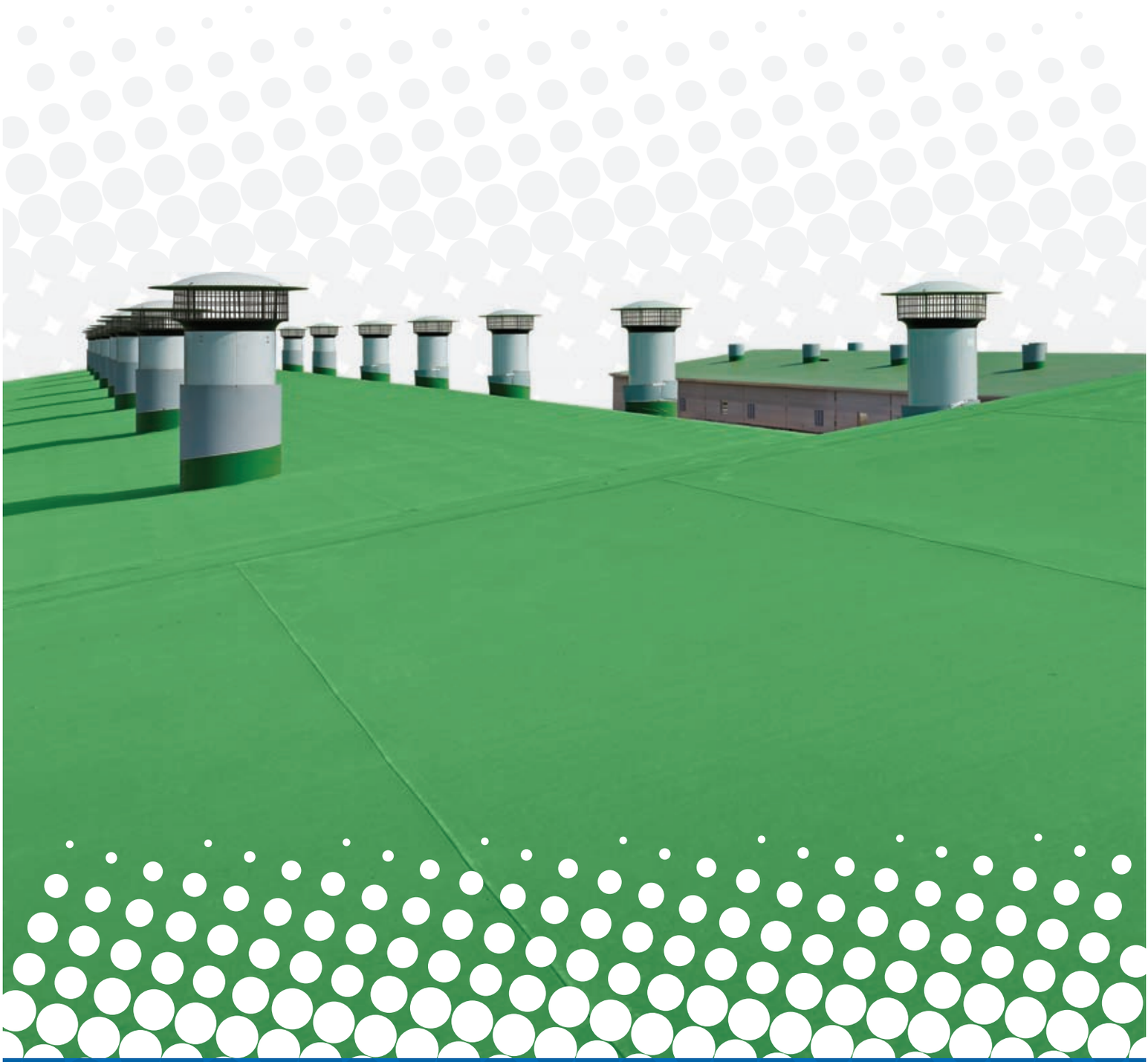
PLASTFOIL®

polymeric waterproofing

Industrial and commercial facility roofs



RELIABLE QUALITY

ARE BITUMINOUS MATERIALS YESTERDAY'S TECHNOLOGIES?

Bituminous materials have been often applied for waterproofing of flat roofs until recently. Many years' experience of their use shows that it is impossible to ensure prolonged operation period without repairs.

This brochure will help you to make correct and deliberate decision regarding material selection in roof waterproofing.

Table 1. Bituminous materials. Disadvantage and results of their use

Disadvantage of bituminous materials	Results of application of bituminous roofing materials
Brittleness at low temperatures	Material cracks
High heating degree at sun light exposure	Material "melts", its thickness decreases
Great water absorption	Material saturated with water fails during frost-thaw cycles
Considerable weight of rolls at small covering area	Number of handling operations and transportation cost is increased
Need for putting several layers in order to ensure required airtightness	Great labor input when working
Prone to rotting and plant growth	Plant roots and microorganisms destroy the material
Application of fire unsafe and explosive equipment (gas containers, burners) for mounting	Probability of fire occurrence during mounting and repair increases
Strongly combustible material (C4)	Fire risks during operation

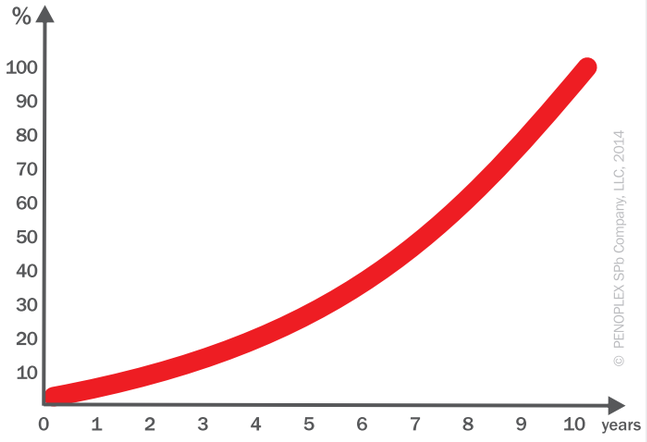


Diagram 1 Bituminous roof leak increase, the data from

- **Actual lifetime of bituminous roofing materials is about 10 years.**
- **75% of bituminous material overall production volume is applied in roof repair in Russia.**
- **Operation of bituminous roofs turns into continuous repair.**
- **Periodic roof repair results in huge losses.**

Imagine how much money you will spend for repair of 1 m2 of roof within 30 years.

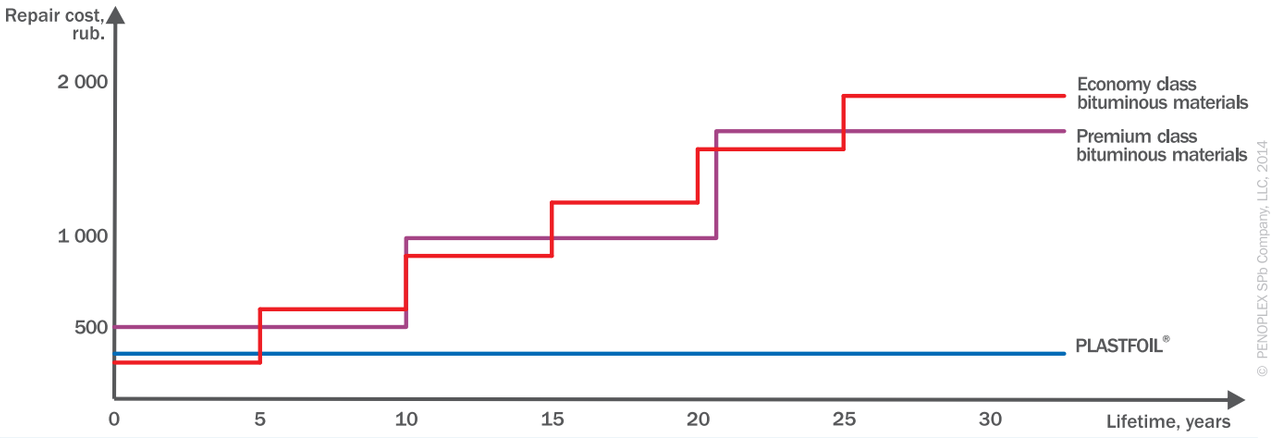


Diagram 2 Cost increase for arranging and maintenance of 1 m2 roof

PLASTFOIL® – GOOD CHOICE

WHY OVERPAY FOR OBSOLETE MATERIALS? WE HAVE A RELIABLE AND GOOD SOLUTION!

Up-to date waterproofing materials shall comply with the following criteria:

- Prolonged operation - over 30 years without repair.
- Mounting without use of open flame source on the roof.
- Very quick mounting.
- Convenient dimensions of rolls for work implementation.
- Possibility to use materials for bituminous covering repair.
- Any coloring of roof.
- Fire classification: Broof T1, T2, T3, T4

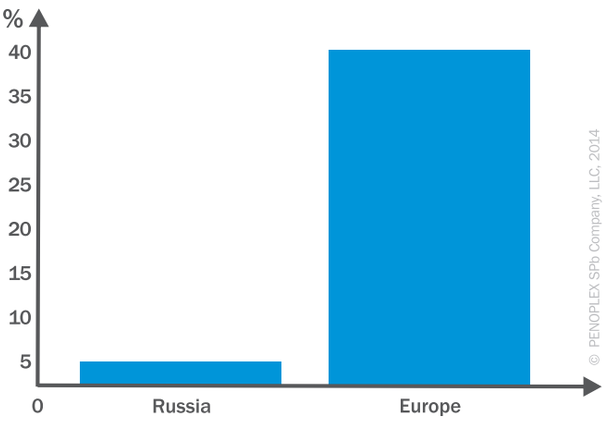


Diagram 3 Part of polymer membranes among waterproofing materials, the data from

Membrane roofs develop headlong in Russia; we repeat the European experience which shows already over 40% of membrane roofs in overall roof area.

Table 2. Comparison of costs for arranging one square meter of roof from bituminous materials and PLASTFOIL® polymer membrane

Item	Basic applied materials	Bituminous, bituminous-polymer materials	R.C. base, PENOPLEX® heat insulating material, PLASTFOIL® membrane	Profiled steel sheet base, mineral wool and PENOPLEX® combined heat insulation, PLASTFOIL® membrane ("PROOF" system)	Profiled steel sheet base, mineral wool eat insulating material, PLASTFOIL® membrane ("OPTIMA" system)
1	Waterproofing material	300* rub. (2 layers)	280 rub.	280 rub.	280 rub.
2	Required layer number	Minimum 2	one	one	one
3	Geotextile	-	13 rub.	13 rub.	-
4	Heat insulation	605 rub. (basalt wool 150 mm)	440 rub. (PENOPLEX® 110 mm)	495 rub. (basalt wool 50 mm, PENOPLEX® 80 mm)	605 rub. (basalt wool 150 mm)
5	Steam barrier	18 rub.	18 rub.	18 rub.	18 rub.
6	Primer	45 rub.	-	-	-
7	Mechanical fasteners for polymer membrane	-	20 rub.	20 rub.	20 rub.
8	Mechanical fasteners for heat insulation	27 rub.	13.5 rub.	13.5 rub.	13.5 rub.
9	Roof mounting work cost (area up to 1 000 m2)	270 rub.	180 rub.	180 rub.	180 rub.
	Total: (cost of one square meter of roof incl. materials and mounting activities)	**1265 rub.**	**964.5 rub.**	**1019.5 rub.**	**1116.5 rub.**

* material with 10 years maximum lifetime.

Conclusions:

- Application of PLASTFOIL® polymeric membrane with PENOPLEX® heat insulating material is THE MOST PROFITABLE solution for your roof!
- Application of PLASTFOIL® polymeric membrane with system "OPTIMA" and "PROOF" system is more advantageous than similar solution with bitumen-polymer material application.
- Operating roofs with PLASTFOIL® materials you are free from repair cost during 30 years.

PLASTFOIL® – ROOFS WITHOUT LEAKS

PLASTFOIL® polymeric membrane qualitatively differs from obsolete bituminous materials by the basic physical and technical properties-and durability, mounting comfort and economic output.

30 years lifetime without repairs

PLASTFOIL® is highly resistant to environmental exposure: wind, UV radiation, low and high temperatures. PLASTFOIL® polymeric waterproofing lifetime is no less than 30 years.*

Safety and incombustibility

Missing open flame when laying PLASTFOIL® materials enables its application at renovation of roofs on chemical, oil and gas and other industrial facilities with increased fire hazard. PLASTFOIL® material is assigned to the minimum combustibility group which is proved by fire tests and appropriate fire certificates; it makes it possible to use the membrane at facilities with increased requirements for fire resistance and fire safety.

Absolute impermeability

Panel joining is carried out by hot air welding. It results in homogenous seam exceeding the membrane itself by strength, so the maximum tightness of covering is ensured.

High bio resistance

Mold, fungi and other harmful microorganisms excrete toxic matters able to destroy practically any material. That is the reason that the PLASTFOIL® composition includes admixtures making the membrane bio resistant.**

Various colors available

PLASTFOIL® polymeric membrane is produced in various colors and tints. Incontestable advantage of the PLASTFOIL® membrane is that you can order a customized batch of material in any color. Using roofing materials of different colors makes the roof more aesthetically beautiful than when using obsolete bituminous materials of black color.

Energy efficiency

Nowadays energy efficiency factor becomes the first subject for great industrial facilities. Top layer of PLASTFOIL® polymeric membrane has light tints. It helps the material reflecting solar radiation and reducing heating, as opposed to bituminous materials of black color.

Everyday quality control

State-of-the-art European process lines of the last generation are installed at “PENOPLEX” Company facility in Kirishi city, Leningrad region. In-house certification laboratory ensures the highest quality control at each stage of production cycle. PLASTFOIL® waterproofing materials pass quality check as per Russian standards GOST and European standards EN.

* as per technical conclusion of CNIIPromzdany, OJSC
** as per conclusion of Municipal Academy named after K.D. Pamfilov

Hotel facilities, Ryazan city

Table 3. Bituminous material and PLASTFOIL® polymer membrane technical parameter comparison

	Parameter	Bituminous, bituminous-polymere materials	PLASTFOIL® waterproofing membrane
1	Working layer weight (average parameter)	8.3 kg/m^2	1.5 kg/m^2
2	Combustibility/flame propagation/inflammability group	C4/FP2/I2	C1/FP1/I2
3	Resistance to ultraviolet	low	high
4	Resistance to mechanical damage	low	high
5	Resistance to temperature change	low	high
6	Seam strength	solid	high-tensile
7	Roll area	8-15 m^2	40 – 52.5 m^2
8	Proneness to rotting	prone	not prone
9	Resistance to root growth	not resistant	resistant
10	Average lifetime	10-15 years**	over 30 years*

* as per technical conclusion of CNII Promzdany, OJSC
** provided that premium class bituminous-polymer material is selected

Table 4. Bituminous material and PLASTFOIL® polymer membrane mounting parameter comparison

Parameter	Bituminous, bituminous-polymer materials	PLASTFOIL® waterproofing membrane
Mounting average speed per shift	200 - 250 m^2	500 -1000 m^2
Required layer number	minimum two	one
Application at facilities with increased fire protection requirements	not recommended	recommended
Using open flame at mounting	yes	no

PLASTFOIL® roofing covering is a high speed of mounting, safety, reliability, impermeability and durability!

Bazhov market, Chelyabinsk city

PLASTFOIL® – RELIABLE AND QUICK MOUNTING

To make a new roof or repair existing one is extremely simple with PLASTFOIL®! Reliable and professional mounting of PLASTFOIL® is another reason to make correct choice.

Mounting a roof with PLASTFOIL® – basic features

- PLASTFOIL® polymeric membrane is to be mounted in ONE LAYER
- PLASTFOIL® polymeric membrane is mounted without the use of open flame
- Mounting of PLASTFOIL® advanced polymer membrane is simple and requires no special skills

WHO WILL MOUNT?

In case you have a team of staff workers, we will TRAIN them!

- Our special will carry out supervised field mounting directly on site: you will be able to obtain all required consultations related to PLASTFOIL® polymeric membrane laying and verify the quality of work.

In case you do not have installation specialists and ability to involve professional contractors

- Will propose you trained (authorized) contractors ready to carry out work on the roofs of any complexity.

Mounting of PLASTFOIL® polymeric membrane will cost you **TIME AND HALF CHEAPER,** then mounting of bituminous materials.

WHEN MOUNTING IS COMPLETED, HOW TO SAVE CERTITUDE IN THE RESULT?

Guaranty

PLASTFOIL® polymeric membrane is covered by the quality guaranty: in case defects of waterproofing are discovered within 10 years, we as the manufacture undertake to provide you with the quantity of material equivalent to the one became unfit for use (with defects) free of charge.

Insurance

Our responsibility for PLASTFOIL® material is insured to the amount of 55 million ruble.

Service

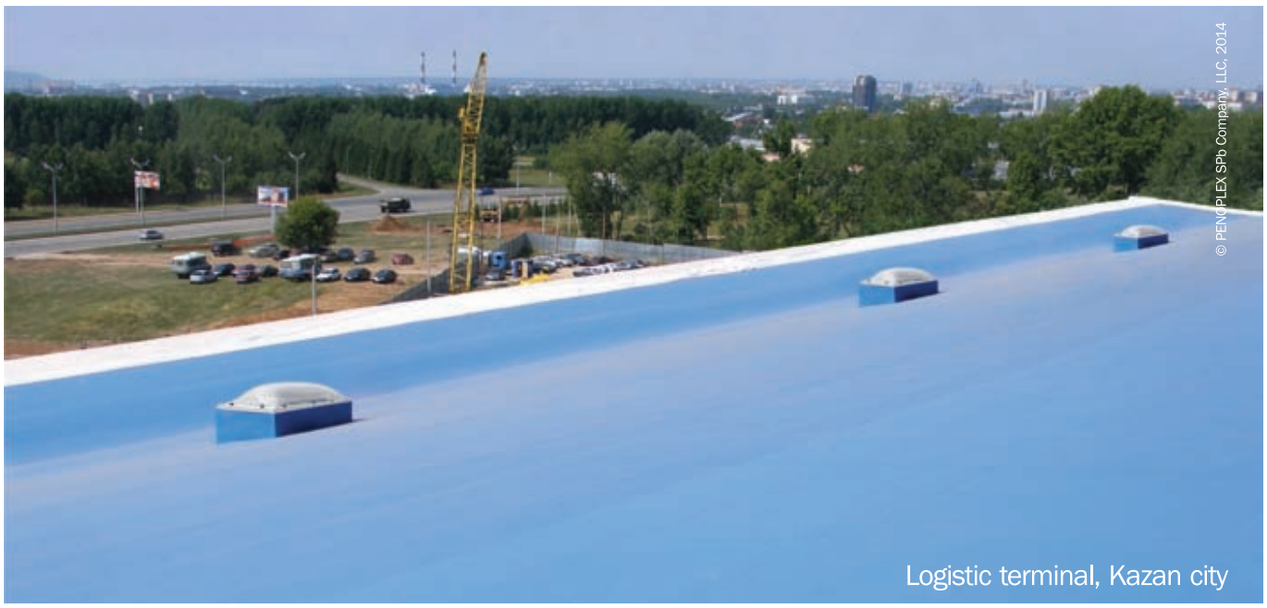
PLASTFOIL® material after laying requires no special service, it is suitable for repair even following many years of operation in case mechanical damage occurs.

PLASTFOIL® – HIGH SPEED OF MOUNTNG

- PLASTFOIL® - to be mounted in one layer.
- PLASTFOIL® - great area of roll – up to 52.5 m^2.
- PLASTFOIL® - no need to clamp along the entire area. Fixing along the perimeter of roll is enough.
- PLASTFOIL® - mounting in a wide temperature range: between -30° C and +60° C.
- PLASTFOIL® - mounting is possible immediately following the completion of precipitation, no need to dry the entire roll surface, drying of the section in welding area is sufficient.
- PLASTFOIL® - mounting on the roofs of complex architectural forms, all kinds of joining.

Team of 3 persons can mount over 1000 m^2 of roofing cover by one shift.

PLASTFOIL® – PROJECTS ALL OVER THE COUNTRY



Logistic terminal, Kazan city

Russian Ministry of Defense facility, Novosibirsk city

Hyundai facility, Saint Petersburg

PLASTFOIL® – PROFESSIONAL CHOICE

PLASTFOIL® polymer membranes are applicable for all types of flat roofs both for assembling new ones and for repairing old roofing covers of industrial buildings. Depending on the type of base and roof renovation method typical solutions developed and applied in practice exist.

NEW CONSTRUCTION

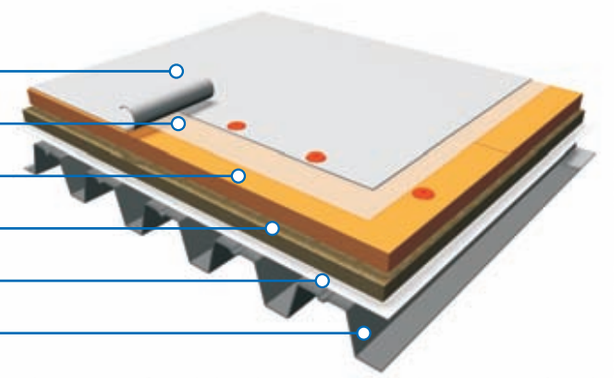
Application of PLASTFOIL® polymeric membranes in a new construction is possible for any roof type.

1. Base – profiled steel sheet.

"PROOF" system. PENOLPEX® extruded foam polystyrene is applied as heat insulating material. It rests on a mineral wool slab layer.

"PROOF" system is developed by PENOLPEX SPb, LLC and approved by the Saint Petersburg branch office of the Russian Emergency Situations Ministry FGU VNIIPO *

1. PLASTFOIL® polymeric membrane
2. Separating layer - geotextile or glass-fiber mat
3. PENOPLEX® extruded foam polystyrene
4. Mineral wool slab 75-110 kg/m cubic
5. Steam barrier
6. Profiled steel sheet



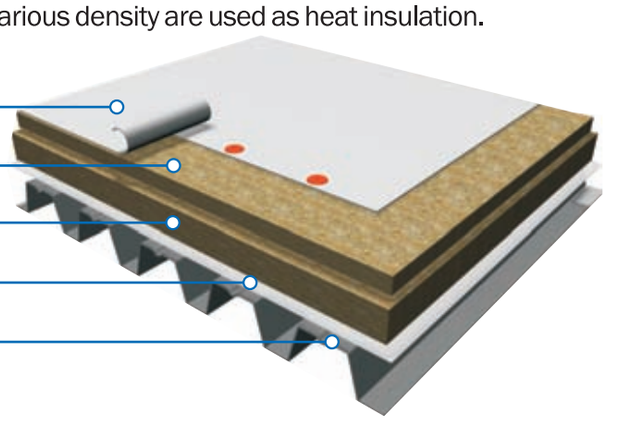
Application of "PROOF" system has a row of benefits: reduces roof weight; increases resistance to load taking; extends roof lifetime; reduces roof price and increase repairability.

*meets the requirements of "Technical Regulation on Fire Safety Requirements 123-FZ dated July 22, 2008."
"PROOF" system is applicable as a covering for any buildings, except for the 1st fire resistance degree buildings.

2. Base – profiled steel sheet.

"OPTIMA" system. Two layers of mineral wool slab with various density are used as heat insulation.

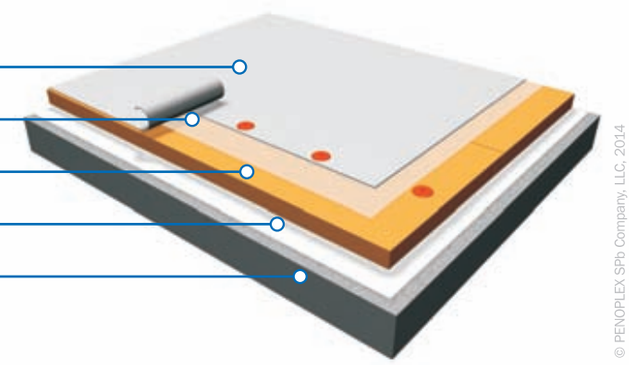
1. PLASTFOIL® polymeric membrane
2. Mineral wool slab 160-190 kg/m cubic
3. Mineral wool slab 90-110 kg/m cubic
4. Steam barrier
5. Profiled steel sheet



3. Base – reinforced concrete slab.

Classic system with PENOLPEX® heat insulating material

1. PLASTFOIL® polymeric membrane
2. Separating layer - geotextile or glass-fiber mat
3. PENOPLEX® extruded foam polystyrene
4. Steam barrier
5. Reinforced concrete slab



PLASTFOIL® – PROFESSIONAL CHOICE

Obsolete bituminous materials with low operation parameters are rather frequently applied for roof waterproofing in Russia. Bituminous waterproofing cover loses elasticity very quickly and covers with cracks which results in leaks, roof structure wear and leads to a need for repair activities.

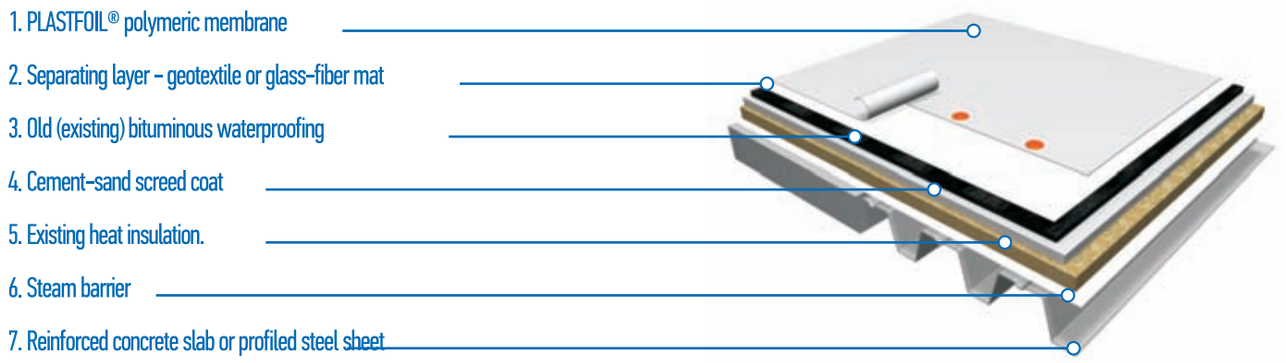
Naturally, when using bituminous materials up to 20 % of roofs have leaks in 1-2 years, up to 60 % have leaks in 5 years and practically all roofs with bituminous material cover have leaks in 7 years. Over 60 % of overall bitumen production volume for the soft roofs is consumed for repairs annually. Polymer admixtures increased the price of bituminous-polymer materials but have not radically altered reliability and durability of roof systems.

RENOVATION

PLASTFOIL® polymeric waterproofing membranes are widely used at renovations and repairs of soft roofs with various purpose and area.

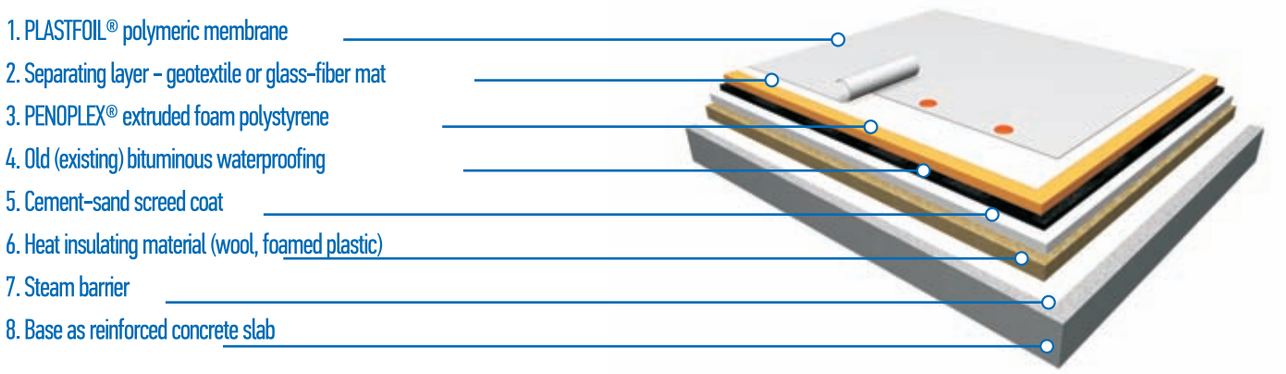
1. The roof requires no change of heat insulation material.

Solution: to lay PLASTFOIL® polymeric membrane atop separating layer without removing the old covering.



2. If there are numerous leaks and heat insulation became unfit for use.

Solution: to mount the classic system atop the old waterproofing with PENOPLEX® additional heat insulation.



Process description:

Separating layer of geotextile (300 g/m^2 weight distribution) is to be installed atop the old waterproofing mat.

Only function of the separating layer between the old bituminous waterproofing (or waterproofing layer on polystyrene base) and membrane is minimizing physical contact of polymer waterproofing and oil-containing base. It is stipulated by the fact that at direct contact of materials above polymer membrane quality parameter loss process commences go faster. Of course this process is prolonged, but we still recommend taking this feature in account.

PLASTFOIL® waterproofing material is installed atop of geotextile. Waterproofing is mounted considering overlapping. Fixation is mechanical in accordance with calculated wind load.

PLASTFOIL® – SAFETY AND TRUST

Safety is a guaranty of trust

- When installing roofs using PLASTFOIL® polymeric membrane you do not need to use open flame, it means no need for locating fire and explosion hazardous containers on the roof.
- PLASTFOIL® polymeric membranes are assigned to the lowest combustibility group among polymer waterproofing membranes which enables their use on the roofs of any area.
- PLASTFOIL® polymeric membranes have all required certificates for material sale both in Russia and European countries.

Certificates and expert judgements

- CERTIFICATE OF CONFORMITY OF FACTORY PRODUCTION CONTROL № 1020-CPR-020029890, 16 July 2016
- CERTIFICATE OF CONFORMITY
- No РОСС RU.АИ064.Н06244 dated August 14, 2012
- CERTIFICATE OF CONFORMITY
- No С-RU.ПБ05.В.02575 dated March 05, 2012
- EXPERT JUDGEMENT
- No 01.05.П.05287.05.14 dated March 29, 2014

PLASTFOIL® – quality guaranteed!

Since 2012 quality of PLASTFOIL® have been insured by the biggest insurance company. Or liability is insures to 55 million rubles! Certificate is effective in the Russian Federation, CIS countries, European countries, USA and Canada.

CERTIFICATE
OF LIABILITY INSURANCE

This certificate is not an insurance contract; it confirms the conclusion of Insurance Contract No. ОК16-160001627, covering third party liability for damages resulting from defects in goods, work or services

Policyholder: Penoplex SPB, LLC

Insurer: OJSC IC Allianz

Insured object:
Property interests of the Policyholder related to the risk of attachment of its liability for damages caused to life, health or property of Beneficiaries due to defects of the following: production and sale of PLASTOFIL roofing and damproofing material, production and sale of the EXTRAROOF roofing and damproofing material

Insured event:
Attachment of the Policyholder's liability in line with RF civil legislation to indemnify for the damages caused to Beneficiaries as a result of:
- Hidden defects and special features of the commodity;
- Defects and special features of materials, equipment, tools, etc., used in manufacturing the commodity;
- Unreliable or insufficient information on the commodity;

Insured activity: in line with conditions of Insurance Contract ОК16-160001627 as of 03.03.2016

Sum insured: RUR 55,000,000.00 (Fifty five million)

Validity period: from March 11, 2016 to March 10, 2017
Claim submission period: insurance contract validity period plus five years after termination of the insurance contract

Covered territory: Russian Federation, Belarus, Kazakhstan, Uzbekistan, Tajikistan, Kyrgyzstan, Armenia, Azerbaijan, Moldova, Turkey, Ukraine , Slovakia , Estonia , Latvia , Lithuania, Romania, Czech Republic, Slovenia, Hungary, Germany, Austria, Poland, Mongolia, Georgia, Switzerland, Finland, Sweden, Bulgaria, Serbia, India, Indonesia, USA, Canada, Spain, Portugal, Malaysia

On behalf of the Insurer

Allianz

Detailed information about PLASTFOIL® polymeric membrane mounting system please refer to::

- technical solution album PLASTFOIL® at official website www.plastfoil.ru
- by technical service telephone +7 (812) 329 54 47
- on-line technical consultant at our official website www.plastfoil.ru
- on-line technical support service for mounting at our official website www.plastfoil.ru

Construction and renovation

More and more customers use PLASTFOIL® polymeric waterproofing membrane in their projects. Some of the are listed below on this page.

Hyundai facility, Saint Petersburg	250 000 sq. m
Izhora facilities, Saint Petersburg	170 000 sq. m
KRASMASH facility, Krasnoyarsk	140 000 sq. m
Omsk tank facility, Omsk	110 000 sq. m
Almaz mall, Chelyabinsk	100 000 sq. m
Comandor tyre facility, Krasnoyarsk	85 000 sq. m
Ural locomotives facility, Verhnyaya Pishma	80 000 sq. m
Subway of Almaty city, Almaty, Republic of Kazakhstan	80 000 sq. m
Zainsk facility, Zainsk, Republic of Tatarstan	68 000 sq. m
Omsk oil processing facility, Omsk	60 000 sq. m
IKEA, Belarus	60 000 sq. m
Exhibition center EXPOFORUM, Saint Petersburg	45 000 sq. m
Liner residential complex, Moscow	42 000 sq. m
Alabuga logistic terminal, Republic of Tatarstan	40 000 sq. m
OSB production facility, Torzhok, Tver region	40 000 sq. m
Automotive equipment maintenance plant of the Russian Ministry of Defence, Novosibirsk	40 000 sq. m
SIBUR-Neftekhim, Dzerzhinsk	36 000 sq. m
“AVISMA” VSMPO, Sverdlovsk region	30 000 sq. m
Ust-Katav carriage works, Chelyabinsk region	30 000 sq. m
Almetievsk pipe plant, Almetievsk	30 000 sq. m
Instrument engineering facility, Perm	30 000 sq. m
Coca Cola facility, Orel	20 000 sq. m
Plant named after Degtyarev, Kovrov, Vladimir region	30 000 sq. m
Uraltransmash production building, Ekaterinburg	28 000 sq. m
Novomoskovsky residential complex, Moscow region	26 000 sq. m
Bugulma mechanical facility (BMF), Bugulma, Republic of Tatarstan	20 000 sq. m
Coca Cola facility, Orel	20 000 sq. m
CONSTRUCTOR mall, Moscow	17 000 sq. m
Selmash Facility, OJSC, Voronezh	17 000 sq. m
FM logistic logistic terminal, Ulyanovsk	15 000 sq. m
Lenta hypermarket, Nizhnekamsk	12 000 sq. m
Lenta hypermarket, Almetievsk	12 000 sq. m
Magnit hypermarket, Samara	12 000 sq. m
Lenta hypermarket, Omsk	11 000 sq. m
Lenta hypermarket, Novosibirsk	11 000 sq. m
Logistik terminal Andreas Schmid, Czech Republic	10 000 sq. m
Teknos technology park, Saint Petersburg	10 000 sq. m
Blagoveshchensk CHPP, Blagoveshchensk	10 000 sq. m

PLASTFOIL®
polymeric waterproofing

Durability

Frost-resistance

Fire safety

Absolute bio-resistance

Environment-friendly

Resistance to UV radiation

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RELIABLE QUALITY