

Uni-Pac Compression Packings



Manufacturers and distributors of sealing and jointing materials.

Introduction

The Uni-Pac range of high performance compression packings are designed to provide a seal between a moving spindle or shaft and the pressurised housing in which it operates.

Uni-Pac utilises the most advanced production techniques and materials to ensure a high integrity seal is achieved in even the most demanding of industries. They are typically used on valve, rotary and reciprocating pump applications.

Uni-Pac packing are available in a range of materials and are supplied in square section from 3mm to 25mm as standard with other sizes available on request. In addition Novus manufacture exfoliated graphite die-formed rings in virtually any size, section or density to suit most requirements.

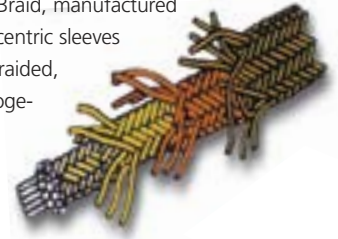
The Uni-Pac range will meet the majority of service requirements. Other packings are available on request

Construction Types

Cross Plait - also known as Super Plait, Diagonal Plait, Mole Braid, interwoven or Lattice Braid. This is a dense, homogeneous packing where each strand of yarn passes diagonally through the packing at a 45° angle.



Steam Plait - also known as Braid over Braid or Round Braid, manufactured by braiding concentric sleeves over a core of braided, twisted or homogeneous material. This produces a round packing which can be calendared



square, alternatively it can be produced square with the addition of four corner strands.

Uni-Pac 1












Uni-Pac 2



Uni-Pac 3



Description	Uni-Pac 1	Uni-Pac 2	Uni-Pac 3
	A pure expanded braided graphite packing with corrosion inhibitors suitable for high temperatures. Resistant to almost all chemicals and steam.	A pure expanded braided graphite packing reinforced with an Inconel wire with corrosion inhibitors. Suitable for high temperatures and pressures. Resistant to most chemicals and pressures.	A carbon fibre packing. Impregnated with PTFE dispersion and graphite lubricant.
Type of construction	Cross Plait	Cross Plait	Cross Plait
Temperature Range °C	-250 / +650	-250 / +650	+290
Pressure - Bar			
Rotary Pumps	30	30	40
Reciprocating Pumps	100	100	150
Valves	200	300	200
Shaft Speed m/s			
Rotary	10	8	20
pH Range	0 - 14	0 - 14	0 - 14
Industries	Refineries, Petrochemical Plants, Steel Works, Power Stations and General Equipment	Refineries, Petrochemical Plants, Steel Works, Power Stations and General Equipment	Refineries, Petrochemical Plants, Paper and Water Industries
Application			
Rotary Pumps			
Reciprocating Pumps			
Valves			

Maximum pressure, temperature and speed guides cannot necessarily be used simultaneously. *500°C in oxidising conditions, 3000°C in inert gas conditions for temperature

Water	●	●	●
Seawater			
Weak Acid	●	●	●
Strong Acid			●
Food			
Petroleum Products	●	●	●
Steam	●	●	
Weak Alkalis	●	●	●
Strong Alkalis	●	●	●
Oxygen			
Oils	●	●	●
Abrasive Slurries			
Greases	●	●	
Solvents	●	●	●

Other packings are available on request, please contact our Technical Department. ● Indicates suitability

Solid Plait - also known as Square Braid or Square Plait. Strands of yarn pass over and under strands running in the opposite direction. The packing is soft, resilient and the structure allows for additional lubricants to be added. Suitable for high speed lower pressure, rotary applications.



Twist - This type of construction is used for small section packings, which are used in valves and pumps having small radial stuffing box dimensions.



Die Formed - This is a precompressed ring form in which many compression packing materials can be supplied to provide controlled density and size.



Uni-Pac 4



A Pure PTFE filament yarn packing impregnated with PTFE dispersion, providing virtually complete resistance to all commercial chemicals. Only exceptions are molten fluorine and molten Alkali metals.

Uni-Pac 5



A firm packing with the seam strand packing consists of integrally graphited PTFE yarn for good lubricity and thermal conductivity. The corner strands are plaited in Aramid fibre to give high mechanical strength and resistance to extrusion at high pressure.

Uni-Pac 6



A firm flax yarn packing impregnated with wax dispersion and tallow lubricant.

Uni-Pac 7



A glass yarn firmly constructed packing, lubricated with both graphite and mineral lubricants.

	Cross Plait	Cross Plait	Solid Plait	Cross Plait
	-200 / +260	-100 / +280	120	590
	50	40	40	10
	150	200	80	70
	250	250	100	100
	20	20	10	2
	0 - 14	2 - 12	5 - 9	40 - 11
	Chemical Plants, Breweries and Food Industry	Refineries and Chemical Plants	Stern Glands	Dynamic and general applications.
Temperatures above 450°C please consult our technical department. **350 bar nominal conditions, 500 bar specific conditions.				
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Uni-Pac Graphite Based Compression Packings for the Environment

Uni-Pac 8 Environmental

Description

Our top-of-the-range fugitive emission control packing for valves. This cost effective, length-form product is manufactured in exfoliated graphite, reinforced in a novel way to provide additional strength and resistance to pressure and extrusion. It incorporates an advanced lubricant system that prevents the pick-up of graphite on valve stems.

Chemical Properties

Chemically inert within the range pH 1-14, excluding strong oxidising agents. Negligible volatile content.

Typical Applications

Harsh operating conditions where fugitive emissions from all types of valves need to be reduced to well below 100ppm. Widely used in systems handling fluid media such as hydrocarbon liquid fuels and gases, lubricating oils and processing chemicals.

Specifications

Certified to TA LUFT requirements for VOC fugitive emission control in valves.

API 607 Fire Safe Tested and Certified: third party tested to extended specification by independent laboratory in USA.

Third party verified emission control performance; eg, by CETIM to Shell spec SPE 77/312 Class A.

Prime Features

Top of its class in independent tests run on behalf of the CAPI Group (Akzo Nobel, Shell, Dow and DSM).

Suitable for rising-stem valves.

Low friction action without graphite pick-up.

No special fitting techniques required.

How Supplied

Ex-Stock: all popular square sections from 3mm cross-section upwards to suit all standard valves. Boxed in 8m lengths or supplied as split preformed rings and sets. Full fitting instructions are included.

Uni-Pac 8 Environmental

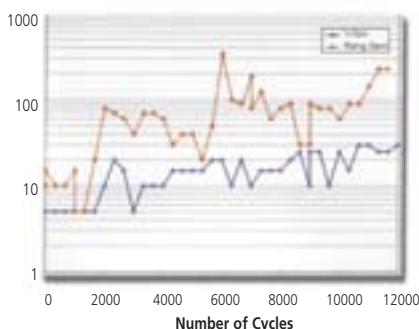


Description		A top class fugitive emission control packing for valves. It is manufactured in exfoliated graphite, reinforced in way that provides extra strength and resistance to pressure and extrusion. It also incorporates an advanced lubricant that prevents the pick-up of graphite on valve stems.	
Type of construction		Solid Plait	
Max Temperature °C		450	
Pressure - Bar	Rotary Pumps Reciprocating Pumps Valves	250	
pH Range		1 - 14	
Industries		Refineries, Chemical Plants Petrochemical Plants	
Application	Rotary Pumps Reciprocating Pumps Valves		
	Water	●	
	Seawater		
	Weak Acid		
	Strong Acid		
	Food		
	Petroleum Products	●	
	Steam	●	
	Weak Alkalis	●	
	Strong Alkalis		
	Oxygen		
	Oils	●	
	Abrasive Slurries		
	Greases	●	
	Solvents	●	

Sealability Tests

Leeds University Tests - 40 bar Helium

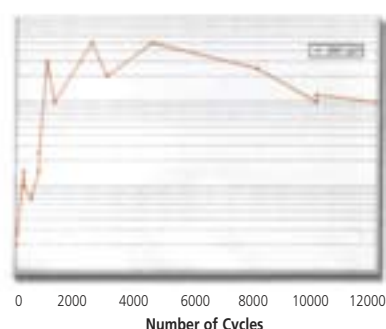
Valve body temperature cycling between 30 °C and 200 °C



Longevity Tests

Novus Uni-Pac 8 Environmental

Endurance Test - 40 bar Methane



Uni-Pac 9 Control



This innovative compression packing for control valves is proven to reduce VOC emissions, it has a long term, high integrity sealing capability with very low stem friction for control accuracy. Made of high purity graphite, reinforced with a non-metallic structure for additional strength and resistance.

Solid Plait

350

250

1 - 14

Refineries, Chemical Plants
Petrochemical Plants



Uni-Pac 9 Control

Description

This innovative compression packing for control valves is proven to reduce VOC fugitive emissions to well below 50ppm. Its use represents a **best available technique (BAT)** in line with the **European Union's IPPC Directive**.

Uni-Pac 9 Control's has a high integrity sealing capability, with very low stem friction for control accuracy, derived from its unique design and manufacture.

It is made of high purity exfoliated graphite, reinforced with a non-metallic structure to provide additional strength and resistance to pressure and extrusion. An advanced lubricant system is incorporated to prevent the pick up of graphite on valve stems.

Typical Applications

Control valves in systems that handle fluid media such as hydrocarbon liquid fuels and gases, lubricating oils and hazardous process chemicals.

It can be used as a long-term replacement for the PTFE V-type packings that are readily damaged by ingress of dirt and other foreign particles to the gland area.

Specifications

TA Luft: Masoneilan control valves fitted with Uni-Pac 9 Control are certified to TA LUFT requirements at leak tightness with helium to $<10^{-4}$ mbar.litre.s⁻¹.m⁻¹. The tests were undertaken with 100bar at 20°C and 57bar at a fluid flow temperature of 425°C for 100,000 stem cycles, including four thermal cycles and two gland adjustments.

ISO 15848-1:

Masoneilan control valves fitted with Uni-Pac 9 Control are certified to ISO 15848-1 Class BH, CC3, at -29°C to +425°C. The valves showed helium leakage rates less than 10⁻⁴ mgs⁻¹ for 100,000 stem cycles. This was achieved with pressure of 57.5bar at a fluid flow temperature of +425°C and 103.4bar at -29°C to +38°C.

Prime Features

High integrity gland sealing for control valve stems: to well below 50ppm fugitive emission level.

Long term adjustment free operation: over 100,000 stem strokes possible with emission levels below 500ppm.

Very low coefficient of friction for smooth and rate valve action.

Reduced friction requirement to save on power consumption and enable smaller actuators to be used.

Summaries of additional tests

In addition to the TA LUFT and ISO 15848-1 certifications, the following impressive test results have been achieved.

Thermal Cycling

10,800 valve operating cycles at 20°C and 50bar, followed by 16,700 operating cycles at 280°C and 50bar. Recorded leakage was $<2.2 \times 10^{-4}$ mbar.litre.s⁻¹. (Third party test by major manufacturer of control valves.)

Fugitive Emission Control

10ppm to 150ppm maximum emission levels for five-ring set of Uni-Pac 9 Control after 1100 stem strokes and five thermal cycles between ambient and 160°C.

Long Term Performance

Over 100,000 stem cycles with emission levels below 500ppm using 40bar methane, without gland adjustment.

Chemical Properties

Chemically inert within the range pH 1-14, excluding strong oxidising agents. Low volatiles content.

How Supplied

Split preformed rings and sets for ease of installation and optimal performance, or boxed in 8m lengths for on-site maintenance economy.

Ex-stock: all popular sections from 3mm upwards to suit standard valves. Non-standard square or rectangular sections made to order. Full fitting instructions are included.

Fitting Instructions for Packing

It is important to remember the following prior to fitting the selected packings:

- Remove all old packing and ensure stuffing box is perfectly clean
- Ensure that the correct length has been selected by wrapping the packing around the shaft and allowing a slight overwrap
- Cut both ends to 45° to form a scarf joint
- After fitting the correct number of rings into the stuffing box, ensure there is sufficient entry for the gland and also that you have effective rotation of the shaft
- Ensure that the gland nuts are evenly tightened until a leak free seal is obtained.

Packing Selection

The components and assembly of the braid are predetermined with specific regard to the media being sealed and to ensure that friction is minimised through a range of operating temperatures. A perennial problem with any packing is the possibility of 'dry running' during the start phase. Lubricants are carefully selected and incorporated into the packing to prevent this.

Any packing must be selected with care. The size is critical to ensure that the stuffing box is filled effectively, whilst ensuring that the packing will also deform sufficiently and compensate for irregularities in the shaft and the wall of the gland housing itself.

Check List

When choosing a specific packing, a typical 'check list' of items for consideration would be:-

- Type of equipment - pump, valve, mixer etc.
- Whether shaft action is rotary or reciprocating
- The diameter of shaft and the consequent surface speed
- The condition of the shaft
- The temperature, pressure and type of media to be sealed
- The material - Stainless Steel, Brass, etc.
- The concentration of the media and its pH value
- Any other special conditions such as abrasive slurries etc.

Guidelines for Stuffing Box Dimensions

Imperial		Metric	
Shaft Range	Section	Shaft Range	Section
5/8" to 1.1/8" inclusive	5/16"	16mm to 29mm inclusive	8mm
1.1/8" to 1.7/8" inclusive	3/8"	29mm to 48mm inclusive	10mm
1.7/8" to 3" inclusive	1/2"	48mm to 75mm inclusive	12.5mm
3" to 4.3/4" inclusive	5/8"	75mm to 120mm inclusive	16mm
4.3/4" to 12" inclusive	3/4"	120mm to 300mm inclusive	19mm

Prepared by Fluid Sealing Association and European Sealing Association. www.esa.int



Packaging

Uni-Pac is supplied on spools individually boxed, indicating the packing grade, square section and length.

Packing Extractors

Novus Sealing flexible packing extractors are designed to remove old packing of any size from 5mm upwards

Using a Novus packing extractor makes it easy to access glands even in the most awkward of positions and the flexible shank is designed for maximum penetration into the packing.

Sizes	Shank Diameter
1	5 & 6mm
2	8 & 10mm
3	11, 12.5, 14 & 16mm
4	12mm upwards



Uni-Pac SELECT

Proper selection of a packing material is the first step in ensuring successful operation in service. The suitability of a packing material in a given application is a function of a number of factors including resistance to the fluid being sealed, the temperature and pressure of the application, the shaft speed and the dimension of the stuffing box and it can be sometimes difficult for users to make an informed choice.

Novus has developed Uni-Pac SELECT, a user friendly software program designed to help with the selection of compression packings for both pump and valve applications. The program utilises material compatibility data combined with practical know-how to simplify the selection process, helping you to make an accurate choice about which is the correct packing for the application.

Novus Uni-Pac SELECT Software

Novus Uni-Pac SELECT software has been developed as a user-friendly package to assist our customers in the selection and installation of Novus Compression Packing products.

Novus Uni-Pac SELECT provides:-

- Selection of Packing materials
- Suitability of Packing materials for given applications.
- Selection criteria including application material, packing properties and approvals.

Uni-Pac SELECT



THE QUICK AND EASY SYSTEM FOR SELECTING COMPRESSION PACKING MATERIALS

To learn more about Novus **Uni-Pac SELECT** please contact our Technical Team who will be happy to discuss the many benefits of the software.



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.

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