PPG NOVAGUARD™ 650

Chemical Resistance Guide

Validity of this list

This resistance list supersedes all earlier issues. The information provided in this resistance list is to the best of our knowledge correct and given in good faith. It is not intended to be exhaustive and the list of cargoes is subject to change without notice. The data is liable to modification, based upon experience and our policy of continued product development. The advice provided, as guidance only, is based upon user reports and laboratory testing that are believed to be reliable.

As many cargoes can be variable in composition and we have no control over the use of our products in service conditions, we accept no responsibility for the performance of the product or any loss or damage whatsoever, arising out of such use.

Substrate and curing

The first coat of the system must be applied directly to the steel substrate which has been blasted in-situ to a minimum of ISO-SA 2½ freed from rust, scale, water soluble salts and other foreign matter. Application of the systems must be carried out in accordance with the respective product data and system sheets. After application of the full system has been completed, the system has to be cured under specified conditions for at least the minimum period indicated in system and product data sheets.

Exposure of the coating to an aggressive cargo before the coating has obtained full cure, may permanently affect the resistance properties of the system.

This list is not valid when shop primers are present under the coating system. Shop primers must be completely removed.

Notation

Ref. note : refers to note in table 1
Max. temp.: refers to maximum temperature allowed for the specific cargo

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Table 1: Reference notes

<table>
<tr><th>Note</th><th>Description</th></tr>
<tr><td>2</td><td>These products may cause some discoloration of the coating. These products are variable in composition, depending on source, and consequently the effects on the coating can also differ. Subsequent cleaning of the tanks may be difficult so that contamination of the subsequent products may occur.</td></tr>
<tr><td>3</td><td>Vegetable and animal oil, fats, greases and waxes are esters of polyols with fatty acids and nearly always contain free fatty acid. If in contact with water at higher temperatures these esters can saponify, resulting in increased free fatty acid content. Free fatty acids, especially the short chain types, can be very aggressive to tank coatings. Thus, during loading, storage and discharge the acid values should not exceed the maximum values indicated in the table.
<table>
<tr><th>Coating System</th><th>Maximum Acid Value (acc.to ISO 660 (1996))</th><th>Approximate Percentage Free Fatty Acid</th></tr>
<tr><td>PPG NOVAGUARD 650</td><td>10</td><td>6-10 %</td></tr>
</table>
This acid value according to ISO 660 (1996) is the only accepted method to determine a cargo's suitability for storage. The free fatty acid percentages given are a guide as the acid value is dependent on the molecular weight of the Fatty Acid(s). The fatty acids (including fatty acid distillates and acid oils) accepted in this list can be stored provided they comply with the following criteria:

- The water content must be limited to 1.0 percent maximum;
- No free mineral acid content is permitted.</td></tr>
<tr><td>16</td><td>This is a generic name. Most of these products can be stored but it should be established that no notes are included under the specific type name of such a product elsewhere in the list.</td></tr>
<tr><td>21</td><td>Automotive gasolines can vary widely in composition. Addition of considerable amounts of aromatic and/or oxygenated solvents are common. When these cargoes have to be transported the tank coating should be fully cured.

Limits for oxygenated solvents (in volume) as set out in European Directive 2003/17/EC.
<table>
<tr><th>Parameter</th><th>Unit</th><th colspan="2">Limits</th></tr>
<tr><td></td><td>Minimum</td><td>Minimum</td><td>Maximum</td></tr>
<tr><td>Hydrocarbon
- Olefins
- Aromatics
- Benzene</td><td>% v/v</td><td>
-
-
-</td><td>6-10 %</td></tr>
<tr><td>Oxygen content</td><td>% m/m</td><td>-</td><td>2,7</td></tr>
<tr><td>Oxygenates:
- Methanol, stabilising agents must be added
- Ethanol, stabilising agents may be necessary
- Iso-propyl alcohol
- Tert-butyl alcohol
- Iso-butyl alcohol
- Ethers containing 5 ort more carbon atoms per molecule</td><td>
% v/v

% v/v

% v/v
% v/v
% v/v
% v/v</td><td>
-

-

-
-
-
-</td><td>
3

5

10
7
10
15</td></tr>
<tr><td>Other oxygenates (2)</td><td>% v/v</td><td>-</td><td>10</td></tr>
<tr><td>Sulphur content</td><td>mg/kg</td><td>-</td><td>150</td></tr>
<tr><td>Lead content</td><td>g/l</td><td>-</td><td>0,005</td></tr>
</table>
Notes:
(1) Except for unleaded petrol regular (minimum motor octane number (MON) of 81 and a minimum research octane number (RON) of 91) for which the maximum olefin content shall be 21% v/v. These limits shall not preclude the introduction on to the market of a Member State of another unleaded petrol with lower octane numbers than set out in this Annex.
(2) Other mono-alcohols with a final distillation point no higher than the final distillation point laid down in national specifications or, where these do not exist, in industrial specifications for motor fuels.

Blending of automotive gasolines with above mentioned additives in the tank are not acceptable.

For products added but not mentioned in this note, PPG PMC must be contacted before storage of these cargoes.</td></tr>
</table>

If in doubt, refer to PPG Technical Service

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Chemical Environment	Ref. Note	Max. Temp.
1-PENTENE		
AIRCRAFT GASOLINE		
ALKYLATES FUEL		
ALPHA-OLEFIN (C 16-C 18)		
ASPHALT EMULSIONS	16, 2	
ASPHALT SOLUTION (LLOYDS CH.9)	16, 2	
AVIATION FUEL OILS 1 AND 2		
AVIATION FUEL OILS 1-D AND 2-D		
AVIATION GASOLINE		
AVIATION KEROSENE		
AVIATION STRAIGHT RUN (LLOYDS CH.9)		
BENZINE, PETROLEUM	21	
BLACK OIL (GASOLINES/NAPHTAS)		
BLENDING STOCKS (LLOYDS CH.0)	16, 2	
BRINE		
BUNKER OIL		
CRUDE OIL (HIGH & LOW SULPHUR)	2	60
CYLINDER BRIGHT STOCK OIL		
CYLINDER STREAM REFINED STOCK OIL		
DIESEL OIL		
DISTILLATES (INCL. STRAIGHT RUN, LLOYDS CH.9)		
ENGINE OIL		
ETHYLBENZENE		
FLASHED FEED STOCK DISTILLATE		
FRESH WATER		
FUEL OIL NR.4		60
FUEL OIL NR.5		60
FUEL OIL NR.6		60
FUEL OILS		
GAS OIL CRACKED		
GASINGHEAD (NATURAL)		
GASOLINE	21	
GASOLINE AUTOMOTIVE	21	60
GASOLINE BLENDING STOCKS		
GREASE	3	60
JET FUELS JP-1 (KEROSENE)		
JP-3		

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Chemical Environment	Ref. Note	Max. Temp.
JP-4		
JP-5 (KEROSENE HEAVY)		
KEROSENE (JP-1)		
LUBE OIL	16	
LUBE OIL BLENDING STOCKS	16	
LUBRICATING OILS	16	
MINERAL OILS		60
MINERAL SPIRIT		
MOGAS OILS	21	
MOTOR OILS		
N-HEPTANE		
N-HEXANE		
NAPHTA	16	
NORMAL PARAFFIN		
OILS CLARIFIED (LLOYDS CH.9)		
OILS MINERAL		60
OLEFIN (C 13 AND ABOVE, ALL ISOMERS)		
PARAFFIN		60
PENETRATING OIL		
PETROL	21	
PETROLATUM		
PETROLEUM SPIRIT		
PETROLEUM, CRUDE		
PETROLEUM, NAPHTA		
PETROLEUM, REFINED		
POLYMER FUEL (LLOYDS CH.9)		
REFORMATES		
RESIDUAL FUEL OIL	2	
ROAD OIL (LLOYDS CH.9)		
ROOFERS FLUX	16, 2	
SEA WATER/SALT WATER		
SOLVESSO 100, 150		
SOUR CRUDE OIL	2	60
SPINDLE OIL		
STRAIGHT RUN RESIDUE		
TRANSFORMER OIL		
TRIMETHYL BENZENE		

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Chemical Environment	Ref. Note	Max. Temp.
TURBINE OIL		
TURBO OIL		
V M & P NAPHTA		
WATER (BALLAST)		
WATER SEA		
WATER, DEIONIZED		
WATER, DISTILLED		
WHITE OIL		
WHITE SPIRITS		
XYLENE		

Visit **ppgpmc.com** or contact:
Asia Pacific ✆ +86-21-6025-2688 ✉ ppgpmc.ap@ppg.com | **Europe, Middle East and Africa** ✆ +32-3-3606-311 ✉ customers@ppg.com
Latin America ✆ +57-1-8764242 ext. 201 ✉ ppgpmcandean-ca@ppg.com | **North America (US & Canada)** ✆ +1-888-9PPGPMC ✉ PMCMarketing@ppg.com