

**TEST SUMMARY**  
**AkzoNobel indr09-191-19872**

**Coating Testing for MicroLouvre™ K700 Metal Fabric**

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# MicroLouvre

## Test Summary

### 1 Purpose of Test

The purpose of the testing is to confirm the correct coating product and process.  
MicroLouvre™ K700 metal fabric coated samples were tested in the AkzoNobel Laboratories to assess



QUV                      ASTM G154 3138 Bulbs                      Accelerated Weathering Test



ISO 9227                      Corrosion Test in Artificial Atmospheres                      Neutral Salt Spray Test

ISO 6270                      Paints and varnishes  
(Determination of resistance to humidity)                      Humidity Test

### 2 Summary

**MicroLouvre™ K700 metal fabric coating is rated Rp = 10, in accordance with EN ISO 10289:2001.**

#### **Note:**

This is the highest possible protection rating after ISO 9227 salt spray testing according to EN ISO 10289:2001 (method of rating corrosion protection on inorganic coated metallic substrates).

The Current production sample of MicroLouvre™ K700 metal fabric with coating MN204E (#5), was tested for 500 hours and produced the result of 'No Effect' passing the accelerated weathering tests.

# MicroLouvre

## Test Summary

### 3 Scope of Test

In order to establish the most appropriate testing for what is a unique product AkzoNobel's testing procedures were adopted, namely the QUV ASTM G154 3138 Bulbs test for Accelerated Weathering Test , the ISO 9227 Corrosion Test in Artificial Atmospheres for the Neutral Salt Spray Test and the ISO 6270 Paints and varnishes (Determination of resistance to humidity) Humidity Test.

### 4 Description of Test Specimens

Eight sheets of powder coated MicroLouvre™ / Koolshade samples were cut into three giving a total of 24 samples for testing.

Sheets #4 - #8 were coated in AkzoNobel Interpon A2202 MN204E (Black)  
AkzoNobel Interpon A2202 MN204E (Black) is the standard production coating for MicroLouvre™ / Koolshade

#### Pre-Treatment

Sheets #4 & #5 were not subjected to any pre-treatment

Sheets #6 - #8 were subjected to a surfactant wash.

#### Coating Thickness

Sheets #4 - #8 all had a typical coating thickness of 75 -100µm.

#### Stoving Temperatures

Stoving temperatures remained constant at 200°C ( 392°F)

#### Stoving Times

Stoving times were varied by 0.05m/min to determine and prove optimum stoving times.

Sheet #4 had a stoving time of 0.25m/min, Sheet #5 had a stoving time of 0.20m/min

Sheet #5 is the standard finish for MicroLouvre™ Metal Fabric. The 3 pieces of Sheet #5 are referenced

RGA4000.KOO1M	QUV Testing
RGA4000.KOO1N	NSS Testing
RGA4000.KOO1O	Humidity Testing

#### Note:

Sheets #1 - #3 were coated in RAL 1033 (Yellow) to 150µm, for a specific lamination application.  
Stoving times and temperatures as directed.

# MicroLouvre

## Test Summary

#### 4 Description of Test Specimens (cont.)

##### Fig 1 Samples identification

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Number: indr09-191-19872  
Lab book ref:RGA4000.KOO1



Date: 1<sup>st</sup> September 2009

#### MicroLouvre: QUV, Neutral Salt Spray and Humidity Testing

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Samples submitted by: Mike Brady

#### Samples:

Eight sheets of powder coated louvre cut into three to give twenty four sections: -

Panel Code	Koolshade Sheet	Powder	Test
RGA4000.KOO1A	1	RAL 1033	QUV
RGA4000.KOO1B	1	RAL 1033	NSS
RGA4000.KOO1C	1	RAL 1033	Humidity
RGA4000.KOO1D	2	RAL 1033	QUV
RGA4000.KOO1E	2	RAL 1033	NSS
RGA4000.KOO1F	2	RAL 1033	Humidity
RGA4000.KOO1G	3	RAL 1033	QUV
RGA4000.KOO1H	3	RAL 1033	NSS
RGA4000.KOO1I	3	RAL 1033	Humidity
RGA4000.KOO1J	4	MN204E	QUV
RGA4000.KOO1K	4	MN204E	NSS
RGA4000.KOO1L	4	MN204E	Humidity
RGA4000.KOO1M	5	MN204E	QUV
RGA4000.KOO1N	5	MN204E	NSS
RGA4000.KOO1O	5	MN204E	Humidity
RGA4000.KOO1P	6	MN204E	QUV
RGA4000.KOO1Q	6	MN204E	NSS
RGA4000.KOO1R	6	MN204E	Humidity
RGA4000.KOO1S	7	MN204E	QUV
RGA4000.KOO1T	7	MN204E	NSS
RGA4000.KOO1U	7	MN204E	Humidity
RGA4000.KOO1V	8	MN204E	QUV
RGA4000.KOO1W	8	MN204E	NSS
RGA4000.KOO1X	8	MN204E	Humidity

Table 1: Summary of Test Part Details

Fig: 1

# MicroLouvre

## Test Summary

### 4 Description of Test Specimens (cont.)

#### Coatings

Figure 2: AkzoNobel Interpron A2202 MN204E Data Sheet

Akzo Nobel Powder Coatings BV



## Product Data Sheet

AkzoNobel Powder Coatings

**Interpron A2202  
MN204E**

<b>Product Description</b>	Interpron A2202 powders can be used for pillars and appliqué, roof racks, grille guards, bumpers, hitches, mirror housings, and wiper arms all require protection from the environment as well as being visually harmonious with the overall design of a vehicle. Interpron A2202 powders are standard durable and answer to the requested performance level specified by the OEMs.		
<b>Powder Properties</b>	<b>Chemical type</b>	Polyester	
	<b>Area of usage</b>	Automotive trim parts	
	<b>Particle Size</b>	Custom manufactured	
	<b>Appearance</b>	Smooth, matt	
	<b>Colour</b>	Black	
	<b>Gloss (60°)</b>	18 ± 3 GU	
	<b>Density (g/cm<sup>3</sup>)</b>	1,55 ± 0,05	
	<b>Stoving schedule</b>	12 minutes at 200°C (time at object temperature)	
	<b>Application</b>	Electrostatic	
	<b>Storage Stability</b>	under dry, cool (<25°C) conditions, at least 24 months from production date	
<b>Test Conditions</b>	The results are based on mechanical and chemical tests which (unless otherwise indicated) have been carried out under laboratory conditions and are given for guidance only. Actual product performance will depend upon the circumstances under which the product is used.		
	<b>Substrate</b>	Steel panels, Aluminium	
	<b>Pretreatment</b>	Bonder (LH) iron phosphate, Bonder (722/W/OF)	
	<b>Film Thickness</b>	60 µm	
	<b>Cure Schedule</b>	12 minutes at 200°C	
<b>Mechanical Tests</b>	<b>Adhesion</b>	DIN EN ISO 2409	Gt 0A
	<b>Erichsen Cupping</b>	DIN EN ISO 1520	≥ 6 mm
	<b>Impact</b>	ASTM D 2794	≥ 20 ip (reverse)
<b>Corrosion Tests</b>	<b>Salt Spray</b>	DIN EN ISO 9227	240 h corrosion creep < 2 mm from scribe
	<b>Humidity Test</b>	DIN EN ISO 6270-2	240 h no blistering
<b>Exterior Durability</b>	<b>Artificial Testing</b>	QUV-B > 50% gloss retention after 200 h	
<b>Pre-treatment</b>	Steel surfaces to be coated must be clean and free from grease. For maximum protection it is essential to pre-treat components prior to the application of Interpron A2202. Iron Phosphate and Zinc Phosphate of ferrous metals improve corrosion resistance. Aluminium parts require a chromate or chromate-free conversion pre-treatment.		
<b>Application</b>	Interpron A2202 powders can be applied by manual or automatic electrostatic spray equipment. It is recommended that for consistent application and appearance product be fluidized during application. Unused powder can be reclaimed using suitable equipment and recycled through the coating system		

Interpron®

1  
Fig: 2

#### 4 Description of Test Specimens (cont.)

##### Figure 3: AkzoNobel Interpron 610 Data Sheet

Interpron 610 Family of products includes Interpron A2202 MN204E

Akzo Nobel Powder Coatings Limited



### Interpron 610 Product Performance

Interpron 610 is a series of polyester based powder coatings designed for the exterior environment, offering excellent light and weather resistance from a single coat finish on a variety of substrates. Interpron 610 powders are available in a wide range of colours in gloss, satin, matt, metallic and textured effects and can be custom matched to the user's requirements.

Design Life Expectancies of up to 15 years for Interpron 610 products have been given within the ExtraLife Coating System Program for a C3 external environment (i.e. Urban and Industrial atmospheres with moderate Sulphur dioxide pollution + Coastal areas with low salinity). Note that during the life of the coating it is necessary to ensure the coating is maintained and cleaned regularly to ensure that the decorative and protective properties of the coating are retained. (guidelines can be given on request).

AkzoNobel refrains from giving specific guarantees for Interpron 610 on external surfaces as there are many factors beyond our control. Properties like "retention of original gloss", "chalking" and "fading" are very dependent on the environment and different buildings may be subjected to a wide variation in conditions (geographic orientation, air temperatures, surface temperatures, hours of sunshine, UV intensity, levels of atmospheric pollution, levels of ozone, humidity, rainfall, prevailing wind direction, proximity to coast, proximity to highway and so on).

In the case of adhesion and/or corrosion, there are similarly a large number of environmental factors which may influence the performance versus a guarantee (proximity to salt water, air temperatures, humidity, rainfall, pollution, acid rain etc.).



Fig: 3

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## Test Summary

### 5 Test Evidence

#### 5 (a) QUV Test

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**Aim:**

To assess the QUV, neutral salt spray, and humidity resistance.

**Test Methods:**

QUV - ASTM G154 QUVB 313B bulbs  
Neutral salt spray - ISO 9227  
Humidity - ISO 6270

**Results:**

**QUV**

Panel Code	Sheet	Powder	100 hour	200 hours	500 hours	1000 hours
RGA4000.KOO1A	1	RAL 1033	No effect	No effect	No effect	No significant colour change
RGA4000.KOO1D	2	RAL 1033	No effect	No effect	No effect	No significant colour change
RGA4000.KOO1G	3	RAL 1033	No effect	No effect	No effect	No significant colour change
RGA4000.KOO1J	4	MN204E	No effect	No effect	No effect	No significant colour change
RGA4000.KOO1M	5	MN204E	No effect	No effect	No effect	No significant colour change
RGA4000.KOO1P	6	MN204E	No effect	No effect	No effect	Chalking and gloss loss observed
RGA4000.KOO1S	7	MN204E	No effect	No effect	No effect	Chalking and gloss loss observed
RGA4000.KOO1V	8	MN204E	No effect	No effect	No effect	Chalking and gloss loss observed

Table 2: QUV Performance

#### 5 (b) Neutral Salt Spray Test

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**Neutral Salt Spray**

Panel Code	Sheet	Powder	250 hours	500 hours
RGA4000.KOO1B	1	RAL 1033	No effect	Green corrosion on ~ 25% cross overs
RGA4000.KOO1E	2	RAL 1033	Couple of green spots at cross overs	Green corrosion on ~ 15% cross overs
RGA4000.KOO1H	3	RAL 1033	Couple of green spots at cross overs	Green corrosion on ~ 15% cross overs
RGA4000.KOO1K	4	MN204E	No effect	Green corrosion on ~ 5% cross overs
RGA4000.KOO1N	5	MN204E	No effect	No corrosion
RGA4000.KOO1Q	6	MN204E	No effect	Couple of green spots at cross overs
RGA4000.KOO1T	7	MN204E	No effect	Couple of green spots at cross overs
RGA4000.KOO1W	8	MN204E	No effect	Couple of green spots at cross overs

Table 3: Neutral Salt Spray Performance



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## Test Summary

### 5 Test Evidence (cont.)

#### 5 (c) Humidity Exposure

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#### Humidity

Panel Code	Sheet	Powder	250 hours	500 hours	750 hours	1000 hours
RGA4000.KOO1C	1	RAL 1033	No effect	No effect	No effect	No effect
RGA4000.KOO1F	2	RAL 1033	No effect	No effect	No effect	No effect
RGA4000.KOO1I	3	RAL 1033	No effect	No effect	No effect	No effect
RGA4000.KOO1L	4	MN204E	No effect	No effect	No effect	No effect
RGA4000.KOO1O	5	MN204E	No effect	No effect	No effect	No effect
RGA4000.KOO1R	6	MN204E	No effect	No effect	No effect	No effect
RGA4000.KOO1U	7	MN204E	No effect	No effect	No effect	No effect
RGA4000.KOO1X	8	MN204E	No effect	No effect	No effect	No effect

Table 4: Humidity Exposure Performance

Table 5: Relative ranking of salt spray performance

#### Humidity

All parts tested show good resistance to humidity.

#### 5(d) General Test Conclusions – all samples

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#### Conclusion:

#### QUV

Panels prepared from Sheets 6, 7, and 8 appear to have chalked and faded worse than the other black panels from sheets 4 and 5. The yellow panels all retain a bright appearance after exposure.

#### Neutral Salt Spray

Corrosion occurs more readily on the yellow sections (RAL1022) compared to the black with green spots seen on parts from sheets 2 and 3 after 250 hours exposure. No corrosion is seen on the part from sheet 1 or any of the black parts after 250 hours.

After 500 hours there is some differentiation this can be ranked: -

Panel Code	500 hours	Performance Ranking
RGA4000.KOO1B	Green corrosion on ~ 25% cross overs	Worst
RGA4000.KOO1E	Green corrosion on ~ 15% cross overs	6 <sup>th</sup>
RGA4000.KOO1H	Green corrosion on ~ 15% cross overs	6 <sup>th</sup>
RGA4000.KOO1K	Green corrosion on ~ 5% cross overs	5 <sup>th</sup>
RGA4000.KOO1Q	Couple of green spots at cross overs	2 <sup>nd</sup>
RGA4000.KOO1T	Couple of green spots at cross overs	2 <sup>nd</sup>
RGA4000.KOO1W	Couple of green spots at cross overs	2 <sup>nd</sup>
RGA4000.KOO1N	No corrosion	Best

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## Test Summary

### 6 Conclusion

Production for MicroLouvre™ K700 metal fabric with coating MN204E (Sheets #5) shall be the standard coating application and stoving duration.

Coating thickness to remain 75 - 100µm.

Specific line speed for stoving should be no more than 0.22m/min and no less than 0.18m/min @ 200°C surface temp.

MicroLouvre™ K700 metal fabric coating is rated Rp = 10 or the highest possible protection rating after ISO 9227 salt spray testing according to EN ISO 10289:2001 (method of rating corrosion protection on inorganic coated metallic substrates).