# Technical Information Sheet

NAP-GARD®
FBE Powder Coatings

**PRODUCT NUMBER:** 7-2502
**APPLICATION:** Pipe Coating

Introduction:

*Nap-Gard® Product No. 7-2502 is a thermosetting epoxy powder designed as a coating for underground and subsea pipeline service. In service, the coating is capable of withstanding continuous operating temperatures of 107°C (225°F). This product has been certified to meet the requirements of CSA Z245.20-06 and NACE RP-0394.*

## POWDER PROPERTIES

| | | | |
|---|---|---|---|
| **Color:** | Reddish Brown | **Theoretical Coverage:** | 134 $Ft^2$/lb/mil |
| **Specific Gravity:** | 1.44 ± .05 | **Typical Gel Time: @ 205°C (401°F) CSA** | 7 ± 2 Sec. |
| **Density: CSA Z245.20-06 (Section 12.6.2.3)** | 1440 ± 50 g/L | **Shelf Life @ 25°C (77°F):** | 12 months |
| **Thermal Characteristics: CSA Z245.20-06** | $Tg_1$ = 60 ± 5°C<br>$Tg_2$ = 108 ± 6°C<br>Δ H = 68 ± 10 (J/g) | | |

## TYPICAL PROPERTIES OF APPLIED FILM

| | | | |
|---|---|---|---|
| **Recommended Film Thickness:** | 350µm (14 mils) Average<br>300µm (12 mils) Minimum | **DSC – glass transition temperature CSA Z245.20-06** | $Tg_3$ = 110°C (230°F) |
| **Tensile Strength:** ASTM D2370-98/D882-91 | 9436 psi | | |
| **Impact Resistance:** | | **Hardness:** | |
| **ASTM G14-72** | @ 25°C (77°F) 160 in. lbs | **Barcol, ASTM D2583** | 60 avg. |
| **1/8" X 5" X 8" Steel Panels** | | **Shore D, ASTM D2240-74** | 89 avg. |
| **CSA Z245.20-06** | @-30°C (-22°F) › 1.5 J Pass | | |
| **Elongation:** Modified ASTM D2370-98 | @23°C (73°F) 10.96% | **Compressive Strength:** ASTM D695-95 | 10230 psi (+/- 20%) |
| **Bending:** | | | |
| **CSA-Z245.20-06** | @-30°C (-22°F) 3.0°/pipe dia. | Pass | |
| **API-RP-5L7** | Passes all requirements | | |

Performance depends on film thickness. Consult Nap-Gard® Specialist for specific recommendations.

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| | | | | |
|---|---|---|---|---|
| **Shear Adhesion ASTM D1002-94:** | | **Hot Water Resistance CSA Z245.20-06:** | | Rating |
| **Average** | 6093 psi | 75°C, 24 hr. | 1 - 2 | Pass |
| **Minimum** | 5934 psi | | | |
| **Maximum** | 6114 psi | | | |

**Thermal Conductivity:** 0.19 ± 0.02 BTU/hr./$ft^2$/ft./°F
**ASTM C177**

**Cathodic Disbondment:**
**CSA Z245.20-06**

| | | |
|---|---|---|
| 24 hr., 3.5 volts, 65°C (150°F) | 2 - 4 mm radius | Pass |
| 28 days, 1.5 volts, 25°C (77°F) | 3 - 5 mm radius | Pass |
| Strained C.D. | No Cracking | Pass |

## TYPICAL ELECTRICAL PROPERTIES

| | | | |
|---|---|---|---|
| **Dielectric Strength:** ASTM D149-97 | 1500 volts/mil @ 250µm (10 mils) | **Breakdown voltage:** ASTM D149-97 | 20000 volts @ 450µm (18 mils) |
| **Dielectric Constant:** ASTM D150 | 2.15 at 1 MHz | **Volume Resistivity:** ASTM D257 | 3.3 X $10^{15}$ ohm-cm. |

## CHEMICAL RESISTANCE TESTS *

90-Day Immersion per CSA Z245.20-98

| | |
|---|---|
| HCl in $H_2O$** | No Blistering |
| 10% NaCl, $H_2SO4$ in $H_2O$** | No Blistering |
| 10% NaCl in $H_2O$** | No Blistering |
| Distilled Water | No Blistering |
| 5% NaOH in $H_2O$** | No Blistering |
| $MgCO_3$ in $H_2O$** | No Blistering |

* For additional information refer to Nap-Gard Products Catalog Chemical Resistance Chart.
**Distilled Water

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## GENERAL APPLICATION PARAMETERS

1. Grit blast to NACE Near-White specifications (Swedish Standard #Sa 2½) and profile between 50µm (2 mils) and 112µm (4.5 mils).
2. Use phosphoric acid/deionized water rinse if water soluble salt contamination is suspected.
3. Preheat pipe to approximately 450°F (232°C) to 482°F (250°C).
4. Apply Nap-Gard® 7-2502 powder to meet customer thickness specifications.
5. Follow recommended cure schedule (see below).
6. Electrically inspect for holidays and repair all found with Nap-Gard® 7-1631S, 7-1847, or 7-1861.

## CURE SCHEDULE GUIDELINES

The cure profile and schedule for **Nap-Gard® Product No. 7-2502** shows the minimum time at temperature required to achieve the typical performance properties of the coating. Because pipe cooling rates vary so widely with pipe wall thickness, no allowance has been made for heat loss from the pipe but this can be easily measured on the coating line and allowance made.
**Recommended powder application temperature range is 232°C (450°F) to 253°C (488°F) for single/dual layer FBE and post heating is not a normal requirement**. The minimum post application curing temperature (as measured on the coated pipe), and the time to quench may conform to the following cure schedule:

| Pipe Temperature | Minimum Time to Quench** |
|---|---|
| 226°C (438°F) | 115 Seconds |
| 232°C (450°F) | 75 Seconds |
| 239°C (462°F) | 45 Seconds |

*CAUTION** Recommended time to quench is based on the assumption that the listed temperature is maintained without any cool down rate. Time to quench will vary with application parameters and pipe sizes. ***Therefore, the above information shall be used only as a guideline by the applicator to develop proper time to quench. Cure should be verified by DSC or other methods.***

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