NAP-GARD®
FBE Powder Coatings

Technical Information Sheet

NSF®

PRODUCT NUMBER: 7-2500
DESCRIPTION: Fusion Bonded Epoxy

Introduction:

*Nap-Gard® Product No. 7-2500 is a thermosetting epoxy powder designed as a coating for underground pipeline service. In buried 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 Z245.20-02** and **NSF 61 for Potable Water Services**. This product is also recommended for valves and fittings at an average film thickness of 8 mils per the NSF requirement.*

POWDER PROPERTIES

Color:	Reddish Brown	Theoretical Coverage:	134 Ft^2/lb/mil
Specific Gravity:	1.44 ± .03	Typical Gel Time: @ 205°C (401°F) CSA	22 ± 4 Sec.
Density: CSA Z245.20-02 (Section 12.6.2.3)	1440 ± 50 g/L	Shelf Life @ 25°C (77°F):	*12 months
Thermal Characteristics:	Tg_1 = 58 ± 5°C		
CSA Z245.20-02	Tg_2 = 106 ± 6°C Δ H = 68 ± 10 (J/g)		

TYPICAL PROPERTIES OF APPLIED FILM

Recommended Film Thickness:	350µm (14 mils) Average 300µm (12 mils) Minimum 200 µm (8 mils) Valves & Fittings (internal)	Heat Distortion Resistance: DSC – glass transition temperature CSA Z245.20-98	Tg_3 = 110°C (230°F)
Impact Resistance: ASTM G14-72 1/8" X 5" X 8" Steel Panels CSA Z245.20-02	@ 25°C (77°F) 160 in.lbs. @-30°C (-22°F) › 1.5 J Pass	Hardness: Barcol, ASTM D2583 Shore D, ASTM D2240-74	 61 avg. 90 avg.
Elongation: Modified ASTM G10-72	@0°C (32°F) 4.8% @-30°C (-22°F) 3.2%		
Bending: SARAMCO-09-SAMSS-089-99 CSA-Z245.20-98 API-RP-5L7	 @0°C (32°F) 5.5°/pipe dia. @-30°C (-22°F) 3.0°/pipe dia. Passes all requirements	 Pass Pass	

Performance depends on film thickness. Consult Nap-Gard® Specialist for specific recommendations.
*Transportation: The material is stable during transportation for duration of up to 45 days at temperatures below 35°C (95°F). If it exceeds the recommended time or temperature during transportation or storage, the product should be re-certified.

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Shear Adhesion ASTM D1002-94:	
Average	6555 psi
Minimum	5934 psi
Maximum	7865 psi

Adhesion CSA Z245.20-98:		Rating
75°C, 48 hr.	1 - 2	Pass
95°C, 24 hr.	1 - 2	Pass

Cathodic Disbonding Modified ASTM G8-77	
30 days, 6 volts, 3% NaCl, 25°C (77°F)	5 - 7 mm radius
90 days, 6 volts, 3% NaCl, 25°C (77°F)	8 - 10 mm radius
90 days, 7.5 volts, 5% NaCl 82°C (180°F)	11 - 14 mm radius

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

CSA Z245.20-02:		
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

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TYPICAL ELECTRICAL PROPERTIES

Dielectric Strength: ASTM D149-97	1500 volts/mil @ 250µm (10 mils)	Breakdown voltage: ASTM D149-97	20000 volts @ 450µm (18 mils) 17000 volts @ 250µm (10 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 inH_2O**	No Blistering
10% NaCl, H_2SO_4 in H2O**	No Blistering
10% NaCl in H_2O**	No Blistering
Distilled Water	No Blistering
5% NaOH in H2O**	No Blistering
$MgCO_3$/$CaCO_3$ in H2O**	No Blistering

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

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. Preheat pipe to approximately 240°C (464°F).
3. Apply Nap-Gard® 7-2500 powder to meet customer thickness specifications.
4. Follow recommended cure schedule (see below).
5. Electrically inspect for holidays and repair all found with Nap-Gard® 7-1631S or 7-1847.

GEL TIME & CURE SCHEDULE GUIDELINES

The cure schedule for **Nap-Gard® Product No. 7-2500** 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 226°C (438°F) to 253°C (488°F) 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:

Gel Time (CSA Method)	Time (Seconds)	Cure Schedule	Time to Quench**
205°C (401°F)	20	226°C (438°F)	120 Seconds
220°C (428°F)	12	232°C (450°F)	80 Seconds
226°C (438°F)	10	239°C (462°F)	60 Seconds
232°C (450°F)	9		

****CAUTION**** Recommended quench time is based on the assumption that the listed temperature is maintained without any cool down rate. Quench time 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 quench time. Cure should be verified by DSC or other methods. **For three layer, the optimum time for adhesive application is between 30-70% cure of the FBE. This has to be developed by the applicator based on his plant layout.**

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