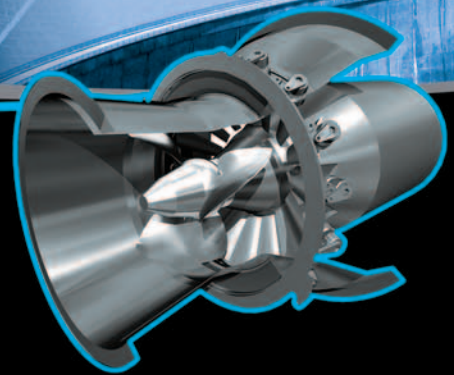


# MD WAY™\*

Vulcanization, molding on site



Solid - Economical - Quick

There is no better way  
to replace a seal  
on heavy equipment

\*Developed and patented by PXL

Typically used on  
Kaplan and Bulb turbines



# There are 4 methods

## the MD WAY™ METHOD

This certified and patented procedure, invented by PXL, consists of molding two uncured ends of a seal into one solid seal. This product and procedure is typically used on the job site when replacing Kaplan and Bulb turbine seals. The MD Way ensures that the new seal will not allow water in, or oil/lubrication out and the end user receives this benefit without having to dismantle the turbine.



### 1 THE MD WAY™ METHOD by PXL

**Principle :** joining the two «non vulcanized» ends<sup>(1)</sup> of the seal with a patented, field molding press, resulting in a solid one-piece seal.

Unlike other existing methods, this operation is carried out by joining<sup>(2)</sup>/molding the two ends of the seal without using additives such as glue or binding agents.

This method ensures identical mechanical characteristics across the entire seal, and perfect geometrical continuity of the seal lips and edges.

Since the operation is carried out by compression molding, the dimensional tolerances obtained through this patented method are more precise than those of extruded products.



#### - Disadvantages

- ▶ None

#### + Benefits

- ▶ The seal is entirely homogeneous
- ▶ Identical mechanical properties across the entire seal
- ▶ No hard points or visible joint
- ▶ Quality of the seal
- ▶ Quality of the design
- ▶ Dimensional quality

#### GLOSSARY

**(1) - Vulcanized or molded material :** material which has been transformed from an initial raw state (raw material) to a final state which gives the material mechanical properties defined by a heating procedure at a fixed temperature, pressure and time. Vulcanization/molding is an irreversible process.

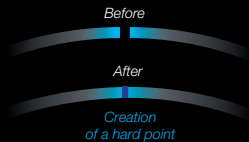
**(2) - Joining :** an action by which two ends of the seal are vulcanized/molded by an irreversible physical connection

# of on-site bonding for sealing joints

## 2 COLD BONDING

**Principle :** joining together the two ends of the seal previously vulcanized. This procedure is carried out with the help of a curable, cyanoacrylate type cold adhesive.

The connected area has mechanical characteristics different than those of the rest of the seal, due to the presence of a hard point, at the joint created by the cold adhesive, which creates a more breakable and fragile part.



### - Disadvantages

- ▶ No homogenous bond between adhesive/ material (non uniform properties)
- ▶ Rigid - lacks flexibility
- ▶ Deteriorates at high and low temperatures
- ▶ Poor compression set
- ▶ Low chemical resistance
- ▶ High risk of failure due to a lack of precision
- ▶ Variable bonding quality

### + Benefits

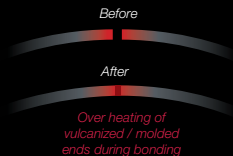
- ▶ Simple
- ▶ Good resistance to traction
- ▶ Quick
- ▶ Low cost
- ▶ Immediate availability

## 3 HEAT BONDING

**Principle :** joining together the two ends of the seal previously vulcanized/molded. This procedure is carried out with the help of a curable, heat bonded adhesive and a portable device.

This type of joining causes a risk of a fragile joint due to the overheating of the parts adjacent to the seal.

Heating the seal vulcanized beforehand can lead to the appearance of cracks and fissures



### - Disadvantages

- ▶ Average to low breaking strength
- ▶ Permeability of the seal
- ▶ Average chemical resistance
- ▶ Risk of overcooking (grilling) of the material close to the seal
- ▶ Risk of cracks and fissures
- ▶ Risk of a non homogenized form that could lead to leaks
- ▶ Quality of the seal could cause leaks

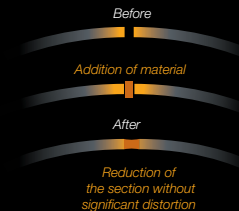
### + Benefits

- ▶ Extremely flexible
- ▶ No hard point
- ▶ Correct compression set
- ▶ Bonding adhesive added close to the seal material

## 4 HEAT BONDING WITH THE ADDITION OF MATERIAL

**Principle :** Inserting a sheet of non vulcanized material between the two ends of the seal prior to molding

The addition of material close to the center of the seal makes it possible to avoid cracks and fissures, although this method always has a risk of making the seal fragile due to overheating of the parts adjacent to the seal.



### - Disadvantages

- ▶ Average to low breaking strength
- ▶ Permeability of the seal
- ▶ Average chemical resistance
- ▶ Risk of over heating of the material close to the seal
- ▶ Risk of cracks and fissures
- ▶ Risk of a non homogenized form that could lead to leaks
- ▶ Quality of the form and seal could cause leaks
- ▶ Connection not homogenized with the rest of the seal

### + Benefits

- ▶ Addition of material close to the material of the seal
- ▶ Extremely flexible
- ▶ No hard point
- ▶ Correct compression set

**PXL has earned the trust of**

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