

关于福来西垫片产品的储藏，运输，安装和使用说明

The statement of storage, transportation, installation and use of Flexitallic gasket product

致福来西的客户：

To who may concern:

## STATEMENT OF SHELF LIFE

### 储存有效期声明

Although a specific shelf life limitation has not been established, the following guidelines are offered for consideration in extending the useful storage life of Flexitallic Spiral Wound Gaskets.

尽管没有发布规范规定缠绕垫的储存期限，以下提供了延长缠绕垫储存有效期的指导意见：

In storage, gaskets should not be subjected to extremes of heat or humidity.

1. 垫片在仓库应避免受到极端高温、潮湿的影响

Gaskets should be kept relatively clean, and free from mechanical damage.

2. 垫片应保持相当的清洁度，避免遭受机械损伤

For maximum protection and extended storage, gaskets should be packaged in sealed polybags. Especially for thermiculite, contact with water is strictly prohibited.

3. 垫片当用塑料袋密封包装，以获得最大的保护，从而延长使用有效期。尤其是高温固力特材料，严禁与水接触。

Since there are no binders present in the following materials, Flexicarb (graphite) and PTFE (polytetrafluorethylene), spiral wound gaskets have an indefinite shelf life.

4. 由于 Flexicarb(石墨) 和 PTFE(聚四氟乙烯) 不含粘合剂, 以这两种材料做填充料的缠绕垫的储存有效期无法确定。

When in compliance with the above listings, the shelf life of Flexite Super Filled Spiral Wound Gaskets is approximately 5 to 10 years.

5. 遵循以上几条储存指导, Flexite Super 填充料的缠绕垫大概有 5 至 10 年储存有效期。

The shelf life of Flexitallic sheet sealing materials depends on the storage conditions.

福来西板材的储存有效期取决于储存条件。

We recommend the following:

我们建议以下储存条件:

Cool, dry conditions. Especially for thermiculite range, contact with water is strictly prohibited.

1. 阴凉干燥的环境, 尤其是高温固力特材料, 严禁与水接触。

Away from electrical switch gear

2. 远离电气开关

Store sheets flat, NOT rolled up. Cover with dust sheets.

3. 平板储存, 杜绝将板材卷起。防尘板覆盖。

Keep away from direct sunlight (e.g., do not store beneath skylights)

4. 避免阳光直射 (例如不能储存在天窗下)

Do NOT hang cut gaskets from hooks

5. 杜绝将切割垫片悬于挂钩上



Under these storage conditions the following shelf lives apply:

遵循以上条件，板材的储存有效期如下：

Material 材料	Shelf life 储存有效期
SF/AF sheet SF/AF 无石棉纤维板	3 yrs minimum 3 年以上
RGS 1 and 4 RGS1 和 RGS4	3 yrs minimum 3 年以上
Thermiculite 815 高温固力特 Thermiculite 815	3 yrs minimum 3 年以上
RGS 3 RGS 3	5 yrs minimum 5 年以上
SIGMA Range SIGMA 系列	5 yrs minimum 5 年以上

# 垫片安装指导

## Gasket installation guidance

### 前言

#### Preface

螺栓接头是一种包含法兰、螺栓、螺母、垫圈，当然还有垫片的连接。还有安装人员的人为因素。总之，如果是防漏型接头，那么就会有许多不同的因素对接头性能造成影响。

Bolt joint packaged the flange, bolt, nut, washer and gasket. And we need to consider the factor of installer. After all, if it is a anti-leakage bolt joint, then many different factor will influence the joint performance.

扭矩是通过螺栓施加转动动力以克服其轴向拉伸的一种力。一般而言，扭矩只有大约 70% 的准确性。

Torque is a force to overcome bolt's axial stretching through a rotation force around bolt. In general, torque value is only about 70% accuracy.

您还要尝试克服摩擦力。拉伸螺栓的大部分作用力都在克服摩擦。

Also need to overcome friction. Most of the force to stretch bolt is overcoming friction.

对于正确的螺栓接头装配而言，润滑是其中非常重要的一部分。超过 50% 的作用力是在克服摩擦，而不仅仅是变成作用在螺柱上的轴向力。

For the right bolt joint assembly, one important part is lubrication. Over 50% working force used to overcome friction, not just turn into axial force against the bolt.

扭矩分布情况：38% 的扭矩变成螺纹之间的相互作用力，并用于克服螺纹处的摩擦；48% 的扭矩用于克服螺母和垫圈或螺母和法兰之间的摩擦；只有 14% 的扭矩变成拉伸螺柱的轴向力。

The torque value distribution: 38% torque value turn into mutual working force between the bolt thread, and used to overcome the friction;48% torque value used to overcome friction between nut and washer and between the gasket and flange; only 14% torque value turn into axial force to stretch the bolt.

## 2. 安装前准备和检查

### Preparation and examination before installation

就安装而言，您始终都应当使用新垫片。垫片一经使用，其性能就会发生变化。它不再具有相同的压缩和回弹特性。这是您总要使用新垫片的原因。此外，请务必检查垫片的大小和压力等级是否正确。

For installation, you need to always used new gasket. Once gasket has been used, the performance will be changed. It is not the same original performance in compressive and resiliency. That's why you always need to used new gasket. Furthermore, please mach sure the gasket size and pressure rating is right to the site condition.

清理掉法兰上所有的残留物也是非常重要的。请小心清理，确保不会造成任径向划痕。这是因为这些划痕会形成泄漏通道。检查法兰，确保没有凹痕或划痕。

It is very important to clean up all leftover on flange sealing surface. Please be careful, make sure no radial scratch on the sealing surface because it will lead to a leakage passageway. Check up flange, make sure there is no any dent and scratch.

您还要确保对法兰的损坏情形、平面度和平行度进行检查。垫片只能对一定数量的不规则缺陷进行补偿。

Also need to examine damage situation, flatness and parallelism. Gasket only compensates some of the flange's irregular defect.

请不要在垫片表面使用润滑剂或脱模剂。

Don't used lubricant or molt release on the gasket.

### 3. 安装顺序

#### Bolt installation sequence

为各螺栓编号（至少要安装人员心里要清楚），并规定一定的顺序。这样，您就不会使垫片发生偏载。切记：您的目的是让垫片均匀受力。

Make a number code for bolts (at least the installer need to know in heart), and stipulate a certain sequence. So that, it will not happened the unbalance load on gasket when installation. Remember that your purpose is to make a even force on gasket.

星形安装或十字交叉模式：在一个带有 8 个螺栓的法兰上，您从螺栓 1 开始，再转至螺栓 5。然后，您从螺栓 3 转至螺栓 7。然后从螺栓 2 转至螺栓 6。再从螺栓 4 转至螺栓 8。按照该模式，可确保均匀地对垫片进行压紧，并将法兰均匀、平行地连接在一起。对于 12 个螺栓和 16 个螺栓及具更多的螺栓的安装而言，请看六附 Flexitallic 螺栓紧固顺序，您就非常清楚了。

Diametrically opposed sequence module: on a flange with 8 bolts, start from bolt number 1, and the to bolt number 5. And then, switched from bolt number 3 to bolt number 7. And then, switched from bolt number 2 to bolt number 6. And then, switched from bolt number 4 to bolt number 8. According to this sequence, can make a even force on gasket, and join together evenly, parallel of the flange. For the flange with 12 bolts and 16 bolts or more on installation, it's will be very clear to see Flexitallic bolt up sequence in appendix 6.

我们将按照标准的星形模式，以三分之一的扭矩进行第一轮紧固。

Firstly torque bolts up to approximately 30% of final torque value following the standard diametrically opposed sequence.

第二轮紧固应以三分之二的扭矩完成，并且也应采用星形模式。

Secondly torque bolts up to approximately 60% of final torque value following the standard diametrically opposed sequence.

第三轮紧固应采用星形模式、以最大扭矩完成。

Thirdly torque bolts up to approximately 100% of final torque value following the standard diametrically opposed sequence.

最后，以最大扭矩完成第四轮紧固，但应采用顺序模式，即：逐个对螺栓进行紧固。

A final tightening should be performed an adjacent bolt-to-bolt sequence to ensure that all bolts have been even stressed.

#### 4. 注意事项

##### Matters need attention

安装完成，请注意：您需要施加足够大的初始载荷以克服松弛。垫片会有松弛。螺栓也会松弛。随着温度升高，甚至会出现更大的松弛。

After installation, pay attention that need to apply an enough initial load to overcome relaxation of gasket and bolt. With temperature raised, they may even showed bigger relaxation.

此外，还应考虑平行度原则。这意味着，在压紧垫片之前，您应当使法兰保持平行。平面度是您必须检查的另一个法兰项目。因此，在压紧垫片之前，您要确保正确对齐法兰，而不是用力校正法兰。

Furthermore, should considering the parallelism on flange. It means that maintain the flange parallel before press load on gasket. And also need to check up the flange's flatness. So that need to mach up flange rightly other than fiercely adjusting the flange after installation.

#### 5. 推荐扭矩

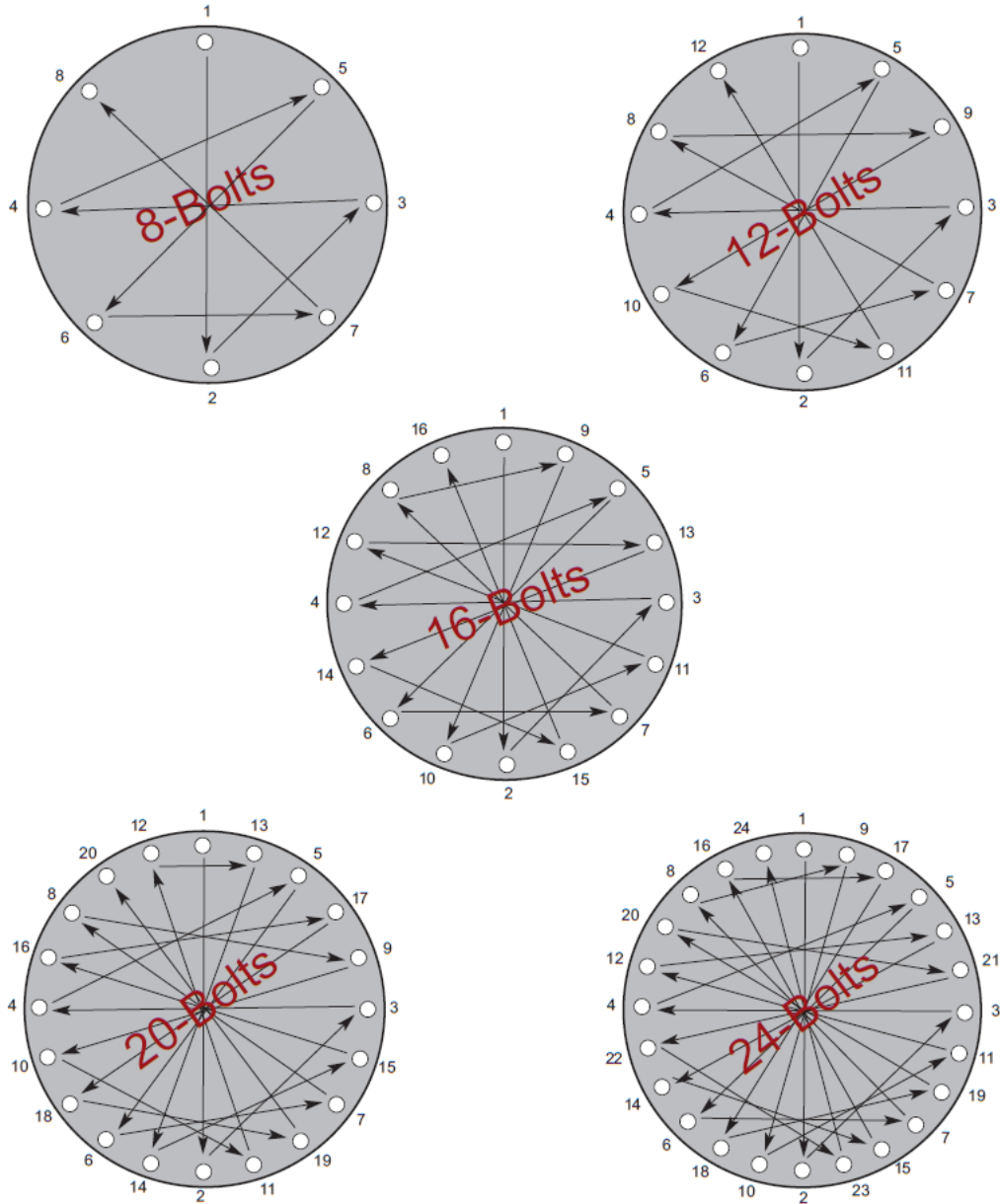
##### Suggestive bolt torque value

根据实际法兰螺栓情况进行计算所得，或标准法兰根据数据表。见福来西设计手册。

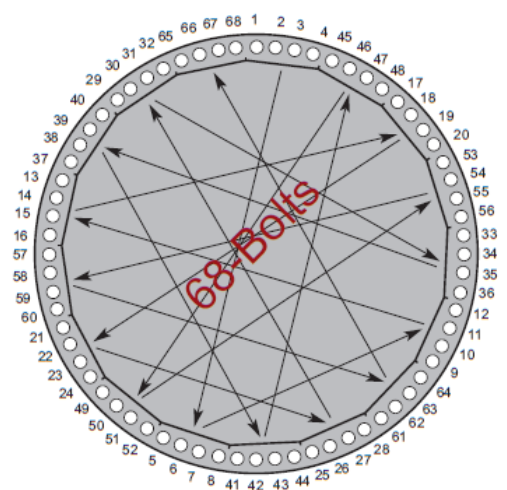
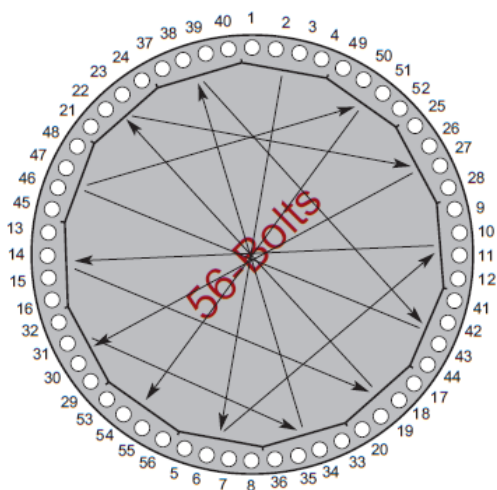
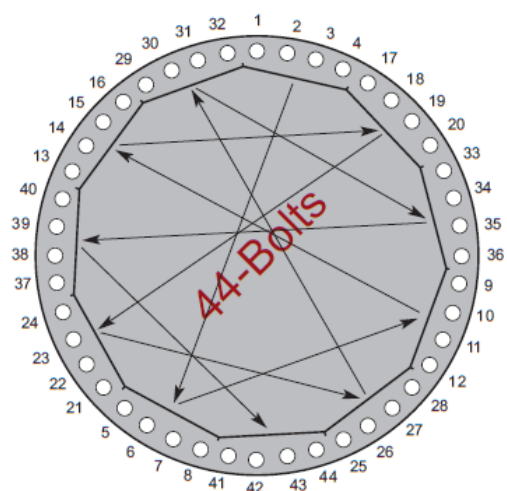
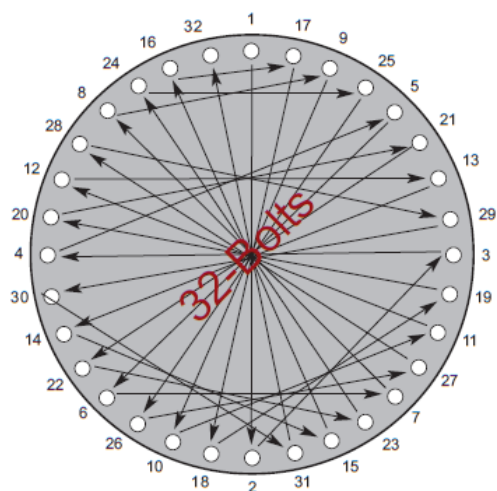
The suggestive bolt torque value is calculated based on actual flange and bolts parameter, or refer to standard flange data sheet. Both way are based on Flexitallic design brochure.

## 6.附 Flexitallic 螺栓紧固顺序

Appendix Flexitallic bolt up tightening sequence.







## 大尺寸垫片搬运注意事项

### Precautions for handling large size gasket

1. 此垫片在拿取及搬运过程中，至少 4 人。

The gasket requires at least 4 people to handle it.

2. 从纸箱中拿取垫片时，只能从外环部分将垫片抬起，不可触碰到垫片及内环。

When taking the gasket from the package, the gasket can only be lifted from the outer ring and cannot touch the sealing part and inner ring.



3. 待整个垫片脱离地面后，双手放平，将垫片托起；垫片搬运过程中，保持水平，不可拉扯。

When the entire gasket is off the ground, put your hands flat and lift the gasket. In the process of gasket handling, keep the gasket horizontal and do not pull it.



4. 垫片竖立时，双手只能抓住外环部分，不可触碰到垫片及内环。

When the gasket is erected, the two hands can only grasp the outer ring, cannot touch the sealing part and the inner ring.



5. 安装时，需要专门的维护人员。

Special maintenance personnel are required during installation.



# 石墨类垫片表面瑕疵判别

## Blemishes on Graphite Gaskets

### 石墨缠绕垫表面瑕疵判别

### Blemishes on Flexible Graphite Filled Spiral Wound Gaskets

#### 通用指导

#### General Guidelines

1. 填充料应齐平或高于金属钢带

The filler should be flush or above the metal windings

2. 拒绝接受露出钢带的表面损伤

Surface damage that exposes the metal windings is subject to rejection

3. 垫片表面瑕疵不应扩展至钢带以下

Surface blemishes on the face of the gaskets should not extend below the metal wraps

4. 填充料单面损失低于 1/4 圈是可以接受的

Up to ¼ ply of missing filler is acceptable on one face

5. 表面瑕疵如果没有导致钢带露出，并且可以用光滑的布轻拭抛光，可以认为是无害的

Surface blemishes shall be considered harmless if they can be removed by light buffing with a smooth cloth and the metal winding is not exposed



核电工业 OEM 的附加要求:

**Additional criteria by OEMs in the nuclear industry:**

以下缠绕垫密封面损伤是可以被接受的

Indentations in the spiral wound area are acceptable provided:

1. 深度小于 1 毫米

The depth is less than 0.040"

2. 长度小于 2/3 的密封面宽度

The length is less than 2/3 the width of the sealing service

3. 宽度小于 1 毫米

The width is less than 0.040"

石墨缠绕垫可通过验收的瑕疵案例

**Examples of Acceptance Criteria for Blemishes on Graphite Filled Spiral Wound Gaskets**



石墨缠绕垫瑕疵拒收标准案例

Examples of Rejection Criteria for Blemishes on Graphite Filled Spiral Wound

Gaskets



填充料低于金属层 Filler falls below metal plies



超过1/4圈的填充料丢失 Missing filler more than 1/4 wrap

## 石墨贴面齿形垫瑕疵判别

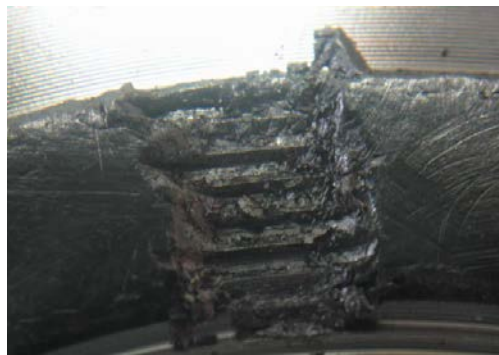
### Blemishes on Flexible Graphite Faced Flexpros

石墨贴面齿形垫瑕疵拒收标准案例

**Examples of Rejection Criteria for Blemishes on Flexpro faced with Flexicarb Facing**

拒绝接受金属芯露出的表面损伤

Surface damage that exposes the metal core is subject to rejection.





石墨贴面齿形垫可通过验收的瑕疵案例

**Examples of Acceptance Criteria for Blemishes on Flexpro faced with Flexicarb**

表面瑕疵如果可以用光滑的布轻拭掉，并且钢带没有露出，则可以认为是无害的

Surface blemishes shall be considered harmless if they can be removed by light buffing with a smooth cloth and the metal core is not exposed.



Sincerely

此致