- wiring in tunnels (fire safety)
- draining tubes and concrete pipes of all dimensions (protection against damage during manipulation, increased impact strength and residual strength)
- prefabricated construction elements (improved surface quality, protection against damage during manipulation)
- architectural face components and thin-walled garden architecture (improved properties of thin-walled boards and elimination of damage during manipulation)
- sprayed concrete (process effectiveness)
- floors, garages, parking places, (improved surface quality, decreased abrasion, lower dustiness, better maintenance)
- heat-resisting materials (increased effectiveness in the production of iron, steel, process quality)
- production of foamed building materials (increased effectiveness in the production, manipulability)
- repair and reconstruction of old and damaged concrete constructions (improved adhesion, lower plastic retraction, better frost resistance of mend)
- cannals building, swimming pools, water shafts (longer lifetime)
- landfills (elimination of seepage, longer lifetime)
- coating(rendering) and dry mason mixture (better frost resistance)

PACKAGING, MARKING, SUPPLIES, STORAGE :

Packaging, marking, the way of supply and storage follow the norm STN 80 1490.

KALCIFIL S is supplied packed in a following way:

- in polyethylene foil packaging – bags heavy á 20 kg
- in polyethylene foil packaging – bags heavy á 0.125 kg, 0.600 kg, 1.0 kg, resp. as heavy as the customer will order.
- in paper in water diswashable bags, with the weight of á 0.125 kg, 0.600 kg, 1.0 kg, resp. as heavy as the customer will order.
- In high capacity packing, e.g. big-bags, suitable containers etc.

KALCIFIL S is produced in so called doses. One dose means the amount of fibres of the same type, same average and length, which are produced under the same technological conditions and so they are marked by the same number of the production dose. One dose means such an amount, which is supplied to the customer at once. The supplies can contain more doses.

KALCIFIL S is supplied in net weight in following terms and amounts:

to one ton	during 5 days from the date of receipt order
to five tons	during 10 days from the date of receipt order
to ten tons	during 20 days from the date of receipt order

In case of agreement it is also possible to shorten delivery dates. Storage of Kalcifil S is in closed containers for 3 months.

EACH SUPPLIES IS CHARACTERIZED BY THESE DATA :

- a) Product name
- b) Nominal cutting length
- c) Dose serial number
- d) Dose net weight
- e) The package number

KALCIFIL S is supplied in covered forms of transport protected against atmospheric exposure.

KALCIFIL S is stored in the room protected against atmospheric exposure. It also must be protected against mechanical damage of foil respectively paper packing.

CERTIFICATION :

Technical and Test Building Institution, n.o., Bratislava issued **Certificate of Accordance** called **ES – CERTIFIKÁT ZHODY 1301 – CPD – 0337** for **polymer fibres to concrete**

KALCIFIL S category I.

There are pre-negotiated tests for the setting the category of fire security BB2, for the use of fibres to concretes of secondary lining in tunnels.

In testing laboratories in Vahostav Prefa-Sk, in Stachema and in Betón Ráció there were performed flow-through tests with the fibre KALCIFIL S, which confirmed the suitability of its use into fibreconcretes with the following results and mainly the increase of:

- Compressive strength by 6 – 15 %
- Tensile bending strength by 6 – 13 %
- Impact strength by 200 – 250 %
- Distributed fibres eliminate the formation of surface cracks during setting and hardening of concrete composite.

PRICE : according to the agreement, according to required properties and amount.

PRODUCER :

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