PLANTOFLUX AT-S
Synthetic fire-resistant hydraulic fluids based on organic esters, type HFDU, rapidly biodegradable

Description

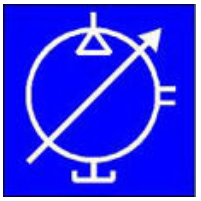
PLANTOFLUX-AT-S are fire resistant hydraulic fluids with self-extinguishing properties. PLAN-TOFLUX-AT-S are synthetic fluids formulated with organic esters and specifically selected additives. They do not contain mineral oils and are free from toxic and unpleasant smelling decomposition products. PLANTOFLUX-AT-S have a higher flash and combustion point than traditional, mineral oil-based hydraulic oils and are specifically designed to reduce the risk of violent explosion when in contact with open flames or hot metal surfaces.
The high viscosity index, constant at all time, provides good lubrication performance in an extremely wide operating temperature range.
PLANTOFLUX-AT-S offer high oxidation and ageing resistance, excellent corrosion protection and anti-wear properties, low foaming tendency, rapid water separation and consequently reduction of water and oil sludge.

PLANTOFLUX-AT-S are non-toxic, biodegradable over 90% according to CEC-L-33-A93 and not included in the CEC list of the hazardous products subject to labelling. PLANTOFLUX-AT-S has also excellent biodegradation of > 60% according OECE 301B.

PLANTOFLUX-AT-S are Factory Mutual Research approved as less flammable hydraulic fluids and listed in the Group 1 of the Approval Guide (approval procedure no. 3014386).

Advantages

- **Rapidly biodegradable (> 90% in 14 days, CEC-L-33-A-93, > 60% according to OECD 301B)**
- **Non-toxic, physiologically harmless, free of heavy metals**
- **Excellent EP-/AW-properties, excellent wear protection (Vickers 1000 h Test “no wear”)**
- **Excellent resistance to ageing and oxidation**
- **Excellent viscosity-temperature characteristics, high natural viscosity index, shear-stable (VI > 180)**
- **Rapid air release, low foaming**
- **Excellent corrosion protection**
- **Factory Mutual Research approved (listed in Group 1 of the Approval Guide, type HFDU)**



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Application

PLANTOFLUX-AT-S are primarily used as fire resistant hydraulic fluids in machines or plants operating in hazardous conditions, i.e. where naked flames or high temperatures are present and the fire risk caused by the fluid leakage is high, most notably: steel mills, blast furnaces, continuous casting machine, coke plants, etc.
PLANTOFLUX-AT-S are generally applicable in any hydraulic systems where environmental protection and biodegradability are a priority.

PLANTOFLUX-AT-S are miscible and compatible with conventional mineral oils, therefore a change to PLANTOFLUX-AT-S is possible at any time. Please contact our Technical Assistance. The compatibility with Nitrile, Teflon, Viton and Silicon elastomers is good, whereas the use of Neoprene, Ethylene-propylene, Butyl and Isoprene seals and hoses is not commonly recommended.

Before filling the hydraulic circuit with PLANTOFLUX-AT-S it is important to know whether the fluid used previously was a mineral oil, a phosphate ester or a different one, such as water-glycol or inverted emulsion.

1. Mineral oil
   Owing the miscibility and compatibility of PLANTOFLUX-AT-S with mineral oils, only draining before replacement is required. In case of relevant presence in the hydraulic system of deposits and sludge, a preliminary flushing with PLANTOFLUX-AT-S is recommended. Filters should be cleaned or replaced.
2. Phosphate esters
   PLANTOFLUX-AT-S is miscible and compatible with phosphate esters, therefore the same procedure as for mineral oils can be followed.
   The compatibility with PLANTOFLUX-AT-S of elastomer components, i.e. seals, hoses, etc., present in the system, must be controlled in advance in the FUCHS' technical assistance laboratories.
3. Other fluids (water base)
   Procedure for replacement is different depending on the fluid type. Please contact our technical department.

PLANTOFLUX-AT-S fluids possess a very high oxidation resistance and are able to resist for a long time to thermic-oxidative conditions, without suffering alterations of relevance. The joined action of metals, water and pollutant can accelerate the oxyen attack at high temperature, therefore, in order to get the best performances of the in-service fluid, it is advisable to maintain it well cleaned and free of water.
The temperature should not exceed 70°C – 90°C in the tank and in the operating parts of the hydraulic system. Temperature peaks of 90°C are tolerable only for a short period of time.
A periodical control of the in-use product is recommended by means of samples to be tested in FUCHS' laboratories. Our Technical Assistance will advise the customer on the best suggestions according to the test results.

Specifications

- HFDU fluid according to DIN 51502, based on synthetic esters.
- Factory Mutual Research approved (approval procedure no. 3014386) – HFDU

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Typical technical data:

Product name		**46 AT-S**	**68 AT-S**	
Property	**Unit**			**Test method**
Appearance		clear	clear	
Colour	ASTM	1.5	1.5	DIN ISO 2049
Viscosity at 40°C	mm²/s	48	69	DIN EN ISO 3104
Viscosity at 100°C	mm²/s	9.6	12.7	DIN EN ISO 3104
Viscosity index	-	190	187	DIN ISO 2909
Density at 20°C	kg/m³	918	928	DIN 51 757
Pourpoint	°C	-35	-32	DIN ISO 3016
Acid number	mgKOH/g	1.2	1.5	DIN 51 558
Foaming characteristics Sequ. I to III 24°C immed./after 10 min 93.5°C immed./after 10 min 24°C after 93.5°C immed./after 10 min	 ml ml ml	 0/0 20/0 5/0	 0/0 20/0 5/0	 ASTM D 892 ASTM D 892 ASTM D 892
Oxidation stability (100°C, 350 h) viscosity variation	%	+6	+6	Inhouse test
Demulsibility	min	12	16	DIN ISO 6614
Rust prevention, Stages A and B	degree of corrosion	no rust (pass)	no rust (pass)	DIN ISO 7120
Copper strip test	degree of corrosion	1a	1a	DIN EN ISO 2160
Cleanness level	Class	7	7	NAS 1638

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Inflammability characteristics:

Product name		**46 AT-S**	**68 AT-S**	
Property	**Unit**			**Test method**
Flashpoint (COC)	°C	270	280	DIN ISO 2592
Fire point	°C	338	358	ASTM D 92
Spray ignition test (Factory Mutual)	--	pass	pass	Factory Mutual
Hot surface ignition test (Factory Mutual)	--	pass	pass	Factory Mutual
Spray ignition test (National Coal Board)	--	pass	pass	National Coal Board

Tribological characteristics:

Product name		**46 AT-S**	**68 AT-S**	
Property	**Unit**			**Test method**
Four ball test - welding	kg	200	220	ASTM D 2783
Four ball test – wear	mm	0.35	0.35	ASTM D 4172
Falex EP, breakage at	lbs	2400	2400	ASTM D 3233
Reichert Value: wear	mm^2	14	14	Inhouse test
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				
ring and vanes 250 h test	mg	16	16	DIN ISO 20763
1000 h test	mg	19	19	DIN ISO 20763

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.

Our products undergo continuous improvement. We therefore retain the right to change our product program, the products, and their manufacturing processes as well as all details of our product information sheets at any time and without warning. With the publication of this product information, all previous editions cease to be valid.