



# Nypol S 89

HOT AND WARM MIX ASPHALT APPLICATIONS

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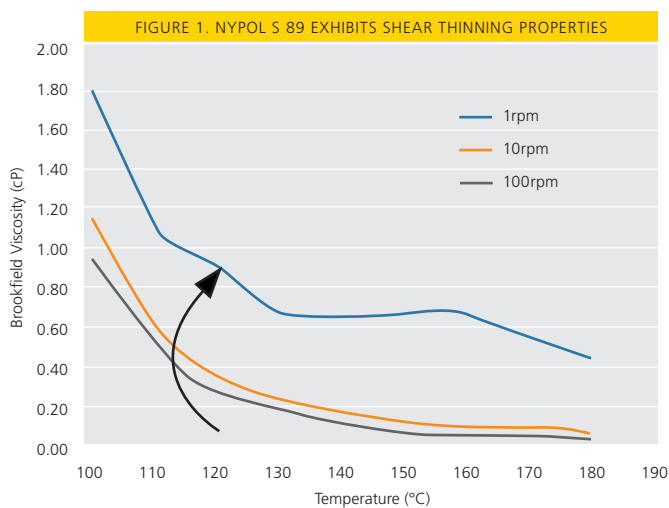
Nypol S 89 is a highly flexible asphalt binder for use in surface, binder and regulating course applications. The thixotropic nature of the binder improves workability and resists binder drainage making it particularly suited to thin surfacing and SMA (Stone Matrix Asphalt) mixtures.

## Performance Attributes

Polymer modification of bitumen reduces temperature susceptibility, creating binders with higher elasticity at in-service temperature while improving resistance to cracking at very low temperatures. The degree to which temperature susceptibility and other properties of the binder are modified is determined by both the type and concentration of the polymer employed.

### WORKABILITY

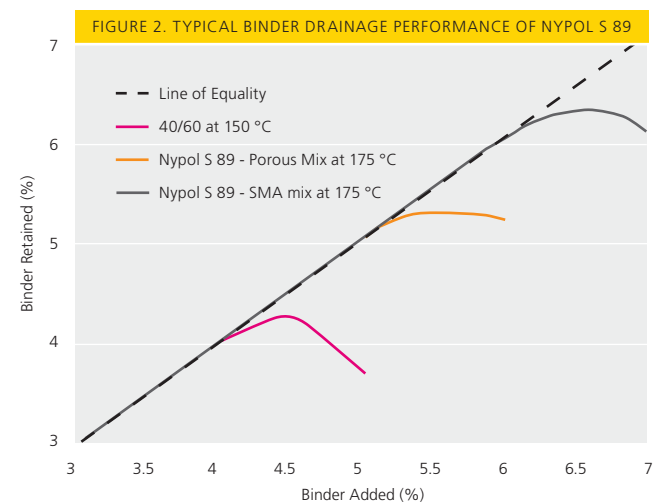
Thin surfacing materials cool quickly during the paving operation which reduces the time window for effective compaction. Due to the shear thinning characteristics of Nypol S 89 the effective viscosity of the mixture is reduced during the compaction process. This localised viscosity reduction is equivalent to an effective temperature increase of around 10 to 15 °C which help facilitate maximum compaction when needed.



### BINDER DRAINAGE

Thick binder films improve the durability of well designed open textured thin surfacing, porous asphalt or SMA mixtures. The thixotropic properties of Nypol S 89 ensure that thick binder films can be achieved without the addition of fibres to the asphalt mix. When compared to a 40/60 paving grade binder the effective binder content of a SMA type mixture can be increased by up to 2 %.

Binder content will vary according to mixture, design and aggregate type, the actual binder content should be verified on a mix by mix basis.



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## FLEXIBILITY

Nypol S 89 is an extremely flexible binder. Developed to withstand high tensile stresses it also exhibits high elastic recovery.



## Technical Information

TABLE 1. TECHNICAL DATA

PROPERTY	UNIT	TEST METHOD	SPECIFICATION	EN CLASS
Penetration @ 25 °C	0.1 mm	EN 1426	65 - 105	6
Softening point	°C	EN 1427	> 45	9

Nypol S 89 is a Polymer Modified Binder (PMB) and complies with EN 14023.

Please refer to the Nypol S 89 Product Data Sheet for a full product technical specification.

## Applications

Nypol S 89 is a performance enhanced binder which negates the need to add fibres and is therefore particularly suitable for use in thin surfacing and SMA type surfacing materials. Its thixotropic characteristics improve workability and reduce the propensity for binder drainage. Nypol S 89 is a versatile binder suitable for all types of routine surfacing applications, including motorways, high streets, country lanes, residential roads or other applications where a low noise permeable surfacing is needed.

Due to its high ductility and relatively low modulus, Nypol S 89 is also suitable for selected use in regulating and binder courses where excess movement and tensile strain can be expected.

## Asphalt Mixture types

Nypol S 89 is suitable for most types of asphalt mix. It is recommended for stone matrix asphalt mixtures e.g. thin surfacing materials, porous asphalt and SMA, where a thick binder film and improved workability are needed.

Optimum performance in any application can only be achieved through appropriate mixture design and best practice construction techniques.

Because of its lower modulus Nypol S 89 is not recommended for use in Hot Rolled Asphalt (HRA), where deformation resistance is critical.

TABLE 2. TEMPERATURE GUIDANCE - ASPHALT PRODUCTION

ASPHALT PRODUCTION	BINDER TEMPERATURE (°C)	TYPICAL VISCOSITY (Pa.s)
Flash point (EN ISO 2592)	≥ 235	Not applicable
Maximum handling temperature	190	0.2
Typical mixing temperature	155 - 190	0.3
Minimum pumping temperature	120	2

TABLE 3. TEMPERATURE GUIDANCE - SURFACING OPERATION

SURFACING OPERATION	ASPHALT TEMPERATURE (°C)
Ideal compaction range	145 - 105
Substantial completion of compaction	105

Please refer to the Nypol S 89 Safety Data Sheet (SDS), for advice on safe handling.

## Binder Storage

Nypol S 89 is a specialist binder. Advice should be sought from Nynas Product Support before allowing the product to come into contact with other modified or specialist binders.

Nypol S 89 is storage stable providing it is stored according to the following guidelines.

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## SHORT TERM HOT STORAGE (UP TO 2 WEEKS)

The recommended short term storage temperature for Nypol S 89 is 155 - 170 °C. The binder should not be heated above 190 °C at any time.

Reducing storage temperature to 150 °C during periods when no asphalt production is taking place will minimise any potential for thermal degradation.

The product should be circulated before use and daily during routine asphalt production. In common with other hot asphalt binders unnecessary circulation should be avoided.

## PROLONGED HOT STORAGE (BEYOND TWO WEEKS)

We do not recommend prolonged storage at 155 - 170 °C. However if this is unavoidable the tank should be sampled and tested for suitability every 7 days. Contact Nynas Product Support for specific advice / guidance on assessing product suitability.

If long term storage is unavoidable the temperature should be reduced to approximately 85 °C. This will minimise thermal/oxidative degradation and reduce energy costs.

When bringing the product back to its normal storage temperature intermittent heating should be used, to prevent localised overheating. When the binder is at a suitable pumping viscosity it should be circulated for 2 hours before being sampled and tested to evaluate fitness for purpose. For advice on a specific situation please contact Product Support.

Best practice suggests that when bituminous binders are stored at elevated temperatures oxidative ageing can be reduced if the headspace above the binder is kept to a minimum and re-circulation is fed through the bulk material at the base of the tank rather than splash fed from the top.

Please refer to the Nypol S 89 Product Safety Data sheet for advice on safe handling.

## Asphalt Production

Nypol S 89 is a modified binder that should be handled in accordance with normal industry best practice. During mixing Nypol S 89 will behave like an equivalent paving grade bitumen and does not require any special attention or conditions, see also Binder Storage recommendations above.

The recommended mixing temperature for Nypol S 89 is 155 - 190 °C.

The mixed asphalt should be laid as soon as practical after production. Due to the potential for oxidative ageing prolonged hot storage prior to discharge is not recommended and where practical should not exceed three hours.

## Asphalt Testing and Quality Control

Due to the tenacity of the modifier used in Nypol S 89 some minor difficulties may be encountered when attempting to extract the binder using solvents. Binder ignition is therefore recommended as the most accurate method for accurate determination of binder content.

## Loading and Transportation

It is recommended that asphalt mixtures incorporating Nypol S 89 are loaded and dispatched to site within 3 hours of manufacture. Truck beds should be lightly sprayed with a non-solvent based release agent. Diesel or oil should not be used.

As with any hot mix asphalt, the material should be protected against temperature loss. In all situations best practice relative to the working environment and risk of temperature loss should be adopted. The use of fully double sheeted insulated trucks is recommended regardless of ambient weather conditions. On discharge at site the asphalt should be sufficiently hot to allow time for effective compaction. As a guide a target paver-out temperature of 150 °C is recommended.

## Paving and Compaction Operations

Nypol S 89 is a modified binder designed to produce optimum in-situ performance in the working environments for which it has been designed. This can only be achieved if the asphalt mixture is properly designed and manufactured and a uniform pavement is constructed to best practice standards. Effective compaction and joint formation are key to the performance of any asphalt. Particular care should be exercised to minimise temperature segregation and ensure any joints are well constructed. When practical, hot match joints formed in echelon are considered best practice<sup>1</sup>.

If necessary the material can be hand-laid, but as with any performance asphalt care should be taken to minimise placement time to facilitate

<sup>1</sup> *TRL Road Note 42, 'Best Practice Guide for the Durability of Asphalt Pavements'*.

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## Weather Restrictions

Laying asphalt in inclement weather can increase the risk of insufficient compaction due to rapid cooling of the asphalt layers - particularly thin surfacing materials. Wind chill, resulting from cold weather working and even moderate wind speed can create particularly onerous conditions for laying asphalt surfacing materials.

TRL has produced Project Report 13, 'Acceptable weather conditions for laying bituminous materials', which provides general guidance on suitable laying conditions.

## Availability

Nypol S 89 is available throughout UK.

At certain times a 24 hour order lead time is required. Please contact your local Sales Manager/office for further advice.

## Product HSE

Nynas is accredited to ISO 9001 for Quality Standards, ISO 14001 for Environmental Standards and OHSAS 18001 for Health and Safety.

For product related HSE information please refer to the corresponding Safety Data Sheet available on request or download from our website at [www.nynas.com](http://www.nynas.com).

## Recycling

Asphalt is considered 100 % recyclable. Asphalt materials incorporating Nypol S 89 are subject to the same limitations as recycling any regular paving grade bitumen. An appropriate assessment of the properties of the reclaimed asphalt should be conducted during the design of the new asphalt mix.

## Product Support

As part of the Nynas product offer, full technical support is available before and after sales from our team of product specialists. Nynas provides assistance and advice to customers on product selection, design and end-performance needs. Contact your local Sales office for further assistance.