XK empty columns

CHROMATOGRAPHY COLUMNS

XK empty columns are designed for liquid chromatography at low to medium pressure. The user-friendly design ensures trouble-free operation with fittings for direct connection to ÄKTA™ design instruments or other high-performance liquid chromatography systems. The product family is based on a proven design for high reproducibility and accurate results. XK columns are compatible with aqueous solutions and most organic solvents used in liquid chromatography of macromolecules.

Features and benefits of XK empty columns include:

- Plunger design to ensure a homogeneous buffer distribution and reproducible packing
- Adapter QuickLock mechanism that facilitates column handling and cleaning
- Fittings for direct connection to chromatography systems
- Cooling jacket for sensitive purifications

XK empty columns provide reliable and reproducible separations. The tube material is made of borosilicate glass, which allows for visual inspection of the media bed. The columns are made of biocompatible materials that exhibit excellent chemical resistance. A broad range of column dimensions makes XK columns suitable for many different purification needs.

Column packing can be performed using either a packing reservoir or an extra column tube attached with a packing connector. The QuickLock mechanism of the adapter shaft facilitates rapid and easy movement of the adapter, simplifying adjustments of the bed height, disassembly, and cleaning. The design of the adapter plunger gives a uniform flow which maintains the integrity of the packed bed during operations. An extensive range of spare parts is available, facilitating maintenance.



Fig 1. XK empty columns.

Column characteristics

XK empty columns are available in three dimensions, each with several lengths (Table 1). Main parts of the column are shown in Figure 2. The chromatographic column tube (1) consists of the glass tube (2), a thermostatic jacket (3), and two column end pieces (4). The red end pieces are made from reinforced acetal plastic, holding the glass tube and the thermostatic jacket in position. Each end piece houses an O-ring, a sealing ring, a washer ring, and a locking ring. The bottom piece (5) is screwed 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 (6). The adapter (7) 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 (8) that seals the adapter to the column wall. XK columns 16 and 26 are supplied with ETFE capillary tubing and XK column 50 is supplied with PTFE tubing.

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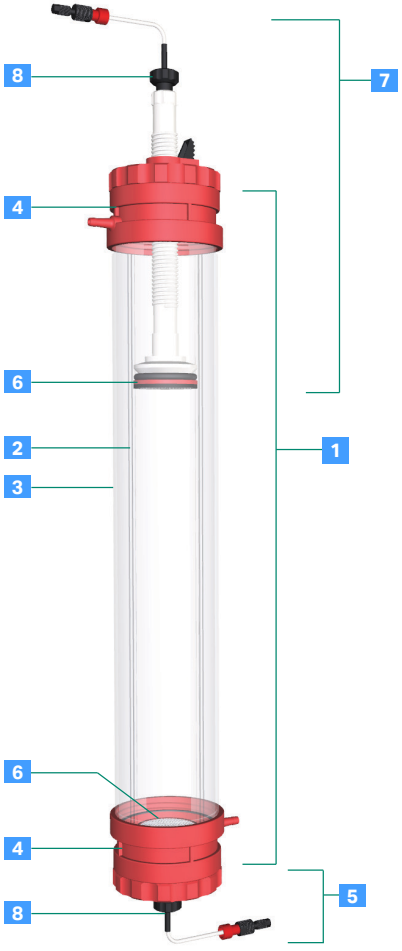


Fig 2. Components of the XK column.

Table 1. Column dimensions for XK empty 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

Operation

The columns 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 thermostatic jacket withstands temperatures up to 40°C. The column can be autoclaved by first removing the thermostatic jacket, tubings, and net ring.

Under normal operating conditions, the materials in contact with the liquid phase are polypropylene, borosilicate glass, polyamide, fluoro-rubber, PTFE tubing, and ETFE ferrules and tubings.

Chemical resistance

The columns can be used in aqueous solutions and in most organic solvents commonly used in liquid chromatography of macromolecules, with the following exceptions: chlorinated hydrocarbons, acetone and other ketones, aliphatic esters, and phenol. Solutions containing more than 10% sodium hydroxide, 10% hydrochloric acid, other strong mineral acids, or 5% acetic acid should not be used.

The thermostatic jacket is made from acrylic plastic and should only be used with water as cooling fluid since the material is not resistant to alcohols, ethylene glycol, or other organic solvents.

Prepacked columns

XK columns are also offered prepacked with Superdex™ media, ion exchange Sepharose™ media, or Phenyl Sepharose.

Applications

The XK columns are well suited for many liquid chromatography techniques. Figure 3 shows a separation of monoclonal antibody monomer from aggregates using XK 16/70 packed with Superdex 200 prep grade.

Column: XK 16/70 packed with Superdex 200 pg
Sample: Monoclonal antibodies purified on HiScreen™ MabSelect SuRe™ LX
Sample volume: 1 ml
Buffer: 0.010 M phosphate buffer, 0.14 M NaCl, 0.0027 M KCl, pH 7.4 (PBS)
Flow rate: 1 ml/min (30 cm/h))

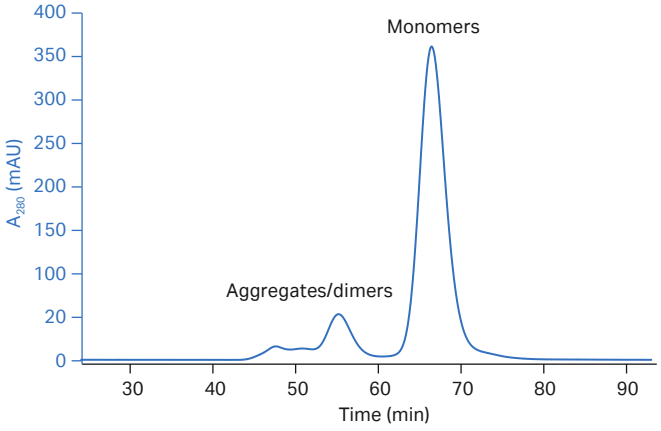


Fig 3. Separation of monoclonal antibody monomers from aggregates/dimers on XK 16/60 Superdex 200 prep grade. 85% of IgG_4 was monomers (9.5 mg).

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Figure 4 demonstrates a selectivity comparison of model proteins. Superdex 75 prep grade (A) gives excellent resolution of the three smallest proteins while Superdex 200 prep grade (B) separates the two largest proteins.

Columns:	A) XK 16/70 packed with Superdex 75 pg B) XK 16/70 packed with Superdex 200 pg
Sample:	1. Myoglobulin, 1.5 mg/ml, M_r 17 000 2. Ovalbumin, 5 mg/ml, M_r 44 000 3. Albumin, human 5 mg/ml, M_r 66 000 4. IgG, 0.2 mg/ml, M_r 158 000 5. Ferritin, 0.24 mg/ml, M_r 440 000
Sample volume:	500 µl
Buffer:	0.010 M phosphate buffer 0.14 M NaCl, 0.0027 M KCl, pH 7.4 (PBS)
Flow rate:	1 ml/min (30 cm/h)

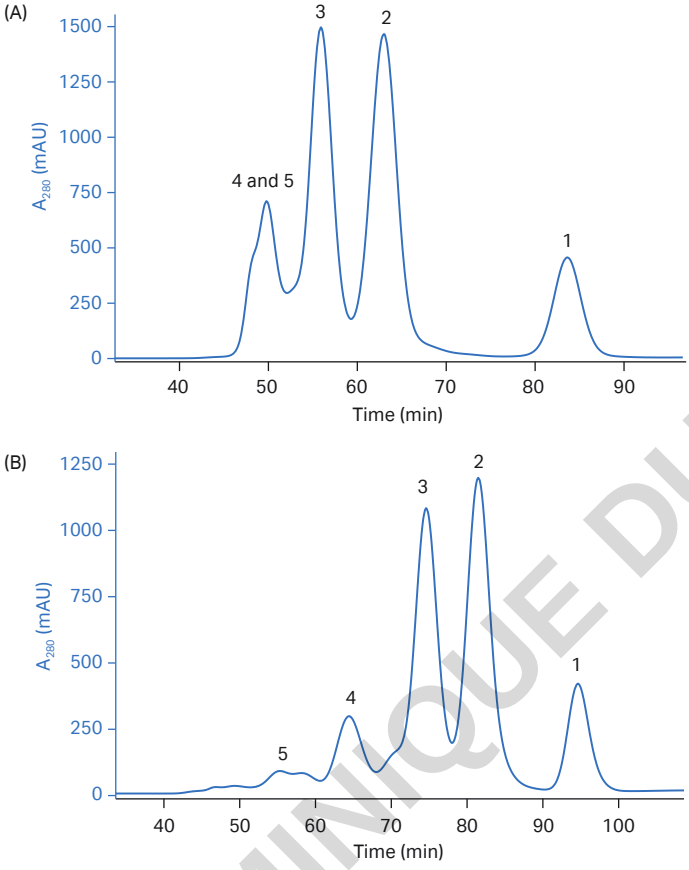


Fig 4. Comparison of the selectivity of Superdex 75 prep grade and Superdex 200 prep grade for model proteins. Superdex 75 prep grade (A) gives excellent resolution of the three proteins in the M_r range 17 000 to 67 000 while the two largest elute together in the void volume. Superdex 200 prep grade (B) resolves these two largest proteins. The ferritin (5) contains aggregates and thus results in a double peak.

Ordering information

XK columns are delivered complete with a thermostatic jacket, one adapter, one bottom piece and tubing at both ends for direct connection to valves and pumps.

Product	Code number
XK 16/20	28-9889-37
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 26/40	28-9889-49
XK 26/70	28-9889-50
XK 26/100	28-9889-51
XK 50/20	28-9889-52
XK 50/30	28-9889-53
XK 50/60	28-9889-64
XK 50/100	28-9889-65

Adapters*	
XK 16	28-9898-76
XK 26	28-9898-77
XK 50	28-9898-80

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

Packing reservoir	
RK 16/26	28-9898-58
RK 50	28-9898-61

Accessory kits	
Accessory kit XK16†	28-9899-78
Accessory kit XK26†	28-9899-79
Accessory kit XK50‡	28-9899-81

† Accessory kit XK 16 and XK 26 contain 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.

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XK columns are specified to run all media including Superdex prep grade and Sepharose High Performance media.

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