



Product Data

Castrol Anvol[®] WG46

Fire Resistant Hydraulic Fluids

Description

Castrol Anvol WG is a water glycol fire resistant hydraulic fluid that meets HFC 7th Luxembourg classification and Factory Mutual Category Group 0 classification. **Castrol Anvol WG** products are outstanding in their category in providing a safe working environment and improved system reliability.

Castrol Anvol WG is specifically designed to minimise foaming and air entrainment in your hydraulic system. This ensures maximum pump life and system performance. As well it is designed to provide excellent protection against ferrous corrosion and non-ferrous corrosion.

Even in the harshest steel mill environment, **Castrol Anvol WG** provides safety, protection and reliability. This has the added value of reducing failures and minimising unscheduled downtime.

Application

Castrol Anvol WG is used in areas of the manufacturing industry where there is extreme risk of fire such as in hot strip mills, coil handling facilities, pipe mills, continuous casters, die casting machines, forging presses and robotic welding machines. The risk is minimised by **Castrol Anvol WG's** high water content and extremely low heat of combustion.

To avoid excessive evaporation of water, the system should be designed in such a way that the temperature does not exceed 50° C. Due to their higher specific gravity and vapour pressure, water glycol fluids have a higher tendency than mineral oil fluids to produce pump cavitation. In order to overcome this, pump manufacturers normally work to the following conditions:

- ❑ Fluid speed in the pump outlet in the range of approximately 2-6 m/s
- ❑ Inlet speed no higher than 1.5 m/s
- ❑ The pump nor the intake pipe must not run empty.
- ❑ The dimension of the pump inlet and outlet must be those recommended by the manufacturers.



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Efficient filtration is important when using **Castrol Anvol WG**. 10-micron filters should be used. They are normally placed in the high-pressure line and in the return line to the reservoir.

The surface of the filters should be large enough to avoid a high-pressure drop and the volumetric capacity of all filters should be such that they are able to pass at least three times the output of the pump at the operating viscosity. Bypasses are not recommended in the high-pressure line, and a pressure drop in excess of 3.5 bars is to be avoided.

Many types of filters are suitable for use with **Castrol Anvol WG**. Users should refer to individual manufacturers' recommendations. Inert metal mesh filters are preferred. Active clay or absorbent filters should not be used.

Performance Benefits

- Greater fire protection
 - With a high water content and shear stability, **Castrol Anvol WG** provides excellent fire suppression characteristics thereby creating a safer working environment and greater equipment protection
- System protection from corrosion
 - **Castrol Anvol WG** is designed to protect ferrous and non-ferrous components from corrosion. Recirculated water used in the cooling systems can make its way into the hydraulic fluid. Castrol Anvol WG ensures that this does not impact on the hydraulic system itself.
- Superior equipment performance
 - Extended pump life and reduction in replacement/maintenance cost
 - Longer life
- Stability in harsh operating environments. Resistance to oxidation and thermal degradation and improved filter tolerance provides
 - Reduces sludge/vanish formation and the potential for valve sticking/failure
 - Ensures that product life is extended with greater drain intervals



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Compatibility with Seal Materials

Packing and hoses:

Castrol Anvol WG fluids are compatible with Acrylonitrile-butadiene rubbers (NBR), hydrogenated NBR and fluorocarbon rubbers (FKM). Polyurethane based elastomers, leather and cork material are not suitable since they absorb water.

High pressure or maximum pressure hoses and packings with wire, cotton or synthetic fibre inserts and coating of natural rubber on the above synthetics may be used without restriction.

Board and paper material should not be used for flange and cover seals. Fluid packing compounds or mastics should be used sparingly so that these do not get into the fluid circuit and lead to valve blockages.

Paint:

Castrol Anvol WG because of its solvent action is incompatible with conventional industrial paints. When a system is converted to **Castrol Anvol WG** from a mineral oil fluid, all internal paints known to be adversely affected should be removed and the surface either left unpainted or treated with a coating that is resistant to **Castrol Anvol WG** (such as epoxy resin or phenolic resin paints).

Metal:

Castrol Anvol WG is compatible with the metals normally employed in hydraulic systems. It should not be used in systems incorporating magnesium alloys, because of its reactivity with water. Zinc and cadmium plated parts should be avoided they tend to form sticky deposits which can clog filters and valves. Cadmium must be passivated if used.

Care must also be exercised when using aluminium. Due to the high pH of Castrol Anvol WG, it is recommended that if using aluminium, that , 'hard-anodised' product should be used.

Compatible metals include, ferrous, tin, nickel, copper, brass and bronze (lead content should not exceed 10%).



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System Changeover

Mineral oil, phosphate ester or Polyol Ester based fluids to Castrol Anvol WG

- 1) Drain the system as completely as possible, paying careful attention to the low points in pipelines, dead legs and pockets of fluid which may be trapped in pumps, valves, accumulators and other components.
- 2) Clean the inside of the reservoir thoroughly using lint free cloth. Paint protected surfaces should preferably be stripped to bare metal before cleaning. If internal surfaces are to be left painted, the paint used should be either epoxy resin or phenolic resin or one recommended by the paint supplier.
- 3) Manually swab the inside of the reservoir thoroughly with **Castrol Anvol WG**.
- 4) Remove filters, clean and replace. If paper filter elements are used, they must be replaced by a resin-impregnated type as recommended by the filter supplier.
- 5) Check the seals, hose accumulator bladders etc for compatibility with the water glycol and replace with recommended materials as necessary.
- 6) Pump, preferably by means of a small rotary hand pump, sufficient water glycol through the suction and delivery pipes to ensure that all of the fluid previously used is removed from the hydraulic circuit. A slow viscosity flow, as from a small hand pump, is most effective for flushing and the small quantity used reduces costs.
- 7) Drain the flushing fluid as completely as possible and clean the inside of the reservoir.
- 8) Clean the filters and renew elements as necessary.
- 9) Fill the reservoir with the **Castrol Anvol WG** to be used, clean the reservoir breather and check the circuit for leakage. The system is now ready for normal operation.
- 10) A sample should be taken 4 hrs after operation. If the mineral oil content is greater than 5%, the system should be drained and filled with new Castrol Anvol WG.

Fluid Maintenance

General:

Water can be lost from **Castrol Anvol WG** by evaporation where bulk fluid temperatures are high. This water must be replaced to maintain the correct viscosity and optimum fire resistance. Water content is determined indirectly by measuring viscosity and the required adjustment calculated by reference to the attached graph.

In addition to the water content, check the reserve alkalinity of the Castrol Anvol WG. This is a measure of the level of corrosion protection provided by the fluid. It should always be between 55 and 75 (see technical data for units). If the fluids measures outside your range, please contact your nearest Castrol branch.

Check the viscosity of Castrol Anvol WG every two to four weeks initially. Normally it is found that water losses are small and subsequent checks can be made at less frequent intervals, once per month for example. Take samples from the full flow part of the system such as the return reservoir. For further assistance regarding adjustments of water in the fluid contact your nearest Castrol branch.

Adjustment of water content in Castrol Anvol WG

Refer to the graph below to calculate the amount of make-up water required. Use either distilled or deionised water where possible. If you are unable to attain these two water sources send a sample to your water to Castrol for analysis to determine suitability.

Add the required quantity of water slowly to the reservoir with the system running to ensure thorough mixing.

Water Specification:

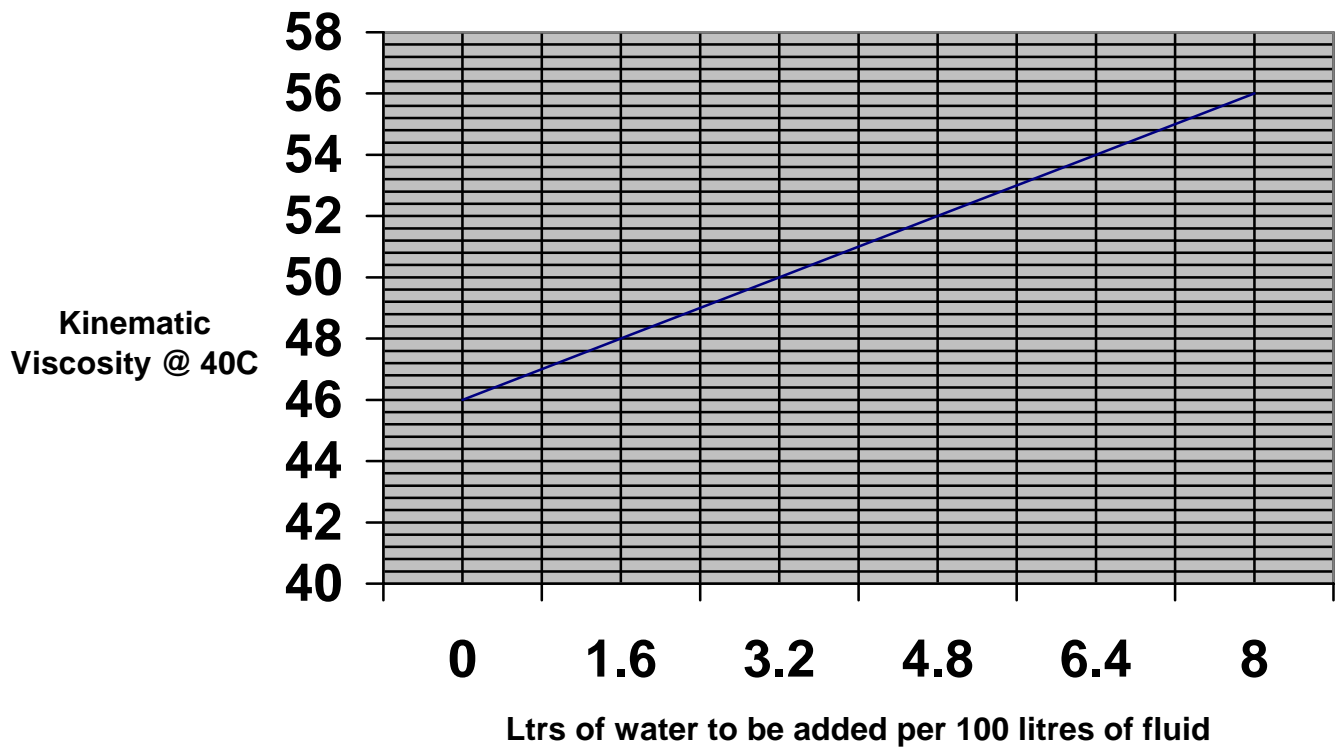
Attribute	Specification	Units	Method
Total hardness as CaCO ₃	5 max	Mg/Kg	-
Colour	10 max	Pt/Co	ASTM D1209
Appearance	Clear liquid free of visible particles	-	ASTM E284



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Adjustment chart:

Castrol Anvol WG Water Content Correction





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Technical Data

Property	Test Method	Castrol Anvol WG 46
Viscosity @ 0C	ASTM D445	272
Viscosity @ 20C	ASTM D445	101
Viscosity @ 40C	ASTM D445	46
Viscosity @ 50C	ASTM D445	34
Viscosity Index	ASTM D2270	> 200
Density at 15°C, kg/l	IP160	1.080
Pour Point (C)	IP 15	-47
Foaming Characteristics Tendency/ Stability, ml	IP 146	
Seq I		20/0
@ 50C	IP 146 modified	10/0
Water Content (Dean and Stark)	IP 74	38% typical
Reserve Alkalinity, 0.1N HCL to pH 5.5, ml		55 - 75
pH at 25C		9.3 – 9.8
Factory Mutual SFP	Calculation	2.9
Air release @ 50°C, min	IP 313	9.5
Rust Protection	IP 135	No Rust
Corrosion Protection, 14 days, 50°C , weight change in mg	7th Luxembourg Report, CETOP Corrosion Test for Water Based Fluids	
Steel		11 max
Copper		11 max
Zinc		22 max
Aluminium		5.5 max
Cadmium		22 max
Brass		11 max
Vickers Vane Test 104, total weight loss, mg	ASTM D 2882	70 max

Health and safety

Castrol Anvol WG is classified as Hazardous according to the criteria of NOHSC. It is harmful by swallowing. It is also good safety procedure to minimise skin contact and inhalation of oil mist.

All reasonable care has been taken to ensure that this information is accurate as of the date of printing. Nevertheless, such information may be affected by changes in the blend formulation occurring subsequent to the date of printing. Material Safety Data Sheets are available for all Castrol products. The MSDS must be consulted for appropriate information regarding storage, safe handling and disposal of a product.