

General Description

Abrasion Test Method

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The objective of the abrasion test is to screen out products that might cause excessive wear to the pumps at airtanker bases due to their abrasiveness.

Two aluminum plates are set up parallel with a 0.020-inch (0.05 cm) gap and submerged in a bath of the fire retardant. The top plate is then rotated at 1800 rpm for 50 hours.

The plates are precisely measured before and after the test, to an accuracy of 0.001 inch (0.0025 cm). The maximum wear on the disk and wear plate are added together.

The combined wear on the wear plates shall not be in excess of 0.010 inches (0.025 cm) after testing.

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A disc and a wear plate made of 2024-T3 aluminum are used to determine abrasion characteristics of the mixed retardant. The disc is 4.00 ± 0.01 inches (10.16 cm) in diameter and has a thickness of at least $5/16$ inch (0.3125 inch) (0.7938 cm) at the center. See figures 7.1 and 7.2. The thickness is uniform to a tolerance of ± 0.001 inch (0.0025 cm). To avoid a low-pressure area near the center, the disc has two $3/8$ -inch (0.95 cm) holes drilled through. The holes are located on a 1.25-inch (3.18 cm) diameter circle, concentric with the disc outer diameter. The wear plate is similar to the disc (including the $3/8$ -inch [0.95 cm] diameter holes) except that it is rectangular and has dimensions of 4.02 inch by 5.0 inches (10.21 cm by 12.7 cm).



Figure 7.1—Disc and wear plates.



Figure 7.2— Measuring thickness.

- a. Thickness is precisely measured in several places on the disc and plate, and recorded with reference to the location of the measurement prior to, and immediately after testing, to the nearest 0.001 inch (0.0025 cm). See figure 7.2.
- b. A retardant tank and wear plate holding fixture is mounted on a milling machine which is used to rotate the disc and provides a means to precisely set the gap between the disc and wear plate. See figure 7.3.



Figure 7.3—Abrasion test stand.

- c. The wear plate is positioned on the mounting fixture located in the center of the tank by allowing the two dowel pins attached to the mounting plate to engage two of the holes in the wear plate. Then the wear plate is fastened down through the remaining two holes in the wear plate with 10-32 allen cap screws, 1 inch long.
- d. The disc is attached to a threaded shaft and the assembly is inserted into the collet of the milling machine with the disc positioned so that its lower surface is directly above and parallel to the wear plate. See figure 7.4.



Figure 7.4—Disc and wear plates mounted onto test stand.

- e. The gap between the disc and wear plate is precisely set with the milling machine by lowering the disc until contact is made with the wear plate, then raising the disc 0.020 inch (0.05 cm) as measured with a dial indicator. The gap is also double-checked with feeler gauges.
- f. The disc is then covered with mixed retardant to a depth of 2 inches (5 cm) approximately 3 gallons (11 liters). With the disc and wear plate immersed in the mixed retardant, the disc is rotated at 1,800 rpm for 50 hours.
- g. At the completion of the 50-hour test, the thickness is measured to the nearest 0.001 inch (0.0025 cm), in several places on the disc and wear plate, and recorded with reference to the location of the measurement.