

# DUPONT™ VESPEL® CP-0664 COMPOSITE COATING EXTENDS REPAIR TIME INTERVALS AND HELPS IMPROVE FAN BLADE PERFORMANCE

## Application

Turbofan jet engine designs utilize single-stage fan blades to introduce air mass flow into compressors. Fan blade materials of construction have evolved over time, from metallic to composites to hybrids. Regardless of the material of construction, one of the biggest challenges is to consistently seat the fan blade root in a predictable and controlled manner.

## Challenges

- Balance of a fan blade is an extremely important condition at startup as well as in operation. Due to the high rotational speeds and the mass of materials, any unbalance could seriously impact operation.
- Controlled and predictable fan blade root “seating” at start-up is critical to performance.
- Fan blade root coatings must hold up to repeated high load impacts to avoid excessive damage and wear to root and mating surfaces.
- Fan blade roots may be treated to prevent galvanic and crevice corrosion from occurring at the interface of dissimilar materials.
- Legacy coating systems may not always be easily maintained in the field, thus negatively impacting repair times as well as cost.
- Large components such as fan blades are susceptible to damage during assembly.

## Solution

- CP-0664 is a unique composite fabric coating used in a variety of aerospace applications.

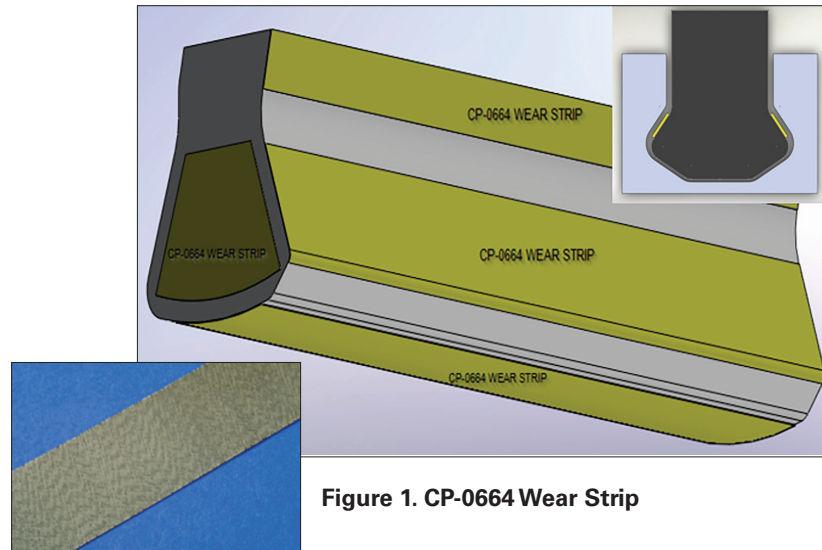


Figure 1. CP-0664 Wear Strip

- CP-0664 can be pre-formed to both 2D and 3D geometries for bonding to critical surfaces (Figure 1).
- Pre-formed CP-0664 allows designers to precisely locate and optimize contact surfaces (Figure 1).
- CP-0664 allows for controlled, predictable, and consistent friction performance during blade root seating.
- Composite fabric provides low friction and durable coating to various surfaces while preventing corrosion and damage during assembly.

## Features and Benefits

### • Wear resistance

CP-0664 has seen extensive use in jet engine fans and nacelles and proven itself with years of service. Wear testing has been conducted over a variety of test conditions and proven to survive from 7500 to over 250,000 cycles. A transfer film is created on the mating metal surface which minimizes the wear on both the metal and composite surfaces.

### • Low friction

PTFE fibers enhance friction performance, dropping the dynamic coefficient of friction below 0.15. Higher loads only improve frictional behavior (Figure 2).

### • Shear strength/Impact resistance/ Durability

CP-0664 was subjected to 70 impacts with a dynamic load of over 150 lbf with no visible damage to material or mating components and at performing loads exceeding 30 ksi (Figure 3).

### • Corrosion resistance

CP-0664 has unique composite construction that creates an insulating barrier between dissimilar mating metal surfaces.

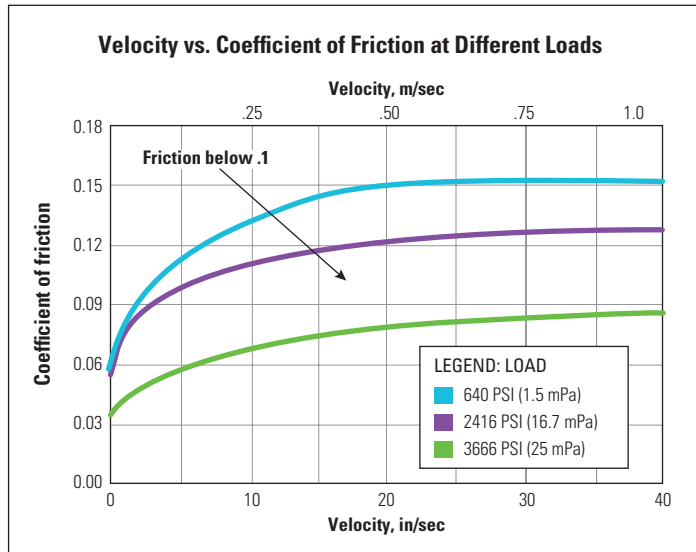
### • Design flexibility

Material can be molded to match unique geometry of most complex designs. Parts can be easily bonded at initial assembly or in the field.

- **Protects expensive components from wear, helps extend life**

Many coatings are brittle, and can be easily damaged in use, or experience corrosion with exposure to normal environmental conditions. CP-0664 has demonstrated ability to protect larger engine components as well as fan blade roots from damage that can lead to costly repairs and removal of engines from service.

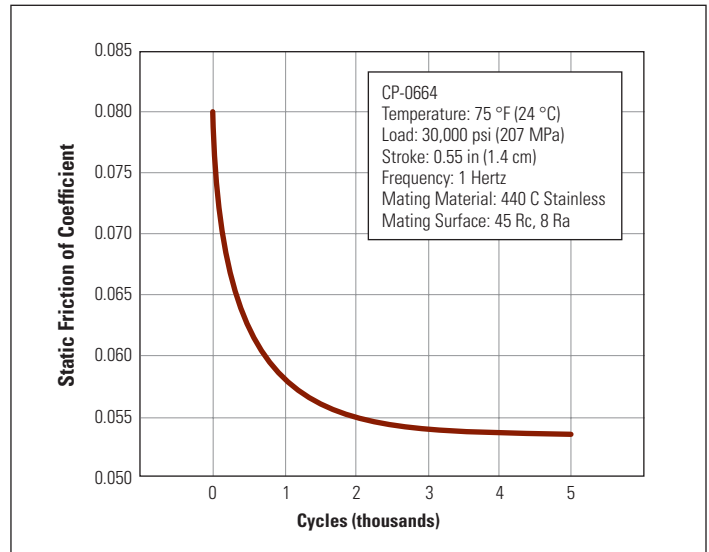
**Figure 2. DuPont™ Vespel® CP-0664 Coefficient of Friction**



- **Solving a variety of problems**

CP-0664 has been used to solve a variety of problems. From v-grooves, fan blade roots, and door/cowl guides to track liners on thrust reversers. The versatility and durability allows you to think out of the box to solve wear and coating problems that are leading to costly repairs on major components.

**Figure 3. DuPont™ Vespel® CP-0664 Wear**



Visit us at [vespel.dupont.com](http://vespel.dupont.com)

Contact DuPont at the following regional locations:

**North America**

800-222-8377

**Latin America**

+0800 17 17 15

**Europe, Middle East, Africa**

+41 22 717 51 11

**Greater China**

+86-400-8851-888

**ASEAN**

+65-6586-3688

**Japan**

+81-3-5521-8484

The information provided in this data sheet corresponds to our knowledge on the subject at the date of its publication. This information may be subject to revision as new knowledge and experience becomes available. The data provided fall within the normal range of product properties and relate only to the specific material designated; these data may not be valid for such material used in combination with any other materials, additives or pigments or in any process, unless expressly indicated otherwise.

The data provided should not be used to establish specification limits or used alone as the basis of design; they are not intended to substitute for any testing you may need to conduct to determine for yourself the suitability of a specific material for your particular purposes. Since DuPont cannot anticipate all variations in actual end-use and disposal conditions, DuPont does not guarantee favorable results, makes no warranties and assumes no liability in connection with any use of this information. All such information is given and accepted at the buyer's risk. It is intended for use by persons having technical skill, at their own discretion and risk. Nothing in this publication is to be considered as a license to operate under or a recommendation to infringe any patent. DuPont advises you to seek independent counsel for a freedom to practice opinion on the intended application or end-use of our products.

**CAUTION:** Do not use DuPont materials in medical applications involving implantation in the human body or contact with internal body fluids or tissues unless the material has been provided from DuPont under a written contract that is consistent with DuPont policy regarding medical applications and expressly acknowledges the contemplated use. For further information, please contact your DuPont representative. You may also request a copy of DuPont POLICY Regarding Medical Applications H-50103-5 and DuPont CAUTION Regarding Medical Applications H-50102-5.

Copyright © 2017 DuPont. The DuPont Oval Logo, DuPont™, and Vespel® are trademarks or registered trademarks of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

VPE-A40047-00-A0217 (1/17)

