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Stuffing box packings. Recommendations for the selection of materials and fitting

Introduction

This version has been thoroughly prepared and verified to ensure compliance with current Swedish and international standards. The recommendations include the selection of gasket materials for different areas of use, as well as assembly instructions.

1 Recommendations for the selection of materials

The pH range for different packings may be a measure of the chemical resistance, even if this is not always decisive. Other particulars that are of importance in the selection of stuffing box packings include the temperature to which the packing will be subjected, the viscosity of the medium, the content of solid particles in the medium, the maximum pressure and the maximum sliding velocity. As a general rule, an increase in the drip leakage from the stuffing box enables the maximum sliding velocity to be increased. Several maximum values should not occur simultaneously.

Stuffing box packing material	Temperature range T °C	Max. pressure in centrifugal pump/valve MPa	pH range	Sliding velocity v_{max} m/s	Particularly suitable applications
PTFE fibre [1)]	-200 - +250	5/2,5	0 -14	8	Lubricant-free PTFE gaskets are used as bottom braided gaskets for oxygen reactors and ozone applications.
PTFE-fibre filled	-200 - +250	5/2,5	0 -14	20	Sealing water and drinking water pumps, refiners, pulp agitators and filters, valve spindles, substitute for bronze lining.
Carbon fibre [2)]	-200 - +400	6 / 6	0 - 14	25	Machinery for unbleached sulphate pulp, continuous and batch digesters, sulphate and condensate pumps, low pressure and high-pressure cocks, steam and condensate valves, refiners.
Graphite [3)]	-200 - +500	10 / 6	0 - 14	25	Lubricant-free graphite packings are used for feed water and condensate pumps, sootblowers, valve stems, bottom scrapers of oxygen gas reactors. Rings of expanded graphite are used in paper machines, dryer cylinders, steam chests and sootblower chests on chemical recovery boilers, and for superheated steam valves.
Other synthetic-fibres [4)]	-50 - +200	4 / 2	3 - 12	10 -12	Frequently used in fine paper mills, refiners, pumps, valves for media such as fibre suspensions, cold water, hot water, etc.

1) Pure PTFE is commonly used as valve packing. If graphite is mixed into the stuffing box braid, the thermal conductivity is improved, and the packing can withstand sliding velocities of up to 20 m/s, depending on the quantity of graphite mixed in. A common fibre is “graphited PTFE” which is a combination of 50% PTFE and 50% graphite. The fibre is also used in combination with other fibres in braids.

2) The temperature limit is +400°C in the presence of oxygen. In an inert atmosphere, the packing can withstand higher temperatures. In this case too, the addition of PTFE or other materials may alter the values specified in the table.

3) In an inert atmosphere, graphite packings can withstand temperatures up to +2500°C. Pure pressed expanded graphite in the form of strip can withstand pressure up to 70 MPa. Wide variations from the tabulated values may occur depending on the quantity and type of material mixed in, the type of lubricant and the design of the packing. Lubricant-free graphite packings can be used with caution for ozone applications, unless combinations of high pressures and temperatures occur.

4) If the braid in its entirety is made of aramid fibres, it may cause heavy wear of shafts and liners.

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