



Pump it up

A CLOSE WORKING RELATIONSHIP WITH A TOP PUMP MANUFACTURER MEANT THAT A LIFT COMPANY THAT AIMED HIGH WAS ABLE TO EASILY REACH ITS PERFORMANCE AND PRODUCTIVITY REQUIREMENTS



Anywhere that lifting is done – whether in the office, factory, hospital, stage, warehouse, market, garage, shop, store, school – products from EdmoLift can do the heavy work and take the strain off people.

Established in 1964 and located in Sweden, EdmoLift operates from modern custom-designed premises that incorporate manufacturing, servicing and sales departments along with extensive warehousing facilities. The company produces lift tables suitable for almost every application across industry – from the smallest component-handling tables to the largest dock lifts or floor-to-floor lifts. Capacities range from only 200kg, right up to 10,000kg. In total, there are over 300 standard models, as well as custom-built specials.

Lifting jobs are the main cause of musculoskeletal disorders (MSD). These can be reduced considerably by eliminating lifting tasks, and in this sense EdmoLift products could be categorised as health aids. They can also be classed as efficiency tools, as they improve local



ABOVE: **Marzocchi pumps series 1BK7 and KE0.5S**

equipment transport and supply. They save industry money, too, by reducing the cost of lost workdays due to MSD injuries, thereby having a direct economic impact.

More than half of all working days lost to work-related health problems involve MSD injuries such as injuries to muscle, bone, or connecting tissue. MSD is the greatest health and safety challenge for Europe, with over 40 million EU

workers currently affected. These injuries (accidents not included) are a great burden on the EU economy, costing employers over €385 million each year, or 0.5-2% of GNP.

Lift and operate

The lift tables produced by EdmoLift have been developed in close co-operation with Marzocchi Pompe. The Marzocchi pump is the heart of the power unit, housed in the hydraulic circuit. Together with the electrical motor, it generates the hydraulic power required to operate the hydraulic motors and cylinders.

Marzocchi pumps were chosen because they were of the correct displacement for optimum performance for the electric motors used. Tests carried out by EdmoLift highlighted the good behaviour of these pumps, such as a low rotation speed and optimal capability in holding the pressure.

Most of the Marzocchi pumps used in EdmoLift lift tables applications are of the 1BK7 type, with displacements ranging from 1.2-9.2cm³/rev. The optimised design of the pump enables the user to have outstanding volumetric and

LEFT: **EdmoLift lift table used as a car lift**



RIGHT: Marzocchi Pompe run-in and test benches

mechanical efficiency in most working conditions, with maximum values reaching 98%. The high efficiency values decrease power consumption and give the user improved autonomy and economy. Marzocchi pumps also boast low noise emissions, making the platform suitable for use where noise is a key issue, for example, in typically quiet environments such as hospitals or car showrooms or, more generally, wherever the noise must be kept within limits.

The graphs in Figure 1 show 1BK7 pump performance in terms of its volumetric and mechanical efficiency and the level of noise emission from a 1BK7-S-4.2 (2.65cm³/rev) pump as a function of the pressure and the velocity at 1m distance. Even in the most stressing work conditions, noise emission stays only a little above 66dB(A).

All new Marzocchi pumps are designed using the state-of-the-art numerical simulation software, FEM and CFD. This gives extra flexibility from the initial specs, and most of the design and verification work can be done on a 3D numerical model, saving time on unnecessary testing and focusing on the best solution before producing a prototype.

This approach reduces some of the costs and time that are typically associated with the development of new products and provides the possibility of offering top-class solutions at very competitive prices.

In addition, innovations for cost-effective assembly, testing and run-in are constantly devised by the R&D department, and this know-



how is regularly transferred to the production line in the form of new processes, tools and test benches, achieving continuous improvement in product quality.

Extensive testing

After assembly, Marzocchi gear pumps undergo run-in and testing procedures on a dedicated test bench. The run-in may be the last stage of the manufacturing process, but it is one of the most important operations, enabling a check on the efficiency of the product and its optimisation to be made.

In run-in tests, increasingly higher pressure levels are created, and the gears, inflected by the hydraulic load, act as tools machining the pump body, thereby creating the best tolerances. This process is performed under computer control as the definition of the gradual increase of the pressure is particularly important, as it establishes the machining speed of the material by the gears and thereby the particles' dimensions. These particles must be small enough so as not to interfere with the running of the product under test or its future performance.

Each pump, of each group, has ramped-up pressure applied so that no contaminating material remains in the circuit and the pump is able to attain maximum performance levels immediately. Reversible motors and pumps are subject to a run-in procedure on both rotations. After this process, the products'

efficiencies are measured according to fixed parameters.

Milling depth depends on many different factors – elastic and plastic deformation of the parts constituting the pump, tolerances and dynamic effects – all of which contribute to the milling process. However, the most important factor for creating correct milling is the pressure that bends the gears, pushing them against the inner surface of the body and giving, as a result, an increased depth in the centre of the milling.

The run-in process is completely computer controlled because of the huge importance of the pressure ramp, which largely determines the milling velocity and therefore the results of the correct milling process.

At the end of the run-in process, the testing phase takes place where efficiencies, performances, absorbed power, flow, temperature and torque are measured. If the measured values do not comply with the limits of acceptance set in the testing machine, the pump is discarded and sent to maintenance for revision. Testing data is automatically acquired and recorded, providing updated statistics on product performances. This can be supplied upon customer request.

Quality recognition

Marzocchi is delighted and proud that EdmoLift has chosen to use its pumps in these applications. This is a recognition of the quality and the effort that Marzocchi Pompe puts in to its everyday production.

Marzocchi Pompe is an Italian company whose premises are located in Casalecchio di Reno, on the outskirts of Bologna. Over the years, it has expanded and increased its product range to reach its present position as one of the most important Italian manufacturers of external gear pumps and motors.

The current Marzocchi production ranges from 0.19-200.3cm³/rev (0.01-12.22in³/rev) and it is divided into eight groups according to the gear size (0.25, 0.5, 1P, 1, 2, 3, 3.5, 4). Within each group, the different displacements are obtained by changing the gear width. A wide range of flange, shaft and coupling configurations is available.

These components can also be manufactured according to customer requirements. Cast-iron versions are available in groups 1, 2 and 3. The maximum operating pressure ranges, on average, from 230 bar (3,300psi) in the aluminium models up to 280 bar (4,100psi) for the cast-iron types, although this varies depending on pump displacement and type.

All products can also be supplied with Viton seals and special versions are available for temperatures between -40 and +120°C (-40 and +248°F). The monodirectional and bi-directional motors are divided into three groups (1, 2, 3) covering a range of displacements 2.8-87cm³/rev (0.17-53.1in³/rev).

The maximum working pressures for the motors are similar to those for the pumps, delivering torques up to 250Nm and power up to 60kW.

Given the trust and the respect the company has accumulated over many years, Marzocchi Pompe is considered a very reliable partner. It has the reputation of being able to provide customers with specific know-how, high-quality products and excellent service for all hydraulic applications. **ALT**

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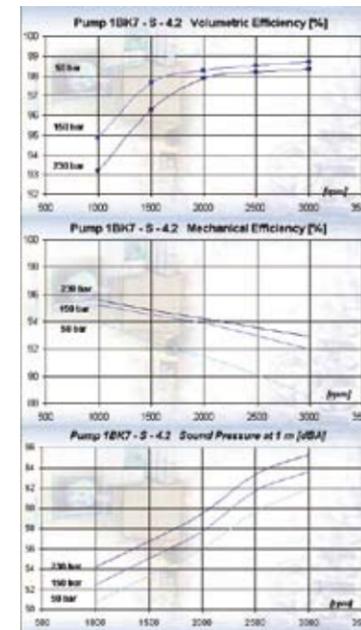


FIGURE 1: Volumetric, mechanical and sound pressure of 1BK7- S- 4.2 pump

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BELOW: EdmoLift lift table used in a hospital application

