

UFI HYDRAULIC SOLUTIONS FOR WIND POWER GENERATION



A WINNING COMPANY



ENGINEERED FILTRATION SOLUTIONS



A 30-YEAR SUCCESS STORY

UFI Filters Hydraulics, founded in 1992 in Bolgare, in the north of Italy, is the branch of the UFI Filters Group dedicated to hydraulics filtration solutions.

For 30 years, UFI Filters Hydraulics has specialised in the design and manufacturing of a comprehensive line of hydraulic filters, filter elements, spare parts and accessories, with the aim to create innovative and sustainable solutions in hydraulic filtration and to meet, at the same time, the requirements of the most demanding operating environments and applications.

UFI Filters Hydraulics daily journey consists in studying customers' filtration problems and sharing with them its worldwide experience, to ensure a safe and constant cleanliness level thereby creating reliable, proven and highly efficient hydraulics, both in mobile and stationary applications.

In 2022, UFI Filters Hydraulics acquired all of the shares of Friedrichs Filtersysteme GmbH, gaining access to a new world with several additional markets, and extending its portfolio with new products and patents: duplex fluidtech® series of

filters, deltaP® differential pressure indicators, air-oil mist separators for big generators, silencers for air compressors, water filters for marine and industry and other filtration units and breathers for several sectors, including wind power generation, mining and chemical industry.

UFI Filters Hydraulics daily journey consists in studying customers' filtration problems and sharing with them its worldwide experience, to ensure a safe and constant cleanliness level thereby creating efficient and reliable hydraulics.

UFI Filters knows the basis of filtration and masters the best filtering materials to make it work at best.

The company counts now six types of FormulaUFI:
FormulaUFI.Extreme
FormulaUFI.Stratiflex
FormulaUFI.Micron
FormulaUFI.Web
FormulaUFI.H2O
FormulaUFI.Cell

UFI FILTERS HYDRAULICS IN NUMBERS



1992

Founded in 1992, it's now a world leader in hydraulic technology



6

6 application sectors: from heavy duty, industrial and power generation to special applications



180

4 production plants and over 180 employees in 6 countries worldwide



6

6 lines of filter supplied: suction, return, pressure, off-line, transmissions, air

MOBILE HYDRAULIC APPLICATIONS

The supply of reliable hydraulic power to vehicles serving the arduous requirements of the construction industry safeguards the system utilisation and the productivity levels, thus enabling vehicle fluid power systems to achieve exceptional performance and avoiding the expensive, time-consuming issues associated with unplanned downtime, maintenance and repair. UFI Filters Hydraulics has the knowledge and the engineering technology to master these issues with more than 6,000 references for mobile applications: agriculture, construction, heavy duty and material handling. In particular, UFI Hydraulics developed a new layout of green element series that prolongs the replacement intervals and means a reduction in labor, material and disposal costs. For these reasons, many well-known construction vehicle manufacturers and end users have placed their trust in UFI Filters Hydraulics' ability for many years, both in Original Equipment and in Aftermarket.

STATIONARY HYDRAULIC APPLICATIONS

UFI Filters Hydraulics has earned a solid reputation for quality and cost-efficient products also for CNC machines, presses, power generation, wind power applications and industrial hydraulic systems. UFI Hydraulics products meet the hydraulic-system requirements of maximum protection, with high efficiency and constant stability. High-performance microfibers filtration media, with high voids-volume, warrant validated levels of dirt-holding capacity, coherent with the economic extended machine-life and service-intervals demanded by the market. UFI Hydraulics developed some specific series for return and off-line applications to meet also the most demanding requirements to respect the environment and reduce polluting components in the hydraulic systems. These ecofriendly series presents coreless filter elements, that weigh up to 60% less than comparable elements with metal end caps and cores, combine environment compatibility with UFI certified quality, lightweight layout and easy service and can be used in a variety of lube & hydraulic systems such as wind power generation and industrial manufacturing, representing a high-performance solution for several hydraulic applications.

HYDRAULIC SECTORS



HEAVY DUTY

Trucks, buses, road building machines etc.



MATERIAL HANDLING

Forklifts, port machining, vertical lifts etc.



AGRICULTURAL

Tractors, combined harvesters, mixers, sprayers etc.



CONSTRUCTION

Excavators, backhoe loaders, dumpers, telehandlers etc.



INDUSTRIAL

Primary metal, ceramic presses, plastic presses, etc.



POWER GENERATION

Wind power generation, genset, oil & gas etc.



HYDRAULICS IN WIND TURBINE

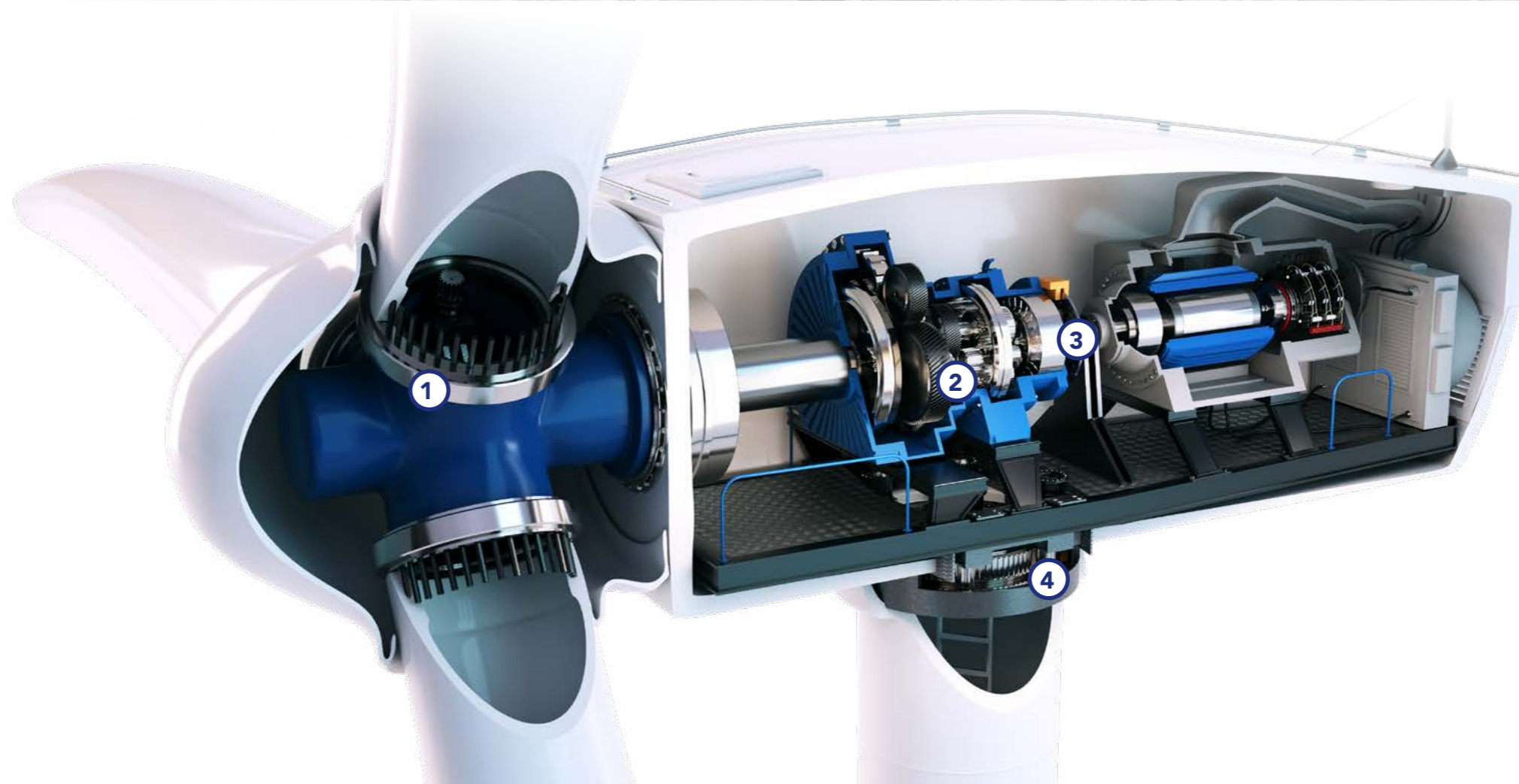
Wind energy is the most efficient technology to produce energy in a safe and environmentally sustainable way. In order to have a secure and sustainable future, wind turbines need to be running economically and require reliable and durable operation.

As hydraulic systems represent a substantial part of each turbine, it is important to implement an effective filtration program, in order to reach the following goals:

- + Prevent the damage of sensitive and expensive components
- + Extend maintenance intervals and reduce costs
- + Increase the reliability of pitch control and yaw systems and gearboxes

For this reason, **selecting the best supplier for the most critical hydraulic components is a matter of paramount importance.**

UFI Filters Hydraulics has the necessary filtration technology and background to manufacture the hydraulic components **to meet OEM, OES and independent aftermarket requirements** for wind power generation application.



① HYDRAULIC PITCH CONTROL

Hydraulic pitch systems provide robust and reliable control of power and speed of modern wind turbines. The pitch control serves not only to optimise the power output but also to protect the wind turbine against excessively high wind speeds.

UFI Filters Hydraulics complete filters and spare parts **ensure optimum power output by keeping the pitch hydraulic system clean and efficient.**

② GEARBOX

The gearbox is a critical component in a wind turbine that helps convert rotational energy into electrical power and is one of the most expensive components, accounting for 15% of the wind turbine's total cost. Gearbox failures lead to the most significant downtime experienced as well as the most costly.

UFI Filters Hydraulics complete filters and spare parts **maintain lubrication and filtration systems in good condition, minimise failure rates and reduce costs.**

③ HYDRAULIC BRAKE SYSTEM

The braking system ensures that the wind turbines yaw and main shaft remains reliable and in safe control. Effective braking prevents permanent damage to turbine's structures in high wind speeds, and keeps the service team safe during maintenance. The hydraulic brake system is based on a hydraulic system that allows controlled revolutions in all weather conditions. UFI Filters Hydraulics range includes **flexible and reliable solutions to protect wind turbines braking system.**

④ AZIMUTH DRIVE

The azimuth drive orients the nacelle towards the wind to ensure optimum turbine utilisation. Wind turbines must be aligned optimally to the wind in order to prevent extreme loads and allow a cost-effective operation.

UFI Filters Hydraulics complete filters and spare parts **ensure that the wind turbines yaw and main shaft remains reliable and in safe control.**



HYDRAULIC FILTRATION SOLUTIONS

RELIABLE PRODUCTS FOR THE MOST DEMANDING OPERATING ENVIRONMENT

UFI Filters Hydraulics, thanks to more than 25 years of experience in hydraulic filtration, guarantees the necessary filtration technology and background to manufacture **complete filters, spare parts and accessories specifically designed for the Wind Power Generation sector**, in order to meet the most demanding OE, OES and independent aftermarket requirements.

UFI Filters Hydraulics products offer **definite and reliable performance**, that are considered strategic features when the machines involved in the maintenance operate in particularly contaminated contexts and difficult environmental conditions

PLUS

- + High degree of filtration
- + Extended filter lifetime
- + Longer service interval
- + High reliability
- + Wide range of **tailor-made solutions**

UFI Hydraulics components are designed to be **compact, lightweight** and **easily serviced**, yet providing at the same time **exceptional service life** to work properly in the most demanding of operating environments.

UFI Filters Hydraulics offers well-engineered solutions to protect wind turbines by helping to avoid malfunctions and the fallout of control devices. UFI's hydraulic products **improve the productivity and the reliability of renewable energy sources**, for on-shore and off-shore wind turbines, by ensuring permanent and failure-free operations.

HIGH PRESSURE FILTER MANIFOLD MOUNTING

The high pressure FPL series offers a wide range of possible combinations, housing dimension and lengths, together with several filtration degree options, thus ensuring:

- **specific ideal configuration** for each wind turbine
- **optimal assembly cost**
- **reduced overall dimensions**, as well as piping and adaptor fittings required to protect sensitive components, thanks to direct side mounting on manifolds



FPL

RETURN LINE TANK TOP FILTRATION

Return Line filters remove the contaminants from the oil used for lubrication, for this reason FRA and FRF series are key elements for the filtration of wind turbines:

- **compact and lightweight layout**
- **inside to outside filtration** for FRF series
- **smooth and cost effective operation**



FRA



FRF



HIGH EFFICIENCY FILTRATION

OFFLINE FILTRATION

UFI Hydraulic Offline FOF Series allows for independently controlled offline filtration of the hydraulic oil 24/7, thus safeguarding:

- **improved lifetime on all components**
- **improved lifetime of hydraulic oil**
- efficient continuous offline filtration of the hydraulic oil and **increased earnings**



FOF

DOUBLE AND TRIPLE STAGE FILTER ELEMENTS

Double and Triple stage filter elements are specifically designed for wind turbine application and are used to filter lubricants even under cold start conditions. UFI Hydraulics 2-Stage elements consist of two separate filter elements designed in series in order to secure a filtration even if the bypass opened under low temperature conditions and thus guides the oil through the element and over the security filter. These special elements guarantee:

- a certain level of **filtration even under the hardest conditions**
- **low initial differential pressure,**
- **high dirt holding capacity** and filtration performance due to multi-layer glass fiber technology



DOUBLE AND TRIPLE STAGE

WATER REMOVAL FILTER ELEMENTS

Used in combination with the other hydraulic filters, Hydro Dry water removal filter elements provide significant benefits:

- **less component wear**
- **reduced downtime**
- **improved machine productivity**
- less replacement and disposal of contaminant fluid
- **reduced risk of failure**



HYDRO DRY

HIGH PRESSURE SPIN-ON

UFI Fortimax high pressure spin-on elements are designed to fit in many different type of housing and are ideal for the most demanding wind power applications as they allow:

- **initial lower clean pressure drop**
- **superior system protection**
- **extended filter life** resulting in **longer change intervals**



FORTIMAX



HIGH EFFICIENCY FILTRATION

AUXILIARY FILTRATION SYSTEM

UFI Filters Hydraulics Portable filtration systems can support the filtration system of the wind turbine, thus improving the operational efficiency, productivity, and reliability of the most critical assets.

The UOW series is the ideal way to prefilter and transfer fluids, on site or on the spot.

Especially in demanding operating applications, fluid should be filtered prior to use, as contamination may be introduced during processing, mixing, handling and storage.

Moreover, the portable filtration system, as UOW, is **the most efficient and economical way to extend fluid life**.

Main purposes of the auxiliary filtration systems are:

PLUS

- + Clean hydraulic fluids prior to system fill
- + Supplement existing system filtration
- + Decrease cleanup time
- + Transfer fluids from drums or storage tanks to system reservoir
- + Condition fluid in use
- + Remove free and emulsified water from a system

The UFI Filters Hydraulics UOW series is designed with particular attention to the corporate values of sustainability, promoted by the vision of the UFI Filters Group.

The filter element is designed to meet the most demanding requirements of respect for the environment and reduction of polluting components of the hydraulic system and presents the following characteristics:

- **coreless structure**, which requires the replacement of the filter media only, eliminating the internal metal support, thus reducing materials waste
- **lightweight layout**, as the weight of the element is significantly reduced compared to the standard version with internal support
- **easy maintenance and replacement** with reduced leakage of environmentally polluting fluid

The filter element, having a wide filtration area and excellent efficiency features, is available with FormulaUFI.MICRON, from 5 to 21 $\mu\text{m(c)}$ ($\beta_x > 1.000$) and FormulaUFI.H2O



UOW



HIGH EFFICIENCY FILTRATION

LUBRICATION FILTERS

UFI Filters Hydraulics has the know-how and the experience to design specific solutions for lubrication systems.

The new WLB series for gear box lube oil systems helps wind turbines operating at peak efficiency. Since the gearbox is the heart of the wind turbine and represents more than 10 percent of the overall cost and since fluid contamination is a huge contributing factor to gearbox failure, **an efficient filtration and lubrication of the system is increasingly considered a strategic factor in the wind power generation sector.**

UFI Filters Hydraulics lubrication filters and elements play a crucial role in removing contaminants within hydraulic and lubrication systems:

- **Helping achieve fluid cleanliness**
- **Prolonging the life of the components and the oil itself**
- **Enabling smooth operation of wind turbines**
- **Reducing expensive repairs and unplanned maintenance.**

The key component of UFI lubrication products is the latest generation FormulaUFI.MICRON filter element. Low pressure loss and high dirt holding capacity enable the use of highly viscous oils with simultaneously long service lives, thus achieving the following goals:

PLUS

- + High efficiency filtration
- + Tailor-made dirt holding capacity
- + Low initial pressure drop
- + Lasting performance over time



WLB



OPTIMAL WIND TURBINE PROTECTION

ECOFRIENDLY FILTER SERIES

UFI hydraulics developed a specific series to meet also the most demanding requirements to respect the environment and reduce polluting components in the hydraulic system. GRF series presents:

- **coreless filter elements**, that combine environment compatibility with UFI certified quality
- **lightweight layout**
- **easy service**



GRF

IRF

HYDRAULIC OEM ALTERNATIVE FILTER ELEMENTS

UFI Filters Hydraulics manufactures a wide range of lube oil filter elements, designed to upgrade any filtration system thanks to FORMULA.UFI media, the industry-leading media optimized for long life in wind turbines of all sizes. UFI Hydraulics alternative elements ensure:

- **high dirt-holding capacity**
- **low pressure drops and high beta ratio**
- **clean lube oil supply to the gearbox in order to minimise replacement intervals**



AIR BREATHERS

UFI Hydraulic air breathers are placed on hydraulic reservoirs and gearboxes to prevent atmospheric contamination from entering and ensure:

- **optimal air movement** inside the reservoirs
- **pressure equalization** inside the chamber



CBS

CSE

CBC

DESSICANT BREATHERS

Wind turbine Desiccant breathers are a key component designed to protect lubricant quality, widely used in gearboxes, storage tanks, transformers and hydraulic stations. UFI Hydraulics Air Sentry desiccant breathers not only filter solid contaminants from the air entering sensitive equipment, but also remove moisture from the entering air to keep the oil clean and dry.

Main advantages:

- **3-stage filtration design** to ensure optimum protection
- **clean and dry air** in the system
- **water absorption** up to 40% of its weight



AIR SENTRY



The proper maintenance of the hydraulic systems and the accurate cleanliness of the hydraulic system are key factors in achieving the best performance of a wind turbine while bringing down the maintenance and running costs.

All UFI Hydraulics elements are made with FORMULA.UFI media, in order to provide high levels of fluid cleanliness while maintaining low pressure drop characteristics.

Company with quality management system certified by DNV
ISO 9001 - IATF 16949

Company with environmental system certified by DNV
ISO 14001

UFI FILTERS HYDRAULICS S.P.A.

Via S. Chierico, 24 - Bolgare (BG) - Italy
T +39 0354493831 - F +39 035843743
info.ufihyd@it.ufifilters.com - www.ufihyd.com

UFI FILTERS INDIA PVT LTD.

Plot no .D-222/ 47 ,T.T.C M.I.D.C Shirwane | Nerul Navi - Mumbai - 400706 - India
T +91 2220875755 - M +91 8744071920

UFI FILTERS KOREA LIMITED

42, Hwanggeum 3-ro, Yangchon-eup | Gimpo-si, Gyeonggi-do, 10048 - Korea
T +82 319861341 - F +82 319861349

UFI FILTERS DO BRASIL LTDA

Av. Prefeito Luis Latorre, 9450 Galpão 15 | Distrito Industrial Jundiaí | São Paulo
Zipcode: 13209-430 Brasil | T. +55 11 2923-6554

FRIEDRICHS FILTERSYSTEME GMBH

Lothforster Benden 2 - 41849 Wassenberg - Germany
T.+49 2432 9660-0 - F +49 2432 9660-90
info@friedrichsfilter.de - www.friedrichsfilter.com

UFI FILTERS USA INC.

50 W. Big Beaver Road, Suite 440 | Troy, MI 48084 - USA
T. +1 (248) 525-0551

SOFIMA INDUSTRIAL FILTER SHANGHAI CO, LTD

Floor 1, building 2, No.128, Yuantong Road, Datuan Town, Pudong new district,
Shanghai City, 201314 Shanghai | China | T +21 39792688

UFI FILTERS AUSTRALIA PTY LTD

Level 10, 171 Clarence Street, 2000 Sydney (NSW)
T. +61 (0) 406 579 305