

closure of u36c21v1 Polylack F K lezárás.doc WORK ORDER	Title: Gépészeti és kábelátvezetések kitöltése Polylack F, K, KR, KG hőre duzzadó tűzvédő anyagokkal
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1.0. Particular dangers in addition to the general safety instruction

During work the workers carrying out the work shall wear tight-fitting closed working clothes, high electrician boots with a micro sole with a thickness of at least 1cm and plastic protection helmet.

The leather uppers of the boots must be usually treated with water-repellent (silicon) cream in order to prevent leaching. In case the boots get soaked due to an abnormal effect, they must be changed to another pair of dry boots. Work in soaked boots is PROHIBITED. In case of the failure or damage of any element of the protective equipment, work shall be immediately stopped, and must be started again only after the failure has been corrected. The electrical lightning devices necessary for work and their insulation shall be frequently checked in terms of quality. Work shall only be started and carried out with machines and tools of sound condition. Using Polylack F, K, KR, KG intumescent fire-protection materials work shall only be started in places where no elements that may cause injury on the walking surfaces and at body height can be found, e.g. wire ends protruding from reinforced concrete, metal waste, residual wires, nails, etc.

The surface of the cables may only be cleaned with the tools and in the manners defined in the technical standard.

In places where risk of injury or suspected risk of injury may exist on the electric cables, work using Polylack F, K, KR, KG intumescent fire-protection materials is PROHIBITED.

Work at height:

During performing fire protection insulation works in order to access high work areas (above 2m) aids and auxiliary devices shall be used.

Tools that may be used to access work area:

- ladder
- rolling scaffold
- self-propelled scissor lifts and lift basket

Requirements relating to work equipment are defined by the FMM decree No.14/2004. (IV.19.).

Work carried out from a ladder:

– Only stable, properly maintained and clean ladder shall be used. Ladders shall be used for their intended purpose.

– The ladders shall be set up so that they are stable during use and remain in a safe standing position.

– The legs of movable (portable) ladders shall be placed on a stable and strong solid base suitable for their size so that the rungs of ladders shall remain in horizontal position.

– Peg-ladders shall be ensured against slipping and excursion.

– Ladders shall be used so that the possibility of grasping and safe standing is always ensured.

In case load shall be taken up the ladder, it may not limit the possibility for grasping.

– Only ladders of sound quality shall be used. Work with damaged ladders is prohibited.

Work carried out from rolling scaffold:

Rolling scaffolds may be used safely if the plane near the area to be scaffolded is horizontal, its surface is even and it has a suitable load capacity. Depending on working height their supports, wall fixations and possible counterweights should be placed.

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Made by: Kasza János	Approved by: Sebestyén Tibor	

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Building of the scaffolding shall be carried out according to the user manual using the supports and weights defined for the given height. Leaning out too far through the barrier is prohibited. A condition of safe work is that workers shall have and use binding strap. No persons may stand on the scaffold while it is in motion.

Work carried out from self-propelled lift:

The lift may only be operated by persons with proper examination. The machine shall only be used according to the operating instructions and only for the purpose given by the instructions.

Leaning through the barrier too far is prohibited. A requirement of safe work is that workers shall have a binding strap which must be used.

The following must be kept at the workplace in an easily accessible place:

- 1 first-aid kit
- 1 bucket of clean water (quick washing of substances contacting eyes with water)
- 5 clean hand towels

In addition to the above requirements workers shall also be trained on the observation of the special general and local requirements and regulatory provisions relating to the particular workplace.

2.0. Environmental regulations

All activities shall be carried out so that they will have as little impact on the environment as possible to reduce burden on the environment and its use, not causing environmental pollution. The prevention of waste production, reduction of the amount of waste produced, recovery of waste and its disposal in an environmentally friendly manner shall be provided.

Collecting all empty packaging and storage containers they shall be transported back to the premise for reuse. After collection foil covers and tools used and dirtied during work shall be transported back to the premise and stored there. For transportation and placement the driver shall be held responsible.

3.0. The definition of necessary tools

3.1. Simple masonry and painting tools, e.g.:

- trowel
- spackling tool
- brush 2"-4"
- radiator brush
- tube-squeezer pistol

4.0. Materials used

Polylack F

Polylack K, KR

Polylack KG

Pre-treated rockwool sheet – painted with 0.9 kg/m² of Polylack F on one or both sides

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Technical specifications:

Technical characteristic	Polylack F	Polylack K, KR	Polylack KG
Condition	spreadable, scatterable liquid, odorless	smoothing patch, paste-like, odorless	smoothing patch, paste-like, odorless
Color	white	white	light grey
Density	1.33 +/- 0,2, kg/dm ³	-	-
Viscosity	approx. 10 000 MPa/s	approx. 60 000 MPa/s	approx. 55 000 MPa/s
Solid content	approx. 70 %	approx. 78 %	approx. 74 %
Flash point	not readily flammable	not readily flammable	not readily flammable
Number of layers	2	-	-
Amount used	approx. 2-4 kg / m ²	approx. 3-5 kg / m ²	approx. 3-5 kg / m ²
Drying	at 23 ⁰ C on mineral wool in case 1,5 kg / m ² applied power dry 3 hours, touchable after 12-24 hours		
Intumescence	approx. 1: 35	approx. 1 : 10	approx. 1 : 10
Final drying time	approx. 24 hours/1 mm	approx. 24 hours/1 mm	approx. 24 hours/1 mm
Dilution	water (usually not necessary)		
Resistance to chemicals	resistant against running water and coating solutions		

Rockwool sheet

- Material: basalt based mineral wool,
- Bulk density: min. 125 - 140 kg/m³
- Thickness: 50 - 60

5.0. Technical process:**5.1.Requirements for the fire resistant insulation of cable conduits:**

- cables may be placed in up to three rows together with a width of not more than 500 mm on holders or cable trays
- the size of the opening of the floor and wall shall take no more than 50% of the opening of the cables and shall provide an at least 20mm gap between the wall of the opening and the cable or cable tray even in case of asymmetric position.
- Based on the inspection results the walls shall meet the following requirements
 - min. 100 mm plasterboard wall in case of wall conduits,
 - min. 150 mm Ytong or reinforced concrete in case of floor conduits

5.1.1. Installation of EI90 – 120-minute fire protection insulation

Clean the cables from greasy and oily impurities with a rag free of dust using solvent (e.g. OLVIKOR), then apply Polylack F paint on the surface within the conduit in a thickness of 0.5 mm

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at 150 mm extending beyond its both sides and including the cable tray as well if the cables are in the cable tray.

The boundaries of the wall and the opening must also be cleaned from the accumulated dirt and other impurities. If the boundaries of the opening are smooth and straight, it must be coated with Polylack F paint in a thickness of 0.5 mm. If the application of Polylack F cannot be executed properly on the boundaries of the opening, do not paint it in this case, but following the filling of the conduit cut the corner at the edge where the wall and rockwool sheet meet in a depth of 5-10 mm in 45 ° angle and fill it with Polylack K or KR putty. In the gap between the wall and the cables 2 layers of rockwool sheet board in the size of at least 50 mm pre-treated as per 4.0 shall be inserted so that it will be tightly pressed to the boundaries, leaving at least a 15-20 mm gap between the rockwool sheet and the cables at the same time. If the size of gap of the conduit is so big that the rockwool boards cannot be squeezed in, approx. 30x30 mm angle elements must be incorporated in the opening, by which rockwool boards may be fixed. Due to aesthetic reasons rockwool boards are usually built in wall-faces with their pre-treated side outwards. Gaps between the wall and the rockwool sheet, the cables and the rockwool sheet or the cables must be filled with Polylack K and Polylack KR fire protection putty on both sides in the depth of 25 mm, and must be smoothed if possible.

5.1.2. Application of EI60-minute fire protection insulation

The entire construction of the fire protection insulation is carried out according to 5.1.1, except that in this double-insulation system rockwool sheets pre-treated on both sides are placed in the conduit in a single layer.

Construction of EI60 minute – 60 mm thick

5.1.3. Fire protection of live cables:

In case of so called earth cables, where metal bandaging can be found under the external insulation coating and bandaging is earthed on both ends of the cables, and the insulation of cables have been checked using 18 V direct current, fire sectioning can be performed on these cables even under the AC load of up to 10 KV.

To clean any impurities sticking to the surface of cables use only dry rags, bristle or fiber network brush, or, in extreme cases soft-wood scraping tool.

The use of any metal tools, emery cloth and grinding-wheels for cable cleaning is PROHIBITED.

Leaning or placing any objects, e.g. ladder, plank, etc. to the cables that may cause injuries is PROHIBITED.

In any point of the live cables, rarely but in any moment, a so called cable explosion may take place, therefore climbing or bending deeply in between cables is PROHIBITED.

5.2. Requirements of the fire protection insulation of mechanical metal tubes:

- metal tubes, if possible, shall be placed orderly in one or more lines; there should be at least 50 mm distance in one line and 100 mm between the lines.

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- the size of the opening of the floor or wall shall be at least so big that the tubes in the opening take an area of not more than 50%, and in case of asymmetric position there shall be at least 20 mm gap to be insulated between the wall of the opening and the tube.
- During our tests the diameter of the smallest tube was 25 mm, the biggest 200 mm.
- Based on the test results the walls shall meet the following requirements:
 - min. 100 mm plasterboard wall for wall conduits
 - min. 150 mm Ytong or reinforced floor for floor conduits

5.2.1. Construction of fire protection insulation.

The construction of fire protection insulation shall be carried out according to 5.1.1. In case of pipes provided with insulation the following shall be observed:

- no Polylack F coating is necessary on the surface of insulated pipes;
- in case of insulation materials of delayed combustion with a thickness of not more than 20 mm the construction of the fire protection insulation differs from 5.1.1 in that the combined solution must be applied, around the pipe insulation Polylack KG must be used instead of Polylack K or KR.

– in case of insulation materials of delayed combustion with a thickness of more than 20 mm or combustible insulation materials in any thickness, the construction of the fire protection insulation shall be carried out in a way that is a little different from 5.1.1, in a combined manner; PS-25 fire protection tape shall be incorporated in the rockwool sheet around the insulation.

5.3. Requirements for the fire protection insulation of air pipes:

- air pipes must be placed at least 50 mm from each other and the wall,
- the opening on the floor or wall: air pipes may take up to 75-80% of the opening,
- Based on the test results, the walls must meet the following requirements:
 - min. 100 mm plasterboard wall for wall conduits,
 - min. 150 mm Ytong or reinforced floor for floor conduits

5.3.1. Construction of fire protection insulation.

The construction of fire protection insulation shall be carried out according to 5.1.1, except that in this case the ventilation pipes and pre-treated rockwool sheets between the cables, and between the wall and the cables do not have to be painted with Polylack F, therefore only the minimum number of gaps created must be filled with Polylack K or KR fire protection putty.

5.4. Requirements for the fire protection insulation of building gaps:

- it shall be applied between non-moving walls, floors or between the wall and the floor,
- general size of gaps: 20 – 100 mm,
 - Based on the test results walls shall meet the following requirements:
 - min. 125 mm of Ytong or reinforced concrete wall for wall conduits,
 - min. 150 mm Ytong or reinforced concrete floor for floor conduits

5.4.1. Construction of fire protection insulation.

The construction of fire protection insulation shall be carried out according to 5.1.1, except that in this case we do not have to walk around the cables and pipes but the gap is filled in a ribbon-like manner.

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5.5. The amount of materials used for the construction of fire protection insulation

Type of fire protection insulation	Rockwool pre-treated on one side EI90-120' (m ² /1m ²)	Rockwool pre-treated on both sides EI60; (m ² /1m ²)	Polylack F (kg/1m ²)	Polylack K, KR (kg/1m ²)	Polylack KG (kg/1m ²)
Cable conduit	1,6 – 1,8	0,8 – 0,9	3 – 4	5 - 6	
Metal tube conduit	1,6 – 1,8	0,8 – 0,9	3 - 4	5 – 6	
Metal tube with combustible insulation	1,6 – 1,8	0,8 – 0,9	1 - 2		5 – 6
Plastic tube Ø≤50 mm	1,6 – 1,8	0,8 – 0,9	1 - 2		5 – 6
Ventilation cable	0,7 – 1,6	0,4 – 0,8	1 - 2	1 - 2	
Building gap	2	1	1 - 2	1 - 2	

5.6. Storage, presentation

It shall be stored on cool and dry place and must be protected from frost and heat. It can be stored for 12 months from filling. open vessel must be used as soon as possible.

Commercial presentation:

Polylack K, KR,	310 ml tube, 600 ml hose, 12,5 kg plastic bucket
Polylack F	12,5 kg plastic bucket
Rockwool pre-treated on one side	1000x600x50 mm board size 1000x600x60 mm board size
Rockwool pre-treated on both sides	1000x600x60 mm board size

6.0. Fields of application of fire protection insulations with Polylack KG:

Polylack KG fire protection putty contains a fire blocking additive, which causes the putty to swell moderately and forms a permanent hard foam layer that withstands also persistent heat. Due to its special features we have developed it for the insulation of cable conduits placed in special plastic tubes, metal tubes of combustible insulation and the fire protection insulation of low-diameter plastic tubes, which could not be solved safely so far with the use of traditional materials.

Another great advantage of Polylack KG is that it can be combined with the insulations with Polylack F, K, KR described under sections 5.

Fields of application:

- for fire protection closure of cables conducted through a plastic intubation tube;

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- for fire protection closure of engineering metal pipelines of combustible insulation;
- for fire protection closure of plastic tubes of combustible materials – up to a diameter of 50 mm

6.1. Requirements for fire protection closure:

- special engineering wires at least 2 d (d= the diameter of the given tube), it shall be placed in an opening, min. wall or floor thickness is 125 mm.
- if more cables or engineering wires are used, they shall be conducted in an orderly way in up to 3 lines and shall be separable at least 5 cm from each other.
- the size of opening on the wall or floor must be made so that min. d/2 or 2 cm gap can be left between the cables and tubes and the wall with the opening.

6.2. Construction of fire protection closure

6.2.1. Fire protection insulation of single intubation tubes, insulated metal tubes or other tubes of combustible material in a circular opening;

- in case of brick, concrete wall or floors the inner surface of the opening shall be cleaned from dust and other impurities;
- in case of plasterboard wall, due to the soft insulation between the two plasterboards a mantle identical to the circumference of the opening shall be folded from galvanized plate with a thickness of 0,5 mm, and then it shall be inserted;
- The surface of the plastic tube containing the cable, the insulation covering the engineering metal tube and the engineering tube of combustible material shall be cleaned with a rag free of dust from greasy and oily impurities using solvent (e.g. OLVIKOR).
- the free opening shall be filled with Polylack KG, in a depth of 25-25 mm from wall planes and around the tube up to the diameter of min. 2 D;
- filling may be carried out with hand tools, e.g. spackling tool or dispenser.

6.2.2. Fire protection insulation of intubation cables, insulated metal tubes or other tubes of combustible material or their combination in a rectangular opening;

- surface preparation shall be carried out according to 6.2.1;
- the cables or wires are arranged in the minimal distances given under 6.1;
- in case so many free opening are left that they cannot be filled only with Polylack KG putty, since it would not stand so long, combine it with Polylack F, K closure given in work order ‘u36c21v1’ so that a 6cm thick step-proof rockwool is cut and placed into the too large opening onto both planes of the wall treated with Polylack F until the gap suitable for Polylack KG has been made;
- free openings around tubes constructed according to the above shall be filled according to 6.2.1.

6.3. Storage, presentation

Commercial presentation: 310 ml tube,
 600 ml hose,
 12,5 kg plastic bucket

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Must be stored in a cool and dry place. Must be protected against heat and frost. Storage life in original packaging is 12 months. Buckets and hoses must be kept well closed in undamaged condition. The material shall be used from the vessels opened as soon as possible.

7.0. Supervision and inspections

POLYLACK F K

-Conduit thickness: EI90' EI120' – 100 – 120 mm.
EI60' – 60 mm

-Thickness of Polylack F coating on cables, cable trays, metal tubes is 0,5 mm

- Length of Polylack F coating on cables, cable trays, metal tubes from both wall planes is 150 – 150 mm

-Polylack F coating on rockwool 0,9 kg/m²

POLYLACK KG:

- The material thickness of filling in the conduit is:
min. 50 mm

- filling size – min 10 mm or twice the tube diameter

8.0. Inspection, measuring instruments, test equipment and tools used

Measuring tape, caliper.

9.0. Relevant requirements, standards and other documents

Local licenses.