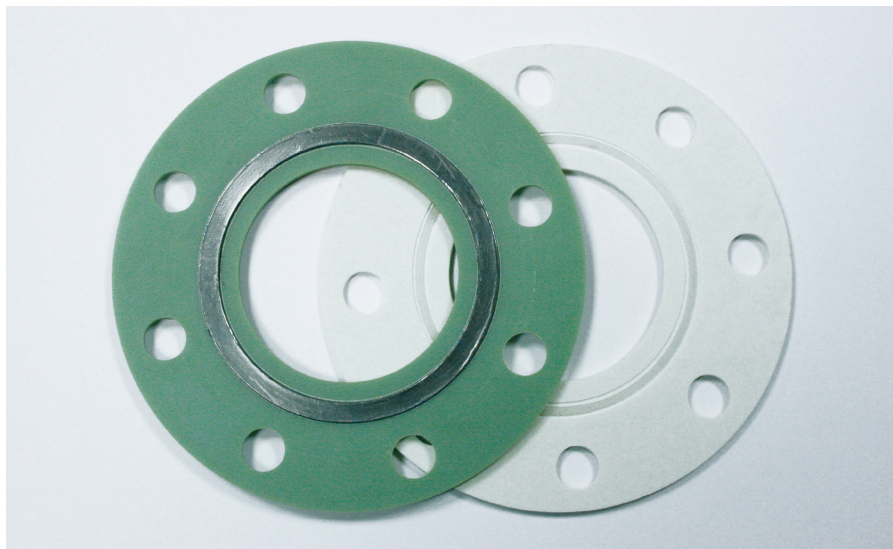


## GENERAL INFORMATION



GLV-UniSeal® T  
UBA ELL recommendation  
C-161711-08-Sf/st  
W270 approval, W163374-08-SI

POTABLE WATER  
KTW/W270

GLV-UniSeal® GGr  
Reg.No. Graphite  
NG-5124BL0367  
DG-5126BL0565



Complies with German Clean Air Act  
according to  
VDI 2440/2200, Nr. 9016364011

TA-Luft-Konform

### Flange isolation with excellent characteristics

The GLV-UniSeal® T and the GLVUniSeal® GGr are high quality isolating gaskets. With the surfaces of the seal retainer closed on all sides, water absorption is reduced to an absolute minimum.

#### General use:

- Flange isolation gaskets combined with isolating sleeves and washers satisfy the requirements of cathodic protection.
- Flange isolation kits can be used in chemically aggressive environments for sealing flammable gases and liquids.
- The GLV flange isolation kits can also be used for general sealing purposes.

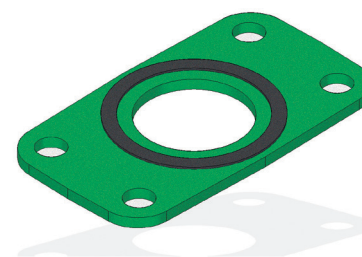
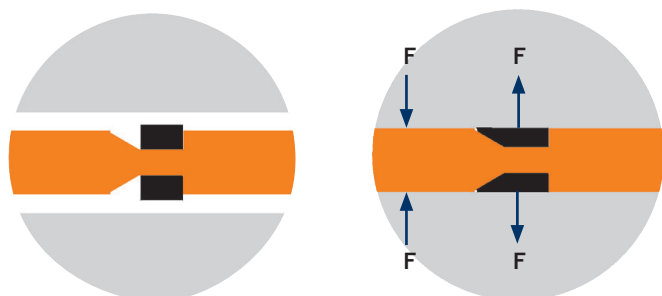
The GLV-UniSeal® T and GLV-UniSeal® GGr make use of indirect bolt force load, which means that the gasket can be used wherever an absolutely tight sealing must be achieved with low surface pressure. The silicone or graphite ring stays permanently elastic throughout the entire service life of the seal and is does not age or become brittle due to the temperature or media it is subjected to. The O-ring properties of the silicone or graphite ring guarantee optimal sealing under indirect bolt force load.

Generally the gasket can be used with all DIN or ANSI flanges. It can be installed in new systems or replaced during maintenance work.

### Advantages of GLV-UniSeal® T and GGr Seals at a glance

- Easy to install
- Maintenance-free, no retightening of the bolts required
- Blow-out safety due to chambered
- sealing rings inside grooves
- Permanently elastic due to being a pure graphite seal (does not become brittle due to temperature)
- Suitable for heavy duty service due to indirect bolt force load
- Functionally reliable due to lowest water absorption

### Indirect bolt force load

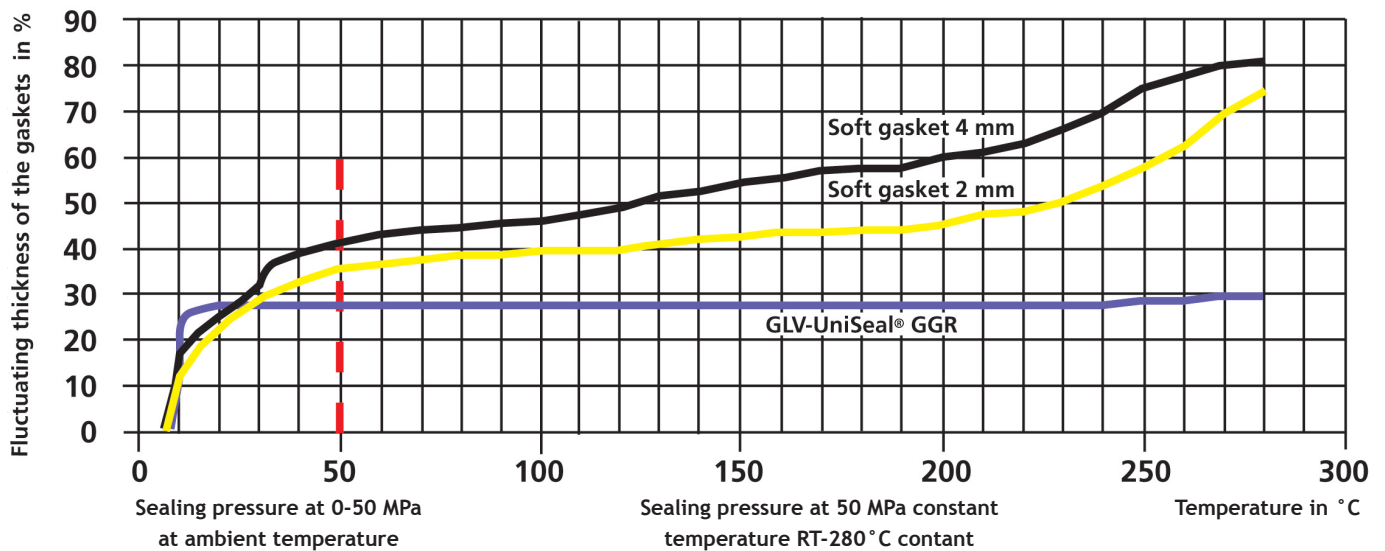


PSI flange isolation gaskets can be individually adapted to all flange shapes.

## GENERAL INFORMATION

This diagram shows the compressive behaviour of isolating sealing joints and the relation between functional safety under service conditions in hot water respectively steam.

Compressive behaviour of GLV-UniSeal® GGr under indirect bolt force load compared to a conventional soft seals under direct bolt force load (in dependency of sealing pressure and temperature).



(Diagram data for soft gasketing according to DIN EN 28091)

The GLV-UniSeal® GGr and GLV-UniSeal® T installed together with isolation sleeves and isolating washers are tested with 5000 voltage according to DIN 50049/2.3 EN 10204. Potable water version GLV-UniSeal® T, GLV T gaskets are made according to KTW/W270 recommendations. General application of GLV-UniSeal® T are the pharmaceutical Industry, water stations, etc.

**Application areas of GLV-UniSeal® GGr, German Clean Air Code ("TA Luft"), DVGW**

These materials have a high universal resistance to most substances and offer long and safe sealing. This gasket material has universal applications and can be used in many different industries including petrochemical, gas, offshore, water, oil etc.

### Chemical Resistance

GLV-UniSeal® T gasket is manufactured from high quality PVC with good resistance

against hydrous solutions and non-concentrated acids and alkalines. The silicone rubber RTV 1-02 sealing element has a good resistance against diluted alkalis, weak acids, water, hydrous and inorganic salts. It stays permanently elastic and has good aging and degrading resistance. The O-Ring-characteristic of the silicone bead ensures absolute tightness of a full elastomer gasket even at low sealing pressure.

GLV-UniSeal® GGr - The gasket is manufactured from epoxy resin bound glass roving fabric with good resistance against most chemicals, fuels, oils, water, hot water and steam.

### Exception

Exceptions are strong alkalines, acids and oxidizing agents. Expanded graphite has excellent sealing characteristics and almost unlimited chemical resistance, very good aging characteristics and is temperature resistant up to 500° C.

### Note:

A combination of maximum nominal diameter and maximum pressure rating is not possible.

Example: Nominal diameter 1000 mm and pressure rating PN100.

The flange isolation's inside diameter is slightly smaller than the inner diameter of the DIN flange. This helps preventing contact corrosion and improves electrical separation behavior.

## TECHNICAL DATA

	GLV-UniSeal® GGr	GLV-UniSeal® T
Nominal size ND	15 - 900 (ND 1000/1200)	
ANSI	1/2" - 40" (depending on pressure class, 44" only GLV-UniSeal® T)	
Pressure class PN	6, 10, 16, 25, 40, 63	6, 10, 16, 25, 40
Class	75, 150, 300, 400	75, 150, 300

Special dimension upon request / \* ND 1000/1200 up to max. PN16 only with GLV-UniSeal® T, larger dimensions upon request

Isolation material		GLV-UniSeal® GGr	GLV-UniSeal® T	
Retainer		Epoxy resin glass roving fabric	Polyvinylchlorid (PVC)	
Color		light green	white	
Mechan./electric Properties	Unit			Test method
Thickness	mm	4	4-6*	-
Density	g/cm <sup>3</sup>	1.9	1.4	DIN EN ISO 1183-1
Tensile strength	Mpa	220	55	DIN EN ISO 527-1
Impact strength 20 °C/180 °C	Mpa	500/350	130	DIN EN ISO 604
Flexural strength 80 °C/180 °C	Mpa	- /220	80/-	DIN EN ISO 178
Notched bar impact value	kJ/m <sup>2</sup>	50	6.3	DIN EN ISO 179
Operating temperature	°C	150	60	DIN/IEC 216/T1
Max. peak temperature	°C	180	80 / 1 hour	DIN 44904
Spec. volume resistance	Ω x cm	10ex16	10ex15	DIN/VDE 0303T30
Dielectric strength	kV/mm	13	27	IEC 243/DIN 53841
Water absorption (10 mm thickness)	mg / %	20	< 0.01	DIN EN ISO 62

\* Weitere Dicken 8, 16, 20 mm auf Anfrage

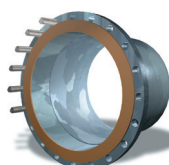
\*\* Bis DN250 = 4 mm, ab DN300 = 6 mm

Sealing-material	Unit	Expanded graphite (GLV GGr)	RTV 1 - 02-Silicon (GLV T)	Test method
Thickness	mm	1.5	2.0	-
Density	g/cm <sup>3</sup>	1.25	1.20	DIN E28090T2/DIN ISO 7619
Hardness	Shore A	-	55	DIN 53504S3D
Impact strength	MPa	> 45	-	DIN 52913
Compression	%	> 20	-	ASTM F36A
Resilience	%	> 12	-	ASTM F36A
Chlorite content	ppm	≤ 50	-	-
Ash content	%	≤ 2	-	DIN 51903
Surface pressure	MPa	20	-	-
max. surface pressure	MPa	120	-	-
max. sustained temperature	°C	+500	+60	-
Approvals	-	DVGW TA-Luft-Comformity	UBA ELL/W270	-

### Available versions:



**Gasket E (FF)**  
Gasket with bolt holes according to the flange standards (Full Face)



**Gasket F (IBC)**  
Gasket without bolt holes according to the flange standard (I.B.C.)

only: Scope of delivery only Flange gasket without washers or sleeves

DW: Scope of delivery flange gasket, per bolt one sleeve, two insulating discs, two washers

## TECHNICAL INFORMATION

### General physical LineBacker® data & max. temperature limits

ASTM	Test method	Plain Phenolic**	G-3 High temp. Phenolic**	G-7** Silicone/Glass**	G-10 Epoxy/Glass	G-11 Epoxy/Glass
D149	Dielectric Strength Volts/Mil. (Short Time)	500	550	350 - 400	550	550
D659	Compressive Strength (psi)	25.000	50.000	40.000	65.000	60.000
D229	Water Absorption (%)	1.6	0.7	0.07	0.04	0.07
D257	Isolating Resistance Meg Ohms	40.000	46.000	2.500	200.000	200.000
D790	Flexural Strength (psi)	40.000	46.000	2.500	65.000	62.000
D638	Tensile Strength (psi)	20.000	42.000	25.000	51.000	42.500
D732	Shear Strength (psi)	10.000	18.000	20.000	21.000	22.000
	Temperature Range Degrees C	-54 to +104 °C	-54 to +200 °C	Cryogenic up to +232 °C	Cryogenic up to +150 °C	Cryogenic up to +200 °C

\* on request

\*\* G-7 material should not be used with hydrocarbons

### Seal Element Temperature Limits

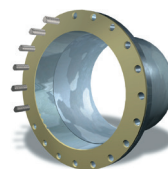
Nitrile	EPDM	Viton	Teflon
-40 up to +121 °C	-54 up to +149 °C	-29 up to +177 °C	Kryogen up to +232 °C

In order to determine a gasket's overall temperature range, temperature limits of both, retainer and sealing element, have to be considered.

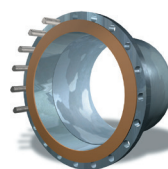
To order LineBacker® sealing/isolating gaskets please indicate the following:

1. Pipe Size
2. Pressure Rating up to class 600/PN 100 (ANSI, DIN, API)
3. of flange gasket (LineBacker®)
4. Retainer material
5. Sealing element version
6. Gasket ( E or F)
7. Flange (weld-neck, slip-on, RTJ, etc.)
8. Quantity
9. For pipe sizes greater than DN600 please contact PSI

Performance data and technical information provided herein is intended for guideline purposes only. Suitability of product configuration for specific applications must be determined by end-user.



Dichtung Typ E (FF)



Dichtung Typ F (IBC)

## TECHNICAL INFORMATION

### Suggested Flange Isolation Material Compatibility

Medium	Seal Retainer	Sealing Ring	Temperature Range ° C
Acetone	Phenol****	EPDM	0 to +27
Air	G-10	Nitrilee	-40 to +107
Ammonia dry	G-10	Teflon	-54 to +104
Ammonia (wet)***	G-10	Teflon	0 to +38
Bleach	G-10	Teflon	0 to +27
Butylene (Butadiene)	G-10	Teflon	0 to +38
Carbon dioxide	G-10	Nitrile	0 to +66
Caustic soda (NaOH)	Consult PSI Products GmbH		
Cryogenic	G-10	Teflon	-184 to +138
Ethanol	G-10	EPDM	0 to +38
Ethylene (Ethene)	G-10	Teflon	0 to +27
Fuel oil	G-10	Viton	-29 to +138
Natural gas	Phenol****	Nitrile	-40 to +104
Sour gas	G-10	Viton	-29 to +104
Petrol	G-10	Teflon	-54 to +107
Hydrogen	G-10	Nitrile	-40 to +121
Jet fuel	G-10	Viton	-29 to +107
LNG liquid gas	G-11	Teflon	-184 to +38
Mercaptane	G-10	Teflon	-29 to +27
Methanol	G-10	Teflon	0 to +38
Nitrogen	Phenol****	Nitrile	-40 to +104
Oil, crude	G-10	Viton	-29 to +138
Oxygen**	G-10	Teflon	-54 to +121
Pentane	G-10	Teflon	0 to +27
Propane	G-10	Nitrile oder Teflon	0 to +27
Propylene	G-10	Viton	0 to +27
Sewage	G-10	Viton	-29 to +138
Spent liquor	G-10	Teflon	0 to +38
Steam	Consult PSI Products GmbH		
Styrene	G-10	Teflon	0 to +27
Sulphur (molten)	G-10	Teflon	0 to +138
Toluene	G-10	Viton or Teflon	0 to +66
Water (hot)	G-10	EPDM	+79 to +138
Water (potable)	G-10	EPDM	0 to +138
Water (sea)	G-10	EPDM	0 to +138
White liquor	G-10	Teflon	+27 to +138

\* G-7 material should never be used with hydrocarbons

\*\* Organic materials that will feed a fire if a leak occurs and an ignition source is next to it.

\*\*\* Ammonia (wet) - Data up to +100 °F (+38 °C) only (same materials as dry).

\*\*\*\* On request

#### General Notes:

The above mentioned performance data is intended as guideline only. Performance suitability for any specific application should be determined by the end-user. Changes with regard to temperature, pressure, concentration or media composition, acting synergistically, may exclude the proposed media suitability above. Material selection is solely at the risk of the end-user. Consult a professional or PSI for specific applications. PSI's liability is limited to the liability listed inside the PSI standard warranties.

## TECHNICAL INFORMATION

### Metal Core

The core of each seal is made of hardened stainless steel (V4A/S316). Other metals such as duplex or Inconel are available upon request.

### Isolating Material Options

Test Method	G-10*	G-11*	G-10CR** (Cryogenic)
Compressive Strength (psi)	65.000	50.000	65.000
Dielectric Strength (VPM)	750-800	500	800
Max. Continuous Operating Temp.	150 °C	202 °C	130 °C
Min. Continuous Operating Temp.	-129 °C	-46 °C	-273 °C
Water Absorption (%)	0.05	0.085	0.085
Flexural Strength (psi)	65.000	57.700	57.700
Tensile strength (psi)	50.000	41.000	41.000
Bond Strength (lb.)	2.600	2.200	2.200
Shear Strength (lb.)	22.000	21.200	21.200

\* NEMA grade glass reinforced epoxy (GRE) laminate

\*\* Manufactured according to NIST G10CR for low temperature applications

### Sealing material

The sealing elements are intended to provide an impenetrable barrier through which no contained media or other substance can penetrate. Consequently, the composite retainer backing material behind the seal remains uncontaminated, thus permanently holding the seal in place in a static, fully encapsulated manner.

### Dichtungsmaterialoptionen

#### 1. Teflon (Spring-Energized) Standard

Recommended for all environments. Helical wound spring provides radial load. Encapsulation in the seal groove eliminates creep or cold flow. This sealing system truly distinguishes PSI Pikotek gaskets from all other flange sealing systems.

Temperature range: -157 °C to +200 °C (note: gasket material is a limiting factor)

#### 2. Viton

General purpose oilfield elastomer. Excellent resistance to aliphatic hydrocarbons, glycols and H<sub>2</sub>S. Good resistance to aromatic hydrocarbons. **Not recommended for:** systems with amine inhibitors and in pipeline systems containing significant partial pressures of polar gases (i.e. CO<sub>2</sub>) where radical pressure drops (i.e. 2000 PSI to 0 PSI) commonly occur.

Temperature range: -26 °C to +200 °C

#### 3. Buna-Nitrile

General purpose elastomer only suitable for low chemical resistance.

Temperature range: -129 °C to +116 °C

#### 4. Silikon

Suitable for use in potable water applications. Approved by WRAS.

Temperature range: -55 °C to +300 °C

Special sealing element materials are available upon request and subject to technical suitability.



## TECHNICAL INFORMATION

### Isolating Material Options

Test method	G-10* (Cryogenic)	G-11*
Compressive Strength (psi)	65.000	50.000
Dielectric Strength (VPM)	750-800	500
Max. Continuous Operating Temp.	150 °C	202 °C
Min. Continuous Operating Temp.	-129 °C	-46 °C
Water Absorption (%)	0.05	0.085
Flexural Strength (psi)	65.000	57.700
Tensile Strength (psi)	50.000	41.000
Bond Strength (lb.)	2.600	2.200
Shear Strength (lb.)	22.000	21.200

\* NEMA grade glass reinforced epoxy (GRE) laminate

### Diamond-Hyde™ HCS Washer System:

As part of the development of the VCFS gasket, we had to compensate the occurring bolt load loss during the burn process of the API 6FB fire test. Therefore we developed the new Diamond Hyde™ hardened coated steel washer system which meets these requirements.

#### Metal

- Grade 1050 steel
- Heat treated per ASTM F-436 specification
- Quenched and tempered for hardening

#### Coating

- The washer coating is a copyright protected development called Diamond Hyde™
- The coating consists of a corrosion resistant pre-treatment and several layers of modified PTFE synthetic resin coating with curing agents.
- The coating is overall strong and long-lasting with high dielectric and lubrication properties
- Dielectric of ~ 1000 Volts/mil
- Maximum working temperature of 250 °C
- Minimum working temperature -40 °C

#### \*Note:

The “FS” or “Fire Safe” designation denotes only that this gasket has successfully passed the API 6FB fire test. Due to the fact that every fire is unique and many uncontrolled variables are present, no other claims regarding suitability or performance in a fire are made. Each designer, user and/or operator will need to assess their individual situation when deciding to install FS style gaskets. Patent Pending.

## TECHNICAL INFORMATION

### Advantages

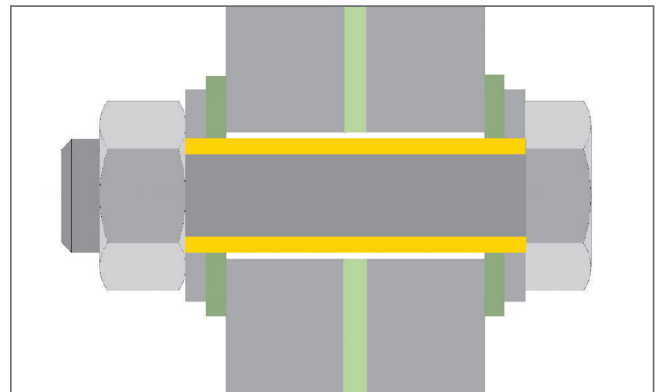
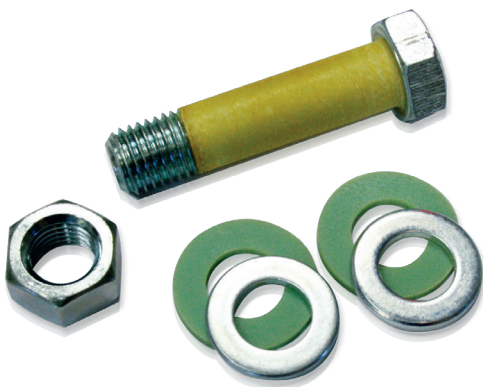
- Optimal electrical separation
- Extreme strength
- No increase of bolt diameter
- Ideal for on-site application

Use isolation bolts for flange isolations for applications up to 200 °C  
(isolation bolts for flange isolations for applications up to 290 °C upon request).

Bolts according to DIN 2510, special bolts upon request.

Bolt dimensions in line with DIN/ANSI flange requirements.

Bolt materials: Quality grade 5.6, 8.8 CK35, 42 CrMo4, UNC - special materials upon request.



### Isolation

Parameters		Test Method	Unit	Values
Material	Epoxy/Glass			
Color	white/yellow			
Glass threads	per cm			30
Breaking load in B state			N/cm	>2000
Breaking load after curing	min.		N/cm	>2500
Elasticity module			Mpa	approx. 50.000
Continuous operating temperature			°C	180
spec. volume resistance			Ω/cm	1x10 <sup>14</sup>
Isolation resistance when submersed in water		IEC168	Ohm	1x10 <sup>12</sup>
Water absorption		ISO 62/1	mg	<20

### Production:

The bolt is lathed off to the permitted diameter and covered with an epoxy resin glass fiber coating afterwards. Heat treatment hardens the epoxy glass fiber coating and adjusts it to the nominal dimension.

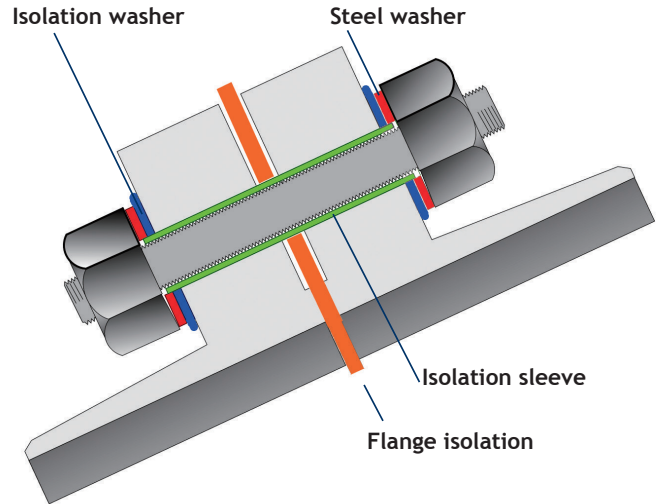


## ISOLATION SLEEVES

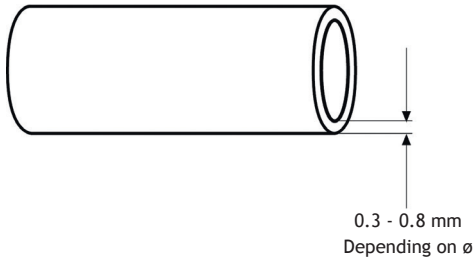
Isolation sleeves are available in the following materials:

- Mylar (standard version)
- Nomex 410
- G-10 (fiber glass composite laminate)

The isolation sleeves are designed for all flanges to be easily inserted into the bolt holes. PSI isolation sleeves have a wall thickness of 0.3 - 0.8 mm and are installed together with isolation and steel washers. They are available for standard American bolt sizes from 1/2" (12.7 mm) to 3 1/2" (88.9 mm) as well as metric bolt sizes from M12 to M52. Further sizes upon request



## INDIVIDUAL COMPONENTS



<b>Mylar</b>	Standard version for GLV-UniSeal® T and GGr	
Version:	Spiral wound polyester film	
Dielectric strength:	DIN/VDE 0303 T2/IEC 243	280.000 V/mm
Water absorption:	DIN 53495	<0.8%
Temperature range:	DIN VDE 0304 part 2	-60 °C to +130 °C
<b>Nomex 410</b>	special version: Aramid spiral wound paper	
Dielectric strength:	DIN/VDE 0303 T2/IEC 243	22.500 V/mm
Water absorption:	DIN 53495	<0.1%
Temperature range:	DIN VDE 0304 part 2	-196 °C to +220 °C
<b>G10 (only inch sizes)</b>	standard version for VCFS	
Version:	Glass silicone composite laminate	
Dielectric strength:	ASTM D149	15.700 V/mm
Water absorption:	ASTM D229	0.10%
Temperature range:	ASTM D229	-150 °C to +150 °C

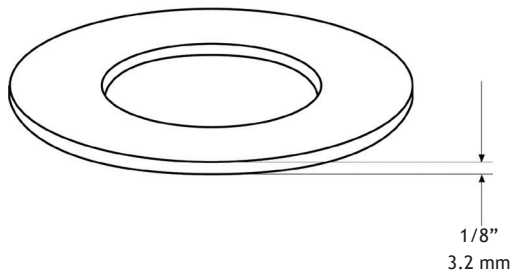
## ISOLATION WASHERS

Isolation washers are available in the following materials:

- G-10 (fiber glass composite laminate) (standard)
- G-7 (glass silicone composite laminate)
- HCS proprietary **Diamond-Hyde™** coating

PSI isolation washers have excellent isolation properties. The fit is designed so that the isolation sleeve can be inserted through the isolation washer. They are available for standard American bolt sizes from 1/2" (12.7 mm) to 3 1/2" (88.9 mm) as well as metric bolt sizes from M12 to M52. Further sizes upon request.

## INDIVIDUAL COMPONENTS



### Isolation washer G10

Version:	Glass silicone composite laminate	
Dielectric strength:	DIN/VDE 0303 part2/IEC 243	20.000 V/mm
Water absorption:	DIN 53495	< 1.0%
Temperature range:	DIN VDE 0304 part 2	-60 °C to +130 °C

### HCS

#### isolation washer

Version:	standard version for VCFS proprietary Diamond Hyde™ coating	
Dielectric strength:		39.400 V/mm
Temperature range:		-45 °C to +218 °C

### Isolation washer G7

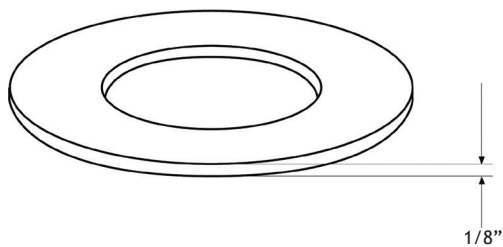
Version:	Special version: Glass silicone composite laminate	
Dielectric strength:	DIN/VDE 0303 T2/IEC 243	10.100 V/mm
Water absorption:	DIN 53495	< 0.13 %
Temperature range:	DIN VDE 0304 part 2	-60 °C to +180 °C

## STEEL WASHERS

Steel washers are designed in a way that the isolation sleeve can be inserted through them. Steel washers are available in the following materials:

- Hot-rolled steel ST 37, galvanized (standard version)
- Hot-rolled stainless steel S316/V4A (special version)

## INDIVIDUAL COMPONENTS



Thickness depending on nominal size ND 2-7 mm

### Steel washer

Standard version: Carbon steel hot rolled galvanized steel

### Steel washer

Special version: **S316 (V4A)**  
Hot rolled stainless steel

The ID of the steel washers corresponds to the OD of the isolation sleeves. Flange gaskets, sleeves and washers can be combined with each other according to temperature range.

### Standard isolation set DW

Isolation sleeve: Mylar  
Isolation washers: Laminated phenolic resin  
Washer: galvanized steel

### Special isolation set DW

Isolation sleeve: Mylar/Nomex  
Isolation washers: G10/G7  
Washer: galvanized steel S304/V2A