

# Polyisoprene Lining for Vacuum Pump Reconditioning



**A reliable and cost effective solution for pumps used in corrosive and erosive processes.**

## **Polyisoprene lined casings**

The same lining technology used on new NASH 2BE4 and P2620 pumps is now available to repair your CL and 904 pumps. This feature provides protection against corrosive and erosive matter, decreases power consumption caused by internal wear and reduces maintenance and repair costs.

Nash has more than 30 years of experience lining vacuum pumps with polyisoprene. It has proven dependable in the most difficult service conditions, such as wet chlorine.

## **Features of polyisoprene lined casings**

The polyisoprene lining is vulcanized, not glued, to the pump casing. The polyisoprene lining binds to the wetted surface better than cladding, and the bond occurs over the entire surface of the part. The chemical bond to the iron housing is so strong that a tensile test results in the polyisoprene material failing, but the bond remaining intact.

The liner is resistant against many acids, alkalis, salt solutions, and erosive particles in the liquid ring. Should any damage occur, the liner is field repairable.

Other components of these large pumps (e.g. the heads) are available with a polyisoprene lining. While providing suitable long-term corrosion protection, this offers significant cost savings compared to supplying these parts in solid stainless steel.



## **The effects of closed loop water systems**

Most plants employ closed loop water systems due to the high cost of fresh water and sewerage, and to meet environmental regulations. These systems lend themselves to the build up of corrosive elements and erosive particulates over time.

Standard materials, such as cast iron and steel, often experience premature wear due to corrosion and/or erosion. Materials that previously held up well, when fresh water was used, often corrode and/or erode when subjected to today's closed loop recirculated water.

## **Protection against increased energy consumption**

The casing of a liquid ring vacuum pump is especially prone to this type of wear, because it is in contact with the liquid seal. Typically, after prolonged exposure to these corrosive and erosive elements, the surface of the casing becomes rough, which increases the friction factor. This results in an increase in the amount of energy required to rotate the liquid ring. Nash has measured power consumption increases of up to 20 percent under these circumstances.

The graph at right is based on actual field measurements. It illustrates the power consumption increase of two vacuum pumps with standard unlined casings, over a period of about 50 months, in a paper mill with a closed water system. Absorbed power was in the range of 114 to 116 percent and still rising.

### The polyisoprene lined solution

Test pumps were disassembled, lined with polyisoprene and then returned to their original service, with the following results:

- power consumption was reduced to the same level as when the pumps were new
- no future power increase over time, even though the water conditions remained unchanged
- periodic internal inspections over time showed no signs of casing wear

The customer had this to say, "*As a result of our long-term experience with the lining types (polyisoprene and stainless steel), we consider both to be technically equal. Both lining types enhance the operational reliability and cost effectiveness of the vacuum pumps to the same degree.*"

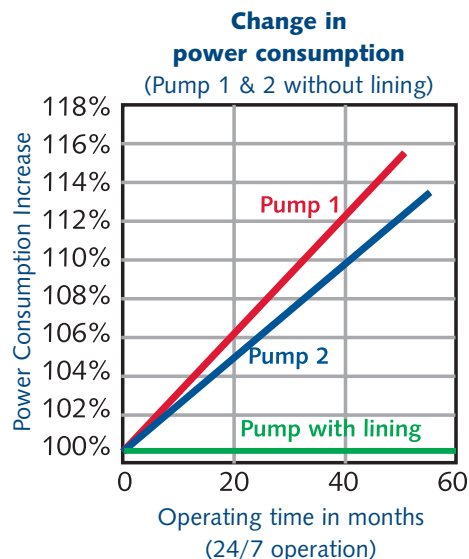
#### Physical values of the polyisoprene lining

Characteristics	Value	Units
Hardness	78 - 83	Shore D
Density	1.35	g/cm <sup>3</sup>
Tensile strength	38	Mpa
Elongation	4.3	%
Adhesion to steel	mean value 6 minimum 4	N/mm <sup>2</sup>
Test voltage	4	KV/mm coating thickness

### Quality assurance through rigorous testing

Continuous production monitoring and quality assurance according to ISO 9001:2008 standards guarantee good specific abrasive resistance, chemical and thermal stressing characteristics. Before shipping, the following standard tests are made and documented:

- the lining thickness is checked
- the Shore hardness is measured
- high-voltage testing for pores and cracks
- visual check



**Polyisoprene lined casing - before use**



**Polyisoprene lined casing - after use**

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