

*Screw pumps with two or three screws*

## Low-pulsation conveying in the pipeline

Screw pumps have two basic designs: twin or triple-screw. Both pumps produce flow in a smooth, continuous manner, resulting in virtually no pressure or flow pulsation. For pumping crude oil, the construction normally includes case-hardened alloy steel screws for maximum abrasion resistance as well as thread ground forms for full rotor interchangeability.



*Screw pumps are commonly used in oil and gas production fields as well as in collection systems with untreated streams*

**M**aag's S series screw pumps are relatively simple machines that provide a durable, competitive pumping solution with reasonable-to-excellent efficiency but without any damaging pressure pulsations. These positive-displacement pumps meet the requirements of the European Machinery Directive, are Atex-certified for use in explosive or dangerous environments, feature self-priming capability with good suction performance and exhibit outstanding speed / output linearity at low pulsation.

Both two and three-screw pumps only expose the pumped fluid to low internal velocities. They thus produce little fluid shear and have no tendency to increase the strength or degree of oil/water emulsification. The operating speed ranges between 800 and 3600 rpm. Two to eight-pole motors or direct-drive diesel engines are normally used to drive the pumps depending on the size, viscosity and flow. Pipeline pressures up to 100 bar are practical for



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either type of screw pump, which can be supplied for any flow rate from 10 to 3000 m<sup>3</sup>/h.

### **Two screws with a long lifespan**

Twin-screw pumps use timing gears to control the mesh of the screws. These gears – one on each shaft and shaft support bearing (normally four) – are outside the product being pumped and separately lubricated. Twin-screw pumps can have one or four shaft seals to prevent pumped fluid from contacting the gears and bearing. There is no internal metal-to-metal contact within the pump. A two-screw pump is capable of pumping liquids with a high percentage of gas as well as 100% water. To better resist abrasive wear from the sand content in crude oils, the screws frequently have hard-face coated inside and outside diameters. Some twin-screw pump designs are fully field repairable, even to the extent that the pumping elements are assembled in a liner that is integrated into the pump casing. With this design, the pump piping connections do not need to be moved during routine repairs.

### **Less space required**

Triple-screw pumps are limited to lubricants that are relatively free of gas and contain little continuous free water. These pumps rely upon a fluid film to support internal pressure forces. Emulsions of crude oil and water, however, do not present any problems for triple-screw technology. In fact, manufactured emulsions of bitumen and water are readily handled by both triple and twin-screw pumps. Triple-screw pumps are very easy to repair, have only one shaft seal and one bearing and require less space than almost any other type of pump. These pumps operate at relatively high speed for positive displacement.

The modest foundation requirements make screw pumps relatively simple and inexpensive to install. No pressure or flow pulsation dampeners are necessary, and normal-torque standard motors are more than adequate for the drives. Maag also offers a multiphase-fluid option designed for medium-to-low pressure applications. It is robust, reliable and durable, and it is commonly used in oil and gas production fields as well as in collection systems with untreated streams. The pumps can handle multiple phases containing oil, gas and water, primarily because they have a large chamber to separate the gas from the liquid.

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