

## RENOSAFE FireProtect 46, 68

### Fire resistant hydraulic fluid, based on new ester and additive technology, Type HFDU

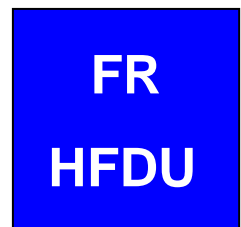
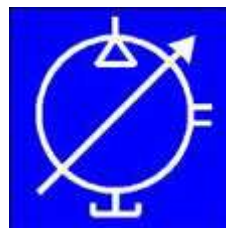
#### Description

RENOSAFE FireProtect products are fire resistant hydraulic fluids based on special synthetic esters. The selected organic ester base oils have highest purity and show high oxidation and thermal stability. The properties of the fluids are improved by the addition of special selected zinc and ash-free additive systems. These zinc and ash-free additive systems are based on new additive technology which guarantees excellent copper compatibility, yellow metal compatibility, excellent hydrolytic stability and highest oxidation stability. They contain very effective robust and stable wear protection additives together with extreme pressure components. The RENOSAFE FireProtect products are non-toxic and physiologically harmless. The products of the RENOSAFE FireProtect series show in comparison to mineral based hydraulic fluids higher flammability temperature and higher self-ignition temperature. Special flammability tests according to ISO 12922 demonstrate that RENOSAFE FireProtect products reduce the risk of violent explosion or flammability when the fluids come in contact with open flames or hot metal surfaces (in comparison with mineral based products). These special flammability tests are in accordance to the ISO specification 12922, group HFDU - fire resistant fluids. The flammability risk is tested when the fluid or the pressurized fluid comes in contact with open flames and hot surfaces. The test results show a significant reduction of flammability risk by using RENOSAFE FireProtect products.

The RENOSAFE FireProtect products have a natural high shear stable viscosity index (multigrade characteristic). This high viscosity index is based on the physical property of the base fluid. The fluids do not contain viscosity index improver. They do not

#### Advantages

- **Excellent yellow metal compatibility, excellent corrosion protection**
- **Long service life**
- **Excellent resistance to ageing and oxidation**
- **Non-toxic, physiologically harmless, free of heavy metals**
- **High shear stable viscosity index - multigrade characteristics**
- **Rapid air release, low foaming behaviour**
- **Excellent wear protection properties, high scuffing load characteristics**
- **Rapid biodegradability (> 60% according to OECD 301 B)**



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contain shear instable material. Therefore, the fluids have a high natural shear stability. Special additive systems which are selected according to the properties of the base fluids (organic esters) guarantee high oxidation and ageing stability. The RENOSAFE FireProtect products have excellent corrosion protection properties. They protect steel and non-iron metals from corrosion. The copper corrosion protection is guaranteed by the selection of a special copper/yellow metal passivator which gives protection over a wide application window. The anti-wear (AW) and the extreme pressure (EP) additives protect the hydraulic pumps and components against wear and against scuffing. The combination of selected additives in the fluid shows excellent low foaming and excellent air release properties. Entrained water can be separated easily. The products of the RENOSAFE FireProtect series are non-toxic, rapidly biodegradable (> 60% according to OECD 301 B) and can be seen as physiologically harmless, free of heavy metals. The RENOSAFE FireProtect series surpass all requirements according to ISO 12922 - dated 2011, group HFDU.

#### Application

The RENOSAFE FireProtect products can be recommended as fire resistant hydraulic fluids - based on organic esters - type HFDU - for all hydraulic units, machines or plants operating in hazard conditions where naked flames or high temperatures are present and a risk of fire caused by a fluid leakage is high. By the use of RENOSAFE FireProtect products the flammability risk in comparison to mineral oil can be reduced. The RENOSAFE FireProtect products have in comparison to mineral oil a higher flammability characteristic and higher ignition temperature, which reduce the risk of fire by leakage of the pressure fluids.

**Typical application:** steel mill, plast furnaces, continuous casting machines, coke plants, mining application, mobile and stationary hydraulic units, injection molding machines.

The products of the RENOSAFE FireProtect series guarantee a rapid biodegradability and reduce the environmental risk potential.

The products are in general miscible and compatible with conventional hydraulic fluids based on mineral oils. In general the compatibility of mineral based fluids and HFDU types can be examined according to the special FUCHS Inhouse compatibility procedure. A change to RENOSAFE FireProtect fluids is possible at any time. Please contact the FUCHS technical assistance.

The compatibility with seal materials, e.g. NBR, Viton, silicon seals is good whereas the use of neoprene, ethylene or propylene seals is not recommended. Before filling the hydraulic circuit with RENOSAFE FireProtect products, it is important to know whether miscibility and compatibility is given. But it is recommended to check the behaviour of hydraulic fluids of the RENOSAFE FireProtect series in a mix with mineral oils and other ester based fluids in a laboratory test. Contamination with water, steam should be avoided (please check the air filter of the circuit, bypass filter systems, water separators etc.). Recommended tank temperatures: 70 - 90 °C. The lower the temperature, the higher will be the lifetime - recommended permanent temperature should be 70 °C or lower. Temperatures of 90 °C or higher are tolerable for a period of time. Periodical control of the used product is recommended. Oil samples of used oil should be tested in the FUCHS laboratories. Our technical assistant will advise the customer on the best suggestions according to the test results.

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#### Used oil analysis:

Examination of viscosity, neutralisation number, purity class, water content, IR spectrum, wear ICP metals, contamination of ICP elements, additive content.

#### Specifications

- RENOSAFE FireProtect HFDU fluid according to DIN 51 502, based on synthetic, organic esters.
- Fulfills HLP requirements (with the exception of the TOST properties)
- HEE46 ISO 15380 hydraulic fluid based on synthetic ester
- HFDU according to ISO 12922

#### General recommendations for changing hydraulic units to RENOSAFE FireProtect

1. Change from mineral oil to RENOSAFE FireProtect

Miscibility and compatibility should be checked according to the FUCHS inhouse test. In general RENOSAFE FireProtect is miscible with mineral based hydraulic oils, type HLP, HM, HLPD. The system should be drained off, the tank should be cleaned, please change the filter, flushing and cleaning of the system is recommend.

2. Change from phosphate ester to RENOSAFE FireProtect

RENOSAFE FireProtect is miscible and compatible with most of the available HFDR products. Please check the miscibility and compatibility according to the FUCHS inhouse test. Compatibility of elastomers and seal material and hoses should be checked. Cleaning of the tank, change of the filters, flushing of the system is recommended.

3. Change of water containing HFC fluids (water glycol) to RENOSAFE FireProtect

Please contact our application engineers.

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#### Typical technical data:

Product name		46	68	
Properties	Unit			Test method
Appearance		clear, yellowish	clear, yellowish	
Colour	ASTM	1,0	1,0	DIN ISO 2049
Viscosity at 0 °C	mm²/s	309,5	488,9	DIN EN ISO 3104
40 °C	mm²/s	50,0	68,0	
60 °C	mm²/s	26,5	34,3	
100 °C	mm²/s	10,4	12,6	
Viscosity index	-	203	188	DIN ISO 2909
Density at 15 °C	kg/m³	920	919	DIN 51 757
Pourpoint, P.P.	°C	- 42	- 45	DIN ISO 3016
Neutralisation number, NZ	mgKOH/g	0,8	0,8	DIN 51 558
Foaming behaviour, Sequ. I bis III				
24 °C at once/after 10 min	ml	0 / 0	10 / 0	ASTM D 892
93,5 °C at once/after 10 min	ml	30 / 0	40 / 0	ASTM D 892
24 °C to 93,5 °C at once/after 10 min	ml	0 / 0	10 / 0	ASTM D 892
Dry TOST test	hours	> 450	> 450	DIN ISO 4263-3
Oxidation stability (95 °C), (ΔNZ = 2 mgKOH/g)				
Demulsifying characteristic	minutes	< 30	< 30	DIN ISO 6614
Corrosion protection - steel, Method A (24 h at 60 °C) Method B (24 h at 60 °C)	degree of corrosion	0-A 0-B	0-A 0-B	DIN ISO 7120
Corrosion protection - copper (3 h at 100 °C)	degree of corrosion	1a	1a	
Corrosion test 35 °C / 28 d		passed	passed	DIN EN ISO 4404-2
Purity class	class	19/17/14	19/17/14	ISO 4406

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#### Inflammability characteristics:

Product name		46	68	
Properties	Unit			Test method
Flash point in open cup according to Cleveland	°C	270	280	DIN ISO 2592
Fire point	°C	364	354	ASTM D 92
Spray ignition test (DMT Test Report)	--	passed < 5 sec	passed < 5 sec	DIN EN ISO 15 029-1
Hot surface ignition test (> 400 °C)	--	passed no ignition	passed no ignition	DIN EN ISO 20823

#### Tribological characteristics:

Product name		46	68	
Properties	Unit			Test method
Four ball test - wear	mm	0,3	0,3	ASTM D 4172
FZG mechanical gear test rig FZG A/8,3/90	failure load stage	> 12	> 12	DIN ISO 14635-1
Vickers vane pump test, weight loss				DIN ISO 20763
ring 250 h test	mg	< 1	< 1	
vanes ..250 h test	mg	< 1	< 1	



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The information contained in this product information is based on the experience and know-how of FUCHS EUROPE SCHMIERSTOFFE GMBH in the development and manufacturing of lubricants and represents the current state-of-the-art. The performance of our products can be influenced by a series of factors, especially the specific use, the method of application, the operational environment, component pre-treatment, possible external contamination, etc. For this reason, universally-valid statements about the function of our products are not possible. The information given in this product information represents general, non-binding guidelines. No warranty expressed or implied is given concerning the properties of the product or its suitability for any given application.

We therefore recommend that you consult a FUCHS EUROPE SCHMIERSTOFFE GMBH application engineer to discuss application conditions and the performance criteria of the products before the product is used. It is the responsibility of the user to test the functional suitability of the product and to use it with the corresponding care.

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