Glass Processing Technology
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Lecture - 40
IGU - Insulated Glazing Unit

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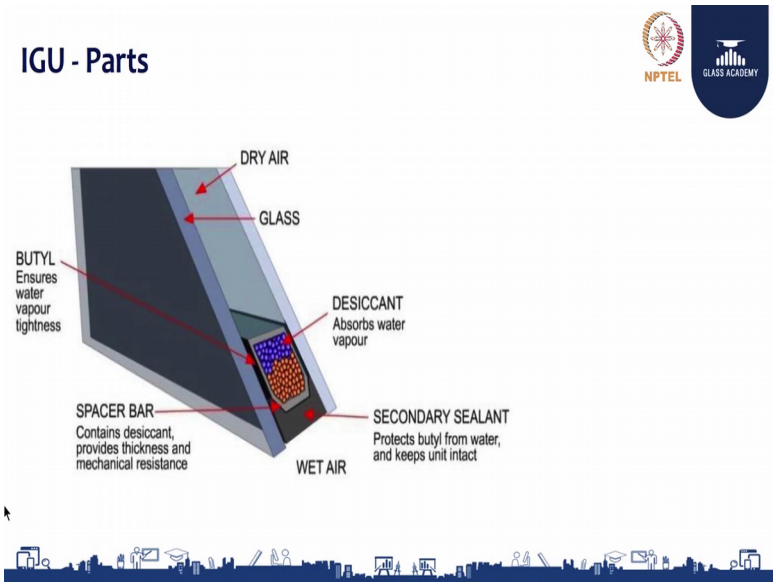

So, let us move on IGU parts. This is most important because each part will have a lot of effect towards IGU performance, whatever we talked about applications benefits. So, these parts each part will do a better job as a nature it will delivers for us a performance. So, let us look at it the what are the IGU parts.

So, having said that there are 2 pans or there are more pans also together, you can hermetically sealed primary and secondary silicon that I can separated by aluminium channel ok. So, this is the construction it is a typical construction of IGU insulated glazing unit.

So, let us look at it as a space like a from the exterior portion. The first pain you are seeing the glass. So, the glass can be a one of the best element in terms of DGU, which occupies a lot of space, it delivers a lot of performance like light comes in those reflect internal reflection outside reflections, what you value selections, what colour of your facade has to be. So, the glass occupies a lot of space it is a first I mean it is a prime function of the glass, the prime parts of IGU is it is a glass.

The next is the butyl, which is ensure water vapor tightness which should not allow any water to seepage inside the IGU unit. Or if any moisture at the time of placing if any water moisture would have been there ok, it will not allow to penetrate into the secondary sealant thereby we will have a loss of insulation problems overcome. So, that will be it will give you a ensure water tightness it prevent vapor tightness; I mean it allows structurally no strengthable. And this butyl will help us like in the deflection like high in load. So, the glass may tends to leave like deflect during those deflection periods. So, this butyl will help enable us enable clear glass to tends to move from like 1 original portion to 2 mm, 3 mm with help of butyls. So, that is this stuff it can have from butyl.

And next is a secondary silicon, protects basically from exterior conditions like water vapor or chemical vapour or rainy season water or sun exposure. What are the messy outside is there. So, in order to avoid to protect to water inside so the secondary sealant structurally will give a structural strength to the IGU, as well as it prevent this abnormal conditions like water, humid, hot gases or fumes or chemical agents in or need not to penetrate inside the DGU. So, that secondary silicon will prevent those abnormalities.

Let us look at it next is spacer, and the spacer is waiting nature is very, very it is alumina spacer. It is a hollow spacer it will not be much when compared to the glass, but it has lot of quality. Basically it gives a mechanical strength basically it separates 2 glass will give a space of a 2 pan which should not the sagging effect. So, it will help us to separate the glass pan in a proper manner so we will have to fill this desiccant.

So, the desiccant perform impact on the condensation effect. If the IGU need to protect the condensation so that your desiccant has to be a proper one. So, the desiccant would absorb the water moisture from which is present in the DGU or painting this comes inside will absorb the water moisture or hydrocarbons. It should not absorb any thermal performance gases like Argon gas, like inner gas which we talked about Argan, Xenon, Krypton it should not absorb it. So, that desiccant should it is performs widely used, and all of the facade I mean all of the IGU means you can place in unit.

Again one more thing the wherever separated the dry air, either you can space between the 2 glasses either you can keep it as a vacuum, or you can keep it as a dry air, or you can fill it with the Argon gas, or Xenon and Krypton. Whichever form you want to use it as a (Refer Time: 04:44) you can decide based on the performance what you wanted you

can go ahead you can select it. So, each components here which is widely now highly helpful, for in terms of you know serving this for us to be happy inside the building. So, these parts are widely you know highly helpful for making it is you know IGU in the grand success.

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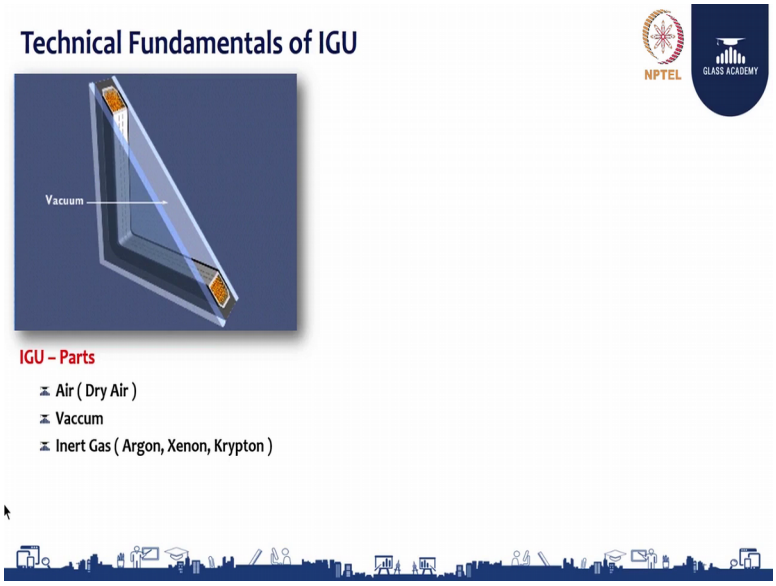

Next move on the technical fundamentals of IGU so which we discuss about it. So, IGU it is nothing but there are 2 or more pan panels glass, separated by a mechanical aluminum channel, which is hermetically sealed with help of a primary and secondary silicon. So, this is how IGU construction which we talked about. IGU parts like air might be a dry air, or be a vacuum, or inert gas, Argons, Xenon, Krypton which we discussed about.

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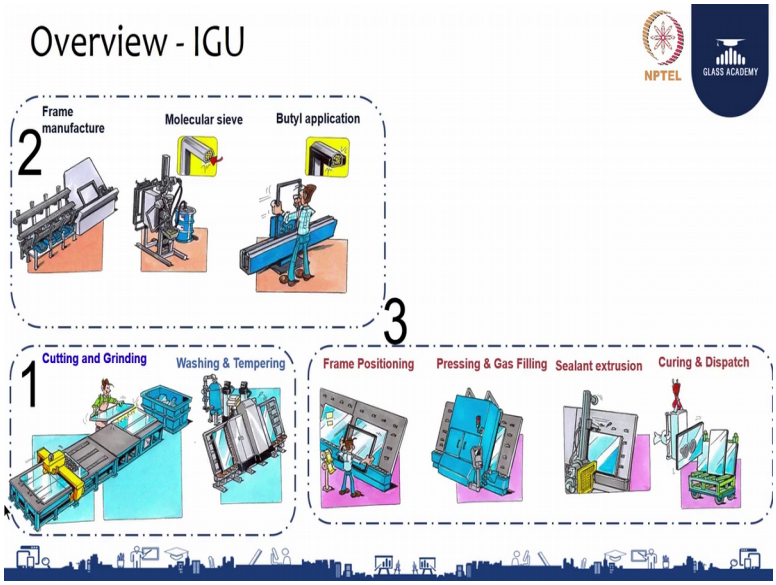

There is an overview of IGU, the first is the most important is glass cutting and grinding. It is a first prime it is a pre-processing what we called as in the IGU process it is a pre-processing; so we will have to draw the glass from the warehouse you have to keep on the loading table order size you want to do it. So, you can have to optimize in that way you have to cut it and snap it, and you have to store it and grind it. And the grinding is most important because if the any shell form or in the grinding is not proper, the glass would tends to break at the tempering sections; in order to avoid as need not to be even need not to be serve only tempering area, it is shows people like to handle from 1 place to other place. So, after cutting the grinding it is you know it help us for the workers to handle the glass in a safe manner.

So, basically we are eliminating the sharpness from the from the edges. So, we are erasing or you can polish or it can be done like a single edge, double edge or seaming machine, there are 3 types of machines are available to grind the surface. And wash in tempering is washing is most important, not only washing it each process in IGU is very, very critical. If you do any mistake will be replicate at the end of the IGU. So, we will have to be very careful in terms of all the process.

So, washing like again if you use a low E glass processing, but a level like it should be the ph of 6 to 8 pH and should be less than 10 microsiemens, and temperature and most of the processor should not follow the temperature on the water tank. So, temperature

should be more than 35 degree. It solves the growth of bacteria or the hot water basically it sells lot of cleaning effect, but most of time people are using the cold water which non help us in long run. So, the temperature also it is mostly you know widely used I mean it has to be used more than 35 degree centigrade has be used, at the time of washing machine. I am drying it is most important if any water surface water droplet present on the low E or the norm of the glasses. If you fed into the furnace it will break.

And so, again it will if suppose if it is not breaking so if it is a low E glass or any other like ceramic glass anything is there the coating burnt because of the water droplet were present on the coated surface. It will have a effect of after tempering. So, washing is most precision process in terms of IGU because thereby; it will allow you to unable to see and you have to thorough quality check before take into the tempering.

So, tempering as you all know about it, it is basically we are you know increasing the strength of the glass from annealed glass to tempered glass, which is 4 to 5 times in this strength. So, it is a heating process so we have talked about the pre-processing in tempering. So, let us move on to the IGU process, so IGU process it is a frame manufacturing is the first process. Basically it is nothing but the aluminium channel EBX comes under running it is. So, based on this your size you will have to bend it either you have to cut or you have to bend it. So, there are 2 ways if you want to cut it then you will have to use a cornel key to join it. If you want to bend it even only 2 bends are required is it from the top and bottom.

So, it can be used only the another bend can be one more corner can be used. And after bending or before bending you can do a molecular sieve it can be filled on the hollow aluminium channel that is the process. Either you can do it manually or you can do it on the automatic machines robotic machines. So nowadays people are robotic machines you should, but we would always advise you to use robotic or automatic machines. So, it help us because if you use manually filled with the desiccant.

So, whatever the whoever is fills it so if he is not using the gloves, or the gloves is get a dirty or it is has a moisture. So, that moisture will absorb by the desiccant so we will have a less durability of IGU. So, we will have to protect that one because the desiccant has a lot of value towards less condensation viewed view ability transparency lot of things. So, we will have to be very careful.

So, we would advise you to use automatic filling machine for molecular sieve and butyl applications. Once it is filled so based on the shape what you required of the project, then you have to take into this next machine it calls butyl extrusion metal. Basically there are 2 pumps there are 2 nozzles are there which pumped which is dispensing the butyl, which is primary silicon through the 2 nozzles. From one side to other side then you take out this will be you know in a uniform form you have to take it and gently to keep it on the glass panel. So, you will have to use very precautions here, because our thumb mark like fingerprint marks should not be impressed on this primary silicon, because it will be see through when the time of pressing.

So, will be able to understand the fingerprints would be will be there after pressing it. Basically in finish tribute you can see that. So, in order to prevent that we have to use a gloves or better not to touch with your fingers gentle hold. So that is expertise, based on the experience you will have a more experience you can get a expertise on this.

Next is processed is the frame positioning, which once the glass is washed and once the bending molecular sieve filling and butyl application is done. And carefully we have to keep it on the glass which is first glass which washed, and comes a stands for ready for the adjoining with this frame. So, one glass has come then we will have to keep this filled desiccant filled aluminum frame on the glass, carefully you have to keep it. And thereby another glass will come then there will be a next is pressing and basically pressing, 6 bar will be applied on this time of pressing. During the pressing it will be automatically you can have suppose, you will not use any inert gases like Argon, Xenon, Krypton. You can use it, you can fill it with a at the time of filling you can be now automatically can be done, so gas filling as well.

Next is sealant extrusion, most of the people are using manually, but we would advise you to go for the robotic sealant. So, that you know you do not have a sagging effect. Because one more thing it has to be done the secondary silicon operation should be done on the vertical in nature, rather than doing on the horizontal. Because horizontal based on the self-weight of the glass the one glass you kept and another glass you kept it. Based on the length width is higher than the 2 meter 2.5 meters, the center portion will have to they have a sagging effect if you do on the horizontal glazing. Otherwise like if you use a if use it on the vertical glazing, you do not expect that sagging effect what comes it is place at the time of secondary silicon application.

So, we will have to keep in mind. So, either will be automatic which is robotic or should be a vertical application of secondary silicon. So, the secondary silicon the main function of a secondary silicon; the moment you apply within 3 to 4 hours you can you can dispatch the glass, because it has you know the curing rate is very faster when compared to the primary silicon, whereas, primary silicon will take more than 36 or 48 hours to cure completely. Whereas, secondary silicon it is immediate effect even with an R you can shift it from 1 place to other place, but we would advise to dispatch probably after 4 hours. The ideal for you to dispatch because your silicon would completely curing, not only the outer layer the inner layer also would get cured within a 4 hours pan of time. So, it can be you know dispatched after curing it can be dispatched in a proper manner.

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And main IGU process; so we discuss about the pre-processing you know like cutting, grinding, washing, tempering and let us move on to the IGU process. The IGU process is mainly frame fabrications it is the most important process and having said that desiccant filling once the desiccant filled; so wherever the puncture you have done. So, those area has to be carefully we have to use butyl to plug that hole. Please do not leave it white, or please do not open because the desiccant have been inside that air vent there will be a possibility of you know getting the moisture through this vent. So, it has to be once it is hole is done, once only once you filling there is a desiccant after that your take back and fill with this butyl, which is basically primary silicon to plug it. And you can go for a you know next operation which means frame positioning of the frames on the glass.

So, this is the next step for IGU process, which means primary silicon which will be taken to the primary extruded machine which will be a part of IGU process. Though it is will be you know it is it is not offline product can say it is another machine it is not joined along with this IGU process, will be another machines. Like you know accessories machines kind of like this where you can do a primary extrusion through this butyl extrusion machine. And carefully we have to press it after done it we have to pressing is taking place, during the pressing we can if you want to use a gas filled. You can have a gas filling can be done on this, and after that robotic ceiling vertical glazing can be done.

So, with help of secondary silicon; So, this is the main IGU process so we will have to keep in mind the pre-processing and tempering is most important. After that this is the main concept we will have to understand the main IGU process. So, frame positioning I mean frame fabrication, a desiccant filling, primary extrusion on the aluminium channel, and pressing with the gas filling, and secondary applications which is secondary Silicon applications.

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