



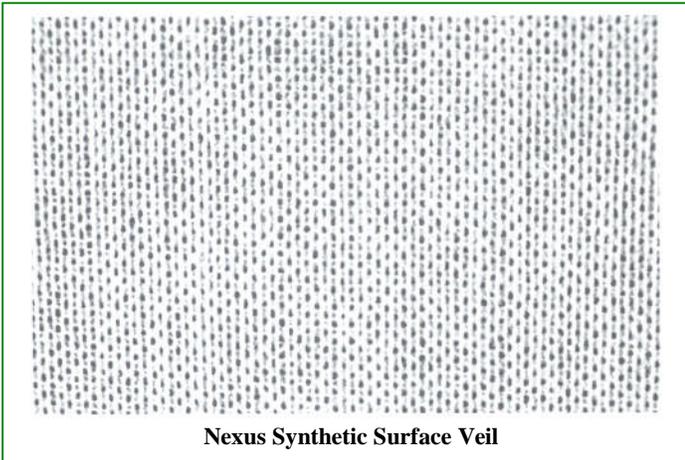
SURFACE VEIL FOR FRP FANS

INTRODUCTION

This Engineering Letter has several functions: to describe **nyb** surface veil characteristics, define the purposes of surface veil, explain the relationship between surface veil and ASTM D4167, detail the specific corrosive agents that require a double layer of veil, and describe the special construction requirements involving hypochlorite applications.

SURFACE VEIL CHARACTERISTICS

The synthetic surface veil used exclusively by **nyb** is Nexus[®]. It is a non-woven formed fabric produced from Dacron[®] 106 homopolymer. This binder-free polyester fiber has an apertured (perforated) design that provides the necessary flexibility for the fabrication of fans. Each layer of surface veil contains about 90% resin and 10% veil material and is applied at a minimum of 10 mils.



PURPOSES OF SURFACE VEIL

One purpose of surface veil, also referred to as surfacing mat or tissue, is to prevent protrusion of the chopped-strand mat glass fibers to the surface which could allow chemical wicking to occur.

A second, but equally important, purpose is to provide reinforcement to the surface layer of resin to prevent cracking and crazing.

Finally, the addition of surface veil allows **nyb** fans to meet the requirements of ASTM Standard D4167.

ASTM STANDARD D4167

The American Society for Testing and Materials (ASTM) D4167, Standard Specification for Fiber-Reinforced Plastic Fans and Blowers defines the basic guidelines for the construction of FRP fans handling corrosive fumes. One of the specifications within D4167 is that the laminate construction be in accordance with another ASTM standard, C582. That standard specifies that the working surface (the surface to be in contact with corrosives) of the laminate consist of one layer of surface veil backed by two layers of chopped-strand mat or equivalent from a chopper gun, followed by the structural layers. Therefore, in order to comply with ASTM D4167, all FRP fans must be furnished with at least one layer of surface veil on all housing surfaces.

CORROSIVES REQUIRING A DOUBLE LAYER OF SURFACE VEIL

There are some chemical agents that are aggressive toward glass. For these specific corrosives, **nyb**'s resin suppliers recommend the addition of a layer of surface veil for increased corrosion resistance. Additionally, in those applications where the corrosive agent is extremely aggressive, a second layer of veil is required. The corrosion-resistance guide found in Engineering Letter 18, Corrosion Resistance of FRP Fans, indicates where one or two layers of veil are required. The corrosives listed as requiring a double layer of surface veil include **fluorine gas, hydrochloric acid, hydrofluoric acid, hydrogen fluoride, potassium hydroxide, and various hypochlorite compounds.**

ADDITIONAL REQUIREMENTS FOR HYPOCHLORITE APPLICATIONS

Applications involving **butyl hypochlorite, calcium hypochlorite, lithium hypochlorite, or sodium hypochlorite** require special FRP construction considerations. In addition to the aforementioned double layer of surface veil, resin suppliers recommend a substitution for **nyb**'s standard catalyst and promoter.

nyb's standard polyester and vinyl ester resins both use cobalt naphthanate (CoNap) as a promoter and Lupersol[®], a methyl ethyl ketone peroxide (MEKP), as a catalyst. Gas streams containing hypochlorites attack CoNap whenever MEKP is used as a catalyst. Therefore, a benzoyl peroxide (BPO) catalyst is recommended for these applications because it

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does not use CoNap as its promoter. The BPO catalyst requires dimethyl aniline (DMA), which is unaffected by hypochlorites, as its accelerator in lieu of the CoNap.

Special BPO/DMA construction is limited in that it cannot be used for FRP wheel construction. It can only be used to apply surface veil to the wheel. All other FRP components can be constructed using this special catalyst/accelerator system.

In addition, note that due to reactivity between BPO catalysts and graphite, which reduces the graphite's conductivity, static

grounding by graphite impregnation is not an available option when used in conjunction with a BPO catalyzed resin.

CUSTOMER RESPONSIBILITY

This Engineering Letter and any discussions between **nyb** representatives and the customer should not be construed as a warranty of material suitability for a particular application. The system designer should have sufficient knowledge of, or experience with, the application to select the appropriate resin or alternate material.