Pacific Marine & Industrial

Composite Bearing Product Manual



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> PH: 001-510-233-2310 FX: 001-510-233-2322

Composite Bearing Product Manual

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01.00 Composite Bearing Description

01.01 Materials of Construction

Composite bearings, both cylindrical and flat, are manufactured from synthetic polyester resins combined with fabric that ads strength and durability to the finished product. Combined with the resin is a lubricant that can be changed depending on the application. For marine and hydro bearings PTFE and molybdenum disulfide are commonly used. For industrial bearings graphite is commonly used. Changes can be made depending on the project requirements.

The material displays exceptional dimensional stability when immersed in water, acids and chemical solutions.

These bearings have excellent low friction qualities in wet conditions and provide very low conductivity and will not promote corrosion in unprotected steel housings and shafts.

01.02 Manufacturing Process

The manufacturing process for cylindrical bearings is by wrapping the materials on a mandrel to make the rough bearing followed by a machining process to finish the bearing. This means that bearings can be made of any inside diameter or outside diameter as needed. Sheet of material are also available.

Production time for a bearing, if needed, can be within a working day for an unmachined bearing. Quick delivery is possible if there are time constraints to the project.



01.03 Delivery Condition of the Bearing

Composite bearings can be shipped raw in un-machined condition on the inner diameter, outer diameter or both. Otherwise PM&I can finish machine the bearing to Marine or Industrial or as desired tolerances given the project and installation method. Water lubrication grooves can be machined into the ID of the bearing.

01.04 Common Bearing Uses

MARINE:

Propeller Shaft (Stern Tube and Strut) Bushings and Staves • Rudder Shaft
Bushings • Shackle Bushings (Rope Termination Bushings) • Stabilizer Bearings
Deck Machinery Bearings • Steering Gear Bearings • Stern Roller Bearings • Crane
Mast Bearings • Tugs and Workboats

HYDRO ELECTRIC GENERATION:

Turbine Main Guide Bearings • Wicket Gate Bearings • Linkage Bearings and
Thrust Washers • Servo Motor Bearings • Valve Bearings • Spill Gate Trunnion
Bearings • Fish Screen Bearings • Crane/Hoist Bearings • Eccentric Pin Bushings
• Control Gate Bushings and Wear Pads

INDUSTRIAL:

Amusement Park Rides / Water Rides • Fork Lifts and Scissor Lifts • Injection Molding • Assembly Lines • Off Road and Farm Equipment • Railway Applications • Steel Mills • Heavy Lifting Equipment • Process Machinery • Hydraulic Cylinder Wear Rings and Rod Ends • Recycling • Medical Equipment • Water Treatment Plants • Oil Reclamation

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02.00 Product Images



Bearing Assortment



Bearing Assortment



Thrust Bearing

Fully Split Bearing



Propeller Shaft Bearings

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03.00 Machining Instruction

As a general guide, methods used for brass, aluminum or lignum vitae will apply for PM&I composite bearings.

It is preferable to use tungsten carbide turning tools with cutting speeds of 20 feet (5 meters) per second.

Composite bearings materials must be machined dry without the use of coolant.

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04.00 Fitting Instruction

04.01 Bonding Method



Sheave Rollers

The method of fixture will depend upon the design employed, however the key point to be emphasized is that in addition to traditional mechanical fixing, composite materials can be bonded to both itself and metallic substrates. If the assembly is to exceed 60-70°C in temperature then interference fitting should be replaced with adhesive fitting.

Numerous adhesives are compatible and have been tested within our laboratory facilities.

Generally the most suitable adhesives are :

- * Epoxies
- * Acrylics
- * Cyanoacrylates
- * Polyurethanes

04.02 Press Fit Method: Hydraulic Press or Centre Pull Jacks

If a bearing is to be press fitted, installers should ensure that they have equipment available to deliver adequate force to press the bearing fully into the housing. The ease of fitting will vary dependent on the finish of the housing and this should be considered when calculating the force required. When press fitting a bearing, it is important that it is in line and square with the bore before the operation beings, an adequate chamfer on the housing will prevent shaving of the bush.

04.03 Freeze Fit Method

Freeze fitting using liquid nitrogen is a fast and efficient assembly method for a composite bearing. The thermal properties of the material allow a good clearance between the bearing and housing when frozen and the material does not become brittle at cryogenic temperatures.

Freeze fitting using dry ice and alcohol will only provide the required clearance when using very light interferences. As such it is rarely a viable method and will often require press fitting as well.

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05.00 Product Datasheets

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05.01 Composite Marine Bearings Datasheet

PM&I Composite Marine Bearings are manufactur strength and durability to the finished product. The when immersed in water, acids and chemical solu material are PTFE and Molybdenum disulfide. conditions, these lubricants also provide very unprotected steel housings and shafts.	ed from synthetic poly material also displays tions. The lubricants While having excel low conductivity and	vester resins and fabric that adds s exceptional dimensional stability in the Composite Marine Bearing lent low friction qualities in wet d will not promote corrosion in
Mechanical Properties	METRIC	IMPERIAL
Compressive Strength Normal to Laminate	345 N/mm ²	50,000 lb./in ²
Compressive Strength Parallel to Laminate	97 N/mm ²	14,000 lb./in ²
Shear Strength	80 N/mm ²	11,603 lb./in ²
Tensile Strength	55 N/mm ²	8,000 lb./in ²
Elastic Modulus Bending Elastic Modulus Tensile	.18 x 10 ⁴ N/n .32 x 10 ⁴ N/n	nm ² 26.11 x 10 ⁶ lb./in ² nm ² 46.41 x 10 ⁶ lb./in ²
Hardness Rockwell M	100	100
Density	1.32 g/cm ³	³ .047 lb/in ³
Swell in Water (% wall thickness increase after one y	ear submerged) < 0.1%	∕₀ < 0.1%
Static Coefficient of Friction (dry)	0.15	0.15
<u>Thermal Properties</u> Linear Expansion Coefficients: (20-100 ⁰	⁰ C (per ⁰ C x 10 ⁻⁵)	86-212ºF (per ºF X 10 ⁻⁵)
Parallel To Laminate	5 - 6	2.7-3.5
Normal To Laminate	9 – 10	5 - 6
The information in this data sheet is based on many years of e However, unknown parameters and conditions may restrict g themselves as to the suitability of individual products through applications we can accept no liability as to the suitability	alues are typical eneral statements during adequate testing. For the or correctness of our reco	re and application of composite bearings. usage. It is vital that Customers satisfy is reason, and due to the wide range of ommendations in individual cases. The

05.02 Composite Hydro Bearings Datasheet

<u>Composite H</u>	lydro Bearing	<u>s</u>
PM&I Composite Hydro Bearings are manufacture strength and durability to the finished product. The when immersed in water, acids and chemical solu material are PTFE and Molybdenum disulfide. conditions, these lubricants also provide very unprotected steel housings and shafts.	d from synthetic polyester material also displays exce tions. The lubricants in the While having excellent k low conductivity and will	resins and fabric that adds ptional dimensional stability e Composite Hydro bearing ow friction qualities in wet not promote corrosion in
Mechanical Properties	METRIC	IMPERIAL
Compressive Strength Normal to Laminate	345 N/mm ²	50,000 lb./in ²
Compressive Strength Parallel to Laminate	97 N/mm ²	14,000 lb./in ²
Shear Strength	80 N/mm ²	11,603 lb./in ²
Tensile Strength	55 N/mm ²	8,000 lb./in ²
Elastic Modulus Bending Elastic Modulus Tensile	.18 x 10 ⁴ N/mm ² .32 x 10 ⁴ N/mm ²	26.11 x 10 ⁴ lb./in ² 46.41 x 10 ⁴ lb./in ²
Hardness Rockwell M	100	100
Density	1.32 g/cm ³	.047 lb/in ³
Swell in Water (% wall thickness increase after one y	ear submerged) < 0.1%	< 0.1%
Static Coefficient of Friction (dry)	.0510	.0510
<u>Thermal Properties</u> Linear Expansion Coefficients: (20-100 ⁰	⁹ C (per ⁰ C x 10 ⁻⁵) 86-2	212ºF (per ºF X 10 ⁻⁵)
Parallel To Laminate	5 - 6	2.7-3.5
Normal To Laminate	9 – 10	5 – 6
The above v	alues are typical	
The information in this data sheet is based on many years of each However, unknown parameters and conditions may restrict g themselves as to the suitability of individual products through applications we can accept no liability as to the suitability application limits for pressure, temperature and speed give correspondingly lower. For exceptional operating conditions, pl	xperience in the manufacture and eneral statements during usage. adequate testing. For this reason or correctness of our recommen- ven in this data sheet are may ease contact us.	application of composite bearings. It is vital that Customers satisfy on, and due to the wide range of fations in individual cases. The dimum values and must be set
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05.03 Composite Industrial Bearings Data Sheet

PM&I Composite Industrial Bearings are manufa	dustrial Bearin	ngs ester resins and fabric tha
adds strength and durability to the finished produ- stability when immersed in water, acids and che Composite Industrial bearing material offering very	ict. The material also displa emical solutions. Graphite is low friction values.	iys exceptional dimensiona s the lubricant used in the
Mechanical Properties	METRIC	IMPERIAL
Compressive Strength	345 N/mm ²	50,000 lb./in ²
Normal to Laminate		
Compressive Strength	97 N/mm ²	14,000 lb./in ²
Parallel to Laminate		
Shear Strength	80 N/mm ²	11,603 lb./in ²
Tensile Strength	55 N/mm ²	8,000 lb./in ²
Elastic Modulus Bending	.18 x 10 ⁴ N/mm ²	26.11 x 10 ⁴ lb./in ²
Hardness Rockwell M	100	100
Density	1.32 g/cm ³	.047 lb/in ³
Swell in Water (% wall thickness increase after one y	rear submerged) < 0.1%	< 0.1%
Static Coefficient of Friction (dry)	.1316	.1316
(15 N/mm ² at 1 meter/minute against 316 Stainless	s Steel)	
Thermal Properties		
Linear Expansion Coefficients:	100 ⁰ C (per ⁰ C x 10 ⁻⁵) 86-2	12 ⁰ F (per ⁰ F X 10 ⁻⁵)
Parallel To Laminate	5 - 6	2.7-3.5
Normal To Laminate	9 – 10	5 - 6
The above v	values are typical	
The information in this data sheet is based on many years of a However, unknown parameters and conditions may restrict a themselves as to the suitability of individual products throug applications we can accept no liability as to the suitability application limits for pressure, temperature and speed of	experience in the manufacture and general statements during usage. h adequate testing. For this reas or correctness of our recommend ven in this data sheet are may	application of composite bearings It is vital that Customers satisfy on, and due to the wide range o dations in individual cases. The dimum values and must be se

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06.00 Composite Bearing Submerged Swell Testing

PM&I Composite Bearing Submerged Swell Testing

	Initial sizes (mm) 24 Hours				5		48 Hours	s	3 Months			6 Months			9 Months			12 Months			
Indu	st Msmt 1	Msmt 2	Msmt 3	Msmt 1	Msmt 2	Msmt 3	Msmt 1	Msmt 2	Msmt 3	Msmt 1	Msmt 2	Msmt 3	Msmt 1	Msmt 2	Msmt 3	Msmt 1	Msmt 2	Msmt 3	Msmt 1	Msmt 2	Msmt 3
#1	37.24	37.25	37.16	37.21	37.24	37.15	37.20	37.25	37.16	37.23	37.26	37.16	37.24	37.26	37.17	37.24	37.27	37.17	37.24	37.26	37.17
#2	37.35	37.18	37.26	37.34	37.17	37.25	37.35	37.18	37.25	37.37	37.19	37.27	37.38	37.19	37.27	37.38	37.19	37.27	37.38	37.19	37.27
#3	37.37	37.16	37.24	37.33	37.16	37.23	37.34	37.16	37.24	37.37	37.18	37.24	37.38	37.18	37.25	37.38	37.18	37.25	37.38	37.18	37.24
#4	37.32	37.15	37.25	37.30	37.14	37.23	37.31	37.15	37.24	37.34	37.15	37.25	37.32	37.15	37.25	37.32	37.15	37.25	37.33	37.15	37.25
#5	37.22	37.15	37.19	37.22	37.15	37.19	37.22	37.15	37.20	37.24	37.15	37.21	37.25	37.15	37.21	37.24	37.15	37.21	37.24	37.15	37.21
	Initia	al sizes (es (mm) 24 Hours			5	48 Hours 3 Months				s	6 Months			9 Months			12 Months			
Hyd	o Msmt 1	Msmt 2	Msmt 3	Msmt 1	Msmt 2	Msmt 3	Msmt 1	Msmt 2	Msmt 3	Msmt 1	Msmt 2	Msmt 3	Msmt 1	Msmt 2	Msmt 3	Msmt 1	Msmt 2	Msmt 3	Msmt 1	Msmt 2	Msmt 3
#1	37.23	37.08	36.96	37.22	37.06	36.97	37.22	37.08	36.98	37.22	37.06	36.97	37.23	37.08	36.97	37.23	37.08	36.98	37.22	37.08	36.98
#2	37.19	36.98	37.04	37.20	36.96	37.03	37.19	36.98	37.04	37.20	36.98	37.04	37.20	36.97	37.04	37.20	36.98	37.04	37.20	36.98	37.04
#3	37.24	37.01	36.86	37.23	37.01	36.86	37.24	37.01	36.87	37.23	37.01	36.87	37.23	37.01	36.88	37.24	37.01	36.87	37.24	37.01	36.87
#4	37.20	36.95	37.05	37.17	36.94	37.06	37.18	36.96	37.05	37.19	36.96	37.05	37.19	36.96	37.07	37.19	36.96	37.05	37.19	36.96	37.05
#5	37.21	37.02	37.06	37.20	37.00	37.05	37.21	37.03	37.05	37.21	37.03	37.05	37.22	37.03	37.05	37.21	37.02	37.05	37.22	37.02	37.05
	Initial sizes (mm) 24 Hours				48 Hours			3 Months			6 Months			9 Months			12 Months				
	Initia	al sizes ((mm)		24 Hours	6		48 Hours	S		3 Month	S		6 Month	s		9 Months	s	1	2 Month	IS
Mari	Initia Msmt 1	al sizes (Msmt 2	mm) Msmt 3	Msmt 1	24 Hours Msmt 2	s Msmt 3	Msmt 1	48 Hours Msmt 2	s Msmt 3	Msmt 1	3 Month: Msmt 2	s Msmt 3	Msmt 1	6 Month Msmt 2	s Msmt 3	Msmt 1	9 Months Msmt 2	s Msmt 3	1 Msmt 1	2 Month Msmt 2	Msmt 3
Mari #1	Initia e Msmt 1 37.41	al sizes (Msmt 2 37.13	mm) Msmt 3 36.98	Msmt 1 37.41	24 Hours Msmt 2 37.13	Msmt 3 36.99	Msmt 1 37.41	48 Hours Msmt 2 37.15	s Msmt 3 37.00	Msmt 1 37.45	3 Month Msmt 2 37.16	s Msmt 3 37.00	Msmt 1 37.45	6 Month Msmt 2 37.16	s Msmt 3 37.01	Msmt 1 37.45	9 Months Msmt 2 37.15	s Msmt 3 37.01	1 Msmt 1 37.45	2 Month Msmt 2 37.16	Msmt 3 37.01
Marii #1 #2	Initia ne Msmt 1 37.41 37.37	al sizes (Msmt 2 37.13 37.15	mm) Msmt 3 36.98 36.99	Msmt 1 37.41 37.37	24 Hours Msmt 2 37.13 37.15	Msmt 3 36.99 37.00	Msmt 1 37.41 37.37	48 Hours Msmt 2 37.15 37.16	s Msmt 3 37.00 37.00	Msmt 1 37.45 37.42	3 Month Msmt 2 37.16 37.17	s Msmt 3 37.00 37.01	Msmt 1 37.45 37.43	6 Month Msmt 2 37.16 37.17	s Msmt 3 37.01 37.01	Msmt 1 37.45 37.43	9 Months Msmt 2 37.15 37.17	s Msmt 3 37.01 37.01	1 Msmt 1 37.45 37.43	2 Month Msmt 2 37.16 37.17	Msmt 3 37.01 37.01
Mari #1 #2 #3	Initia Msmt 1 37.41 37.37 37.38	al sizes (Msmt 2 37.13 37.15 36.92	mm) Msmt 3 36.98 36.99 37.12	Msmt 1 37.41 37.37 37.37	24 Hours Msmt 2 37.13 37.15 36.92	Msmt 3 36.99 37.00 37.16	Msmt 1 37.41 37.37 37.38	48 Hours Msmt 2 37.15 37.16 36.93	s Msmt 3 37.00 37.00 37.14	Msmt 1 37.45 37.42 37.42	3 Month Msmt 2 37.16 37.17 36.96	s Msmt 3 37.00 37.01 37.14	Msmt 1 37.45 37.43 37.42	6 Month Msmt 2 37.16 37.17 36.96	s Msmt 3 37.01 37.01 37.15	Msmt 1 37.45 37.43 37.42	9 Month: Msmt 2 37.15 37.17 36.96	s Msmt 3 37.01 37.01 37.14	1 Msmt 1 37.45 37.43 37.42	2 Month Msmt 2 37.16 37.17 36.96	Msmt 3 37.01 37.01 37.01 37.15
Marii #1 #2 #3 #4	Initia Msmt 1 37.41 37.37 37.38 37.32	al sizes (Msmt 2 37.13 37.15 36.92 37.17	(mm) Msmt 3 36.98 36.99 37.12 37.00	Msmt 1 37.41 37.37 37.37 37.32	24 Hours Msmt 2 37.13 37.15 36.92 37.17	Msmt 3 36.99 37.00 37.16 37.00	Msmt 1 37.41 37.37 37.38 37.32	48 Hours Msmt 2 37.15 37.16 36.93 37.17	s Msmt 3 37.00 37.00 37.14 37.01	Msmt 1 37.45 37.42 37.42 37.36	3 Months Msmt 2 37.16 37.17 36.96 37.17	Msmt 3 37.00 37.01 37.14 37.01	Msmt 1 37.45 37.43 37.42 37.36	6 Month Msmt 2 37.16 37.17 36.96 37.18	s Msmt 3 37.01 37.01 37.15 37.01	Msmt 1 37.45 37.43 37.42 37.36	9 Months Msmt 2 37.15 37.17 36.96 37.17	s Msmt 3 37.01 37.01 37.14 37.01	1 Msmt 1 37.45 37.43 37.42 37.36	2 Month Msmt 2 37.16 37.17 36.96 37.17	Msmt 3 37.01 37.01 37.15 37.01
Mari #1 #2 #3 #4 #5	Initia 37.41 37.37 37.38 37.38 37.32 37.28	al sizes (Msmt 2 37.13 37.15 36.92 37.17 37.03	(mm) Msmt 3 36.98 36.99 37.12 37.00 37.16	Msmt 1 37.41 37.37 37.37 37.32 37.27	24 Hours Msmt 2 37.13 37.15 36.92 37.17 37.03	Msmt 3 36.99 37.00 37.16 37.00 37.16 37.16	Msmt 1 37.41 37.37 37.38 37.32 37.28	48 Hours Msmt 2 37.15 37.16 36.93 37.17 37.03	s Msmt 3 37.00 37.00 37.14 37.01 37.16	Msmt 1 37.45 37.42 37.42 37.36 37.30	Msmt 2 37.16 37.17 36.96 37.17 37.17 37.04	Msmt 3 37.00 37.01 37.14 37.01 37.17	Msmt 1 37.45 37.43 37.42 37.36 37.31	6 Month Msmt 2 37.16 37.17 36.96 37.18 37.04	Msmt 3 37.01 37.01 37.15 37.01 37.16	Msmt 1 37.45 37.43 37.42 37.36 37.30	9 Months Msmt 2 37.15 37.17 36.96 37.17 37.05	s Msmt 3 37.01 37.01 37.14 37.01 37.18	1 Msmt 1 37.45 37.43 37.42 37.36 37.30	2 Month Msmt 2 37.16 37.17 36.96 37.17 37.05	Msmt 3 37.01 37.01 37.15 37.01 37.01 37.17
Marii #1 #2 #3 #4 #5	Initia 37.41 37.37 37.38 37.32 37.28 Initia	al sizes (Msmt 2 37.13 37.15 36.92 37.17 37.03 al sizes ((mm) Msmt 3 36.98 36.99 37.12 37.00 37.16 (mm)	Msmt 1 37.41 37.37 37.37 37.32 37.27	24 Hours Msmt 2 37.13 37.15 36.92 37.17 37.03 24 Hours	Msmt 3 36.99 37.00 37.16 37.00 37.16	Msmt 1 37.41 37.37 37.38 37.32 37.28	48 Hours Msmt 2 37.15 37.16 36.93 37.17 37.03 48 Hours	s Msmt 3 37.00 37.00 37.14 37.01 37.16 s	Msmt 1 37.45 37.42 37.42 37.36 37.30	Months Msmt 2 37.16 37.17 36.96 37.17 37.04 3 Months	s Msmt 3 37.00 37.01 37.14 37.01 37.17 s	Msmt 1 37.45 37.43 37.42 37.36 37.31	6 Months Msmt 2 37.16 37.17 36.96 37.18 37.04 6 Months	s Msmt 3 37.01 37.01 37.15 37.01 37.16 s	Msmt 1 37.45 37.43 37.42 37.36 37.30	9 Months Msmt 2 37.15 37.17 36.96 37.17 37.05 9 Months	s Msmt 3 37.01 37.01 37.14 37.01 37.18 s	1 Msmt 1 37.45 37.43 37.42 37.36 37.30	2 Month Msmt 2 37.16 37.17 36.96 37.17 37.05	Msmt 3 37.01 37.01 37.15 37.01 37.17 37.17
Marii #1 #2 #3 #4 #5	Initia 37.41 37.37 37.38 37.32 37.28 Initia Msmt 1	al sizes (Msmt 2 37.13 37.15 36.92 37.17 37.03 al sizes (Msmt 2	mm) Msmt 3 36.98 36.99 37.12 37.00 37.16 (mm) Msmt 3	Msmt 1 37.41 37.37 37.37 37.32 37.27 Msmt 1	24 Hours Msmt 2 37.13 37.15 36.92 37.17 37.03 24 Hours Msmt 2	Msmt 3 36.99 37.00 37.16 37.00 37.16 37.16 Msmt 3	Msmt 1 37.41 37.37 37.38 37.32 37.28 Msmt 1	48 Hours Msmt 2 37.15 37.16 36.93 37.17 37.03 48 Hours Msmt 2	s Msmt 3 37.00 37.00 37.14 37.16 s Msmt 3	Msmt 1 37.45 37.42 37.42 37.36 37.30 Msmt 1	3 Months Msmt 2 37.16 37.17 36.96 37.17 37.04 3 Months Msmt 2	s Msmt 3 37.00 37.01 37.14 37.01 37.17 s Msmt 3	Msmt 1 37.45 37.43 37.42 37.36 37.31 Msmt 1	6 Month: Msmt 2 37.16 37.17 36.96 37.18 37.04 6 Month: Msmt 2	s Msmt 3 37.01 37.01 37.15 37.01 37.16 s Msmt 3	Msmt 1 37.45 37.43 37.42 37.36 37.30 Msmt 1	9 Months Msmt 2 37.15 37.17 36.96 37.17 37.05 9 Months Msmt 2	s Msmt 3 37.01 37.01 37.14 37.01 37.18 s Msmt 3	1 Msmt 1 37.45 37.43 37.42 37.36 37.30 1 Msmt 1	2 Month Msmt 2 37.16 37.17 36.96 37.17 37.05 2 Month Msmt 2	Msmt 3 37.01 37.01 37.15 37.01 37.15 37.01 37.17 Is Msmt 3
Marin #1 #2 #3 #4 #5	Initia 37.41 37.37 37.38 37.32 37.28 Initia Msmt 1	al sizes (Msmt 2 37.13 37.15 36.92 37.17 37.03 al sizes (Msmt 2	mm) Msmt 3 36.98 36.99 37.12 37.00 37.16 (mm) Msmt 3	Msmt 1 37.41 37.37 37.37 37.32 37.27 Msmt 1	24 Hours Msmt 2 37.13 37.15 36.92 37.17 37.03 24 Hours Msmt 2	Msmt 3 36.99 37.00 37.16 37.00 37.16 37.16 Msmt 3	Msmt 1 37.41 37.37 37.38 37.32 37.28 Msmt 1	48 Hours Msmt 2 37.15 37.16 36.93 37.17 37.03 48 Hours Msmt 2	s Msmt 3 37.00 37.00 37.14 37.16 s Msmt 3	Msmt 1 37.45 37.42 37.42 37.36 37.30 Msmt 1	3 Months Msmt 2 37.16 37.17 36.96 37.17 37.04 3 Months Msmt 2	s Msmt 3 37.00 37.01 37.14 37.01 37.17 s Msmt 3	Msmt 1 37.45 37.43 37.42 37.36 37.31 Msmt 1	6 Month: Msmt 2 37.16 37.17 36.96 37.18 37.04 6 Month: Msmt 2	s Msmt 3 37.01 37.01 37.15 37.01 37.16 s Msmt 3	Msmt 1 37.45 37.43 37.42 37.36 37.30 Msmt 1	9 Months Msmt 2 37.15 37.17 36.96 37.17 37.05 9 Months Msmt 2	s Msmt 3 37.01 37.01 37.14 37.14 37.18 s Msmt 3	1 Msmt 1 37.45 37.43 37.42 37.36 37.30 1 Msmt 1	2 Month Msmt 2 37.16 37.17 36.96 37.17 37.05 2 Month Msmt 2	Msmt 3 37.01 37.01 37.15 37.01 37.17 37.17 Is Msmt 3
Marii #1 #3 #4 #5 #1 #1	Initia ne Msmt 1 37.41 37.37 37.38 37.32 37.28 Initia Msmt 1	al sizes (Msmt 2 37.13 37.15 36.92 37.17 37.03 al sizes (Msmt 2	mm) Msmt 3 36.98 36.99 37.12 37.00 37.16 (mm) Msmt 3	Msmt 1 37.41 37.37 37.37 37.32 37.27 Msmt 1	24 Hours Msmt 2 37.13 37.15 36.92 37.17 37.03 24 Hours Msmt 2	s Msmt 3 36.99 37.00 37.16 37.00 37.16 s Msmt 3	Msmt 1 37.41 37.37 37.38 37.32 37.28 Msmt 1	48 Hours Msmt 2 37.15 37.16 36.93 37.17 37.03 48 Hours Msmt 2	s Msmt 3 37.00 37.00 37.14 37.01 37.16 s Msmt 3	Msmt 1 37.45 37.42 37.42 37.36 37.30 Msmt 1	3 Months Msmt 2 37.16 37.17 36.96 37.17 37.04 3 Months Msmt 2	s Msmt 3 37.00 37.01 37.14 37.01 37.17 s Msmt 3	Msmt 1 37.45 37.43 37.42 37.36 37.31 Msmt 1	6 Month: Msmt 2 37.16 37.17 36.96 37.18 37.04 6 Month: Msmt 2	s Msmt 3 37.01 37.01 37.15 37.01 37.01 s Msmt 3	Msmt 1 37.45 37.43 37.42 37.36 37.30 Msmt 1	9 Months Msmt 2 37.15 37.17 36.96 37.17 37.05 9 Months Msmt 2	s Msmt 3 37.01 37.01 37.14 37.01 37.18 s Msmt 3	1 Msmt 1 37.45 37.43 37.42 37.36 37.30 1 Msmt 1	2 Month Msmt 2 37.16 37.17 36.96 37.17 37.05 2 Month Msmt 2	Msmt 3 37.01 37.01 37.15 37.01 37.01 37.17 Is Msmt 3
Marii #1 #2 #3 #4 #5 #1 #2 #3	Initia Msmt 1 37.41 37.37 37.38 37.38 37.32 37.28 Initia Msmt 1	al sizes (Msmt 2 37.13 37.15 36.92 37.17 37.03 al sizes (Msmt 2	mm) Msmt 3 36.99 37.12 37.00 37.16 (mm) Msmt 3	Msmt 1 37.41 37.37 37.37 37.32 37.27 Msmt 1	24 Hours Msmt 2 37.13 37.15 36.92 37.17 37.03 24 Hours Msmt 2	s Msmt 3 36.99 37.00 37.16 37.00 37.16 37.16 Msmt 3	Msmt 1 37.41 37.37 37.38 37.32 37.28 Msmt 1	48 Hours Msmt 2 37.15 37.16 36.93 37.17 37.03 48 Hours Msmt 2	s Msmt 3 37.00 37.00 37.14 37.01 37.16 s Msmt 3	Msmt 1 37.45 37.42 37.42 37.36 37.30 Msmt 1	3 Months Msmt 2 37.16 37.17 36.96 37.17 37.04 3 Months Msmt 2	s Msmt 3 37.00 37.01 37.14 37.01 37.17 s Msmt 3	Msmt 1 37.45 37.43 37.42 37.36 37.31 Msmt 1	6 Month: Msmt 2 37.16 37.17 36.96 37.18 37.04 6 Month: Msmt 2	s Msmt 3 37.01 37.01 37.15 37.01 37.16 s Msmt 3	Msmt 1 37.45 37.43 37.42 37.36 37.30 Msmt 1	9 Months Msmt 2 37.15 37.17 36.96 37.17 37.05 9 Months Msmt 2	s Msmt 3 37.01 37.01 37.14 37.01 37.18 s Msmt 3	1 Msmt 1 37.45 37.43 37.42 37.36 37.30 1 Msmt 1	2 Month Msmt 2 37.16 37.17 36.96 37.17 37.05 2 Month Msmt 2	Msmt 3 37.01 37.01 37.15 37.01 37.17 is Msmt 3
Marin #1 #2 #3 #4 #5 #1 #2 #3 #4	Initia e Msmt 1 37.41 37.37 37.38 37.32 37.28 Initia Msmt 1	al sizes (Msmt 2 37.13 37.15 36.92 37.17 37.03 al sizes (Msmt 2	mm) Msmt 3 36.98 36.99 37.12 37.00 37.16 (mm) Msmt 3	Msmt 1 37.41 37.37 37.37 37.32 37.27 Msmt 1	24 Hours Msmt 2 37.13 37.15 36.92 37.17 37.03 24 Hours Msmt 2	s Msmt 3 36.99 37.00 37.16 37.00 37.16 s Msmt 3	Msmt 1 37.41 37.37 37.38 37.32 37.28 Msmt 1	48 Hours Msmt 2 37.15 37.16 36.93 37.17 37.03 48 Hours Msmt 2	s Msmt 3 37.00 37.00 37.14 37.01 37.16 s Msmt 3	Msmt 1 37.45 37.42 37.42 37.36 37.30	3 Months Msmt 2 37.16 37.17 36.96 37.17 37.04 3 Months Msmt 2	s Msmt 3 37.00 37.01 37.14 37.01 37.17 s Msmt 3	Msmt 1 37.45 37.43 37.42 37.36 37.31 Msmt 1	6 Month: Msmt 2 37.16 37.17 36.96 37.18 37.04 6 Month: Msmt 2	s Msmt 3 37.01 37.01 37.15 37.01 37.16 s Msmt 3	Msmt 1 37.45 37.43 37.42 37.36 37.30 Msmt 1	9 Months Msmt 2 37.15 37.17 36.96 37.17 37.05 9 Months Msmt 2	s Msmt 3 37.01 37.01 37.14 37.01 37.18 s Msmt 3	1 Msmt 1 37.45 37.43 37.42 37.36 37.30 1 Msmt 1	2 Month Msmt 2 37.16 37.17 36.96 37.17 37.05 2 Month Msmt 2	Msmt 3 37.01 37.01 37.15 37.01 37.17 IS Msmt 3

*All measurements done in metric

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