

XK 16, 26, 50 columns RK 16/26, RK 50 packing reservoirs

Instructions for Use

Intended use

XK empty columns are designed for liquid chromatography of macromolecules at low to medium pressure.

Dimensions

XK columns are available in the following dimensions:

Table 1. XK column dimensions.

Length (cm)	Inner diameter		
	16 mm	26 mm	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

A larger range of bed heights can be obtained by fitting an additional adapter at the bottom of the column, see the table below.

Table 2. Maximum bed volumes (mL) and bed heights (cm) using one or two adapters.

Column	With one adapter		With two adapters	
	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*

* See [Pack XK 50 columns with two adapters](#), on page 7.

(For details, see [Packing reservoirs and column packing](#), on page 5)

Unpacking

Unpack the XK column. A consumable kit containing a tubing cutter is also included in the delivery. Use the packing list supplied to make sure that no components are missing. Examine the components for transport damage. Report any transport damage immediately to the local Cytiva representative or reseller.

Description of main parts

An XK column consists of a glass tube, a thermostatic jacket, one adapter, and one bottom piece with tubing for direct connection to valves and pumps. The main parts of the column are shown in the image below. For a detailed view of the column parts, see the exploded view in [Fig. 6, on page 4](#).

Note: The actual colors of parts might differ from the colors that are shown in the images.

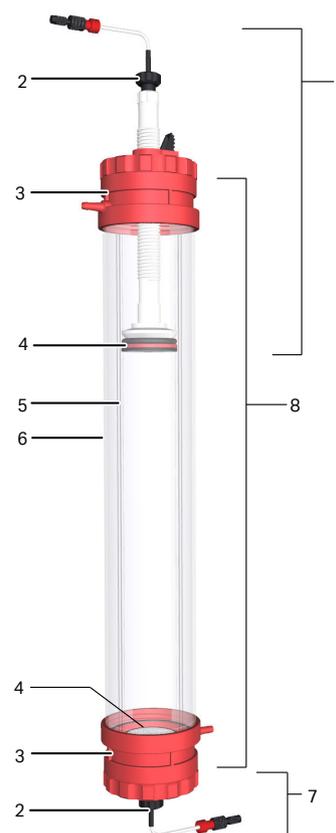


Fig 1. Main parts of an XK column.

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

Thermostatic jacket (6). The thermostatic jacket is an acrylic plastic tube with threaded ends. The thermostatic jacket 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, the 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 has an inlet/outlet for the fluid used in the thermostatic jacket.

Column bottom piece (7). The bottom piece is screwed onto the column end piece. The resin 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 turning the adjusting knob (2).

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 the support screen. It also has an adjusting knob (2) that seals the adapter to the column wall.

Tubing and connections. XK columns are supplied with capillary tubing with tubing connectors (1/16") and stop plugs. 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.

Materials

Under normal operating conditions, the only materials in contact with the eluent are: glass-fiber reinforced polypropylene, polyamide, acrylic plastic, borosilicate glass, fluoro-rubber, and ETFE/PTFE. All column sizes contain a metal part in the black QuickLock on the top end cap.

Chemical resistance

The columns are designed for use with aqueous solutions and most organic solvents commonly used in liquid chromatography of macromolecules, except for: chlorinated hydrocarbons, acetone and other ketones, aliphatic esters, and phenol. Solutions containing more than 2.5 M sodium hydroxide, 2.7 M hydrochloric acid, other strong mineral acids, or 0.8 M acetic acid must not be used either.

Only use water as a cooling fluid for the thermostatic jacket. Acrylic plastic is not resistant to alcohol, ethylene glycol, or other organic solvents.

The columns can be used at temperatures from 4°C to 40°C and at 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 thermostatic jacket can be used at temperatures up to 40°C, but must 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, the tubing, and the net ring. Alternatively, the entire column can be sterilized with ethylene oxide. The built-in sealing rings on the XK 50 column contain a metal spring.

Instructions

Note: Always loosen the black adjusting knob before inserting or removing the bottom piece and the column adapter.

Disassemble the adapter or the bottom piece

See [Fig. 6, on page 4](#) for details.

Step	Action
1	Loosen the black adjusting knob (5).
2	Unscrew the end caps (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 the XK 50, also remove the expander ring.
5	Remove the net ring (13) from the plunger (11), using a spatula.

Replace the net ring and the support screen

See [Fig. 2, on page 2](#) for details.

Step	Action
1	Remove the net ring (3), using a spatula.
2	Remove the support screen (2) from the plunger.
3	Clean the plunger and the O-ring, and place the new support screen (2) and the net ring (3) on the plunger (1).
4	Press on the net ring (3).

Note:
The net ring is easier to press on after heating it in hot water at 50°C to 60°C before placing it on the plunger.

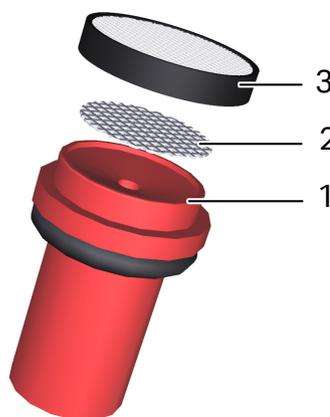


Fig 2. Replacing the net ring and the support screen on the plunger.

Reassemble the adapter

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

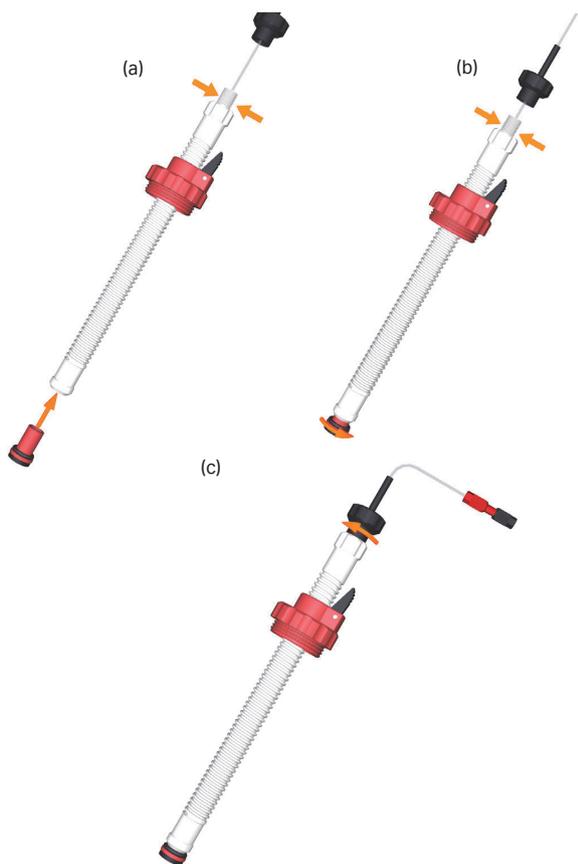


Fig 3. Tightening the plunger onto the inner shaft.

- 2 Adjust the O-ring on the plunger against the adapter shaft using the adjusting knob (Fig 3c).

Note:

Do not overtighten.

The adapter is ready for use.

Reassemble the bottom piece

Step	Action
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- 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, on page 1).
- 4 Tighten the adjusting knob to obtain a good seal.

Note:

Do not overtighten.

Replace the capillary tubing

Step	Action
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- 1 Disassemble 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 a tubing cutter to shorten the tubing to the minimum length needed to connect the column to the instrument. Perform a straight cut without squeezing the tubing, see Fig. 13, on page 10.

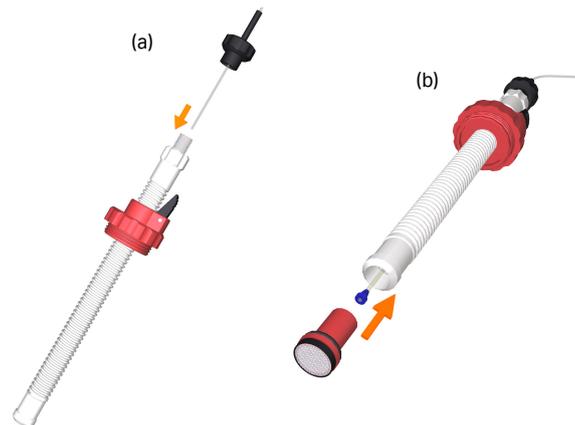


Fig 4. Passing the new tubing through the inner shaft.

- 5 Assemble a new ferrule and screw the plunger onto the inner shaft.
- 6 Reassemble the bottom piece or the adapter (Fig 4b).

Disassemble XK 16 and XK 26 columns

Step	Action
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- 1 Unscrew the bottom piece and the adapter.
- 2 Use the dismantling tool to unscrew the locking rings and to free the chromatographic tube.

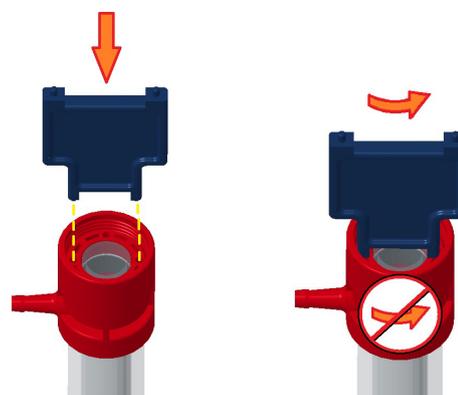


Fig 5. Using the dismantling tool to unscrew the locking ring.

- 3 Remove the sealing ring, the washer, and the chromatographic tube.
- 4 Unscrew the column end pieces from the thermostatic jacket and remove the O-ring.

Disassemble XK 50 columns

Step	Action
1	Unscrew the bottom piece and the adapter.
2	Unscrew the column end pieces from the thermostatic jacket and remove the O-rings.

Note:

The XK 50 column's chromatographic glass tube is held in position by built-in sealing rings in the end piece. No washers nor locking rings are required.



NOTICE

The XK 50/100 chromatographic glass tube is heavy and can easily slide out through 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 installing the column vertically.

Reassemble XK 16 and XK 26 columns

Step	Action
1	Insert the chromatographic glass tube into the thermostatic jacket.
2	Screw one of the end pieces into the thermostatic jacket, making sure that the O-ring is in place.
3	Assemble a sealing ring and a washer at the end of the chromatographic glass tube.
4	Screw in the locking ring, using the dismantling tool.
5	Repeat steps 2 to 4 at the other end of the column.

Reassemble XK 50 columns

Step	Action
1	Screw the two end pieces onto the thermostatic jacket. Make sure 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, through the thermostatic jacket, and 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.



NOTICE

Make sure that the distance between the sealing ring and the end of the chromatographic glass tube is equal at both ends.

Exploded view of column with adapter

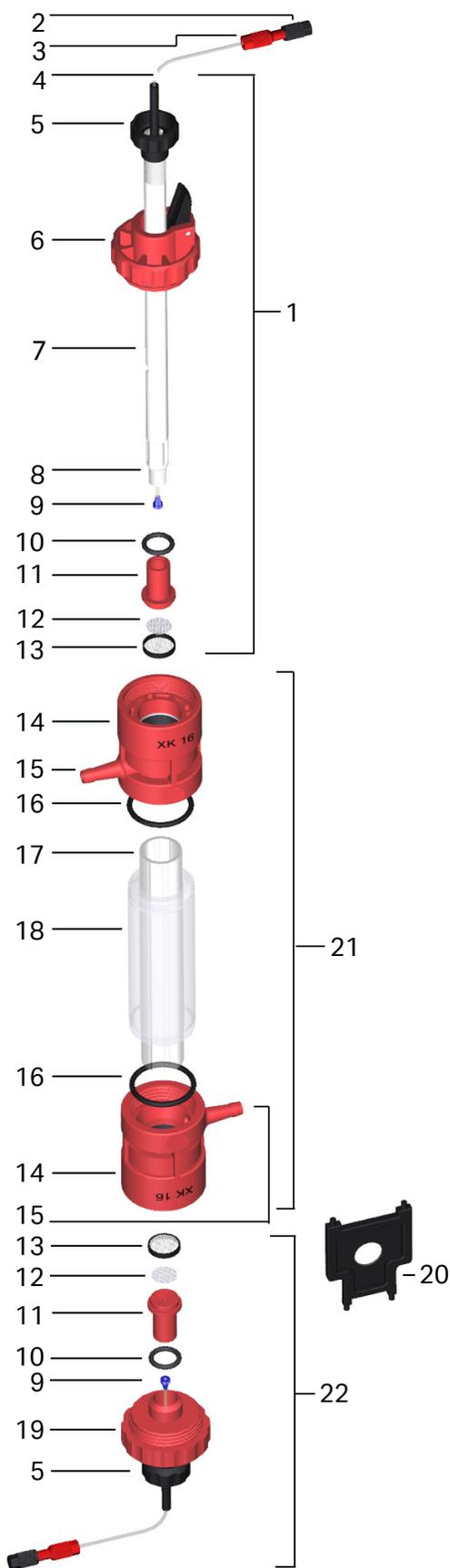
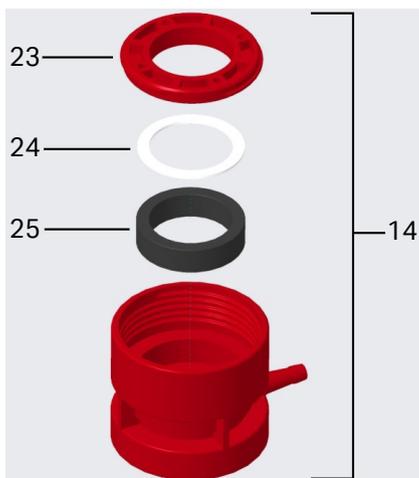


Fig 6. Exploded view of XK column with XK adapter.

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	Inlet/outlet for thermostatic jacket fluid
16	O-ring
17	Glass tube
18	Thermostatic jacket
19	Bottom end cap
20	Dismantling tool
21	Column tube
22	Bottom piece
23	Locking ring
24	Washer
25	Sealing ring



Packing reservoirs and column packing

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 reservoirs can also be used as eluent containers. For chemical resistance, see [Spare parts for column, on page 10](#). The reservoirs can withstand temperatures up to 40°C and pressures up to 0.5 MPa (5 bar).

Column packing

When packing high beds a separate packing reservoir (see [Fig. 12, on page 8](#)) or an extra column tube can be used. The extra column tube is attached via a packing connector (see [Fig. 8, on page 6](#)).

A detailed column packing procedure can be found in the Instructions for Use for the respective resin, and in the instruction *Size exclusion chromatography Principles and Methods* (18102218).

Column packing procedures

Pack the column

Step	Action
1	Remove the column adapter and make sure that the column end piece is in position and that the O-ring is tightened.
2	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 resin through the packing reservoir into the column tube. Avoid introducing air bubbles.
5	Slacken the O-ring of the top adapter and insert the adapter in the column tube at an angle so that no air is trapped under the net (Fig 7a).
6	Fasten the adapter to the column tube by turning the end cap down (Fig 7b).
7	Slide the adapter down to 1 to 2 cm above the resin bed, using the black QuickLock on the top end cap (Fig 7c).
8	Tighten the end knob to seal the O-ring against the column wall.
9	Screw down the adapter a few mm by turning the adapter shaft, to secure that any trapped air under the net ring and the capillary tubing is displaced by liquid (Fig 7c).
10	Continue packing the column according to the packing procedure in the instructions for the respective resin.

Pack the column using a packing reservoir

Step	Action
1	Remove the column adapter and replace it with the appropriate conical adapter (Fig. 12, on page 8). Make sure that the column end piece is in position and that the O-ring is 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 resin through the packing reservoir into the column tube. Avoid introducing air bubbles.
5	Screw the end cap onto the packing reservoir and make sure that the capillary tubing is filled with liquid completely to avoid trapping any air.
6	Connect the capillary tubing to the system and follow the packing instructions provided in the resin instructions.
7	Disconnect the capillary tubing from the system.
8	Remove the packing reservoir.

Step	Action
9	Insert the adapter at an angle, so that no air is trapped inside the column (Fig 7a and 7b).
10	Adjust the adapter against the resin surface as described, see Adjust 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 make sure that any air under the net ring and the capillary tubing is displaced by the liquid (Fig 7c).
13	Continue packing the column according to the packing procedure in the resin instructions.

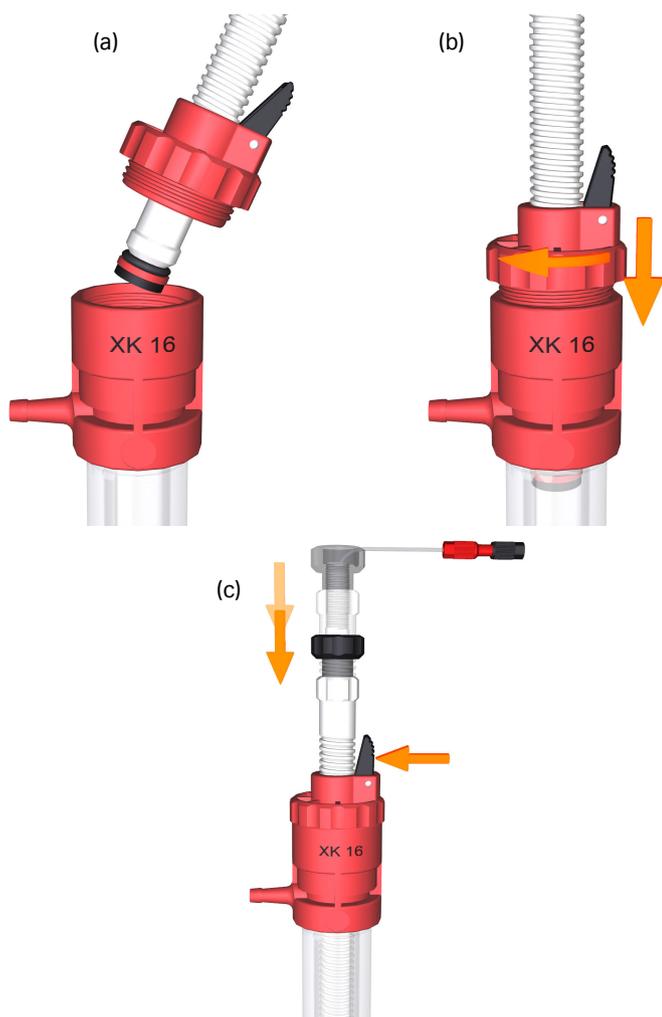


Fig 7. Inserting and adjusting the adapter.

Pack the column using an additional column tube

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

Step	Action
1	Attach the bottom piece to the column.

Step	Action
2	Attach the additional column tube to the column with a packing connector (see Fig 8).

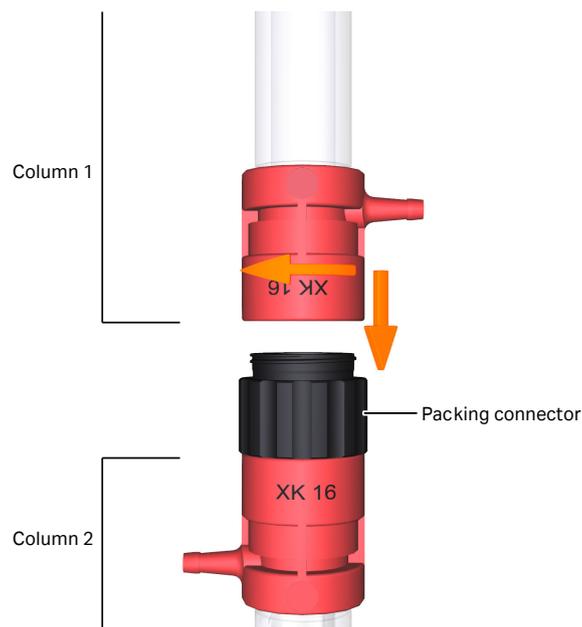


Fig 8. Connecting the column to another column.

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 pour chromatography resin into the column tube. Avoid introducing air bubbles.
6	Insert the adapter.
7	Connect the capillary tubing to the system and follow the packing instructions provided in the resin instructions.
8	After packing the column, disconnect the capillary tubing 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. 7, on page 6 (a) and Fig. 6, on page 4).
11	Slide the adapter down to 1 to 2 cm above the resin bed, using the black QuickLock on the top end cap (Fig. 7, on page 6 (c)).
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 make sure that any trapped air under the net ring and the capillary tubing is displaced by liquid.
14	Continue packing the column according to the packing procedure in the resin instructions.

Adjust the QuickLock adapter in a packed column

When operating the column at higher pressures, it is not possible to press the QuickLock as it has a self-locking mechanism.

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

Step	Action
1	Stop the pump.
2	Disconnect the column from the pump leaving the inlet tubing open.
3	Loosen the adjusting knob on the adapter to slacken the O-ring.
4	Press in the QuickLock and adjust the adapter.
5	Tighten the adjustment knob to obtain a good seal.
6	Fine-tune the adapter position by turning the adapter shaft.

Pack XK 50 columns with two adapters

The spacer for dual adapters is only used for packing an XK 50 column with two adapters, using a packing reservoir. The spacer limits longitudinal movement of the glass tube within the thermostatic jacket and improves the sealing between the column and the packing reservoir.

Note: Only place the spacer for dual adapters on the lower adapter that replaces the bottom piece (Fig 6, item 22).

Step	Action
1	Remove all four tubing connection components (black and yellow colored items in the image below) from the end of the capillary tubing.

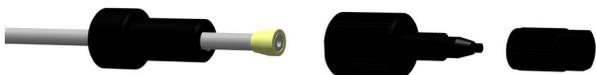
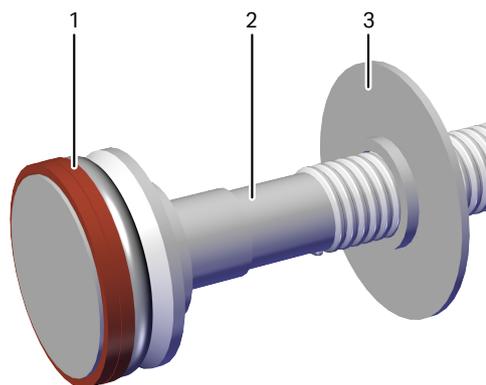


Fig 9. Exploded view of tubing connection components.

2	Loosen the adjusting knob and slide it off the capillary tubing completely.
3	Press the QuickLock on the top end cap and slide the top end cap off the adapter shaft and off the capillary tubing.

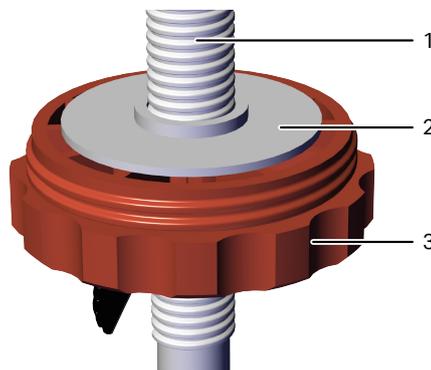
Step	Action
4	Slide the spacer for dual adapters over the capillary tubing and onto the adapter shaft. Make sure that the side with the raised center faces the plunger.



- 1 Plunger
- 2 Adapter shaft
- 3 Spacer for dual adapters

Fig 10. Spacer orientation on the adapter shaft.

5	Reassemble the top end cap onto the adapter shaft.
6	Reassemble the adjusting knob onto the top end of the inner shaft.
7	Reassemble the tubing connection components removed in step 1 onto the end of the capillary tubing.
8	Let the large and flat surface of the spacer for dual adapters rest against the top end cap when assembling the adapter at the bottom of the column tube.

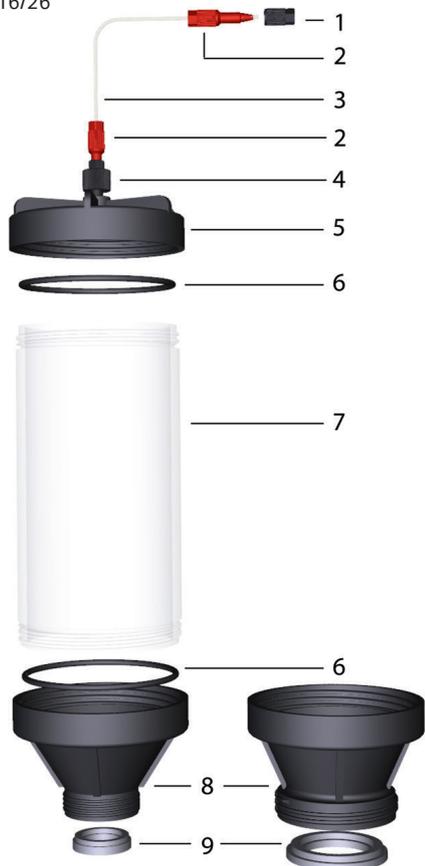


- 1 Adapter shaft
- 2 Spacer for dual adapters
- 3 Top end cap

Fig 11. Spacer orientation on adapter shaft.

Exploded view of packing reservoirs

RK 16/26



RK 50

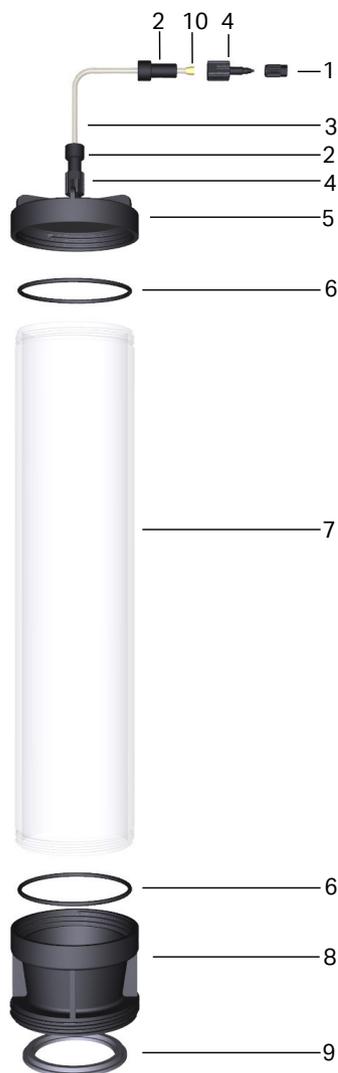


Fig 12. Exploded view of RK 16/26 and RK 50 packing reservoirs.

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

Ordering information

Column	Product code	Adapter ¹	Product code	Packing reservoir	Product code
XK 16/20	28988937	XK 16	28989876	RK 16/26	28989858
XK 16/40	28988938				
XK 16/70	28988946				
XK 16/100	28988947				
XK 26/20	28988948	XK 26	28989877	RK 16/26	28989858
XK 26/40	28988949				
XK 26/70	28988950				
XK 26/100	28988951				
XK 50/20	28988952	XK 50	28989880	RK 50	28989861
XK 50/30	28988953				
XK 50/60	28988964				
XK 50/100	28988965				

¹ Each XK column is delivered with one XK adapter and one bottom piece.

Accessories

Sample applicators	Product code	Tubing connectors	Product code
Superloop™ 10 mL, 1/16" fitting	18111381	HiTrap™/HiPrep™ 1/16" male connector for ÅKTA™ design	28401081
Superloop 50 mL, 1/16" fitting	18111382	Union 5/16 Fe HPLC	18114208

Accessory kits	Product code	Packing connectors	Product code	Column holders	Product code
Accessory kit XK 16 ¹	28989978	Packing connector XK 16	18115344	Column holder	28956282
Accessory kit XK 26 ¹	28989979	Packing connector XK 26	18115345	Column holder XK 50	18309460
Accessory kit XK 50 ²	28989981				

¹ Accessory kit XK 16 and XK 26 each contain:

2 support screens, 5 net rings, 2 O-rings, 2 stop plugs, 10 tubing connectors (HiPrep/HiTrap 1/16" male connectors for ÅKTA design), and 1 tool for dismantling.

² 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 for column

Fig. 6, on page 4 shows the positions of the different parts of the XK columns. For replacements, order according to the spare parts list below using the appropriate product codes.

Note:

For compatibility with old adapters, capillary tubing 1.2 mm, and 0.8 mm (i.d.), flanging kits, and M6 tubing connectors are available as spare parts.

Item no.	Designation	XK 16	XK 26	XK 50	Material	Qty/pack
1	Adapter XK (complete)	28989876	28989877	28989880	A, B, C, D, E, G*/H†	1
	Spacer for dual adapters			29719940	L	1
3	Tubing connector 1/16" male	28401081	28401081	28401081	B	8
4	Capillary tubing 0.75 mm i.d., 1/16" o.d.	18111974	18111974		G	2 m
	Capillary tubing 1/16" i.d., 1/8" o.d.			18112116	H	3 m
	Tubing cutter	18111246	18111246	18111246		1
9	Ferrules 16/26 for 1/16" o.d. tubing	18112706	18112706		G	10
	Ferrules 50 for 1/8" o.d. tubing			18112118	G	10
10	O-ring	19016301	28978227	28978228	E	5
11	Plunger	18103180	18103181	18875801	B	1
12	Support screen	19065101	18937701	19066401	D	5
13	Net ring (10 µm)	18876101	18876001	18875901	B, C	5
14	End piece (complete) item 16 included	18648801	18648901	18879701	A, J, K*	1
17	Glass tube for column length:				F	1
	20 cm	19031501	18100084	18100085		
	30 cm	–	–	19132601		1
	40 cm	19011301	19014501	–		1
	60 cm	–	–	19052501		1
	70 cm	19011401	19014601	–		1
	100 cm	19011501	19014701	19050901		1
18	Thermostatic jacket for column length:				I	
	20 cm	18001172	18100082	18100083		1
	30 cm	–	–	18001178		1
	40 cm	18001173	18001167	–		1
	60 cm	–	–	18001177		1
	70 cm	18001174	18001168	–		1
	100 cm	18001175	18879101	18876501		1
	Transport device	18117643	18117643	–		1
22	Bottom piece (complete)	28989885	28989887	28989888	A, B, C, D, E, G*/H†	1

* XK16/26

† XK50

Materials

A	=	Reinforced acetal plastic
B	=	Polypropylene (reinforced glass fiber)
C	=	Polyamide (nylon)
D	=	Polypropylene
E	=	PTFE coated (Viton)
F	=	Borosilicate glass
G	=	ETFE
H	=	FEP
I	=	PMMA (acrylic)
J	=	EPDM
K	=	PTFE
L	=	Acetal plastic

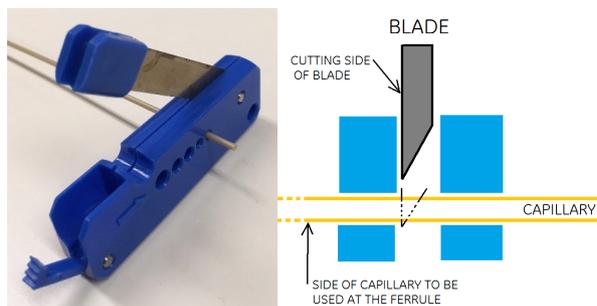


Fig 13. Tubing cutter, equipment and instruction.

Spare parts for packing reservoir

Part	Product code	Qty per pack	Part	Product code	Qty per pack
Sealing ring RK 16	19018901	5	Cap RK50, RK 16/26	18879201	1
Sealing ring RK 26	19019001	5	Ferrules 16/26 for 1/16" o.d. tubing	18112706	10
Sealing ring RK 50	18879801	5	Ferrules 50 for 1/8" o.d. tubing	18112118	10
Conical adapter RK 16	18878701	1	HiTrap/HiPrep 1/16" male connector for ÄKTA design	28401081	8
Conical adapter RK 26	18878601	1	Union 1/16" female M6 male	18111257	6
Conical adapter RK 50	18878501	1	Union 5/16" female 1/16" male	18114208	8
O-ring RK	18025391	5	Union 5/16" female / M6 male	18112776	3
Cylinder RK 16/26	18878901	1	Connector 5/16" male for 1/8" tubing	18112117	10



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