

Report

Offshore Technique



Water as a tool
for a clean environment

To guarantee a safe and effective performance, facilities for the extraction, storage and transport of petroleum and natural gas need to be inspected, maintained and repaired regularly. This happens often under extremely poor conditions and partly under water.

Typical application tasks are cleaning, decoating and derusting as well as cutting and demolition.

As a promising technology to solve all these tasks, high pressure water jet technique can be used.

For this technique, newly designed

plunger pumps and a set of exclusively developed tools for ultra high pressures are available. The pumps are equipped with the WOMA central valve head. Further on, WOMA offers an exclusively designed water jet unit which is licensed for offshore applications.

Why High Pressure Water Jets?

▶ The range of tools is extremely large. Using a basic unit a large number of different applications – such as cleaning, derusting, cutting – can be done.

▶ The tool dimensions are small. It is possible to work in narrow areas and in areas with difficult access.

▶ A geometrically exact material removal is possible, including a linear movement. Therefore, it is not a problem to follow welding seams.

▶ The tools generate small reaction forces. The body sound can be neglected.

▶ The amount of deposits can be reduced significantly. Compared to grit blasting, up to 98 percent less waste material needs to be removed.



Submerged cleaning using a reaction force reduced underwater tool



Exclusively designed WOMA Ecomaster unit for offshore applications



Derusting and decoating of steel surfaces using a water jet tool



*Gullfaks Gas and Oilfield
At the platforms A and B, several WOMA Ecomaster systems are used successfully for surface preparation, pipeline maintenance and tank cleaning*

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- ▶ The technique works dust free. This allows the parallel work of other trades, such as coating. Also, dust sensitive areas can be maintained side by side with the surface preparation.
- ▶ It is possible to remove multi-layered coating systems selectively.
- ▶ Water jets act extremely gently. Sensitive parts, such as welding seams and connections, will not be damaged.
- ▶ Standards which are published in the meanwhile allow the exact evaluation of the quality of water jet derusted surfaces.
- ▶ The salt level of the surfaces can be lowered significantly because the water jet enters even the smallest depressions. In contrast, the grit blasting closes the pores and traps contaminants.
- ▶ The prepared surfaces give an excellent adhesion behaviour.
- ▶ Submerged applications are possible.
- ▶ An exclusively developed abrasive water jet tool enables the cutting of almost any technical material. There is no generation of steam, dust or slag.

The Range of Materials

The following materials can be removed reliably from steel and concrete surfaces by high pressure water jets:

adhering multiple layered coatings, intumescent coatings, bitumen, chemical contaminations, loose paint layers, rubber, resin, lacquer, marine growth, oil, rust, and impurities.

The following materials and components can be cut by abrasive water jets:

constructive steel, coated steel constructions, tanks, pipelines, heavily reinforced concrete members, fibre reinforced materials, multilayered constructions, glass, ceramic.

The Technique

Basically, WOMA offers complete systems for pressures up to 2,500 bar which consist of high pressure plunger pump, guiding elements, and water tools. Further on, the Ecomaster offshore modification, developed by WOMA, which is licensed for the application on oil platforms during the active oil extraction, can be used.

This unit is characterized by the following safety features:

- ▶ Crash-frame, designed for safe helicopter transport.
- ▶ Pneumatically driven starter which can be run by an external compressed-air ductwork system, and can be operated via control panel.
- ▶ Explosion protection of the electrical system according to EEXIleT3.
- ▶ Connecting to ground of critical parts.
- ▶ Cooling system for engine combustion gas.
- ▶ Gas sensor.
- ▶ Pneumatically driven pump control system including an electrical monitoring.

To run several tools simultaneously in the ultra high pressure range the WOMA Twin Jet system has been developed which is based on two in-line high pressure pumps.

The WOMA offshore programme also includes the following tools:

- ▶ Rigid hand-held lances for decoating and cleaning.
- ▶ Rotating hand-held tools for processing of sensitive surfaces and selective material removal.
- ▶ Tools with combined mechanical and hydrodynamical action for cleaning of clogged pipes.
- ▶ Combined removal-suction tools for cleaning and decoating with simultaneous suction of water and removed material.
- ▶ Rotating nozzle heads for surfaces preparation.
- ▶ Abrasive water jet systems for linear and circular cutting and for trenching.
- ▶ Reaction force reduced hand-held tools for submerged applications.
- ▶ Special, exclusively designed tools.



Demolition of rubber coated pipe elements using an abrasive water jet cutting unit



Derusting of bottom boards using a removal-suction tool and steel decoating with a rotating water jet tool



Removal of heavy intumescent coatings with hand-held water jet tools



Oseberg Twin-Platform in the North Sea WOMA Ecomaster has been used here successfully for surface preparation and derusting of steel surfaces