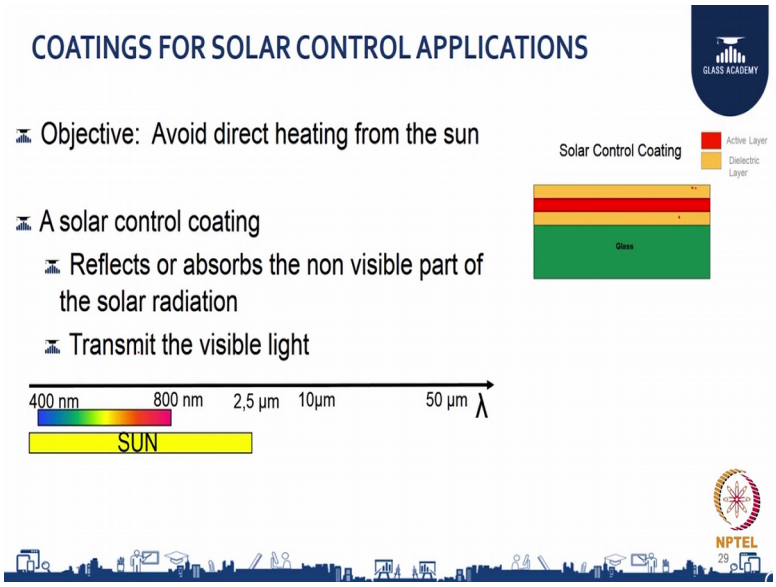
Glass in Buildings: Design and Application
Prof. Swaminathan
Department of Civil Engineering
Indian Institute of Technology, Madras

Lecture - 05
Coatings on Glass - Need and Types

So, now coming back let us have a recap of the products that we do in terms of offering coating process. Initially we said we have two types of major applications in terms of you know building exterior application: one is in terms of solar control, second in terms of low e; first coatings for solar control applications

(Refer Slide Time: 00:29)

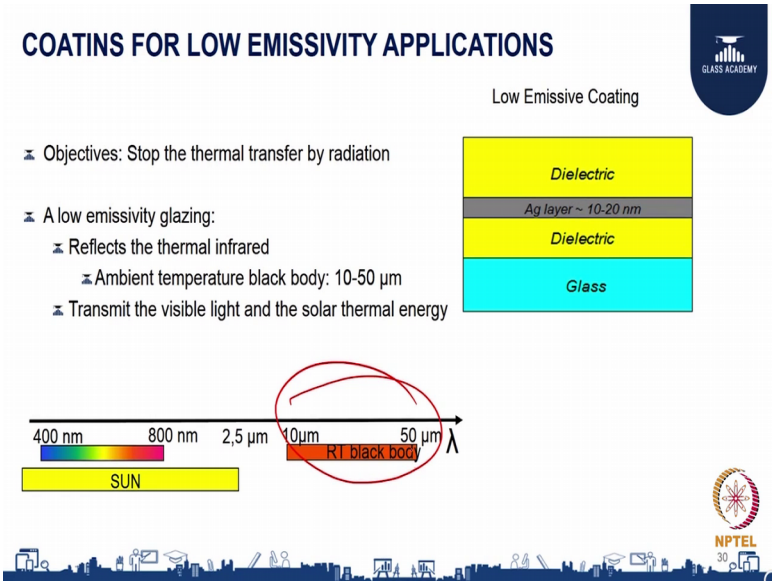


So, this objective is to avoid direct heating from the sun and so the coating functionality is it reflects or absorbs the non visible part of solar radiation, and transmits the visible light inside the building. So, the typical no layers could be no it could be a 3 or 5 layer coating. So, you it will have a basic under layer, a active layer and over layer.

So, the under layer ensures that the coating is know is adhering to the glass its sticking to the glass, active layer is the one which gives the functionality of coating, and the over layer is the one which protects against the you know atmospheric effect and the you know handling and the you know mechanical abrasion.

So, as I told you know the solar control coating generally cuts down the solar radiation which happens in the visible in the visible and the near infrared range.

(Refer Slide Time: 01:41)

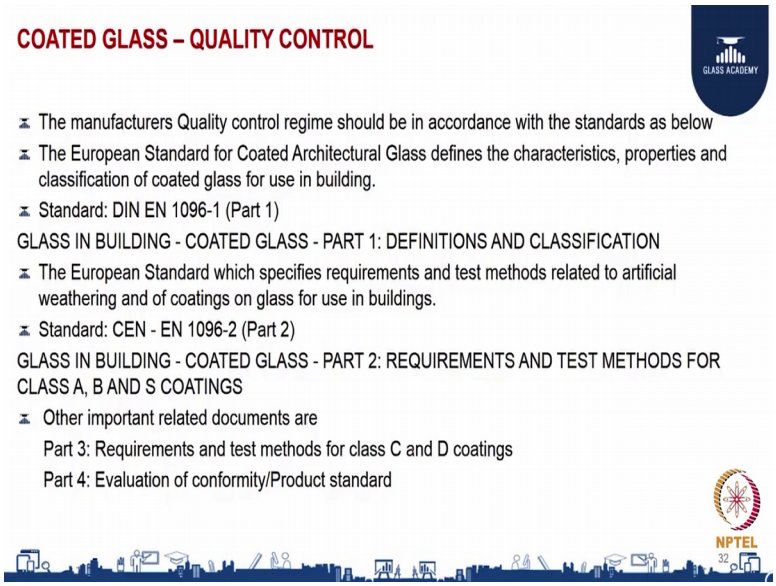


Next is the coatings following emissivity applications. The objective here is to stop the thermal radiation, thermal transfers that is happening by radiation. So, here you know this again could be a 5, 7, 10, 17, 20 layer coatings depending on the product that this offered and its selectivity or the performance. So, you will have a dielectric layer and a functional layer which could be a silver based coating. And on top of it we will have no more dielectric which protects the silver layer against the atmospheric effect.

So, the low emissivity glazing it has no it works on a thermal infrared range; so the blackbody spectrum. So, it works in that range and also it transmits a visible light and solar thermal energy into the building. So, this is the area where we will have the no functionality of our low emissivity glass application.

Now, let us move on to understand the quality control that is apply it on the coated glass.

(Refer Slide Time: 02:53)



So, the quality regime will have to be for the manufacturer; the quality regime has to be compliant with the standards or of European standards as below which is EN 1096 Part 1 which says about glass in buildings of coated glass and it says about the methods related to artificial weathering of coatings on glass for use in building applications. And also the second part is part two, where it talks about the requirements and test methods for class A B and S type coatings. And other important related documents could be related to the test methods of class C and D coatings, and the evaluation and nonconformity evaluation of conformity and product standard that is part 4.

So, these are the basic complaints that we need to establish to these standards in terms of the quality regime in the production process.

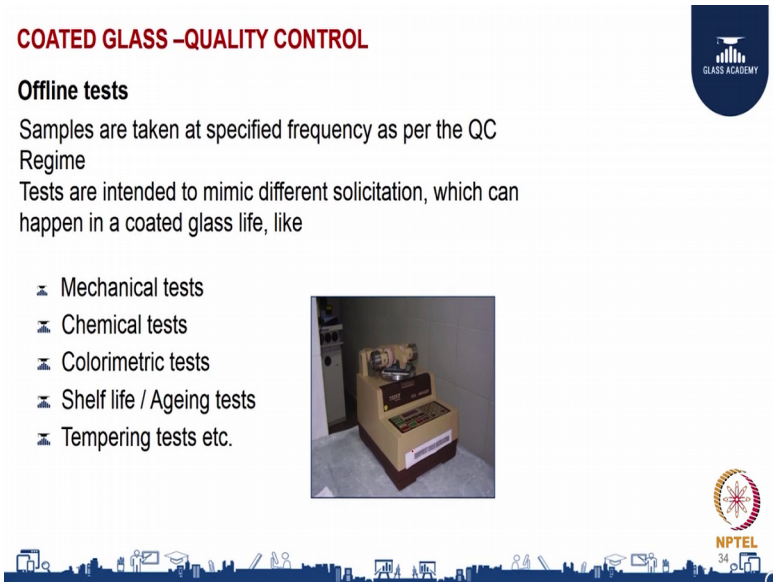
(Refer Slide Time: 03:51)

So, the typical the quality controls that exists are in terms of in the line, we will have color measurements in line which measures the optical mainly the transmission of light inside in inside the coating chamber. This is useful for product adjustments in case of multilayer coatings and also they provide information related to the individual layers that is you know sputtered on the glass.

And we will also have a Ex-Situ measurements at the end of the line where, you will have a spectrophotometer that will traverse across the width of the glass. Here the glass measurements will give us one on the glass side coating side in terms of transmission and reflection the L A B across the width of the glass. And, this is generally used to control the quality against the specifications of the product.

And there is also on top of this we will also have a visual inspection. Since the coating process also know involves spud the thin film coating also creates no debris and other defects on the glass, we now to have a additional visual control which will have manual inspection under simulated daylight conditions and it will control surface defects like debris pinholes breakages and other aspects.

(Refer Slide Time: 05:11)



So, apart from this online test we should also the quality regime will mandate taking samples at periodical intervals as per the specific frequency, as per the standard and also the product requirements. And these are intended to mimic different solicitation which can be know which can happen in coated glass like, mechanical tests, chemical tests, colorimetric tests, shelf life ageing, and tempering tests.

So, these are tests that is mandated to check for the durability of the glass for the entire product lifecycle.

(Refer Slide Time: 05:49)

And once the quality control is the quality glass passes the quality control, then it is unloaded and stacked and it goes for packing. The offline coated glass know is generally sensitive to atmospheric conditions. So hence, it is recommended to protect during the storage and transit to the customer locations.

So, the types of packing will depend upon the exact product that you use, and the surface treatment, and the manufacturer uses, and also the local manufacturing conditions. Typically the packing is done by sealing the edge protection tapes with adequate quality quantity of desiccants. And transportation of coated glass over high seas it may require special aluminum foil wrapping to prevent oxidation.

(Refer Slide Time: 06:33)