

Product Guide dispersions for hot mix asphalt and bitumen emulsions



Overview

Product	Solids M.-%	pH	Tg (DSC) °C	MFFT °C	Apparent viscosity mPa·s	Density g/cm³	Surfactant charge	Hot Mix Asphalt	Track/Bond coat	Fog seal	Spray a. sprinkle	Cold mix f. pothole	Crack sealing	Slurry seal	Chip seal	Micro surfacing	Thin lift overlays
Non-ionic dispersions																	
Butonal® 5126 X	~ 52	~ 7.5	- 24		~ 200	~ 1.00	neutral	☺☺☺									☺☺☺
Acronal® NX 4627	~ 48	~ 7.0	12	5 - 23	~ 100 - 500	~ 1.03	neutral	☺	☺☺☺	☺☺☺							
Dispersions for anionic emulsions																	
Butonal® NS 175	~ 71	~10.5	- 53	0 - 4	~ 1000 - 1500	~ 0.97	anionic	☺				☺	☺☺☺	☺☺			
Butonal® NX 1129	~ 70	~10.4	- 53	0 - 4	~ 1000 - 2000	~ 0.97	anionic/crosslinkable	☺☺					☺			☺	
Dispersions for cationic emulsions																	
Butonal® NS 198	~ 64	~ 5.3	- 53	0 - 4	~ 250 - 2000	~ 0.97	cationic	☺	☺		☺☺	☺☺	☺	☺	☺☺	☺	
Butonal® NX 4190	~ 64	~ 5.4	- 53	0 - 4	~ 250 - 2000	~ 0.97	cationic	☺☺			☺☺☺	☺☺☺		☺☺☺	☺☺☺	☺☺☺	

	Application	Description	Best fitting recommendation	Emulsion type	Regulations	Formulating guidelines
New pavements and resurfacing	Hot Mix Asphalt pavement (HMA)	Hot Mix Asphalt (HMA) is a combination of approximately 95% stone, sand, or gravel bound together by bitumen, a product of crude oil. Hot asphalt is heated aggregate, mixed with hot bitumen at an HMA facility. Often RAP (old recycling asphalt) could be added. The resulting Hot Mix Asphalt is loaded into trucks for transport to the paving site. The trucks dump the Hot Mix Asphalt into hoppers located at the front of paving machines. The asphalt is placed, and then compacted using a heavy roller, which is driven over the asphalt. Traffic is generally permitted on the pavement as soon as the pavement has cooled. Next to use Polymer modified bitumen, it is possible to use Butonal directly into the pugmill at asphalt mixing plants.	Butonal 5126 X	It's hot mix and no emulsion :)	EN 13108-x ASTM, AASHTO, Superpave	It's hot mix and no emulsion :) 6% Butonal 5126 X to bitumen (= 3% solid/polymer content to bitumen) Bitumen content in asphalt mix: ~ 4 M.-% in asphalt concrete (base course) ~ 4.4 M.-% in asphalt concrete (binder course) ~ 5.4 - 7 M.-% in asphalt concrete (surface course) ~ 6.6 - 7.4 M.-% in SMA (stone mastic asphalt) ~ 5.5 - 6.5 M.-% in PA (porous asphalt) ~ 6.8 - 7.5 M.-% in MA (mastic asphalt) No need for fibers by mixing stone mastic or open porous asphalt caused by increased binder viscosity after modification!
	Tack coats, bond coats	Bond coats, commonly referred to as tack coats, are a light and even distribution of an bitumen emulsion applied during resurfacing which provide an adhesive bond between asphalt layers. Polymer modified bond coats reduce the tracking to ensure the emulsion stays in place during construction. The bond coats improve the adhesive strength to reduce raveling and help prevent failures. This adhesive asphalt layer is placed between applications of old and new asphalt mix to prevent slippage and provide a strong bond to the old surface. Bitumen emulsions are the preferred bond coat. Compared to hot asphalt, emulsions more easily penetrate the micro surface of the old pavement to improve the bond between hot mix layers. Emulsions are also produced at lower temperatures resulting in reduced emissions and improved eco-efficiency. Additional performance improvements can be obtained with the polymer modification of these bitumen emulsions. Our Acronal NX 4627 X is especially designed for tack/bond coat emulsions. It is a neutral styrene-acrylic that can be used in either cationic or anionic emulsions. This property supports the rapid setting of the emulsion produced from it and the maximum low adhesion to the wheels of the vehicles rolling over it.	Acronal NX 4627 X	both anionic or cationic	EN 13808: C 60 BP4-S means: C = cationic 60 = 60% bitumen content BP = bitumen polymer modified 4 = class 4 (draining speed) S = "Schichtenverbund" = layer bond ASTM: CRS-2P means: C = cationic (nothing = anionic) RS = rapid set -2 = higher viscosity, min. 65% bitumen content P = polymer modified	e.g. C60BP4-S (according to EN 13808/TL-BE): 40% water 60% bitumen (70/100 according to EN 12591) within 5% Acronal to bitumen (= 3% polymer to bitumen) and ~1.0-1.5% emulsifier to bitumen, may contain solvent (~1.5 - 3% to bitumen) typical used emulsion: cationic rapid setting, low PH ~3

Maintenance	Fog seal	A low cost preventive maintenance application applying a diluted emulsion to an existing asphalt road surface to enhance the road surface, reduce raveling, and extend the surface life of the pavement. Polymer modified fog seals are also used on open graded friction course pavements to prevent raveling and on existing chip seals to reduce chip loss.	Acronal NX 4627 X	both anionic or cationic	EN 15322 TL-Sbit no further standards	Diluted bitumen emulsion with water from 1:1 to 7:1. Emulsion itself: ≤ 50% bitumen content within 1.5% emulsifier to bitumen typical used emulsion: both anionic or cationic, medium or slow setting
	Spray and sprinkle chip seal	Patchworking tool to repair local pavement damages The NX 4190 develops a better toughness over time, as it is equipped with an additional crosslinking package compared to the precursor NS 198. The crosslinking package makes it possible to significantly improve the properties (elastic recovery, ductility and softening point) after recovery from high-temperature distillation or evaporation.	Butonal NS 198 Butonal NX 4190	cationic cationic	C 60 BP4-REP C 67 BP3-REP	33-40% water 60-67% bitumen within 4.5-5% Butonal to bitumen (= 3% polymer to bitumen) and ~1.5% emulsifier to bitumen
	Cold mix for pothole repair	Pothole repair with ready mixed cold asphalt. Mostly aggregates 0-2mm mixed with modified bitumen emulsion. Sometime formulated with reactive components (e.g. water reactive binder).	Butonal NX 4190	cationic	C 60 B10-BEM with additional Butonal	58-62% bitumen rest mixture of: water, emulsifier, acid, additives like Butonal and/or others ...details secret by customers
	Crack sealing (not only filling)	In most cases modified anionic bitumen emulsions with filler, pasty and fast curing, permanently elastic.	Butonal NS 175	anionic	EN 15322 TL-Sbit	several different types are common: cold processables with solvent, cold processables with bitumen emulsions, or hot processables with polymer mod. bitumen (all may contain flux oil) ...details secret by customers
Surface treatments	Slurry seal	Slurry seals are a preventive maintenance surface treatment of emulsified bitumen, dense graded aggregate, additives, and water that seals the asphalt pavement and improves the texture of the road surface. Slurry seals may be polymer modified to enhance performance, improve adhesion, and extend application life span. Layer thickness equal to largest aggregate (max. 5mm).	Butonal NS 175 Butonal NX 1129 Butonal NX 4190	anionic anionic cationic	C 65 BP6-DSK ASTM D3910 CSS-1h (Cationic Slow Set) CQS-1h (Cationic Quick Set) SS-1h (Anionic Slow Set) QS-1h (Anionic Quick Set) or modified: LMCQS-1h (Latex Mod. Cationic Quick Set)	ASTM Type 1 (Filling small surface cracks and voids or to provide a thin surfacing to improve erosion resistance/skid resistance): 10-16 M.-% bitumen to dry aggregates 3.3-5.4 kg/m³ ASTM Type 2 (Providing a thin surfacing to improve skid resistance of pavement and to treat old pavement that exhibits raveling): 7.5-13.5 M.-% bitumen to dry aggregates 5.4-8.2 kg/m³ ASTM Type 3 (Providing a new wearing surface for pavement): 6.5-12 M.-% bitumen to dry aggregates 8.2 kg/m³ typical used emulsion: both anionic or cationic, slow setting, slurry seals may contain cement
	Chip seal (Surface dressing)	Chip sealing surface treatments extend the service life of existing pavement by filling small cracks and voids to prevent water and air from entering the pavement base and sub-base. Chip sealing consists of spraying a liquid asphalt binder onto the existing pavement and covering with a compatible aggregate. This maintenance application provides protection for the pavement base and sub-base and a satisfactory wearing surface for up to seven years or longer. Chip sealing also improves skid resistance. Chip sealing is applied with an bitumen emulsion sprayer, aggregate spreader and rubber tire roller.	Butonal NS 198 Butonal NX 4190	cationic cationic	C 69 BP3-OB-1 C 69 BP3-OB-2 C 70 BP3-OB-1 C 70 BP3-OB-2	30-31% water 69-70% bitumen within 4.5-5% Butonal to bitumen (= 3% polymer to bitumen) and ~1.0-1.5% emulsifier to bitumen typical used emulsion: Cationic, rapid setting
	Micro surfacing	Micro surfacing surface treatments extend the service life of existing pavement by waterproofing the pavement base and sub-base. Micro surfacing involves the placement of a polymer modified slurry mixture consisting of dense graded aggregates, bitumen emulsion binder, mineral fillers/cement, additives and water onto the existing pavement. Micro surfacing applications typically have a surface life of up to 10 years or longer, and they help improve skid resistance. Micro surfacing slurry mixtures are mixed and placed by a single machine designed specifically for this purpose. Layer thickness only approx. 1cm (=10-30kg/m²)	Butonal NX 4190	cationic	C 65 BP6-DSK ASTM 3910 CSS-1h (Cationic Slow Set) CQS-1h (Cationic Quick Set) SS-1h (Anionic Slow Set) QS-1h (Anionic Quick Set) or modified: LMCQS-1h (Latex Mod. Cationic Quick Set)	75-80% aggregate 10% water 0.5-1.5% filler (cement, lime) 10-15% bitumen emulsion 65% bitumen 35% water 4.5-5% Butonal to bitumen (= 3% polymer to bitumen) 1.5% emulsifier to bitumen typical used emulsion: Cationic, slow setting, PH ~2-5
	Thin lift asphalt overlay	Thin lift asphalt overlays are utilized in maintenance programs to extend the surface life of existing pavement. The paver-placed asphalt mix product is manufactured at a central asphalt mix plant adhering to the asphalt mix design specifications. Mix designs can be open graded or dense graded. The finished pavement product is generally 2.5 cm or less in thickness. A typical asphalt maintenance overlay has an expected service life of up to 10 years. Thin lift asphalt maintenance overlays are placed with a conventional asphalt paver and include both steel and rubber tire rollers.	Butonal 5126 X	It's hot mix and no emulsion :)	EN 13108-2 (BBTMS40/60) EN 13108-1 (AC 5 D L) EN 13108-5 (SMA 5 N, SMA 5 S) EN 13108-6 (MA 5 S, MA 6 S)	6% Butonal to bitumen/binder (= 3% polymer content to bitumen)