

## NAP Free Hybrid Coolant

NAP Free Hybrid Coolant is an ethylene glycol based engine coolant concentrate formulated for optimum performance in heavy duty diesel engine applications but equally suitable for light duty use. It employs established inhibitor technology and is nitrite, amine and phosphate (NAP) free. BTC Classification Type 3E

The inhibitors in NAP Free Hybrid Coolant include organic acids in combination with borate and silicate to provide excellent corrosion protection in all applications.

NAP Free Hybrid Coolant uses a superior silicate stabilisation technology to eliminate the potential for formation of silicate gel often observed with inferior products whilst other additives ensure good compatibility with hard water and prevent the formation of scale that can result from use of hard water.

### Physical Properties

| Parameter                                | Method      | NAP Free Hybrid Coolant | ASTM D3306    |
|--|-------------|-------------------------|---------------|
| Appearance                               | Visual      | Clear liquid *          | Not Specified |
| Density @20°C mg/cm <sup>3</sup>         | ASTM D 4052 | 1.123                   | 1.110 – 1.145 |
| Equilibrium Reflux Boiling Point °C      | ASTM D 1120 | 170                     | 163 min       |
| Freezing Point °C (50% Dilution by vol.) | ASTM D 1177 | -40                     | -37 max       |
| Freezing Point °C (33% Dilution by vol.) | ASTM D 1177 | -20                     |               |
| pH (50% vol.)                            | ASTM D 1287 | 8.0                     | 7.5 – 11.0    |
| Reserve Alkalinity 0.1N HCl              | ASTM D 1121 | 15                      | Report        |
| Water Content                            | ASTM D 1123 | 3                       | 5 max         |
| Foaming Properties                       | Vol. (ml)   |                         | 150 max       |
|  | Break (s)   | ASTM D1881              | 5 max         |

\* Product can be supplied colourless or dyed in accordance with customer requirements.

## Corrosion Protection

### ASTM D1384 Glassware Corrosion Test Results

|                                | Weight Loss mg/ Coupon |        |       |       |           |           |
|--------------------------------|------------------------|--------|-------|-------|-----------|-----------|
|                                | Copper                 | Solder | Brass | Steel | Cast Iron | Aluminium |
| <b>ASTM D3306 (max)</b>        | 10                     | 30     | 10    | 10    | 10        | 30        |
| <b>NAP Free Hybrid Coolant</b> | 0.9                    | 2.0    | 1.0   | 0.9   | 0.2       | -2.8      |

### ASTM D 4340 Corrosion of Aluminium under heat rejecting conditions

|                                | Weight Loss mg/ cm <sup>2</sup> /week |
|--------------------------------|---------------------------------------|
| <b>ASTM D 3306 (max)</b>       | 1.0                                   |
| <b>NAP Free Hybrid Coolant</b> | 0.2                                   |

### ASTM D2570 Simulated Service Corrosion Test

|                                | Weight Loss mg/ Coupon |        |       |       |           |           |
|--------------------------------|------------------------|--------|-------|-------|-----------|-----------|
|                                | Copper                 | Solder | Brass | Steel | Cast Iron | Aluminium |
| <b>ASTM D2570 (max)</b>        | 20                     | 60     | 20    | 20    | 20        | 60        |
| <b>NAP Free Hybrid Coolant</b> | 2.0                    | 5.1    | 3.0   | 2.2   | 0.5       | -2        |

### ASTM D2809 Cavitation Corrosion Characteristics of Aluminium Pumps

|                                | Visual Rating |
|--------------------------------|---------------|
| <b>ASTM D 2809 (min)</b>       | 8             |
| <b>NAP Free Hybrid Coolant</b> | 9             |

*All of the above figures are typical values and do not constitute a specification.*

## Freeze Protection

|                            | Concentration by Volume % |       |       |       |       |
|----------------------------|---------------------------|-------|-------|-------|-------|
|                            | 25                        | 33    | 40    | 50    | 60    |
| Specific Gravity<br>20/4°C | 1.030                     | 1.045 | 1.060 | 1.074 | 1.087 |
| Freeze<br>Protection * °C  | -12                       | -22   | -27   | -40   | -56   |

\*Average of Freezing Point and Pour Point

## Consumer Safety

NAP Free Hybrid Coolant contains the aversive agent denatonium benzoate to prevent accidental ingestion of coolant prepared from it. The concentration of the aversive is 70ppm which is in compliance with all current legislation internationally that requires an aversive agent be used in ethylene glycol based antifreeze.

## Performance Standards

NAP Free Hybrid Coolant exceeds the requirements of most European and International Standards including: ASTM D3306, ASTM D 4985, SAE J 1034, BS 6580 (1992), AFNOR NF R15601, JIS K2234 and the performance requirements of ASTM D 6210.