

# Best Available Techniques in Sealing Technology

How Novus Sealing can help reduce your environmental impact



Manufacturers and distributors of sealing and jointing materials.

## Guidance on the **Best Available Techniques** for Sealing Technology

## Committed to Protecting the Environment

Novus Sealing design, manufacture and supply a variety of high quality sealing products and services for applications in the industrial and manufacturing sectors. Our products are an important component in emission control within industrial systems and have a direct environmental benefit by reducing leakage and improving energy efficiency. We are committed to reducing our customer's environmental impact by investment in the development of low emission products and environmental services.

Novus Sealing continually strives to improve its own environmental performance. The company manages its operations in accordance with the Environmental Management Standard ISO 14001 (the only UK manufacturer of industrial static sealing products to do so) and has an ongoing policy of preventing pollution, improving the use of resources, promoting recycling, and reducing waste in all activities.

This brochure is intended as an information source for operators under the auspices of the Integrated Pollution Prevention and Control (IPPC) directive. The brochure reflects our commitment to the prevention of airborne pollution and contaminants release.

## IPPC and BAT

IPPC is a European wide environmental protection directive (96/61/EC) that requires nominated industry sectors to be regulated under an integrated pollution control regime. The purpose of the directive is the achievement of a high level of protection of the environment as a whole.

Facilities covered by the legislation are subject to authorisation through permitting, that requires both operators and regulators to take an integrated, overall view of the polluting and consuming potential of their installation. All existing operators must have a permit to operate by October 2007, without one they will be unable to run their process after this date.

Central to IPPC is the general principle that operators should take all appropriate preventative measures against pollution through the application of Best Available Techniques (BAT).

BAT can be interpreted as the most effective method of achieving a high level of protection of the environment, whose implementation is both economically and practically viable.

### **In the IPPC directive BAT is defined as follows:**

- **'best'** means most effective in achieving a high general level of protection of the environment as a whole.
- **'available'** techniques are those developed on a scale which allows implementation in the relevant industrial sector, under technically and economically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside Member States in question, as long as they are reasonably accessible to the operator.
- **'technique'** includes both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned.

The following four actions will significantly reduce your environmental impact:

- 1) Adopt a Leak Detection and Repair Programmes**
- 2) Choose the Correct Sealing Material**
- 3) Control the Joint Making Process**
- 4) Recover and Recycle Sealing Materials**

## 1) Adopt a Leak Detection and Repair Programme

### Fugitive Emissions

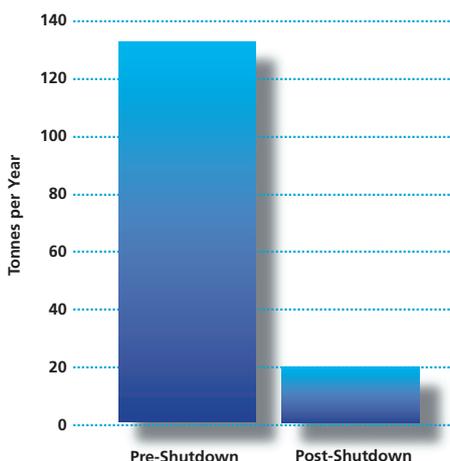
A fugitive emission is a spurious emission of the process fluid, usually a hydrocarbon in gaseous form, from any plant component which relies on a seal to separate the process fluid from the environment. The major sources of fugitive emissions are valve glands, pump seals and flanged joints, and although emissions from individual components can be small the cumulative effect can be very significant in some cases sufficient to cause a noticeable impact on the overall mass balance for the plant. A characteristic feature of fugitive emissions is that they are often unnoticed, and until recently the measurement and control of these emissions has received little attention.

Emissions from oil, gas or chemical plants have two main impacts. Firstly, emissions of process chemicals can cause damage to the environment or harm to the health of plant workers or the general public. Secondly, emissions of process or service chemicals represent financial loss to the operating company.

The most effective method of reducing fugitive emissions from process equipment is the implementation of a structured Leak Detection and Repair (LDAR) Programme. The basis of this approach is to identify individual leaking components by measuring the concentration of the process fluid in the atmosphere close to the item. The data gathered through monitoring can then be used to implement a repair and maintenance schedule.



This chart shows reductions in fugitive emissions at a major UK petrochemical plant following a valve refurbishment program based on results of a structured LDAR program



### Novus LDAR

Our LDAR service has helped major oil, gas and chemical facilities reduce their emissions to atmosphere. By identifying the source of airborne pollution and contaminants and then taking action to eliminate or reduce it major gains have been made in emission reduction. In all cases, the action to reduce fugitive emissions has offered excellent financial payback to our clients, enabling them to sell product that would otherwise be lost to the environment.

As well as undertaking emission monitoring, we can assist in the scheduling of maintenance programmes and can carry out repair or refurbishment work. Monitoring can be repeated after repair work to check that this has been effective and to provide an auditable trail for the regulators.

#### We provide

- On-site personnel
- All monitoring equipment
- Surveys carried out weekly/monthly
- All equipment is tagged and logged to identify least/worst offenders
- Data Management System

### Data Management

Our data management system is designed to provide a reference source for all measured components on plant, detailing all the relevant information and recorded emissions in accordance with client specification. By simplifying the collection, administration and reporting of fugitive emissions monitoring our clients are best able to meet the requirements of IPPC.

### Benefits of LDAR

- Emission Reduction
- Compliance with IPPC
- Savings in product loss
- Enhanced plant safety

### Key Points

- Execute an on going LDAR programme tailored to site requirements
- Quantify emission sources in order to identify the highest emitters first
- Document emission sources using a data management system
- Instigate a repair and maintenance programme

## 2) Choose the Correct Sealing Material

### Sheet Materials

Novus has developed an extensive range of world class sealing products which meet or exceed the requirements of many international standards including TA Luft, placing the company at the leading edge of fugitive emissions control.

**For full details of any of our products please refer to our specific brochures or to our website. [www.novussealing.com](http://www.novussealing.com)**

### Flange Connections

Chemical and petrochemical plants have many thousand flange joints and although the emissions from individual flanged joints may be relatively small, the cumulative effect can be significant. Our world beating gaskets and sheet jointing range can help minimise fugitive emission losses from flange joints.

**All products shown are certified as meeting TA-Luft emission requirements.**

### Valves

Valves may account for more than 60% of fugitive emissions from a chemical plant, with the major proportion of the emissions attributable to only a small fraction of leaking valves. The valve packing performs the role of the shaft seal and is the major influence on valve leaking losses. It can be shown that the emission performance of valve packings varies considerably making it important to select a grade which has a proven record of emission control.

Novus Sealing offers two products **Uni-Pac 8 Environmental** and **Uni-Pac 9 Control**, which have been developed specifically to combat VOC (Volatile Organic Compounds) emissions from valves.

#### Novus 10 5G



Novus 10 is a premium grade based on carbon fibre with a nitrile rubber binder

#### Novus 30 5G



Novus 30 is a good quality sheet material with aramid fibre and a nitrile binder system

#### Novus 34 5G



Novus 34 is a high performance compressed material in a blend of aramid, organic and special additives

#### Novus 45 5G



Novus 45 is a medium quality, cost effective material using virgin fibres and recycled components

#### Novus 49 5G



Novus 49 is a compressed material combining graphite, with aramid fibres and a rubber binder

#### Uniflon 50 5G



Novus Uniflon 50 is a superior performance biaxially constructed PTFE with high conformable properties.

### Semi-Metallic Gaskets

#### Spiral Wound Gaskets



Designed for high sealing performance in high temperature and pressure applications

#### Camprofile Gaskets



Standard choice for super effective sealing in pipeline and heat exchanger applications

#### Corrugated Gaskets



An infused graphite layer over a metal core creates an high integrity seal across a wide range of stress levels

### Compression Packings



#### Uni-Pac 8 Environmental

World-beating Fugitive Emission Control for block valves. Certified to Ta-Luft requirements.



#### Uni-Pac 9 Control

World-class packing for control valves. Certified to Ta-Luft requirements.

### 3) Control the Joint Making Process

#### Training

The reliability of a flanged joint depends not only on a low emission gasket to achieve an effective seal but also on competent control of the joint making process. It is common to put considerable effort into the design and selection process only for improper assembly to lead to joint failure. Therefore it is important that the joint making process is undertaken by trained and validated technicians who have an understanding of the procedure and the underlying principles and practice of joint flange assembly.

Novus '**Control of Flanged Joints**' training programme is an industry recognised program designed to ensure that all individuals with responsibilities in connection with ensuring the safe control of flanged joints are trained and validated as competent to undertake these responsibilities. This unique training course is based around a practical demonstration and a video presentation of best practices and utilises an intelligent bolting system to explain and demonstrate these principles.

#### Novus SELECT CD

Correct design and calculation of the load required to seal the gasket is critical in ensuring low emission flanged joints. Novus Select calculates the required bolt stress and torque based on the material limits of the gaskets and bolts but also takes into account the likely effects of relaxation and assembly variation on gasket stress. Its user friendly interface simplifies the calculation process for both standard and non standard flange designs, helping to minimise emissions throughout the joint's service life. The CD is free to end users.

**Novus Flange Joint Tool kits** are a further assistance for operators to ensure a properly assembled flange. Each kit contains a number of tools that help to ensure that the flange has the correct surface finish, is properly aligned and is assembled correctly.

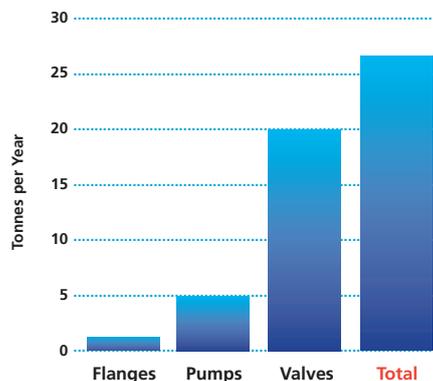
#### Each kit contains:

- Flange alignment tool
- Surface finish comparator
- Engineering databook
- Plant safe torch

#### Key Points

- Ensure the correct joint design and calculation of the load required to seal the joint (Novus Select)
- Assemble the joint using properly trained and validated technicians who have an understanding of the procedure and the underlying principles and practice (Control of Flanged Joints Training)
- Provide the necessary tools to ensure correct installation (Novus Fitters Kit)

Properly assembled flanged joints have little overall impact on total emissions



There is also a DVD which accompanies the course.



A DVD presentation explains the principles of best practice.

## 4) Recover and Recycle Sealing Materials

### Recovery and Re-cycling

Recycling and recovery are key factors in the consideration of the application of BAT. They are also key tenants of our ISO 14001 system and our experience in these areas has led to development of a number of programmes designed to contribute to the waste reduction of our clients.

### Novus Recycling Programme

Traditionally sealing products such as spiral wound gaskets would be scrapped after use but using Camprofile gaskets we are able to provide a recycling service which eliminates the need for costly disposal strengthening the plant operators' commitments to applying BAT. The programme is illustrated in the diagram below.

Camprofile gaskets are a lower emission alternative to spiral wound or metal jacketed gaskets and are finding increasing use throughout chemical plants in Europe and the US. The product has the capability to be refurbished and

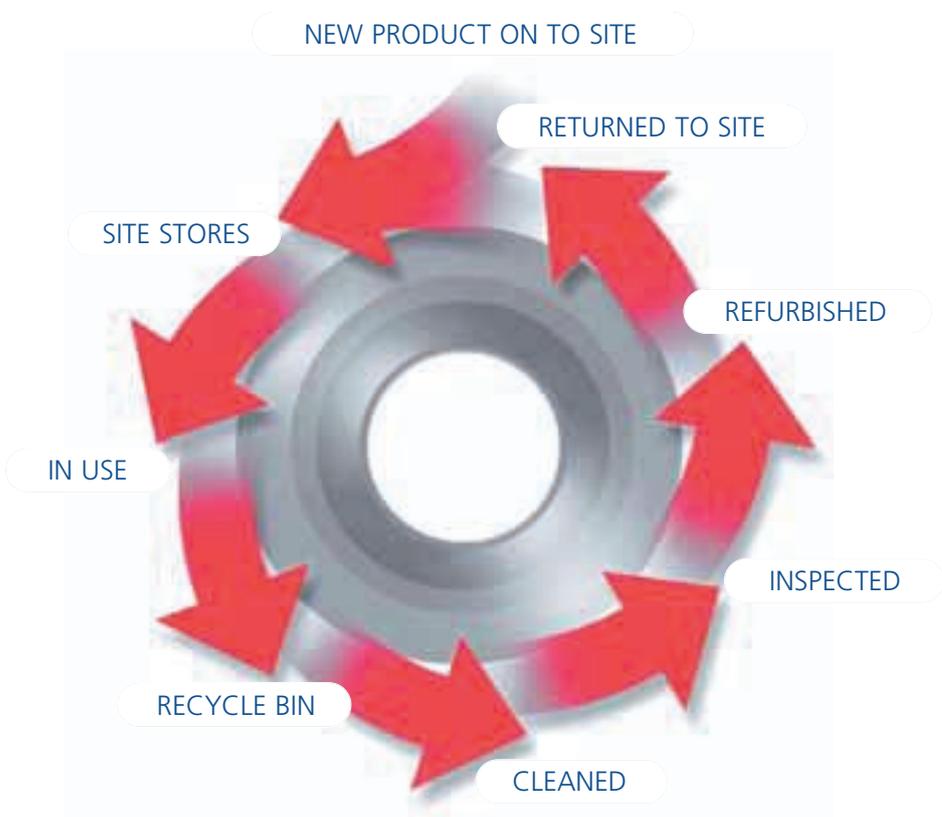
re-used making it cost effective over a number of recycles. By providing suitable collection points on site, the spent product can be collected, returned to our factory workshops, checked, reconditioned and supplied back to the site. Gaskets can be collected monthly or at times to suit the facility. As an additional option, we offer a leasing cost program in which the Camprofiles are leased and the prerequisite number and type of joints supplied to your stores.

Novus recycling programme extends to packaging of the gasket. Our unique packing systems allows for recycling; the packaging can be removed and placed in bins which can be collected by Novus and then reused. This further eliminates the waste that is generated from gaskets. Novus recycled packaging can be applied to other Novus products e.g. Metal Jacketed Gaskets.

### 5G Recycling

Our environmentally friendly range of compressed fibre products, 5G, offer the ability to recycle scrap material. Waste material from these products can be stored in bins and collected for use in one of our recycled grades e.g. Novus 45.

**For further information please contact Novus Sealing Technical.**



### Key Points

- Fully recyclable gasket option
- Recycle packaging
- Recycle scrap from 5G materials



Novus Sealing and our distributors are fully committed to ensuring our customers throughout the world receive the highest level of quality and technical support for our products and services. Our technical specialists can provide expertise on all issues associated with sealing performance.

#### HEAD OFFICE

##### Novus Sealing Ltd

Hunsworth Lane  
Cleckheaton  
West Yorkshire BD19 4EJ  
England, UK  
T: + 44 (0)1274 878787  
F: + 44 (0)1274 862588  
E: mailbox@novussealing.com  
www.novussealing.com

#### OVERSEAS OPERATIONS

##### Novus Sealing Pty Ltd

15 Vinnicombe Drive  
Canning Vale  
Perth, Western Australia 6155  
T: + 61 (08) 9455 2155  
F: + 61 (08) 9455 2165  
E: mailbox@novussealing.com.au  
www.novussealing.com.au

##### Novus Sealing Technology (Shanghai) Co. Ltd

Bld 1, No. 1069, Xuanzhen (E) Road  
Nanhui Industrial Park  
Shanghai  
P.R. China  
T: + 86 (0) 21 6608 0973  
F: + 86 (0) 21 6608 0977  
E: zhuyaqi@novussealing.com.cn  
www.novussealing.com.cn

##### Novus Sealing SA

5 Coert Steynberg Street  
Van Eck Park – Extension 2  
Brakpan, Gauteng, South Africa  
T: + 27 (0) 11 915 0016  
F: + 27 (0) 11 915 0940  
E: mailbox@novussealing.co.za  
www.novussealing.co.za

##### Novus Sealing Thailand Co. Ltd

135/18 Amornphan 205  
Tower 2 Building, 8th Floor  
Soi Natong, Rachadaphisake Road  
Din Dang District  
Bangkok 10400, Thailand  
T: + 66 (0) 2689 5393  
F: + 66 (0) 2689 5397  
www.mpac-asia.com

##### Novus Sealing Caspian LLP

7v Atambayev Street  
Atyrau, 060005,  
Republic of Kazakhstan  
T: + 7(7122) 251103  
F: + 7(7122) 252835  
E: enquiries@novussealing.kz  
www.novussealing.kz

##### Novus Sealing Middle East LLC

PO Box 6591, Al Jazeera  
Warehouse WIZ04-30 & 32  
Al Hamra Warehouse Area  
Ras Al Khaimah  
United Arab Emirates  
T: + 971 (0)7 243 4305  
F: + 971 (0) 7 243 4306  
E: mailbox@novussealing.ae  
www.novussealing.ae

##### Novus Sealing (M) SDN BHD

Plo 232, Kawasan Perindustrian  
Tebrau III  
81100 Johor Bahru  
Johor Darul Takzim  
T: + 607 351 3910  
F: + 607 357 9910  
E: enquiry@novus.com.my

##### Novus Sealing Nigeria Ltd

Plot 29A, Elelenwo Street  
GRA Phase 1, Port Harcourt  
Rivers State  
Nigeria  
T: + 234 (0) 84 901022  
E: mailbox@novussealing.com.ng  
www.novussealing.com.ng

##### Novus Sealing NZ

Better Industrial Ltd  
Po Box 5329  
Frankton, Hamilton 3242  
New Zealand  
Tel: +64 (0)7 847 9269  
Fax: +64 (0) 7 847 8752  
www.novussealing.co.nz