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Proposed ASTM Standard for
UV-Cured GRP Jacketing: A Technical Approach

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UV-Cured Jacketing

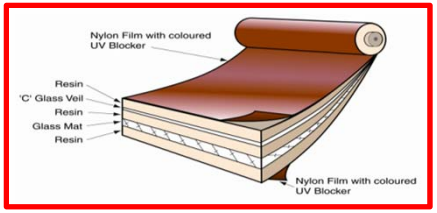
Proposed ASTM Standard for UV-Cured GRP Jacketing

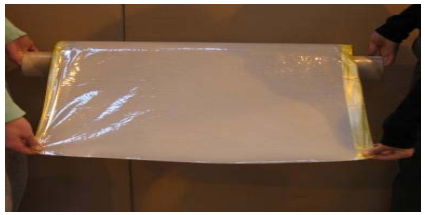
A Technical Approach

UV-Cured Jacketing

What is UV-Cured GRP?

- Is a Composite product based upon an Polyester Resin reinforced with chopped glass fibers and surfacing tissue.
- Typically delivered in thickness of between 1mm and 2.5mm (1/32” up to 3/32”)on rolls 24” wide or 39”
- The product cures with U/V light in the wavelength 280 – 420nm at ambient temperatures.
- Product cures in UV A, UV B, or visible types of light.
- Cure times between 5 min up to 1 hr. Many factors influence cure time
  - Type of light (natural vs. lamp)
  - Distance from light if using lamp
  - Product formulation





UV-Cured Jacketing

Benefits of UV-Cured GRP:

- **Cures under ambient temperatures and pressures makes it easily fabricated into 90's, tees, tank heads and complicated shapes**
- **Cures to a hardness that can be walked on and can withstand mechanical abuse (ideal for walk down areas)**
- **Highly chemical resistant**
- **Can withstand cryogenic temperatures and direct contact with cryogen**
- **Product is a vapor barrier (though not recommended as primary vapor barrier)**
- **High emmittance (0.8) could allow for thinner insulation design**

UV-Cured Jacketing

Why the need for an ASTM now?

- UV-Cured GRP has been used in Asian and European markets successfully for over 15 years over all types of insulation.
- O&G owners and specifiers are pushing non-metallics into certain areas of their upstream and midstream processes
- Already listed in CINI Specifications
- Need to convert European standards to US standards

UV-Cured Jacketing

What are key elements of the UV-Cured GRP ASTM Standard?

- Smoke and Flame properties including toxicity and dripping. Product should meet ASTM E-84 25/50 Smoke and flame and be non-dripping and should not support flames.
- UV degradation – For any outdoor use it is highly recommended that UV-Cured GRP products pass accelerate weathering to ASTM G-154 Standards
- Fittings and Straights should comply with ASTM C450 and C585
- Material should be free from defects (air pockets, holes, etc) and be meet dimensional tolerances.
- Temperature Resistance – UV-GRP products are thermoset resins and as such do not melt but char. It is important to get good temperature resistant data and testing from your supplier.
    - Polymers + Heat + Time = ??????
    - ASTM- D-746 - Brittleness test
    - ASTM D-648 – Heat Deflection Temperature
- ASTM – E-96 Water Vapor Permeability
    - Most GRP products are classified as vapor barriers, but we do not recommend them to be the primary vapor barrier. We should protect the vapor barrier from being damaged/compromised.
- Product should be labelled properly and traceable

Proposed Properties of UV-GRP

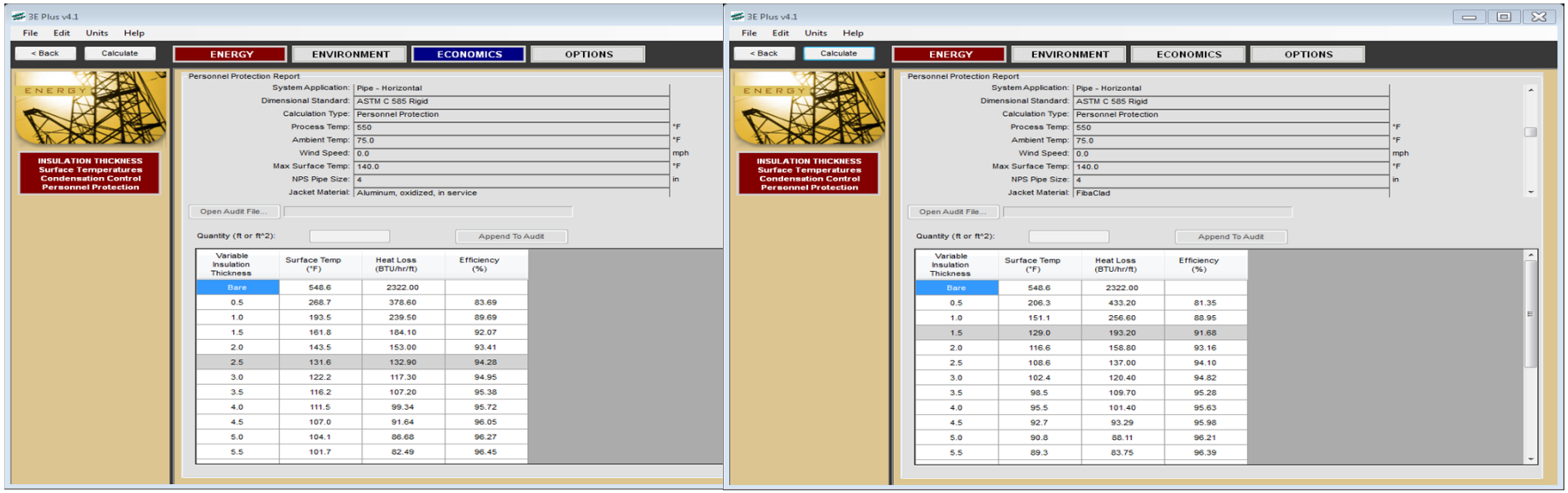
At 1.8 mm Thickness

		GRP Values
Water Vapor Permeability	ASTM E-96 Ng/(Pa-s-m^2)	<15
Density	lbs/SF	0.75 lbs/ft^2
Smoke and Flame	ASTM E-84	25/50
Barcol Hardness	Barcol	61
Tensile Modulus	ASTM D638	17,200 psi
Compressive Strength	ASTM D695	16000 psi
Izod Impact	Ft-lb/in	13
Flexural Stress	ASTM D790	18000 psi
Manuf. Max Temp		300 F
Meet CINI Stds		Yes

Providing solutions to the insulation industry

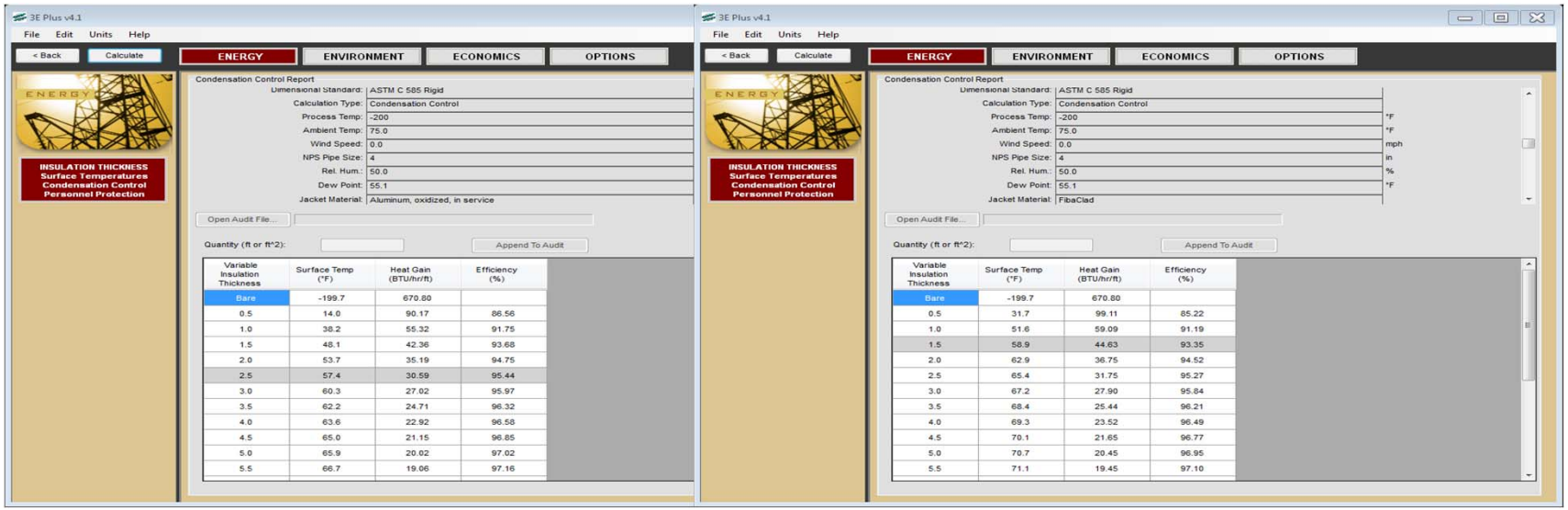
Thermal Advantages to GRP in hot applications

UV-GRP has an emissivity of 0.8 versus 0.1 for Aluminum



Thermal Advantages to GRP in cold applications

UV-GRP has an emissivity of 0.8 versus 0.1 for Aluminum



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Where are we with the ASTM Standard?

- **Work Item 41433 is the UV-Cured GRP standard.**
- **We have submitted to subcommittee ballot in January 2017.**
- **Received 2 persuasive negatives when we went to ballot in 2016 (both concerned the use of C411 for determining temperature resistance).**
- **Expect approval in 2017 for this standard.**

Examples

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Questions?

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