GE Healthcare
Life Sciences

Instruction 28-9920-23 AF

Columns XK 16, XK 26, XK 50
Packing Reservoirs RK 16/26, RK 50

XK columns are designed for standard liquid chromatography of macromolecules. They are available in the following dimensions:

Table 1. Dimensions of XK columns

Length (cm)	i.d. 16 mm	i.d. 26 mm	i.d. 50 mm
20	XK 16/20	XK 26/20	XK 50/20
30	-	-	XK 50/30
40	XK 16/40	XK 26/40	-
60	-	-	XK 50/60
70	XK 16/70	XK 26/70	-
100	XK 16/100	XK 26/100	XK 50/100

XK adapters are used with XK columns. The columns come with one adapter and one bottom piece. A larger range of bed heights can be obtained by fitting an additional adapter at the bottom of the column (Table 2 on page 4).

Opening the box

XK columns are delivered complete with a thermostatic jacket, one adapter, one tubing cutter, one bottom piece and tubing at both ends for direct connection to valves and pumps. Unpack the XK column and the adapter carefully. Check the contents of the delivery package against the packing list supplied. Inspect for any missing components or damage that may have occurred during transport. Report any damage immediately to the local GE Healthcare representative and to the transport company concerned.

Description of main parts

The main parts of the column are shown in Figure 1. For a detailed view of the column parts, see the exploded view, Figure 5 on page 5.

Glass tube (5). The high-precision borosilicate glass tube has a length of 200, 300, 400, 600, 700±0.25 or 1000±1 mm with an inner diameter of 16±0.02, 26±0.02 or 50±1.00 mm.

Thermostatic jacket (6). The jacket is an acrylic plastic tube with threaded ends. It encloses the chromatographic tube and is sealed to the end piece with an O-ring.

Column tube (8). The chromatographic column tube consists of the glass tube, thermostatic jacket and the respective column end pieces.

Column end pieces (3). The red end pieces, made of reinforced acetal plastic, hold the glass tube and the thermostatic jacket in position. Each end piece houses an O-ring, a sealing ring, a washer and a locking ring. The end piece also carries a fluid connector through which fluid from the thermostat enters or leaves the column.

Column bottom piece (7). The bottom piece screws onto the column end piece. The medium bed is supported by a 10 µm nylon net ring, which is placed on top of a plunger (4). The bottom piece is sealed to the chromatographic tube by an O-ring.

Adapter (1). The adapter consists of a top end cap that fits the column end piece, and a plunger that carries the net ring and support screen. It also has an adjusting knob (2) that seals the adapter to the column wall.

Tubing. XK columns are supplied with capillary tubing. The adapter tubing is 130 cm long. The bottom piece tubing is 35 cm long. The inlets on the adapter and the column bottom piece have a 5 cm protection tubing threaded over the capillary tubing. This prevents the capillary tube from being squeezed during transport and storage.

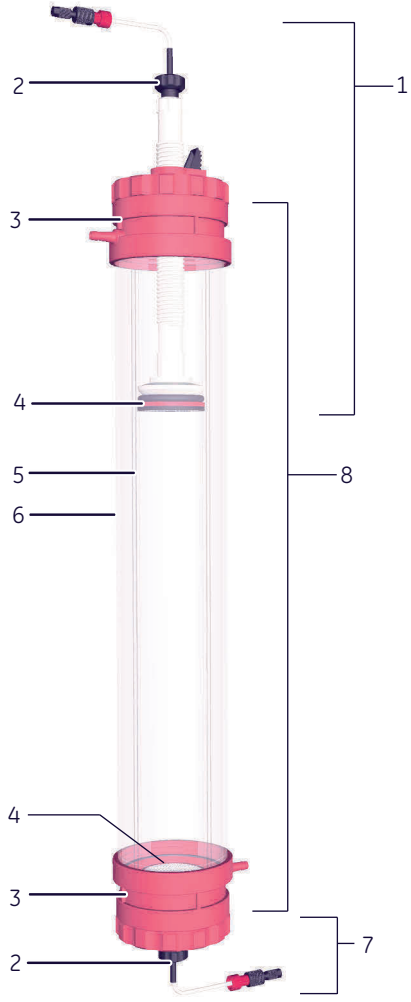


Fig. 1 XK adapter with an XK column.

Materials

Under normal operating conditions, the only materials in contact with the eluent are: glass-fibre reinforced polypropylene, polyamide, acrylic plastic, borosilicate glass, fluoro-rubber and ETFE/PTFE.

Resistance

The columns can be used in aqueous solutions and almost all the organic solvents commonly used in liquid chromatography of macromolecules, with the following exceptions:

- chlorinated hydrocarbons
- acetone and other ketones
- aliphatic esters
- phenol

Solutions containing more than 10% sodium hydroxide, 10% hydrochloric acid, other strong mineral acids or 5% acetic acid should not be used either.

The thermostatic jacket should only be used with water as cooling fluid. Acrylic plastic is not resistant to alcohol, ethylene glycol or other organic solvents.

The column may be used at temperatures up to 40°C and pressures up to 0.5 MPa (5 bar) for XK 16 and XK 26 columns, and 0.3 MPa (3 bar) for XK 50 columns. The jacket can also withstand temperatures up to 40°C but should not be exposed to pressures higher than 0.2 MPa (2 bar).

Cleaning

Suitable cleaning agents are soapy water or laboratory detergents. Enzyme detergents are recommended for removing proteinaceous contaminants.

The column can be autoclaved without the thermostatic jacket, tubings and net ring. Alternatively, the entire column may be sterilized with ethylene oxide.

Instructions

Note: *It is important to always loosen the black adjusting knob before inserting or removing the bottom piece and the column adapter.*

Dismantling the adapter or the bottom piece

See Figure 5 for details.

1 Loosen the black adjusting knob (5).

2 Unscrew the end cap (6, 19) and loosen the adapter (1) from the column.

3 While holding the inner shaft (8), unscrew the plunger (11).

4 Before autoclaving, remove the O-ring (10). For XK 50, remove the expander ring also.

5 The net ring (13) may now be removed from the plunger (11) with a sharp tool.

Replacing the net ring and support screen

See Figure 2 for details.

1 Remove the net ring (3) with a sharp tool.

2 Remove the support screen (2) from the plunger.

3 Place the new support screen (2) and net ring (3) on the plunger (1).

4 Press on the net ring (3).

Note: *If the net ring is difficult to press on, it can be warmed in hot water at 50°C to 60°C prior to placing it on the plunger.*

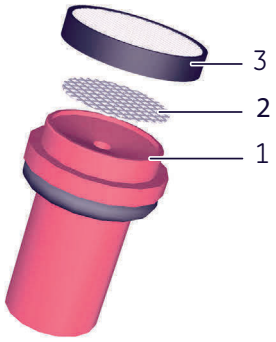


Fig. 2 Replacing the net ring and the support screen on the plunger.

Reassembling the adapter

1 Tighten the inner shaft firmly to the plunger (Fig 3a and 3b).

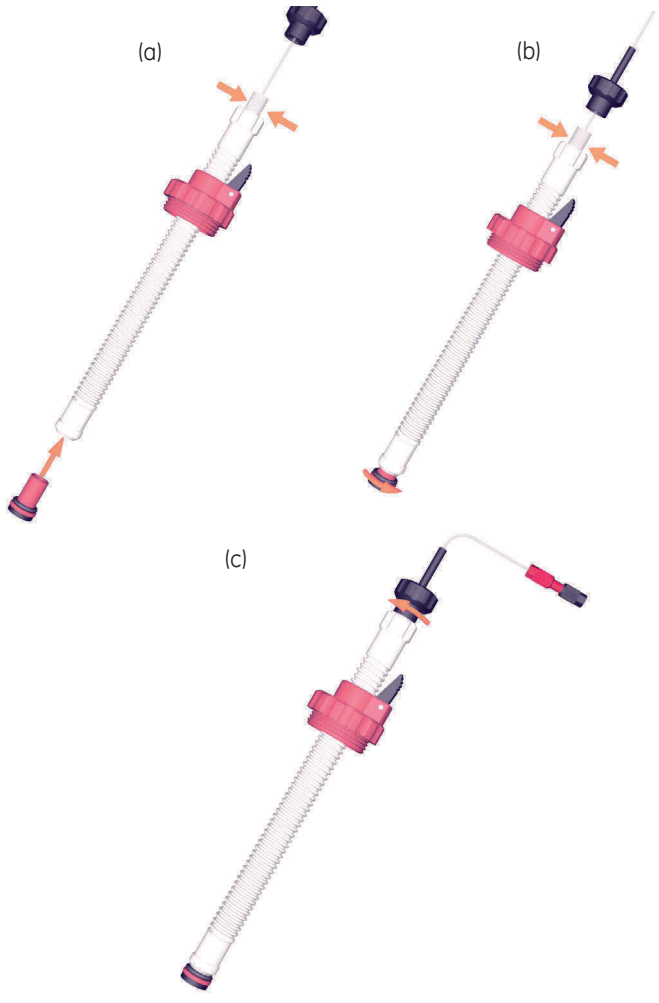


Fig. 3 Tightening the plunger onto the inner shaft.

2 Adjust the O-ring on the plunger against the adapter shaft using the adjusting knob (Fig 3c). Do not overtighten.

The adapter is now ready for use.

Reassembling the bottom piece

1 Tighten the inner shaft firmly to the plunger (Fig 3a and 3b).

2 Adjust the O-ring on the plunger against the bottom end cap using the black adjusting knob (Fig 3c).

3 Screw the bottom piece (7) into the column end piece (3) (Fig 1).

4 Tighten the adjusting knob to obtain a good seal. Do not overtighten.

Exchanging the capillary tubing

1 Dismantle the bottom piece or the adapter.

2 Remove the ferrule and the existing capillary tubing.

3 Pass the new tubing through the inner shaft (Fig 4a)

4 Use the tubing cutter to shorten the tubing to the minimum length needed to connect the column to the instrument.

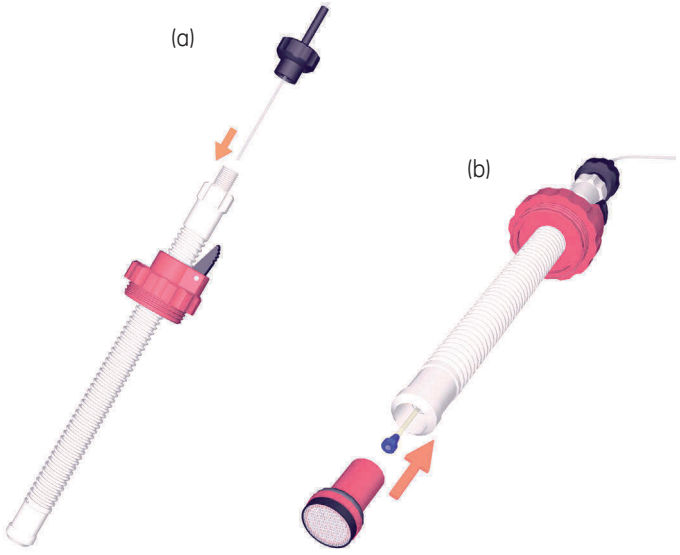


Fig. 4 Passing the new tubing through the inner shaft.

5 Put on a new ferrule and screw the plunger onto the inner shaft.

6 Reassemble the bottom piece or the adapter (Fig 4b).

Dismantling the columns XK 16 and XK 26

1 Unscrew the bottom piece and the adapter.

2 Use the dismantling tool to unscrew the locking rings and to free the chromatographic tube.

3 Remove the sealing ring, washer and chromatographic tube.

4 Unscrew the column end pieces from the thermostatic jacket and remove the O-ring.

Dismantling the column XK 50

1 Unscrew the bottom piece and adapter.

2 Unscrew the column end pieces from the thermostatic jacket and remove the O-rings.

Note: *The XK 50 column chromatographic glass tube is held in position by built-in sealing rings in the end piece. Washer and locking rings are not required.*

Caution: Since the XK 50/100 chromatographic glass is very heavy, it can easily slide out from the built-in sealing rings. To keep the tube in position when washing the column, screw the conical adapter (supplied with Packing Reservoir RK 50) to one of the end pieces of the column and hold that end downwards while washing. After washing, screw the bottom end piece into the end piece before mounting the column vertically.

Reassembling the columns XK 16 and XK 26

1 Put the chromatographic glass tube into the thermostatic jacket.

2 Install one of the end pieces by screwing into the thermostatic jacket, ensuring that the O-ring is in place.

3 Put a sealing ring at the end of the glass tube followed by a washer.

4 Screw in the locking ring with the dismantling tool.

5 Repeat steps 2 to 4 for the other end of the column.

Reassembling the column XK 50

1 Screw the two end pieces onto the thermostatic jacket. Ensure that the metal spring-rings are seated in the built-in sealing rings and that the O-rings are in place in the end pieces.

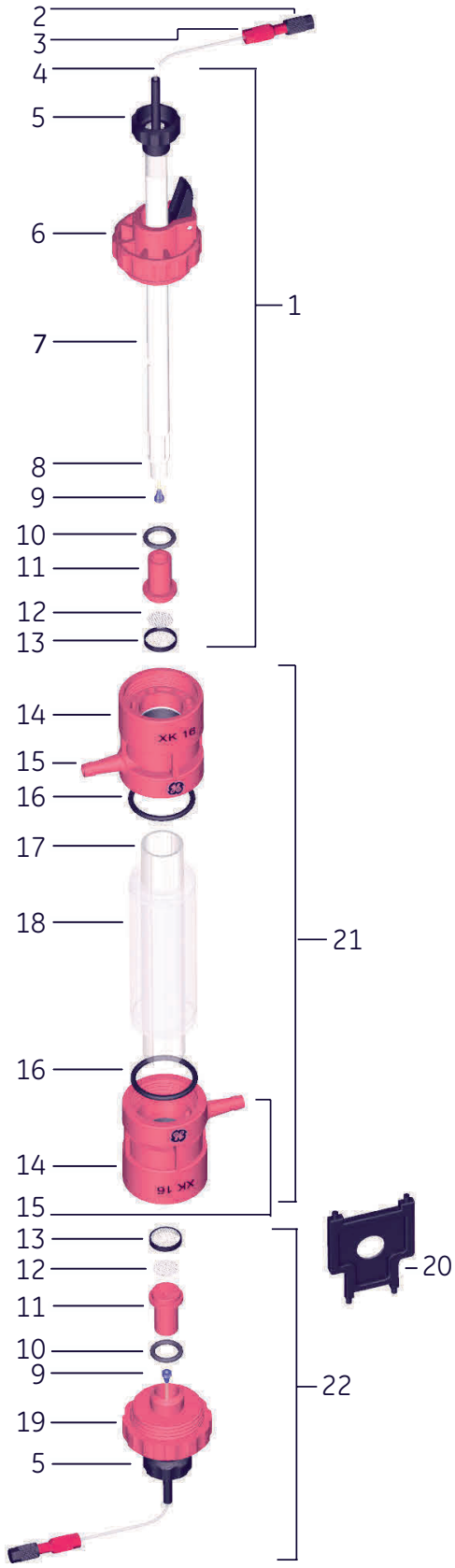
2 Wet the built-in sealing rings with water. Slide in one end of the chromatographic glass tube through the built-in sealing ring, thermostatic jacket and finally through the built-in sealing ring of the other end piece. Push the tube towards the second sealing ring. Use a small screwdriver or a similar blunt tool to carefully ease the sealing ring over the tube.

Caution: Ensure that the distance from the sealing ring to the end of the chromatographic glass tube is equal at both the ends.

Note: *It is important to properly tighten the bottom piece and the adapter to the end piece.*

Table 2. The maximum bed heights (cm) and bed volumes (ml) possible using one or two adapters in the various XK columns (Please see "Packing Reservoirs and Column Packing" on page 6)

	With one adapter		With two adapters	
Column	**Volume (ml)**	**Bed height (cm)**	**Volume (ml)**	**Bed height (cm)**
XK 16/20	5-31	2.5-15.5	0-31	0-15.5
XK 16/40	45-70	22.5-35	16-70	8-35
XK 16/70	105-130	52.5-65	76-130	38-65
XK 16/100	165-190	82.5-95	136-190	68-95
XK 26/20	5-66	1-12.5	0-66	0-12.5
XK 26/40	122-186	23-35	45-186	8.5-35
XK 26/70	281-344	53-65	204-344	38.5-65
XK 26/100	440-504	83-95	363-504	68.5-95
XK 50/20	0-274	0-14	0-274	0-14
XK 50/30	265-559	14-28	0-559	0-28
XK 50/60	794-1088	40-56	500-1088	26-56
XK 50/100	1588-1862	81-95	1274-1862	65-95



1	Adapter
2	Stop plug
3	Tubing connector
4	Capillary tubing
5	Adjusting knob
6	Top end cap
7	Adapter shaft
8	Inner shaft
9	Ferrule
10	O-rings
11	Plunger
12	Support screen
13	Net ring
14	Column end piece
15	Fluid connector from/to the thermostatic jacket
16	O-ring
17	Glass tube
18	Thermostatic jacket
19	Bottom end cap
20	Dismantling tool
21	Column tube
22	Bottom piece

Fig. 5 Exploded view of XK column with XK adapter.

Packing Reservoirs and Column Packing

Column Packing

Packing the column can be performed using either a packing reservoir (Fig 8) or an extra column tube, which is attached via a packing connector (Fig 7). Detailed procedure for column packing is described in the Instructions for each gel medium and also in the Gel Filtration Handbook Principles and Methods (Code 18-1022-18).

Packing Reservoirs

The packing reservoirs are available as RK 16/26 and RK 50. Each unit consists of a cylinder with a conical adapter. The reservoir can also be used as an eluent container. For chemical resistance, see "Spare parts Column" on page 10. The reservoirs can withstand temperatures up to 50°C and pressures up to 0.5 MPa (5 bar).

Column Packing Procedures

Packing the column using a packing reservoir

1 Remove the column adapter and replace it with the appropriate conical adapter (Fig 8). Make sure the column end piece is in the right place and the O-ring tightened.

2 After installing the appropriate cylinder on the conical adapter, pour a small amount of packing liquid into the column tube and let it drain until the level of liquid in the tube is 1 to 2 mm above the bottom net ring.

3 Close the column outlet on the bottom piece using a stop plug.

4 Carefully fill chromatography medium through the packing reservoir into the column tube. Avoid introducing air bubbles.

5 Put the cap on the packing reservoir and make sure the liquid is pressed through the capillary to avoid trapping any air.

6 Connect the capillary to the system and follow the packing instructions provided in the media instructions.

7 Disconnect the capillary from the system.

8 Remove the packing reservoir.

9 Insert the adapter at an angle, so that no air is trapped in the column (Fig 6a and 6b).

10 Adjust adapter against medium surface as described (see "Adjusting the QuickLock adapter in a packed column" on page 7).

11 Tighten the end knob to seal the O-ring against the column wall.

12 To fine tune the plunger in position, slide the plunger slowly down a few mm by turning the end cap to secure that any air under the net ring and capillary tubing is displaced by the liquid (Fig 6c).

13 Continue packing the column according to the packing procedure in the media instructions.

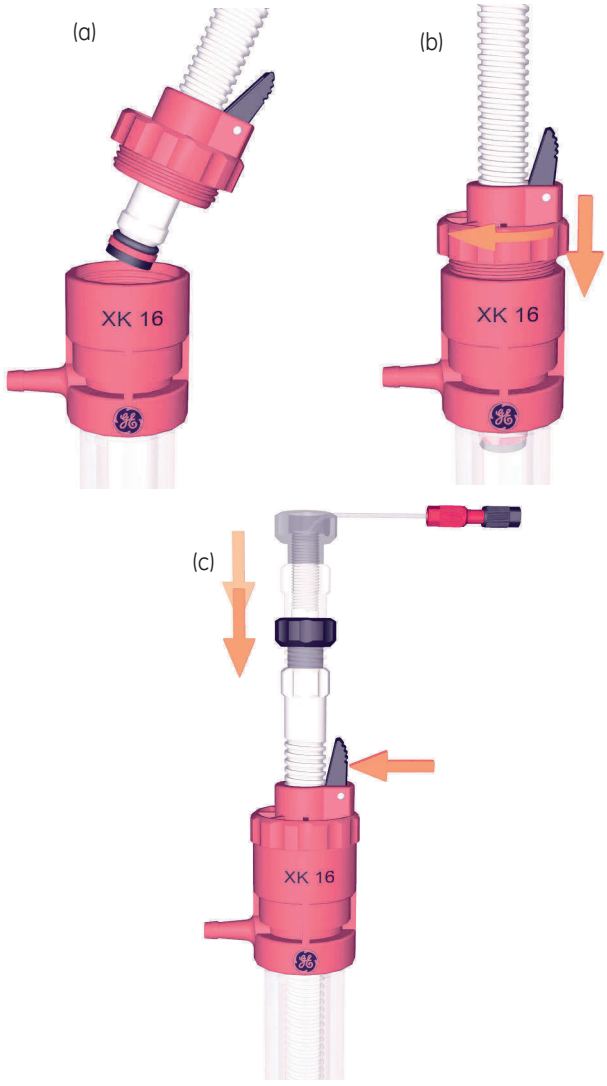


Fig. 6 Inserting and adjusting the adapter.

Packing the column using an additional column tube

An additional column tube connected with a packing connector can also be used for packing.

1 Mount the bottom piece to the column.

2 Attach the additional column tube to the column with a packing connector (Fig 7).

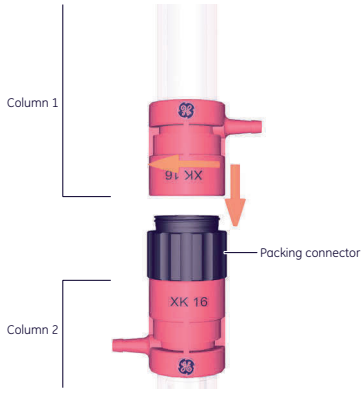


Fig. 7 Connecting the column to another column.

3 Pour a small amount of packing liquid into the column tube and let it drain until the level of liquid in the tube is 1 to 2 mm above the bottom net ring.

4 Close the column outlet on the bottom piece using a stop plug.

5 Carefully fill chromatography medium into the column tube. Avoid introducing air bubbles.

6 Insert the adapter.

7 Connect the capillary to the system and follow the packing instructions provided in the media instructions.

8 After packing the column, disconnect the capillary from the system.

9 Remove the additional packing tube and the packing connector.

10 Insert the adapter at an angle, so that no air is trapped in the column (Fig 6a and 6b).

11 Slide the adapter down using QuickLock to 1 to 2 cm above the medium bed (Fig 6c).

12 Tighten the end knob to seal the O-ring against the column wall.

13 Screw down the adapter a few mm by turning the adapter shaft, to secure that any trapped air under the net ring and capillary tubing is displaced by liquid.

14 Continue packing the column according to the packing procedure in the media instructions.

Adjusting the QuickLock adapter in a packed column

When operating the column at high pressures of 0.3 to 0.5 MPa (3 to 5 bar), it is not possible to press the QuickLock as it has a self-locking mechanism.

To readjust the position of the adapter in the column, follow the steps below:

1 Stop the pump.

2 Disconnect the column from the pump leaving the inlet tubing open.

3 Loosen the adjusting knob of the adapter to slacken the O-ring.

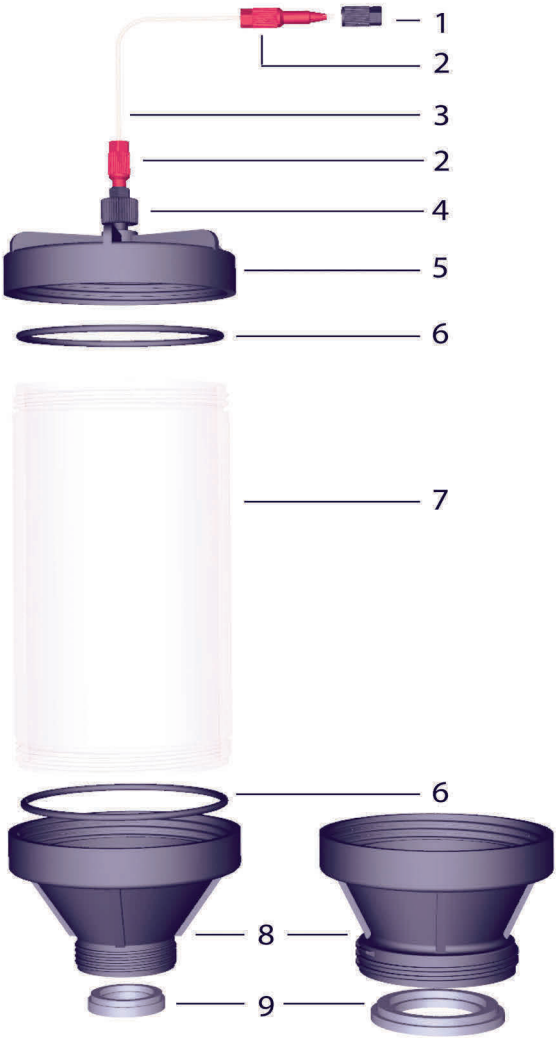
4 Press in the QuickLock and adjust the adapter to a desirable position.

5 Tighten the adjustment knob to obtain a good seal.

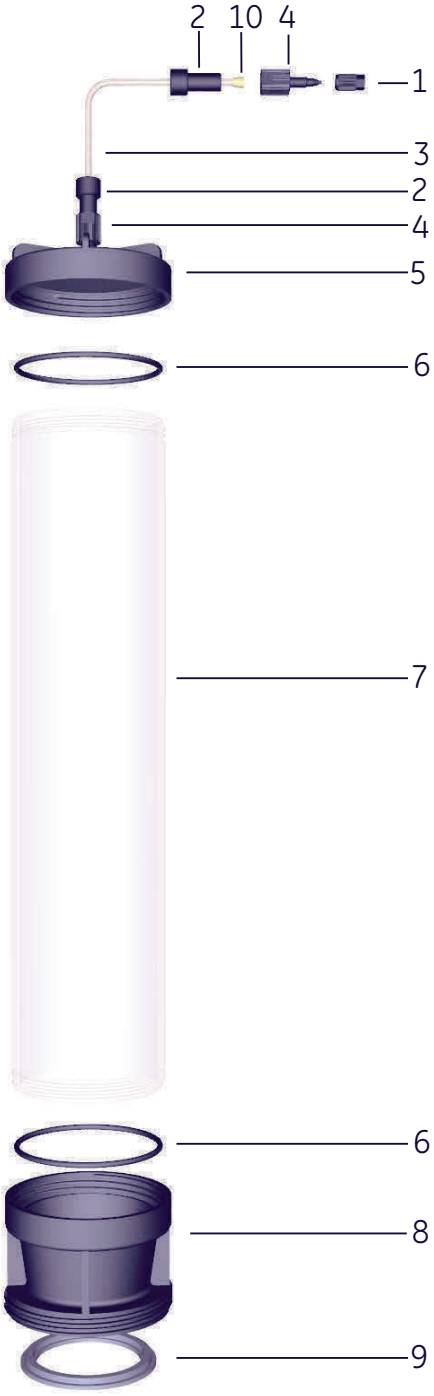
6 Fine tune the position of the adapter by turning the adapter shaft.

Note: *When using organic solvents, the liquid level in the column can be lowered to 5 mm above the medium bed surface. The adapter may then be inserted directly into the column and lowered into the liquid surface. The air in the adapter is displaced and the position of the adapter is secured as described above. When the adapter is in this position and the medium bed has been equilibrated at the operating pressure, there should be no liquid space between the medium bed surface and the adapter net. The position of the adapter may be readjusted after equilibrating the medium bed, but ensure that the column outlet is closed before moving the adapter.*

RK 16/26



RK 50



1	Stop plug
2	Connector
3	Capillary tubing
4	Union
5	Cap
6	O-rings
7	Cylinder
8	Conical adapter
9	Seal ring
10	Ferrule

Fig. 8 Exploded view of RK 16/26 and RK 50 packing reservoirs.

Ordering information

Column	Code No.	Adapter*	Code No.	Packing reservoir	Code No.
XK 16/20	28-9889-37	XK 16	28-9898-76	RK 16/26	28-9898-58
XK 16/40	28-9889-38				
XK 16/70	28-9889-46				
XK 16/100	28-9889-47				
XK 26/20	28-9889-48	XK 26	28-9898-77	RK 16/26	28-9898-58
XK 26/40	28-9889-49				
XK 26/70	28-9889-50				
XK 26/100	28-9889-51				
XK 50/20	28-9889-52	XK 50	28-9898-80	RK 50	28-9898-61
XK 50/30	28-9889-53				
XK 50/60	28-9889-64				
XK 50/100	28-9889-65				

* Each XK column is delivered with one XK adapter and one bottom piece.

Accessories

Sample applicators	Code No.	Manual valves	Code No.	Tubing connectors	Code No.
Superloop™ 10 ml, 1/16" fitting	18-1113-81	SRV-3	19-2098-01	HiTrap™/HiPrep™ 1/16" male connector for ÄKTA™ design	28-4010-81
Superloop 50 ml, 1/16" fitting	18-1113-82	SRV-4	19-2099-01		
		V-7	19-7500-01		
		V-8	19-7576-01		
				Union 5/16 Fe HPLC	18-1142-08

Accessory kits		Packing connectors		Column holders	
Accessory kit XK 16*	28-9899-78	Packing connector XK 16	18-1153-44	Column holder	28-9562-82
Accessory kit XK 26*	28-9899-79	Packing connector XK 26	18-1153-45	Column holder XK 50	18-3094-60
Accessory kit XK 50†	28-9899-81				

* Accessory kit XK 16 and XK 26 contain each:
2 support screens, 5 net rings, 2 O-rings, 2 stop plugs, 10 tubing connectors (HiPrep/HiTrap 1/16" male connectors for ÄKTA design) and 1 tool for dismantling.

† Accessory kit XK 50 contains:
2 support screens, 5 net rings, 2 O-rings, 2 stop plugs, 2 tubing connectors (Union 5/16 Fe HPLC) and 10 Ferrules.

Spare parts Column

Figure 5 shows the positions of the different parts of the XK columns. For replacements please order according to the spare parts list below using the appropriate code numbers.

Note: *To enable compatibility with old adapters, capillary tubings 1.2 mm and 0.8 mm (i.d.),flanging kits and M6 tubing connectors will still be available as spare parts.*

Item No.	Code No. Designation	XK 16	XK 26	XK 50	Material	No. per pack
1	Adapter XK (complete)	28-9898-76	28-9898-77	28-9898-80		1
4	Capillary tubing 0.75	18-1119-74	18-1119-74		G	2 m
	Capillary tubing 1.55			18-1121-16	H	3 m
	Tubing cutter	18-1112-46	18-1112-46	18-1112-46		1
9	Ferrules 16/26	18-1127-06	18-1127-06		G	10
	Ferrules 50			18-1121-18	G	10
10	O-ring	19-0163-01	28-9782-27	28-9782-28	E	5
11	Plunger	18-1031-80	18-1031-81	18-8758-01	B	1
12	Support screen	19-0651-01	18-9377-01	19-0664-01	D	5
13	Net ring (10 µm)	18-8761-01	18-8760-01	18-8759-01	B, C	5
14	End piece (complete) item 16 included	18-6488-01	18-6489-01	18-8797-01		1
17	Glass tube for column length:				F	1
	20 cm	19-0315-01	18-1000-84	18-1000-85		
	30 cm	-	-	19-1326-01		1
	40 cm	19-0113-01	19-0145-01	-		1
	60 cm	-	-	19-0525-01		1
	70 cm	19-0114-01	19-0146-01	-		1
	100 cm	19-0115-01	19-0147-01	19-0509-01		1
18	Thermostatic jacket for column length:				I	
	20 cm	18-0011-72	18-1000-82	18-1000-83		1
	30 cm	-	-	18-0011-78		1
	40 cm	18-0011-73	18-0011-67	-		1
	60 cm	-	-	18-0011-77		1
	70 cm	18-0011-74	18-0011-68	-		1
	100 cm	18-0011-75	18-8791-01	18-8765-01		1
	Transport device	18-1176-43	18-1176-43	-		1
22	Bottom piece (complete)	28-9898-85	28-9898-87	28-9898-88		1

Materials

A = Reinforced acetal plastic

B = Polypropylene (reinforced glass fibre)

C = Polyamide (Nylon)

D = Polypropylene

E = PTFE coated (Viton™)

F = Borosilicate glass

G = ETFE

H = FEP

I = PMMA (Acrylic)

Spare parts Packing reservoir

Part	Code No.	No. per pack	Part	Code No.	No. per pack
Seal ring RK 16	19-0189-01	5	Cap	18-8792-01	1
Seal ring RK 26	19-0190-01	5	Ferrules 16/26	18-1127-06	10
Seal ring RK 50	18-8798-01	5	Ferrules 50	18-1121-18	10
Conical adapter RK 16	18-8787-01	1	HiTrap/HiPrep 1/16” male connector for ÄKTA design	28-4010-81	8
Conical adapter RK 26	18-8786-01	1	Union 1/16" female M6 male	18-1112-57	6
Conical adapter RK 50	18-8785-01	1	Union 5/16” female 1/16" male	18-1142-08	8
O-ring RK	18-0253-91	5	Union 5/16" female / M6 male	18-1127-76	3
Cylinder RK 16/26	18-8789-01	1	Connector 5/16" male for 1/8" tubing	18-1121-17	10
Cylinder RK 50	18-8788-01	1			

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