RANDO® HDZ

Chevron

Keep Your Equipment Operating at Peak Performance

INDUSTRIAL LUBRICANTS

The demands on your equipment, time and bottom line multiply daily. Rando® HDZ helps keep your equipment operating longer, faster and harder, allowing you to extend the time between required maintenance, and reduce or eliminate catastrophic (and expensive) equipment failures.

Take Advantage of the Latest Technology

With Rando® HDZ, you can take advantage of additive and base oil technology that helps provide robust protection of hydraulic pumps.

Approvals

Rando HDZ 32, 46, and 68 are approved for:

- Eaton-Vickers I-286-S for industrial applications, M-2950-S for mobile applications, (35VQ25A pump)
- MAG Cincinnati, Cincinnati Machine P-68 (ISO 32), P-69 (ISO 68), P-70 (ISO 46)
- Parker Hannifin (Denison) HF0, HF1, HF2, (T6H20C pump)

Rando HDZ meets requirements of:

- JCMAS HK-1 (ISO 32, 46)
- DIN 51524-3 (ISO 32, 46, 68)
- ISO 11158L-HV (ISO 32, 46, 68)
- ASTM D6158, HV (ISO 32, 46, 68)
- Bosch Rexroth AG RE 07 075 (ISO 32, 46, 68)
- Frank Mohn, Framo Hydraulic Cargo Pumping (ISO 46)
- Auburg (ISO 46)

Rando® HDZ, our premium, zinc additized, anti-wear hydraulic oil that helps provide you with:

Capability of operating over a wide temperature range, with up to 5 percent improvement in pump efficiency over lower viscosity index (VI) products

Long service life for both the lubricant and your equipment

Robust protection against wear, rust, corrosion and water infiltration of critical hydraulic system components

Outstanding air release and foam control

Shear stable

Rando® HDZ Hydraulic Oil

Rando® HDZ performed well in wet performance testing such as the Parker Hannifin (Denison) Hybrid T6H20C dry and wet pump test. The ISO 32, 46, and 68 viscosity grades are most commonly used for hydraulics with vane-, piston-, or gear-type pumps especially when pressures exceed 1000 psi. Rando HDZ 32, 46 and 68 can also be used to lubricate lightly loaded reciprocating compressors and as a general purpose shop lubricant for motors and bearings.

Performance promises can be inconclusive without the data to back them up. We have results documenting the performance of Rando HDZ in tests directly relating to performance where it counts — in your equipment.

Hydrolytic Stability Test for Hydraulic Oils

It's a fact of life in most hydraulic systems: water and oil don't mix. Acidic and insoluble contaminants can be formed when you mix water with hydraulic oil at the elevated temperatures found in hydraulic systems. These contaminants can cause hydraulic system malfunctions due to corrosion, valve sticking, or change in the viscosity of the fluid. That's why you need an oil formulated for hydrolytic stability. Rando HDZ provides the protection you need for your equipment, even in the presence of water.

Test Method

ASTM D2619-09 Standard Test Method for Hydrolytic Stability of Hydraulic Fluid

Test Procedure

75 g of oil plus 25 g of water and a copper test specimen are sealed in a pressure-type beverage bottle. The beverage bottle is rotated slowly, end over end, for 48 hours in an oven at 200°F. At the end of the test, layers are separated and insolubles are weighed. Weight change of the copper is measured. Viscosity and acid number changes of fluid and acidity of water layer are determined.

Limits

Copper Loss, mg/cm^2	0.2 max [Parker Hannifin (Denison) HF0]
Copper Appearance	No gray or black (by IL-H-17672D)
Water Acidity, mg KOH/g	4.0 max [Parker Hannifin (Denison) HF0]

Results

Rando HDZ 46

Copper Weight Loss	0.07 mg	

Competitive Anti-wear Hydraulic Oil

Copper Weight Loss	3.7 mg	

Water Separation Test

Water enters hydraulic systems in a number of ways — through condensation, poor sealing, leaks in cooling circuits, or rain. This can lead to increased wear, filter plugging, and corrosion of hydraulic equipment. That's why it's important to use an oil that sheds water quickly and fully. Rando® HDZ allows you to readily remove free water from your hydraulic system without having to change out the oil.

Water Separation Test	ASTM D1401-10 Standard Test Method for Water Separability of Petroleum Oils and Synthetic Fluids
Test Procedure	40 ml of oil and 40 ml of water are stirred at 1500 rpm for 5 minutes at 54°C in a graduated cylinder. ISO 100 viscosity grade and higher oils are run at 82°C. The separation time of the oil and water emulsion is recorded. The volumes of oil, water, and emulsion are monitored at five-minute intervals and recorded. The test is generally run for duration of 30-60 minutes depending on the oil's test temperature and viscosity.
Limits	3 ml maximum emulsion in 30 minutes [Parker Hannifin (Denison) HF0]
Results	0 ml emulsion in 15 minutes

Oxidation Stability Test for Hydraulic Oils

Oxygen may bring life to our entire planet, but it can be deadly to lubrication systems. When oxygen mixes with water and metals such as copper and iron, especially at the elevated temperatures found in hydraulic systems, the result is oxidation. Oxidation creates a build up of acids in the system. These acids cause corrosion of metal surfaces and the build up of sludge in the oil, which can plug filters. That's why Rando HDZ is formulated with Group II base oils and special antioxidants that effectively prevent this problem. Because Rando HDZ slows the oxidation rate, it can contribute to extending the life of your equipment.

Oxidation Stability Test for Hydraulic Oils	ASTM D1401-10 Standard Test Method for Water Separability of Petroleum Oils and Synthetic Fluids
Test Procedure	Specified amounts of oil and water are placed in a tube with an interwoven coil of copper and iron. Oxygen is bubbled into the mixture at a set rate and it is heated to a set temperature. The amount of acid produced, as measured by the Total Acid Number (TAN), is measured.
Limits	Test is run until TAN of 2.0 mg KOH/g is reached.
Results	Greater than 5,000 hours (ISO 32, 46, 68)

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

Air Release Test for Hydraulic Oils

The operation of hydraulic systems creates turbulent conditions that produce air bubbles that can disperse into the lubricant. If the oil does not allow the air bubbles to rise to the oil surface quickly enough while in the reservoir, a mixture of air and oil will circulate through the lubricating oil system. This can result in an inability to maintain oil pressure (particularly with centrifugal pumps), incomplete oil films in the pumps/motors, bearings and gears, as well as poor hydraulic system performance or even failure. Rando® HDZ is formulated to disperse air bubbles quickly to provide your equipment with smooth, precise hydraulic action.

Test Method	ASTM D3427-07 Standard Test Method for Air Release Properties of Petroleum Oils
Test Procedure	Compressed air is blown through 180 ml of the test oil, which has been heated to a specified temperature (25°C, 50°C, and 75°C are standard temperatures) for 7 minutes. In the time that it takes for the oil to release, all but 0.2 percent by volume of the air is then measured.
Limits	7 minutes maximum at 50°C [Parker Hannifin (Denison) HF0 requirement for ISO 46 grades]
Results	Less than 2 minutes (ISO 46 grades at 50°C)

Cincinnati Machine Thermal Stability Test for Hydraulic Oils

The Thermal Stability Test determines the ability of hydraulic oils to resist breakdown at high temperatures in the presence of copper and steel. This test method was developed to assess the thermal stability of various anti-wear agents, primarily zinc dialkyldithio-phosphates (ZDDP).

ZDDP can decompose at high temperatures. As decomposition occurs, the resulting reaction can form by-products that enhance oxidative and corrosive tendencies, which can attack the copper and steel components present in piston and vane pumps.

Test Method	Cincinnati Machine Thermal Stability Test Procedure A (formerly Cincinnati Milacron), ASTM D2070-10	
Test Procedure	A sample of the test lubricant and pre-weighed copper and steel test rods are placed in a beaker, and heated at 135°C for 168 hours (1 week). At the end of this test period, the copper and steel rods are weighed and rated visually, and the oil is analyzed for sludge and viscosity change.	
Limits	Test is run until TAN of 2.0 mg KOH/g is reached.	25 max
	Copper Weight Loss, mg/200ml	10.0 max
	Viscosity Change @ 40°C, %	5 max
Results	Total Sludge, mg/100ml	3.65
	Copper Weight Loss, mg/200ml	0.4
	Viscosity Change @ 40°C, %	0.86

Parker Hannifin (Denison) T6H20C Hybrid Pump Test

Bench tests can be excellent predictors of field performance, but sometimes it's more valuable to test the lubricant directly in a piece of equipment—in this case the Parker Hannifin (Denison) T6H20C pump test, commonly referred to as the hybrid pump test. This test simultaneously evaluates the hydraulic fluid's ability to protect both vane and piston pumps. It also tests performance in both types of pumps when water is present since water is a common contaminant in hydraulic systems.

Failure of a lubricant to provide vane and piston pump protection can result in scoring, polishing, abrasion or adhesion of metal surfaces to one another. All of these mechanisms can lead to premature equipment failure and costly repairs and downtime.

Test Procedure

This test evaluates hydraulic fluids using a pump housing both vane and piston pumps operating on a common sump with and without water being added to the hydraulic fluid. There are two phases to the test. Both phases are cyclic in pressure from <50 to 4061 psi (<4-280 bar) and run for 300 hours each. At the end of the test, the weight loss of the vanes and pins cannot exceed 15 mg. The piston pump components must be in good physical good condition after testing.

Test Phase	Speed (RPM)	Fluid Temperature	Water Added
1 (dry)	1700	230°F (110°C)	None
2 (wet)	1700	176°F (80°C)	1% weight

Limits

Maximum allowed combined vane and pin weight loss, 15 mg
Maximum 9 piston weight loss, 300 mg

Results

Combined vane and pins, 7 mg

9 piston weight loss, 174 mg

Rando® HDZ— Exceptional Performance

Rando HDZ demonstrated excellent anti-wear performance based on the criteria given by Parker Hannifin (Dension) for final evaluation. The final weight losses fell well within the maximum limits set by Parker Hannifin (Denison). There was only minor viscosity loss during the entire 600 hours, showing great shear and thermal stability.

Meets the Latest Requirements

The hybrid pump test replaces both the P46 piston pump and T6C vane pump tests. While new approvals require passing performance in the T6H20C hybrid pump test, many fluids on the market today gained their HF0 approvals using the older, less-severe requirements. Use Rando HDZ in your hydraulic systems to ensure your fluid meets today's demanding requirements.

Eaton-Vickers 35VQ25 Vane Pump Test

Because many hydraulic systems contain Eaton-Vickers rotary vane pumps, Eaton-Vickers developed this test based on the anti-wear needs of their pumps. The result of the test confirms that Rando® HDZ provides protection for your critical hydraulic components, even in extreme conditions.

Test Method	Eaton-Vickers M-2952-S Pump Test, using an Eaton-Vickers 35VQ25A-11*20 Rotary Vane Pump
Test Procedure	Each pump cartridge is operated at 2375 rpm/3000 psi (above rated pressure)/ 200°F for 50 hours. Evaluation requires a minimum of three cartridges.
Limits	All three cartridges must pass the requirements of a maximum of 90 mg weight loss each, combined for the cam ring and vanes. If any one cartridge fails for any reason, two more cartridges should be tested. In this case, four of the five test cartridges must each meet the wear limit. In addition, the cam ring and vanes should have no evidence of unusual wear or stress in contact areas.

*Average of three pump cartridges

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Learn more at chevronlubricants.com

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