

DuPont™ Vespel® Rotating Equipment Reliability Technology

Vespel® CR-6100 Bearings for API (American Petroleum Institute) Separators

API Separator

The API separator is equipment typically found in oil refineries. It handles foul water from refinery process sewers and sends its to the treatment plant for processing. It also sends oil back to the coker or for other reprocessing. This service contains hydrocarbons, water, acids, particles, amines and ammonia.

Challenge

Sleeve bearings support series of 21 foot (6.4m) long shafts in the 4 inch (101.6mm) diameter range. Unit size determines the number of shafts and some units are hundreds of feet long. The bearings drive skimmers and are historically babbitt or bronze. Greased bushings fail due to corrosion and contamination. Nickle-graphite bushings wear and score the shafts.

Solution

DuPont™ Vespel® CR-6100 bearings increase performance and reliability and reduce failures to extend life and lower maintenance costs. Vespel® CR-6100 can operate without lubrication because of its low wear and low coefficient friction. The composite nature of Vespel® CR-6100 allows for less damage to the shaft at contact which extends the life of the equipment. In addition, its chemical resistance allows for operation in the most diverse aggressive services. pumps.

For technical support, material samples, or a machining guide, call 1-800-222-VESP (8377) vespel.com



System Shafts



Bronze Bushing



Metal impregnated graphite
3.5 year service
0.5" (12.7mm)
Wear, shaft damage
Not serviceable



Vespel® CR-6100
3.5 year service
0.02" (0.51mm) Wear, no shaft damage
Serviceable

Comparative Wear Data

Material	Wear Rate (E-6)				Dynamic Coefficient of Friction		Limiting PV	
	25 ft./min. (0.13m/sec.)		50 ft./min. (0.25m/sec.)		25 ft./min. (0.13 m/sec.)	50 ft./min. (0.25 m/sec.)	English (psi-ft./min)	SI Units (MPa-m/sec.)
	in./hr.	cm/hr.	in./hr.	cm/hr.				
Vespel® CR-6100	271	68.8	74.4	189.0	0.20	0.29	>155,000	>5.4
Carbon Fiber/PFA	471	119.6	102.8	261.1	0.18	0.24	>92,000	>3.2
PEEK-Lubricated	70.7	179.6	149.2*	379.0	0.52	0.18	40,000	1.4
PAI-Lubricated, Wear-resistant	37.3	94.7	1,435.2*	3,645.4	0.33	0.21	64,000	2.2
Carbon Fiber/PEEK	85.2	216.4	-	-	0.29	-	-	-
Glass Fiber/PEEK	93.2	236.7	-	-	0.26	-	-	-
PEEK (Unfilled)	699.0	1,775.5	-	-	0.42	-	-	-

*Stick-slip/vibration.

Unlubricated pin on AISI carbon steel disc finished to 16 microinches (0.4 micrometers) (AA): 400 psi (8.9 MPa)

Broad Chemical Resistance*

Acids	Vespel® CR-6100	PEEK
Aqua Regia	A	C
Chromic Acid >50%	A	D
Chlorosulfonic Acid	A	D
Sulfuric Acid, 96%	A	D
Phosphoric Acid, 85%	A	B
Fluoboric Acid	A	D
Fluorosilicic Acid	A	D
Hydrofluosilicic Acid	A	D
Nitric Acid	A	D
Solvents		
Acetone	A	C
Ketones	A	C
Tetrahydrofuran	A	N/A
Methyl Acetone	A	C
Methyl Ethyl Ketone	A	C
Methyl Isobutyle Ketone	A	C
Dimethyl Sulfoxide	A	N/A
Oleum	A	D

Acids	Vespel® CR-6100	PEEK
Other		
Bromine	A	C
Sodium Hydroxide	A	C
Aq Zinc Chloride, 25%	A	N/A
Caustic Soda	A	C
Caustic potash	A	C
Chlorinated Water	A	D
Oxygen	A	D
Steam	A	A
Iodine	A	D
Oleum	A	D

Explanation of Ratings

A = Excellent, B = Good, C = Poor, D = Do not use

* Source: Chemical Resistance Guide for Plastics. Compass Publication

DuPont™ Vespel® CR-6100 parts and shapes are polymeric composite articles consisting of PFA/CF reinforced composite, 20% mass fraction random X-Y oriented carbon-fibre.

Visit us at vespel.com

The information set forth herein is furnished free of charge, is based on technical data that DuPont believes to be reliable and represents typical values that fall within the normal range of properties. This information relates only to the specific material designated and may not be valid for such material used in combination with other materials or in other processes. It is intended for use by persons having technical skill, at their own discretion and risk. This information should not be used to establish specification limits nor used alone as the basis of design. Handling precaution information is given with the understanding that those using it will satisfy themselves that their conditions of use present no health or safety hazards and comply with applicable law. Since conditions of product use and disposal are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. As with any product, evaluation under end use conditions prior to specification is essential. Nothing herein is to be taken as a license to operate or a recommendation to infringe on patents.

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 the DuPont policy regarding medical applications and expressly acknowledges the contemplated use. For further information, please contact your DuPont representative.

DuPont's sole warranty is that our products will meet our standard sales specifications in effect at the time of shipment. Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted. TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, DUPONT SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR NON-INFRINGEMENT. DUPONT DISCLAIMS LIABILITY FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

DuPont™, the DuPont Oval Logo, and all trademarks and service marks denoted with ™, SM or ® are owned by affiliates of DuPont de Nemours, Inc. unless otherwise noted. © 2022 DuPont. All rights reserved.

Reference No. K-22692 0422 CDP



dupont.com