

OZAK ML series (Rustproof Type) Corrosion Resistance Test

Corrosion Resistance Test The OZAK ML Series of rustproof type linear bearings features outer race surfaces with the most outstanding corrosion resistance; and, for finishing, a surface treatment process has been used assuring the highest degree of uniformity. As a result, the OZAK ML Series bearings have a clearly superior resistance to corrosion than the conventionally used stainless steel bearings made of steel grades SUS440C or QD51. The following salt spray fog test results testify to the much superior corrosion resistance performance capabilities of the ML Series.

This is why the ML Series is ideally suited for the work environments requiring a high corrosion resistance—a consideration that has played an increasingly more important role in recent years.

■ Test Methods

Test Method	Salt spray fog test to JIS H 8617 and Z 2371
Test solution composition	Sodium chloride 5.0±1%, pH 6.5—7.2
Grade of table salt (NaCl) used	Special grade to JIS K 8150
Quality of water used	Use of water purified in ion exchanger (resistivity 50×10 ⁴ Ohm cm or more).
Specimen surface preparation	Cleaning with ethanol
Test time	96 hours
Spraying method	Continuous spraying for 24 hours
Assessment method	Rating scores to indicate the extent of red rust formation on the specimen surface

■ Test Results

Specimen	No.	Test Time (hr)								
		2 hr	5 hr	8 hr	16hr	24hr	36hr	48hr	72hr	96hr
Rustproof ML Series	1	10	9.8	9.8	9.8	9.8	9.5	9.5	9.5	9.5
	2	10	10	10	10	9.8	9.8	9.8	9.8	9.8
	3	10	9.8	9.8	9.8	9.8	9.8	9.5	9.5	9.5
Stainless Steel SIJS 440C or QD51	1	9.0	8.0	7.0	6.0	6.0	6.0	6.0	5.0	5.0
	2	9.0	8.0	8.0	8.0	7.0	6.0	6.0	5.0	5.0
	3	8.0	7.0	7.0	7.0	7.0	7.0	7.0	5.0	5.0

* M Series: This series offers the most effective protection against rust: Outer races have OZAK, with the M-Series anti-rust surface treatment while the balls use stainless SUS440C.

* M2 Series: This is a more economic rustproof series: Outer races have OZAK, with the M-Series anti-rust surface treatment while the balls use stainless SUJ2. In general working conditions, there is only an extremely small probability of rust development on the oil- or grease-lubricated balls while rotating during operation.

The evidence of the salt spray fog tests has demonstrated that the OZAK M Series bearings have a much more favorable corrosion resistance than those using stainless steel (grades SUS440C. and QD51). The test results have already demonstrated the effectiveness of the rust protection that is the hallmark of this series. Yet the acid resistance of these bearings is often called into question when inquiries are made. We have conducted acid corrosion tests to determine the behavior of this series under acid exposure conditions. The results are reported below.

1. Resistance to Hydrochloric Acid

Resistance to hydrochloric acid systems is determined on the basis of the hydrogen chloride spray test results. These tests have shown that the OZAK M Series has a much higher corrosion resistance to hydrogen chloride than the stainless steel bearings. For comparative assessment, the hydrogen chloride spraying test results for the OZAK M Series and for stainless steel bearings are compared in the table below using rating scores.

2. Resistance to Nitric Acid

Test Method: Nitric Acid Fuming Test to JIS H8616 4,5,3 Test

Conditions: Introduce 150cc of first-grade reagent-type nitric acid into the bottom of a 20cm glass desiccator and close desiccator lid. Leave for 30 minutes to let the nitric acid gas (fumes) fill the interior of the desiccator. Then place the degreased (ethanol-cleaned) specimen on the center board in the desiccator and close lid. Leave in this condition and observe the changes of the specimen surface.

Test Results

Specimen No. Exposure Time	OZAK M Series					Stainless Steel (440C or QD51)				
	1	2	3	4	5	1	2	3	4	5
15 minutes	No rust formation					No rust formation				
30 minutes	No rust formation					No rust formation				
1 hour	No rust formation					No rust formation (Clouding discoloration of surface)				
1.5 hours	No rust formation					Some rust formation				
2 hours	No rust formation (Black discoloration of surface)					Rust formation on entire surface Rating score 2 3 2 3 3				