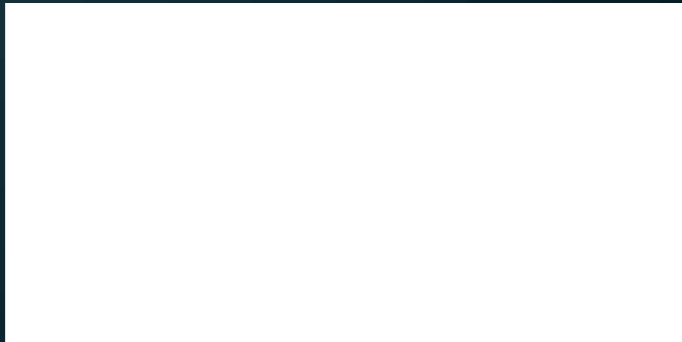




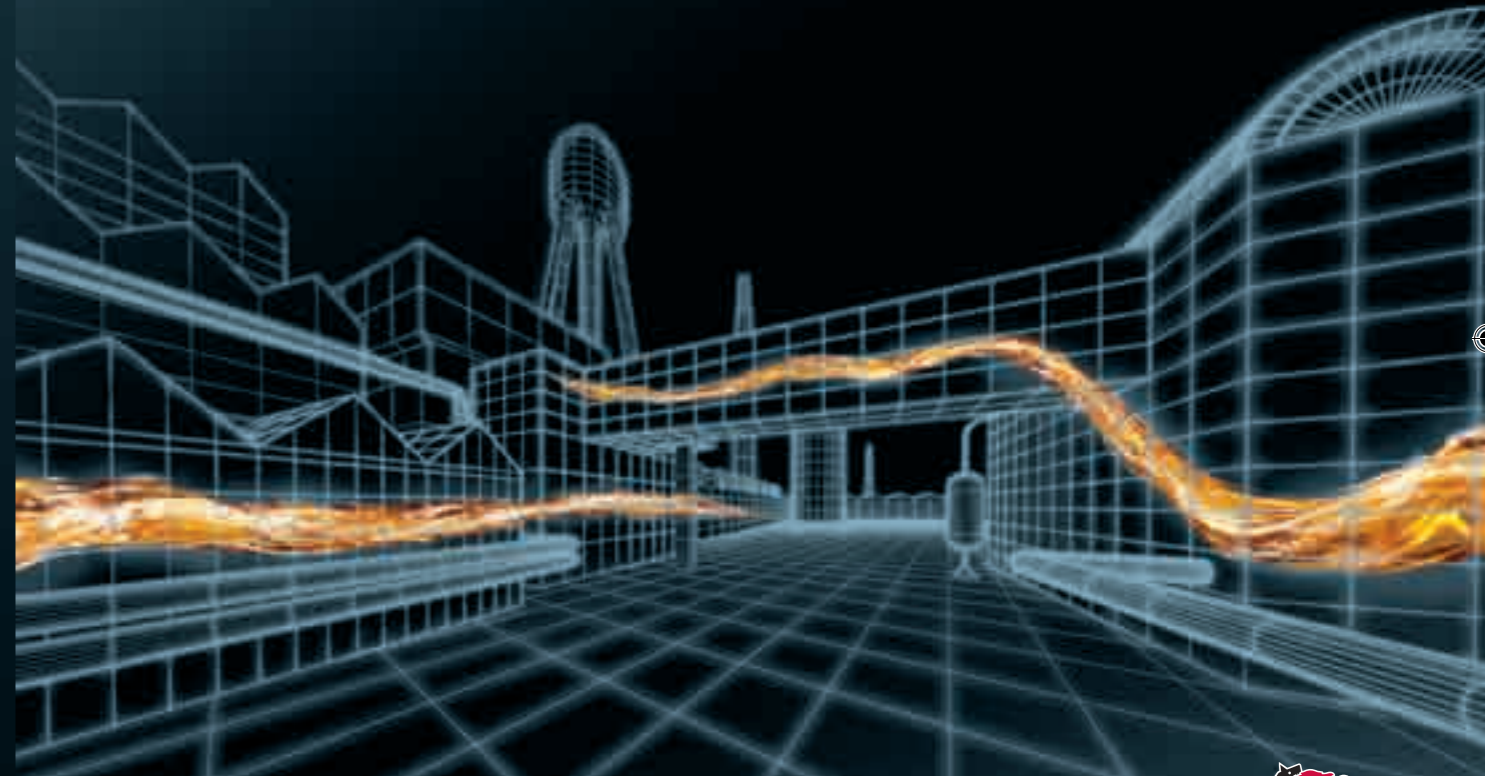
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hydraulic
oils

agip lubricants
technology comes alive



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eni, through its **Agip brand**, is the leading company in the industrial lubricant market in Italy. Technical and commercial leadership is maintained and reinforced by **eni's** commitment to **technology, quality, environmental protection and technical customer support**.

technology

The internationally recognised advanced level of expertise and equipment at the San Donato Milanese laboratories generate the development of products and processes for the most modern production requirements.

quality

All plants in the lubricant production cycle operate in accordance to a certified quality management system in conformity with standard ISO 9002.

environment

Attention to the environment is one of the main guiding principles in product development and in the production cycle. All plants implement a certified environmental management system in conformity with standard ISO 14001.

technical support

The highly qualified technical manpower are the highly dispersed global operations, ensured outstanding technical back up support services to customers, security in total customers satisfaction.

The industrial product line includes lubricants and special products to satisfy all the lubrication requirements of any type of industrial plant at a qualitative level at the top of the market.

More information about application, characteristics and TDS is available on <https://nalis.eni.it/Alis> and by e-mail alis@eni.it

fluids for hydraulic system

Hydraulic systems, or more precisely hydrostatic systems, transmit mechanical energy from one point of a plant to another using the pressure exerted on a fluid. The fluids used in such a plant must therefore flow easily, limit friction and prevent wear. The choice of the fluid depends on the type of use, on the operating conditions and on the characteristics of the components of the hydraulic system.

chemical and physical properties

viscosity

The physical "size" of a fluids, defined as the intrinsic resistance to flow, measured by the dynamic viscosity. The ISO VG viscosity grade must be chosen on the basis of the pump and/or plant manufacturer's instructions, taking into account, of the operating temperature of the system and the ambient temperature at starting and in service.

viscosity index

Viscosity depends on temperature (it reduces with an increase in temperature) and the parameter that measures this variation is called the viscosity index. The higher the index the more constant the fluid maintains its level of viscosity with variations in temperature. The hydraulic fluids in current usage have viscosity indices of about 100, but there are mineral hydraulic oils containing special polymers with indices greater than 140-150 and synthetic oils with viscosity indices of between 130 and 190.

antirust and anticorrosion capacity

The capacity of the hydraulic fluid to protect internal metallic surfaces from chemical attack by extraneous substances, primarily water and oxygen but also acidic substances. These properties are obtained by the addition of special polar or passive additives that act by adhering to the metallic surfaces and forming a protective layer.

oxidation stability

The resistance of the oil to react with oxygen. Antioxidant additives increase this capacity considerably, which reduces the effects of oxidation (formation of acids, sludge, etc.) and also considerably increases the life of the lubricant in use. In general synthetic oils possess an intrinsically higher oxidation stability.

thermal stability

The intrinsic resistance of the oil to form sludge and carbonaceous deposits when it is subjected to high thermal stress. The chemical nature of the oil (mineral or synthetic) has a predominant influence on this property.

demulsivity

Demulsivity is the ability of the oil to release water and is closely dependent on the nature of the original crude and on the refining process. Demulsivity can also be partially improved by special additives and is generally reduced by the presence of contaminants.

antiwear property

The ability of the fluid to limit wear. It is obtained by specific additives in the oil that drastically reduce the mechanical wear of the components in circuits where there are sliding contacts (vane pumps). This characteristic is generally evaluated by tribological tests, such as 4 balls wear and "FZG", and by bench top tests with the hydraulic pumps of leader manufacturers (Eaton-Vickers and Denison).

filterability

The evaluation of the tendency of an oil to leave deposits and/or form emulsions that may block filters. This property is assessed in the presence or in the absence of water.

compatibility with rubbers

Elastomeric (rubber) components (washers and flexible parts) must be compatible with the oil in circulation in order to avoid their rapid failure. The degree of compatibility between the elastomer and the oil depends on their relative chemical compositions. All AGIP hydraulic fluids are compatible with the elastomers in current use (nitrile, silicone, fluorocarbon, and acrylic rubbers).

mineral hydraulic fluids

AGIP RADULA

AGIP RADULA are pure mineral oils for use as hydraulic fluids for light applications.

AGIP ACER

AGIP ACER are quality lubricants with antioxidant and antirust additives (R&O oils) for use as functional fluids for oleodynamic circuits where there are no problems of wear.

AGIP OSO

AGIP OSO are high quality lubricants designed to be used as functional fluids in all types of hydraulic systems and plants. They are blended from high quality paraffin bases with antirust, antioxidant and antiwear additives. AGIP OSO conform to the following classifications and specifications and/or are approved by the following international organizations or manufacturers:

- > ISO-L-HM
- > ISO 11158
- > AFNOR NF 48603 HM
- > BS 4231 HSD
- > DIN 51524 TEIL 2 HLP
- > VDMA 24318
- > ATOS TAB. P 002-0/I
- > PARKER HANNIFIN (DENISON) HF-0 LEVEL
- > CINCINNATI P-68, P-69 AND P-70 LEVEL
- > LINDE
- > REXROTH RE 90220-1/11.02
- > SAUER-DANFOSS 520L0463

AGIP OSO S

AGIP OSO S are superior quality ashless hydraulic oils suitable for the lubrication of hydraulic equipment and systems. They are formulated from highly selected paraffin bases and additives which confer excellent antiwear, filterability, antirust and antioxidant properties to the product.

- > ISO-L-HM
- > ISO 11158
- > AFNOR NF 48603 HM
- > BS 4231 HSD
- > DIN 51524 TEIL 2 HLP
- > PARKER HANNIFIN (DENISON) HF-0 LEVEL
- > REXROTH RE 90220-1/11.02
- > CINCINNATI P-68, P-69 AND P-70 LEVEL

AGIP OSO D

AGIP OSO D are detergent/dispersant type hydraulic fluids with the ability to emulsify water, which has infiltrated into the hydraulic circuit. Suitable for cutting machines.

AGIP ARNICA

AGIP ARNICA are superior quality mineral antiwear hydraulic oils, with a very high viscosity index, developed to satisfy the needs of modern oleodynamic plants that operate in the severest conditions. The products of the AGIP ARNICA series are characterised by a high antiwear capacity and by an excellent thermo-oxidative stability, ensure prompt de-emulsification, rapid release of entrained air, high flash point and excellent filterability; the compatibility of the fluid with rubber and paints and its resistance to chemical attack, also guarantees the complete protection of the components of the circuit. Their performance places AGIP ARNICA at the top in the field of hydraulic oils. AGIP ARNICA are also suited to work in the most severe conditions, as demonstrated by tests carried out on piston and vane pumps made by the major manufacturers, such as Eaton-Vickers and Denison. AGIP ARNICA conform to the following classifications and specifications and/or are approved by the following bodies or manufactures:

- > ISO-L-HV
- > ISO 11158
- > AFNOR NF 48603 HV
- > BS 4231 HSE
- > DIN 51524 TEIL 3 HVLP
- > ATOS TAB. P 002-0/I
- > CINCINNATI P-68, P-69 AND P-70
- > COMMERCIAL HYDRAULICS
- > PARKER HANNIFIN (DENISON) HF-0
- > EATON VICKERS M-2950
- > LINDE
- > REXROTH RE 90220-1/11.02
- > SAUER-DANFOSS 520L0463

AGIP ARNICA DV

AGIP ARNICA DV is detergent/dispersant high viscosity index type hydraulic fluid with the ability to emulsify water, which has infiltrated into the hydraulic circuit. It is particularly suitable for use in ceramic industry presses and in machine tools that operate with aqueous fluids.

AGIP EXIDIA HG

AGIP EXIDIA HG are specific fluids developed for machine tools, where one product is needed for lubricating the guide and for driving the oleodynamic controls.

PRODUCTS	CLASSIFICATION ISO	STANDARD	DIN
AGIP RADULA	ISO-L-HH	ISO 11158	DIN 51502 H
AGIP ACER	ISO-L-HL	ISO 11158	DIN 51524 PART 1 HL
AGIP OSO	ISO-L-HM	ISO 11158	DIN 51524 PART 2 HLP
AGIP OSO S	ISO-L-HM	ISO 11158	DIN 51524 PART 2 HLP
AGIP OSO D	ISO-L-HM (*)	ISO 11158	DIN 51524 PART 2 HLPD
AGIP ARNICA DV	ISO-L-HV (*)	ISO 11158	DIN 51524 PART 2 HVLPD
AGIP ARNICA	ISO-L-HV	ISO 11158	DIN 51524 PART 3 HVLP
AGIP EXIDIA HG	ISO-L-HG	ISO 11158	DIN 51502 HG

(*) detergent oils are not covered by ISO.

synthetic hydraulic fluids

AGIP ARNICA S

AGIP ARNICA S are hydraulic fluids formulated from synthetic esters bases. AGIP ARNICA S are characterised by a particularly high viscosity index and an extremely high flash point, properties which make these oils suitable for use in plants exposed to fire danger; additionally, they are biodegradable and thus suitable where there is a risk of leaks, that may pollute the environment.

AGIP ARNICA PSX

AGIP ARNICA PSX is a totally synthetic very high performance fluid with antioxidant, antirust, antiwear and detergent/dispersant additives specifically formulated for presses used in the ceramics industry. The interval replacement in systems in which it is used may be considerably extended due to the very high resistance to oxidation.

AGIP ARNICA 104 FR

AGIP ARNICA 104 FR is a special non-flammable biodegradable fluid characterised by high viscosity index and low stick-slip point, conforming to the needs of the hydraulic circuits of industrial machinery. It is composed of a propylene glycol/water solution with anticorrosive additives.

PRODUCTS	BASE TYPE	CLASSIFICATION ISO	STANDARD	APPLICATIONS
AGIP ARNICA S	ESTER	ISO-L-HFDU ISO-L-HEES	ISO 12922 ISO 15380	FIRE RESISTANT ACCEPTABLE TO THE ENVIRONMENT
AGIP ARNICA PSX	PAO	ISO-L-HS	-	CERAMIC PRESSES
AGIP ARNICA 104 FR	GLYCOL + WATER	ISO-L-HFC ISO-L-HEPG	ISO 12922 ISO 15380	FIRE RESISTANT ACCEPTABLE TO THE ENVIRONMENT

other hydraulic fluids

The range of AGIP hydraulic fluids is supplemented by other products for particular applications as shown in the following table:

PRODUCTS	BASE TYPE	APPLICATIONS	CHARACTERISTICS
AGIP ARNICA A 15 AGIP ARNICA ABX 15	mineral pao/ester	gate opening mechanisms gate opening mechanisms	very high viscosity index very high viscosity index, biodegradable
AGIP ARNICA SA (series of products)	mineral	shock absorbers	avoid stick-slip phenomena, good antiwear characteristics
AGIP SP 7734 - SP 7735 - SP 7736	natural esters	environmental pollution risks	biodegradable according to method OECD 301b

Grades available

Agip hydraulic fluids are available in a wide viscosity range as shown in the following table:

ISO VG VISCOSITY PRODUCT	15	22	32	46	68	100	150
AGIP RADULA			X	X	X	X	X
AGIP ACER		X	X	X	X	X	X
AGIP OSO	X	X	X	X	X	X	X
AGIP OSO S			X	X	X		
AGIP OSO D			X	X			
AGIP ARNICA	X	X	X	X	X	X	
AGIP ARNICA DV				X			
AGIP ARNICA S				X	X		
AGIP ARNICA PSX				X			
AGIP ARNICA 104/FR				X			
AGIP ARNICA A 15	X						
AGIP ARNICA ABX 15	X						
AGIP EXIDIA HG			X		X		
AGIP SP 7734 - SP 7735			X	X			
AGIP SP 7736					X		

international classification and properties

AGIP hydraulic fluids have particular characteristics which make them suitable for several applications as illustrated in the following table:

ISO CLASSIFICATION	PROPERTY	PRODUCTS
HH	straight mineral oil	AGIP RADULA
HL	antirust and resistant to oxidation	AGIP ACER
HM	antiwear	AGIP OSO - AGIP OSO S
HM	antiwear + detergent (*)	AGIP OSO D
HV	antiwear + detergent and HVI (*)	AGIP ARNICA DV
HV	antiwear and high viscosity index	AGIP ARNICA
HG	HM + anti stick-slip characteristics	AGIP EXIDIA HG
HS	long life synthetic oil	AGIP ARNICA PSX
HFC	fire resistant	AGIP ARNICA 104 FR
HFDU	fire resistant	AGIP ARNICA S
HEES	acceptable for the environment	AGIP ARNICA S
HETG	acceptable for the environment	AGIP SP 7734 - SP 7735 - SP 7736
HEPG	acceptable for the environment	AGIP ARNICA 104 FR
HEPR	acceptable for the environment	AGIP ARNICA ABX 15

(*) detergent oils are not covered by ISO.