

# Rotary vane machines for glass moulding

The IS forming line functions at its best only if the gob chemistry, the mechanics and control of the IS machine itself and the pneumatic energy supply match production demand precisely. Daniel Hilfiker discusses the latest improvements in auxiliary equipment for the compressed air and vacuum requirements in the hollow glass moulding process.

Low pressure blowers are installed on the positive pressure side to keep the machine temperature in an acceptable range. The fast and precise shaping of glass containers in the mould depends on the 3.5 bar(g) compressed air, the higher pressure of 7 bar(g) as well as the vacuum of 150 mbar(a). While the large side channel blowers are huge fans, the compressors and vacuum pumps have quite different thermo- and fluid-dynamic challenges. To cover the pneumatic demand on the IS machine, it can be observed how obsolete technology is slowly being substituted with up-to-date machinery.

## RETURN ON INVESTMENT

The first example is the impressive low return on investment when liquid ring vacuum pumps are replaced with rotary vane pumps. On average, the ROI is 18 months and in some tropical countries, the cooling water temperature of the liquid ring pump reduces the performance to only 30% of the nominal value.

Affirmed and consolidated is the Pneumofore high-end range of UV vacuum pumps, with the world's largest, air-cooled, single stage rotary machine, named UV50.

## PNEUMATIC SPECIFICATION

Second comes the 3.5 bar(g) pneumatic specification, which is frequently covered by compressed air supply from two-stage centrifugal compressors of large size. Their high rotation speed of 60,000 rpm, the lack of a VSD option and the inefficient blow-off valve system sometimes motivates glassmakers to consider the old, yet very sturdy, reliable and extraordinarily durable rotary vane technology.

The Pneumofore range of compressors covers pressure from 2.5 to 10 bar(g), single stage, air-cooled up to 55°C and with installed nominal power of up to 355kW. Twin compressors with two air-ends excel in large installed power of 710kW. Thus, several glassworks have considered operating compressors with lower rotation speeds of 1450 rpm rather than turbine speed. The basic advantages are the ease of repair, the variable speed to keep the 3.5 bar(g) pressure, the low temperatures, the highest efficiency to avoid electrical power waste and the ease of running and maintenance. While turbo equipment faces important costs of repair, the rotary vane machine can be overhauled on site and with low costs.

## LIFE CYCLE COST

Third is the 7 bar(g) compressed air demand, wrongly covered by screw compressors, which lose performance within 30,000 hours of operation. The attractive purchasing price, even of quality brand screw compressors, hides



Pneumofore's rotary vane vacuum pump model UV50.

the cost of forced screw air-end replacement.

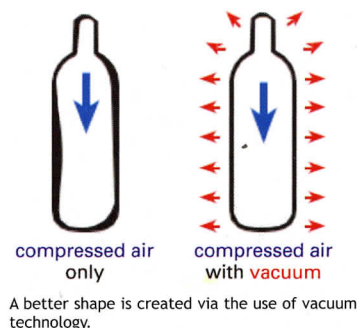
This point is closely monitored by Pneumofore, because it represents a major portion of the total Life Cycle Cost. Rotary vane technology wins the race of minimal environmental impact because of its continuous and constant performance. While the screw air-end requires substitution, the Pneumofore rotary vane can be overhauled and kept efficient after 120,000 hours of operation.

## TOTAL OWNERSHIP COST FOCUS

The conclusion of these parameters is the growing number of hollow glass manufacturing plants, from polar to tropical countries, moving

towards the selection of auxiliary equipment with a focus on the total ownership cost, including all maintenance and repair jobs. Still, the largest part of the TOC is power consumption, which is the direct consequence of machine performance in terms of efficiency.

Often, the practically measured electrical supply amount does not correspond to the catalogue data. The gap between measured and nominal values is considerably high. Pneumofore, on the other hand, guarantees performance over five years and is remote from short-term economic considerations, providing a winning strategy to improve the productivity and success of more and more hollow glass factories worldwide. ■



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