



TECHNICAL DATA SHEET

# PRECOAT SUPA 20

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<b>Issued and Approved by:</b>	Neil Morcombe

## 1. PURPOSE and SCOPE

This technical data sheet is intended as a guide for the use of Supa 20 as a precoating agent in Quarry operations through to the storage and use of precoated stone.

## 2. GENERAL DESCRIPTION

Bituminous Products Precoat Supa 20 is a bitumen based liquid, especially formulated to **PREVENT STRIPPING** of aggregate from road surfaces. To ensure a high degree of adhesion, even under the most adverse conditions, Precoat Supa 20 contains the optimum concentration of bitumen solids, surfactants and oils to achieve the desired rheology. Supa 20 is compatible with bitumen binders class C170 & C320 used for spray sealing applications. The specifications are formulated to the RTA QA Specification 3258 and to fall into the Testing Requirements of RTA T230 and RTA T238 and QMR 212B.

### **3. STRIPPING AND ITS CAUSES**

"Stripping" is simply the term used when the aggregate comes away from the binder or the breaking of the bitumen / aggregate adhesion bond. This process, once started is accelerated by traffic and wet conditions.

There are 3 main causes of stripping:

- I. Water**
- II. Dusty Aggregate**
- III. Type of Aggregate**

#### **3.1 WATER**

This is the main cause of stripping because most aggregates are more easily wetted by water than by bitumen ie, they are hydrophilic (water loving) or oleophobic (oil hating). Over time, water `creeps in\_ between the bitumen and the aggregate interface which displaces the bitumen causing the aggregate to separate from the bitumen binder. High silica aggregates such as granite and quartz are more prone to this problem. A coating of precoat will prevent the ingress of water and therefore prevent stripping.

Aggregate that is already saturated with water from either wet crushing or rainfall must be allowed to dry before precoating. Water saturated stone will not absorb the required amount of precoat and will not adequately bond with bitumen.

Water trapped inside the aggregate will be liberated during application to the road due to the elevated temperatures involved, which displaces bitumen at the aggregate bitumen interface and will weaken or break the bond.

#### **3.2 DUST**

When aggregate is dusty, the bitumen is preferentially absorbed onto the dust rather than the aggregate itself which will weaken the adhesion bond with the bitumen binder.

#### **3.3 AGGREGATE TYPES**

Different aggregates are sometimes classified as being alkaline or acidic. The greater the concentration of silica in the aggregate, the more acidic the aggregate. Due to the chemical composition of bitumen, the more acidic the aggregate, the weaker the aggregate bitumen bond will be. Surface texture, porosity and absorption rates of aggregate also come into consideration. The aggregate bitumen bond will be stronger for a rough surfaced and more porous aggregate. **Refer to Table Below.**

<b>M A R B L E</b>		<b>L I M E S T O N E</b>		<b>B A S A L T</b>	<b>D I O R I T E</b>		<b>G R A N I T E</b>	<b>S A N D S T O N E</b>		<b>Q U A R T Z I T E</b>
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
SILICA CONTENT										
ACIDITY										
LOW									HIGH	
LIKLYHOOD OF STRIPPING										
LOW									HIGH	

#### 4. PREVENTING STRIPPING

The answers to the stripping problem are:

- use a precoating agent with a high performance adhesion compound, able to dispel water and enhance the formation of a strong aggregate / bitumen bond.
- use washed and dried aggregate
- use aggregate less prone to stripping

***Caution should be used in the amount of cutter used by the spray sealing contractors prior to applying a precoated aggregate in the bitumen binder. This may cause another form of stripping (flushing) and carryover tracking from new work to old work.***

Bituminous Products **PRECOAT SUPA 20** contains bitumen and an anti-stripping agent in an oil flux and is designed to coat the aggregate before laying on the bitumen binder.

Because of the viscosity and surfactants present in Supa 20, excellent `wetability\_ can be achieved by spraying the aggregate whilst loading, spraying and turning the stock pile over with a loader or by a purpose built precoating system. To ensure an adequate, uniform coating of the aggregate, it is recommended that 9 - 12 litres of precoat is used to every cubic meter of aggregate. This is a guide only as aggregate absorption rates may vary. On highly absorbent stone, it may be necessary to increase application rates to ensure adequate surface coverage remains.

***Caution: The application rate of 9 litres per cubic meter is ideal for surface dry 14mm basalt. Excessive application may lead to run-off from the stone, however, application rates need to be some 5 times the recommended rate before this occurs which, of course is just a waste of money.***

To ensure that the proper application rate is maintained, it is recommended that the precoating of aggregate be performed at a quarry with mechanical precoating means with a measurable and controllable application rate.

## **5. ABSORPTION TIME**

The precoat must be allowed time to adequately penetrate the aggregate before use. The actual time required will vary with weather and the type of stone. It is recommended that at least 72 hours is allowed which should be adequate for most conditions.

## **6. APPLICATION RATES**

Our recommended application rate is 9 to 12 litres per cubic meter, however, this maybe insufficient for highly absorbent stone.

It is a reasonably simple matter to determine what the application rates should be for various types and sizes of stone. The smaller the stone, the greater the surface area to be precoated.

### **DETERMINATION OF MASS OF AGGREGATE TO APPARENT VOLUME (BULKING VALUE)**

#### **Method**

- i) Fill the 500ml measuring cylinder with water accurately to 500ml.
- ii) Tare a 500ml beaker to 0.1 of a gram and record ( $M_t$ )
- iii) Nominally fill the beaker with aggregate
- iv) Weigh and record gross of beaker and aggregate to 0.1 of a gram ( $M_g$ )
- v) Fill the beaker containing the aggregate with water and allow to stand 1 hour
- vi) Tip out aggregate and pat dry on a towel
- vii) Gently place aggregate in the empty 1000ml measuring cylinder
- viii) Pour the 500mls of water on top of the aggregate and record total volume ( $V_t$ )

#### **Calculation**

$$\text{Mass of aggregate } M_a = M_g - M_t$$

$$\text{Volume of aggregate } V_a = V_t - 500$$

$$\text{Density of aggregate } D_a = M_a \div V_a$$

$$\text{Bulking Value } BV_a = D_a \times 0.64$$

This assumes that the aggregate is spherical which, of course, it is not. The "flatter" the aggregate, the less accurate this will be but will still give an acceptable indication.

**DETERMINATION OF MINIMUM APPLICATION RATE OF PRECOAT**

i) Accurately weigh to 0.1 of a gram, about 1kg of dry aggregate into a 1L paint can and record (**M**)

ii) Calculate apparent volume of aggregate

$$AV = M \div BV_a$$

iii) Calculate amount of precoat to add at the rate of 9L per cubic meter

$$\text{Vol of precoat in mls} = AV \div 1000 \times 9$$
$$\text{Weight of precoat in grams } W_1 = \text{Vol} \times 0.88$$

vi) Add correct weight **W<sub>1</sub>** of precoat to can containing aggregate, put lid on and agitate for a few minutes

vii) Take lid off and observe stone to determine if it has been 100% coated. If not, further agitate. If still not 100% coated, add 10% more (**W<sub>2</sub>**) precoat and repeat until aggregate is adequately coated.

viii) Calculate application rate

$$\text{Application rate in litres per cubic meter} = (W_2 \div W_1) \times 9$$

**7. SUMMARY SPECIFICATION AND TECHNICAL DATA**

<b>Major Uses:</b>	Road Aggregate Precoating Agent
<b>Appearance:</b>	Black Liquid
<b>Odour:</b>	Bitumen /Mineral oil/Diesel
<b>Specific Gravity @ 25°C:</b>	0.88
<b>Flashpoint:</b>	> 62°C
<b>Boiling Point:</b>	150°C
<b>Packaging:</b>	205L drums, 1,000L bulk packs or 18,000+L tankers
<b>Recommended application rate:</b>	9 - 12 Litres per cubic meter of aggregate

## **8. HEALTH AND SAFETY**

### **Refer to Material Safety Data Sheet for full safety information**

All oils are hazardous to human health when in the form of a mist. During the spraying process, care should be taken to avoid exposure to over-spray and mist. Prolonged contact with the skin may cause irritation so PVC gloves should be worn.

## **9. ENVIRONMENTAL**

Steel containers are recyclable provided they are empty and any residual product is dry.

Precoat Supa 20 contains oil, any oils including kerosine, diesel and mineral oil will float on water in very thin films and therefore have the potential to contaminate a large area of water.

***Great care should be taken to prevent Supa 20 from entering waterways and stormwater systems.***

Spills should be contained as quickly as possible using booms and absorbent material. Consult with local authorities for disposal of clean up materials.

Precoating aggregate that is saturated with water may cause the precoat to drip from the stone, even at the recommended application rates. This is not only an environmental risk but may also cause stripping (see above).

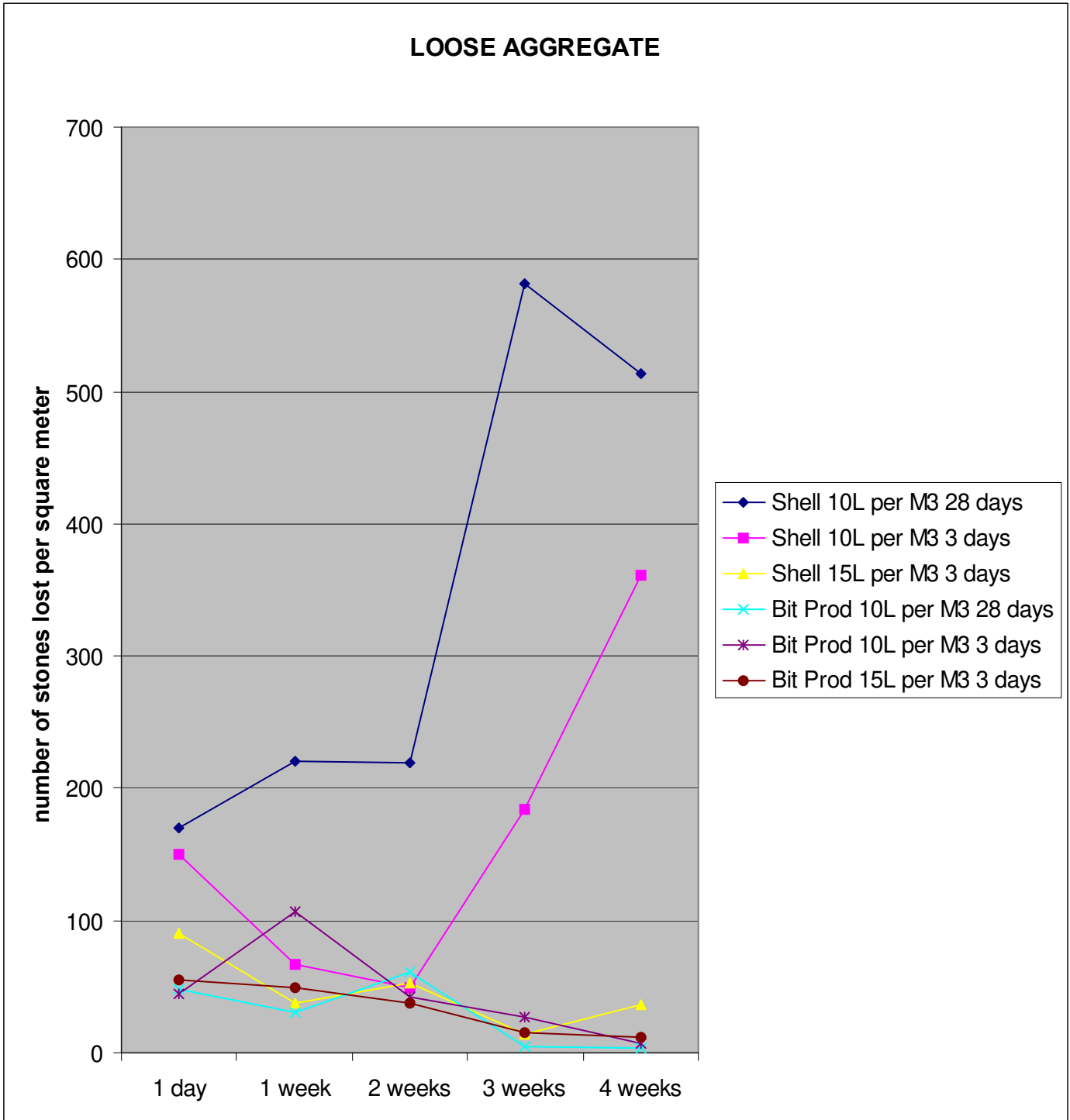
***Precoat should be applied to surface dry stone only.***

Precoated aggregate stockpiles may present an environmental risk under certain conditions. After heavy rainfall, a large amount of water can be trapped in the voids between the stone. If the aggregate is scooped up by a front end loader and dumped into a truck, the trapped water will be freed up when dropped and could run out of the tail gate onto roadways and vehicles travelling behind.

***Stockpiles should be either left to dry out after heavy rain or turned over before loading onto a truck.***

**10. SUMMARY OF RECOMMENDED BEST PRACTICES**

- Precoat Supa 20 is used
- Aggregate is allowed to dry before precoating
- The least acidic aggregate available is used
- Aggregate with roughest available texture is used
- Aggregate is as dust free as possible
- Amount of cutter used is kept to a minimum
- Precoat application rate has been optimised for the type of stone and conditions
- Precoat application rate is controlled
- 72 hours is allowed between precoating and use of the aggregate
- Stockpiles are turned over before loading onto trucks after rainfall



These are the results of a test conducted by Queensland Main Roads. Shell and Transpacific Bituminous Products precoats were applied to 14mm Hornsfels at both the recommended rate of 10 litres per cubic meter and were stockpiled for 3 days and 28 days. They were also applied at 50% over the recommended rate at 15 litres per cubic meter and stockpiled for only 3 days.

**Results:**

Aggregate precoated with Shell material at the normal application rate completely strips within 4 weeks. Application of Shell precoat needs to be 50% over the recommended rate before it works. Transpacific Bituminous Products precoat does not strip regardless of the application rate or the time that the precoat has been stockpiled.