

TECHNICAL BULLETIN

Reflector Materials

B E (a) W A R E

Dear Luminaire Buyer / Specifier,

If you are considering purchase of Mirror Optic Luminaires, here are some things you should know about the Louvre/Louvre materials.

Although the Louvres offered by different vendors in their Luminaires may appear the same to the naked eye, there can actually be a vast difference in the products. Hence if you find a significant difference in the pricing of different vendors, some of the price differences could be because of the following reasons : Material Grade, Gauge, Product Design.

MATERIALS

Prior Practice :

From 1997 to 2002 the minimum Industry standard was Imported Anodised material Grade 90 or 100 in 0.4 mm thickness or equivalent.

Current Practice:

Since early 2003 competitive pressures and the strong Euro have tempted some vendors to switch over to cheaper, alternative materials, as well as thinner gauges.

We believe that buyers/specifiers should be fully informed and aware about this subject so that they can make an appropriate choice. We therefore furnish below some information about these materials for your information.

IMPORTED ANODISED ALUMINIUM

This material is a good quality material with thorough Anodising and Sealing, and guaranteed to retain its original surface brightness for 15 years in normal installations.

Imported anodised materials come with different properties and prices depending on the following main characteristics [a] Total reflectance [b] Diffuse Reflectance [c] Iridescence. The Table below furnishes details of the most commonly used materials and their properties:-

<i>Grade</i>	<i>Total Reflectance</i>	<i>Diffuse Reflectance</i>	<i>Iridescence</i>
090	86%	15%	Controlled
100	86%	12%	Low
103	86%	8%	Very low
106HB	>90%	6%	No iridescence
130/3 Matt	82%	80%	No iridescence
230/235 Hammer Finish	85%	84%	Low

Diffuse Reflectance is a measure of uncontrolled reflection. A special treatment is required in the Anodising Line to control the diffuse reflectance (for mirror finish) and the iridescence. Hence the lower the diffuse reflectance (for mirror finish), and the lower the iridescence, the higher the grade and price of the Reflector material.

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The Grades 90 and 100 are commercial grades and are standard for T8 Lamps. The Grade 100 has slightly less Diffuse reflectance and Iridescence than Grade 90. This is normally the minimum grade requirement to comply with Category 1, 2 and 3 Louvres. The Grades 103 and 106HB are ideal for T5 Lamps. The Matt Finish Grade 130/3 has no iridescence and is suitable for all T5 and T8 Lamps.

All the above materials listed can be considered as standard international quality materials widely used worldwide by all reputed brands in the Lighting Industry.

CHEAPER REFLECTOR MATERIALS NOW BEING USED BY SOME VENDORS IN INDIA

a) Locally Anodised Material – This material is anodised locally using indigenous base material or imported base material. It has been found to be inconsistent in quality as the anodising is not uniform and at times the surface is found to be patchy with defects such as process lines, stains, etc. This material shows extremely high iridescence particularly when lit in a luminaire with Triphosphor coated lamps. This material is approximately 20% cheaper than the imported material and is mostly sold in 0.3 mm thickness only, resulting in a flimsy louvre.

Locally anodised Hammer Finish Aluminium also is not a true Hammer Finish as compared to the imported material. Each dimple of the imported Hammer Finish material has a smooth curve to ensure widespread scattering of light reflected from the light source in flood-lighting applications. On the other hand, the locally anodised Hammer Finish material simply has flat indentations as a result of which the light scattering will not be as effective as desired to be achieved by a true Hammer Finish.

CHEAPER IMPORTED MATERIALS:

a) Flash Anodised Aluminium : These materials are run very fast through the Anodising Line and therefore offer some degree of protection against tarnishing. These materials are about 12½ % cheaper than the imported standard quality anodised materials. These are a superior alternative to the locally anodised material.

b) Non-Anodised Aluminium comes without guarantees about the surface retaining its original brightness. However, in practice, it may take 2-3 years before the material darkens due to tarnishing, etc. Non-Anodised materials are about 20% cheaper than the imported Anodised material. The original brightness and reflective properties are similar to those of standard anodised aluminium materials. These materials are widely used in the Middle East as they seem to survive reasonably well in a non-humid environment. However, in a humid environment their surface is unprotected and will tarnish and become whitened with corrosion.

Gauge

Most of the above materials are available in the following gauge/thickness : 0.4 mm, 0.35 mm and 0.3 mm. Till recently the Industry standard was the use of 0.4 mm thick which has proven to be quite sturdy and adequate for Mirror Optic Luminaires. However, competitive pressures have now forced some vendors to switch over to the thinner gauges and there has been a very strong drift downwards to 0.3 mm thickness. Luminaire users should be aware that 0.4 mm thickness is nearly 33% thicker and stronger than 0.3 mm and therefore offers significantly higher strength and durability.

Experience has shown that 0.3 mm thick material is so flimsy that the Louvre profile and consequently photometry, can get distorted very easily during assembly, handling, transportation, re-lamping, etc. This has particular significance for larger products such as 4Lx18W and 2Lx36W Luminaires. This flimsiness can also lead to increased scrap losses from manufacture through to installation. Because of the lower weight of 0.3 mm louvre, its cost will be at least 12% lower than a corresponding louvre of 0.4 mm thickness. Thus a 0.3 mm thick louvre made from Indian Anodised Aluminium is effectively 30% cheaper than a corresponding top class louvre made from 0.4 mm thick imported Anodised Aluminium, but its quality will be greatly inferior.

PRODUCT DESIGN

The ideal height for a top quality T8 parabolic louvre (with respect to light output ratio, cut-off angles as per Category 1, 2, 3, etc. should be 80-85 mm with a lamp centre at 65 mm height). However, as this obviously results in increased consumption of Aluminium and cost, there is a temptation to reduce the height of the louvre by 10-15 mm. While this results in a saving of Aluminium, it results in an increased opening at the back of the Louvre which adversely affects the efficiency of the Louvre. The reduced Louvre height does not permit the perfect parabolic profile to be generated thereby defeating the purpose and intent of using the parabola. It is unlikely that such louvres will have cut-off angles in compliance with Category 1, 2 or 3. Luminaire buyers/specifiers should keep this factor in mind while inviting Offers from vendors.

CONCLUSION:

From the above, it should now be easy for potential buyers/specifiers to conclude that if one manufacturer offers a lower price than the others, a major reason may be the much cheaper louvre material and gauge and design being used in the product. Viewed in isolation, a cheaper, lower grade metal material can look satisfactory and from a visual inspection or sampling, it may not be evident that the louvre will perform much worse than its good quality equivalent. Hence if the luminaire buyers/specifiers would like to have a level playing field for all the vendors, we would suggest the following check-list which can form a part of a Questionnaire in their specification:-

1.	Reflector Materials	a) Anodised-Imported? b) Anodised-Indian? c) Flash Anodised? d) Non-Anodised? e) Gauge?	Grade ? Imported Base Material or Indian Base Material 0.3 or 0.35 or 0.4mm ?	
2.	If Anodised	Material Grade/Brand Total Reflectance % Diffuse Reflectance % Iridescence ?	 Controlled/Low/Very Low/Nil	
3.	Louvre Description	Width? Length ? Height ? Cross Blade Height ? No. of Cross Blades ? Lamp height with respect to bottom of Louvre ?		

We hope this information is useful to all concerned. We would be pleased to answer any further queries.

ELEKTROMAG DEVICES PVT. LTD.