Technical Sheet…

CHEMICAL ENVIRONMENTS

The extremely dense structure of Densiphalt confers good chemical resistance, since chemicals are generally unable to penetrate and cause damage. Densiphalt is resistant to mineral oils, most salts and dilute acids but may be susceptible to attack in certain situations.

DURATION AND TYPE OF CHEMICAL ATTACK
A constant flow of the fresh chemical at a constant Concentration is likely to do more damage to Densiphalt than pools of chemicals, where the Concentration and thus degree of attack – gradually decrease.

TEMPERATURE
As chemical attack increases with temperature, the danger can often be avoided by keeping the temperature low.

MECHANICAL LOADING
If Densiphalt is exposed to chemicals at the same time as wear or impact loading, the attack will be more aggressive than for chemical exposure alone.

The following information is required to assess the effect of a particular chemical on Densiphalt:

- Type of chemical.
  Its concentration or pH.
- Curing period for the flooring before chemical contact.
- Duration and type of chemical attack.
- Temperature, both ambient and of the chemical. The higher the temperature, the greater the attack.
- Any mechanical loading.

The more information there is about the nature of the chemical exposure, the more accurate will be the assessment of the potential for attack to Densiphalt.

In the following table, the deleterious effects of a large number of substances on Densiphalt are evaluated. It is important to note that, for the most part, the information provided is based on evaluations rather than tests. The table should, therefore, be thought of as a guide.

In a specific situation it may be necessary to carry out laboratory tests to make a precise evaluation of a substance. The assessments are made upon the basis of a standard surface. A significant reduction in resistance to oils and solvents can be expected if the surface is ground.

Type of Chemical substance;

Acids & Bases

In general, Densiphalt mortar will be attacked when the ph Falls below 5 or is greater then 13. Certain acids and bases are more aggressive than others in the same pH range. Organic acids are especially aggressive towards Densiphalt mortar. Bitumen in the asphalt component of Densiphalt can be attacked by nitric acid, concentrated hydrochloric acid and sulphuric acid, whereas dilute sulphuric acid and other mineral acids will not attack it.

Solvents

Organic solvents and phenols will dissolve bitumen in the asphalt component of Densiphalt.

Indirectly aggressive substances

Certain chemicals, which in themselves will not harm Densiphalt, can be transformed to other substances that will attack the mortar. For example, although blood is not corrosive, bacterial breakdown can produce organic acids, such as lactic acid and propionic acids, which can be very aggressive towards the mortars. Similar reactions can occur for other substances.

Concentration of the chemical substance

Most chemicals become more aggressive with increased concentration. However, attack by indirectly aggressive substances is independent of concentration. This is especially applicable to EDTA (Ethylene Diamine Tetra Acetate), often present in cleaning agents. EDTA will attack Densiphalt mortar.

SUBSTANCE	Substance group	Decom-position	Destructive effect	Comment
Abattoir waste	o.	yes	● !	Blood + others decompose to organic acids. ❷
Acetic acid*	org. acid	no	▼	Ⓜ
Acetone	org. sol.	no.	▼	High volatility reduces degree of attack. Ⓑ❷
Aluminium sulphate*	i.	no	●	❷
Ammonium carbonate*	i.	no	●	
Ammonium chloride*	i.	no	●	
Ammonium nitrate	i.	no	●	
Ammonium sulphate	i.	no	●	❷
Animal fat*	i.	yes	● !	❷
Animal waste	o.	ja	● !	Blood and other substances decompose to organic acid. ❷
Beer*	o.	yes	●	❷
Blood*	o.	yes	● !	Blood and other substances decompose to organic acid. ❷
Boric acid*	inorg. acid	no	●	
Calcium chloride*	i.	no	●	
Calcium hydroxide*	inorg.base	no	●	
Calcium sulphate*	i.	no	●	❷
Carbon dioxide (gas)*	i.	no	●	❷
Carbonic acid (dissolved)*	i.	no	▼	Ⓜ❷
Copper sulphate	i.	no	●	❷
Ethyl alchohol*	org. sol.	no	▼	High volatility reduces degree of attack. Ⓑ❷
Ethylene glycol*	o.	no		❷
Fatty acid	o.	yes	▼▼	Dependent upon chain length. Ⓜ❷
Fermenting fruit, grain, vegetables or extract*	o.	yes	● !	Fermenting processes from lactic acid and other organic acids. ❷

SUBSTANCE	Substance group	Decom-position	Destructive effect	Comment
Fertiliser (artificial)		no	●	
Fertiliser (natural)	o.	yes	● !	❷
Fish waste	o	yes	● !	Blood and other substances decompose to organic acids. ❷
Formic acid*	org. acid	no	●	Minor attack at very high concentrations. Ⓜ
Fruit juice*	o.	yes	● !	Can contain fruit acids, sugar, or similar. ❷
Fuel oils	o.	yes	▼▼	Low volatility increases degree of attack. Ⓑ Can contain fatty acids, in which case will attack. Ⓜ❺
Humic acid	org. acid	(yes)	● – ▼	> 25% = ▼
Hydrochloric acid*	inorg. acid	no	▼▼ - ▼▼▼	> 30% = ▼▼▼ Ⓑ Ⓜ
Hydrofluoric acid	inorg. acid	no	▼▼ - ▼▼▼	>10% = ▼▼▼ Ⓑ Ⓜ
Lactic acid*	org. acid	(yes)	▼ – ▼	> 25% = ▼▼
Lye	inorg. base	no	● – ▼▼	> 15% = ▼ > 25% = ▼▼ See Sodium hydroxide. Ⓜ
Magnesium sulphate*	i.	no	▼	Ⓜ❷
Methyl alchohol	org. sol.	no	▼	High volatility reduces degree of attack. Ⓑ❺
Milk*	o.	yes	● !	❷
Molasses*	o.	yes	●	❷
Nitric acid	inorg. acid	no	▼▼ - ▼▼▼	> 20% = ▼▼▼ Ⓑ Ⓜ
Oils	o.	yes	▼▼	Low viscosity oils lead to greater degree of attack than high viscosity oils. Ⓑ
Oxalic acid	org. acid	(yes)	●	
Petrol	org. sol.	no	▼	High volatility reduces degree of attack. Ⓑ❺
Phenol	org. sol.	no	▼	Ⓑ Ⓜ at very high concentrations.❺

SUBSTANCE	Substance group	Decom-position	Destructive effect	Comment
Phosphoric acid*	inorg. acid	no	▼▼	Ⓑ Ⓜ
Potassium aluminium sulphate*	i.	no	●	❷
Potassium hydroxide	inorg. base	no	▼	Ⓜ
Potassium nitrate	i	no	●	
Potassium sulphate*	i	no	●	❷
Salpetre	i.	no	●	See Potassium nitrate.
Sea water		no	●	
Silage		yes		Contains organic acids and is therefore aggressive. Ⓜ
Soda*	i.	no	●	
Sodium chloride*	i.	no	●	
Sodium hydroxide*	inorg. base	nej	● – ▼▼	> 15% = ▼ > 25% = ▼▼ Se Lye. Ⓜ
Sodium nitrate*	i.	nej	●	
Sodium sulphate	i.	nej	●	❷
Sour milk*	o.	yes	▼	Lactic acid. Ⓜ❷
Sugar*	o.	yes	● !	❷
Sulphuric acid	inorg. acid	no	▼▼ – ▼▼▼	> 30% = ▼▼▼ Ⓑ Ⓜ
Sulphurous acid	inorg. acid	no	▼▼▼	Minor attact upon bitumen. Ⓜ
Tensides cationic, non-ionic, anionic		no	●	❷
Thawing salt	i/o.	no/yes	●	❷
Toluene	org. sol.	no	▼	High volatility reduces degree of attack. Ⓑ❺
Urea*	o.	yes	●	❷
Vegetables*	o.	yes	● !	Can contain organic acids, sugar, or similar. ❷
White spirits	org. sol.	no	▼	High volativity reduces degree of attack. Ⓑ❺
Wine*	o.	yes	▼	Ⓑ❷

REMARK

If Densiphalt® comes into contact with chemicals before the recommended curing period has elapsed, the resultant reactions cause:

- **An expansion that makes the structure more porous.**
- **Cessation of the curing process. As a result, the final structure of the Densiphalt® will not be as dense and impermeable as it would normally be and so will not have the expected chemical resistivity.**

LEGEND

*	Sometimes used in the food industry.	o.	Organic material.
●	No destructive effect.	i.	Inorganic material.
▼	Weak destructive effect.	org. acid	Organic acid.
▼▼	Strong destructive effect.	inorg. acid	Inorganic acid.
▼▼▼	Very strong destructive effect.	org. sol.	Organic solvent.
!	Potential indirectly aggressive substance.	inorg.base	Inorganic base.
❷	**Recommended curing days at 20°C:** States whether a curing time longer than 24 hours at 20°C is of importance for the deteriorating effect of a particular substance, especially with regard to penetration of substances which can affect the reactivity of the mortar.	Ⓑ	Attack upon bitumen.
		Ⓜ	Attack upon mortar.

Reference:
Ulla Kjær, "Concrete in an aggressive environment", Beton-teknik, 3.3.1974.

CURING TIME

With well-cured Densiphalt, any chemical reaction will occur only at the surface because, once the extreme density of the Densiphalt mortar has developed, most chemicals are unable to attack it.

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