

# LABORATORY TEST AND PERFORMANCE EVALUATION OF SEAL COAT MATERIAL

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## ABSTRACT

*A good asphalt pavement will not last forever; outside variables crush the black-top oil that ties it all together. Gradually at to start with, rapidly over the long haul. When the crisply laid hot black-top asphalt blend starts to cool, so additionally starts the maturing procedure which will inevitably loot the asphalt of its life. Whenever oxygen and water, which continually bathe the asphalt, begin to join with the asphaltic fastener of the asphalt, a synthetic change happens. Warmth and daylight will quicken the decay procedure; salt will go about as an impetus. Water which infiltrates the surface can get into the base course to bring about inconvenience, and in the meantime begin oxidizing the asphaltic folio inside the asphalt. A thicker blend won't oxidize as quickly as a coarse, open asphalt. A thicker lift of asphalt will keep its life longer than a slight one.*

*Seal coating the black-top asphalt with Seal coat-1 and 2, a slurry sealcoat that has been experimentally created by me can secure the asphalt against all these dangerous elements. Black-top is not as extreme as it looks. Black-top asphalts, for example, garages and parking garages are ceaselessly being built however shockingly are not enduring the length of they used to. A large number of us recall asphalts enduring 15, 20 years or more with practically zero support.*

**Keyword:** - Seal coat, seal coat evaluation, seal coat performance

## 1. INTRODUCTION

Sealcoat is a liquid that is connected to black-top to shield it from oxidation and the harm created by winter breaking, and in addition UV beams and movement. In zones of the world that experience solidifying and defrosting, the reapplication timetable will probably be accelerated. Black-top seal coats are made out of a dainty layer of a black-top material, for example, reductions, black-top emulsions, or clearing grade black-top concrete. Modifiers are regularly added to the asphaltic fluid blend and may incorporate elastic, latex, polymers, and rejuvenators.

Asphalt pavement, to keep in basic terms, is fundamentally shake and/or stone and rock, alongside a fastener. The stone, or total, is held together with this fastener otherwise called black-top concrete. The fastener is made from the refining procedure of certain rough oils. Keeping up this cover is key in dragging out the weakening of black-top surfaces. Downpour, U.V. beams, and chemicals, as they are brought into the black-top, will debase the fastener and hence start the corruption procedure of the black-top. This will proceed and make a surface that turns weak. To diminish the impacts of these components, it is critical to execute a support program that uses sealcoating to develop the life of your parking garage or carport.

Sealcoating is really a typical kind of street reemerging done on BC roadways. It includes the use of an exceptional blend to the street that shields the street base from extra wear and tear. So it's sort of like a little coat, yet for streets. When it's connected over existing asphalt, sealcoating is a truly financially savvy method for restoring that expands the life of the street via fixing out dampness. It additionally gives a slide safe, against glare surface amid wet climate and, in light of the fact that it solidifies the surface of rock streets, it gives a without dust driving surface.

Since asphalt pavement is a petroleum based item, other petroleum items may respond with the surface. This incorporates vehicle oil and gas. The seal coat may go about as a makeshift boundary against those materials. A seal coat is not a split filling operator; this must be done preceding applying the seal coat. Seal coating may diminish the grating or hostile to slide properties connected with the uncovered totals in black-top.

The crucial inspiration to seal coat a dark top asphalt pavement is to shield the pavement from the rotting effects of sun and water. Exactly when a dark top black-top is displayed to sun, wind and water, the asphalt hardens, or oxidizes. This causes the black-top to wind up more delicate. Hence, the black-top will part since it can't bend and flex when displayed to action and temperature changes. A seal coat fights this condition by giving a waterproof film which backs off the oxidation methodology and also helps the black-top to shed water, keeping it from entering the base material.

A helper favorable position of seal covering is an extension in the surface get in touch with it gives. This is refined by the additional surface the spread aggregate adds to the black-top. With time, movement begins to wear the fine material from an asphalt black-top surface. This result in a condition implied as raveling. Right when enough of the fine material is worn off the black-top surface, development is driving generally on the course add up to. As these aggregate particles get the chance to be smooth and cleaned, the roadway may get the opportunity to be slippery, making it difficult to stop quickly. A seal coat fabricates the black-top organization and developments the surface disintegration properties.

## 2. CONDITION CONDUCTIVE TO LONG LASTING SEAL COATS

Sealcoats are influenced incredibly by climate conditions, particularly amid development. The perfect conditions are a warm, sunny day with low dampness. Stickiness and cool climate will postpone the curing time and cause the seal coat to be delicate for a more drawn out timeframe making it more helpless to harm by activity. Downpour can bring about significant issues when seal covering. In the event that the black-top folio has not cured, it can get to be weakened and transcend the highest point of the spread total. After the water dissipates, black-top may cover the whole surface making tires get total or track the fastener over the surface. Seal covering ought to never be done when showers are debilitating. Pavement to be seal covered ought to likewise be in moderately great condition. This implies there ought to be little, assuming any, heap related pain, for example, crocodile breaking, rutting and potholes. In the event that these conditions exist, the garage ought not to be fixed unless it is repaired first. In rundown, seal covering is a decent upkeep strategy for asphalts pavement with the following:

- Low to moderate block cracking.
- Low to moderate raveling.
- Low to moderate transverse and longitudinal cracking.
- A smooth surface with low friction numbers.

## 3. ADVANTAGES OF SEAL COAT

There are many benefits to sealcoating the asphalt to your driveway or parking lot. Think of sealcoating more of as a preventative maintenance for your driveway or parking lot, similar to how you paint your home to keep the weather from deteriorating the wood.

Sealcoating the asphalt, seals the small cracks that can turn into large cracks and prevents water from seeping down to the base material. The dark black color of newly applied sealcoat improves the appearance of new and old asphalt, making your driveway or parking lot look near brand new.

New sealcoating can preserve the resilience of asphalt surfaces and help hide small cracks, patches and rough spots as well as making traffic lines on parking lots more visible. Sealcoat that is applied correctly makes your asphalt driveway look cleaner because rain washes dirt and debris easily away from the smooth, non-porous surface.

- Protect and extend the lifespan of your driveway or parking lot
- Prevents water from penetrating the surface which leads to cracking
- Protects against oxidization from the sun (paving materials become dry, brittle)
- Prevents erosion of asphalt
- Costs pennies a square foot compared to repairs
- Prevents oils and salt from breaking down the asphalt
- Aides water run off
- Limits pooling of water
- Slows down surface cracking

- Prevents slip and fall injuries
- Enhances the aesthetics and curb side appeal of property

#### 4. SEAL COAT-1 AND 2 PROPERTIES

**Table 1: Properties of seal coat-1 and seal coat-2**

SR NO.	MATERIAL SEAL COAT-1	MATERIAL SEAL COAT-2	CONTENT (%)
1	VG-10 BITUMEN	VG-30 BITUMEN	75%
2	ANTI-STRIPPING AGENT	ANTI-STRIPPING AGENT	1%
3	SOLVENT	SOLVENT	24%

#### 5. LABORATORY TEST RESULT OF SEAL COAT-1 AND 2

**Table 2: Test result of seal coat-1**

SR NO.	CHARACTRICTS	TEST RESULT	LIMITES IS: 217-1998
1	Residue from distillation up to 360°c percent volume by difference	75%	67-100
2	Test on residue (a) Viscosity (b) Ductility at 27°c,cm (c) Solubility in trichloroethylene	674 103 100%	300-1200 100 100
3	Water content percent by mass	0.2%	0.2%

**Table 3: Test result of seal coat-2**

SR NO.	CHARACTRICTS	TEST RESULT	LIMITES IS: 217-1998
1	Residue from distillation up to 360°c percent volume by difference	75%	67-100
2	Test on residue (a) Viscosity (b) Ductility at 27°c,cm (c) Solubility in trichloroethylene	712 109 100%	300-1200 100 100
3	Water content percent by mass	0.2%	0.2%

## 6. SKID RESISTANCE TEST ON SEAL COAT

The resistance of wet road surfaces to skidding can be checked by means of a Portable Skid-resistance Tester (Portable Pendulum Tester). This apparatus developed at the Road Research Laboratory is used to measure the frictional resistance between a rubber slider (mounted on the end of a pendulum arm) and the road surface. This method provides a measure of frictional property, macrotexture of surfaces, either in the field or in the laboratory.

The quantity measured with the portable tester has been termed "Skid-resistance" and this correlates with the performance of a vehicle with patterned types braking with locked wheels on a wet road at 50 km/h.



**Figure 1: Skid resistance equipment**

**Table 4: Test value of skid resistance on seal coat-1 and 2**

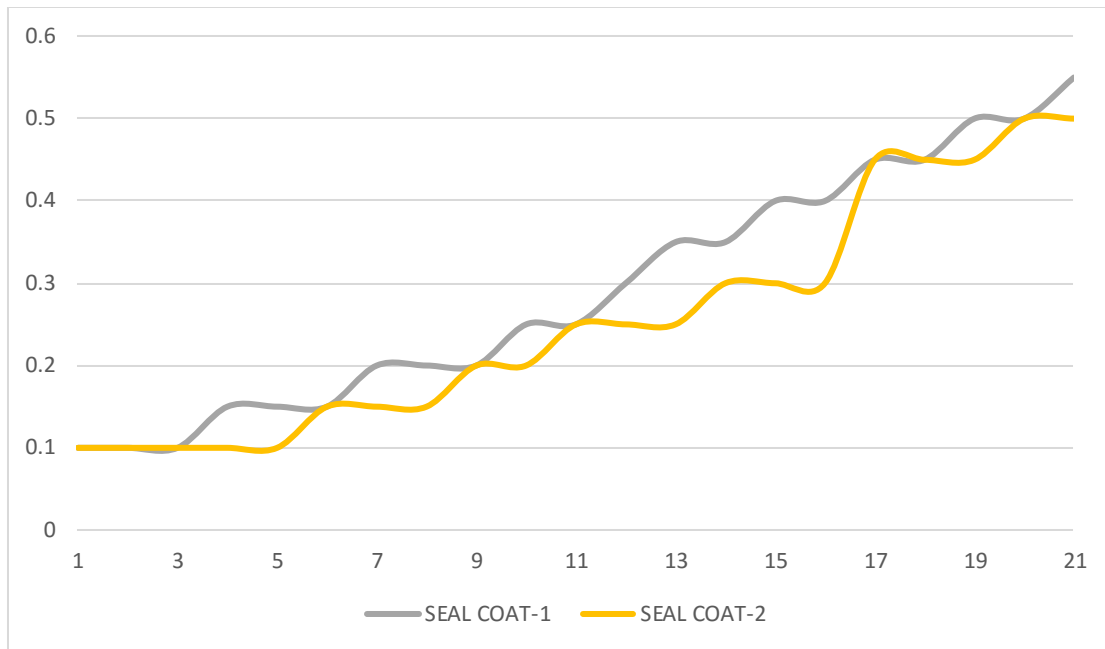
## 7. WATER SEEPAGE TEST

Prepare a Marshall mould or a sheet sample of the BC grade. On sample place the 80 mm diameter funnel. The funnel was fixed with the epoxy or silicon on the sample. Then apply the water drop in to the funnel through the high burette. The drop of water level in the burette was recorded from the time to time during 21 days.

**Table 5: The results are expressed in ml. of water seepage**

No. of Days	Sample with- out coating ml./hour	Sample coated with Seal coat-1 ml./hour	Sample coated with Seal coat-2 ml./hour
1	5	0.10	0.10
2	5	0.10	0.10
3	10	0.10	0.10
4	10	0.15	0.10
5	10	0.15	0.10
6	10	0.15	0.15
7	15	0.20	0.15
8	15	0.20	0.15
9	15	0.20	0.20
10	20	0.25	0.20
11	20	0.25	0.25
12	25	0.30	0.25
13	25	0.35	0.25
14	30	0.35	0.30
15	30	0.40	0.30
16	30	0.40	0.30
17	35	0.45	0.45

SR. NO	TEST LOCATION	SKID RESISTANCE VALUE			
		PRODUCT	ACTUAL	DRY	WET
1	CSIR- CRRI internal road new Delhi	Seal coat-1	60	78	68
2	CSIR- CRRI internal road new Delhi	Seal coat-2	60	84	72
18	35		0.45		0.45
19	40		0.50		0.45
20	45		0.50		0.50
21	50		0.55		0.50

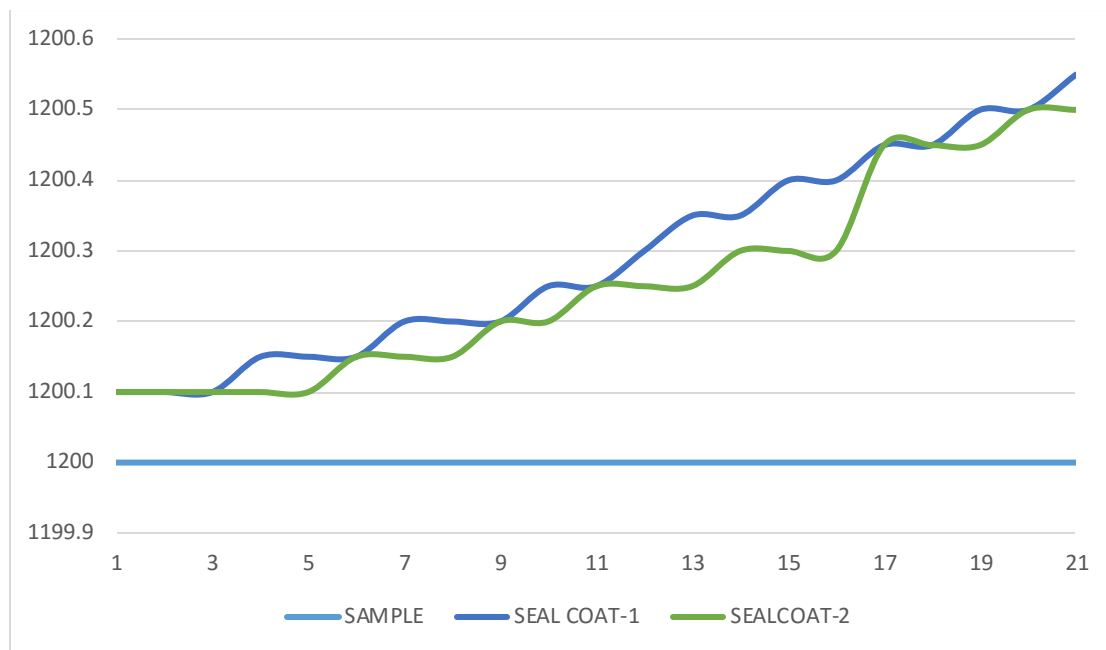


**Chart 1: water seepage of ml/hour**

At the rate of application generally used, in the order of form about 0.7Kg/m<sup>2</sup> to about 4Kg/m<sup>2</sup>, the composition penetrates in to the top layer of the concrete asphalt surface and impregnates this layer. Practically no actual layer is formed on top of the original one and the main quantity of impregnating SEALCOAT is concentrated in the upper 0.7 to 1 mm. Concrete asphalt surfaces of roads and the like have ascertain porosity and this facilitates the penetration of SEALCOAT into the uppermost layer of such existing surface.

**Table 6: The results are expressed in weight of water seepage**

No. of Days	Sample	Sample with- out coating Weight	Sample coated with Seal coat-1 Weight	Sample coated with Seal coat-2 Weight
1	1200	1205	1200.10	1200.10
2	1200	1205	1200.10	1200.10
3	1200	1210	1200.10	1200.10
4	1200	1210	1200.15	1200.10
5	1200	1210	1200.15	1200.10
6	1200	1210	1200.15	1200.15
7	1200	1215	1200.20	1200.15
8	1200	1215	1200.20	1200.15
9	1200	1215	1200.20	1200.20
10	1200	1220	1200.25	1200.20
11	1200	1220	1200.25	1200.25
12	1200	1225	1200.30	1200.25
13	1200	1225	1200.35	1200.25
14	1200	1230	1200.35	1200.30
15	1200	1230	1200.40	1200.30
16	1200	1230	1200.40	1200.30
17	1200	1235	1200.45	1200.45
18	1200	1235	1200.45	1200.45
19	1200	1240	1200.50	1200.45
20	1200	1245	1200.50	1200.50
21	1200	1250	1200.55	1200.50



**Chart 2: After water seepage weight of sample**

## 8. RESULT AND DISCUSSION

Seal coat have of excellent adhesive and waterproofing properties. The open chain provides easy access to weather, salts, and chemicals to attack and disintegrate the asphaltic molecules. The first visual sign of this phenomenon is a progressive change in the color of asphalt pavement from rich black to brown to gray. Roads, having the advantage of continuously rolling traffic, do not need protection because the rolling action of the traffic steadily brings the lower layers, rich in asphalt, to the surface and "kneads" the oxidized surface layers back into the pavement. The rate of pavement deterioration depends upon the traffic volume as well as climatic conditions. The next step is the development of minor cracks which widen and deepen with time. If the cracks are not repaired at this stage, water seeps into the base courses and damages the pavement's load bearing capacity. It is evidenced by rutting, shifting, and serious cracking. The pavement then must be either overlaid or completely removed and reinstalled, depending on the condition. The surface layers of road pavements are under continuous attack from the weather and other destructive elements, eventually developing minor surface cracks. Again, aggregates start unravelling producing minor cracks which widen and deepen with time. The damage will continue if proper protective actions are not taken.

## 9. REFERENCE

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