



cowie[®]

PTFT

**Laboratory
Products**



BETTER SYNDICATE CO., LTD.

WWW.BETTERSYNDDICATE.CO.TH

The worlds leading specialist for the design and manufacture of PTFE Laboratory Products, including:-

PTFE Labware

and **PTFE Process Chemistry Equipment**

PTFE used in the manufacture of COWIE® PTFE Laboratory Products is pure, virgin material which conforms to FDA and USP Class VI requirements.

PTFE is the material of choice for -

■ **Chemical Resistance**

The chemical resistance of PTFE is almost total over its working temperature range. Reaction is limited to some compounds with free electrons such as sodium in liquid ammonia and some fluorine compounds at high temperature and pressure. Halogens will penetrate PTFE but without apparent reaction.

■ **Thermal Stability**

The thermal stability of PTFE is outstanding. The material can be used to ca. 280°C yet there is no embrittlement in liquid helium. Thermal degradation does not commence until about 400°C. PTFE does not melt to form a liquid phase.

■ **Insolubility & Purity**

The PTFE we use conforms to USP Class VI and FDA requirements and is intrinsically pure and contains no additives. PTFE is insoluble in all known solvents except under extremes of pressure and temperature and will not contaminate media by dissolution.

■ **Sterilisation**

PTFE can be sterilised by all usual means except gamma radiation.



JOINT CLAMPS

Safe • Reliable • Long Life • Exceptional Value

Joint Clamps are unaffected by all chemical reagents. Totally encapsulated steel spring maintains strength to 280°C. Adjust simply by compression-extension by hand.

Ref No.	Joint
030.010.1	10/-
.012.1	12/-
.014.1	14/-
.019.1	19/-
.024.1	24/-
.029.1	29/-
.034.1	34/-
.040.1	40/-
.045.1	45/-



A COWIE® Original Design

THIN WALL JOINT SLEEVES

Thin Wall Joint Sleeves are inserted between standard taper ground glass joints to eliminate the use of grease and prevent sticking. Sleeves have a wall thickness of about 0.05mm and will withstand low to medium vacuum.

FULL LENGTH 'A' TYPE

Ref No.	Joint
019.007	7/25
.010	10/30
.012	12/30
.014.1	14/20
.014	14/35
.019.1	19/22
.019	19/38
.024	24/40
.029	29/42
.034	34/45
.040	40/50
.045	45/50
.050	50/50
.055	55/50
.060	60/50
.070	71/60

MEDIUM LENGTH 'B' TYPE

Ref No.	Joint
019.107	7/16
.110	10/19
.112	12/21
.114	14/23
.119	19/26
.124	24/29
.129	29/32
.134	34/35
.140	40/38
.145	45/40
.150	50/42
.155	55/44
.160	60/46
.170	71/51



STANDARD TAPER COMPRESSION FITTINGS

Compression Fittings fit standard taper ground glass joints to hold items such as temperature probes and sampling tubes securely in place.

Compression fittings are manufactured from pure PTFE with a PEEK olive to give a secure grip.

PTFE Plugs are available to seal compression fittings without removing the fitting - see page 51 for sizes.

To define the Reference Number of the required part add the bore size suffix to the required taper reference using the table below.

Example:

A fitting with a 19/38 taper and 8mm bore is -
PC704.1938.08



FULL LENGTH 'A' TYPE - METRIC BORE

Ref No.	Taper	Bore Size (mm)							
		3	6	8	12	14	16	19	25
PC704.1938.XX	19/38	.03	.06	.08	.12				
.2440.XX	24/40		.06	.08	.12	.14	.16		
.2942.XX	29/42				.12	.14	.16	.19	
.3445.XX	34/45				.12	.14	.16	.19	.25
.4550.XX	45/50				.12	.14	.16	.19	.25

MEDIUM LENGTH 'B' TYPE - METRIC BORE

Ref No.	Taper	Bore Size (mm)							
		3	6	8	12	14	16	19	25
PC704.1926.XX	19/26	.03	.06	.08	.12				
.2429.XX	24/29		.06	.08	.12	.14	.16		
.2932.XX	29/32				.12	.14	.16	.19	
.3435.XX	34/35				.12	.14	.16	.19	.25
.4540.XX	45/40				.12	.14	.16	.19	.25

FULL LENGTH 'A' TYPE - IMPERIAL BORE

Ref No.	Taper	Bore Size (in)							
		1/8"	1/4"	5/16"	1/2"	9/16"	5/8"	3/4"	1"
PC704.1938.XXX	19/38	.125	.250	.312	.500				
.2440.XXX	24/40		.250	.312	.500	.560	.625		
.2942.XXX	29/42				.500	.560	.625	.750	
.3445.XXX	34/45				.500	.560	.625	.750	.1000
.4550.XXX	45/50				.500	.560	.625	.750	.1000

MEDIUM LENGTH 'B' TYPE - IMPERIAL BORE

Ref No.	Taper	Bore Size (in)							
		1/8"	1/4"	5/16"	1/2"	9/16"	5/8"	3/4"	1"
PC704.1926.XXX	19/38	.125	.250	.312	.500				
.2429.XXX	24/40		.250	.312	.500	.560	.625		
.2932.XXX	29/42				.500	.560	.625	.750	
.3435.XXX	34/45				.500	.560	.625	.750	.1000
.4540.XXX	45/50				.500	.560	.625	.750	.1000

PTFE used in the manufacture of COWIE® PTFE Laboratory Products is pure, virgin material which conforms to FDA and USP Class VI requirements.

The worlds largest range of stirrer bars -



- Isostatic encapsulation to eliminate cracks and porosity
- FDA and USP Class VI approved PTFE
- Alnico V and Rare Earth magnet cores
- Polished finish to reduce pick-up and cross contamination

Magnetic stirring is a widely used and long established method for stirring and mixing in liquid media. The process is not only simple and inexpensive, but extremely diverse in the range of application.

Examples include: synthetic procedures, drug delivery, chemical analysis, flow control, emulsification, milling and grinding and solid phase extraction.

Magnetic stirring can be used in open and closed systems, over a range of positive and negative pressure, over a broad temperature range and with virtually any chemical reagent. The use of bearings, glands, seals and complex drive mechanisms common to other mixing systems are not required.

Magnetic stirring - Key Points

Material:

PTFE is the material of choice for encapsulation because of its almost total chemical resistance and its wide range of working temperature -200°C to $+280^{\circ}\text{C}$.

Shape:

It is difficult to quantify the most effective shape for a particular stirring application, some shapes are self-evident, for example, an oval or egg shape for round bottom containers or a flat and triangular shape where a scraping action is required, large containers generally require large stirring bars. For very viscous liquids a vaned stirrer at slow speed is required, while for stirring in shallow dishes a long thin stirrer also at slow speed is effective. Often, however, selection is a matter of choice or trial with various shapes.

Particle Formation and Abrasion:

PTFE is a relatively soft material and the rubbing action against the surface of the container may generate small particles. In an application where the generation of such particles must be avoided, the stirring system must be evaluated before actual use. Generation of particles is reduced by careful selection of the shape of stirrer, ensuring the contact surfaces are smooth and even, not using an over powerful stirring bar or use suspended stirring.

Coupling Effects:

De-coupling in the form of spin-out, tumbling or migration is generally due to weakness in the strength of the magnetic circuit, a mismatch in the sizes of drive magnet and stirrer bar or a stirring speed too high.

Rare Earth Magnets:

Rare Earth Magnets may behave in an erratic manner due to increased strength and may migrate to one of the poles of the drive magnet or tumble with great ease and must, therefore, be selected with great care. Due to the strength of Rare Earth Magnets, there may be an increase in abrasion between the container and stirrer, which may cause increased particle generation.

Sterilisation:

PTFE stirring bars can be sterilised by chemical or thermal means, but not by gamma radiation.

Traceability & Change Control:

Full traceability and change control agreements available on request.

CYLINDRICAL

Cylindrical Stirrer Bars have a smooth, round profile. A popular general purpose stirrer for a wide variety of applications.

Ref No.	L (mm)	Ø (mm)
001.106	6 x	3
.108	8 x	3
.110.6	10 x	6
.112	12 x	4.5
.113.6	13 x	6
.113.8	13 x	8
.113.10	13 x	10
.115	15 x	4.5
.115.6	15 x	6
.120	20 x	6
.120.7	20 x	7
.120.8	20 x	8
.125.5	25 x	5
.125	25 x	6
.125.8	25 x	8
.130	30 x	6
.130.7	30 x	7
.130.8	30 x	8
.135	35 x	6
.140.7	40 x	7
.140	40 x	8
.145	45 x	8
.150	50 x	8
.160	60 x	10
.170	70 x	10
.180	80 x	10
.0120	120 x	12
.0127	127 x	12
.0165	165 x	12



PLAIN

Plain Stirrer Bars have a similar action to cylindrical but give more turbulence at low speed.

Ref No.	L (mm)	Ø (mm)
001.210.6	10 x	6
.212	12 x	4.5
.213.8	13 x	8
.215	15 x	4.
.215.6	15 x	6
.220	20 x	6
.220.7	20 x	7
.225	25 x	6
.225.8	25 x	8
.225.10	25 x	10
.230	30 x	6
.230.7	30 x	7
.235	35 x	6
.235.7	35 x	7
.235.10	35 x	10
.240	40 x	8
.250.7	50 x	7
.250	50 x	8
.250.10	50 x	10
.257	57 x	27
.260.7	60 x	7
.260.8	60 x	8
.260	60 x	10
.265.13	65 x	13
.270	70 x	10
.275	75 x	13
.280	80 x	10
.2108	108 x	27
.2159	159 x	27



PTFE Stirrer Bar dimensions are NOMINAL and are approximately $\pm 5\%$ for Length and $\pm 10\%$ for Diameter of the stated values.

PIVOT RING



Pivot Ring Stirrer Bars are for use in containers with bases that are slightly curved or uneven - the pivot enables the stirrer to adopt the optimum position for stirring.

Ref No.	L (mm)	Ø (mm)
001.308	8 x	3
.312	12 x	4.5
.312.6	12 x	6
.313.8	13 x	8
.315	15 x	4.5
.315.8	15 x	8
.320	20 x	6
.325	25 x	6
.325.10	25 x	10
.330	30 x	6
.335	35 x	6
.340	40 x	8
.345	45 x	8
.350	50 x	8
.357	57 x	24
.360	60 x	10
.370	70 x	10
.375.13	75 x	13
.3108	108 x	24
.3159	159 x	24

OCTAHEDRAL



Octahedral Stirrer Bars use a similar action to Pivot Ring type but with increased turbulence at low speeds.

Ref No.	L (in)	Ø (in)	L (mm)	Ø (mm)
001.513.3	½ x	⅙	13 x	3
.513	½ x	⅙	13 x	8
.513.10	½ x	⅙	13 x	10
.515	⅝ x	⅙	15 x	8
.522	⅞ x	⅙	22 x	8
.525	1 x	⅙	25 x	8
.525.10	1 x	⅙	25 x	10
.528	1⅛ x	⅙	28 x	8
.538	1½ x	⅙	38 x	8
.538.10	1½ x	⅙	38 x	10
.541	1⅝ x	⅙	41 x	8
.551	2 x	⅙	51 x	8
.551.10	2 x	⅙	51 x	10
.564.8	2½ x	⅙	64 x	8
.564	2½ x	⅙	64 x	10
.575	3 x	½	75 x	13

COLOURED OCTAHEDRAL



Coloured Octahedral Stirrer Bars are for use where identification is of prime importance.

Note: Coloured PTFE coatings are not as inert as pure PTFE. Suffix R=Red, B=Blue, Y=Yellow

Ref No.	L (in)	Ø (in)	L (mm)	Ø (mm)
001.513-R,B or Y	½ x	⅙	13 x	8
.515-R,B or Y	⅝ x	⅙	15 x	8
.522-R,B or Y	⅞ x	⅙	22 x	8
.525-R,B or Y	1 x	⅙	25 x	8
.538-R,B or Y	1½ x	⅙	38 x	8
.551-R,B or Y	2 x	⅙	51 x	8
.575-R,B or Y	3 x	½	75 x	13

MICRO

Micro Stirrer Bars are for the very smallest containers.
Note: Always use the largest stirrer bar possible.

Ref No.	L (mm)	Ø (mm)
001.802	2 x	2
.803	3 x	3
.805	5 x	2
.806	6 x	3
.807	7 x	2
.808	8 x	1.5
.808.3	8 x	3
.810	10 x	3
.813	13 x	3
.815	15 x	1.5
.820	20 x	3
.830	30 x	3



COLOURED MICRO

Coloured Micro Stirrer Bars for identification purposes.
Note: Coloured PTFE coatings are not as inert as pure PTFE. Suffix R=Red, B=Blue, Y=Yellow

Ref No.	L (mm)	Ø (mm)
001.802-R,B or Y	2 x	2
.803-R,B or Y	3 x	3
.805-R,B or Y	5 x	2
.806-R,B or Y	6 x	3
.807-R,B or Y	7 x	2
.808-R,B or Y	8 x	1.5
.808.3-R,B or Y	8 x	3
.810-R,B or Y	10 x	3
.813-R,B or Y	13 x	3
.815-R,B or Y	15 x	1.5



OVAL

Oval Stirrer Bars are for use in round bottomed flasks.

Ref No.	L (mm)	Ø (mm)
001.610	10 x	5
.615	15 x	6
.620	20 x	10
.625.10	25 x	10
.625	25 x	12
.630.10	30 x	10
.630	30 x	16
.635.13	35 x	13
.635	35 x	16
.640.13	40 x	13
.640	40 x	20
.650.17	50 x	17
.650	50 x	20
.664	64 x	20
.670	70 x	20
.670.25	70 x	25
.670.27	70 x	27
.6100	100 x	30
.6150	150 x	40



OCTOVAL

Octoval Stirrer Bars are an effective stirrer with action similar to Oval/Pivot Ring types.

Ref No.	L (mm)	Ø (mm)	L (in)	Ø (in)
001.3319	19 x	10	¾ x	⅜
.3325	25 x	13	1 x	½
.3338	38 x	16	1½ x	⅝
.3341	41 x	19	1⅝ x	¾
.3351	51 x	19	2 x	¾
.3364	64 x	19	2½ x	¾
.3376	76 x	19	3 x	¾



REMOVABLE RING



Removable Ring Stirrer Bars are for use as Cylindrical or Pivot Ring types.

Ref No.	L (mm)	Ø (mm)
001.1712	12 x	8
.1725	25 x	8
.1732	32 x	8
.1738.8	38 x	8
.1738	38 x	10
.1742	42 x	10
.1751.8	51 x	8
.1751	51 x	10
.1775	75 x	12
.17102	102 x	16
.17127	127 x	16
.17150	150 x	19

TAPERED



Tapered Stirrer Bars are an effective stirrer with action similar to Oval/Pivot Ring types.

Ref No.	L (mm)	Ø (mm)
001.1910	10 x	4
.1915	15 x	
.1920	20 x	7
.1925	25 x	8
.1930	30 x	8
.1935	35 x	8
.1940	40 x	8
.1945	45 x	8
.1950	50 x	8
.1955	55 x	8
.1960	60 x	8
.1970	70 x	10
.1980	80 x	10

DOUBLE ENDED



Double Ended Stirrer Bars have a double paddle action for efficient stirring plus high stability.

Note: Coloured PTFE coatings are not as inert as pure PTFE.

NATURAL

Ref No.	L (mm)	Ø (mm)
001.1335	35 x	8
.1355	55 x	8

COLOURED

Suffix R=Red, B=Blue, Y=Yellow

Ref No.	L (mm)	Ø (mm)
001.1335-R,B or Y	35 x	8
.1355-R,B or Y	55 x	8

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Triangular Stirrer Bars are effective for dissolving solids and mixing sediments because of the scraper-like action.

Ref No.	L (mm)	Ø (mm)
001.412	12 x	6
.420	20 x	8
.425	25 x	8
.425.14	25 x	14
.435	35 x	9
.440	40 x	14
.450	50 x	12
.455	55 x	14
.480	80 x	14
.4110	110 x	36
.4136	136 x	36

TRIANGULAR



Triangle with Rib Stirrer Bars have excellent turbulence at all speeds and can be used on uneven surfaces.

Ref No.	L (mm)	Ø (mm)
001.1812	12 x	6
.1825	25 x	8
.1835	35 x	9
.1850	50 x	12
.1880	80 x	18

TRIANGLE WITH RIB



Wing Stirrer Bars for effective stirring in small tapered and round bottom test, centrifuge and sample tubes.

Ref No.	Ht (mm)	Ø (mm)	Tube ID (mm)
001.2201.1	9 x	5.5	6 - 7
.2201	11 x	8	9 - 10
.2202	16 x	10	11 - 12
.2203	10 x	13	14 - 15
.2204	20 x	13	14 - 15

WING



Giant Stirrer Bars are for use in very large containers.

CYLINDRICAL

Ref No.	L (mm)	Ø (mm)
001.0120	120 x	12
.0127	127 x	12
.0165	165 x	12

PLAIN

Ref No.	L (mm)	Ø (mm)
001.257	57 x	27
.2108	108 x	27
.2159	159 x	27

PIVOT RING

Ref No.	L (mm)	Ø (mm)
001.357	57 x	24
.3108	108 x	24
.3159	159 x	24

TRIANGLE

Ref No.	L (mm)	Ø (mm)
001.480	80 x	14
.4110	110 x	36
.4136	136 x	36

GIANT



PTFE Retrievers for use with Giant Stirrer Bars - see page 32

CROSS

Cross Stirrer Bars are very stable general purpose stirrers.

Ref No.	Ø (in)	Ø (mm)	Ht (mm)
001.2401	$\frac{3}{8}$ "	10	5
.2402	$\frac{3}{4}$ "	20	8
.2403	1"	25	9
.2404	$1\frac{1}{4}$ "	30	10
.2405	$1\frac{1}{2}$ "	38	11
.2406	2"	50	15
.2407	$2\frac{3}{8}$ "	60	20

CROSSHEAD

Crosshead Stirrer Bars are designed for use with tube-like containers yet very effective as general stirrers.

DOUBLE SIDED

Ref No.	Ht (mm)	Ø (mm)
001.1110	8 x	10
.1114	10 x	14
.1117	13 x	17
.1122	15 x	22
.1130	12 x	30
.1135	12 x	35
.1140	14 x	40
.1160	15 x	60

SINGLE SIDED

Ref No.	Ht (mm)	Ø (mm)
001.1110.1	8 x	10
.1114.1	12 x	14
.1117.1	13 x	17
.1125.1	15 x	25
.1140.1	17 x	40
.1160.1	17 x	60

HUB

Hub Stirrer Bars are very stable stirrers, especially at low speeds.

Ref No.	L (mm)	Ø (mm)
001.2301	45 x	27
.2302	62 x	37
.2303	70 x	37

TUBE

Tube Stirrer Bars are designed for use with 10mm standard cuvettes.

Ref No.	Ht (mm)	Ø (mm)
001.1609	6 x	9

DISC

Disc Stirrer Bars are for use in tubes.

Ref No.	Ht (mm)	Ø (mm)
001.709	6 x	9
.710	6 x	10
.720	10 x	20
.730	12 x	30

**SQUARE ECONOMY**

Square Economy Stirrer Bars give a highly effective mixing over a wide range of conditions and offer outstanding value.

Ref No.	L (mm)	Ht (mm)
001.1412	12 x	4
.1425	25 x	5.5
.1435	35 x	6
.1450	50 x	7.5

**PLAIN ECONOMY**

Plain Economy Stirrer Bars give a highly effective mixing over a wide range of conditions and offer outstanding value.

Ref No.	L (mm)	Ø (mm)	L (in)	Ø (in)
001.2912	12 x	3	½ x	⅛
.2925	25 x	8	1 x	⅝ ₁₆
.2940	40 x	8	1½ x	⅝ ₁₆
.2950	50 x	8	2 x	⅝ ₁₆

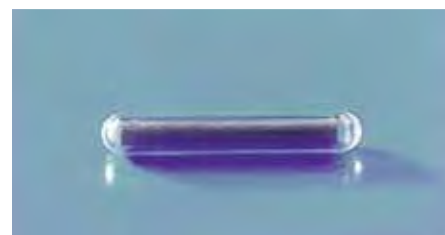
**SPHERICAL**

Spherical Stirrer Bars are of special interest for tubes and eccentric stirring.

Ref No.	Ø (mm)
001.1512	12

**GLASS COVERED**

Ref No.	L (mm)	Ø (mm)
001.1206	6 x	5
.1212	12 x	5
.1219	19 x	6
.1225	25 x	6
.1245	45	8
.1250	50	8
.1260	60	8



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'TURBO' STIRRER BARS

Extra power Samarium-Cobalt magnets

Turbo Stirrer Bars use rare earth magnets to provide significantly increased magnetic strength compared to Alnico magnets and are almost **totally resistant to demagnetisation**. Turbo Stirrer Bars are identified by a **carbon black spot**, which is chemically inert.

Note on using Turbo Stirrer Bars:

The high magnetic coupling power of Rare Earth magnets used in Turbo Stirrer Bars can give rise to erratic stirring effects such as magnet migration and tumbling while the powerful attraction between the stirrer and the drive magnet system can give rise to the formation of PTFE particles caused by abrasion between stirrer magnet and the container base.

TURBO ELLIPTICAL



Ref No.	L (mm)	Ø (mm)
001.2610.RE	10 x	6
.2615.RE	15 x	10
.2625.RE	25 x	14
.2650.RE	50 x	24
.2670.RE	70 x	28

TURBO OVAL



Ref No.	L (mm)	Ø (mm)
001.610.RE	10 x	5
.615.RE	15 x	6
.620.RE	20 x	10
.625.RE	25 x	12
.635.RE	35 x	16
.640.RE	40 x	20
.650.RE	50 x	20
.664.RE	64 x	20

TURBO OCTAHEDRAL



Ref No.	L (mm)	Ø (mm)
001.513.3.RE	13 x	3
.513.RE	13 x	8
.515.RE	15 x	8
.525.RE	25 x	8
.538.RE	38 x	8
.551.RE	51 x	8
.564.8.RE	64 x	8

TURBO CYLINDRICAL



Ref No.	L (mm)	Ø (mm)
001.108.RE	8 x	3
.112.RE	12 x	4.5
.120.RE	20 x	6
.125.RE	25 x	6
.130.RE	30 x	6
.140.RE	40 x	8
.150.RE	50 x	8
.160.RE	60 x	10

'TURBO' STIRRER BARS

Extra power Samarium-Cobalt magnets

TURBO FLUTE

Turbo Flute is a high power multi-faceted stirrer for general use.

Ref No.	L (mm)	Ht (mm)
001.3450.RE	50 x	21



Turbo Block has twin TURBO magnets inserted in a solid body. Very effective stirring especially in viscous media.

Ref No.	Magnet (mm)		Block (mm)			Hole Ø (mm)
	L	Ø	W	Ht	D	
001.32040.RE	40 x	10	34 x	14 x	14	8
.32055.RE	55 x	12	44 x	18 x	14	8
.32090.RE	90 x	24	80 x	30 x	25	13



TURBO BOXED SETS

Turbo Boxed Sets include an assortment of useful sizes of stirrer bar in a re-usable container.

TURBO ELLIPTICAL

Ref No.	No. of Bars	L (mm)	Ø (mm)	Qty
001.3035.RE	10	10 x	6	3
		15 x	10	3
		25 x	14	3
		50 x	24	1



TURBO CYLINDRICAL

Ref No.	No. of Bars	L (mm)	Ø (mm)	Qty
001.3036.RE	14	8 x	3	2
		12 x	4.5	2
		20 x	6	2
		25 x	6	2
		30 x	6	2
		40 x	8	2
		50 x	8	1
		60 x	10	1



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RETRIEVERS



Retrievers are for the removal of stirrer magnets from vessels of all kinds. The polypropylene version has a hanging ring.

PTFE

Ref No.	L (mm)	Ø (mm)
004.150	150 x	10
.250	250 x	10
.350	350 x	10
.450	450 x	10

PTFE FLEXIBLE

Ref No.	L (mm)	Ø (mm)
004.330F	330 x	10

POLYPROPYLENE

Ref No.	L (mm)	Ø (mm)
004.1300	300 x	10
.1350	350 x	10
.1450	450 x	10

PTFE TURBO

Ref No.	L (mm)	Ø (mm)
004.150.RE	150 x	10
.250.RE	250 x	10
.350.RE	350 x	10
.450.RE	450 x	10

PTFE TURBO - FOR GIANT STIRRER BARS

Ref No.	L (mm)	Ø (mm)
004.2350.RE	350 x	18
.2450.RE	450 x	18

STIRRING RODS



Stirring Rods are available in two versions. Pure PTFE solid rod with tapered end and pure PTFE with mild steel core. The version with steel core can be bent into a permanent shape. Inert and will not scratch, use up to 280°C.

STEEL CORE

Ref No.	L (mm)	Ø (mm)
003.100	100 x	6
.150	150 x	6
.200	200 x	6
.250	250 x	6
.300	300 x	6
.350	350 x	6
.400	400 x	6

SOLID PTFE

Ref No.	L (mm)	Ø (mm)
003.1100	100 x	8
.1150	150 x	8
.1200	200 x	8
.1250	250 x	8
.1300	300 x	8

CUSTOM MANUFACTURE OF PTFE STIRRER BARS

We manufacture Custom PTFE Stirrer Bars in a huge range of shapes and sizes.

Our service includes the supply of Custom PTFE Stirrer Bars from a simple item through to the original design, development, verification and validation of more complex shapes. We offer this service directly to users and Original Equipment Manufacturers (OEM's) and include customised packaging and private labelling.



COWIE® use only Pure Virgin PTFE which -

- **Complies with FDA 21 CFR 177.1550** and may be used as articles or components of articles intended to contact food.
- Has been certified in accordance with USP protocol, and specifically meets **the requirements of USP 27, NF22, 2004 for USP Class VI Plastics** at 70°C.
- Is **free from animal derived components** (ADCF).
- Has **no additional ingredients** or processing aids added during the manufacturing process.



Full Traceability and Change Control Compliance is available upon request.

If you require any further information on the supply of Custom PTFE Stirrer Bars or other encapsulated products, please send your enquiry to -

enquiries@cowie.com



GENERAL

Polytetrafluoroethylene (PTFE-Teflon®, Dyneon®, Diakin®) is the most important member of a group of fluoropolymers with a range of unique and useful properties not possessed by any other polymeric material.

The unique properties of PTFE include –

- Almost totally chemically inert
- Exceptional thermal stability
- Electrical and dielectric properties
- Non-stick properties
- Flexural strength

This range of properties means that the scope for the use of PTFE products is potentially very high, however, because of cost considerations and difficulties of fabrication PTFE is generally considered a specialist material for use in highly specific and demanding applications.

STRUCTURE

PTFE is a linear chain polymer of tetrafluoroethylene [TFE] with the repeat structure $[-CF_2-]_n$. The molecular weight of the polymer is very high and this coupled with the protective shield of fluorine atoms around the carbon core provides the basis for the unique properties of PTFE.

RELATED FLUOROPOLYMERS

- **Modified PTFE** (Dyneon® TFM, Teflon® NXT) – A co-polymer of PTFE where a small amount (less than 1%) of a co-monomer such as perfluoropropylvinyl ether is incorporated in the PTFE chain. Properties of the material are similar to PTFE but with improved mechanical properties, reduced porosity and can be self fused.
- **PFA** – A copolymer of TFE and a per-fluoroalkyl ether. PFA has many of the desirable properties of PTFE and is translucent and melt processable. Maximum working temperature is 260°C.
- **FEP** – A copolymer of TFE and hexylfluoropropylene. Exhibits many of the desirable properties of PTFE. High clarity and melt processable. Maximum working temperature 200°C.

CHEMICAL RESISTANCE

Over its operating temperature range the chemical inertness of PTFE is generally considered to be total.

Rare examples of known reactions of PTFE are –

- Slight reversible swelling of PTFE with some fluorinated hydrocarbons, benzyl chloride, dimethylformamide and chloroethanes. At higher temperatures these substances may cause mechanical breakdown by diffusing into the polymer and expanding the structure.
- Molten or dissolved alkali metals, such as sodium in liquid ammonia and sodium in a naphthalene-tetrahydrofuran mixture, will abstract fluorine from the surface of the polymer to leave a black finish (believed to be carbon).
- Reactions with alkali earth, alkali metal oxides and carbonates at temperatures above 350°C have been noted.
- Reactions with fluorine, some fluorine related compounds and chlorine trifluoride have been observed at elevated temperatures and pressures.
- Gases including oxygen, helium and halogens, notably chlorine and bromine, have been reported as reversibly diffusing into PTFE without apparent chemical reaction.
- A vigorous reaction when mixed with finely powdered aluminium and heated.

PTFE – The material of choice when chemical resistance is essential.

PURITY

Virgin, unfilled, PTFE materials are considered to have very high levels of purity.

Typical values –

	PTFE	TFM
	Ng/cm ²	Ng/cm ²
Al	3.7	2.2
Ca	22	11
Cu	21	24
Fe	5	3
Pb	3	2
(Extraction medium 2% Nitric Acid for 2 days at 20°C. Origin – Dyneon®)		

Virgin PTFE and TFM can, therefore, be used in applications where very high levels of purity are required, eg, in trace analysis and semiconductor manufacture.

- **Filled PTFE** - PTFE is available with a range of fillers such as glass fibre and carbon which are used to improve certain properties of PTFE. Filled PTFE does not have the same levels of purity as virgin material.
- **Re-Processed PTFE** - Consists of virgin PTFE blended with a very fine powder of ground PTFE scrap and is used to reduce cost. Re-processed PTFE does not have the same levels of purity as virgin material.
- **Paste Extruded PTFE** - PTFE processed by paste extrusion may contain residues arising from the lubricant used in the extrusion process.
- **PFA** - has a more homogeneous structure than PTFE, can exhibit a better extractable performance than PTFE, however, this may be offset by the possibility of metal contamination arising from the moulding tools used to process PFA.
- **FEP** - similar purity properties to PFA.

SOLUBILITY

PTFE is generally regarded as being completely insoluble in all media except under very extreme conditions of temperature and pressure.

Contamination due to dissolution will not be an issue when using PTFE.

Exceptions include –

- Dissolution of PTFE has been reported in materials such as cyclic polyfluorocarbon oligomers at 300°C at atmospheric pressure.
- Under suitable conditions of temperature and pressure dissolution of PTFE has been observed in some perfluorocarbons, perfluorocarbon ethers, sulphur hexafluoride and carbon dioxide. Dissolution of PTFE in these types of solvent, followed by precipitation of the substrate has been used to prepare specialised forms of PTFE.
- Swelling of PTFE has been reported with benzyl chloride but without chemical reaction.

PTFE – NO Dissolution.....NO Contamination

Teflon® is a registered trademark of E.I. duPont de Nemours, Dyneon® is a registered trademark of 3M.
Diakin® is a registered trademark of Diakin Industries Ltd.

For further technical information and support on PTFE and it's applications,
please contact us at enquiries@cowie.com.



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