

Scope

The product applies to RAIN RFID tag for integration into elastomer tire.

This is the Gen 4 RFID tire tag approved by MICHELIN specifically designed for tire applications. Murata is the licensed partner of MICHELIN for tire tag technologies. Please make sure not to consider for application other than elastomer products.



1. General Descriptions

RAIN RFID is the UHF band RFID technology with a unique identifier that helps to create reliable and efficient data capturing. It is commonly used for business operation and process typically for logistics, inventory, product tracking, security, sustainability, and so on.

The tag supports the memory to add SGTIN-96, the serialized global trade identification number standardized by GS1. It is also the suggested data format to use across different tire manufacturer in the industry organization of GDSO, GLOBAL DATA SERVICE ORGANIZATION.

The tag is specifically designed to meet ISO20909 and 20910 to be embedded inside the tire to survive the lifetime from the tire manufacturing and to the use in the after market including tire retreading.

The design of radiating antenna is tuned to have the best performance when it is embedded inside tire rubber, Murata also supports the RF evaluation following the method of ISO20912 for RFID tires.

[Features]

- UHF Global band (865~928MHz)
- ISO18000-63 / EPC Global Gen2(v2) Compliant
- The size is 37 x 1.8 mm (Length x diameter)
- Using Impinj tag chip M750 (EPC memory 96bit User memory 32bit)
- Reading range: 1-5m *Reference
- Robust against tire manufacturing process
- RoHS compliant

(Preliminary)
UHF RFID Tag Data sheet
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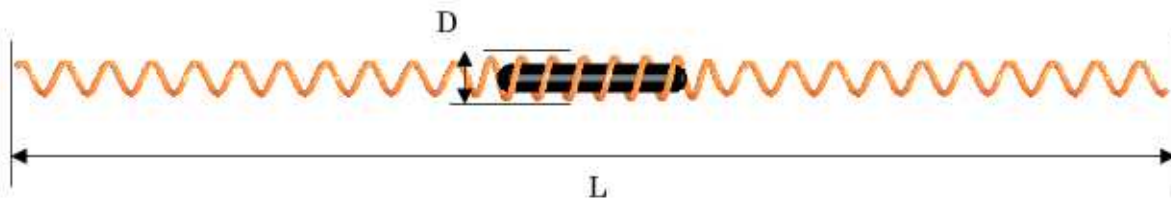
2. License from Michelin

The product is licensed by Michelin under Technology License Agreement signed between Michelin and Murata. It covers the implementation of radio frequency identification components, equipment, technology or services in the tire industry. Please refer to the Michelin website for the list of patents under the agreement.

<https://rfid.michelin.com/what-is-rfid/#technology-licensing>

3. Mechanical Information

[Dimension]



Unit: mm

Mark	Dimensions
L	37±1
D	1.8±0.1

4. Electrical characteristics

4-1. Frequency range

865 – 928 MHz

4-2. IC / Memory size

Parameter		Description	Remarks
IC		Impinj M750	
Protocol		ISO/IEC 18000-63	
		EPC global Gen2 V2	
Memory	EPC	Max 96 bit	Read & Write
	TID	96 bit	Read Only
	Reserved memory	32 bit Access	Read & Write
		32 bit Kill	
User	32 bit		
Data Retention Time		※10years	Tamb = 22°C

※Reference value

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LXTBANNCMH-024



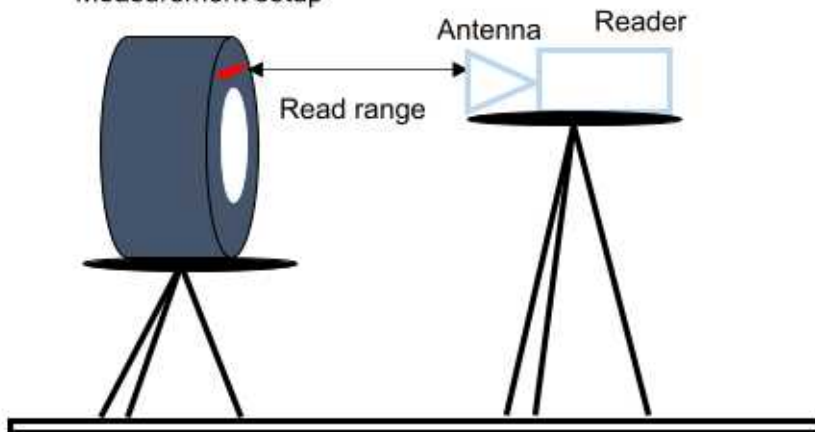
5. Reading range (reference only)

The product is evaluated following the measurement criteria specified in ISO20912.

However, the reading range varies by the design and material of the tire, a position of where the tag is embedded, orientation of the tire, and the setting of reader and writer. Therefore, the tire with RFID embedded must be evaluated. Please contact Murata for further information.

UHF band(865~928MHz): 1-5m (depends on tire and measurement condition)

*Measurement setup



6. Ratings

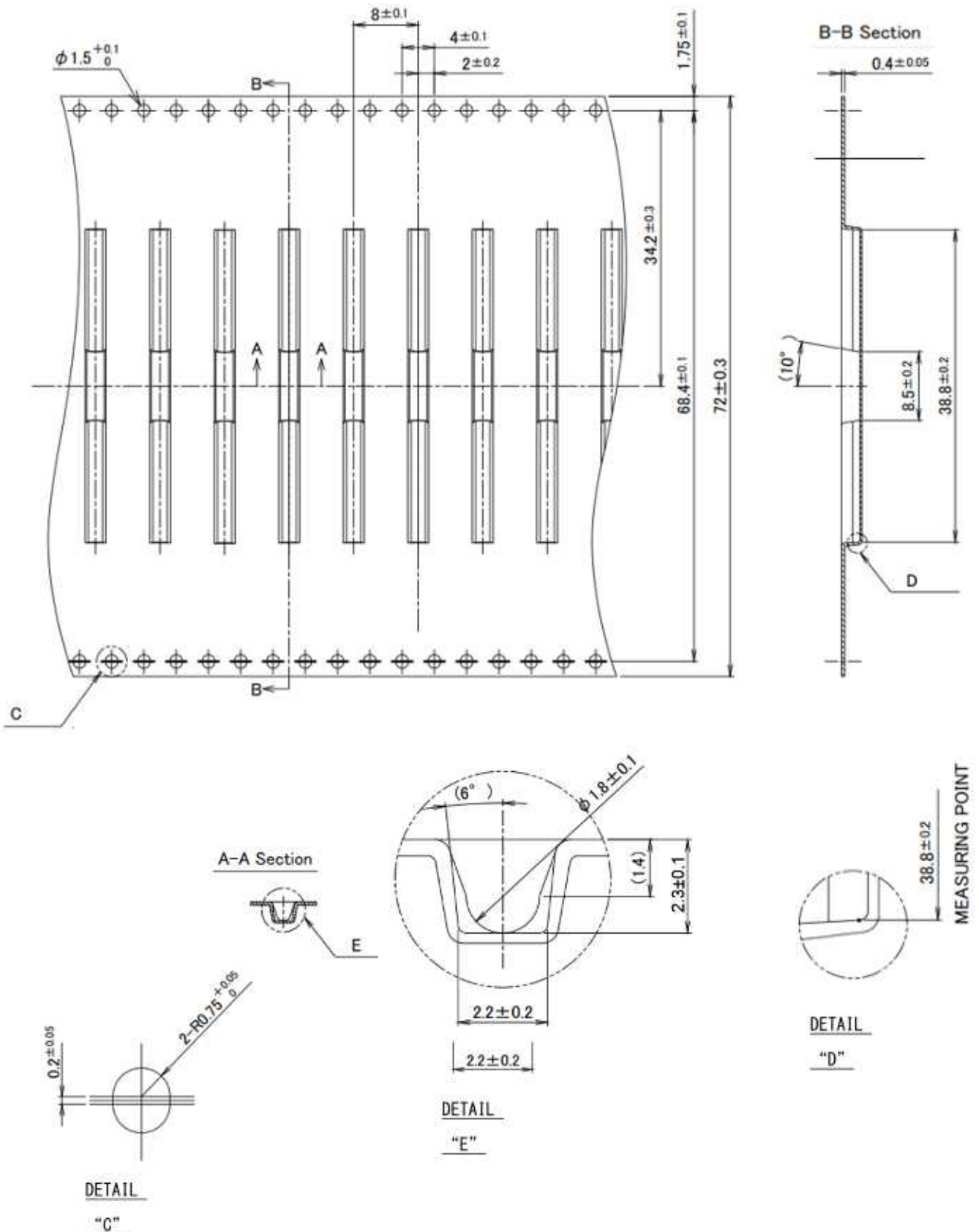
Symbol	Item	Min	Max	Unit
T _{stg}	Storage temperature	-40	+85	°C
T _{amb}	Operating temperature	-40	+85	°C

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7. Packaging

7-1. Dimensions of tape

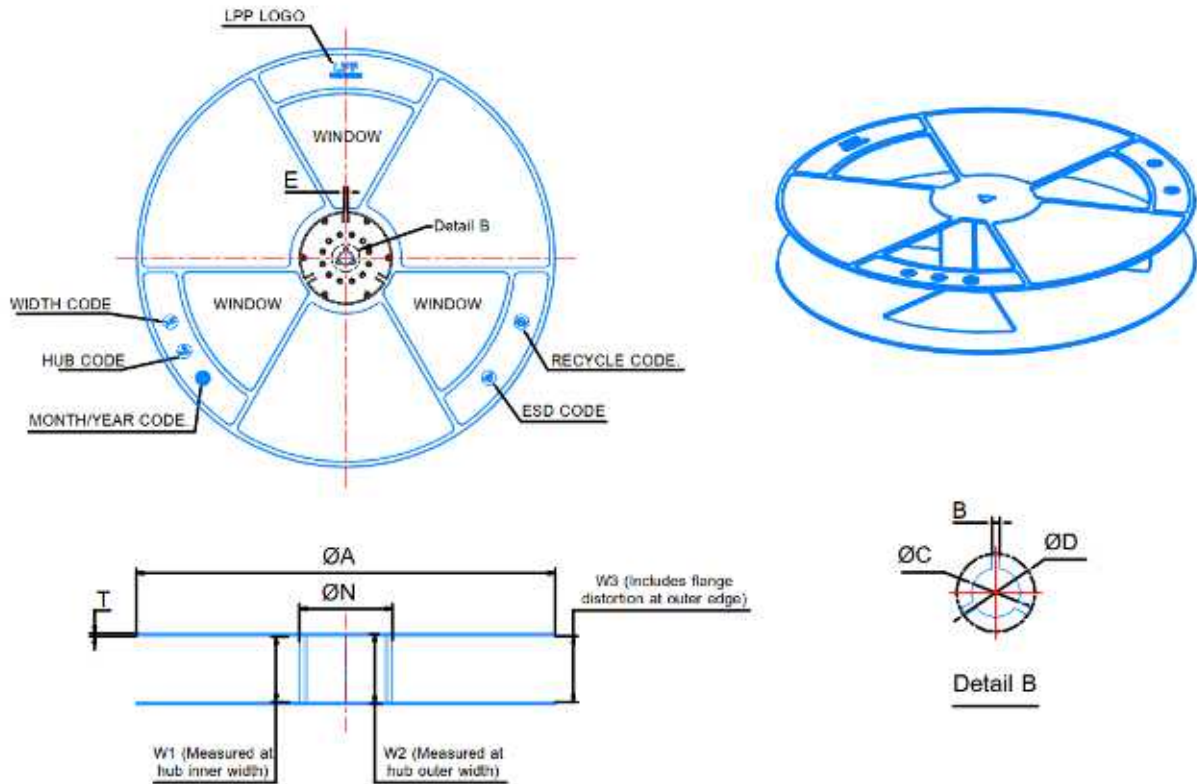


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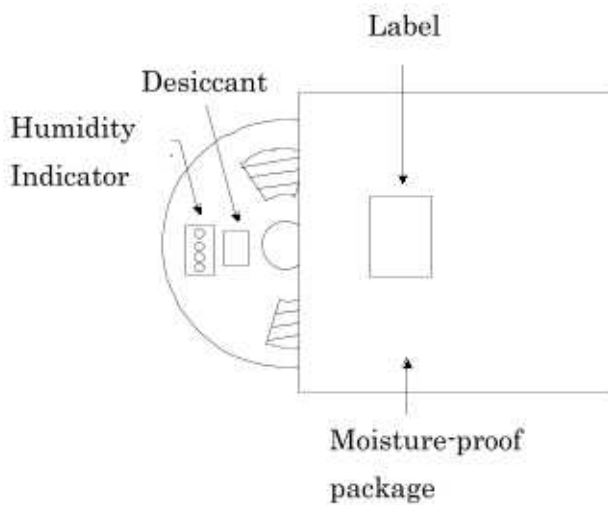
7-2. Dimensions of reel



MATERIAL : ANTISTATIC POLYSTYRENE (Surface resistance $10E5 \leq X \leq 10E10$)

ØA ±1.00	ØN (MIN)	B (MIN)	ØC ±0.20	ØD (MIN)	E ±1.00	T ±0.10	W1 (Min)	W2 (Max)	W3 (Max)
458.00	100.00	1.50	13.00	20.20	4.00	3.00	72.40	89.00	Shell Accommodate Tape Width Without Interference

7-3. Packing (Moisture-proof package)



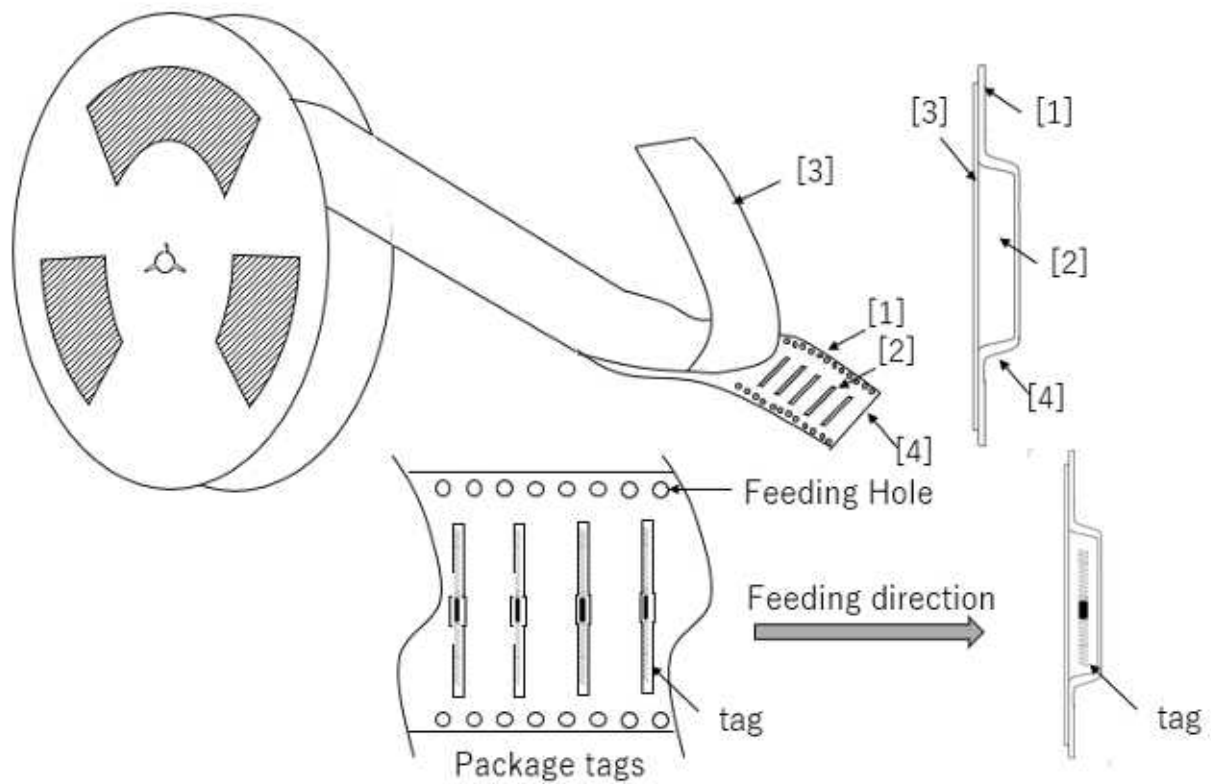
Reel will be packed in moisture-proof package together with desiccant and humidity indicator.
 After packing, the package will be heat-sealed.

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7-4. Taping Diagrams :

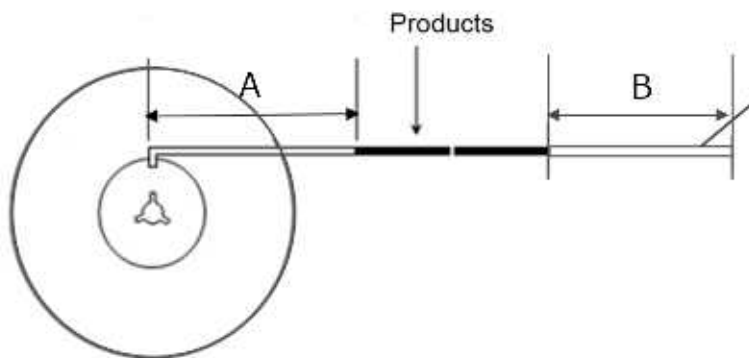


- [1] Feeding Hole : As specified in 7-1)
- [2] Hole for chip : As specified in 7-1)
- [3] Cover tape : 62um in thickness
- [4] Base tape : As specified in 7-1)

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7-5. Leader and Tail tape



A	100±10pcs (800±80mm)
B	100±10pcs (800±80mm)

7-6. Taping direction

The tape for chips are wound clockwise.

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7-7. Quantity per reel

6,000 pcs

7-8. Minimum order quantity

6,000pcs

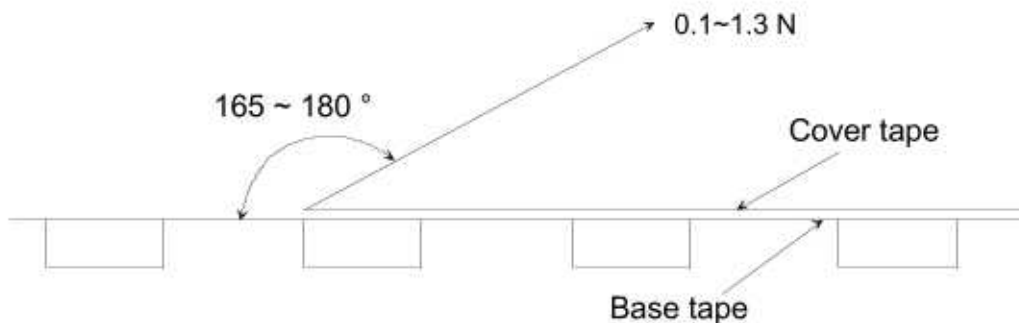
7-9. Material

Base and Cover tape : Plastic

Reel : Plastic

7-10. Peeling strength

0.1-1.3N when peeled in the direction below.



8. Contact window

Website URL:

For the product detail

<http://www.murata.com/products/rfid>

For the tire solution detail

<https://solution.murata.com/en-global/service/rfid-solution/solution/case-study/tire/>

For the technology licensing of Michelin

<https://rfid.michelin.com/what-is-rfid/#technology-licensing>

Email:

RFID Business Department at Murata Manufacturing Co, Ltd.

rfid.contact@murata.com

For any inquiries/queries, please feel free to contact us.

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NOTICE

1. Storage Conditions:

To avoid damaging, be sure to observe the following points.

- Store products where the ambient temperature is 15 to 35 °C and humidity 45 to 75% RH.
(Packing materials, In particular, may be deformed at the temperature over 40 °C.).
- Store products in non corrosive gas (Cl₂, NH₃, SO₂, NO_x, etc.).
- Stored products should be used within 6 months of receipt.

2. Handling Conditions:

Be careful in handling or transporting products because excessive stress or mechanical shock may break products.

3. Operational Environment Conditions:

Products are designed to work under normal environmental conditions (ambient temperature, humidity and pressure). Therefore, products have no problems to be used under the similar conditions to the above-mentioned. However, if products are used under the following circumstances, it may damage products and leakage of electricity and abnormal temperature may occur.

- In an atmosphere containing corrosive gas (Cl₂, NH₃, SO_x, NO_x etc.).
- In an atmosphere containing combustible and volatile gases.
- In a dusty environment.
- Direct sunlight
- Water splashing place.
- Humid place where water condenses.
- In a freezing environment.

If there are possibilities for products to be used under the preceding clause, consult with Murata before actual use.

If static electricity is added to this product, degradation and destruction may be produced.

Please use it after consideration enough so that neither static electricity nor excess voltage is added at the time of an assembly and measurement.

If product malfunctions may result in serious damage, including that to human life, alternative measures of the operation and design must be taken to secure the safety.

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4. Limitation of Applications:

The product is designed and manufactured to be used for elastomer products and does not support any other application.

We shall not warrant anything in connection with the Products including fitness, performance, adequateness, safety, or quality, in the case of applications listed in from (1) to (11) written at the end of this precautions, which may generally require high performance, function, quality, management of production or safety. Therefore, the Product shall be applied in compliance with the specific application.

WE DISCLAIM ANY LOSS AND DAMAGES ARISING FROM OR IN CONNECTION WITH THE PRODUCTS INCLUDING BUT NOT LIMITED TO THE CASE SUCH LOSS AND DAMAGES CAUSED BY THE UNEXPECTED ACCIDENT, IN EVENT THAT (i) THE PRODUCT IS APPLIED FOR THE PURPOSE WHICH IS NOT SPECIFIED AS THE SPECIFIC APPLICATION FOR THE PRODUCT, AND/OR (ii) THE PRODUCT IS APPLIED FOR ANY FOLLOWING APPLICATION PURPOSES FROM (1) TO (11) (EXCEPT THAT SUCH APPLICATION PURPOSE IS UNAMBIGUOUSLY SPECIFIED AS SPECIFIC APPLICATION FOR THE PRODUCT IN OUR CATALOG SPECIFICATION FORMS, DATASHEETS, OR OTHER DOCUMENTS OFFICIALLY ISSUED BY US*).

- (1) Aircraft equipment
- (2) Aerospace equipment
- (3) Undersea equipment
- (4) Power plant control equipment
- (5) Medical equipment
- (6) Transportation equipment
- (7) Traffic control equipment
- (8) Disaster prevention/security equipment
- (9) Industrial data-processing equipment
- (10) Combustion/explosion control equipment
- (11) Equipment with complexity and/or required reliability equivalent to the applications listed in the above.

For exploring information of the Products which will be compatible with the particular purpose other than those specified in the product specification, please contact our sales offices, distribution agents, or trading companies with which you make a deal, or via our web contact form.

Contact form: <https://www.murata.com/contactform>

*We may design and manufacture particular Products for applications listed in (1) to (11). Provided that, in such case we shall unambiguously specify such Specific Application in the product specification without any exception. Therefore, any other documents and/or performances, whether exist or non-exist, shall not be deemed as the evidence to imply that we accept the applications listed in (1) to (11).

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Note:

Please make sure that your product has been evaluated and confirmed against your specifications when our product is attached to your product.

All the items and parameters in this product specification have been prescribed on the premise that our product is used for the purpose, under the condition and in the environment agreed upon between you and us.

You are requested not to use our product deviating from such agreement.