YMC BULK STATIONARY PHASES FOR NP- RP- AND CHIRAL PREP-LC
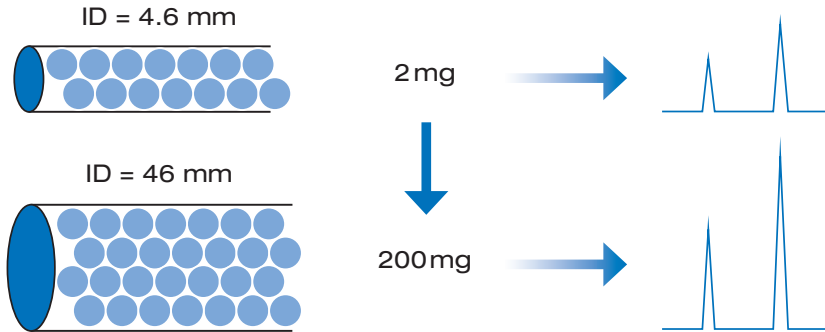
		STATIONARY PHASE	BASE MATERIAL	PARTICLE SIZE* (µm)	PORE SIZE* (nm)	CARBON LOAD** (%C)	pH RANGE	TYPICAL APPLICATIONS
Reversed Phase	C18	YMC-Triart Prep C18-S	Organic/inorganic hybrid silica	7, 10, 15, 20	12	20	2.0–10.0	acidic, neutral, basic compounds, peptides, oligonucleotides, small molecules, amino acids, APIs, sugars
		YMC*Gel ODS-A-HG	High grade silica	10, 15, 20, 50	8, 12, 20, 30	20, 17, 12, 7	2.0–7.5	peptides, proteins, amino acids, pharmaceuticals
		YMC*Gel ODS-AQ-HG	High grade silica	10, 15, 20, 50	8, 12, 20	15, 14, 10	2.0–7.5	peptides, nucleic and amino acids, pharmaceuticals, in particular for more polar compounds
	C8	YMC-Triart Prep C8-S	Organic/inorganic hybrid silica	10, 15, 20	12, 20	17, 13	2.0–10.0	acidic, neutral, basic compounds, peptides, oligonucleotides, small molecules, amino acids, APIs
		YMC-Triart Prep Bio200 C8	Organic/inorganic hybrid silica	10	20	14	2.0–10.0	peptides (especially insulin, insulin-like peptides), proteins, oligonucleotides
		YMC*Gel C8-HG	High grade silica	10, 15, 20, 50	12, 20, 30	10, 7, 4	2.0–7.5	peptides, proteins, pharmaceuticals
		YMCbasic	Classical silica	10	20	7	2.0–7.5	small molecules, peptides (specifically insulin), basic compounds
	⬡	YMC-Triart Prep Phenyl-S	Organic/inorganic hybrid silica	10	12	17	2.0–10.0	acidic, neutral, basic compounds, small proteins, peptides, phenols, aromatics
		YMC*Gel Ph-HG	High grade silica	10, 15, 20, 50	12, (20, 30)	9	2.0–7.5	phenols, fullerenes, sweeteners, aromatics
	C4	YMC-Triart Prep C4-S	Organic/inorganic hybrid silica	10	12	14	2.0–10.0	acidic, neutral, basic compounds, peptides, oligonucleotides, small molecules, APIs
		YMC*Gel C4-HG	High grade silica	10, 15, 20, 50	12, 20, 30	7, 5, 3	2.0–7.5	proteins, antibodies, peptides
	C1	YMC*Gel TMS-HG	High grade silica	10, 15, 20, 50	12, (20, 30)	4	2.0–7.5	(water-soluble) vitamins
		YMC Omega	Classical silica	10, 20, 50	proprietary	15	2.0–7.5	polyunsaturated fatty acids, EPA, DHA
Normal Phase/HILIC	NH₂	YMC*Gel NH₂-HG (Amino)	High grade silica	10, 15, 20, 50	12, (20, 30)	3	2.0–7.5	sugars, nucleotides, (water-soluble) vitamins
	CN	YMC*Gel CN-HG (Cyano)	High grade silica	10, 15, 20, 50	12, (20, 30)	7	2.0–7.5	RP, NP, SFC, HILIC, proteins, steroids, catechols, nitroaromatics
	Diol	YMC*Gel Diol-HG	High grade silica	10, 15, 20, 50	12, 20, 30	—	2.0–7.5	NP, SFC, HILIC, small organic molecules, (fat-soluble) vitamins, tocopherols, steroids, phenols
		YMC*Gel SIL-HG (Silica)	High grade silica	10, 15, 20, 50	6, 8, 12, 20, 30	—	—	NP, SFC, HILIC, small organic molecules, (fat-soluble) vitamins, tocopherols, steroids
		YMC*Gel SIL (Silica)	Classical silica	50, 75, 150	6, 12	—	—	small organic molecules, (fat-soluble) vitamins, tocopherols, steroids
Chiral	Polysaccharides	CHIRAL ART Amylose-C Neo	Classical silica	10, 20	proprietary	—	—	NP, SMB and SFC mode, wide application range for chiral separations
		CHIRAL ART Cellulose-C	Classical silica	10, 20	proprietary	—	—	NP, SMB and SFC mode, wide application range for chiral separations
		CHIRAL ART Amylose-SA	Classical silica	10, 20	proprietary	—	2.0–9.0	NP, SMB, SFC and RP mode, wide application range for chiral separations
		CHIRAL ART Cellulose-SB	Classical silica	10, 20	proprietary	—	2.0–9.0	NP, SMB, SFC and RP mode, wide application range for chiral separations
		CHIRAL ART Cellulose-SC	Classical silica	10, 20	proprietary	—	2.0–9.0	NP, SMB, SFC and RP mode, wide application range for chiral separations
		CHIRAL ART Cellulose-SJ	Classical silica	10, 20	proprietary	—	2.0–9.0	NP, SMB, SFC and RP mode, wide application range for chiral separations

*not all combinations of particle and pore size are available · **with respect to pore size
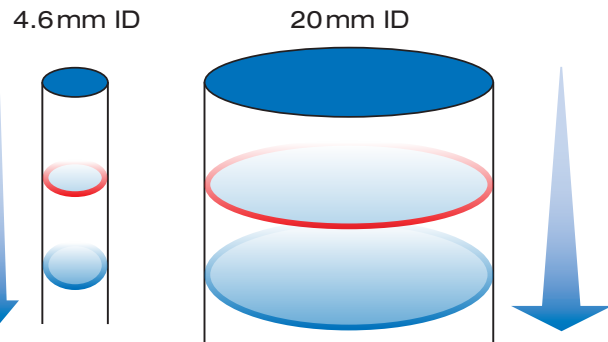
YMC — LINEAR SCALE-UP FOR PREPARATIVE CHROMATOGRAPHY

Linear Scale-up: Loading

$$SF = \frac{ID^2_{prep.}}{ID^2_{analyt.}} = \frac{m_{prep.}}{m_{analyt.}} \rightarrow SF = \frac{(46\ mm)^2}{(4.6\ mm)^2} = \frac{200\ mg}{2\ mg} = 100$$

SF = 100

ID = 4.6 mm

ID = 46 mm

2 mg → 200 mg

Linear Scale-up: Flow rate and retention time

$$SF = \frac{ID^2_{prep.}}{ID^2_{analyt.}} \rightarrow SF = \frac{(20\ mm)^2}{(4.6\ mm)^2} = 18.9$$

4.6 mm ID   20 mm ID

Flow rate: 1 ml/min   **18.9** ml/min

		Lab scale → Production scale								
Column inner diameter [mm ID]		4.6	10	20	30	50	100	200	500	1,000
Cross sectional area ratio		1.0	4.7	19	42	118	473	1,890	11,800	47,300
Example of calculation	**Flow rate [ml/min]**	0.5	2.4	9.5	21	60	235	950	6,000 (6 L)	24,000 (24 L)
		1.0	4.7	19	42	120	470	1,900	12,000 (12 L)	47,000 (47 L)
	Loading [mg]	5	25	100	220	600	2,500	10,000	60,000 (60 g)	240,000 (240 g)
Column efficency, Pressure, Costs (HIGH → LOW)	**Particle size [µm]** 5	+++	+++	+++	+++	++	+			
	10	++	+++	+++	+++	+++	++	++	++	++
	10–20	+	++	++	++	+++	+++	+++	++	++
	15–30		+	+	+	++	+++	+++	+++	++
	50~					+	++	++	+++	+++

+++ Most appropriate, ++ Appropriate, + Depending on purpose

The YMC Scale-up Calculator