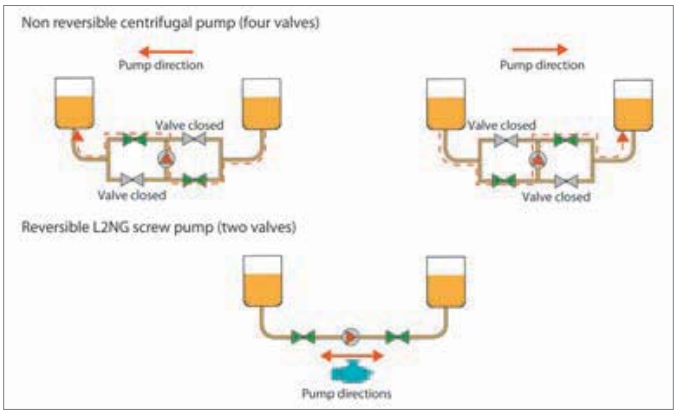
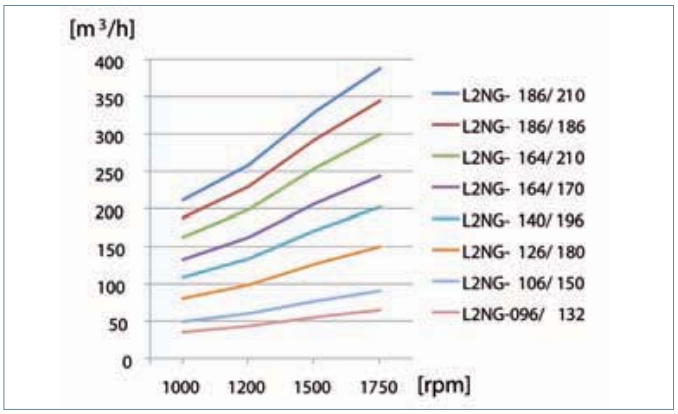
Balancing loads with a two-spindle displacement pump



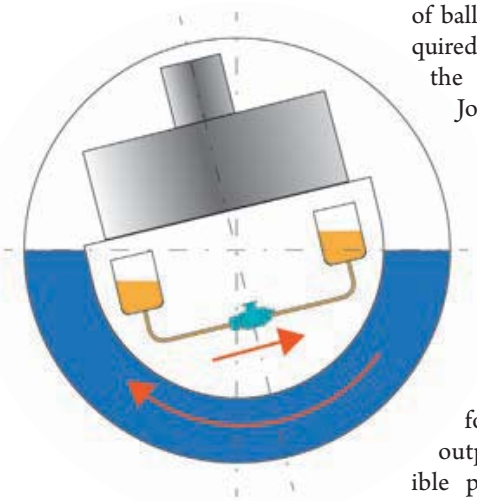
Leistritz anti-heeling principle



Performance curves of L2NG

ANTI-HEELING | Be it high wind, shifting cargo or load distribution, or the penetration of water due to hull or tank damage, the causes of a ship's heeling are many. Germany's Leistritz Pumpen GmbH has developed what it says is an innovative way to control heeling: the L2NG displacement pump.

Heeling often occurs in port during loading and unloading, for example when heavy-duty vehicles or trailers drive on or off a ferry or RoRo vessel. It is comparatively harmless, though, as there is normally no additional swell. On the open water a ship can heel during tight turns, taking on waves, or in rough seas. If any poorly secured cargo then shifts, it can quickly become dangerous.



Anti-heeling scheme

Balancing the load using anti-heeling systems

Anti-heeling systems were specially developed in the maritime industry for these kinds of situations. They control undesirable heeling by pumping ballast water back and forth between the ship's ballast tanks as required. "The systems sometimes have to react instantly with a pumping action and be able to move larger amounts of ballast water very fast if required to manage balancing the undesirable list," said Johannes Döring, branch manager at Leistritz Pumpen GmbH. The company produces screw spindle pumps and systems.

Leistritz L2NG pump

Anti-heeling systems for more than 400m³/h output normally use reversible propeller pumps. If an output of up to approximately 400m³/h is desired, the systems generally use non-reversible centrifugal pumps. These require a complex four-valve system for reverse operation. "Leistritz is offering an alternative to this with its two-spindle L2NG displacement pump," Döring said. While a centrifugal pump requires more piping, the opposite is the case with the L2NG pump. "This is a crucial advantage that allows the pump to be used with simple pipe installation even on smaller ships," he noted. The Leistritz L2NG pump is bronze and therefore suitable for seawater in a pressure range up to 3 bar. It can be speed-regulated and operated bidirectionally in both forward and backward mode. Thanks to the different sizes and screw lead combinations, the Leistritz anti-heeling pump covers outputs from approximately 40 to 400m³. A suitable pump size can be selected for its specific flow requirements using a performance curve diagram, Leistritz stated.

Another advantage of the screw pump is the almost linear relation between the speed and rate of flow due to its working principle, which means it has excellent controllability, the company added. By contrast, a centrifugal pump relies heavily on opposing pressure drops in the system for the flow volume to be achieved. Apart from low inflow losses, this is not the case with a screw pump, being a "positive displacement pump". Since the product is certified by DNV GL, approvals for any category of ship can be guaranteed during the course of pump testing on Leistritz's own test bench – independently as a factory test and in conjunction with an authorised inspector from other major classification societies, too.

"If you want to do a cost comparison in this output range, you have to include all the other peripherals required when the standard centrifugal pump is used," Johannes Döring said. "These include pipe installation, fittings with quick-reacting valve actuators, additional control sensors as well as control hardware and software for forward and reverse piping. The investment in a screw pump pays off relatively quickly in such a comparison."