

Material compatibility

*Skydrol™ aviation
hydraulic fluids*



EASTMAN

aviation solutions

 **SKYDROL**
HYDRAULIC FLUIDS
from eastman



Materials used in the hydraulic system must be compatible with the hydraulic fluid, so both materials and components are carefully selected by the airframe manufacturer. The aircraft industry uses many synthetic materials that are resistant to Skydrol fluids, but some are not. Most materials that are not totally resistant require long exposure before damage results. Deviations from the recommended materials should not be made without prior consultation with the airframe manufacturer and the material component suppliers.

The general ratings of compatibility of various materials with Skydrol fluids are:

- **Excellent resistance**—may be used in constant contact with the fluid
- **Good resistance**—withstands exposure to the fluid with minimum swell (for plastics and rubber) or loss of integrity
- **Poor resistance**—should not be used near the fluid
- **No resistance**—disintegrates in the fluid

All approved phosphate ester hydraulic fluids are miscible and compatible and may be used with each other in any and all proportions. Miscibility and compatibility testing of the phosphate ester fluids is a qualification requirement and ensures the compatibility of all approved fluids in all proportions.

Which materials are right for you?

Material	Excellent	Good	Poor	No
Fabrics				
Acrylic ¹			✓	
Carbon (graphite)	✓			
Cotton, wool, rayon		✓		
Fiberglass, nylon, polyester ²		✓		
Coated fabrics				
Buna-N-coated cotton or nylon			✓	
Butyl-coated nylon	✓			
Chlorosulfonated polyethylene nylon			✓	
Ethylene-propylene-coated nylon	✓			
Fluoroelastomer-coated nylon		✓		
Neoprene-coated nylon, cotton, polyester			✓	
Silicone-coated fiberglass		✓		
Silicone-coated polyester		✓		
Vinyl-coated cotton, nylon, polyester				✓
Vinyl-coated fiberglass				✓
Metals				
Aluminum	✓			
Beryllium copper	✓			
Brass		✓		
Bronze		✓		
Cadmium		✓		
Chromium	✓			
Copper ³		✓		
Exotic (Hastelloy™)	✓			
Ferrous	✓			
Lead ⁴		✓		
Magnesium ³		✓		
Nickel	✓			
Noble (gold, silver)	✓			
Stainless steel	✓			
Titanium ⁵		✓		
Zinc ⁴		✓		
Conversion coatings				
Anodizing (aluminum)	✓			
Dow 7 and 17 (magnesium)	✓			

Material	Excellent	Good	Poor	No
Paint finishes				
Acrylic				✓
Alkyd ⁶			✓	
Asphaltic				✓
Cellulosic lacquer				✓
Epoxy	✓			
Epoxy-amide	✓			
Heat-resistant aluminized				✓
Latex			✓	
Linseed oil			✓	
Polyurethane		✓		
Shellac			✓	
Silicone		✓		
Urethane		✓		
Varnish			✓	
Vinyl			✓	
Thermoplastics				
Acetal			✓	
Acrylic			✓	
Acrylonitrile butadiene styrene (ABS)			✓	
Cellulosic			✓	
ETFE copolymer ⁷	✓			
FEP (fluorocarbon)	✓			
Nylon	✓			
PETG	✓			
Polycarbonate 8			✓	
Polychlorotrifluoroethylene (PCTFE)	✓			
Polyetheretherketone (PEEK)		✓		
Polyetherketone (PEK)		✓		
Polyethylene	✓			
Polyphenylene oxide (PPO)			✓	
Polyphenylene sulfide (PPS)		✓		
Polypropylene	✓			
Polystyrene				✓
Polytetrafluoroethylene (PTFE)	✓			
Polyvinyl chloride				✓
Polyvinylidene chloride		✓		
Polyvinyl fluoride (PVF) ⁹	✓			
Reinforced TFE	✓			
TFE (fluorocarbon)	✓			

Material	Excellent	Good	Poor	No
Thermosets				
Melamine		✓		
Phenolic		✓		
Polyamide	✓			
Polyester		✓		
Polyimide	✓			
Elastomers				
Butadiene acrylonitrile (Buna N)				✓
Chlorosulfonated polyethylene ¹⁰		✓		
Epichlorohydrin		✓		
Ethylene propylene (EPR, EPDM)	✓			
Fluorinated hydrocarbon ¹¹			✓	
Fluoroethylene (TFE, FEP)	✓			
Isobutylene isoprene (butyl)		✓		
Perfluorohydrocarbon ¹²	✓			
Polyacrylic			✓	
Polybutadiene			✓	
Polychloroprene (neoprene)			✓	
Polyisoprene (natural and synthetic)			✓	
Polysulfide			✓	
Polyurethane				✓
Silicone		✓		
Styrene butadiene (Buna S)			✓	
Miscellaneous materials				
Cork			✓	
Leather			✓	
Vinyl floor tile				✓

Based on material from *Machine Design*, January 21, 1971. Copyright 1971 by Penton IPC Inc., Cleveland, Ohio.

¹ Includes Acrilan, Creslan, Orlon

² Includes Dacron, Fortrel, Kodel

³ Copper and magnesium are not recommended for use in a hydraulic system. Long-term corrosion may occur with copper and magnesium.

⁴ Lead and zinc are not recommended for use in a hydraulic system. Their oxidation products can form soaps and cause emulsions.

⁵ Titanium should not be used at temperatures above 325°F. Hydrogen embrittlement may occur.

⁶ Includes alkyd-phenolic, alkyd-silicone, and alkyd-urethane finishes.

⁷ Tefzel™ (DuPont)

⁸ Lexan™ (General Electric)

⁹ Tedlar® (DuPont)

¹⁰ Hypalon™ (DuPont)

¹¹ Viton® (Chemours)

¹² Kalrez® (DuPont), Chemraz® (Greene Tweed)

For more information about Skydrol hydraulic fluids, visit Eastman.com/Aviation.



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