

THE ONYX LINE OF MICRO BUBBLE TECHNOLOGY PUMPS

The Onyx pump is the most reliable pump based method of micro bubble generation on the market. The Onyx pump utilizes a multi-stage centrifugal design to allow for site specific pressure and temperature environments. The Onyx pump is the only micro-bubble generating pump on the market that meets API 610 requirements for it's castings, couplings, bearings, labyrinth oil seals, mechanical seals, shafts & sleeves which gives a high reliability for the demanding oilfield environment. Use of the Onyx pump for Micro Bubble Flotation applications allows for smaller footprints and weights which are critical in offshore applications.



SOME BACKGROUND TO MICRO BUBBLE FLOTATION:

Generally in upstream oil processing facilities there is a requirement to separate oil, water and solids from produced water. Onshore historically large skim tanks are often used to encourage separation by gravity. Typically this requires prolonged residence time and often results in less than desirable separation. Over the years various systems have been developed to improve on both the time required, size of the equipment and improve on water quality, gas flotation is one of these technologies.

Exterran Water Solutions has devised a significantly improved gas flotation technology using micro bubbles (~10-50 microns) of gas to assist separation. It is generally accepted that a bubble of gas of a given size will attach itself to a similar sized oil droplet and encourage it to float to the surface where the oil coalesces, collects and is skimmed off. Through the use of micro bubbles it is easier to achieve lower concentrations of oil in the treated water.

The Micro Bubble Flotation technology (MBF™) substantially enhances the separation process and gives much improved separation results. The benefits of this are increased revenue from recovered oil, less problems in reinjection of the water, alternative uses for the oil free water (steam, polymer floods, etc.) elimination or less chemicals where chemicals are used and the ability to separate oil even in an emulsified state

Exterran Water Solutions offers two methods of creating micro bubbles:

1. A Gas Liquid Reactor (GLR™) that uses velocity, impact and shear under pressure to create micro bubbles from a primary mixture of gas and water.
2. A multi stage centrifugal pump where the impeller/s and hydraulic internals have been designed to create micro bubbles of ~30 micron. The pump can also self create a partial vacuum at the suction to induce gas when a pressurized source is not available. Unlike other centrifugal pumps, the MB line can handle up to 20% gas. The pump can achieve the above without cavitating or stalling. GLR Solutions has called this pump the ONYX™ line of pumps. It includes models MB-100 (100 usgpm), MB-200 (200 usgpm), MB-400 (400 usgpm) and MB-600 (600 usgpm)

THE PUMP

1. What is the ONYX-MB Pump ?

This is a very unique multi-stage ring sections type pump capable of self inducing 20% of its inlet flow as a gas into its suction casing. While most pumps would not be capable of pumping or at least suffer from severe cavitation with this gas the ONYX-MB pump creates trillions of micro bubbles through shear and pressure with no cavitation. The performance of this pump is primarily due to its proprietary impeller configuration and unique method of moving this multiphase water stream from stage to stage through the pump.

2. How Does this Pump Compare to Other Pumps Capable of Dissolving Gas ?

There are very few pumps capable of creating micro bubbles of the size required for MBF™. The ONYX-MB pump is superior to anything on the market due to its higher discharge pressures, higher gas saturation efficiency, multi-stage design, mechanical seal, operational reliability and standard materials of construction. All components are of API 610 specifications which allows for ready access to spare parts and of a construction suitable for the harsh operating environments found within the Oil & Gas industry.

3. What is the Commercial Implementation / Operating History of This Pump ?

The ONYX-MB pump resulted from the combination of two very proven pump technologies. The hydraulic design was evolved from a DAF pump which has a 25 year long successful history in many industrial settings outside of the Oil & Gas industry. The mechanical design was directly duplicated from an API 610 (between bearings) pump with a 30 year long successful history - including its shaft, sleeves, seals, lubrication, bearings, etc.

4. Can I Induce Gas to the Pump Directly from the Tank / Vessel Headspace ?

Yes, the ONYX-MB pump is capable of self inducing gas from the headspace of a tank or vessel provided the water temperature is below 60 °C and the pressure drop across the piping arrangement is not significant. At temperatures above 60 °C a compressed gas feed is piped directly to the inlet of the pump.

5. What Materials is the Pump Available in ?

The pump Casing and wetted parts are available in Ductile Iron, 316 Stainless Steel, Duplex Stainless, Super Duplex Stainless Steel and Hastelloy-C materials. Our base standard is 316 Stainless Steel with Duplex impellers.

6. Can I apply Microbubbles to any Vessel to improve Water Quality ?

No, due to their very slow rise velocity special hydraulic vessel designs are required to gain the benefits of microbubbles. The IGF and API tank designs developed by Exterran Water Solutions are specific to the very small gas bubble size generated by the Onyx pump and optimize zones for contact with oil droplets, surface release and hydraulic collection and skimming .