



TECHNICAL BULLETIN #52

SAMIfalt B380

SAMI Bitumen Technologies

12 Grand Ave
Camellia NSW 2142
PO Box 163
Granville NSW 2142
Australia
Telephone: 02 9638 0150
Facsimile: 02 9638 4983

Description

The binder designated as SAMIfalt B380 is an “engineered” Polymer Modified Bitumen using bitumen of specific characteristics modified with low to mid level of elastomeric polymers. The low to mid level of modification reduces the cost of the binder without compromising on the performance of the asphalt.

SAMIfalt B380 is recommended for use in all Dense Grade Asphalt, Stone Mastic Asphalt and Open Grade Asphalt mixes.

Features

SAMIfalt B380 has been developed by blending specialty polymers with harder grade bitumen. SAMIfalt B380 binder will provide a combination of durability benefits to the asphalt that significantly improve both the performance and life expectancy of the mix.

SAMIfalt B380 has been proven to have excellent storage stability and is homogenous under prolonged hot storage conditions. This allows the binder to be transported and stored for lengthy periods at its utilization temperature without any risk to the binder properties. SAMIfalt B380 has a greater resistance to oxidation than Multigrade binders (200% vs. 320 % under RTFO).

Unlike other polymer modified binders SAMIfalt B380 is not susceptible to phase separation during storage. The requirement to stir and circulate the SAMIfalt B380 binder is not regarded as a specific requirement during storage.

SAMIfalt B380 does not fume during the manufacturing, laying and compaction of the asphalt mix. The asphalt which incorporates SAMIfalt B380 has very good compactability and has very good hand workability at lower temperatures (around 100 degrees), fact witnessed not only in the laboratory, but also in the field whenever the binder has been used.

Performance Benefits

Laboratory testing of asphalt provides valuable information as the results are used as indicators to determine the expected field performance of a mix. Wheel Tracking and Resilient Modulus tests are a very important part of the testing regime, these tests were carried out on laboratory prepared mixes of Dense Grade AC10 in order to compare SAMIfalt B380 with other traditional asphalt binders.

Wheel Tracking: measures rutting resistance (expressed as rut depth) of the mix.

This is extremely important where there are a high percentage of heavy vehicles and/or a heavily trafficked pavement. The test carried out using the Cooper Wheel Tracking tester determines the level of rutting in wheel tracks which could be expected on a given mix under trafficking.

Results:

SAMIfalt B380	1.8 mm rut depth
Multigrade 1000/320	2.4 mm rut depth
Class C320 bitumen	7.5 mm rut depth

Resilient Modulus: measures the stiffness of the asphalt mix and is related to its load spreading capacity.

Results:

SAMIfalt B380	4400 MPa
Multigrade 1000/320	4700 MPa
Class C320 bitumen	3300 MPa

Fatigue Life: Fatigue life of an asphalt mix is expressed in number of cycles (loadings) to failure and is related to the ability of mix to withstand flexural deformation without cracking.

Results:

SAMIfalt B380	1,000,000 cycles
Multigrade 1000/320	650,000 cycles
Class C320 bitumen	100,000 cycles

Case Study

SAMIfalt B380 binder was used as the binder in dense grade AC14 and AC20 wearing course asphalt on a section of taxiway at Sydney's domestic airport. Samples taken from the Sydney Airport mix were tested for Wheel Tracking and Resilient Modulus with the following results:

AC14 Dense Graded Mix (5.6% binder content)		
Cooper Wheel Tracking (AGPT/T231)		1.7 mm rut depth
Resilient Modulus (AS 2981.13.1)		5100 MPa
AC20 Dense Graded Mix (4.7% binder content)		
Cooper Wheel Tracking (AGPT/T231)		1.2 mm rut depth
Resilient Modulus (AS 2981.13.1)		9200 MPa

There was a very good correlation between laboratory and field mix samples under Wheel Tracking testing for this project. As part of the specific performance testing for the Sydney Airport, grooved slabs were used under wheel tracking testing and the SAMIfalt B380 mixes indicated significant resistance to groove closure. This indicates a vast improvement in resistance to plastic flow and in resilience.

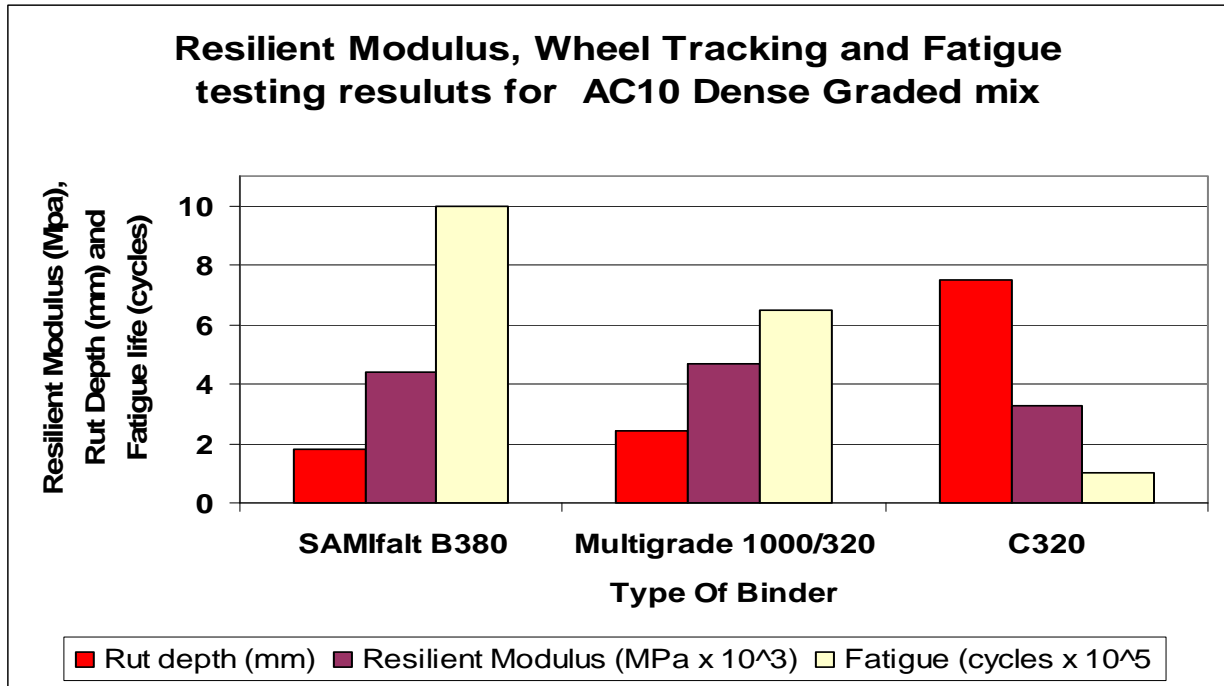
Another high profile project where SAMIfalt B380 binder has been used was for the New South Wales Roads and Traffic Authority as the binder in an intermediate layer of AC20, and in the wearing course of AC14 on a north-bound section of Olympic Drive, Lidcome (Metroad 6, Sydney), one of the busiest key arterial routes in the area with a significant percentage of heavy vehicles.

Samples from the Olympic Drive mix were also tested

AC14	Cooper Wheel Tracking (AGPT/T231)	1.0 mm rut depth
	Resilient Modulus (AS 2981.13.1)	5700 MPa
AC20	Cooper Wheel Tracking (AGPT/T231)	2.7 mm rut depth
	Resilient Modulus (AS 2981.13.1)	6200 MPa

Tests carried out by both the contractor, and the New South Wales Roads and Traffic Authority, yielded similar wheel tracking and resilient modulus values.

Comparison of SAMIfalt B380, Multigrade 1000/320 and Class 320 binders



Storage of SAMIfalt B380

Recommended storage times are as follows:

Mixing Temperature	165 – 180°C
Holding Time at Mixing Temperature	10 days
Medium-Term Storage Temperature	120 – 140°C
Medium-Term Storage Time	20 days

For storage of binders for periods longer than those listed above please contact SAMI Bitumen Technologies. Longer storage times apply to lower storage temperatures.

Temperatures

The mixing temperature and the holding time at mixing temperature on the above table, refer to the binder prior to its introduction to the mixing process. Adjustments to these temperatures may be required to allow for prevailing conditions such as pavement surface temperature, wind speed, asphalt mix type and haulage distance.

Precautions should be taken to ensure that flow meters or other batching systems are properly calibrated to take account of the different viscosity/temperature relationship of SAMIfalt B380 binder compared to conventional bitumen.

The temperature of the mix at the point of delivery to the paver should not exceed 180°C.

Laying

The minimum mix temperature in the paver should be 135°C with compaction commencing at this temperature.

Rolling

Use steel rollers with a minimum capacity of 7 tonnes and vibratory capacity (the first pass should be vibratory).

No pneumatic or rubber tyre rollers should be used until the mix cools down sufficiently, so that no “pick up” occurs.

Binder Sampling

Binder samples should be heated to between 165 - 185°C, held at this temperature for one hour and thoroughly stirred before immediately casting into test moulds. Casting test moulds at lower temperatures will result in unrepresentative test results, which may be as much as 50% below those achieved by the above procedure.

NOTE: Whilst every care is taken in the preparation of this data, no responsibility is accepted for the interpretation of the information contained herein, nor is any warranty expressed or implied for the suitability of the material for a particular application.