

为搪玻璃设备选择垫片，  
实现环保、安全和成本之间的恰当平衡。

**Finding the perfect balance between environmental protection, safety and costs, when selecting gaskets for glass-lined steel equipment**

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Gabriella Mokos, W. L. Gore & Associates GmbH



# 如何为您的工厂选择垫片？

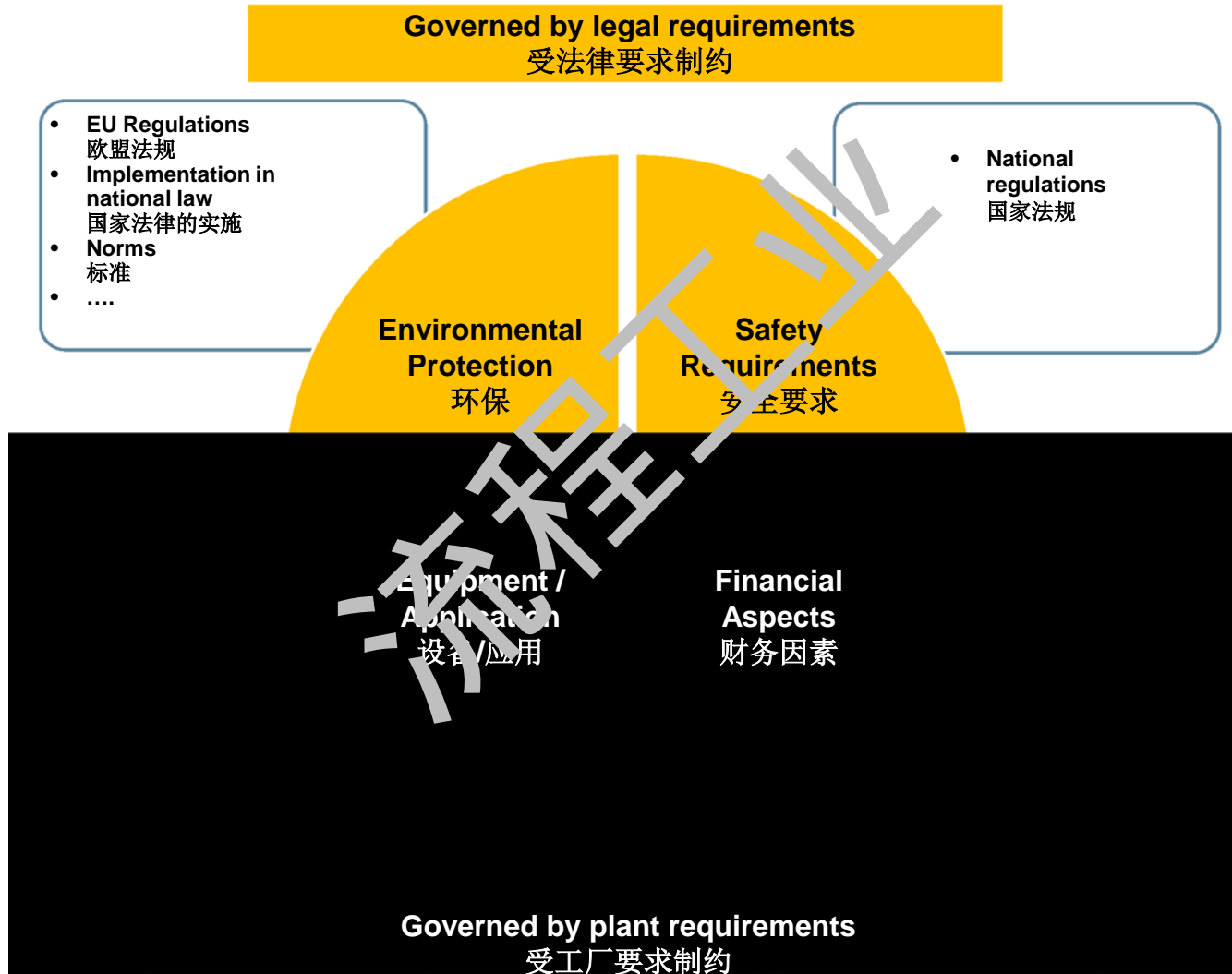
## How Does Your Plant Choose a Gasket?

Pressure	压力
Supplier Preference	供应商偏好
Gasket Manufacturer	垫片制造商
Installation	安装
Media	介质
Temperature	温度
Pricing	定价
Flange Type	法兰类型
Expectations vary by functional role?	期望是否因不同功能定位而异？
Reliability	可靠性
Procurement	采购
Maintenance	维护
Engineering	工程设计
Pipefitters	管道装配工
Warehousing	仓储
Technical support	技术支持
Outside Recommendations	外部推荐
Corporate Specifications	企业规范
Plant History	工厂历史
Performance	性能
AVAILABILITY/LEADTIME	供货情况/供货周期



# 为搪玻璃设备选择垫片时的难题

## Challenges in selecting a gasket for Glass-Lined-Steel equipment



# 环保

## Environmental Protection

### 法规

- 欧盟法规

例如IPPC指令 = 综合污染预防与控制

- 国家法律的实施

例如BImSchG = Bundes-Immissions-Schutz-Gesetz  
与减少环境污染相关的德国法律

- 工厂监管机构管制

### Regulations

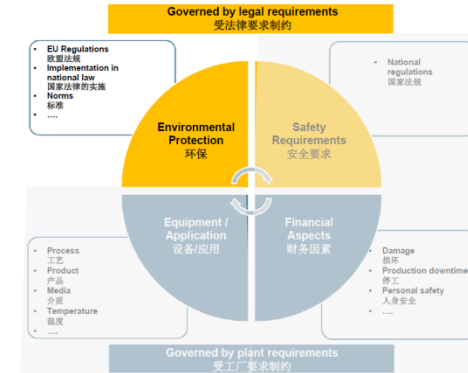
- EU Regulations

e.g. IPPC directive =  
Integrated Pollution Prevention & Control

- Implementation in national law

e.g. BImSchG = Bundes-Immissions-Schutz-Gesetz  
German law to reduce environmental pollution

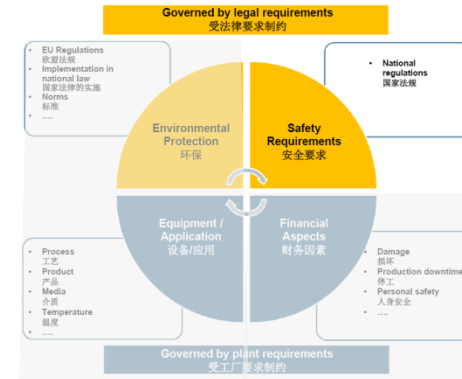
- Regulatory for Plant regulators



# 安全要求

## Safety Requirements

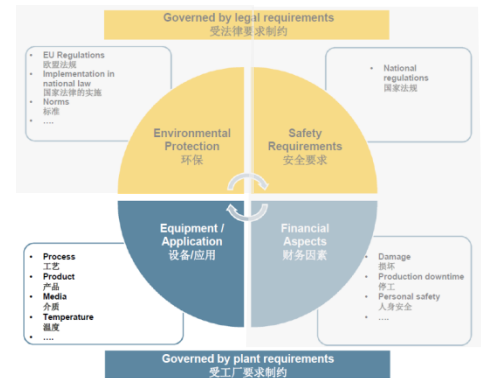
- 保障健康与安全的相关法规，涉及工作设备的供应以及这些设备在工作中的使用，需监管的设施在运营期间的安全性，以及安全运营的组织规划
- 影响保险保费
- Regulation on Safety and Health in the supply of work equipment and its use at work, safety during operation of supervision requiring facilities and the organization of operational safety
- Influence Insurance contribution



# 设备/应用

## Equipment / Application

- 化工工艺装置在苛刻条件下处理腐蚀性介质时需要用到搪玻璃设备。
- **Glass-lined-steel equipment is used by chemical processors when dealing with aggressive media at demanding conditions.**



# 搪玻璃设备优点

## Glass-Lined-Steel Equipment Advantages



- + 抗腐蚀性高
- + 耐磨性优异
- + 防粘
- + 生物惰性
- + High resistance against corrosion
- + Good abrasion resistance
- + Anti-Adhesive
- + Biologically inert

# 搪玻璃设备面临的难题

## Glass-Lined-Steel Equipment Challenges



- 表面易损
- 垫片压紧力有限
- 密封面不规则/不平整

- Fragile surfaces
- Limited gasket loads
- Irregularities / Deviations of sealing surfaces

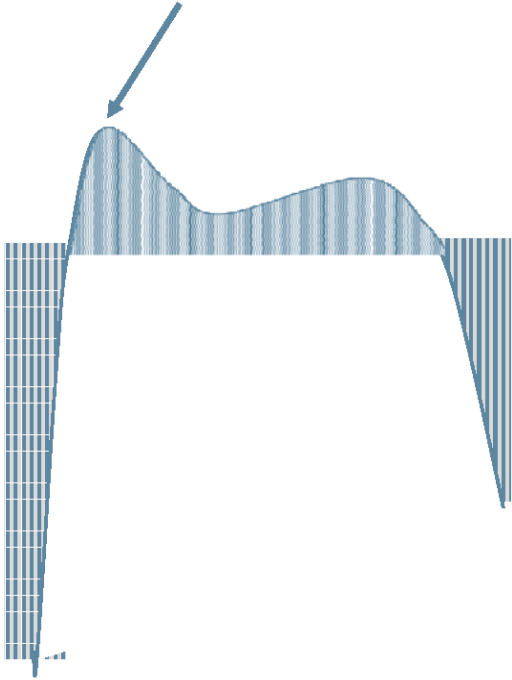


# 搪玻璃设备面临的难题

## Glass-Lined-Steel Equipment Challenges

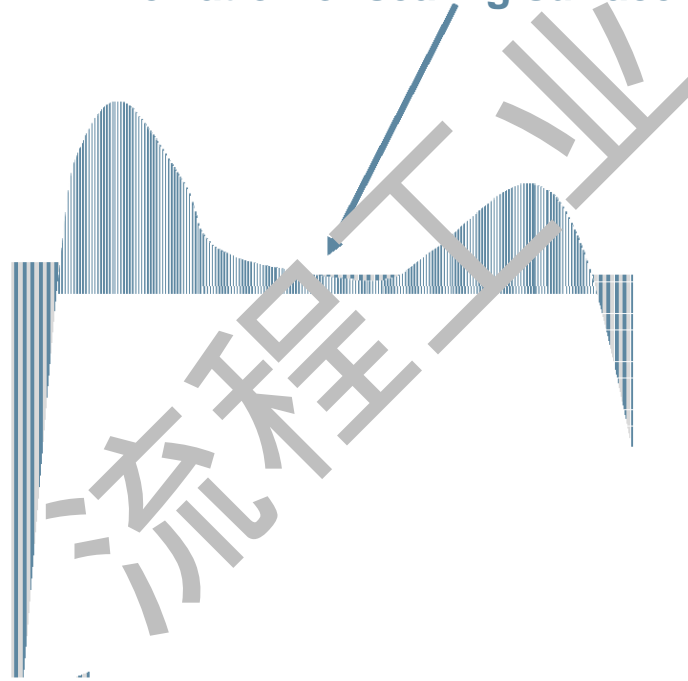
受力聚集

High peak loads



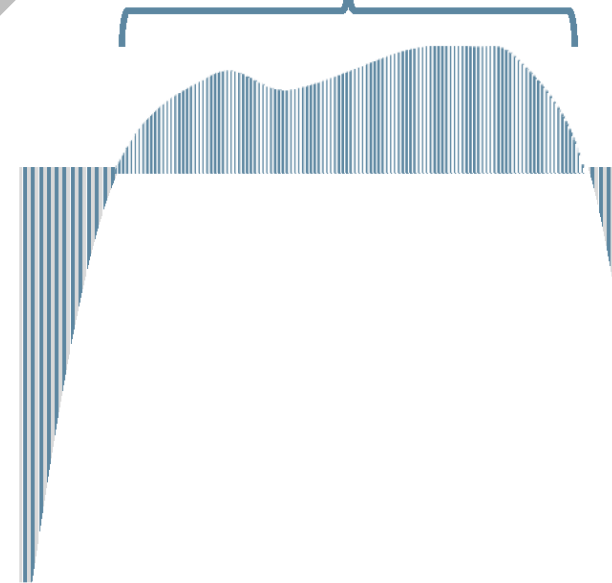
密封面不平整

Deviation of sealing surface



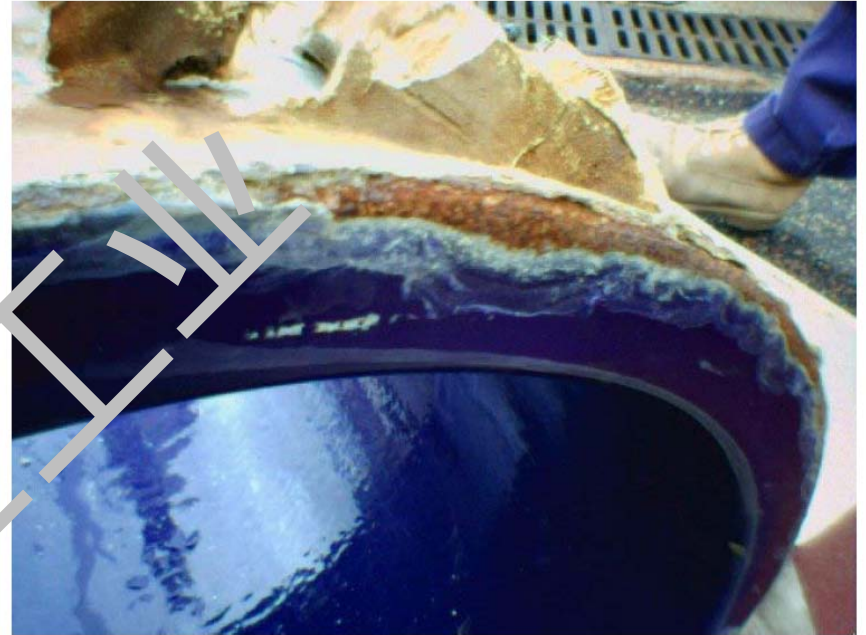
波浪形法兰表面 ->  
伞状效应

Wavy flange surface ->  
Umbrella effect



# 泄漏损坏示例

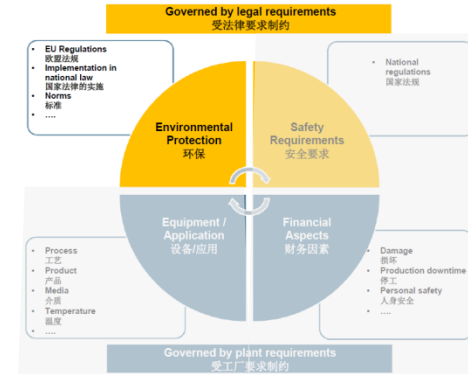
## Examples of Leak Damage



# 财务因素

## Financial Aspects

- 设备损坏
  - 昂贵的更换和修理费用
  - 停工
  - 计划外的维护
  - 人身安全隐患
- 
- Equipment damage
  - Costly to replace and repair
  - Production downtime
  - Unplanned Maintenance
  - Risk to personnel safety



# Properties of PTFE

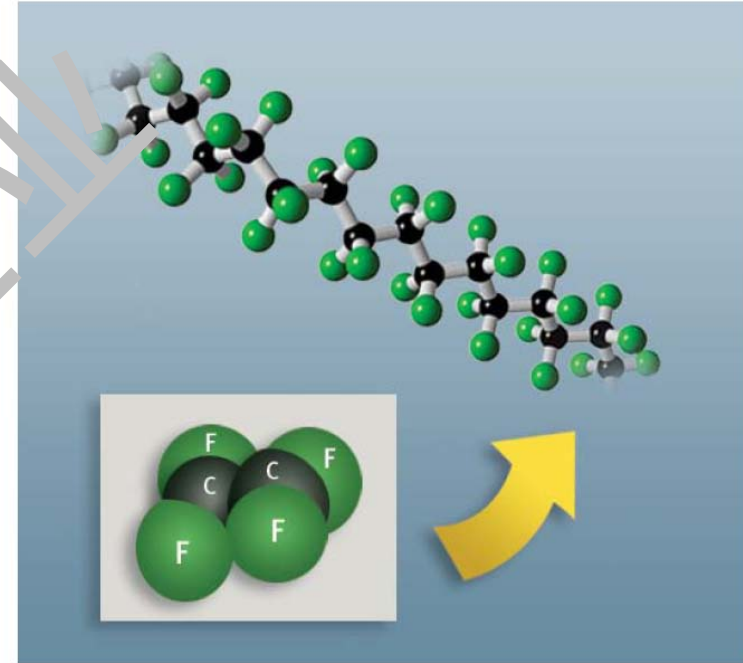
## 聚四氟乙烯 (PTFE) 的性质

### 优点-Advantages

- 对几乎所有介质(pH 0-14)都具有化学惰性
- 不会老化、具有耐候性、抗紫外线
- 摩擦系数低
- 对生理无害
- 应用范围广
- Chemically inert to nearly all media (pH 0-14)
- Non-aging, weather and UV resistant
- Low coefficient of friction
- Physiologically harmless
- Wide application versatility

### 缺点-Disadvantages

- 机械强度低（在较高温度变化下及压力作用下会发生蠕变）
- 冷流蠕变明显
- Mechanically weak (this means it will creep under load)



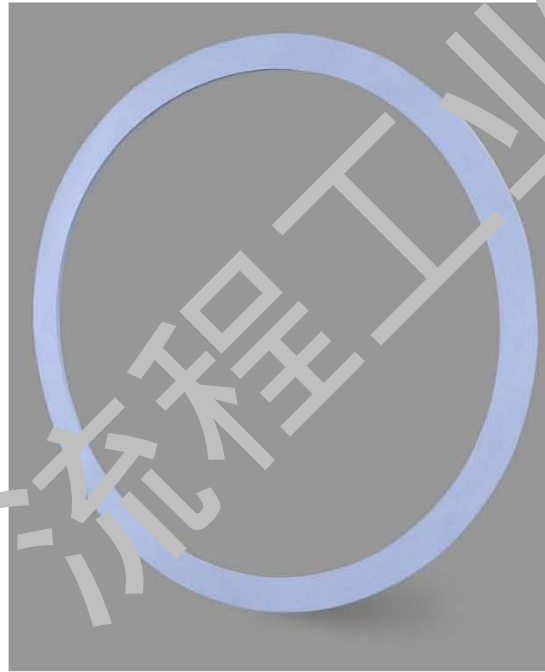
# 常用密封垫片

## Commonly Chosen Seals

包覆垫片  
Envelope Gaskets



膨体聚四氟乙烯 (ePTFE) 带状垫片  
ePTFE Gasket Tape

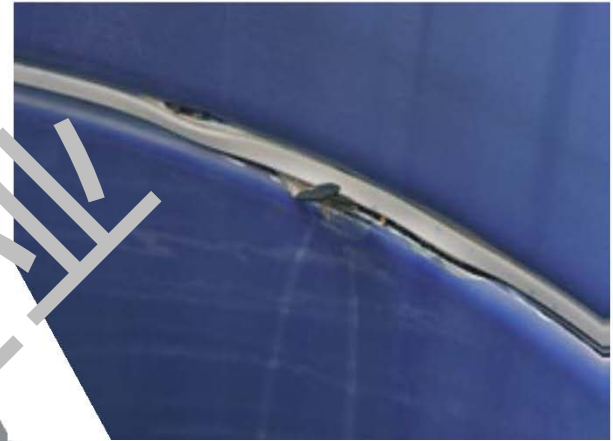
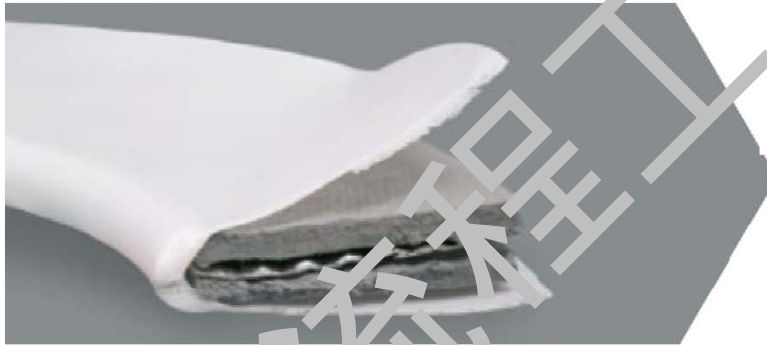


填充的聚四氟乙烯 (PTFE) 垫片  
Filled PTFE Gaskets

# 包覆材料易被化学品侵蚀

## Envelope Chemical Attack

- 易通过包覆材料的薄弱区域产生化学渗透
- **Chemical permeation through envelope weak spots**



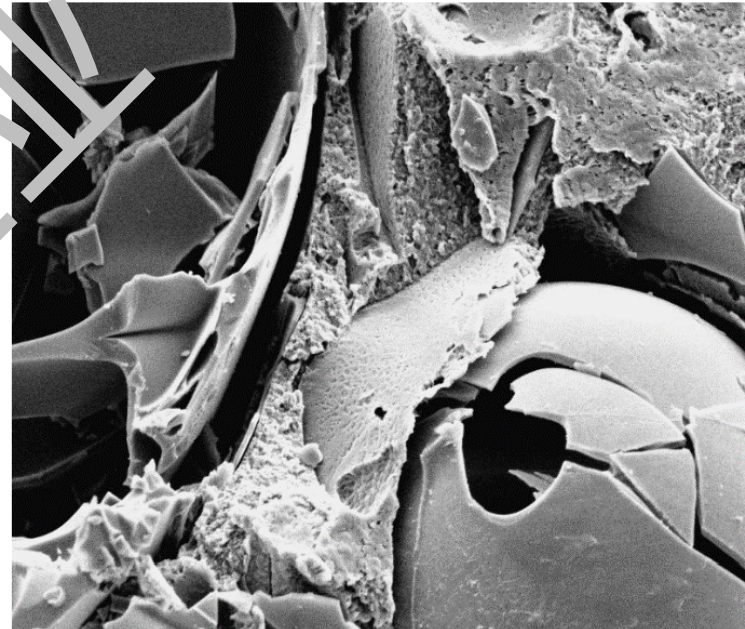
- 外部环境会侵蚀垫片内部
- **External environment attack on gasket internals**



# 填充的聚四氟乙烯 (PTFE) 蠕变

## Filled PTFE Creep

- 填料可在一定程度上增强抗蠕变性
- 但在高温和低压紧力条件下（例如在搪玻璃上的应用）效果有限
- 夹紧力减小会导致严重泄漏
- **Fillers increase creep resistance to an extent**
- **But with limited success in high temperature and low load conditions, such as in glass-lined steel**
- **Clamp force loss leads to high leakage**



# 大型垫片面临的难题

## Challenges with Large Gasket

- 供货周期过长
  - 质量因供应商而异
  - 难以运输、移动和储存
  - 安装耗时且复杂
- 
- Long lead times
  - Varying quality across suppliers
  - Difficult shipping, handling & inventory
  - Time consuming & complex installation





# What is ePTFE

## 什么是膨体聚四氟乙烯 (ePTFE)

- **1969年，Bob Gore发现了膨体聚四氟乙烯(ePTFE)。**
- 这种独特工艺不仅大幅提升了机械性能，而且还保留了基础聚四氟乙烯(PTFE)材料的所有优良化学属性。
- In 1969, Bob Gore discovered expanded PTFE.
- Unique process significantly improved the mechanical properties while maintaining all the positive chemistry attributes of the base PTFE material.



# 膨体聚四氟乙烯 (ePTFE) 垫片的性能优势

## Gasket performance benefits of ePTFE

是什么使戈尔膨体聚四氟乙烯(ePTFE)如此独特?  
What makes Gore expanded PTFE so special?

### 传统聚四氟乙烯(PTFE)的性质 Properties of conventional PTFE

- 机械强度低
- 耐温变性能差，冷流蠕变明显
- 对几乎所有介质(pH 0-14)都具有化学惰性
- 不会老化、具有耐候性、抗紫外线
- 应用范围广
- **Mechanically weak**
- **Chemically inert to nearly all media (pH 0 -14)**
- **Non-aging, weather and UV-resistance**
- **Wide application range**

### 戈尔膨体聚四氟乙烯 (ePTFE) 的优势 Benefits of Gore expanded PTFE

- 出色的机械强度
- 优异的耐高温性
- 出色的防吹出性能
- 高度的顺应性造就出色的密封表现
- 更长的使用寿命
- **Superior mechanical strength**
- **High temperature performance**
- **Superior blowout resistance**
- **Highly conformable to achieve incredible tightness**
- **Longer service life**

膨体带来的优势  
Benefits of the expansion

## 使用示例：GORE®带状密封垫片 Series 1000

非常适用于高腐蚀性介质工艺中所用到的大型搪玻璃法兰

## Example: GORE® Gasket Tape Series 1000

Optimized for large glass-lined-steel flanges used in processes utilizing highly aggressive media

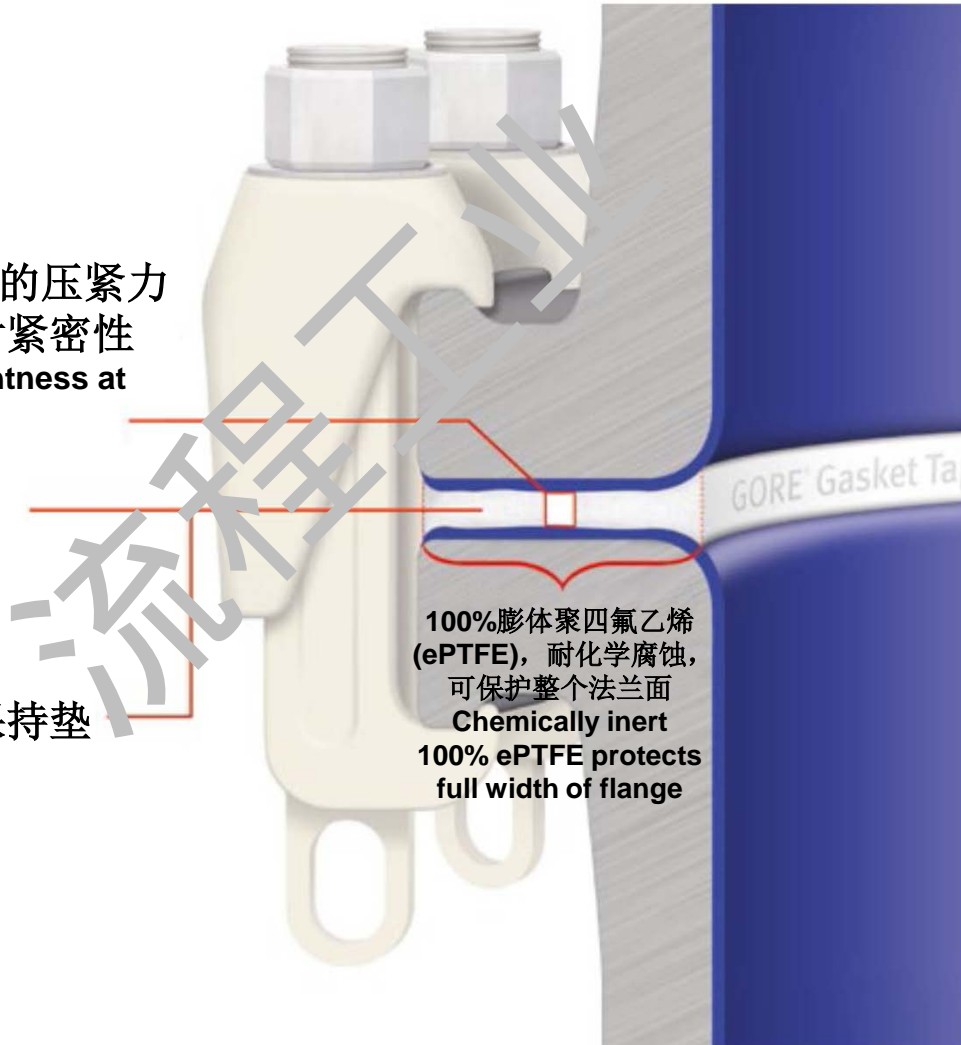
# GORE®带状密封垫片 Series 1000

## GORE® Gasket Tape Series 1000

**Barrier Core**在较低的压紧力下可实现更高的密封紧密性  
Barrier core for extra tightness at low loads

高度顺应法兰面的不平整，建立紧密密封  
Highly conformable to seal surface deviations

高度抗蠕变性，可保持垫片压紧力  
High creep resistance to maintain gasket load

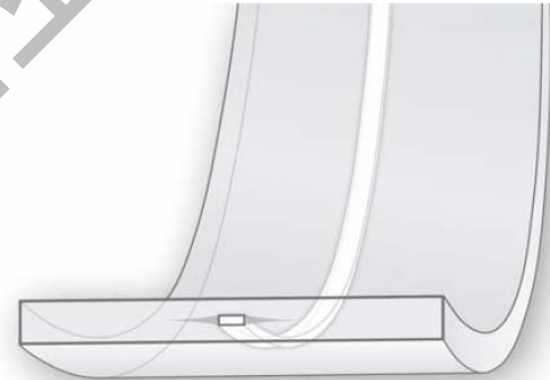


100%膨体聚四氟乙烯 (ePTFE)，耐化学腐蚀，可保护整个法兰面  
Chemically inert  
100% ePTFE protects full width of flange

# 独一无二的 Barrier Core 技术

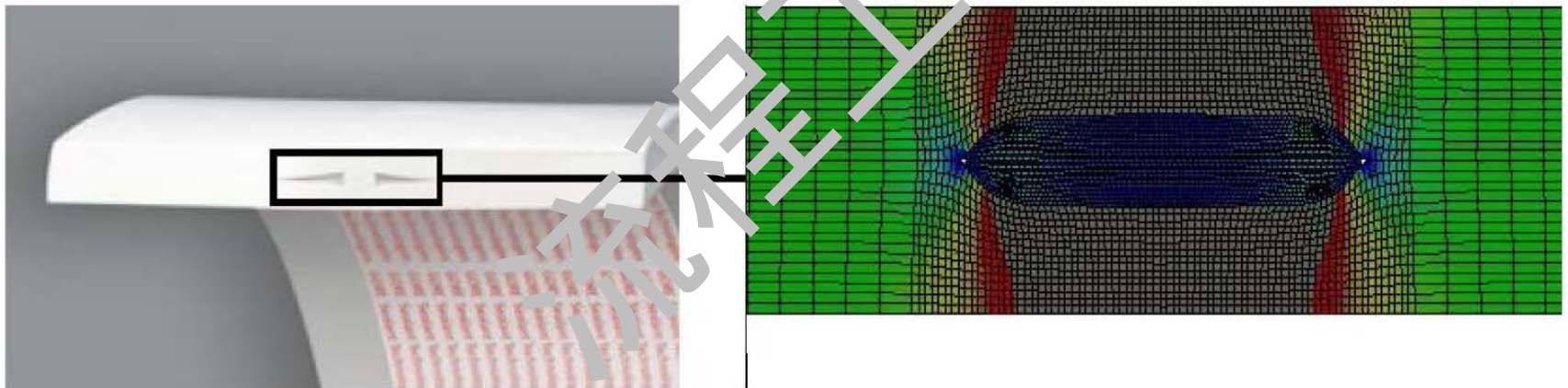
## Unique Barrier Core Technology

- 增大可用载荷
- 密封性提高**10**倍以上
- Amplifies the available load
- 10+ times greater tightness



# 独一无二的 Barrier Core 技术

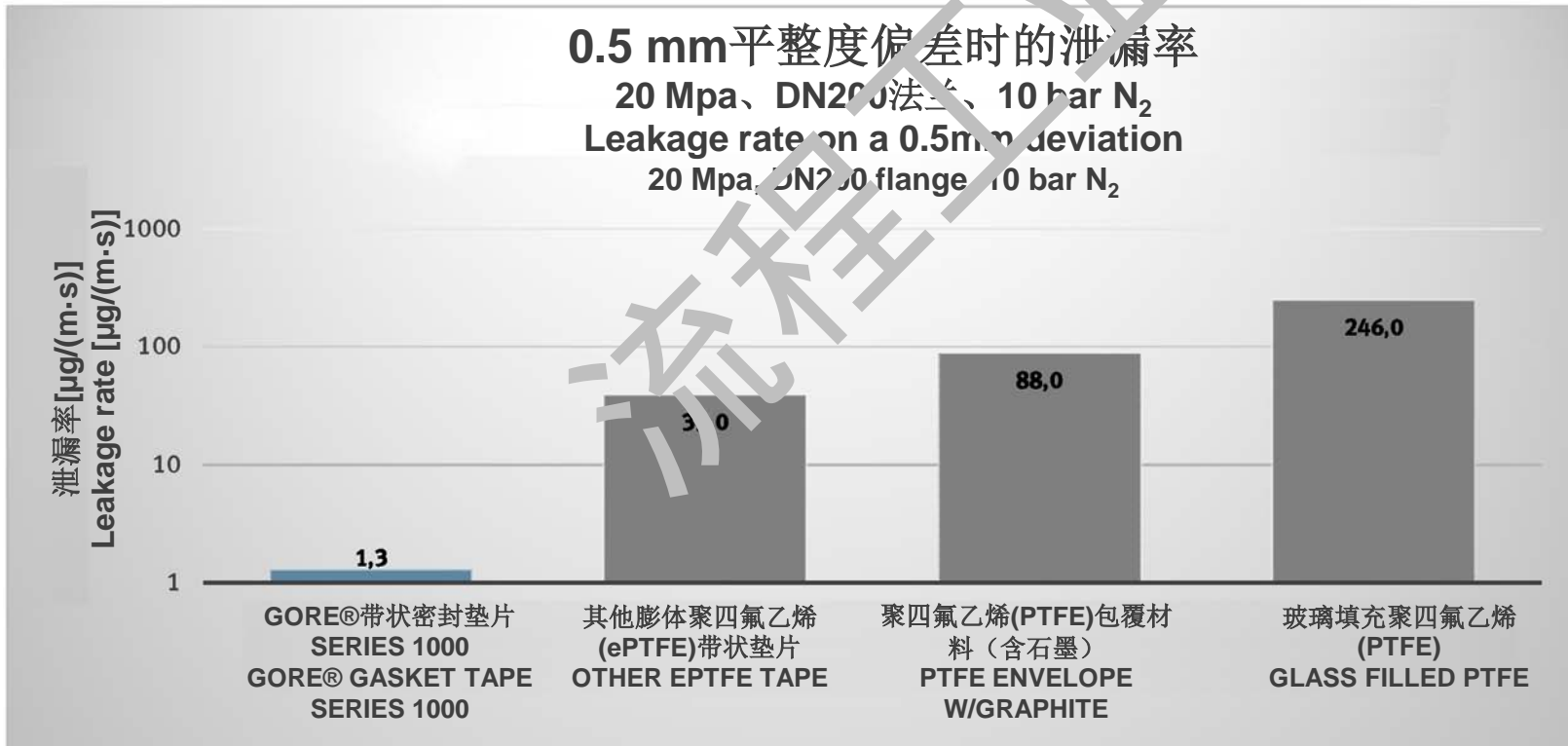
## Unique Barrier Core Technology



# 出色的顺应性

## Outstanding Conformability

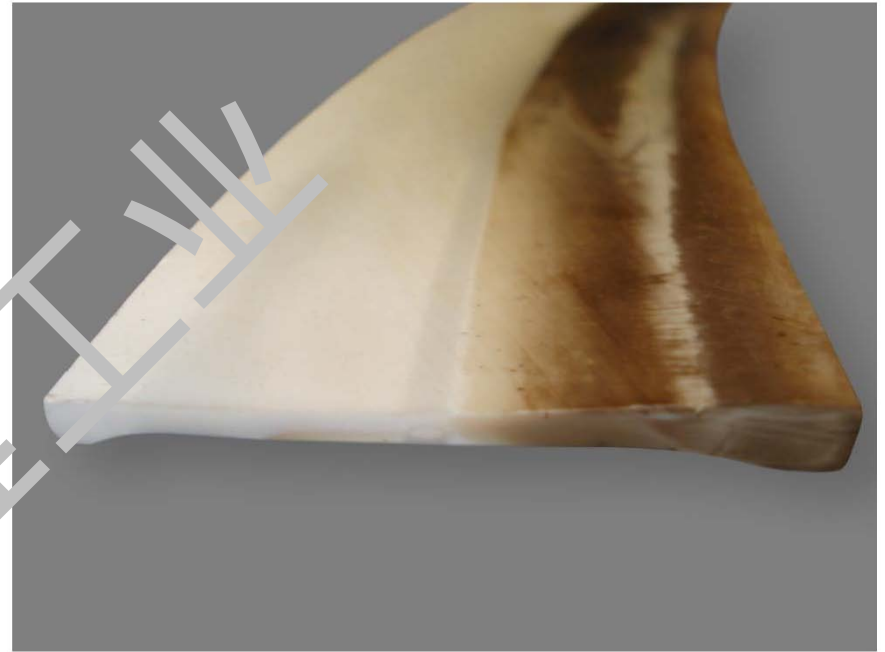
- 即使在较低的压紧力下亦可顺应不平整的法兰面
- 通过气泡试验，不会对生产启动造成麻烦
- **Seals deviations even at low gasket stress**
- **Pass the bubble test for trouble-free start-up**



# 实现长久可靠密封

## Reliable and long-term seal

- **Barrier core**可形成紧密的密封
- 有效保护整个法兰表面免受化学介质侵蚀
- 抗蠕变且夹紧力不会减
- Barrier core creates a tight seal
- Chemical protection across full width
- Resists creep and clamp force loss



在极具挑战性的工艺条件下使用后的戈尔®带状垫片Series 1000的横截面

Cross section of GORE® Gasket Tape Series 1000 after service in challenging process conditions



# Thank You!

欢迎亲身体会戈尔密封  
技术，敬请光临**J20**展位

Visit Gore Sealant  
Technologies at **J20**

