# Glove facts

*Safety, storage, and handling information for Skydrol™ aviation hydraulic fluids*

**As a company committed to safety, we provide the following information to assist customers in selecting the right protective gloves to be used when handling Skydrol products. The data was developed through laboratory testing, using ASTM F739 standards for permeation testing. The applicability of this information should be evaluated based on your intended use of Eastman products.**

## Permeation testing

Permeation testing involves exposing one side of a glove to chemicals and noting breakthrough time (the amount of hours or minutes it takes for the chemical to be detected on the opposite side) and the permeation rate (the rate at which the chemical passes through the material). Long breakthrough times and low permeation rates are desirable qualities in glove selection.

The permeation rate is expressed as the mass of the permeated chemical per area of glove material per unit time (μg/cm$^2$/min). Permeation tests are generally conducted for a maximum of 8 hours. If no breakthrough time is observed, the reported breakthrough time is greater than 480 minutes.

All tests were performed in triplicate. The results reported for the 4H and Jackson Safety gloves were provided by the manufacturer. The results reported for the MAPA LF-128 glove were provided by MAPA Professional.

## Factors affecting glove selection

The following factors, in conjunction with permeation data, should be considered when selecting a glove for a particular operation:

- **Glove material**—Different polymeric materials resist chemicals at different permeation rates and breakthrough times.
- **Frequency/severity of contact**—Permeation tests present a worst-case situation of continuous liquid contact with a glove. Immersion of hands in chemical liquids is not a recommended practice. Where feasible, implement engineering controls and good work practices to reduce such practice. Frequent contact with Skydrol products requires gloves demonstrating higher breakthrough times and/or lower permeation rates. Frequent replacement of gloves may be necessary to reduce skin contamination, especially when operations require repeated removal and donning. If you observe changes in glove material consistency, immediately remove and dispose of the gloves.
- **Chemical mixtures**—Permeation behavior of mixtures can be very different from that of individual components. The test data provided here are for pure samples of hydraulic fluids. Mixtures with other solvents or dilutions of Skydrol may alter the effectiveness of the gloves listed in this document.
- **Temperature**—The data listed in Table 1 are from tests conducted at 23°C. However, gloves generally become less resistant to chemical permeation as the temperature increases. An increase in temperature of 10°C can cause approximately a twofold decrease in breakthrough time and a similar increase in permeation rate. These tests do not consider thermal protection for handling hot materials. Such use may require different materials of construction.
- **Thickness**—Permeation varies directly with thickness. The thicker the glove material, the longer the expected breakthrough time; however, thickness might not affect permeation rate.
- **Manufacturers and quality control**—Processes can vary from one manufacturer to another. Consequently, a given glove material from one manufacturer may not have the same breakthrough time and/or permeation rate as one obtained from a different manufacturer when challenged with the same chemical. These tests were conducted using a single lot of a manufacturer's gloves. The results are specific to the manufacturer and glove material and are valid only if the manufacturer maintains high standards of quality control.

*TABLE 1. Permeation testing*

| Glove tested | Skydrol LD-4 | | | Skydrol 500B4 | | | Skydrol 5 | | | | Skydrol PE5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean thickness (mm) | Mean breakthrough time ± one standard deviation (min) | Mean permeation rate ± one standard deviation ($\mu g/cm^2/min$) | Mean thickness (mm) | Mean breakthrough time ± one standard deviation (min) | Mean permeation rate ± one standard deviation ($\mu g/cm^2/min$) | Mean thickness (mm) | Mean breakthrough time ± one standard deviation (min) | Mean permeation rate ± one standard deviation ($\mu g/cm^2/min$) | Post test | Mean thickness (mm) | Mean breakthrough time ± one standard deviation (min) | Mean permeation rate ± one standard deviation ($\mu g/cm^2/min$) |
| **Neoprene® Edmont Model 29-865** | 0.43 | 325 ± 38 | 74.4 ± 26.4 | 0.43 | 287 ± 94 | 160.8 ± 1.8 | | | | | 0.43 | 325 ± 38 | 74.4 ± 26.4 |
| **Nitrile-Pioneer Stansolv® Model AF18** | 0.46 | >480 | ND | 0.46 | 213 ± 9 | 120.0 ± 60.0 | 18 | >480 | ND | NC | 0.46 | >480 | ND |
| **Nitrile/ Neoprene-Microflex® 93-260** | 0.19 | 94 ± 25 | 9.4 ± 1.2 | 0.22 | 87 ± 41 | 42.8 ± 4.2 | 0.21 | 219 ± 30 | 27.5 ± 7.9 | | 0.21 | 65.2 ± 26.0 | ND |
| **JACKSON SAFETY™* G29 Solvent Glove** | 0.32 | 127 ± 13 | 20.3 ± 3.32 | 0.32 | 95 ± 7 | 5.5 ± 1.0 | 0.32 | 146 ± 20 | 17.7 ± 3.3 | | 0.32 | 85 ± 9 | 12.6 ± 4.2 |
| **Latex MAPA® Professional Model LF-128** | 0.51 | 60 ± 0 | 31.3 ± 13.4 | | | | | | | | 0.51 | 60 ± 0 | 31.3 ± 13.4 |
| **Nitrile Best N-Dex® Model 8005M** | | | | | | | 8 | 76 | 20 | Swollen | | | |
| **North Butyl™ Model B174R** | | | | | | | 27 | >480 | ND | NC | | | |
| **Neoprene MAPA® Professional Model NL-34** | | | | | | | 35 | >480 | ND | Wrinkled | | | |
| **Neoprene Best® Model 723-L** | | | | | | | 29 | >480 | ND | NC | | | |
| **Natural Rubber Microflex® Model Evolution One®** | | | | | | | 5 | 4 | 12 | Swollen | | | |

**This testing is not standard to 8 hours.*

*ND = None detected*
*NC = No change*

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