

# **ALP Lighting Components, Inc.**

## **White Coil-Coated Pre & Post paint Steel Specifications**

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## **LIST OF CONTENTS**

### **1.0 BASE SUBSTRATE**

- 1.1 MATERIAL
- 1.2 SURFACE FINISH
- 1.3 MECHANICAL PROPERTIES

### **2.0 COATING SPECIFICATION**

- 2.1 MATERIAL TYPE
- 2.2 DRY FILM THICKNESS
- 2.3 SUBSTRATE PRE-TREATMENT
- 2.4 COATING PHYSICAL PROPERTIES

### **3.0 OPTICAL PROPERTIES OF COATED SUBSTRATE**

- 3.1 REFLECTANCE LEVEL
- 3.2 GLOSS LEVELS
- 3.3 COLOR
- 3.4 SURFACE FINISH

### **4.0 COATING APPLICATION**

- 4.1 COATING PRESHIPMENT TESTING

### **5.0 ACCELERATED EXPOSURE TESTING**

- 5.1 SALT SPRAY
- 5.2 UV EXPOSURE

### **6.0 DIMENSIONAL REQUIREMENTS**

### **7.0 PACKAGING**

### **8.0 SPECIAL REQUIREMENTS**

- 8.1 WAX / MINERAL SPIRIT APPLICATION
- 8.2 PROTECTIVE FILM APPLICATION

### **9.0 AREAS OF RESPONSIBILITY**

- 9.1 DESIGNATION OF RESPONSIBILITY  
(INCLUDES CERTIFICATION REQUIREMENTS)

### **10.0 SUMMARY OF REQUIREMENTS**

## **WHITE PREPAINT SPECIFICATION**

THE FOLLOWING PROCUREMENT SPECIFICATION SETS FORTH ALP LIGHTING'S PAINT REQUIREMENTS FOR REFLECTIVE WHITE COIL COATED PREPAINT. PRODUCTS WITH THIS FINISH WILL BE EITHER ROLL FORMED OR FABRICATED USING PROGRESSIVE DIE PUNCHING AND FORMING. SPECIAL REQUIREMENTS AND EXCEPTIONS/DEVIATIONS SHALL BE SPECIFICALLY NEGOTIATED AND DOCUMENTED ON THE ALP LIGHTING PURCHASE ORDER.

## **POST PAINT WHITE**

THE FOLLOWING PROCUREMENT SPECIFICATION SETS FORTH ALP'S PAINT REQUIREMENTS FOR HIGH GLOSS AND DIFFUSE REFLECTIVE WHITE POST PAINT PRODUCTS. SPECIAL REQUIREMENTS AND EXCEPTIONS/DEVIATIONS SHALL BE SPECIFICALLY NEGOTIATED AND DOCUMENTED ON THE ALP PURCHASE ORDER.

# SPECIFICATION

## 1.0 BASE SUBSTRATE

### 1.1 MATERIAL

VARIOUS GAGES OF STEEL PER ALP LIGHTING COLD ROLLED CARBON STEEL COILS PURCHASING SPECIFICATION.

(II) ALUMINUM

ALUMINUM ALLOY NO. 3003 H24 PER 1993 ALUMINUM STANDARDS DATA - ALLOY AND TEMPER DESIGNATION SYSTEM.

### 1.2 SURFACE FINISH

BOTH SIDES MILL FINISH AND MUST BE CLEAN, FREE FROM OIL, GREASE, METAL CHIPS AND STAINS.

### 1.3 MECHANICAL PROPERTIES

REFERENCE ALP COLD ROLLED, LOW - CARBON STEEL COIL & SHEET PROCUREMENT SPECIFICATIONS OR ALUMINUM ALLOY PROCUREMENT SPECIFICATIONS.

## 2.0 COATING

### 2.1 MATERIAL TYPE

ALL COATINGS MUST BE SUITABLE FOR LONG TERM (15 YEARS) USE IN A LIGHT FIXTURE.

ALL PREPAINT COATINGS SHALL HAVE AN INTERNAL LUBRICANT TO ALLOW ADEQUATE LUBRICATION DURING THE PUNCHING AND/OR ROLL FORMING PROCESS.

### 2.2 DRY FILM THICKNESS

#### PRE PAINT

DESCRIPTION	90 % REFLECTANCE HIGH GLOSS	82% REFLECTANCE HIGH GLOSS	90% REFLECTANCE DIFFUSE
COLOR	WHITE	WHITE	WHITE
DRY FILM THICKNESS			
A. SHOW SURFACE	1.20 - 1.30 MILS	0.50 - 1.10 MILS	1.20 - 1.40 MILS
B. BACKSIDE	0.40 - 0.50 MILS	0.30 - 0.50 MILS	0.40 - 0.50 MILS

POST PAINT

DESCRIPTION	90% REFLECTANCE HIGH GLOSS	90% REFLECTANCE LOW GLOSS - DIFFUSE
COLOR <sup>NOTE 1</sup>	WHITE	WHITE
DRY FILM THICKNESS		
A. SHOW SURFACE	1.50 - 2.50 MILS	1.50 - 2.50 MILS
B. BACKSIDE	0.80 - 1.50 MILS	0.80 - 1.50 MILS

NOTE 1: PER AGREED UPON SAMPLES

**2.3 SUBSTRATE PRE-TREATMENT**

THE SUBSTRATE MUST BE CLEANED PER THE APPLICATION INSTRUCTIONS PROVIDED BY PAINT MANUFACTURER.

**2.4 COATING PHYSICAL PROPERTIES**

**(1) APPEARANCE**

THE VISIBLE SURFACE SIDE SHALL BE COMMERCIALY SMOOTH AND FREE OF DISCOLORATION, STREAKS, SCRATCHES, FLOW LINES, BLISTERS, AND OTHER IMPERFECTIONS, WHICH COULD DETRACT FROM REFLECTANCE OR VISUAL ACCEPTANCE.

**(2) DRY FILM HARDNESS**

**PRE PAINT**

ON RECEIPT BOTH SIDES SHALL EXHIBIT A PENCIL HARDNESS OF H MINIMUM AS MEASURED WITH AN EAGLE TURQUOISE PENCIL IN ACCORDANCE WITH N.C.C.A. TECHNICAL BULLETIN 4.2.5 OR PER ASTM D3363 - 92a or latest ASTM revision.

**POST PAINT**

ON RECEIPT BOTH SIDES SHALL EXHIBIT A PENCIL HARDNESS OF H MINIMUM TO A 2H MAXIMUM AS MEASURED WITH AN EAGLE TURQUOISE PENCIL IN ACCORDANCE WITH N.C.C.A. TECHNICAL BULLETIN II - (12) OR PER ASTM D3363.

**(3) SOLVENT RESISTANCE**

**PRE PAINT**

(I) VISIBLE COATING SIDE MUST WITHSTAND 50 DOUBLE RUBS OF METHYL-ETHYL-KETONE (MEK) WITHOUT EXPOSING BARE METAL.

(II) UNDERSIDE SHOULD WITHSTAND 25 DOUBLE RUBS WITH MEK WITHOUT EXPOSING BARE METAL.

(III) ALL TESTS TO BE PERFORMED IN ACCORDANCE WITH N.C.C.A. TECHNICAL BULLETIN 4.2.11 OR ASTM D5402 - 93 or latest ASTM revision.

**POST PAINT**

(I) VISIBLE COATING SIDE MUST WITHSTAND 75 DOUBLE RUBS OF METHYL-ETHYL-KETONE (MEK) WITHOUT EXPOSING BARE METAL.

(II) UNDERSIDE SHOULD WITHSTAND 25 DOUBLE RUBS WITH MEK WITHOUT EXPOSING BARE METAL.

(III) ALL TESTS TO BE PERFORMED IN ACCORDANCE WITH N.C.C.A. TECHNICAL BULLETIN II - SECTION (12) OR ASTM D4752.

#### **(4) ADHESION TESTS**

(I) ZERO - T BEND TEST ONLY REQUIRED WHEN SPECIFIED ON PO. ALL STANDARD MATERIAL TO BE T1 OR T2.

THE SAMPLE MUST BE FOLDED OVER ON ITSELF LEAVING A MAXIMUM GAP BETWEEN THE INNER SURFACES OF THE BEND OF .011 INCHES. THE TWO SIDES OF THE SAMPLE MUST BE PARALLEL TO EACH OTHER IN ACCORDANCE WITH NCCA TECHNICAL BULLETIN 4.2.8 OR ASTM D4145 - 83 or latest ASTM revision. THE TEST IS TO BE PERFORMED ON A SAMPLE THAT HAS BEEN ALLOWED TO STABILIZE AT A TEMPERATURE OF 72° F (+/- 2° F).

THE SAMPLE MUST BE SMOOTH TO THE FINGER TOUCH AROUND THE BEND AREA, VISIBLE FLAKING OR DELAMINATION IS NOT ACCEPTABLE.

A PIECE OF 3M BRAND #610 TAPE MUST BE FIRMLY AFFIXED ACROSS THE ENTIRE BEND AND THEN PULLED OFF PER ASTM D3359-95a or latest ASTM revision. THERE SHOULD BE NO CRACKING OR FLAKING OF THE PART VISIBLE (FROM A VIEWING DISTANCE OF 18") ALONG THE FOLDED EDGE.

(II) EDGE DELAMINATION (FRILLING)

PAINT MUST NOT DELAMINATE FROM, THE CUT EDGE OF THE COIL, OR PREPUNCHED HOLES, PARTIALLY PIERCED HOLES / KNOCKOUT DETAILS OR NOTCHED DETAILS DURING ROLL-FORMING OR ANY OTHER FABRICATION OPERATION. (NO PAINT SLIVERS OR FRILLS.)

(III) LATTICE TEST

NO FLAKING SHOULD OCCUR WHEN A ONE-INCH SQUARE AREA IS SCRATCHED (WITH A FINE RAZOR POINT) IN 1/8 INCH SQUARES. THE SCRATCHES MUST PASS THROUGH THE COATING TO THE BASE METAL, AND NO FLAKING SHOULD OCCUR WHEN A PIECE OF 3M 610 TAPE IS PULLED AWAY AFTER HAVING DIAGONALLY COVERED THE 1 INCH SQUARE AREA. TEST METHOD AS PER NCCA TECHNICAL BULLETIN 4.2.10 OR ASTM D3359-95a.

(IV) DIRECT AND REVERSE IMPACT

THE SAMPLE SHOULD BE TESTED IN ACCORDANCE WITH NCCA TECHNICAL BULLETIN 4.2.6 OR ASTM D2794 - 93 or latest ASTM revision. THE FULL COAT SIDE (SHOW SURFACE) SHALL SHOW NO EVIDENCE OF COATING CRACKS AT THE POINT OPPOSITE IMPACT WHEN A ONE POUND BALL IS DROPPED ONTO THE BACK SIDE FROM A HEIGHT OF 16 INCHES, IMPACTING ONTO A TEST PANEL SUPPORTED BY AN ANVIL WITH A 1 3/4 INCH HOLE.

(V) CHEMICAL RESISTANCE

THE COATING MUST RESIST DISCOLORATION, CHANGE IN GLOSS, SPOTTING, SOFTENING, BLISTERING, LOSS OF ADHESION, OR OTHER PHENOMENA WHEN SUBJECTED TO A VARIETY OF HOUSEHOLD CHEMICALS OR STRONG CLEANERS PER ASTM D1308-87.

MATERIALS OR CHEMICALS SUGGESTED AS REAGENTS INCLUDE:

- DISTILLED WATER, HOT AND COLD.
- ETHYL ALCOHOL, 50% BY VOLUME.
- VINEGAR, 3% ACETIC ACID.

- ALKALI SOLUTION.
- ACID SOLUTION.
- SOAP AND DETERGENT SOLUTIONS.
- FRUIT CUT.
- OILS AND FATS.
- LUBRICATING OILS AND GREASES.

### 3.0 OPTICAL PROPERTIES OF PAINTED SUBSTRATE

#### 3.1 PAINT REFLECTANCE

##### PRE PAINT

DESCRIPTION	90 % REFLECTANCE HIGH GLOSS	82% REFLECTANCE HIGH GLOSS	90% REFLECTANCE DIFFUSE
REFLECTANCE <sup>NOTE 1</sup>	90 % MIN	82% MIN	90 % MIN

##### POST PAINT

DESCRIPTION	90 % REFLECTANCE HIGH GLOSS	90% REFLECTANCE LOW GLOSS DIFFUSE
REFLECTANCE <sup>NOTE 1</sup>	90 % MIN.	90% MIN.

NOTE 1: AS MEASURED ON A TECHNIDYNE TR-2 TOTAL REFLECTOMETER

#### 3.2 GLOSS LEVEL

##### PRE PAINT

DESCRIPTION	90 % REFLECTANCE HIGH GLOSS	82% REFLECTANCE HIGH GLOSS	90% REFLECTANCE DIFFUSE
GLOSS LEVEL <sup>NOTE 1</sup>	90 MIN	90 MIN	20 - 40

##### POST PAINT

DESCRIPTION	90 % REFLECTANCE HIGH GLOSS	90% REFLECTANCE LOW GLOSS - DIFFUSE
GLOSS LEVEL <sup>NOTE 1</sup>	90 MIN.	20 -40

NOTE 1: AS MEASURED ON 60° GLOSS METER BYK LABOTRON OR EQUIVALENT. THE UNIT OF MEASURE IS THE GLOSS UNIT.

#### 3.3 COLOR

##### (I) FULL COAT SIDE

COLOR MUST BE WHITE IN ACCORDANCE WITH THE AGREED UPON SAMPLES BETWEEN ALP LIGHTING, THE INDIVIDUAL COATERS AND THE PAINT MANUFACTURER.

##### (II) REVERSE SIDE

COLOR MUST BE INDICATIVE OF A WHITE WASH COAT PER AGREED UPON SAMPLES BETWEEN ALP LIGHTING, THE INDIVIDUAL COATER AND THE PAINT MANUFACTURER.

## 4.0 COATING APPLICATION

### 4.1 PRE PAINTCOATING PRESHIPMENT TESTING

A PRESHIPMENT OF THE PRODUCTION MANUFACTURED COATING WILL BE SHIPPED TO THE ROLL-COATER TO ENSURE CONFORMANCE TO THIS SPECIFICATION.

## 5.0 ACCELERATED EXPOSURE TESTING

### 5.1 SALT SPRAY

THE COATED SUBSTRATE MUST BE EXPOSED TO A CONTINUOUS 5% SALT SPRAY SOLUTION AT 95°F PER ASTM B 117-95 OR LATEST ASTM REVISION FOR NUMBER OF HOURS SPECIFIED BELOW:

DESCRIPTION	90 % REFLECTANCE HIGH GLOSS	82% REFLECTANCE HIGH GLOSS	90% REFLECTANCE DIFFUSE
SALT SPRAY- ASTM B117	300 HOURS	250 HOURS	250 HOURS

THE RESULTANT MATERIAL MUST EXCEED THE FOLLOWING PERFORMANCE LEVEL:

THE FULL COAT SIDE SHALL WITHSTAND THE SPECIFIED AMOUNT OF EXPOSURE WITH A MAXIMUM OF 3/16" CREEP FROM A DIAGONALLY SCRIBED LINE.

### 5.2 ACCELERATED UV CONDITIONING

THE COATED SUBSTRATE MUST WITHSTAND EXPOSURE TO 100% UV (UVA-351 LAMPS) AT 120°F FOR 1000 HOURS.

THE RESULTANT MATERIAL MUST EXCEED THE FOLLOWING PERFORMANCE LEVEL.

- (I) TOTAL REFLECTANCE MUST EXCEED 85%.
- (II) COATING ADHESION MUST MEET ASTM 3359 PULL TEST WHEN THE SAMPLE HAS STABILIZED AT ROOM TEMPERATURE.
- (III) MAXIMUM % GLOSS LOSS MEASURED AT 60° - 15% OF THE ORIGINAL GLOSS MEASUREMENT.

#### NOTE:

TESTING PERFORMED BY COATING SUPPLIER FOR QUALIFICATION AND/OR PERIODIC VERIFICATION ONLY AND RESULTS PROVIDED TO ALP LIGHTING PRIOR TO COATING APPROVAL.

## 6.0 COIL DIMENSIONAL REQUIREMENTS

SEE ALP LIGHTING COLD ROLLED CARBON STEEL COIL PURCHASING SPECIFICATION.



## 7.0 PACKAGING

SEE ALP LIGHTING COLD ROLLED CARBON STEEL COIL PURCHASING SPECIFICATION.

## 8.0 SPECIAL REQUIREMENTS

THE FOLLOWING ADDITIONAL REQUIREMENTS MAY BE SPECIFIED BY ALP LIGHTING ON THE RELEVANT PURCHASE ORDER:

### PRE PAINT

(I) PETROLEUM WAX/ VM & P NAPHTHA OR EQUIVALENT

APPLY PETROLEUM WAX (5%) / VM & P NAPHTHA (95%) P/NO JL 8467 MANUFACTURED BY LILY INDUSTRIES OR EQUIVALENT TO THE FULL COAT SURFACE OF THE MATERIAL. THE THICKNESS OF THE WAX/ NAPHTHA COATING MUST BE 4 mg / Sq. FT MIN. TO 7 mg /Sq. FT MAX.

THE DESIRED EFFECT IS THAT THE NAPHTHA OR EQUIVALENT EVAPORATES AND LEAVES THE PETROLEUM WAX DEPOSIT ON THE FULL COATED SURFACE, TO MINIMIZE THE CONTACT PRESSURE OF THE ROLL-FORMING TOOLING ON THE COATING.

AFTER EVAPORATION OF THE NAPHTHA, THE RESULTANT WAX DEPOSIT CANNOT BE OF SUCH AN EXCESSIVE LEVEL AS TO REQUIRE THE PRODUCT TO BE WASHED PRIOR TO SHIPMENT.

### POST PAINT

PROTECTIVE FILM LAMINATED TO THE SHOW SURFACE OF THE PAINTED PRODUCT.

## 9.0 AREAS OF RESPONSIBILITY

### 9.1 DESIGNATION OF RESPONSIBILITY

THE FOLLOWING CHART OUTLINES WHICH SECTIONS OF THIS SPECIFICATION ARE RELEVANT TO THE FOUR KEY PARTIES INVOLVED:

ACTIVITY	SUBSTRATE SUPPLIER	COATING SUPPLIER	COATING APPLICATION	ALP LIGHTING
1.0 BASE SUBSTRATE				
1.1 MATERIAL	X			
1.2 SURFACE FINISH	X			
1.3 MECHANICAL PROPERTIES	X			
2.0 COATING				
2.1 MATERIAL		X		
2.2 THICKNESS (OPTIONS)		X	X	
2.3 PRETREATMENT			X	
2.4 PHYSICAL PROPERTIES				
- APPEARANCE	X	X	X	

ACTIVITY	SUBSTRATE SUPPLIER	COATING SUPPLIER	COATING APPLICATION	ALP LIGHTING
- HARDNESS		X	X	
- SOLVENT RESISTANCE		X	X	
- ADHESION TESTS		X	X	
3.0 OPTICAL PROPERTIES				
3.1 REFLECTANCE		X	X	
3.2 GLOSS LEVEL		X	X	
3.3 COLOR		X	X	
4.0 COATING APPLICATION				
4.1 PRESHIP TESTING		X	X	
5.0 ACCELERATED TESTING				
5.1 SALT SPRAY		X	X	
5.2 UV EXPOSURE		X	X	
6.0 DIMENSIONAL REQ.				
	X			
7.0 PACKAGING				
	X			
8.0 SPECIAL REQUIREMENTS				
	X	X	X	X

NOTE:

(I) EACH SUPPLIER MUST PROVIDE THE NECESSARY CERTIFICATION OR PROOF OF TESTING THAT EACH NEW BATCH OF MATERIAL CONFORMS TO THEIR RESPECTIVE AREAS OF RESPONSIBILITY PER THE CHART ABOVE.

## 10.0 SUMMARY OF REQUIREMENTS

THE FOLLOWING CHART PROVIDES A QUICK REFERENCE TO THE RELEVANT SPECIFICATION FOR EACH WHITE PAINTED MATERIAL PURCHASED BY ALP LIGHTING:

### PRE PAINT

DESCRIPTION		90 % REFLECTANCE HIGH GLOSS	82% REFLECTANCE HIGH GLOSS	90% REFLECTANCE DIFFUSE
1	COLOR	WHITE	WHITE	WHITE
2.	BASE PRIMER	NO	NO	NO
3.	DRY FILM THICKNESS			
	A. SHOW SURFACE	1.20 - 1.30 MILS	0.50 - 1.10 MILS	1.20 - 1.40 MILS
	B. BACKSIDE	0.40 - 0.50 MILS	0.30 - 0.50 MILS	0.40 - 0.50 MILS
4.	HARDNESS	H MIN	H MIN	H MIN
5.	SOLVENT RESISTANCE	75 DOUBLE RUBS - MEK	50 DOUBLE RUBS - MEK	75 DOUBLE RUBS - MEK
6.	ADHESION TEST	ZERO T BEND - ANY GRAIN DIRECTION	ZERO T BEND - ANY GRAIN DIRECTION	ZERO T BEND - ANY GRAIN DIRECTION
7.	EDGE DELAMINATION	NONE	NONE	NONE
8.	LATTICE TEST	YES	YES	YES

9.	DIRECT & REVERSE IMPACT	YES	YES	YES
10.	CHEMICAL RESISTANCE	YES	YES	YES
11.	INTERNAL LUBRICANT	YES	YES	YES
12.	REFLECTANCE			
	A. SHOW SURFACE	90% MIN	82% MIN	90 % MIN
	B. REVERSE SIDE	N/A	N/A	N/A
13.	GLOSS LEVEL	90 % MIN	90 % MIN	20% - 40%
14.	SALT SPRAY- ASTM B117-95	300 HOURS	168 HOURS	250 HOURS

**POST PAINT**

ITEM NO.	DESCRIPTION	90% REFLECTANCE HIGH GLOSS	90% REFLECTANCE LOW GLOSS DIFFUSE
1	COLOR <sup>NOTE 1</sup>	WHITE	WHITE
2.	BASE PRIMER	NO	NO
3.	DRY FILM THICKNESS		
	A. SHOW SURFACE	1.50 - 2.50 MILS	1.50 - 2.50 MILS
	B. BACKSIDE	0.80 - 1.50 MILS	0.80 - 1.50 MILS
4.	HARDNESS	H MIN - 2H MAX	H MIN - 2H MAX
5.	SOLVENT RESISTANCE (SHOW SURFACE)	75 DOUBLE RUBS - MEK	75 MIN. DOUBLE RUBS - MEK
6.	ADHESION TEST	0T BEND - ALL GRAIN DIRECTION	0T BEND - ALL GRAIN DIRECTIONS
7.	EDGE DELAMINATION	NONE	NONE
8.	LATTICE TEST	YES	YES
9.	DIRECT & REVERSE IMPACT	YES	YES
10.	CHEMICAL RESISTANCE	YES	YES
11.	INTERNAL LUBRICANT	YES	YES
12.	REFLECTANCE		
	A. SHOW SURFACE	90% MIN	90% MIN
	B. REVERSE SIDE	N/A	N/A
13.	GLOSS LEVEL	90 % MIN	20 - 40%
14.	SALT SPRAY- ASTM B117	300 HOURS	300 HOURS

NOTE 1: PER AGREED UPON SAMPLES