



# PACKINGS





# STEM AND SHAFT SEALS








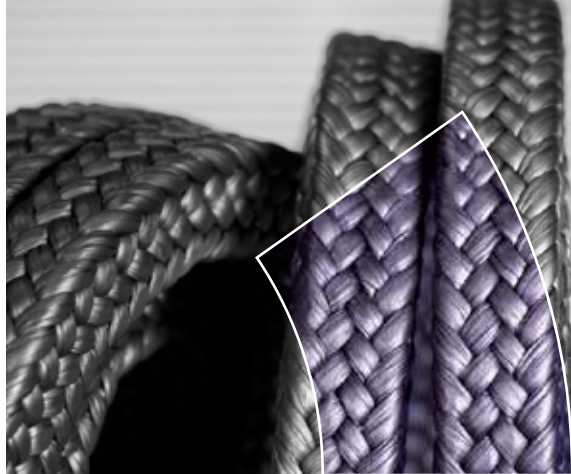
## STEM AND SHAFT SEALS



### BRAIDED PACKINGS

Code	Picture	Description																				
SPETOPAK® SGR® 804 W	 <table border="1"> <thead> <tr> <th></th> <th>⊖</th> <th>⊕</th> <th>⊕</th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-100 ÷ +550</td> </tr> <tr> <td>P. atm</td> <td>250</td> <td>-</td> <td>-</td> </tr> <tr> <td>V m/s</td> <td>2</td> <td>-</td> <td>-</td> </tr> <tr> <td>pH</td> <td colspan="3">0 ÷ 14</td> </tr> </tbody> </table>		⊖	⊕	⊕	t °C	-100 ÷ +550			P. atm	250	-	-	V m/s	2	-	-	pH	0 ÷ 14			<p>The hybrid packing made from the graphited synthetic yarn and flexible graphite, the inonel reinforced synthetic yarn braided in the corners prevents the packing from being extruded and reduces the abrasion of the elastic graphite; the <b>SPETOPAK® SGR® 804 W</b> packing is an alternative to the sealing sets, as both sealing and closing functions are performed by each separate ring of the packing; this style is preferred by the maintenance departments in refineries, petrochemical and power plants.</p>
	⊖	⊕	⊕																			
t °C	-100 ÷ +550																					
P. atm	250	-	-																			
V m/s	2	-	-																			
pH	0 ÷ 14																					
SPETOPAK® SGR® 880	 <table border="1"> <thead> <tr> <th></th> <th>⊖</th> <th>⊕</th> <th>⊕</th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-100 ÷ +550</td> </tr> <tr> <td>P. atm</td> <td>200</td> <td>100</td> <td>26</td> </tr> <tr> <td>V m/s</td> <td>1</td> <td>1.5</td> <td>26</td> </tr> <tr> <td>pH</td> <td colspan="3">0 ÷ 14</td> </tr> </tbody> </table>		⊖	⊕	⊕	t °C	-100 ÷ +550			P. atm	200	100	26	V m/s	1	1.5	26	pH	0 ÷ 14			<p>It is made of graphitized fibre synthetic yarn, containing high-quality lubricating and anti-adhesion mediums; impregnated right through while braided, and additionally, while drying and calibrating, surface-impregnated with a graphite layer. <b>SPETOPAK® SGR® 880</b> packing is resistant to temperature, good heat abstraction, to be applied individually or in WGR® stuffing-box sets. Appreciated in industry, used in both traditional and nuclear power engineering. Applied to both hot water and steam systems; either in high-speed heavy duty pumps.</p>
	⊖	⊕	⊕																			
t °C	-100 ÷ +550																					
P. atm	200	100	26																			
V m/s	1	1.5	26																			
pH	0 ÷ 14																					
SPETOPAK® SGR® 880 R	 <table border="1"> <thead> <tr> <th></th> <th>⊖</th> <th>⊕</th> <th>⊕</th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-100 ÷ +550</td> </tr> <tr> <td>P. atm</td> <td>300</td> <td>-</td> <td>-</td> </tr> <tr> <td>V m/s</td> <td>1</td> <td>-</td> <td>-</td> </tr> <tr> <td>pH</td> <td colspan="3">0 ÷ 14</td> </tr> </tbody> </table>		⊖	⊕	⊕	t °C	-100 ÷ +550			P. atm	300	-	-	V m/s	1	-	-	pH	0 ÷ 14			<p>The packing made from graphited synthetic yarn designed for the highest parameters encountered in the conventional power plants, refineries and power plants; ensures the smooth operation of the spindle and prevents the corrosion of the gland; <b>SPETOPAK® SGR® 880 R</b> does not show ageing processes; has corrosion inhibitor; reinforced with an inonel wire; applied both as the only ring in the gland and in the sealing sets as the anti-extrusion rings for flexible graphite.</p>
	⊖	⊕	⊕																			
t °C	-100 ÷ +550																					
P. atm	300	-	-																			
V m/s	1	-	-																			
pH	0 ÷ 14																					

# STEM AND SHAFT SEALS

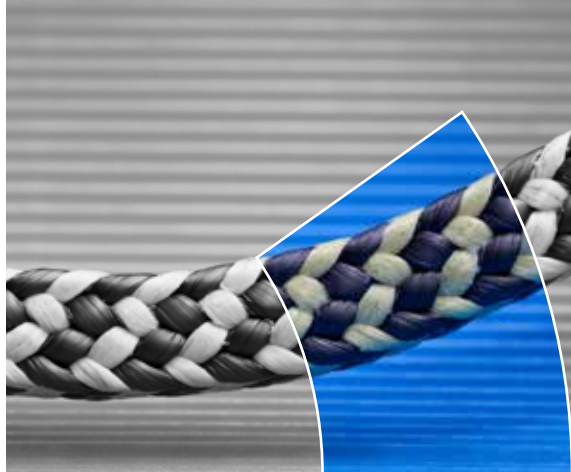


## BRAIDED PACKINGS

Code	Picture	Description																				
SPETOPAK® SGR® 800 R	<table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-100 ÷ +550</td> </tr> <tr> <td>P. atm</td> <td>200</td> <td>-</td> <td>-</td> </tr> <tr> <td>V m/s</td> <td>2</td> <td>-</td> <td>-</td> </tr> <tr> <td>pH</td> <td colspan="3">0 ÷ 14</td> </tr> </tbody> </table>					t °C	-100 ÷ +550			P. atm	200	-	-	V m/s	2	-	-	pH	0 ÷ 14			<p>Made of elastic graphite yarn, every fibre is reinforced with inconel wire braid, type <b>SGR® 800 R</b>. The <b>SGR® 800</b> type without inconel reinforcement, designed to pump applications. Reinforced heavy duty packing of high mechanical properties; resistant to high temperature, good heat abstraction, easy to shaping. Designed to be used in refineries, petrochemical industry, power engineering; to be used individually or as closing packing in <b>WGR®</b> high-temperature sets.</p>
t °C	-100 ÷ +550																					
P. atm	200	-	-																			
V m/s	2	-	-																			
pH	0 ÷ 14																					
SPETOPAK® SGR® 900 RR	<table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-100 ÷ +650</td> </tr> <tr> <td>P. atm</td> <td>300</td> <td>-</td> <td>-</td> </tr> <tr> <td>V m/s</td> <td>1</td> <td>-</td> <td>-</td> </tr> <tr> <td>pH</td> <td colspan="3">0 ÷ 14</td> </tr> </tbody> </table>					t °C	-100 ÷ +650			P. atm	300	-	-	V m/s	1	-	-	pH	0 ÷ 14			<p>Made of highest-quality expanded graphite yarn, every fibre is reinforced with a net of an inconel wire. It contains inhibitors of corrosion and oxidizing. Due to application of a fibre, reinforced with inconel braid, the packing demonstrates high mechanical properties and/or resistance to be blown out. Being impregnated, while braided, with high-temperature mediums containing corrosion and oxidizing inhibitors, it demonstrates good slide, anticorrosion, and anti-adhesion heavy-duty properties. It is designed to be used in the chemical industry, petrochemical industry, heat engineering, and/or power generation heavy duty installations, even in supercritical systems, to be applied individually or as closing packing in <b>WGR® 900 RR</b> sets.</p>
t °C	-100 ÷ +650																					
P. atm	300	-	-																			
V m/s	1	-	-																			
pH	0 ÷ 14																					
SPETOPAK® SPT® 554 S	<table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-100 ÷ +280</td> </tr> <tr> <td>P. atm</td> <td>150</td> <td>150</td> <td>15</td> </tr> <tr> <td>V m/s</td> <td>1</td> <td>2</td> <td>4</td> </tr> <tr> <td>pH</td> <td colspan="3">0 ÷ 14</td> </tr> </tbody> </table>					t °C	-100 ÷ +280			P. atm	150	150	15	V m/s	1	2	4	pH	0 ÷ 14			<p>The packing braided from PTFE yarn of the chemical resistance and physiological properties which allow it to be applied for practically all media encountered in the industry, except for molten alkali metal and some fluorinated compounds; applied in the valves in the chemical industry for the most aggressive media also in the high pressure; special styles: <b>SPT® 554 OX</b> for the contact with oxygen – the packing without any additional agents used for technological reasons, <b>SPT® 560 K</b> with aramid reinforcement in the corners – to be applied in high pressure plunger pumps.</p>
t °C	-100 ÷ +280																					
P. atm	150	150	15																			
V m/s	1	2	4																			
pH	0 ÷ 14																					

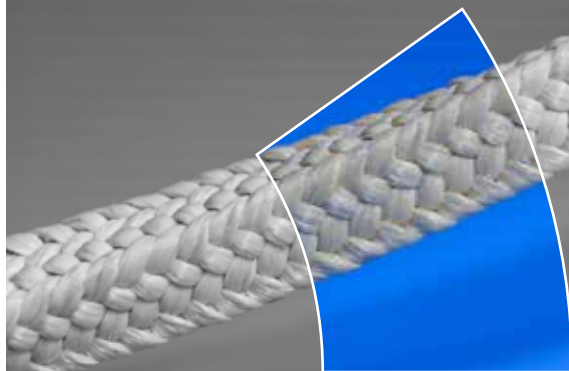
# STEM AND SHAFT SEALS

## BRAIDED PACKINGS





















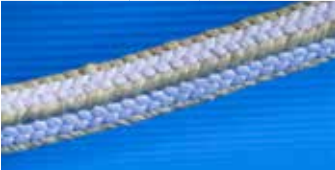































Code	Picture	Description																		
SPETOPAK® SGf 770		<p>Most popular ever used non-asbestos packing. Universal packing made from original 100% GFO® WL Gore fiber showing high stability, heat conductivity, easy to cut and install, chemically resistant (except for strongly oxidizing media). It can be applied in contact with potable water; applied first of all in rotating pumps, but also in plunger pumps and valves; special styles: SGF 770/G – with elastomeric core increasing the resistance to the shaft malfunctioning (shaft beating).; SGF 477 – made from 100% Gore G2 PTFE-fiber with incorporated fiber without lubricant. SGF 771 – made from 100% K-Fiber from WL Gore.</p>																		
			<table border="1"> <thead> <tr> <th></th> <th>⌊</th> <th>⌋</th> <th>⌋</th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-200 ÷ +280</td> </tr> <tr> <td>P. atm</td> <td>300</td> <td>200</td> <td>20</td> </tr> <tr> <td>V m/s</td> <td>2</td> <td>2</td> <td>20</td> </tr> <tr> <td>pH</td> <td colspan="3">0 ÷ 14</td> </tr> </tbody> </table>		⌊	⌋	⌋	t °C	-200 ÷ +280			P. atm	300	200	20	V m/s	2	2	20	pH
	⌊	⌋	⌋																	
t °C	-200 ÷ +280																			
P. atm	300	200	20																	
V m/s	2	2	20																	
pH	0 ÷ 14																			
SPETOPAK® SGf 772		<p>Universal packing made from expanded PTFE with incorporated graphite; economical alternative of SGF 770 style. Paraffin oil applied as the running-in lubricant, good chemical resistance (except for strongly oxidizing media), good sliding properties, resistance to ageing, good heat conductivity, applicable in rotating and plunger pumps as well as in the valves; special styles: SGF 772/G with elastomeric core increasing the shaft runout compensation; SGF 488 – made from PTFE-fiber with incorporated graphite without lubricant.</p>																		
			<table border="1"> <thead> <tr> <th></th> <th>⌊</th> <th>⌋</th> <th>⌋</th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-200 ÷ +280</td> </tr> <tr> <td>P. atm</td> <td>300</td> <td>200</td> <td>20</td> </tr> <tr> <td>V m/s</td> <td>2</td> <td>2</td> <td>20</td> </tr> <tr> <td>pH</td> <td colspan="3">0 ÷ 14</td> </tr> </tbody> </table>		⌊	⌋	⌋	t °C	-200 ÷ +280			P. atm	300	200	20	V m/s	2	2	20	pH
	⌊	⌋	⌋																	
t °C	-200 ÷ +280																			
P. atm	300	200	20																	
V m/s	2	2	20																	
pH	0 ÷ 14																			
SPETOPAK® SGf 766		<p>The hybrid packing composed of 'zebra' braided aramid and PTFE yarns with incorporated graphite; this solution increases the resistance of the packing to the wear but does not decrease the sliding properties; designed for pure liquids, contaminated with the solid particles, crystallizing media etc; customized styles: SFK 760K with the aramid reinforcement in the corners of the packing, SFK 760 K/G, SGF 766/ G – styles with elastomeric cores.</p>																		
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	⌊	⌋	⌋																	
t °C	-200 ÷ +280																			
P. atm	300	-	20																	
V m/s	2	-	20																	
pH	3 ÷ 12																			
SPETOPAK® SGF 760 K		<p>The hybrid packing composed from PTFE yarns with incorporated graphite and braided aramid fibers on corners. This solution make the packing resistance from being torn on corners and eventually extruded into stuffing box gaps; customized styles: SFK 760 K/G styles with elastomeric core.</p>																		
			<table border="1"> <thead> <tr> <th></th> <th>⌊</th> <th>⌋</th> <th>⌋</th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-200 ÷ +280</td> </tr> <tr> <td>P. atm</td> <td>300</td> <td>200</td> <td>-</td> </tr> <tr> <td>V m/s</td> <td>2</td> <td>2</td> <td>-</td> </tr> <tr> <td>pH</td> <td colspan="3">3 ÷ 12</td> </tr> </tbody> </table>		⌊	⌋	⌋	t °C	-200 ÷ +280			P. atm	300	200	-	V m/s	2	2	-	pH
	⌊	⌋	⌋																	
t °C	-200 ÷ +280																			
P. atm	300	200	-																	
V m/s	2	2	-																	
pH	3 ÷ 12																			
SPETOPAK® SGR® 800/ SGR® 800 C		<p>Packing made from expanded graphite; designed for the highest rotating speeds and pumping high temperature media, applied for example in power station feeding pumps; style 800 C is additionally equipped in special "temperature fuse" introduced into the core. This prevents the excessive rise of the temperature and stress in the contact area between the housing and the packing, thus enhances the safety of the pump's operation; the packing may be applied alone or in sets together with SGR 880.</p>																		
			<table border="1"> <thead> <tr> <th></th> <th>⌊</th> <th>⌋</th> <th>⌋</th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-200 ÷ +280/550*</td> </tr> <tr> <td>P. atm</td> <td>200*</td> <td>200*</td> <td>20</td> </tr> <tr> <td>V m/s</td> <td>1*</td> <td>1*</td> <td>26</td> </tr> <tr> <td>pH</td> <td colspan="3">0 ÷ 14</td> </tr> </tbody> </table>		⌊	⌋	⌋	t °C	-200 ÷ +280/550*			P. atm	200*	200*	20	V m/s	1*	1*	26	pH
	⌊	⌋	⌋																	
t °C	-200 ÷ +280/550*																			
P. atm	200*	200*	20																	
V m/s	1*	1*	26																	
pH	0 ÷ 14																			

# STEM AND SHAFT SEALS



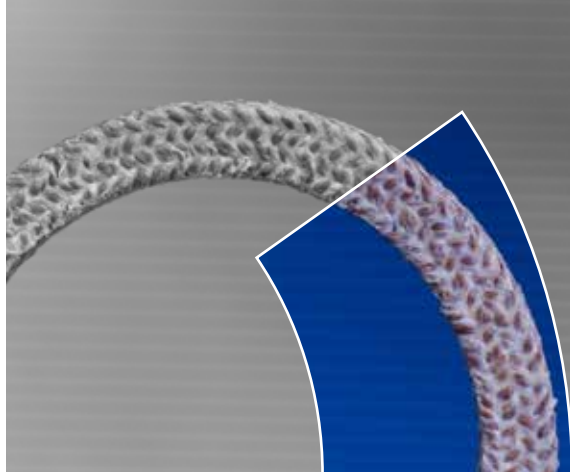
## BRAIDED PACKINGS

Code	Picture	Description																				
<b>SPETOPAK®</b> <b>SGR® 880</b>	 <table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-60 ÷ +550</td> </tr> <tr> <td>P. atm</td> <td>-</td> <td>100</td> <td>26</td> </tr> <tr> <td>V m/s</td> <td>-</td> <td>1,5</td> <td>26</td> </tr> <tr> <td>pH</td> <td colspan="3">2 ÷ 12</td> </tr> </tbody> </table>					t °C	-60 ÷ +550			P. atm	-	100	26	V m/s	-	1,5	26	pH	2 ÷ 12			<p>Pump packing for high rotating speeds made from graphitized fibres; SGR 880 the packing contains high temperature lubricating agents, which allow the service at high temperatures of the sealed medium; Another benefit is higher mechanical strength of graphitized fibers in compare to mechanical properties of graphite yarns used in common graphite packings; this increased mechanical properties of SGR 880 are used while applied as edged rings in the sets together with SGR 800 or SGR 800C, the most common application: hot water in power engineering.</p>
																						
t °C	-60 ÷ +550																					
P. atm	-	100	26																			
V m/s	-	1,5	26																			
pH	2 ÷ 12																					
<b>SPETOPAK®</b> <b>SPT 554</b>	 <table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-100 ÷ +280</td> </tr> <tr> <td>P. atm</td> <td>150</td> <td>150</td> <td>15</td> </tr> <tr> <td>V m/s</td> <td>1</td> <td>2</td> <td>8</td> </tr> <tr> <td>pH</td> <td colspan="3">0 ÷ 14</td> </tr> </tbody> </table>					t °C	-100 ÷ +280			P. atm	150	150	15	V m/s	1	2	8	pH	0 ÷ 14			<p>Pump packing made from PTFE yarn having the widest range of chemical resistance, physiological resistance, hygienic properties, widely applicable in the chemical and pharmaceutical industries, as well as in the production of paints and paper where the white colour is required; packing easily die-formed, but still of good mechanical properties, thus its application in plunger pumps; special styles: SPT 554/G with elastomeric core, SPT 565 with 'zebra' aramid fibers for abrasive media.</p>
																						
t °C	-100 ÷ +280																					
P. atm	150	150	15																			
V m/s	1	2	8																			
pH	0 ÷ 14																					
<b>SPETOPAK®</b> <b>SPT 560 K</b>	 <table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-200 ÷ +280</td> </tr> <tr> <td>P. atm</td> <td>500</td> <td>150</td> <td>-</td> </tr> <tr> <td>V m/s</td> <td>1</td> <td>2</td> <td>-</td> </tr> <tr> <td>pH</td> <td colspan="3">3 ÷ 12</td> </tr> </tbody> </table>					t °C	-200 ÷ +280			P. atm	500	150	-	V m/s	1	2	-	pH	3 ÷ 12			<p>The hybrid packing composed from PTFE yarns and braided aramid fibers on corners. This solution make the packing resistance from being torn on corners and eventually extruded into stuffing box gaps; customized styles: SFK 560 K/G styles with elastomeric core.</p>
																						
t °C	-200 ÷ +280																					
P. atm	500	150	-																			
V m/s	1	2	-																			
pH	3 ÷ 12																					
<b>SPETOPAK®</b> <b>Skd 660</b>	 <table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-100 ÷ +280</td> </tr> <tr> <td>P. atm</td> <td>100</td> <td>100</td> <td>100</td> </tr> <tr> <td>V m/s</td> <td>1,5</td> <td>10</td> <td>20</td> </tr> <tr> <td>pH</td> <td colspan="3">3 ÷ 12</td> </tr> </tbody> </table>					t °C	-100 ÷ +280			P. atm	100	100	100	V m/s	1,5	10	20	pH	3 ÷ 12			<p>High performance packing made from continuous aramid fiber with having best available resistance to abrasives included in pumped medium. Every single fiber is impregnated with PTFE. Also available 'dry-style' containing no PTFE impregnation (SKD 660S). Applicable in liquids contaminated with solid particles, cold water, static applications, also exposed to high pressures; May request good enough hardness of the stem, as soft metal stems may have lower resistance against being torn by abrasive compounds than SKD 660 by itself.</p>
																						
t °C	-100 ÷ +280																					
P. atm	100	100	100																			
V m/s	1,5	10	20																			
pH	3 ÷ 12																					
<b>SPETOPAK®</b> <b>Skd 664</b> <b>and Skd 667</b>	 <table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-100 ÷ +280</td> </tr> <tr> <td>P. atm</td> <td>100</td> <td>100</td> <td>100</td> </tr> <tr> <td>V m/s</td> <td>1,5</td> <td>10</td> <td>20</td> </tr> <tr> <td>pH</td> <td colspan="3">3 ÷ 12</td> </tr> </tbody> </table>					t °C	-100 ÷ +280			P. atm	100	100	100	V m/s	1,5	10	20	pH	3 ÷ 12			<p>SKD 664 and SKD 667 –universal packings from aramid yarn with a surface capable of absorbing high quantity of PTFE impregnation (SKD 664) or graphite impregnation (SKD 667); due to the high volume of impregnation, in spite of very good mechanical properties the wear of the shaft is reduced to minimum; applicable in liquids contaminated with solid particles, cold water, static applications, also exposed to high pressures; special styles: SKD 667R with inconel reinforcement for static application in the high load connections.</p>
																						
t °C	-100 ÷ +280																					
P. atm	100	100	100																			
V m/s	1,5	10	20																			
pH	3 ÷ 12																					



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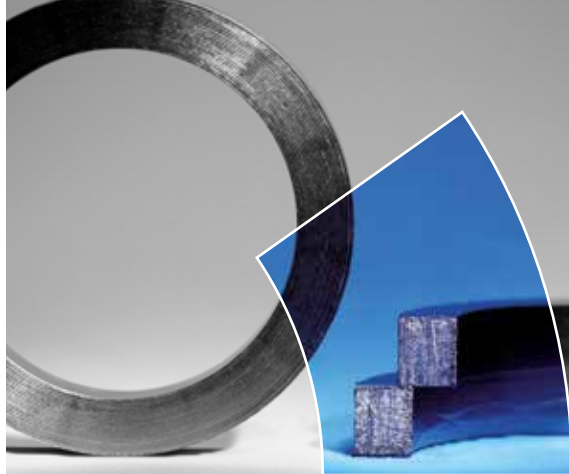
## BRAIDED PACKINGS



Code	Picture	Description																				
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		t °C	-50 ÷ +250																			
		P. atm	300	150	15																	
		V m/s	2	2	20																	
pH	0 ÷ 13																					
SPETOPAK® STR 676	<table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-50 ÷ +250</td> </tr> <tr> <td>P. atm</td> <td>300</td> <td>150</td> <td>15</td> </tr> <tr> <td>V m/s</td> <td>2</td> <td>2</td> <td>20</td> </tr> <tr> <td>pH</td> <td colspan="3">3 ÷ 12</td> </tr> </tbody> </table>					t °C	-50 ÷ +250			P. atm	300	150	15	V m/s	2	2	20	pH	3 ÷ 12			<p>Hybrid version of STR 676 the hygienic and lubrication properties are improved and resistance to abrasion increased by usage of continuous aramide fibers having the top available resistance against abrasives.</p>
		t °C	-50 ÷ +250																			
		P. atm	300	150	15																	
		V m/s	2	2	20																	
pH	3 ÷ 12																					
SPETOPAK® SFK 250	<table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-80 ÷ +280</td> </tr> <tr> <td>P. atm</td> <td>150</td> <td>150</td> <td>10</td> </tr> <tr> <td>V m/s</td> <td>2</td> <td>2</td> <td>10</td> </tr> <tr> <td>pH</td> <td colspan="3">0 ÷ 13</td> </tr> </tbody> </table>					t °C	-80 ÷ +280			P. atm	150	150	10	V m/s	2	2	10	pH	0 ÷ 13			<p>Packing from the special synthetic yarn of good sliding and ageing properties, high chemical and temperature resistance; easy to fit which makes it possible to apply SFK 250 in the relatively old, worn out pump, easy to cut, die-form, good resistance to abrasion and extrusion; also applicable in the valves as the valve version: SFK 250S.</p>
		t °C	-80 ÷ +280																			
		P. atm	150	150	10																	
		V m/s	2	2	10																	
pH	0 ÷ 13																					
SPETOPAK® SN 344	<table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>t °C</td> <td colspan="3">-100 ÷ +550</td> </tr> <tr> <td>P. atm</td> <td>200</td> <td>200</td> <td>–</td> </tr> <tr> <td>V m/s</td> <td>1</td> <td>1</td> <td>–</td> </tr> <tr> <td>pH</td> <td colspan="3">0 ÷ 14</td> </tr> </tbody> </table>					t °C	-100 ÷ +550			P. atm	200	200	–	V m/s	1	1	–	pH	0 ÷ 14			<p>Packing for general services in the pump and gland compensator applications; economical alternative to asbestos in the simplest applications, usage of acrylic yarn shows good resistance to ageing and satisfactory lubricating properties. Standard lubricant is paraffin oil; Customized styles: SN 330 with silicone oil as lubricant; SN 344 R with usage of ramia fibres.</p>
		t °C	-100 ÷ +550																			
		P. atm	200	200	–																	
		V m/s	1	1	–																	
pH	0 ÷ 14																					



## STEM AND SHAFT SEALS




### GRAPHITE RINGS

Code	Sketch	Description
<b>Grafmet® 950</b>		<p>This is a basic form the rings to seal up stems of fittings are made by moulding a graphite foil up to required density (see the table), usually within 1.3÷1.7 g/cm<sup>3</sup> (standard density: 1.4g/cm<sup>3</sup>). The cross-section of the <b>GRAFMET® 950</b> ring is usually a square, however a rectangular cross-section is also available. <b>GRAFMET® 950</b> has a high ratio K of transformation of axial stress forces into radial stress forces (0.8÷0.9, depending on its density). They are made of various types of graphite foil – see the table. As a standard, if no other designation is provided, rings are made of <b>SIGRAFLEX® C</b> foil. When other types of foil are used, it is designated adequately, for instance: <b>GRAFMET® 950 TF</b>, etc. <b>GRAFMET® 950</b> can be used individually (new fittings with stems of rather small diameters, systems of rather low pressure) or in sets (see: valve stuffing-box sets) as main rings responsible for sealing. It is also a component of special packing sets.</p>
<b>Grafmet® 950 I</b>		<p>Its construction form has an appearance nearing to <b>GRAFMET® 950</b>, but it is strengthened with an internal reinforcement of 316L grade steel. The reinforcement is designed to improve mechanical extrusion resistance. Usually it is made of <b>SIGRAFLEX® C</b> graphite foil. Its principal application is to work as a closing rings (top or bottom ring) in a sealing packet (e.g. <b>SPETOPAK® WGR 951/950</b>). Its function is to prevent extrusion of the proper sealing material into gaps around a gland and/or in the bottom of a stuffing-box.</p> <p>The <b>GRAFMET® 950 I</b> ring can be used as a distance piece in a long stuffing-box (see: <b>GRAFMET® HD</b>). Also other materials (e.g. nickel foil) can be used as a reinforcement in special products, and the rings can be made of other types of the <b>SIGRAFLEX®</b> foil.</p>

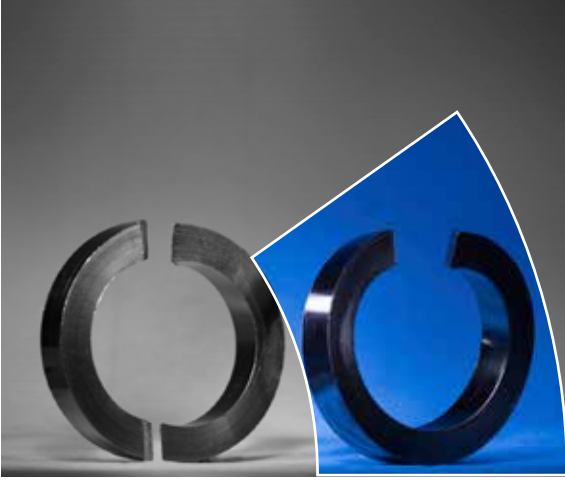
 braided packing

 pure graphite ring

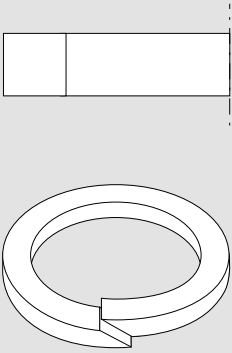
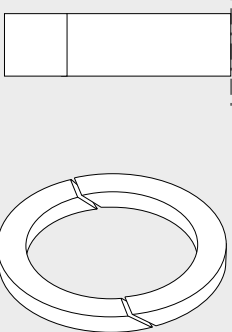
 packing with internal metal reinforcement

 other materials

## STEM AND SHAFT SEALS

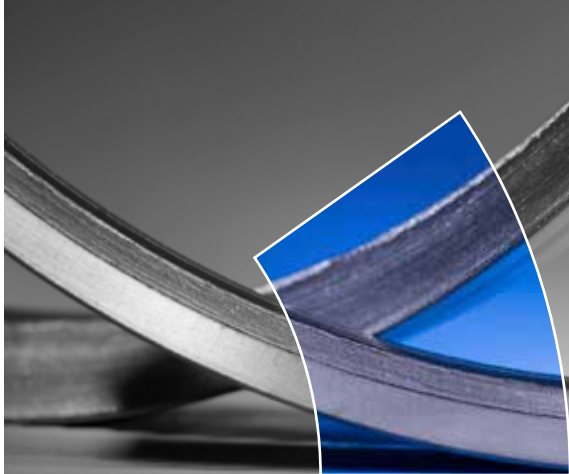


### GRAPHITE RINGS

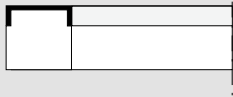
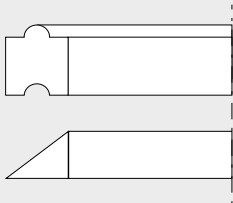
Code	Sketch	Description
<b>Grafmet® 950</b>		<p>This is a basic form the rings to seal up stems of fittings are made by moulding a graphite foil up to required density (see the table), usually within 1.3÷1.7 g/cm<sup>3</sup> (standard density: 1.4g/cm<sup>3</sup>). The cross-section of the <b>GRAFMET® 950</b> ring is usually a square, however a rectangular cross-section is also available. <b>GRAFMET® 950</b> has a high ratio K of transformation of axial stress forces into radial stress forces (0.8÷0.9, depending on its density). They are made of various types of graphite foil – see the table. As a standard, if no other designation is provided, rings are made of <b>SIGRAFLEX® C</b> foil. When other types of foil are used, it is designated adequately, for instance: <b>GRAFMET® 950 TF</b>, etc. <b>GRAFMET® 950</b> can be used individually (new fittings with stems of rather small diameters, systems of rather low pressure) or in sets (see: valve stuffing-box sets) as main rings responsible for sealing. It is also a component of special packing sets.</p>
<b>Grafmet® 950 PP</b>		<p>The rings are conformable, in their essence, with descriptions of construction forms of the <b>GRAFMET® 950</b> and <b>GRAFMET® 950 I</b> respectively. Their differences to the above consist in two cuts in their circumferences facilitating assembly operations. Unlike the rings with one cut, the piece with two cuts is not deformed during assembly. Hence, the ring of even very small diameter and considerable width can be used without risk of damage is sealing functions. Of course, correct installation requires accuracy and compliance to the rule that a cut in every layer is turned by 90° to the other one.</p> <p>Particularly such a construction is required for rings relatively stiff (due to high density) or inserted with a metal foil. In such situations two cuts provide real facility in assembly.</p>



## STEM AND SHAFT SEALS

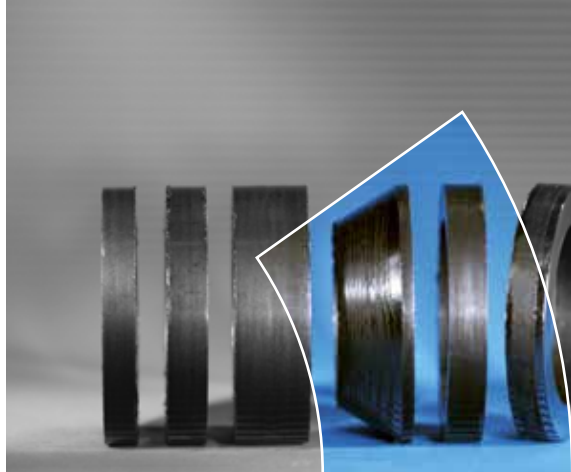


### GRAPHITE RINGS

Code	Sketch	Description
<b>Grafmet® 952 HTX (upper ring)</b>		<p>The ring of such a form is designed to protect against squeezing (flowing) of the sealing material (graphite) into gaps existing on place of its application. Another function is to minimize access of oxygen to graphite. The ring can be used individually in static applications as sealing of a cylindrical surfaces, and/or as an upper/lower ring in a packet sealing a stuffing-box. In such a case, forged material of low tacking to the stem material is recommended (see also: <a href="#">WGR 952/950</a>), as for instance nickel.</p> <p>Applying to systems of high pressure, density of graphite is recommended to be selected according to the working pressure (see the table), the standard density of the product is 1.6g/cm<sup>3</sup> and the product itself is made of <a href="#">SIGRAFLEX® C</a> foil. In case of power system applications, <a href="#">SIGRAFLEX® P</a> foil is recommended (designation is: <a href="#">GRAFMET® 952 HTX</a>).</p>
<b>Grafmet® Profil#...</b>		<p>The rings <a href="#">GRAFMET® Profil#...</a> with respective description are use in, according to an individual design, machine, fittings, and/or pump construction.</p> <p>Their use is related to simplification of their structures by implementation of special sealing profiles. It allows, for instance, to reduce the number of components, to decrease a joint outline by separation three rooms (areas) with one seal, to reduce void pockets, to facilitate assembly operations. Parameters that can be assorted by <a href="#">SPETECH®</a> while manufacture of <a href="#">GRAFMET® Profil#...</a> profiled rings, are: geometry, density (density distribution), stiffness/hardness, split or not split, etc. Adjustments are made directly with the constructor of the equipment. Sealing of diameters up to 2000mm are available, density from 1.1g/cm<sup>3</sup> up to 1.7g/cm<sup>3</sup>.</p> <p>The above solutions can contain metal pieces pressed in, and can be an integral part of a constructure, and not only a sealing.</p>



## STEM AND SHAFT SEALS




### STUFFING BOX SETS

Code	Sketch	Description
<b>SPETOPAK®</b> <b>WGR-TA1</b>  <b>SPETOPAK®</b> <b>WGR-TA2</b>  <b>SPETOPAK®</b> <b>WGR-TA3</b>		<p>The certified sealing set of leak tightness: <math>3,2 \cdot 10^{-3}</math> mbar-l/(s·m) according to VDI 2440 in compliance with requirements of the German Clean Air Act TA-Luft. Tightness is certified for operation in a temperature of equal and above 250°C. The set is made of expanded graphite, hence its high resistance to relaxation. The <b>SPETOPAK® WGR-TA1</b> sealing set is distinguished by its lowest, of all known products, assembly pressure of 40N/mm<sup>2</sup>. The reinforced closing rings allow operation of the set in highest pressure systems (up to 300bar). When operation in a very high temperature is planned, consultation about the reinforcing material is recommended and use of an unstandard reinforcing material can be required.</p> <p>The set consists of 6 profiled rings, each of them has a different function, therefore the condition for effective operation is to use a complete packet.</p> <p>The effect of highest tightness is achieved due to special profiles of the rings and suitably selected density of respected items of the packet.</p> <p>Please note that SPETECH others sets of TA-Luft packing sets are soon to be certified (e.g. <b>SPETOPAK® WGR-TA2</b> and <b>SPETOPAK WGR-TA3</b>).</p>
<b>SPETOPAK®</b> <b>WGR-TA</b> <b>8515</b>  <b>SPETOPAK®</b> <b>WGR-TA</b> <b>8535</b>  <b>SPETOPAK®</b> <b>WGR-TA</b> <b>8530</b>		<p><b>SPETOPAK® WGR-TA 8515</b> is a sealing set of tightness in accordance to VDI 2440 (<math>5,6 \cdot 10^{-5}</math> mbar-l/(s·m) as required by the German Clean Air Act TA-Luft for temperatures lower than 250°C. It is made of multi-filament yarn consisting of carbon fiber and PTFE film. It is available both as a cord on a spool and/or complete packet. When a cord is concerned, it must be taken into account that achievement of required degree of leak tightness in compliance with the TA-Luft regulation requires the ring has to be prepared according to description contained in the certification report.</p> <p>Also in this case, intending to achieve required effects of leak tightness, a full packet should be used observing requirements regarding method of assembly (assembly stresses, setting up rings) and condition of the fittings (e.g. roughness of a stem surface).</p> <p>Please note that SPETECH others sets of TA-Luft packing sets are soon to be certified (e.g. <b>SPETOPAK® WGR-TA 8535</b> and <b>SPETOPAK WGR-TA 8530</b>). For most updated list of 'Clean Air Act' complied packings, as well as packings sets acc. to API of Fire Safety Tests please contact SPETECH.</p>

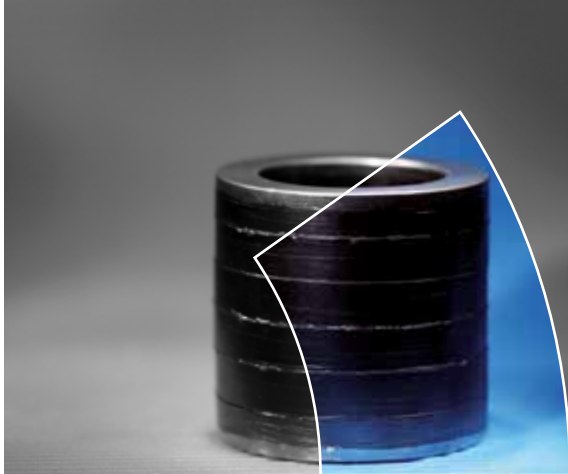
 braided packing

 pure graphite ring

 packing with internal metal reinforcement

 other materials

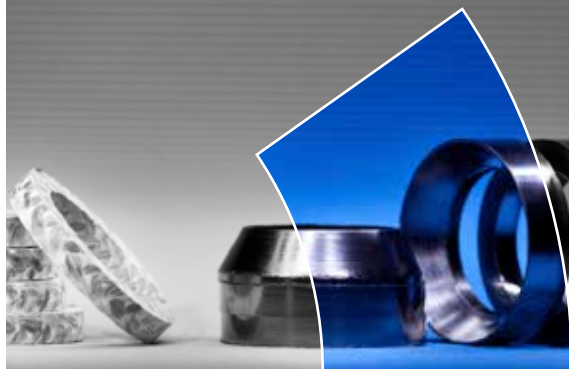
## STEM AND SHAFT SEALS



### STUFFING BOX SETS

Code	Sketch	Description
SPETOPAK® WGR 952/950 HTX		<p>The <b>SPETOPAK® WGR 952/950 HTX</b> sealing set consists of two types of rings: closing rings (on top and bottom) reinforced with steel members, and the appropriate sealing rings placed in a middle of the packet height. The rings are made of the <b>SIGRAFLEX® P</b> foil providing the highest, as achieved today, resistance to oxidation.</p> <p>Due to the treatment, i.e. implementation of a special construction form and the special material, <b>SIGRAFLEX® P</b>, the packet can be applied to systems of highest pressure (depending on the structure of the sealing joint: 630bar) and temperature up to 700°C.</p> <p>If the temperature is to be higher than 450°C, you are kindly requested to contact us to select the best metal material.</p>
SPETOPAK® WGR 900 RR/950		<p>The <b>SPETOPAK® WGR 900 RR/950</b> sealing set is designed to be used in high-pressure fittings, in systems of up to 300 bar pressure and 650°C temperature. The packet consists of closing rings made of <b>SPETOPAK® 900 RR</b> packing with special braided Inconel® reinforcement and graphite of increased resistance to oxidation owing to special inhibitors. The <b>Grafmet® 950</b> sealing rings can also be made of graphite of increased oxidation resistance of the foil: <b>Sigraflex® E</b>, <b>Sigraflex® APX</b>, or <b>Sigraflex® P</b>. In such a case there are products designated: <b>WGR 900 RR/950 E</b>, <b>WGR 900 RR/950 APX</b>, and/or <b>WGR 900 RR/950 HTX</b> respectively.</p> <p>Advantage of the packet is its capacity to be installed on fittings without removal of a drive (in such a case <b>WGR 900 RR/900 P</b> has to be used).</p>
SPETOPAK® WGR 950 I/950		<p><b>SPETOPAK® WGR 950 I/950</b> sealing is a packet designed to be used, first of all, by fittings manufacturers. It is highly economical solution regarding its delivery cost, but must be installed on fittings without the drive. However, this restriction can be avoided using <b>GRAFMET® WGR/950 IP/950 P</b>. It is designed to be used on fittings in systems of up to 300bar and/or 550°C (then the <b>WGR 950 I/950 HTX</b> product is recommended). The packet can be made of various types of graphite foil, that provides capacity to be used in a very wide range of applications. Main applications are: cut-off valves for power industry, petrochemistry, refineries, heat engineering.</p> <p>Application to industrial purposes requires proper selection of packet density that has an effect on leak tightness (the higher density the better tightness) and/or on facility in assembly (the lower density the easier assembly).</p>

## STEM AND SHAFT SEALS




### STUFFING BOX SETS

Code	Sketch	Description
<b>SPETOPAK®</b> <b>WGR</b> <b>880 R/950</b>		<p>The <b>SPETOPAK® WGR 880 R/950</b> set is used most widely as a repair packet (also as a <b>WGR 880 R/950 P</b> product) in power industry, petrochemistry, refineries, and/or heat engineering. The graphitized fibre, that the closing rings are made of (reinforced additionally with Inconel® wire), is highly suitable when installed on fittings with wide gaps in stuffing boxes and/or on stems that have lost their nominal roughness, because the graphitized fibre has very good mechanical properties making squeezing of the product into gaps practically impossible. Inconel® is used to provide durable mechanical qualities of the reinforcement in very high temperature, and to make sticking of the product to a stem surface practically impossible. Maximal parameters of the product operation depend, of course, on a structure and technical condition of fittings the product is applied to. If there are new fittings, parameters of 300bar and/ or 550°C are quite possible.</p>
<b>SPETOPAK®</b> <b>WGR 554</b>		<p>The <b>SPETOPAK® WGR 554</b> sealing packet is designed for fittings of various applications and/or metering plunger pumps. The only restriction is the maximal temperature 280°C.</p> <p>The packet is made of braided packing of PTFE yarn, modified according to the purpose. The product in its basic form (designation <b>S</b>) is impregnated with fine-grained teflon without any lubricant, having the best chemical and/or ageing resistance.</p> <p>In case of more dynamic applications, where addition of lubricant is allowed, impregnation contains paraffin oil (designation <b>WGR 554</b>). The packet in this version has a high wear resistance. It can be also applied to fittings in oxygen systems (designation <b>WGR 554 OX</b>) with pressure up to 150bar.</p>

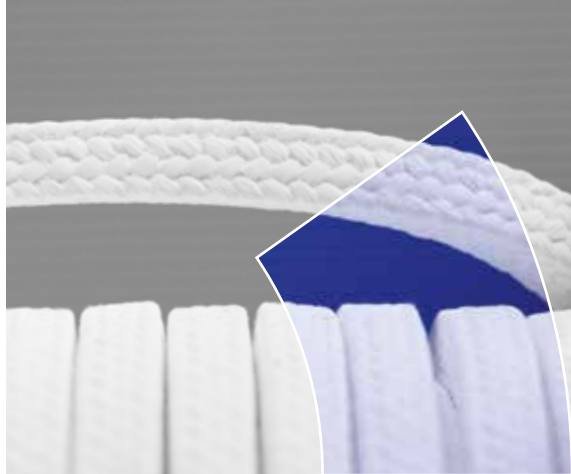
 braided packing

 pure graphite ring

 packing with internal metal reinforcement

 other materials

## STEM AND SHAFT SEALS

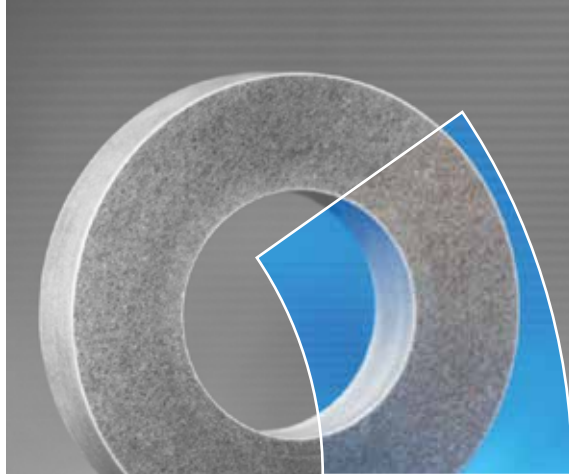


### STUFFING BOX SETS



Code	Sketch	Description
<b>SPETOPAK®</b> <b>WGR</b> <b>554/160</b>		<p>The <b>SPETOPAK® WGR 554/160</b> packet is designed to be used in plunger pumps, principally pumps batching various chemicals. The product is used mostly because of its high stiffness and resistance to squeezing. Moreover, interlayers of filled PTFE has high thermal conductivity. Depending on operating conditions, chemical compatibility with the medium to be sealed, and/or durability expectation, stiffening rings can be made either of synthetic carbon (<b>WGR 554/carbon</b>) or PEEK material (<b>WGR 554/PEEK</b>), or highly-compacted rings of expanded graphite can be applied to a respective purpose (<b>WGR 554/950HD</b>). In some specific cases, the stiffening rings are made of brass and/or bronze.</p>
<b>SPETOPAK®</b> <b>WGR</b> <b>Special#...</b>		<p>The <b>SPETOPAK® WGR SPECIAL#...</b> sealing packets can be designed according to expected critical loads. Selection of a suitable form, and material and/or dynamic structural features can provide optimal resistance to abrasion/hydraulic impacts/temperature changes, leak-proofness, minimal friction, etc.</p> <p>There are various criteria of optimization depending on planned application (cut-off valves, control valves, size of a stem, plunger pump, etc.).</p> <p><b>SPETOPAK® WGR SPECIAL#...</b> might be equipped also in additional special components like: anti-extrusive rings, V-shape rings, O-rings, GRAFMET® rings, injectable compounds, machined metal rings, etc.,</p>



## STEM AND SHAFT SEALS




### DISTANCE BUSH

Code	Sketch	Description
SPETOTERM® TUI 820		<p>The <b>SPETOTERM® TUI 820</b> distance rings are made of mica composite material of admissible operating temperature up to 650°C.</p> <p>The material is almost absolutely chemically resistant, having good sliding properties (low friction factor, no sticking to steel), and high ageing resistance.</p> <p><b>SPETOTERM® TUI 820</b> rings are used as distance rings in long stuffing-boxes, sometimes being also used as guides for stems. They can be used as closing rings (under gland) in special sets, as well.</p> <p>Due to high temperature resistance, the material is implemented to sealing engineering. Rings are produced according to respective requirements, to customized requirement only.</p>
Grafmet® 950 HD		<p>The <b>GRAFMET® 950 HD</b> rings are made of expanded graphite, compacted to 1,7g/cm<sup>3</sup> density. They can be made also with internal reinforcement of a steel foil 0.1 mm, ANSI 316.</p> <p>The rings are used as distance rings installed at bottoms of stuffing-boxes, and/or as a component of <b>WGR Special</b> high-pressure sets.</p> <p>Their advantage is almost complete chemical resistance and/or resistance to highest temperatures used in power engineering. The rings as guiding-distance rings at bottoms of stuffing boxes can be applied to a temperature up to 650°C. They are particularly usable when shortening stuffing-boxes of old fittings, constructed to be used with asbestos packing previously.</p>

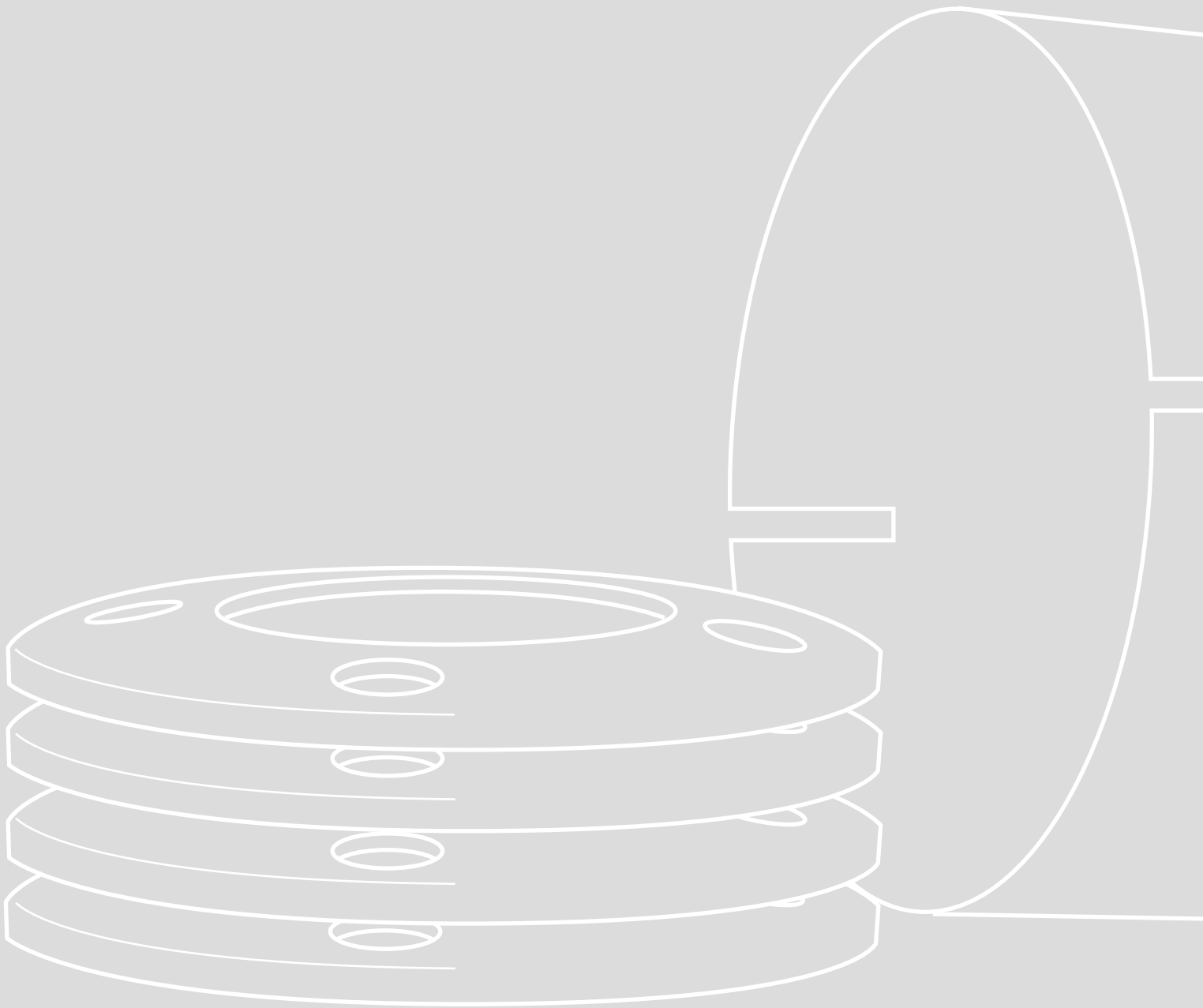
 braided packing

 pure graphite ring

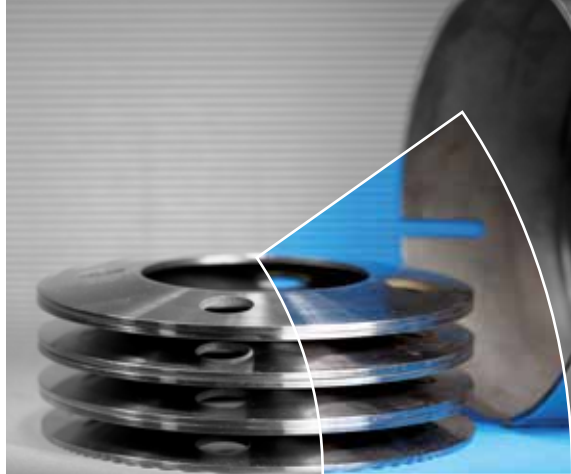
 packing with internal metal reinforcement

 other materials

# GENERAL INFORMATION

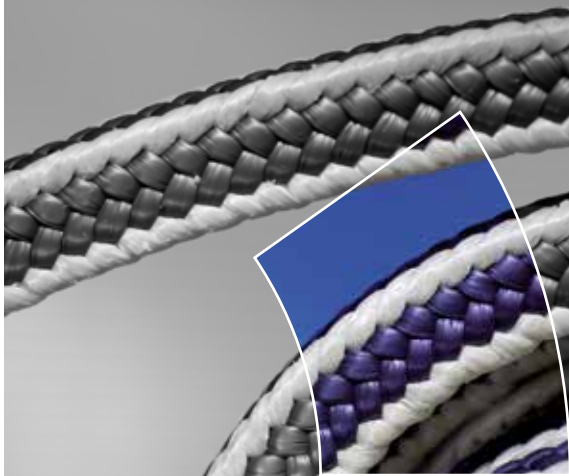


## GENERAL INFORMATION



## ACCESSORIES

Code	Sketch	Description
<b>PACKING CUTTER 45</b>		<p>The tool designed to precise cutting of stuffing-box rings made of spliced cord. The tool provides proper cutting of sealing ends, so while putting them together the cord can be properly joined. Regarding sealing for fittings, recommended angle of cutting is 45°.</p>
<b>EXTRACTOR BOX</b>		<p>The set of tools for fitters and/or maintenance service. The set contains tools to remove worn packing, matched to various sizes of sealing, as well as flexible connectors with replaceable ends, extractors.</p>
<b>SPETECH® LL</b>		<p>SPETECH manufactures and delivers systems of pull and control of wear degree of packing, so called the Live-Loading (<b>SPETECH® LL</b>) system. They are used to compensate and identify packing wear, for compensation of relaxation of both stuffing-box sealing and screws, and owing to a tension indicator built in the device they facilitate assembly operations. SPETECH® implements LL systems also into the existing fittings that have not been constructed with intention to use LL systems. Intending to solve such a case, SPETECH® has worked up and implemented disk springs of a special type, having holes for stuffing-box screws.</p> <p>Generally, <b>SPETECH® LL</b> systems can be used as centralized systems (on a mandrel) or as uncentral systems (on screws). Materials of springs allow to use the systems in a temperature up to 650°C.</p>



## GENERAL INFORMATION

The SPETECH company uses, to manufacture GRAFMET® pre-formed graphite rings, only the highest-quality graphite foils made by SGL Carbon Group. This company, famous for development of graphite sealing, is at the present time the greatest and highly respectable supplier of graphite semi-products to manufacture various types of sealing. In particular, the types of foil, as specified beneath, are highly applicable to production of GRAFMET® rings.

### Conversion table of packing kilograms (weight) into linear meters (length)

Packing		4	5	6	7	8	10	12	14	16	18	20	22	25
SGF 770	[m/kg]	42,0	27,0	16,0	14,0	10,5	6,8	4,7	3,5	2,7	2	1,7	1,4	1,1
SGF 772	[m/kg]	42,0	27,0	16,0	14,0	10,5	6,8	4,7	3,5	2,7	2	1,7	1,4	1,1
SGF 766	[m/kg]	46,0	28,7	20,0	14,7	11,0	7,0	5,0	3,6	3,1	2,3	1,8	1,5	1,2
SGF 760K	[m/kg]	42,0	27,0	19,0	14,0	11,0	6,8	4,7	3,5	2,7	2,0	1,7	1,4	1,1
STR 666	[m/kg]	44,5	28,3	19,6	14,3	11,0	7,0	4,8	3,5	2,7	2,1	1,8	1,4	1,1
STR 676	[m/kg]	51,9	35,0	23,3	17,3	13,3	8,4	5,5	4,3	3,7	2,6	2,3	1,8	1,4
SPT 554S	[m/kg]	35,0	22,0	16,0	13,0	9,4	5,6	3,9	2,9	2,2	1,7	1,4	1,2	0,9
SPT 554OX	[m/kg]	35,0	22,0	16,0	13,0	9,4	5,6	3,9	2,9	2,2	1,7	1,4	1,2	0,9
SPT 554	[m/kg]	43,6	28,0	18,0	14,0	11,0	6,0	4,8	3,5	2,7	2,1	1,7	1,4	1,1
SPT 560K	[m/kg]	43,6	28,0	19,0	14,0	11,0	6,9	4,8	3,5	2,7	2,1	1,7	1,4	1,1
SKD 660	[m/kg]	43,0	29,0	19,0	13,5	11,0	7,0	4,8	3,5	2,7	2,1	1,8	1,4	1,1
SKD 664	[m/kg]	43,0	29,0	19,0	14,0	11,0	7,0	5,4	3,5	2,7	2,1	2,0	1,7	1,2
SKD 667	[m/kg]	52,0	35,0	23,5	17,4	13,5	8,4	5,8	4,3	3,5	2,6	2,2	1,8	1,4
SGR 900 RR	[m/kg]	52,0	34,0	23,0	17,0	13,0	8,3	5,3	4,2	3,2	2,5	2,1	1,7	1,3
SGR 880	[m/kg]	52,0	35,0	23,5	17,5	13,4	8,4	5,8	4,3	3,4	2,6	2,2	1,8	1,4
SGR 880R	[m/kg]	52,0	34,0	23,0	17,0	13,0	8,3	5,3	4,2	3,2	2,5	2,1	1,7	1,3
SGR 804W	[m/kg]	60,0	36,0	24,0	18,0	17,4	8,7	5,9	4,4	3,4	2,8	2,2	1,8	1,4
SGR 804K	[m/kg]	60,0	36,0	24,0	18,0	17,4	8,7	5,9	4,4	3,4	2,8	2,2	1,8	1,4
SGR 800	[m/kg]	53,0	35,0	23,3	17,3	13,3	8,4	5,5	4,3	3,5	2,6	2,3	1,8	1,4
SGR 800R	[m/kg]	60,0	36,0	24,0	19,0	17,4	8,7	5,9	4,4	3,4	2,8	2,2	1,8	1,4
SGR 800 RR	[m/kg]	51,0	34,0	23,0	17,0	13,0	8,3	5,8	4,3	3,3	2,6	2,1	1,7	1,3
SFK 250	[m/kg]	38,0	24,3	17,5	12,8	10,0	6,0	4,5	3,3	3,1	2,2	1,7	1,5	1,2
SN 344	[m/kg]	43,6	28,0	19,0	14,0	11,0	6,9	4,8	3,5	2,7	2,1	1,7	1,4	1,1

Please note:

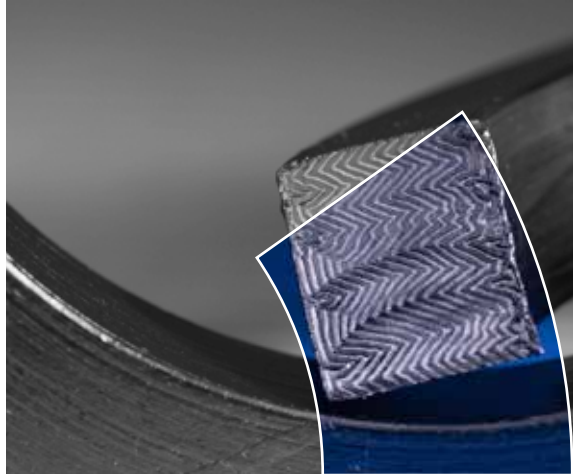
- above table is only estimation
- packing are sold in kilograms as standard

### Standard package of SPETOPAK® braided packings

cross section [mm]	package [kg]	0,5	1	2,5	5
3-6		X	X	X	
7-15			X	X	X
16-25				X	X



## GENERAL INFORMATION



## GRAPHITE GRADES

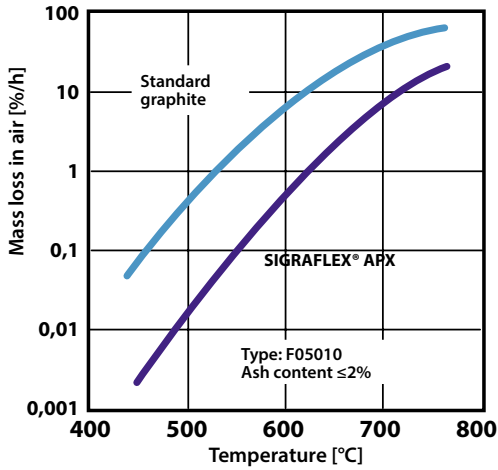
### Types of materials in GRAFMET®

GRAFMET® CODE	Foil grade	Description
no code	<b>SIGRAFLEX® C</b>	Standard Industrial Grade flexible graphite foil with $\geq 98,0\%$ carbon content, no binders or fillers, ash content $\leq 2\%$ , total chloride content $\leq 25$ ppm. Generally, if no special quality requirements are specified in an order, most of sealing products are made of this foil.
<b>APX APX2</b>	<b>SIGRAFLEX® APX SIGRAFLEX® APX2</b>	Special Oxidation Resistant Grades flexible graphite foil for maximum temperature resistance, ash content $\leq 2\%$ , total chloride content $\leq 25$ ppm. The material is recommended to be used in all applications where the temperature exceeds $450^{\circ}\text{C}$ .
<b>E</b>	<b>SIGRAFLEX® E</b>	Premium Grade flexible graphite foil with $\geq 99,0\%$ carbon content with conventional inorganic passivating inhibitor for oxidation and corrosion resistance; no binders or fillers, ash content $\leq 1\%$ , total chloride content $\leq 10$ ppm.
<b>N</b>	<b>SIGRAFLEX® Z</b>	High Purity Nuclear Grade flexible graphite foil with $\geq 99,85\%$ carbon content, no binders or fillers, ash content $\leq 0,15\%$ , total chloride content $\leq 10$ ppm.
<b>ZX</b>	<b>SIGRAFLEX® ZX</b>	High Purity Nuclear Grade flexible graphite foil with strong corrosion inhibitor; total chloride content $\leq 10$ ppm. The material is recommended to be used in systems with raw and/or polluted water, because it minimizes the phenomenon of galvanic corrosion.
<b>TF</b>	<b>SIGRAFLEX® TF</b>	Special PTFE Coated Grade for the manufacture of stuffing box packings with reduced friction and leakage; manufactured from flexible graphite foil $\geq 98,0\%$ carbon content, ash content $\leq 2\%$ , total chloride content $\leq 25$ ppm.
<b>HTX</b>	<b>SIGRAFLEX® p</b>	Flexible graphite foil with outstanding oxidation resistance, used for the manufacture of packing rings to seal valve shafts in various industrial applications; ash content $\leq 1\%$ , total chloride content $\leq 20$ ppm.

# GENERAL INFORMATION



## Effect of temperature on loss of mass by SIGRAFLEX® APX and SIGRAFLEX® P



## SIGRAFLEX® APX, SIGRAFLEX® P

Proper selection of the sealing material ensures long-lasting and failure-free use of the highest quality fittings. Graphite rings made of **SIGRAFLEX® APX** and **SIGRAFLEX® APX2** foil prolong the working life. Graphite rings of **SIGRAFLEX® APX** and **SIGRAFLEX® APX2** foil demonstrate loss of mass smaller by an order of magnitude than rings of pure graphite.

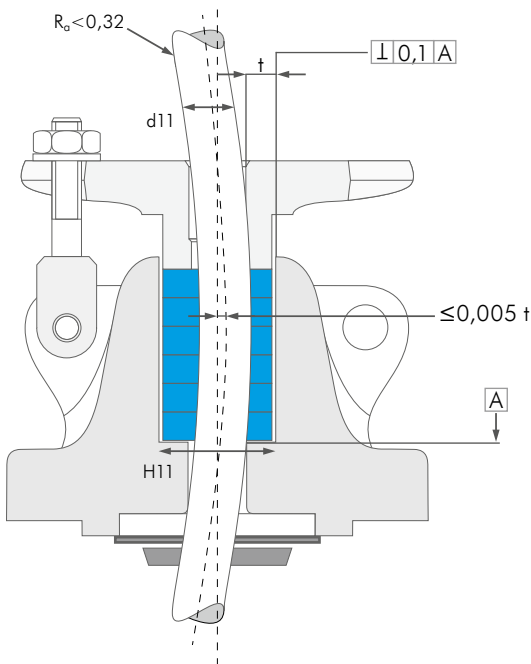
## Recommended density of GRAFMET® rings

Proper selection of density of sealing rings ensures their long-lasting and failure-free operation, no caulking required. Increased density of sealing results in smaller leakage through rings. The higher pressure while fittings operation, the higher density of sealing, i.e. smaller leakage through rings.

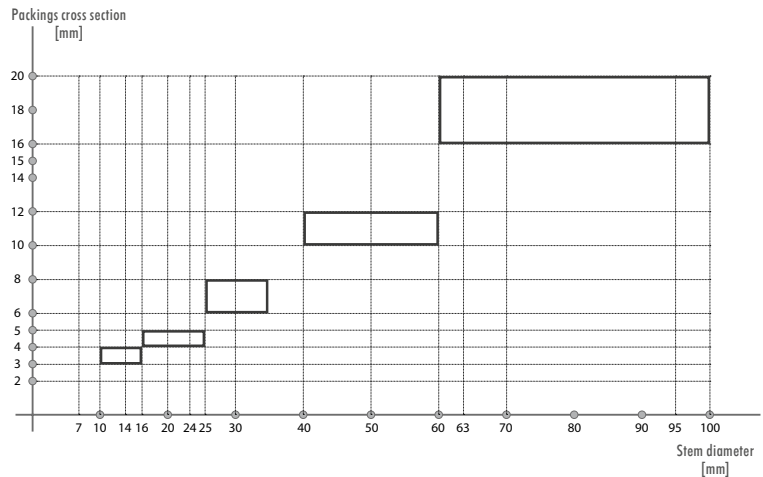
## Relationship between service pressure and initial GRAFMET® density

Pressure MPa	10	16	20	25	40
Density g/cm <sup>3</sup>	1,3	1,4	1,5	1,6	1,7

## Recommendations regarding structures of stuffing box



## Recommended widths of packing as a function of stem diameters



# GENERAL INFORMATION

## GLAND PACKINGS INSTALLATION



### ESA/FSA Installations Procedures

#### Tools Required

Specific tools are required for removal of the old packing and installation of the new packing, as well as tensioning of the fasteners. In addition, always use standard safety equipment and follow good safety practices. Acquire the following equipment prior to installation:

- Calibrated packing ring cutter
- Packing extractor
- and torque wrench or spanner
- Packing knife
- Flashlight
- Safety goggles
- Helmet
- Steel rule
- Inside & outside calipers
- Tamping tool
- Lubricant for fasteners
- Vernier dial gauge
- Mirror
- Other plant-specified equipment

#### clean and examine



- Loosen gland follower nuts slowly and lift follower to release any trapped pressure under packing set.
- Remove all old packing and thoroughly clean shaft/stem and stuffing box area following plant-specified procedures.
- Examine the shaft/stem for corrosion, nicks, scoring or excessive wear.
- Examine other components for burrs, cracks, or wear that could reduce packing life.
- Check stuffing box for excessive clearances and shaft/stem for eccentricity.
- Replace any components found defective. If in doubt, seek advice.
- Inspect old packing as part of failure analysis for clues to cause of premature packing failure.

#### Measure and record



- Document the shaft or stem diameter, stuffing box bore and depth, and, when using lantern rings, distance of port to bottom of stuffing box.

#### Select packing

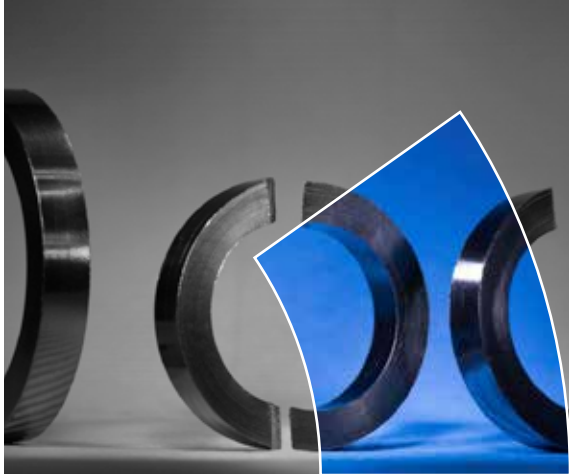


- Assure packing is as specified by packing manufacturer and/or plant engineering department to match service conditions.
- Calculate packing cross section and number of rings needed from recorded measurements.
- Examine packing to be sure it is free from defects.
- Refer to any special installation instructions from packing manufacturer.
- Ensure cleanliness of equipment and packing before proceeding

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# GENERAL INFORMATION



## GLAND PACKINGS INSTALLATION

### ESA/FSA Installations Procedures

#### Prepare rings



##### Braided

- Wind packing around properly sized mandrel, or use calibrated packing ring cutter.
- Cut packing cleanly, either butt (square) or skive (diagonal), per instructions from packing manufacturer or plant engineering department.
- Cut one ring at a time, and, using shaft or stem, check for proper sizing.

##### Die formed/molded

- Assure that rings are sized precisely to shaft or stem.
- Cut rings, when necessary for installation, according to instructions from packing manufacturer or plant engineering department.

#### instal packing



- Carefully install one ring of packing at a time.
- Twist each ring over shaft/stem.
- Ensure each ring is seated fully in stuffing box prior to installing next ring.
- Stagger joints of subsequent rings a minimum of 90 degrees.
- After last ring is installed, draw gland up evenly until nuts are finger-tight.
- Check lantern ring, if used, for correct positioning relative to port.
- Make sure shaft/stem turns freely.

#### Adjust packing (Valves)



- Consult packing manufacturer and/or plant engineering department for guidance on torque specifications or percent of compression.
- Tighten gland nuts in multiple steps:

Step 1 – Torque gland bolts to approximately 30% of full torque or appropriate compression percentage.

Step 2 – Cycle the valve a number of times and apply full torque while valve is in closed stroke position.

Step 3 – Repeat Step 2 three or four times.

#### Retightening and replacement



Caution: Consult your packing manufacturer and/or plant engineering department for guidance and recommendations on retightening. It is advisable to check gland adjustment after a few hours of operation. Tighten as necessary. Packing must be replaced when gland can not be adjusted further.

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