

Glass Processing Technology
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Lecture - 38
IGU-Insulated Glazing Unit

Hi, welcome to glass academy.

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Today we are going to focus on what really matters on IGU which means insulated glazing unit my name is John Peter Raj. So, I will be happy to present today.

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The slide features a white background with a blue header area containing the word "Agenda" in a large, bold, blue font. In the top right corner, there are two logos: the NPTEL logo (a circular emblem with a gear and a book) and the Glass Academy logo (a blue shield with a white building icon). A list of seven items is presented in a numbered format on the left side. On the right side, a man in a grey suit and blue shirt is shown from the waist up, looking towards the camera. At the bottom of the slide, there is a decorative blue silhouette of a city skyline with various icons representing different industries and education.

Agenda

1. Benefits of IGU
2. Applications of IGU
3. Technical fundamentals
4. The IGU Process
5. Raw materials
6. In Process Quality Test
7. Handling and Storage

So, today agenda it is all about there are 7 important points which all you need to know both on in terms of IGU process. So, before get into the technical fundamentals of IGU process let us begin with benefits of IGU application of IGU's. So, that is most important you to understand rather than the process first.

So, I would start with the presentation today with the.

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The slide features a white background with a blue header area containing the text "Benefits of Insulating Glass" in a bold, blue font. In the top right corner, there are two logos: the NPTEL logo and the Glass Academy logo. A list of six bullet points is presented on the left side. On the right side, the same man in a grey suit and blue shirt is shown from the waist up, gesturing with his hands as if speaking. At the bottom of the slide, there is a decorative blue silhouette of a city skyline with various icons representing different industries and education.

Benefits of Insulating Glass

- Energy conservation
- Perfect transparency
- Acoustic Insulation
- Increased wind load strength
- In cold climates the aim is to reduce infiltration of the cold, and hence maintain internal heated temperature and reduce the cost of heating
- In hot climates the aim is to reduce heat coming in and hence reduce the cost of air conditioning.

Benefits of IGU so, let us begin with benefits of insulated glass unit energy conservation energy conservation in India it is it is widely enormous impact. So, we will have to save

the energy towards when we use a glass inside the building. So, how are we going to get the energy out of benefit? So, the glass an insulated unit it is going to be highly helpful in temp in terms of harvesting that the solar energy in terms of energy conservation system.

We are going to discuss on detail in upcoming slides and perfect [transfer/transparency] transparency which is most important the facade it looks appealing in the when you outside or when you are inside. So, that it will it will be connecting towards from indoor to outdoor. So, you will not have a perfected transparency. So, this insulated glass glaze unit will help you to see the out outside world as well as inside the world I mean outside and inside.

Acoustic insulation which is most important in a normal like sprawling cities which high raise skyscraper of buildings all the buildings are widely used glass in that in recent times. So, acoustic insulation, which is most useful in terms of those high rise buildings or who were used to IGU wherever high traffic areas; like airports hospitals near the traffic areas of where people are commuting like bus horn bike horn. So, in order to prevent that sound which comes inside. So, the IGU will help and help us in lot we are going to discuss in lot about it.

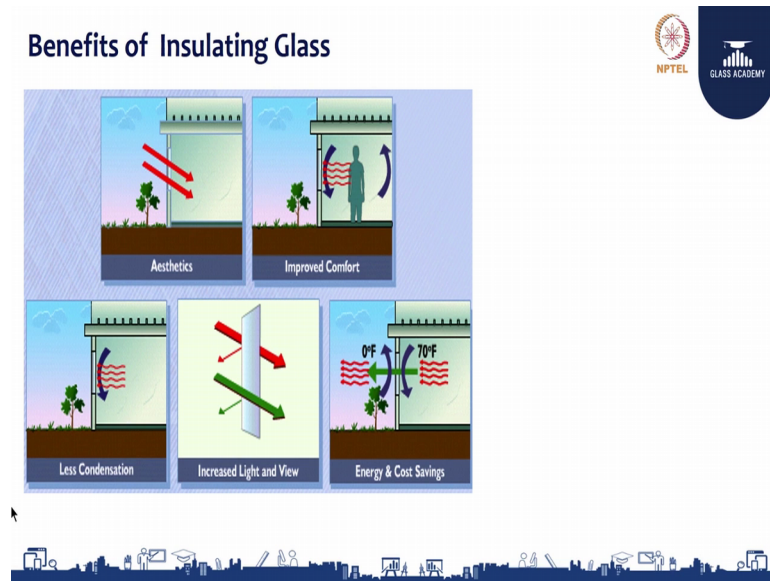
And increased wind load strength like when we use a facade as a glass because outside will not be not normally it will not be uniform we will have a it is a tropical country we have a winter hot summer all those things as we will have a lot of wind pressure will hit on our facades in order to avoid that deflections to prevent those wind load. So, IGU will highly helpful to know to prevent such a impact on the wind load.

In cold climatic conditions like it is aimed to reduce infiltration of the cold and hence maintain the internal heated temperature and reduces cost of heating. So, which means in cold climates when the glass you are the inside the building the DGU that we are double glazed unit which is IGU what we call is presently. So, that is will prevent you from this infiltration of the cold from outer to inside.

So, that you can easily inside if you are there inside you can easily heat the building because the outside cold would not come inside because the infiltration effect is happening through this IGU. So, that your cost of heating is considerably less in cold climatic.

Whereas the hot climatic condition like India like tropical countries we have an enormous heat outside should not come inside as well. So, that way will be using the air condition system. So, if you use the effective glass effective ice insulated glazing unit that way we can reduce of a n number of saving on air conditioning. So, it will help in energy conservation.

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Next is the benefits of insulation I mean insulated glazing unit is aesthetics yes it depends upon what glass you are going to select either it is a grey glass a solar control or thermal insulated glass and tinted or clear glass what colour you are going to select. So, based on that colour selections you are building whole building facade will look uniform and please see look aesthetically it is a pattern view you will get from the outside as well as inside. So, that is what all about it.

Next improved comfort. So, improved comfort which means you do not have enormous heat would come inside to hit you where if you want to work near the glazing façade if the glaze if it is single glazing you not able to sit when the hot sunny days. So, this DGU double glazed unit will prevent that those heat comes in hit you where who were the nearer to the occupant who is working near to the glass. So, it is highly helpful for people who is inside the building for a improved comfort.

Less condensation it is the condensation is happened due to the temperature difference between the outside inside if it is the DGU is not performing which means there is a

desiccant inside we are going to discuss about what is desiccant inside what is the desiccant and all the both. So, that desiccant if it failure or expired. So, they are IGU will become a ineffective in terms of condensation effect.

So, you will not able to see the outside world or outside people cannot see inside. So, you will have a foggy effect kind of this water moisture which is tripping around this your edges of the frame and you can see the fogging effect. So, that is all about less condensation.

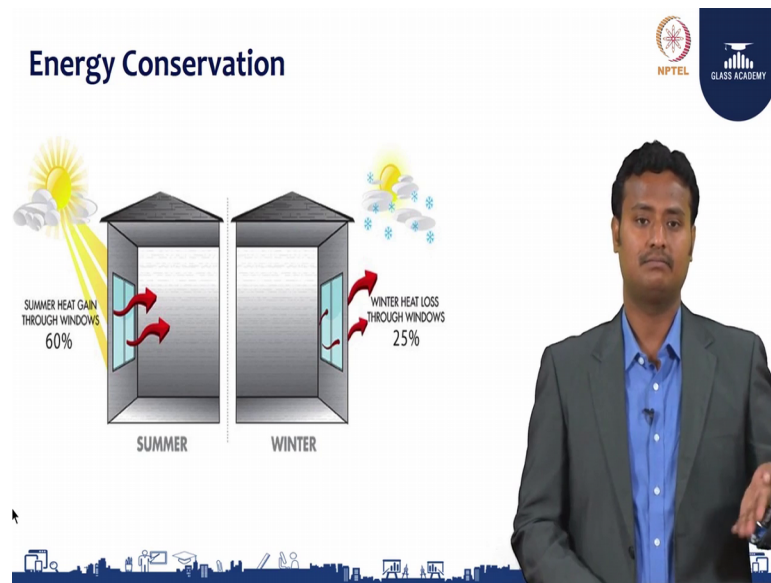
And increased lightened view again DGU is a it is insulated unit it is comprising between the 2 glasses like the glass what you select that is most important. So, thereby you would have an whether you want to have a more light comes in or you do not want to more light comes in. So, you can select appropriate the glass based on your requirement. So, this IGU will help you to enable you to select those glasses and it will help you on your occupant over there and you can see that glass performance in your naked eyes.

Energy conservation and cost saving which you discussed about the earlier in India we have to save energy as well as we will have to use consumption of electricity which means the air conditioning is the; however, you less you use it you are and saving the automatically we are saving the energy of electricity usages.

So, this IGU, this double glazed unit, but highly helpful for the facade or the building, who is a user. So, people are allowed to use because it will it is enormous it is a profound saving on the energy cost in terms of a less usage of air conditioning.

And we quill it allows you less space like for example, early there will be a bigger wall where you not able to see the outside world now we can be able to see the world outside and you will it is required only the occupant of the it occupies less space than the normal wall. So, your square feet cost nowadays square feet is most important in terms of a office space or a residential or know on the real estate nature it is most important that the space. So, this IGU s all gets less space gives more sufficient space for occupant.

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So, let us talk about the energy conservation in detail for example, in summer the heat gain through windows is 60 percentage. So, you will have to protect the heat there by you have to reduce the energy I mean the heat comes in from the outside to inside you will have to block that. So, we can use it with help of IGU.

The same time the in winter season you will have a heat loss. So, that also you have to be protect if the wintertime if you are allow the glass know there is seepage of heat it is goes outside. Again you are heating of the cost of heating is increases similarly the cost of cooling like when it is a summer with the cost of cooling on your building or the inside will be increases.

So, that is the energy conservation through this IGU's highly helpful. So, if you use appropriate glass paints is it a single silver single silver double silver triple silver what kind of view value we are going to discuss about and perfect transparency.

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Perfect Transparency



The slide features a man in a grey suit and blue shirt on the right, speaking. On the left, a large window shows a person sitting at a table in a room with a view of a dense forest. The NPTEL and GLASS ACADEMY logos are in the top right corner.

Transparency is the most people want to look at outside the world when you are in office or when you are in workspace.

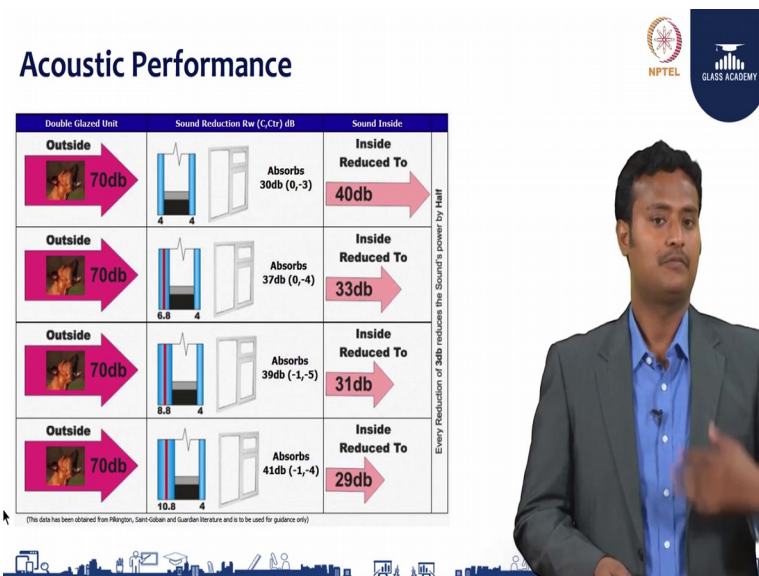
When you work there and what is happening around you want to see that you can see that even if you are in which whichever storey building you are there you can see the outside world. So, it will enable you to see outside the world. So, the IGU does which means that glass which will does the magic to see outside it is will have a lot of transparency the amount of you select the proper selection of the glass.

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Acoustic Performance

Double Glazed Unit	Sound Reduction Rw (C,Ctr) dB	Sound Inside
Outside 70db	Absorbs 30db (0,-3)	Inside Reduced To 40db
Outside 70db	Absorbs 37db (0,-4)	Inside Reduced To 33db
Outside 70db	Absorbs 39db (-1,-3)	Inside Reduced To 31db
Outside 70db	Absorbs 41db (-1,-4)	Inside Reduced To 29db

Every Reduction of 3db reduces the Sound's power by Half



The slide features a man in a grey suit and blue shirt on the right, speaking. On the left, a table shows acoustic performance data for double-glazed units. The NPTEL and GLASS ACADEMY logos are in the top right corner.

Acoustic performance as I earlier said the having said that wherever the traffic areas you will lead a more acoustic performance. for example, outside you have a barking dog like it is a 70 decibel if you barking if you use normal DGU like 4 plus 4 you will get a gain of 40 decibel which is 30 decibels considerable reduction on you get on the normal single clear glass or you can say that.

Again if you increase the thickness of the glass pane you can see here the first and fourth one the first is the 80 mm which is 84 plus 4 and 12 mm or 8 mm 6 mm air gap which is kept over there you will get a which is basically this is 6, I mean this is 12 mm a gap that given on it you will get a 40 decibels. Whereas, the fourth column you can see outside is 70 decibels you will get a inside decibel 29 decibels.

So, that there will be a forty one decibel I mean considerable noise reduction has been used here with help of the selection of the glass basically they are using the laminated glass as a front portion and this air gap air gap and the glass. So, if you increase the thickness of the DGU you will get a considerable amount of acoustic performance of the glass.

Ah having said that earlier. So, the highly traffic areas which is widely used all of the airports as IGU unit because in order to prevent that aircraft while landing or take off you occupants should not get disturbed. So, that is a reason nowadays wherever you go you can see all the airports are laminated IGU unit. So, that is the usage have been used so, far.

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And wind load strength you can see there will be a 2 colour which distinguish between which is low pressure and high pressure. The high pressure which is called red color which is indicated and the low pressure is blue color you can see as a use of facade either in the front window or beyond the roof like a skylight.

So, what would be the wind load which going to impact on your system which means your plays in system. So, which is described over here so, basically if you see this a window if you use a window you will have a more potential breakage is because of the wind load.

So, in order to prevent that wind load to hit on your double glaze unit or window you will have to select appropriate panel. If you use a single glass it will break easily, if you use IGU glass it would not breaks because it has a mechanically you know structurally a very good strength. because, there are 2 glasses have been separated with help of mechanicals mechanical support like aluminium channel and butyl and secondary sealant like silicon used it. So, it will allow you to put that that wind load comes into glass.

So, if you see that there is a glass original portion it said they have been showcased as a dotted line. The wind load is hitting on your glass there may be slight deflection like 2 mm 3 m deflections which is allowable if you the high wind load which is, you know keep on heating on your window so, the deflections.

So, that the primary silicon which allows the DGU to shifted the glass can shift and again one more in the tempering like tempered glass will allow to protect the wind load also it is complete it is like a uniform you know unique support from each part of IGU, each part will do the rest of work in terms of you know wind load protections.

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Summary:

By the end of this video, you have learnt about the:

- Benefits of IGU
 - Energy conservation
 - Perfect transparency
 - Acoustic insulation
 - Wind load strength

