



## SUSTAINABLE SOLUTIONS

## HIGH QUALITY PRODUCTS

**ENFALT A.Ş.**, combines technical innovations and innovative solutions with its know-how and experience of nearly half of century, and offers added value to our country's economy with the projects that it has completed successfully as a contractor.

Meeting its own project needs at the asphalt and emulsion manufacturing plants in many cities across the country, **ENFALT A.Ş.**, also provides supplies to national and international companies and offers consultancy services to the industry.

With a service range from hot bituminous mixture, emulsion & bitumen surface treatment, water based emulsion primer, polymer modified bitumen, hot and cold joints, concrete road and waterproofing applications, **ENFALT A.Ş.**, has adopted the mission of serving the industry at high quality and at international standards.

 [www.enfalt.com.tr](http://www.enfalt.com.tr)



İstanbul Deri Organize Sanayi Bölgesi Finisaj Cad. No.1 Ya-1 Tuzla, İstanbul/Türkiye

 +90 216 591 05 15  +90 216 591 00 75  [enfalt@enfalt.com.tr](mailto:enfalt@enfalt.com.tr)



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enfalt asfalt



In the Road and Insulation Industry  
**since 1977...**



**Enfalt Emülsiyon ve Asfalt Tesisleri A.Ş.** is a member of the innovation leader **Engine Holding**.

With its experience of more than 40 years, Enfalt has led the way in many projects in the road, asphalt and insulation industry, brought innovation to the industry with its aim of sustainable solutions, and introduced numerous products to the industry.

With its stationary and mobile plants spreading to the whole country, Enfalt provides service to many public and private enterprises, particularly the highway administrations and the municipalities.

**HISTORY**

Having started providing the emulsion production service in Ankara in 1993 in the first and only emulsion plant with a capacity of 12 tons/hour in Turkey which was controlled with a constant-type computer system under the partnership of ENGINE A.Ş. and AKZO NOBEL - Scan Road (Sweden), ENFALT A.Ş. gets its experiences from ENGINE Holding dating back to 1977.

With its partnerships and know-how transfers with the leading companies such as AKZO NOBEL, COLAS and BP, ENFALT A.Ş., has brought innovation to the road and insulation industry in our country with its aim of sustainable solutions, introduced numerous products to the industry, and led the way in many projects for more than 40 years. ENFALT A.Ş., continues its production activities today as a full member of ENGINE Holding, and the road and asphalt products in the product range are successfully used on all intra-and inter-city roads, particularly on highways, and the insulation products are used in the construction industry. Thanks to its successful service mindset, ENFALT A.Ş., increases the number of its road and insulation applications every

**OUR FOUNDER KEMAL TATAROĞLU (1929-2017)**

ENGINE HOLDING was founded in 1977 by Kemal Tataroğlu.

When he founded the company at the age of 49 following his service of 27 years in the General Directorate of Highways, Kemal Tataroğlu had one single aim: to provide the road and asphalt industry with better products and services by using the latest technology without compromising the quality or the honesty, and to present the company as an innovative and progressive company inside and outside the country to leave a meaningful legacy to the country that we live in.



For over 40 years, we grow following the principles of our founder Kemal Tataroğlu.

**THE FIRSTS INTRODUCED BY ENFALT TO OUR COUNTRY**

- 1978: The first tunnel insulation application in Turkey, Torul Tunnels - Gümüşhane
- 1985: The first geotextile application in drainage, Trabzon City Crossing
- 1986: The first geotextile applications on asphalt in Turkey, Ankara-Istanbul Highway
- 1990: The first imported asphalt delivery in Turkey, 190,000 tons, General Directorate of Highways
- 1992: The first subway line in Turkey, PE membrane insulation application, Ankaray
- 1992: The largest mining pond insulation in Turkey, 280,000 m2, Eurogold
- 1993: The largest PE membrane foundation insulation application in Turkey, 28,000 m2, Tat Towers
- 1993: The first geogrid reinforced wall application in Turkey, Bahçeşehir-Istanbul
- 1994: The first surface treatment emulsion application in Turkey, Çankırı Highway
- 1994: The first on-site prepared Trinidad Lake Asphalt application in Turkey, 1. Bosporus Bridge and link roads
- 1996: The largest stabilization application with geogrid in Europe, Bodrum Airport
- 2004: Erosion control with geogrid, Izmir Olympic Village
- 2004: The first stream improvement application with geosynthetics in Turkey, Melez Stream
- 2006: Anionic emulsion production
- 2011: Ibef membership
- 2017: The largest surface treatment in single application, K.Maraş
- 2019: Building the first R&D center in the industry



We continue to increase our 40-year production experience with the plants we incorporated within the scope of our domestic and foreign projects.

Asphalt Plant - 240 t/h	Stationary Emulsion Production Plant - 20 t/h
Asphalt Plant - 160 t/h	Mobile Emulsion Production Plant - 12 t/h
Crushing & Screening Plant - 350 t/h	Mobile Emulsion Production Plant - 13 t/h
Crushing & Screening Plant - 250 t/h	Mobile Emulsion Production Plant - 10 t/h
Polymer Modified Bitumen Plant - 20 t/h	Asphalt Joint Filler Plant - 10 t/h
Ready Mixed Concrete Plant - 90 m3/h	Insulation Products Production Plant - 10 t/h



Engine Holding  
 ENFALT Emülsiyon ve Asfalt Tesisleri A.Ş. is a member of the innovation leader Engine Holding

**Nouryon**

Nouryon  
 ENFALT is the solution partner and exclusive representative in Turkey of Nouryon, formerly known as Akzo Nobel Surface Chemistry



Ibef  
 Enfalt is the only Turkish member of the International Bitumen Emulsion Federation (IBEF)

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**ASPHALT EMULSIONS**

Asphalt Emulsions are bituminous binders that are formed by dissolution of the bitumen particles in water with the help of an emulsifier. Asphalt emulsions, which have a wide range of application such as surface treatment, tack coat, primer, etc., do not have a flash point and they are not flammable or explosive. They are both affordable and environmentally friendly. They consume less energy and have less greenhouse gas emissions. Since they are applied at low temperatures, they extend the working season.



**CATIONIC ASPHALT EMULSIONS**

**CRS1 Cationic Asphalt Emulsion / Asphalt Binder and Adhesive Emulsion (ENEM 100)**

ENEM 100 is a multipurpose rapid shearing binder cationic asphalt emulsion manufactured from bitumen of the penetration specified in technical specifications. It is used as bituminous binder, primer and adhesive material for the road superstructures.



**Technical Specifications**

Test Values	TS EN	Unit	Value (*)
Shearing Value	13075-1		< 110
Bitumen Content	1431	%	58-62
Flow time, 2mm, 40 °C	12846-1	sn	≤ 20
Residue on Sieve, 0.5 mm sieve	1429	% m/m	≤ 0,2
Precipitation Tendency	12847	%	≤ 5
Adhesiveness	13614	%	≥ 90
Penetration, 25°C	1426	0,1 mm	≤ 220
Softening Point	1427	°C	≥ 35

\*According to the specifications of rapid curing bitumen emulsion of C60B2-5 grade in accordance with KTŞ (Technical Specifications for Highways) 412-5 (TS EN15808)

**Application**

- It is applied at about 50 to 85 °C.
- It can be applied with asphalt distributor or simpler spraying elements to the surface at a rate of 0.15-0.5 lt/m<sup>2</sup>.

**CRS2 Cationic Asphalt Emulsion / Surface Treatment Emulsion (ENEM 200)**

ENEM 200 is a rapid shearing cationic asphalt emulsion with high bitumen ratio (67 to 70%), used in single or double layer or multi-layer surface treatments and bituminous protective (seal coat) coat applications.

**Technical Specifications**

Test Values	TS EN	Unit	Value (*)
Shearing Value	13075-1		< 110
Bitumen Content	1431	%	67-71
Flow time, 4 mm, 40 °C	12846-1	sn	5-70
Residue on Sieve, 0.5 mm sieve	1429	% m/m	≤ 0,2
Precipitation Tendency	12847	%	≤ 5
Adhesiveness	13614	%	≥ 90
Penetration, 25 °C	1426	0,1 mm	≤ 220
Softening Point	1427	°C	≥ 35

According to the specifications of rapid, curing bitumen emulsion of C69B2-5 grade in accordance with KTŞ (Technical Specifications for Highways) 412-3 (TS EN13808)

**Application**

- The temperature of the emulsion should be 65-90 °C.
- The emulsion of 1.5 kg/m<sup>2</sup> in average is added with distributor to the first layer. Right after, the Type-1 stone chips of 20 kg/m<sup>2</sup> in average are added sparsely in such a way not to cover the tires of the truck and roller. The emulsion of 2.0 kg/m<sup>2</sup> in average is added to the second layer and right after, the Type-3 stone chips of 15 kg/m<sup>2</sup> in average are added in such a way to fill the gaps of the first layer, and the double layer coating is completed.
- An iron-tire roller is used preferably.
- Single pass is sufficient for the cylinder (Forward + Backward). It is essential that the roller follows the chip spreader.
- After the application, allowing the traffic in a controlled manner on the area of application will extend the lifetime of the surface treatment.

**Bitumen-Based Road Primer (ENEM 500)**

ENEM 500 is a bitumen-based, solvent containing, road primer material used in any priming applications required by specifications on plant mix foundation in asphalt concrete applications on a foundation as surface treatment. It is applied on the plant mix foundation layer in surface treatment applications and allows bonding of the lower layer and coated layer.

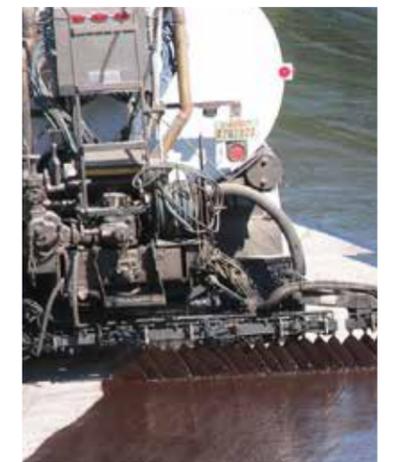
**Technical Specifications**

Characteristics	Unit	Value (*)
Density	g/cm <sup>3</sup>	0,95-1,10
Viscosity (25°C, 4 mm)	Sn.	< 200
Solubility	%	> 99
Flash Point	°C	> 55
Residual Penetration (25°C, 100 g, 5 sn.)	0,1 mm	≤ 220
Residue Softening Point	°C	≥ 39

**Application**

Before any application, the surface of the road should be dry and cleared of any foreign substances.

The field application should be performed with the distributor. The product temperature should not be over 60 °C during application. The application should be made as to limit the consumption to approx. 1 kg/m<sup>2</sup>. After the application, the material should be left to cure and penetrate the surface for at least 24 hours depending on the air temperature.



**Resin-Containing Water Based Emulsion Primer Binder (ENEM PWR)**

ENEM PWR is developed to replace Fm2B2 (MC 39). As described in KTŞ Section 420, it is applied on plant mix foundation layer in surface treatments and allows the lower layer and the coating layer to bind.



**Technical Specifications**

Characteristics	Unit	Experiment Method	KTŞ Specification Value
Appearance	-	-	Light brown
Specific Gravity	(g/cm <sup>3</sup> )	TS EN 15326	0,98 - 1,02
Saybolt Furool Viscosity (50 °C, 2 mm, 60 ml)	sn.	ASTM D 244	<100
Storage Stability (24h)	%	ASTM D 6930	<2
Precipitation after 5-Day Storage	%	ASTM D 6930	<5
Solid Content (Residues)	%	-	-
pH	-	TS EN 12850	5,5 - 8,5
Curing time	Hour	Sense organs	4 - 8
Penetration Test (0,9-1,5 lt/m <sup>2</sup> )	mm	KTŞ Şartname	>10
Impermeability Test (24 Hours)	%	KTŞ Şartname	<50



**Application**

Before any application, the surface of the road should be dry and cleared of any foreign substances. The field application should be performed with the distributor. The product temperature should not be over 60 °C during application. Material of 1.0 - 1.5 kg/m<sup>2</sup> in average should be used. After the application, the material should be left to cure and penetrate the surface for at least 8 hours depending on the air temperature.

**Specifications and Advantages**

The product is solvent-free and therefore environment-friendly, it is not harmful to nature. Once applied, it penetrates the surface and creates a rigid and impermeable layer. It is used by first being diluted with water at various ratios depending on the traffic volume and need. It can be used to solve the dust problem and protect the road surface in roads without asphalt coating.

**Storage**

This product can be stored without degrading at room temperature in circulation or mixing tanks for 3 months. Its stability should be restored by sufficient mixing before use if necessary. It should be heated up to max. 50 °C to prevent evaporation of its water content.

**ASPHALT JOINT FILLERS**

Asphalt joint fillers are the hot or cold-mix repair and joint filler materials which are manufactured to repair the cracks on asphalt coatings, to ensure impermeability on joints of repaired old and new asphalt layers, and to fill asphalt and concrete site joints.

**Hot-mix Asphalt Joint Filler (IZOFALT D)**

**General Specifications**

IZOFALT D is a black, hot-mix, modified bitumen based crack repair and joint filler material which is manufactured and packaged in order to repair the cracks on asphalt coatings and to ensure impermeability on joints of repaired old and new asphalt layers. It is also used to protect the surfaces requiring insulation.

As the Polymer Modified Bitumen is manufactured from thickener, fiber and rubber, it is suitable for cold and hot weather conditions and it does not lose its performance. It is fully compatible with the surfaces it is applied to. It is saltproof and waterproof. It can be applied quickly and it does not create a slippery surface after the application.



**Technical Specifications**

Color	Black
Flow (60°C, 75°C angle, 5 hours)	2 mm
Resilience (25°C, rebound resilience %)	65%
Conical Penetration (25°C, 100 g, 5 sec.)	40
Ductility (25°C, 5 cm/min.)	60
Softening Point, °C	90
Metal Surface Compatibility	Compatible
Safe Heating Temperature °C	180
Specific Gravity kg/m <sup>3</sup>	1,52
Packaging: 20 kg Sheet Drum	

**Izofalt D's Areas of Application**

- For road coating cracks,
- On highway, asphalt and concrete sites,
- On joints of two concrete sections,
- On horizontal joints and cracks,
- As filling and repair material

**Izofalt D's Advantages**

- Resistant to any climate conditions.
- Resistant to waste water and sea water.
- Partially resistant to solvents.
- Resistant to low and high temperatures.
- Requires minimum team and equipment.

Consumption: Approx. 0.15 kg – 0.18 kg for a depth of 1 cm, width of 1 cm, and length of 1 cm.

**Cold-mix Asphalt Joint Filler (IZOFALT S)**

**General Specifications**

IZOFALT S is a modified bitumen-based, solvent-containing joint filler and crack repair material developed to be used in asphalt and concrete joints. It is used to protect the surfaces requiring insulation. It strongly binds to the area it is applied and creates a waterproof elastic layer.

It is suitable for cold and hot weather conditions and it does not lose its performance. It is suitable for constant water contact. It is resistant to various chemicals and ultraviolet.



**Technical Specifications**

Appearance	Black
Content	Modified Bitumen
Solubility	Solvent
Density	0,900 – 1,100 g/cm <sup>3</sup>
Drying time	
Touching time	4 hours
Full Drying	24 hours

\* Drying time may vary depending on weather conditions.

**Areas of Application**

- For horizontal and vertical joint and cracks,
- On seams between two concrete surfaces,
- As filling and repair material For binding

**Advantages**

- Highly resilient and resistant to dynamic movements as it contains modified bitumen
- Excellent binding and abrasion resistance
- Resistant to deformation with its elastomeric structure
- Easy cold and ready-to-use application

**POLYMER MODIFIED BITUMEN (PMB)**

Polymer modified bitumen is used to help the roads show more resistance to intense traffic burden and changing weather conditions. The purpose of the addition of polymer to bitumen is to improve the positive properties of the bitumen without changing it. Thus, the sensitivity of bitumen to heat reduces, the softening point rises and the brittleness point decreases.



**Polymer Modified Bitumen (POLIFALT)**

POLIFALT is a polymer modified bitumen manufactured by Enfalt in accordance with KTŞ Technical Specifications.

**Purposes of Bitumen Modification**

For Hot Bituminous Mixtures:

- Preventing wheel track formations, preventing deformations at high temperatures
- Improving resilience and preventing thermal cracks at low temperatures
- Increasing strength against fatigue and reflection cracks
- Increasing resistance to reflection cracks
- Thickening the bituminous film surrounding the aggregates (resistance to oxidation)
- Reducing layer thicknesses
- Increasing the durability of coating

**Technical Specifications**

Test Values	TS EN	Unit	Value
Penetration, 25°C,150g,5 sn	1426	0,1 mm	25-55
Softening Point	1427	°C	≥ 65
Ductility with Dynamometry, 25°C, 5 cm/min	13589	J	≥ 0,5
Elastic Rebound, 25°C	13398	%	≥ 60
Flash Point	2592	°C	≥ 220
Specific Gravity	15326	gr/cm <sup>3</sup>	1,0-1,1
Dynamic Shearing Reometer (DSR) (DSR) G*/sinδ>1kpa	14770	°C	≥ 76
Permanent Penetration	1426	%	≥ 45
Bending Beam Rheometer (BBR) Bending-Creep Hardness S ≤ 300MPa, m≥0.300	14771	°C	≥ -6

\* According to the specifications of polymer modified bitumen of PMB 76-16 quality in accordance with KTŞ (Technical Specifications for Highways) 412-2 (TS EN1402-3)

**Polifalt's Effect of Preventing Wheel Track Formation**



**Polifalt's Effect of High Resistance to Crack Formation**



**Cold Asphalt Joint Material (COLD MIX)**

COLD MIX is a cold asphalt mix used for repairing the hollow areas on the top structures of roads. It is a ready to use asphalt product that can be applied when it is not possible to produce hot asphalt or when the weather conditions are not suitable for hot asphalt production. It is produced by adding ENEM FLUX cold asphalt additive.

**Application**

- Any puddles, sludge etc. on the application area should be cleared with a sweeper or brush.
- COLD MIX is taken out of the bag and poured on the application area.
- Asphalt mix is spread inside the hollow area adequately.
- Compression is applied. It is recommended to compress the area with a mini cylinder, compacter or joint mallet.
- The traffic can resume to its regular state right after application.
- It is recommended for 50x59 cm pits with a depth of 5 cm. It is not harmful to environmental or human health as it is free of volatile solvents.

**Areas of Application**

- Repairing on inter- or intra-city roads where asphalt mixes are used
- Filling the pits regardless of seasons, but particularly in winter
- Repairing the damaged areas in factories, housing estates, parking lots, sports pitches



**Packaging and Storage**

It is offered in polyethylene-reinforced, polypropylene air-tight bags of 30 kg. Stocking life is approx. 6 months. Maximum 10 bags should be piled on top of each other. It is recommended to store the product at room temperature to preserve its effectiveness. It should be covered in tarpaulin if it is to be stored outdoors.

**ENFALT FIBROCEL CELLULOSIC FIBER FOR STONE MASTIC ASPHALT**

ENFALT Fibrocel is a high-quality cellulosic fiber product used in stone mastic asphalt applications inside and outside the country.

**Specifications and Advantages**

It provides a high homogeneous distribution and increases the adhesion of bitumen, and fills the gaps between aggregates and minimizes the bitumen percolation. The product, approved by the General Directorate of Highways, is the most suitable fiber type used for stone mastic asphalt applications and has many advantages

HIGH QUALITY (ISO 9001 and OHSAS 18001)

- SHORT MIXING TIME AND HOMOGENEOUS DISTRIBUTION
- HIGH BITUMEN ABSORPTION
- 100% LOCAL PRODUCTION AND GAIN FOR NATIONAL ECONOMY WITH ITS EXPORTS ACHIEVEMENT

Thanks to its high quality, Fibrocel is preferred not only by Turkish companies but also by the foreign road construction companies, especially in Europe.

**Application**

ENFALT Fibrocel can be very easily mixed with the dry mix before mixing with bitumen. Thanks to this property, it disperses homogeneously and quickly in the bitumen and covers the aggregate. Depending on the type and size of the mixer, a mixing time of 5-15 seconds is sufficient to distribute ENFALT Fibrocel in the dry mix.

**Packaging**

Big bag of 500 kg (suitable for overseas shipments)



**Technical Specifications**

Appearance	Thickness of 4-7 mm
Schellenberger Percolation Value (with 0.3%)	Max. 0.18% (The criterion of the Specifications is 0.3%)
Moisture Absorption	Max. 5%
Oil Absorption	At least 5 times the cellulose weight
Ash Content	% 18 ± % 5
Ph	7,5 ± % 1

**ASPHALT CHEMICALS**

The exclusive representative of Akzo Nobel Surface Chemistry in Turkey, ENFALT carries out the marketing and distribution operations of Akzo Nobel's wide range of high quality asphalt chemicals for sustainable solutions.

**Anti-stripping Asphalt Additives (DOP)**

Adhesion between bitumen and aggregate (binding) is an important factor for the useful life of bituminous coatings. The reason for the deterioration on the road surface is the lack of adhesion and the stripping.

Water has the feature of separating bitumen from aggregate under certain conditions. In addition, traffic load accelerates this separation. Many aggregates are more easily wetted with water than with bitumen.

Materials increasing the resistance to stripping, called anti-stripping materials, are used to prevent stripping. It is tried to prevent stripping by adding these materials into asphalt at low rates. Considering the cost of an entire asphalt superstructure, the use of these resistance-increasing materials does not bring quite extra costs. On the other hand, they also extend the useful life of asphalt by acting as a good protector.

Stripping means the break of the bond between aggregate and bitumen. In some way, water enters between the aggregate and the bitumen. The reaction of the aggregate surface with water is greater than that with bitumen, so the bond will break.

The contact angle between water, aggregate and bitumen can be observed if a drop of bitumen is dropped on the aggregate surface and then immersed in water. The rate of occurrence of the stripping varies by temperature, aggregate type and viscosity and components of bitumen.



**Wetfix BE**

Wetfix BE is an anti-stripping liquid additive produced by Akzo Nobel Surface Chemistry especially for hot and warm-mix asphalt.

**Specifications and Advantages**

- Maintains its stability up to 5 days without losing its properties in hot bitumen.
- Minimizes water damage and cracks.
- Minimizes wheel tracks.
- Increases the adherence at perfect level.
- As it can be applied at -20 °C to 0 °C, it is easily added to bitumen also in cold weather.
- Complies with the Section 411 of the Technical Specifications for Highways.

**Amount of Use**

Wetfix BE has a low amount of use. Depending on the type of bitumen and aggregate to be used, it is used at a rate of 0.1% to 0.3% of the bituminous binder under normal conditions.

**Packing and Storage**

Wetfix BE can be supplied in barrels of 190 kg or in IBCs of 950 kg. It does not lose its properties for a minimum of 2 years as long as it is stored in its original package at room temperature in a dry place.

**Physical Properties and Specifications**

Appearance at 20 °C	Brown Liquid
Density, 15°C, kg/m <sup>3</sup>	0.934
Flash point, °C	>280
Viscosity, 40°C, cSt	49.54
pH, in solution of 5%	> 10
Acid Count, mg KOH/g	< 10

**ENEM AP 245**

ENEM AP 245 is a liquid additive material designed to improve the adherence between asphalt and aggregate to prevent stripping in surface treatments and hot mixtures (BSK).

ENEM AP 245 preserves its stability for a long time without losing its characteristics in hot bitumen. It minimizes water damage and cracks. It is excellent at increasing adherence.

**Amount of Use**

It is used at low amounts. It is mixed to the bitumen in the service tank at 0.2 - 0.3% of the bitumen binder depending on the type of aggregate and the bitumen to be used.

**Packing and Storage**

ENEM AP 245 can be supplied in barrels of 180 kg or in IBCs of 900 kg. It does not lose its properties for 2 years as long as it is stored in its original package at room temperature in a dry place.

**Physical Properties and Specifications**

Appearance at 20 °C	Liquid
Density, 15°C, g/cc	0.934
Flash point, °C	> 280
Viscosity, 40°C, cSt	49.54
pH, in 5% solution	> 10
Acid count, mg KOH/g	< 10



Asphalt Emulsifiers



Redicote EM 44

Redicote EM 44 is a liquid emulsifier produced by Akzo Nobel Surface Chemistry for cationic type, rapid and medium shearing bituminous emulsions (CRS1, CRS2) which are generally used in adhesive layer and surface treatment applications.

Specifications and Advantages

**Low amount of use:** With low amount of use of 0.12-0.22 %, high-quality rapid shearing emulsions are achieved.

With Redicote EM 44, quality emulsions with high storage stability are achieved.

Low or medium viscosity emulsions are achieved with low amount of use.

Amount of Use

Cationic rapid shearing emulsions  
0.12% to 0.22% - pH 1.5-3.5 HCl  
Cationic medium shearing emulsions  
0.25% to 0.60% - pH 1.5-3.5 HCl  
Slurry and Microsurfacing  
0.80% to 1.50% - pH 2-3 Phosphoric Acid

Packing and Storage

Redicote EM 44 can be supplied in barrels of 180 kg or in IBCs of 900 kg. It does not lose its properties for a minimum of 2 years as long as it is stored in its original package.

Physical Properties and Specifications

Appearance at 20 °C	Liquid
Density, 20°C, g/cc	0.93
Flash point, °C	>100
Viscosity, 20 °C, mPa.s	450

ENEM 22

ENEM 22, is a highly effective, rapid and medium shearing liquid emulsifier for cationic emulsions. ENEM 22 easily dissolves with water and is suitable to be used in batch type or in-line plants.

Application and Advantages

The mixture should be reach an adequate pH value with hydrochloric acid or another acid before use. A concentrated mixture with emulsifier up to 20% can be produced and the product can be safely stored at room temperature at 20 °C.

With its optimum use ratio, high quality emulsions with high storage stability are obtained.

Amount of Use

Cationic rapid shearing emulsions  
0.2% to 0.3% - pH 1.5 - 3.5 HCl  
Cationic medium shearing emulsions  
0.40% to 0.90% - pH 1.5 - 3.5 HCl

Packaging and Storage

EM 22 can be supplied in barrels of 180 kg or in IBCs of 900 kg. It does not lose its properties for a minimum of 2 years as long as it is stored in its original package.

Physical Properties and Specifications

Appearance at 20 °C	Liquid	
Density, 20°C	kg/m <sup>3</sup>	941
Flow Point	°C	<5
Flash point	°C	>100
Viscosity, 20 °C	cP	400

Redicote E-11

Redicote E-11 is an emulsifier produced by Akzo Nobel Surface Chemistry for cationic type, slow shearing bitumen emulsions used in adhesives, primers, slurry seal and cold mix applications.

Specifications and Advantages

**Low amount of use:** With low amount of use, high-quality slow shearing emulsions are achieved.

**Excellent Adhesion:** Emulsions made with Redicote E-11 provide excellent adhesion with limestone based aggregates.

**No need for acid:** Acid is not needed in the water phase. Emulsions can be prepared at normal pH levels.

**APE-free:** Redicote E-11 does not contain alkylphenol ethoxylate.

Amount of Use

The amount of use for cationic slow shearing emulsions is 0.6% to 1.5% of emulsion. The pH of the emulsion should be 2-6 with the appropriate acid.

Packing and Storage

Redicote E-11 can be supplied in barrels of 170 kg or in IBCs of 900 kg. It does not lose its properties for a minimum of 2 years as long as it is stored in its original package at room temperature.

Physical Properties and Specifications

Appearance at 25°C	Liquid
Density, 20°C, g/cc	0.90
Flash point, °C	18
Viscosity, 20°C, mPa.s	52
pH, propanol-water	6-9



Redicote E-4875 NPF

Redicote E-4875 NPF is an emulsifier produced by Akzo Nobel Surface Chemistry for cationic type, slow shearing bituminous emulsions and grave emulsions which are used in slurry seal, stabilization and cold recycling applications.

Specifications and Advantages

**Low amount of use:** For most applications, the use of 0.8 to 1.2% is sufficient.

**Proven performance:** Its performance has been proven in wide areas of application.

**Comfortable mixtures without solvent:** Dense aggregate mixtures provide comfortable working and coating performance with recycled materials.

**Environmentally conscious:** Redicote E-4875 NPF does not contain nonylphenol ethoxylate.

Amount of Use

The amount of use for cationic slow shearing emulsions is 0.8% to 2.0%. The pH of the emulsion should be 2-5 with the appropriate acid. The quality of emulsion will increase in case 0.1 to 0.3% of CaCl is used.

Packing and Storage

Redicote E-4875 NPF can be supplied in barrels of 210 kg or in IBCs of 1000 kg. It does not lose its properties for a minimum of 2 years as long as it is stored in its original package at room temperature.

Physical Properties and Specifications

Appearance at 25°C	Dark Liquid
Density, 20°C, g/cc	1.07
Flash point, °C	>100 (ISO 2592)
Viscosity, 20°C, mPa.s	1200
pH, in water of 1%	11



Warm Asphalt Mixture Additives

Rediset LQ-1102CE Warm Asphalt Mixture Additive

Rediset LQ-1102CE is an additive produced by Akzo Nobel Surface Chemistry for hot and warm mixtures and thanks to its heat stability, it both allows decreasing the mixture and spread, compression temperatures and provides resistance to stripping.

Specifications and Advantages

**Active Adhesion:** The Rediset LQ-1102CE added bitumen has the ability to coat aggregates comfortably at low temperatures.

**Heat stability:** It maintains its performance in hot bitumen.

**Workability and easy spread effect:** It allows workability of mixture at low temperatures and comfortable spread, and thus the spread at low temperatures and fast spread.

**Moisture Resistance:** With Rediset LQ-1102CE additive, the mixtures with excellent adhesion and moisture resistance are achieved. There is also no need for anti-stripping additives.



Amount of Use

The amount of use in hot and warm mixtures is 0.3 to 1.0% of the binder.

Packaging and Storage

Rediset LQ-1102CE can be supplied in barrels of 200 kg or in IBCs of 950 kg. It does not lose its properties for a minimum of 2 years as long as it is stored in its original package at room temperature.

Physical Properties and Specifications

Appearance at 25°C	Liquid
Density, 20°C, g/cc	1.00
Flash point, °C	>165
Viscosity, 20°C, mPa.s	1700
Amine count, mg KOH/g	540-640

Cold Asphalt Additive

ENEM FLUX Cold Asphalt Additive

ENEM FLUX is a special product designed to be used in cold asphalt mixture production. It does not lose its properties even at very low temperatures and remains workable for a long time. It is free of volatile organic compounds harmful to environmental or human health.

Amount of Use

It is a liquid additive used in the production of high-performance joint material. It provides excellent workability to the cold asphalt mixture. Produced asphalt can be stored in piles or air-tight bags for months.

Ratio of use may vary depending on the bitumen penetration. Recommended amount of use is 20-30% of the bitumen.

It is added to the bitumen tank, and circulated well before use; or it can be added to the plant mixer after the aggregate and bitumen mixture through a separate dosing unit.

Asphalt mixture temperature should be 110°C - 140°C. The flash point of the product is higher than 160°C, but caution is advised in production, and the temperature should not exceed 140°C.

Packaging and Storage

Drum, IBC and bulk packaging are available. The minimum shelf life of this product under correct storage conditions is 2 years.

Physical Properties and Specifications

	Test Method	Typical Value
Appearance	-	Dark brown liquid
Density, 20°C, g/cm <sup>3</sup>	ASTM D 4052	0,900 - 1,000
Freezing Point, °C	ASTM D 6749	<-10
Flash Point, °C	ASTM D 92	>160

BITUMEN BASED INSULATION EMULSIONS AND SOLUTIONS

Bituminous insulation emulsions are bituminous binders that are formed by dissolution of the bitumen particles in water with the help of an emulsifier.

Bituminous solutions are mixtures obtained by mixing the bitumen with the additives by using special methods.

Bituminous emulsions and solutions are used as primers for waterproofing or as intermediate products for bitumen based liquid insulation products.

Anionic Bitumen Emulsion (ENEM 600)

ENEM 600 is anionic bitumen emulsion which is formed by dissolution of water in a certain amount of bitumen in invisible small particles with special methods. On the area where it is applied to, it creates a waterproof black layer increasing adhesion strength with the evaporation of the water in it.

ENEM 600 is used as a basic component in bitumen based single and binary component waterproofing products.

Areas of Use of Waterproof Products Produced with ENEM 600

As a moisture-proof material in foundation and basement walls of buildings,

- As a waterproofing material in dry or moist details such as terrace, roof, kitchen, bathroom, etc.,
- As a primer under bituminous coatings,
- As a priming material and binder in applications such as fiberglass, canvas, etc.,
- As an impermeability and adherence-enhancing additive in mortars and plasters formed with cement and/or fine sand,
- As a mould release agent preventing resilience and deterioration of construction moulds due to their contact with water.

Product's Technical Data

Respective Standard	: TS 113
Public works item no.	: 04.611
Customs Tariff Statistics Position (GTIP) No.:	: 2715.00.00.00.00
Basis	: Bitumen
Thinner	: Water
Color	: Brown in package, black after drying.
Package	: Sheet Metal Barrel of 200 kg / IBC of 1000 kg



Liquid membrane application produced with ENEM 600

Technical Specifications

Test	Method/std	Unit	Tolerance	Value
Density	TS 113	Gr/cm <sup>3</sup>	±0,03	1,01
Viscosity	ASTM D4402-87	CP	±40	245
Distillation (0-225 °C)	TS 122	%	Min.	35
Distillation (225 °C-360°C)	TS 122	%	Max.	65
Residual Penetration (25°C)	TS 118	DMM	-	20-50
Heat Test (100 ± 3°C)	TS 113	There should be no residue / flow / heave		
Dry Time	TS 113			1 sa.
1-touch				5-6 sa.
2-through-dry				8 sa.
3-test				

**Solvent-Based Bitumen Solution (ENEM 300 M)**

ENEM 300 M is a bitumen solution, the bitumen properties of which have been improved with resilience increasing additives and which does not contain any filling material. With the evaporation of the Xylene in it, it strongly adheres to the surface where it is applied to and it creates a high-resistant durable film layer.

It is used as a production input raw material in the production of polyurethane/acrylic based single and binary component insulation products. Its content may vary according to the requests of manufacturers.

**Areas of Use of Waterproofing Products Produced with ENEM 300**

- With the application to the lateral surfaces of buildings, preventing water and moisture and preventing blister, paint deterioration and mold formation on the walls of inner surfaces,
- Protecting metal surfaces against corrosion,
- With the application to a metal surface that is under or above the soil, preventing decomposition,
- With its use together with fiberglass net and bitumen sheet, creating a waterproof layer,
- Insulating external surfaces that are in contact with the soil,
- Insulating tunnels, drainage and waste water channels and collectors.

**Product's Technical Data**

- Respective Standard : TS 103
- Public works item no. : 04.614
- Basis : Bitumen/rubber and polymers on request
- Thinner : Xylene
- Color : Black
- Package : Sheet Metal Barrel of 200 kg



Foundation insulation application with PU/acrylic based insulation material produced with ENEM 300 M

**Technical Specifications**

Test	Method/ Std	Unit	Tolerance	Value
Density	TS 113	Gr/cm <sup>3</sup>	±0,03	0,98
Viscosity	ASTM D4402-87	CP	±30	245
Distillation (0-225 °C)	TS 122	%	Min.	35
Distillation (225 °C-360°C)	TS 122	%	Max.	65
Residual Penetration (25°C)	TS 118	DMM	-	20-50



**POLYURETHANE BASED INSULATION PRODUCTS**

Polyurethane based insulation products are suitable for joint applications on the surfaces such as concrete, steel, wood, epoxy polyurethane, etc. The adhesive force and abrasion resistance of the polyurethane based joint fillers are high.

**Polyurethane Based Joint Filler Primer (ENEM PUR-AST)**

ENEM PUR-AST is a polyurethane based, single component primer produced for topcoats and joint filler compounds. It is suitable for applications on the surfaces such as concrete, steel, wood, epoxy, polyurethane, etc. It can also be used as surface hardener and dustproofing agent for concrete coatings.

**Areas of Use**

ENEM PUR-AST is used as primer before the application of the polyurethane joint filler ENEM PUR.

**Primary Areas of Use**

- On airports, aprons and runway areas, parking lots,
- At shipyards and ports, gas stations, and all concrete floors of refineries,
- In military and industrial areas,
- In joints of asphalt and concrete roads and for repair of cracks,
- On surface joints of bituminous and concrete floors,
- On all concrete floor surfaces under the influence of oil, fuel and various chemicals.



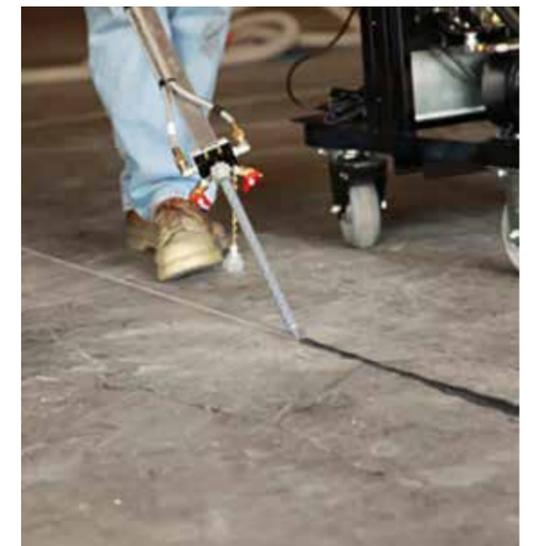
**Polyurethane Based Joint Filler (ENEM PUR)**

ENEM PUR is a polyurethane and tar based, binary component, solvent-free, cold-mix, self-spreading joint filler resistant to jet fuels for concrete surfaces.

It is suitable for applications on the surfaces such as concrete, steel, wood, epoxy, polyurethane, etc.

**Technical Specifications**

Color	Black
Curing speed (22 °C) h	48
Hardness (according to Shore A, +/- 5)	5-25
Application Temperature °C	5-35
Tensile Strength Kg/cm <sup>2</sup>	15
Resilience %	~ 200
Specific Gravity kg/m <sup>3</sup>	1.35+/-0.10 gr
Min-Max joint depths mm	10-30
Expansion ratio (joint width / depth ratio)	1 / 1-1.5
Pot life, min.	30-40
Solid content, %	96



## PROJECTS AND REFERENCES

### Some of Our Important Projects and References



Northern Marmara Highway Project



İka İzmir Highway Project



İga İstanbul New Airport Project



Çanakkale Troya Museum Road Project



Hot Bitumen Mix Application, Samsun 2017



Double-Layer Emulsion Surface Coating, K. Maraş 2017



Modified Bitumen Based Waterproofing Application, İstanbul 2017



Concrete Road Application, Samsun 2017



Polymer Modified Bitumen Application, Eskişehir 2017



Double Layer Emulsion Surface Treatment Application, K. Ereğli 2017



Hot Asphalt Joint Filler Application, 1 Region of General Directorate of Highways 2015-2017



Bituminous Emulsion for Concrete Pipes, İstanbul 2017



Bituminous and Double Layer Emulsion Surface Treatment Application, Samsun 2016



Bituminous Surface Treatment Application, Eskişehir 2016



Bituminous and Double Layer Emulsion Surface Treatment Application, Çarşamba 2016



Asphalt Repair Application, Muğla 2015



Hot Bituminous Mixture Application Eskişehir 2016



Bituminous Mixture Application, Adana 2015



Bituminous Mixture Application Aydın 2015



Double Layer Emulsion Surface Treatment Application, Pozanti-Tufanbeyli 2014



Erosion Control with Geogrid, Olympic Village İzmir 2004



AnkaRay PE Membrane Insulation Application, Ankara 1992



Torul Tunnel Insulation Application, Gümüşhane 1978

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