Glass Processing Technology.
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Lecture - 39
IGU- Insulated Glazing Unit

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Let us see application of insulating glass unit. So, having said that the IGU is the usages on a facade is massive nowadays, like either it is office or houses or shopping complex, museum, halls or the skylight. So, the applications widely used so far these are the locations like facades, office, houses, shopping complexes, museum, malls and skylights.

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I can see this is the picture from architecture glass, aesthetically it is a pleasing picture where what are the design you want to do it on the DGU? Whatever the architects you know, the design you can get it done through this IGU. You know any shape can be done, it is not need not to be a rectangular square, even you can have a curved one or you can have a shaped one also.

So, the based on the architectural and architect decides know they believe wants to see the blue colour you can select a blue colour or if you want to see a green colour you can select a green glass. So, thereby you can get a good view from inside and outside. So, this is the one of the example for it.

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And next you can see this is the how it is elegantly glazed with the glass, you can see the facade it is completely filled with the glass.

If there is no other materials like wood or concrete or ACP, you can see this complete usage at the glass. So, thereby you can get a lot of thereby you can get a lot of light comes inside, occupant gets a best you know best transparency you can see the outside world and even we can see from here also you can see this the ground floor. So, what is happening inside we can see what is there and just like a showcase kind of this.

So, this is how it can the facade you know it is aesthetically it is a pleasing and it is a fabulous look you can see, you can get this done with help of you know IGU.

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And most of residential nowadays, widely they will be using the IGU the reason is the space. It is most important for a residential applications if a concrete wall if occupies like 100 mm or 150 mm or the more than that the concrete space nowadays it occupies and will have a less space in inside.

So, if you remove that concrete, if you use as a glass, it be a complete you know revolutionized building for you. Because, it allows lights and you can reduce the space of material usage instead of wall you can use a glass will be with the hardly maximum it will be 100 mm with help. But, if you add this frame also not more than 100 mm, you can have it a sound properties and light comes in so, a lot of applications have been used in residential application, this is one of the picture I would like to show.

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And not only the green colour, a blue colour, white colour or any other shades you can bring your facade or any number of shades you want it with the help of ceramic frit. Or if you want to use a laminated glass with the polyvinyl butyl you can know you can have a wide variety of colours. So, facade would not be the same colour, it can be you know numerous colours there are possibilities are there.

So, either you can got go on we can select as a ceramic frit or will be a lamination or PVB can use it. So, thereby you can get a different kind of a facades system altogether you can get it. And, we can see this is one of the nice building which we would like to show.

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Because it need not be a square or rectangular it can be have a curved shape or any shapes you know it can have this. So, that is the speciality of the IGU you need not to be constrained about only one there are 2 dimension like rectangular square. It can be a cloud shaped or shape of the like you can see that they made a kind of a shell or we can say the egg kind of this, it can be done through glazing with the help of IGU.

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Again like either you can do ceramic frit or PVB or you know like nobodies picture it like you can do digital printing on the glass. So, what are the possibility you can do that?

Again you can have a privacy also like if we have a smart glass kind of (Refer Time: 05:20) a light which can you know, if you use a facade if you want to see the outside world or you know you can switch on this again automatically it changes the face from the translucent to the transparency.

So, that is the amount of a luxury you can have it on the IGU and like you can tint also there will be a sage glass. So, you can tint in a in a click or automatically it can change your facade based on the sun outside looks it will changes into different colours like blue colours from the different zones you can do that.

So, these are the possibility for IGUs, skylight you can see this skylight.

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So, this is the natural light will comes inside so, thereby there will not be any artificial lights nowhere will be used for any auditorium museum this things. So, it will be widely used in the Europe's and nowadays in India it is will picked up. So, it is going to be a lot of the museums, auditorium going to be like this.

So, there will be you can see the outside world and if the rain or it is a moon, the winter whatever it is happening outside you can see from inside. There will be lot of you know pleasing appealing for you inside or the outside also, have been elegant look if you use as a glass as a skylight so, this is the one of the example. So, because widely is going to be used and people are using it right now.

You can see this is also they can be possible for IGU need not to be a you know shape of the round shape this, this can be normal DGU like it can have a triangle rectangle you can keep it on your roof. So, this also can you know kind of a sky lighting can be possible, there are n number of possibilities these are the example which are emphasised today.

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So, let us go to the main comparison between the what is monolithic glass? And what is IGU unit? So, monolithic glass is nothing but either it is annealed glass or it is a tempered glass or it is a single glass basically. Whereas, IGU glass which means it comprised our it consists of 2 or more panels together with separated with help of aluminium spacer and hermetically sealed with help of primary and secondary silicon.

So, that is a difference between single glass which is monolithic and IGU glass that is a difference. And if it is a monolithic glass, it hits heat directly by the sun because you have a single layer, you do not have the protection at all. Whereas, here double glazing, it prevent the direct contact with the sunlight. Because, you have a space so that will reduce you know considerable heat loss I mean heat gain inside the building.

When air condition is used inside the building the temperature difference between the inside and the outside building is very high when you use a monolithic glass. Whereas,

IGU glass is very very less because of that there are 2 more panels have been used with the separation of unit either will be air filled or to be a vacuum can be done on this.

So, that will affect you to give the less energy conception on this and there is a only thin glass barrier as I say having said that earlier this is the single glass. It is a monolithic glass, it is has a prevent like there is a only 2 surfaces say the face 1 and face 2. Whereas, double glazed unit upper face 1, face 2, face 3, face 4.

So, that is the help us to prevent sun get energy which is heat energy getting inside the building. So, that a loss that will be restricted because of double glazed unit whereas, monolithic glass you need not to have the restriction because this single mono layer, it is a monolithic glass.

Barrier to prevent this outside heat from coming inside resulting in excessive loss of the energy so, that is what we discuss about it and the main important how the effect is getting it? Due to the convection of as circulates inside the IGU, it act as a barrier preventing outside heat from coming inside and the cool air inside from escaping resulting in energy saving. That is all about the difference between a monolithic and the insulating glass. Let us look at it what is solar energy conservation.

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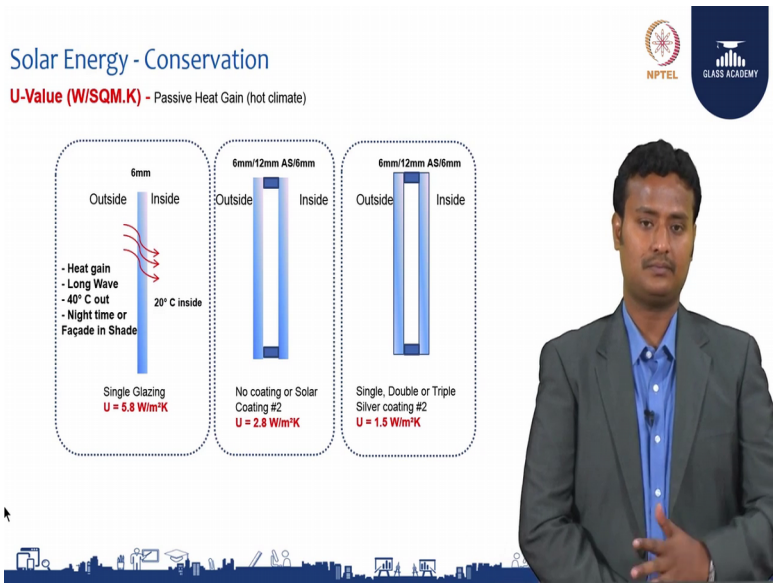

So, U value watts per square meter Kelvin it is a passive heat gain when it hot climate let us see what it is. If you see if you choose a 6 mm as a layer as a single pan monolithic

glass, the 40 degree it is outside. So, there will be heated if you select a proper glass like the U value of 5.8 or 5.6 you will get a concerned reduction of 20 degree which means 40.

Here is a 20 degree insight so, this is the considerable reduction you can have it. Either in the form of 6 plus 12 plus 6 which is 12 mm DGU, there is no this clear glass. For example, clear glass there is no coating or a solar coating on phase 2 if you have a know you can get a U value of 2.8 watts meter square Kelvin.

If it is the same DGU it has a double dribble silver coated glass basically it is a low e glass, then you will have a U value of 1.5 watts my meter square per Kelvin you can have get it. The more the less U value equal to less heat, which is getting inside.

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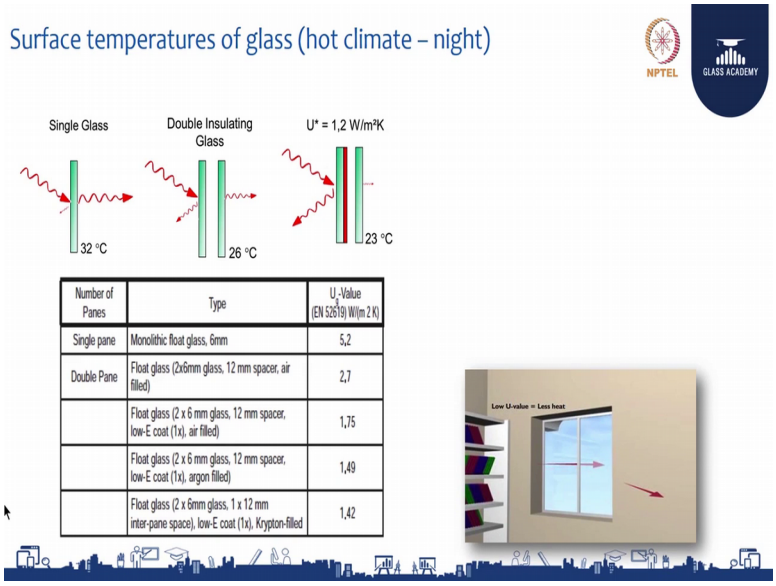

You see that single glass solar energy comes in the partly absorbed and partly reflected and again there will be a transmission in the inside the building the energy. If I use single glass I may have get it the 30 degree inside, if I use double glazed in the same thickness only there are 2 panels have increased I mean 2 panels are used it with the separation of a 12 mm then I will be getting a 26 degree inside.

If I use solar control like in thermal insulated glazing unit I mean glass if I use as a phase 2 what is going to happen? So, that U value is 1.2 watts per meter square Kelvin. So, there will be a 23 degree centigrade whereas, you can see the single glazing if you use it

is a normal clear glass you will get a 32 degree come inside. Whereas, if you use a if you selected appropriate U value of glass like 1.2 watt square watts per meter square Kelvin you will be the enormous heat reduction you will get it, you will enjoy the benefit of heat reduction like 23 degree centigrade.

Again I would like to reiterate once again see that single pane monolithic float glass 6 mm if has a 5.2 or 5.6, 5.8 within the range, they depends upon the glass selection and the size of the glass double glazed pane. For example, float glass like 2 by 6 like 2 layer of 6 mm glass 12 mms air gaps as a spacer, if you filled with the normal air you will get a 2.7 watts U value.

And if it the same float glass the only changes in low e glass if you use in a phase 2 with the air filled you will have a 1.75. The same float glass 6 mm thickness 2 layer 12 mm air gap low e coated with the organ gas which is inert gas which is filled will it is like we are going to discuss about it what is argon gas and this thing.

So, if you used instead of normal dry air if you use argon gas argon filled you will have a 1.49 watts meters watts per meter squared Kelvin, basically U value. If you use like floor a float glass is same 6 plus 6 plus 12 mm air gap in a space with the low e coating with the krypton filled glass. With this also krypton which is it is again it is a inert glass inert gas sorry which will help us you know thermal performance to increase them the performance. So, it has a 1.42 U value which means watts per meter squared Kelvin. So, having said that the low U value which means that less heat.

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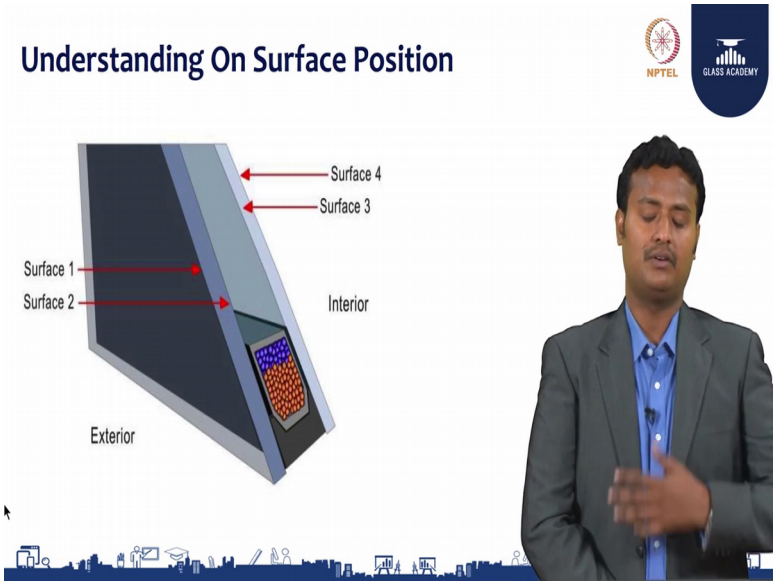

Before we get into that let us understand first the surface of IGU unit which is what site the coating portion, what glass it is, let us see about it. So, if you look at the pan like IGU unit so, you will have to differentiate with the exterior, interior which is the first most point which you have to look at it.

Because, whenever while doing a processing we will have to understand which side is going to be a coated face. If we are not understand properly as in this case then our glazing will be a different altogether. When we at the time of insulation like installation at the site we will have a shade variations because of you are not followed proper surfaces which basically we are not understood the surface portion, which coated face is going to be facing which location. So, we have to understand.

So, let us see if you consider this is the DGU. So, whatever you see as a face 1 which is when you from outside, you look at it from outside like you have a facade, you are you are outside of the building, you are seeing that so whatever you see that that is a face 1. The glass has a 2 face having said that that the 2 faces is one is air side and tint side. So, the first face what you look at it from the outside of the facade exceeded the building which is the phase 1 which is surface 1.

Next is surface 2, then separated air gap and you can see this there is a another pane which is going to be a inner pane, which is interior pane. When the people are located from inside they will see the first glass, for them it is first glass for you the second pane.

So, when you look at it from the outside building. So, whatever the you are looking the first surface this is a surface 1 and surface 2 and surface 3 and surface 4 so on you have to look at it. So, if you understand the surface portions at the time of productions you will not make any mess and thereby you will have a get good result.