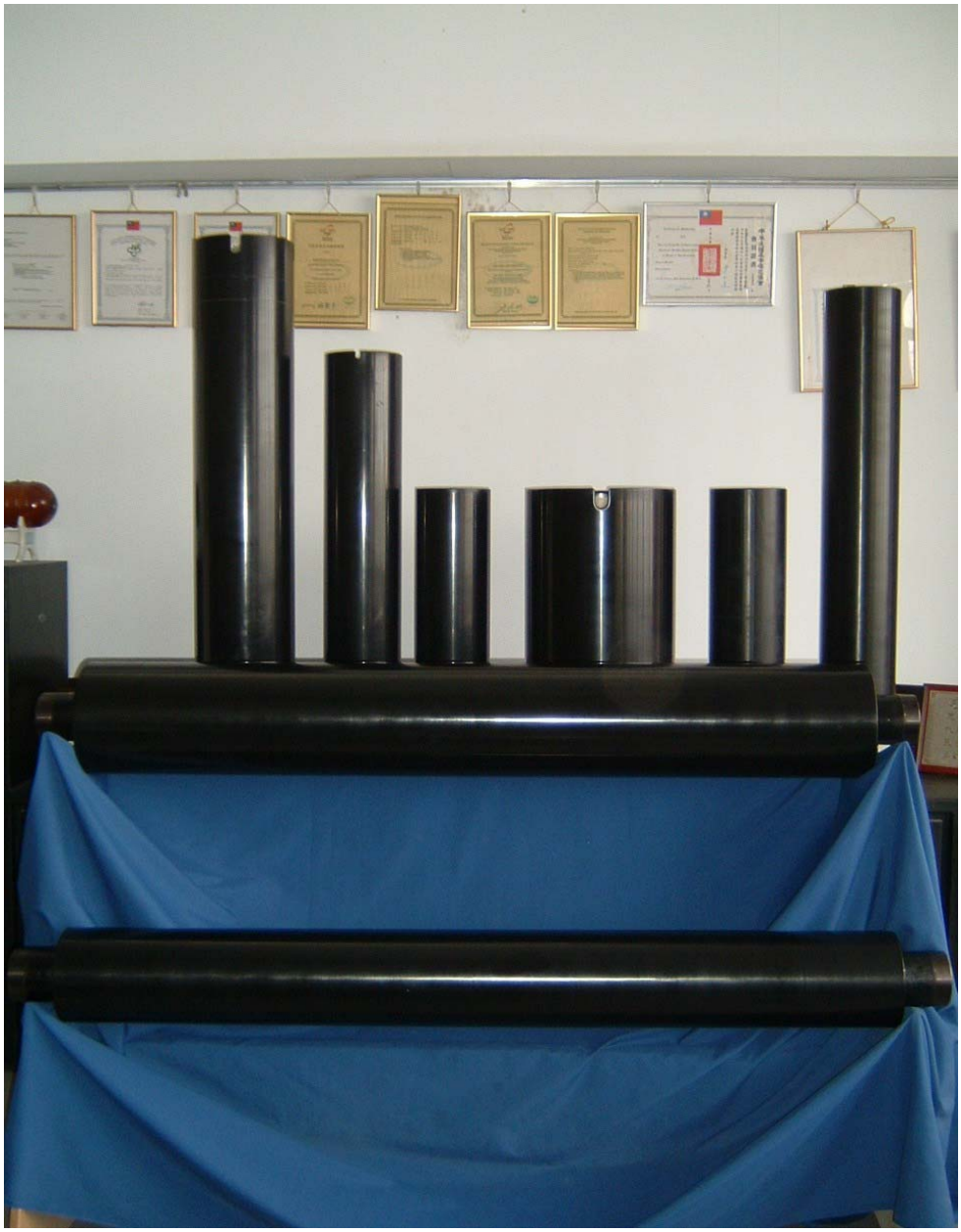
FRP 捲 軸 (Core Pipe/Roller)



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CORE PIPE / Roller made by FRP

為何 FRP 是捲軸最佳材質

(A) 質輕 (Light weight)

相較於金屬材質之捲軸，FRP 有較輕重量。

質輕因此慣性力距(mass moment of inertia)較小，對使用者而言，在其製程上可以有較佳的加速及減速特性。

(B) 質堅 (High rigidity)

高強度的 MM FRP 捲軸，其軸向抗張強度 Ex (Tensile Strength in Axial direction)，可達 160,000kgf/cm^2 ，荷重變形 (Bending under loading) 小，因此可提供更高的製程轉速。

(C) 可修補 (Easy to repair)

相較於金屬材質之捲軸，MM FRP Core Pipe 對表面之細微磨損易於回收修補，經濟與環保效益高。

(D) 表面處理 (Surface of Core)

MM FRP Core Pipe 可根據使用者的不同的工作程序提供各式的表面處理，無論是光滑表面處理(表面粗度 Ra < 0.6μm)或為增加表面摩擦力而做的表面粗糙處理(Ra≒4μm)。

(E) 導電特性 (Electrical conductive property)

可依使用者不同的目的做軸壁表面導電處理以消除靜電(表面阻抗係數 $10^7\Omega$以下)、靜電防制(表面阻抗係數 $10^9\Omega$)或做絕緣表面處理(表面阻抗係數 $10^{12}\Omega$)。

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FRP 捲軸規範標準

項次	規範標準	容許差
1	長度 (mm)	± 1 mm
2	內徑 (mm)	＋ 0.3 mm － 0.0 mm
3	表面粗度	0.6μm < Ra < 4μm
4	表面硬度	平均 30°以上巴可爾硬度
5	耐熱溫度	75°C
6	真圓度	0.1 mm 以下
7	真直度	0.03 mm / 400 mm^{L}
8	軸向抗張模數	Ex 可達 160,000 kgf/cm^2
9	荷重變形量	如 6"ϕ 捲軸 中央荷重 450 kgf， 跨距 1850 mm， 變形量 3.5 mm 以下
10	表面阻抗係數	a. 靜電消散 10^7 Ω以下 b. 防制靜電 10^9 Ω c. 電氣絕緣 10^{12} Ω

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(A) The advantage of FRP core pipe:

(1) Light weight:

Specific gravity of FRP *v. s.* steel :

FRP : 1.7～1.9

Steel : 7.85

In comparison to the metal roller, FRP has a lighter weight. It may provide not only less rotary force but also better acceleration and deceleration characteristics for the rotary machine due to the lower mass moment of inertia of FRP core pipe.

(2) High strength and high stiffness:

The tensile strength of FRP core pipe in its axial direction may be up to 160,000 kgf/cm^2 or higher. The bending deflection of FRP core pipe under loading is also minimized, as a result, it may provide the rotary machine a higher rotational speed.

(3) Easy to repair:

After some production cycles, the surface of the roller may be damaged by transportation or other reasons. In comparison to the metal roller, FRP core pipe is much easier to be repaired and recycled. Therefore, it is more efficient on both economical and environmental consideration using FRP core pipe.

(4) Surface property of FRP core pipe:

According to user's process requirements, the surface of MM FRP core pipe can be made as smooth as glass ($Ra<0.6\mu m$) or as rough as to increase the frictional force ($Ra \fallingdotseq 4\mu m$).

(5) Electrical conductivity of FRP core pipe:

In compliance to different process requirements, the surface layer of MM FRP core pipe can be made by an electrical conductive material to eliminate the static electricity (surface impedance factor: $10^7\ \Omega$ below) or to protect against the electrostatic discharge (surface impedance factor: $10^9\ \Omega$), short as ESD, or by an insulation material (surface impedance factor: $10^{12}\ \Omega$) for insulation purpose.

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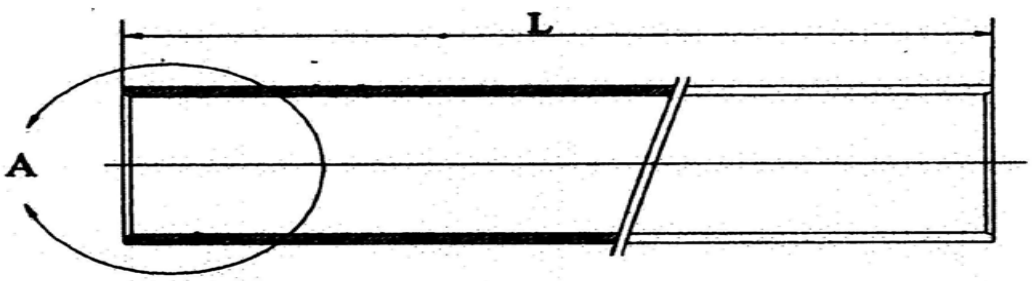
(B) Properties of FRP core pipe:

a. Tolerance in length:	± 1mm
b. Tolerance in Diameter:	＋ 0.3mm － 0.0mm
c. Roughness of Surface:	0.6 m < Ra < 4 m
d. Hardness of Surface:	Barcol hardness 30° up
e. Service Temperature:	75°C
f. Roundness:	less than 0.1mm
g. Straightness:	less than 0.03mm/40mm^{L}
h. Tensile strength in Axial direction:	Ex = 160,000kgf/cm^2
i. Deflection under loading:	For 6”$^{\phi}$ Core pipe Central loading = 450 kg Span = 1850mm Deflection $\delta \leqq$ 3.5mm

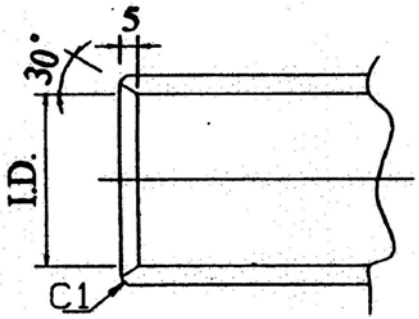
MM FRP 導電級捲軸規格表



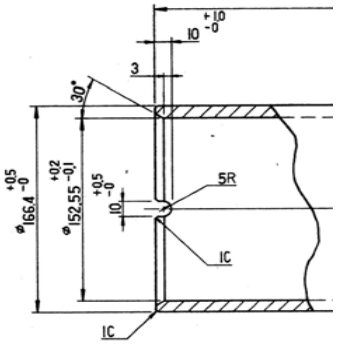
Allowance :

真 圓 度： ＜0.1mm
表面粗度： Ra＜0.6μm
表面阻抗：Grade Ⅰ = $<10^7\Omega$
Grade Ⅱ = $10^9\ \Omega$
Grade Ⅲ = $10^{12}\Omega$
表面硬度： ＞30 Barcol
軸向抗張模數 E：160000kgf/cm^2

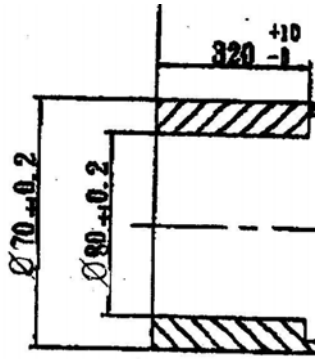
（P 型）



（C型）



（ H 型）



型 號					ID (mm)	L (mm)	真直度 (mm)	參考重量 (kg)
FV-	I	-6	-L-	P	152.55	Max. 3200	L/400 × 0.03	約為 L × (0.007 ~ 0.0011) 依厚度而不同
	II			C				
	III			H				
FV-	I	-8	-L-	P	203.4	Max. 3200	L/400 × 0.03	約為 L × 0.015 依厚度而不同
	II							
	III			C				