

16 mm Screw Elements Portfolio

The screw shaft flexibility is a key success factor of co-rotating parallel twin screw extruders. It allows to change the screw configuration to meet various application requirements. To suite various applications the screw elements are offered manufactured from various materials. The standard material (EN40B) is a proven compromise between wear and corrosion resistance. For pharmaceutical or food applications, screw elements manufactured from surgical grade steel 1.4123 (X15 TN). For increased wear resistance elements are also offered manufactured from power metallurgic alloy (CPM).



Conveying elements

Conveying elements have a self wiping twin lead geometry and are used in feeding, conveying and venting sections along the screw configuration. Standard element's helix has a pitch of 1 L/D. The helix pitch may vary to increase or decrease the free volume and conveying speed. All Feed Screws shown in the following table have a length of 1 L/D to visualize the different helix pitch.

Feed Screw	Helix	Length	Standard	Pharma	CPM
	1 L/D	1 L/D	040-0107	041-0235	041-4238
		1/2 L/D	040-0274	041-0236	041-4239
	3/2 L/D	2 L/D	041-5899	041-7089	042-4480
	2/3 L/D	1 L/D	041-6023	041-7323	

Table 1

Reverse conveying elements can be placed at the end of a mixing section to increase the residence time within the mixing section. In extreme cases where longer than 1/2 L/D reverse feeding is required, the elements can be combined.

Reverse Feed Screw	Helix	Length	Standard	Pharma	CPM
	-1 L/D	1/2 L/D	040-2745	041-4831	042-8329

Table 2

Wide throat elements allow feeding larger sized particles (broken flakes rather than pellets). They should mostly convey solid particles, so they are mainly used within the main feeding zone. The wide throat element's geometry is not self wiping and due to their single lead helix they are shaft specific. Transitions to twin lead elements (generally Feed Screws) have to be performed by shouldered elements.

Wide Throat Element	Shaft	Length	Standard	Pharma	CPM
	α	1 L/D	040-1874	041-4875	
	β	1 L/D	040-1875	041-4876	
Shouldered WTE	Shaft	Length	Standard	Pharma	CPM
	α	1 L/D	040-8653	041-4877	
	β	1 L/D	040-8654	041-4878	

Table 3

Mixing Elements

Mixing sections are created by combination several multiple single mixing elements. The offset between neighbored elements determine the conveying and mixing properties. The conveying properties decrease with increasing offset angles while the mixing properties increase. In extreme 90° offset sections have pure mixing and no conveying capabilities. By alternating elements with 0° and 90° on the hexagonal shaft orientation 30° and 90° offsets can be achieved. To achieve 60° (forward or also reverse) offsets elements of the same orientation are combined.

Most common mixing elements have a length of 1/4 L/D. Longer elements (1/2 L/D) introduce higher shear while shorter elements (1/8) dispersive mixing improve.

Mixing Blocks

Mixing block elements build a solid block of mixing elements. The geometry is the same as build from individual mixing elements. The solid block has an increased overall strength. Especially for the first mixing/melting zone's start mixing blocks can be used for high performance material applications.

Distributive Flow Elements

Distributive Flow Elements generate a low energy mixing. The distributive flow dominates over shear flow. These type of elements may be used to incorporate liquids into a melt further downstream the extruder barrel.

Each element combines an outer grooved and inner plain diameter disk. The element's orientation alters on both shafts. Due to the notched outer disk distributive flow elements have a non self wiping geometry. Distributive Flow elements are available with different notch depth (Full (1), 1/2 and 1/4 depth) and also with different disk thickness, what leads to different element length. The pictures in the following table display full depth elements, the Length refers to the total element length.

Distributive Feed Screws are a different form of distributive mixing elements. The basic geometry is the same a

Mixing Elements	Angle	Length	Standard	Pharma	CPM
	0°	1/4 L/D	040-0104	041-0239	041-4134
		1/2 L/D	041-2631	042-1380	042-3335
		1/8 L/D		041-9838	
	90°	1/4 L/D	040-0105	041-0240	041-4135
		1/2 L/D	041-2632	042-1381	042-3336
		1/8 L/D		041-9839	

Table 4

Mixing Blocks	Length	Length	Standard	Pharma
	5x30°	1 1/4 L/D	041-5902	042-1431
	5x60°	1 1/4 L/D	041-5901	041-8524
	5x90°	1 1/4 L/D	041-5900	042-1432
	4x60°	1/2 L/D		042-2372
	4x90°	1/2 L/D		042-2371

Table 5

Distributive Flow Elements	Depth/Helix	Length	Standard	Pharma	CPM
	1	1/2 L/D	042-3332	041-7325	042-3330
	1/2		042-0000		
	1/4		041-9999		
	1	1/4 L/D	042-3333	042-2370	042-3331
	1 L/D	1 L/D		042-2653	
	2/3 L/D	1 L/D		042-2693	

Table 6

Extrusion Element	Shaft	Length	Standard	Pharma	CPM
	α	1 1/2 L/D	040-0127	041-2123	041-3796
	β	1 1/2 L/D	040-0126	041-2124	041-3795
	-	1 L/D	040-0521	041-2121	-

Table 7

standard feed screw. To generate the material's distribution flow, the helix is grooved to allow material exchange between both conveying channels.

Extrusion Elements

Extrusion elements have a single lead geometry to generate the required extrusion pressure. Single lead ele-

ments need to be shaft specific (α- and β-shaft). An end cylinder limits the shaft geometry. So extrusion elements have a counter bored end face. For open discharge application also conveying elements with the counter bore are available.

Process Instruments

International/Germany

Dieselstr. 4,
76227 Karlsruhe
Tel. +49(0)721 40 94-444
info.mc.de@thermofisher.com

Benelux

Tel. +31 (0) 76 5 87 98 88
info.mc.nl@thermofisher.com

China

Tel. +86 (21) 68 65 45 88
info.mc.china@thermofisher.com

France

Tel. +33 (0) 1 60 92 48 00
info.mc.fr@thermofisher.com

India

Tel. +91 (20) 66 26 7000
info.mc.in@thermofisher.com

Japan

Tel. +81 45 453 9167
info.mc.jp@thermofisher.com

United Kingdom

Tel. +44 (0) 1606 54 81 00
info.mc.uk@thermofisher.com

USA

Tel. 603 436 9444
info.mc.us@thermofisher.com

www.thermoscientific.com/mc

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