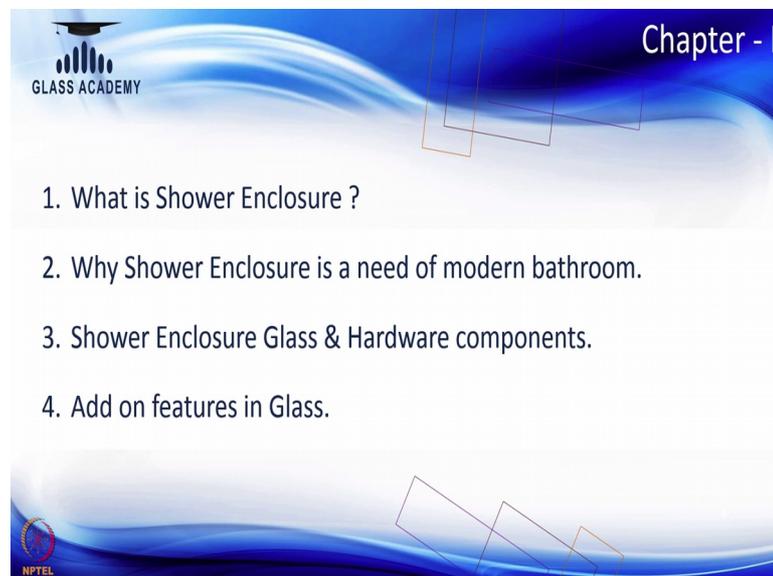


Glass in buildings : Design and Application
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Lecture - 38
Interior Glazing Applications – Shower Enclosure

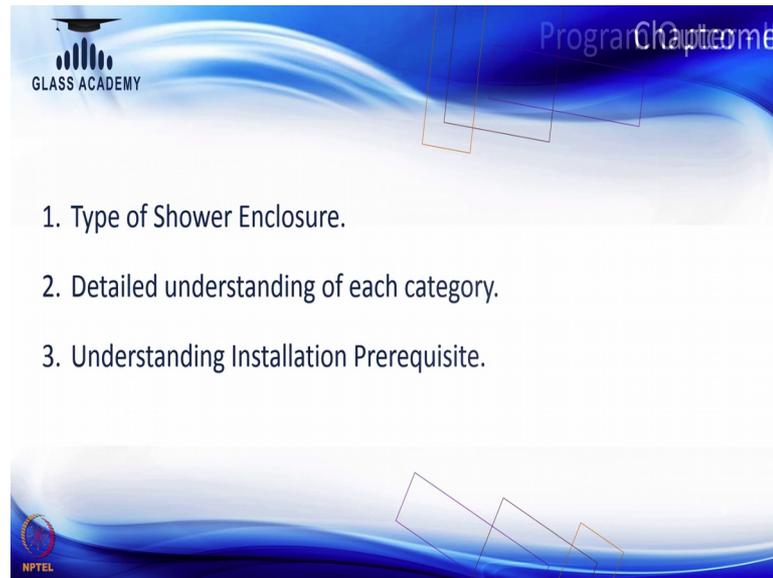
I am Sanjeev Chaubey, today we learn about Shower Enclosure business in interior as well as commercial spaces. We have designed this program in two chapter to make it easy for you to understand.

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So, I will take you through that what we are covering in chapter I. So, chapter I we will talk about, what is shower enclosure? Basically we will understand what it is? Then we will go through the product understanding that why shower enclosure is needed in a modern bathroom concept? Then we will go through the shower enclosure and it is hardware and glass component.

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In chapter II we will talk about types of shower enclosure, each and every category in detail and then of course, the understanding the installation prerequisite for this product.

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After this training program you will be able to understand the shower enclosure product category and understanding the product category you will be able to select the right product as per the customers need, then selection of right glass and hardware. So, because you will go through the problem you will come to know the glass quality and the

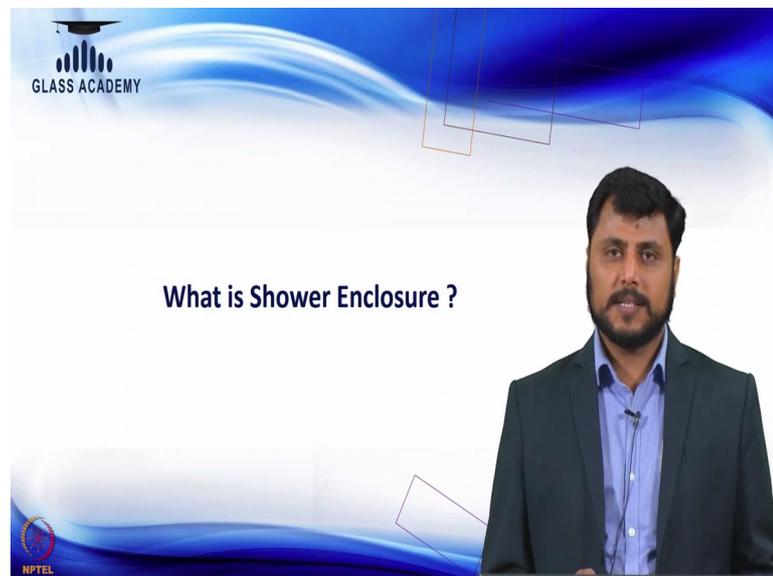
hardware component. So, you will be able to select the right glass and the hardware components.

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So, let us start with chapter I, it says about the shower enclosure and its components.

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So, first of all let us understand that what is the shower enclosure? Whenever this word comes in mind what is shower enclosure? So, I will show you few pictures will come in our mind.

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Because maybe somewhere you have experienced you have seen this kind of product you can see here, there is a bathroom, one w c, one wash basin is there where is the shower area is being enclosed by a glass partition same here, but the glasses of a different category. In third picture also you can see some bath tub is there then on the windows side the shower area is there and again it is being partitioned by a glass partition which is known as shower enclosure.

So, primarily if I would like to sum up that what basically a shower enclosure is. So, you can see shower enclosure is a watertight compartment. Watertight compartment means it is going to prevent the water to come out from one area to another area. And the benefit of putting it shower enclosure is it will maintain separate it will separate basically wet and dry area in your bathroom and then of course, making it easy to drain it out from your washroom area.

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We will talk about the my shower enclosure? Why shower enclosure means nowadays because if will see, people are having a concept of modern bathroom. When it comes to a modern bathroom this space is the most expensive thing in a living space.

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So, the first benefit majorly which comes with the shower enclosure is the maximization of utilization of your space. Why I am saying like that the maximization of space once you are not putting a shower enclosure the entire bathroom is becoming wet after taking shower. In case if you are going to put up a shower enclosure it is going to straight way

separate the dry and wet area in your bathroom. So, whenever there is a separation of area that area can be utilized in a better way, let us see if you are putting a commode a wash basin and a shower area.

If your going to put shower enclosure in shower area. So, you will be able to use your wash basin and commode area freely, there would not be any water spillage on this w c and wash basin area. So, that area will be totally dry. So, your homo ability moving in bathroom from one place to another place to another corner will be very very easy and you will be able to utilize the rest of the space in your bathroom.

So, that is why we say that, if shower enclosure is there it is going to help you in utilization of space. So, that is the most critical benefit of this product. Then secondly, safety though it separates the dry and wet area. So, one in general benefit comes is safety many of times you might have experience that kid sometime we also you know in hurry in morning getting up and rushing to washroom.

If washroom is wet, I mean if it is being used by some of our family members before us what will happen complete floor will be wet. In that case if your rushing to washroom there will be a chances of slip raise, most of the time you have heard somebody slipped in bathroom or some miss has happened to some users. So, to avoid that kind of miss happenings if your placing a shower enclosure it will again restrict water to be in shower area, rest your w c and wash basin area will be hundred percent dry. So, that is how it is going to be safe in terms of the uses of the space in your bathroom. The another aspect of the safety is because the glass which is being used it is a toughened glass.

So, sometime because of any miss happening in your bathroom, it is not going to break in a larger piece, because it is a toughened glass. So, it will break down in a small-small pieces which is not going to call major injury. So, in that way also this product is considered as a safety product. I will definitely take you through in detail that how this toughened glass is better than the raw glass and why we are using toughened glass in this category. So, first benefit was utility whereas, we are saying utilization of space, the second is putting a shower enclosure making it separate from dry and wet it is going to give you more and more safety in bathrooms. And then third the most essential part of our link spaces, aesthetical appeal of a bathroom or a complete house. So, whenever you

are going to put a shower enclosure of course, it is going to enhance the aesthetic appeal of your bathroom, because nowadays bathroom is considered as a recharge area.

Where area going and spending more and more time while taking bath, while taking shower, while using wash basins all. So, in that way it is going to give a give a aesthetic appeal to your bearing space. So, these are three major benefit which is going to enhance the beauty of your bathroom. So, let us understand when a shower enclosure comes in how a customer will get benefit of it and then what are the components of it.

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So, the major component of a shower enclosure is the glass of course, because it is going to be fixed. And then the fixing part, when it comes to the fixing part there are different type of set of hardware which is known as may be hinges, maybe profiles, maybe connectors then in between those hinges connectors there are certain plastic part used to prevent water leakage from the sides, from floor and in between the closer part where the door is being closed.

So, these all component composite a shower cubicle product so, we will go one by one what is a glass what are the qualities which we need to understand when we are going to select a glass. Then we will go through the hardware part, then we will go through the plastic component and other accessories used in this product category.

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Shower Enclosure : Components

GLASS ACADEMY

- Glass
 - Only toughened Glass can be used for Shower Enclosures
 - Quality of toughened glass is a major concern
 - Customer has a choice to select glass thickness of 4, 6, 8, 10 mm
- Hardware
 - Variety of hardware available in market – Brass, Zinc, SS 304,
 - Best Hardware material to be used : Brass C 360 grade
- Stabilizer Rod & fixing brackets
 - Variety of Rod, Towel Bar & support bars are available in market
- Magnetic Seals & Other Plastic Parts : Food Grade Plastic
 - Magnetic seals to close the door to prevent water leakage
 - Water dispersal seal to avoid water coming out of cubicle area

NPTTEL

So, when we talk about glass, in this category only toughened glass is being used. As I shared earlier why toughened glass because, it is toughened first of all it will resist great impact of hammering, a great impact of resistance impact some weight is coming on if you be able to with stand to that.

If you are using raw glass it may break down and if it is breaking down it will break in big pieces. Whereas, if you are using toughened glass, if it breaks it will break in small crystals; which is not going to injure our body so that is why in this category in this product vertical the glass is prominently used is toughened glass. Of course, there are variety of glass which is being used and which can be used in this category, but majorly people consider toughened glass in this category.

There is the choice of glass thickness also a customer may select 4 mm 6 mm 8 mm and 10 mm as well, depending on the space depending on the customer choice, depending on the load bearing capacity it specify that what kind of hardware we need to suggest.

So, when it comes to hardware, hardware maybe of a brass maybe of SS maybe of zinc depending in market and depending on the price concept. What we recommend is the personal I mean the technical recommendation for a hardware is it must be of brass. And that to of C 360 grade. Why brass because, it is less prone to corrosion it will be giving a longer life and because the glass is going to be hold on brass. So, it must be of very good quality, I will take in to the detail also that what kind of hardware I mean what kind of

brass we were using and why there. Then to fix the glass for shower enclosure there are some supporting rods which will hold the glass from top and supporting bar also which can be used of SS.

SS again, but here we need to specify the rate it must be of 304 grade, which is again considered as a best domestic grade of SS. Apart from this connectors and stabilizers rod there are some magnetic seals, plastic seals, which are again used for water leakage prevention. For example, magnetic seal being used where the door is being closed so, that no water will come out of the door area. Then plastic seals on the side of the wall where the glass is being fixed, it should not come out from that area, then water dispersal seals are there. So, ones your opening the door it should not come out from the bottom. So, in this way these are the major component of a shower enclosure product category. So, let us study one by one that start with glass.

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So, you can see here this is annealed or generally we call raw glass which is mostly being used in windows you would have seen. If window is getting break it will break in big-big pieces. Whereas, the parallel it has being shown that it is a toughened glass, we can see here if toughened glass is breaking it is breaking into small crystal and that crystal also has got dull edges.

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Shower Enclosure : Glass Components

GLASS ACADEMY

Annealed Glass

- Glass in its most basic form
- Used as the base product for toughening and other processing
- When broken, forms large shards and can be dangerous

Annealed / Raw Glass

NPTEL

The slide features a presenter on the right side, a photograph of a broken glass pane on the left, and a blue wavy background with technical diagrams of glass panes.

So, if it is coming to your body, the risk of injury will be very very less. I will take you through the component of annealed glass why we cannot use annealed glass? Because it is a basic form it is being used for other processing for toughening all. And then when it breaks it breaks in large pieces that is the biggest disadvantage of a raw glass that is why we do not recommend to use raw glass in a shower cubicle product.

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Shower Enclosure : Glass Components

GLASS ACADEMY

Toughened Glass

- Glass which has undergone a specific toughening process at 700 degree Celsius to increase its strength.
- Toughened glass is 5 times stronger than ordinary glass.
- Significantly more resistant to breakage through impact
- If it breaks, will burst actually into small pieces with dulled edges.
- Reduced risk of injury.

Toughened Glass

NPTEL

The slide features a presenter on the right side, a photograph of a shattered glass pane on the left, and a blue wavy background with technical diagrams of glass panes.

Then why toughened glass, toughened glass because, it has gone through a specific toughening process which is being done at almost 700 degree Celsius right. And the

toughening glass is five times stronger than the raw glass. So, as I shared earlier that if any impact is coming to the glass, it is still there to with stand that much of load.

And that much of strength and then significantly it is more resistant to break is through any kind of impact which is happening knowingly or unknowingly. Then if it is break if it breaks it will break into small-small crystal with dull edges like this reducing the risk of injury. So, that is the biggest reason in this category the glass which is being used is always a toughened glass.

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Shower Enclosure : Glass Components

GLASS ACADEMY

Toughening Process

- Raw Float Glass is heated to a temperature of 675 – 700°C in a Furnace and then cooled down suddenly (Quenching) in a chamber with air blown from all sides.
- Rapid cooling brings the temperature from 700° to 60°
- A compressive stress develops at the center and a tensile stress at the core.
- When an impact happens , it has to breach the compressive layer to break glass.
- When the compressive layer is breached, the energy built up is released quickly causing the entire glass to break into small pieces.

NPTEL

Coming to the component of this glass, why toughening at what temperature the toughening is happening at 675- 700 degree Celsius. How the toughening is happening is for that of course, you can go through our processing and processing and this toughening process line, that is a separate model for it you can go through that also.

In this I will explain you in brief we put a glass in furnace where is the temperature is maintained around 675-700 degree Celsius. After toughening at that temperature I mean heating at that temperature the glass will be passed through a quenching chamber. Quenching chamber means air will come to the glass with high level of pressure and that will bring the temperature from 700 degree Celsius to 60 degree. So, suddenly that heated glass will be cooled down, the moment this thing will happen to the glass it will become toughened and it will develop a compressive strength at the corner and tensile stress at the core.

So, that is how it is being toughened, the movement any impact is coming to the glass that centre part will breach to corners and that is how it will break in pieces. So, that is the basic fundamental of a toughening glass that how it breaks in crystal because the tensile strength trying to get out from the centre to the core; I mean core to the corner. So, it has getting in pieces the thing in less risk of injury.

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Coming to the hardware part, hardware as I said that most of the component is of brass and stabilizer rod and connectors maybe of SS. So, you can see I will take it through what kind of hardware being used here stabilizer rod rollers, then towel rod to open the door, then glass connectors to connect the fix glass, then wall clamp while fixing a glass you need to clamp it with the walls.

So, that it would not vibrate, it would not shaky, then hinges to fix of the door inside opening or outside opening it depends on the customer selection. Then wall profile sometimes a customer may use sliding on some different kind of model which I let you know then plastic part. As I discussed that there are some magnetic seals, some plastic wall seal some floor seal. So, I will get into the detailing of the hardware components then I will take you through the models where what kind of hardware will be used and what kind of plastic part will be used.

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Shower Enclosure : Hardware Components

GLASS ACADEMY

- **Brass** is a tensile metal, and has a great ability to bend. It is used to make **shower fittings**, sanitary fittings (Tap, shower, etc.), bearings, valves and moving parts, because it does not break easily.
- **Brass** is more **anti-corrosive** compared to Stainless Steel, and does not rust easily, yet both of the **elements** may react with different **corrosive agents**.
- Due to its high anti-corrosive attribute, **Brass** is used for petroleum products and for carrying **hot** or cold water within industrial or residential systems. The tensile strength of Brass also overlaps carbon steel. The strength of brass makes threaded parts stronger.

NPTEL

So, first we are going through the glass part, then we are getting into hardware. So, as I said hardware why brass is recommended because, brass has got more tensile strength compared to the SS that is number 1. Number 2, the glass brass is basically an alloy where is SS of course, it is a raw metal then formed in a SS form where it is prone to corrosion, brass being an alloy it is less prone to corrosion. So, that is why brass is recommended as a most compatible hardware component, hardware material in this category. Apart from this brass threading mechanism I mean the threading part of the brass will be more strengthen compared to the SS one.

Because all the hinges are fixed in the screw so, when threading is happening it is strengthier compared SS. So, that is why people recommend brass to use in this category and due to its anti corrosion property, brass is the mostly used hardware component in this category, you can see the hinges connectors everything will be of brass.

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GLASS ACADEMY

Shower Enclosure : Hardware Components

- Brass is Nickel/Chrome plated to resist tarnishing, for surface hardening of products and decorative purposes. Stainless Steel is with composition of 8% **chromium** and 8% **nickel**, and it can't be plated with Nickel/Chrome so Stainless Steel is less corrosion resistant compared with Brass
- **Brass** can bear extreme weather conditions. Brass has various shades from gold to silver. Architects use brass to decorate or refurbish buildings because it is available in various colors and shades. So we can get **Gold finished Shower fittings**
- Brass has a longer fatigue life compared to Stainless Steel or other metal products. Brass and steel are both easy to use for welding and brazing.



NPTEL

Then it is good to do some coating on this. So, generally in market people are doing some nickel and chrome plating, which will again prevent brass to get corrosion or get rust from water. Because this component is always I mean most of the time when you are using shower, water will come on to this hardware part.

So, it is must be coated so, generally people are using nickel and chrome plating. Where are the minimum thickness of nickel is being 8-12 microns and the average thickness of chrome finish is used in 0.3-0.5 micron to just to give a glossy finish. So, that will match to glass and it will match to CPA fittings also provided in a washroom.

So, the matching interior as we discuss that first the third benefit of shower enclosure was the aesthetic appeal also. So, the hardware which is being used in this category will be again of the same finish as we are using in our CP fitting so, that will match our interior décor. So, that is why we are recommending here that, brass to be used as a most commonly hardware.

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GLASS ACADEMY

Shower Enclosure : Add on Features

- ❑ Anti Lime Scale Coating
 - Its an easy clean chemical coating on glass which prevents stain on glass as it does not allow water deposition on glass surface. Generally it is known as Hydrophobic Coating.
- ❑ Sand Frosting
 - Sand frosting is a permanent frosted effect on the glass that is caused by the sand blasting on high pressure which rub the glossy finish off the glass producing the frosted opaque effect.
- ❑ Acid Frosting
 - Post Sand Frosting, few are applying acid wash to make it more transparent. Generally industry uses HCL acid for such washing process.

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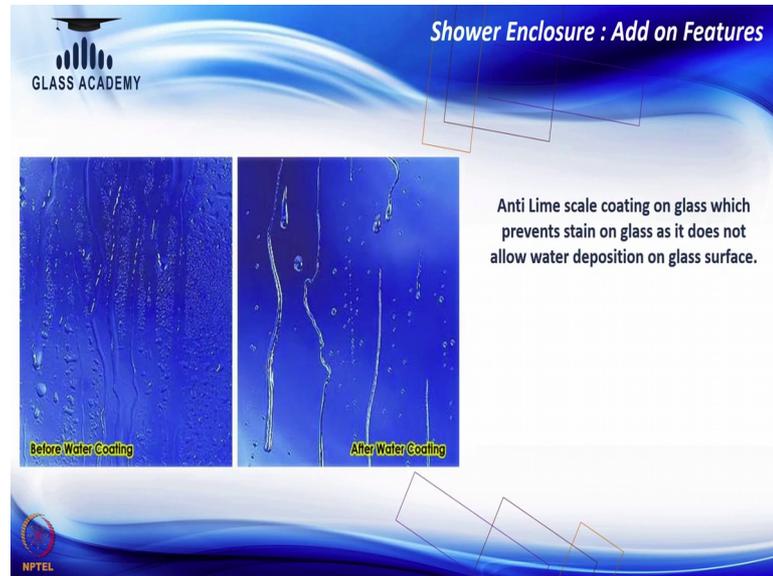
Then coming to add on features once the glass is being done, hardware is being done then there are some add on features which can be added to glass to beautify the product and to enhance the physical properties of a product. So, first add on feature comes is other anti lime scale coating, people call it hydrophobic coating few people call it nano coating also. So, it is basically a coating which prevents water to get stick on to the surface. So, if water is not getting stick to the surface I mean surface of the glass what will happen is it will help you to clean the glass in a easy way.

That is one thing secondly, the moment you are going to clean it there would not be any scaling marks. So, that is why people call anti lime scale, there would not be any scaling marks. So, cleaning glass will be very very easy and it will give you long life compared to the a normal glass. Then the second feature comes in as a sand frosting I will take (Refer Time: 17:06) sand frosting is a process were sand is being blasted on a glass it will make the glossy surface opaque. So, you would not be able to see through it. So, many people are using in residential as well as in commercial spaces also in terms of beautification of the glass or in terms of making it more separate.

So, that at a time two people can use the same wash room. Then the sand frosting is elevated to the next step next step which is known as acid frosting. Acid frosting is nothing, but it is simply post sand frosting the same glass will be washed by some acid it will make it more transparent. So, the people who are considering the sand frosting

process for design aspect they may use this acid wash. So, this will help them to make the design more glossy and more clear right, whereas, if you are using it for partition purpose of course, people will go for the sand frosting thing.

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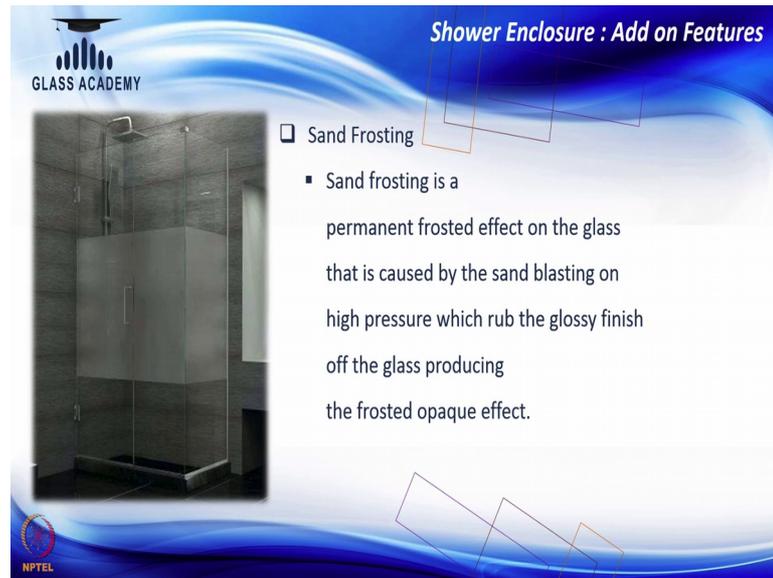


I will take you through the picture of it you can see here anti lime scale coating the first thing. Whereas, the first picture shows there is no coating even see more water more condensation is happening on the glass, where the second right side you can see there is a coating on the glass. So, it shows that water is simply dripping out; water is not getting stick to the surface of the glass.

So, if you are cleaning the first glass you can see you will have to rub it with some cloth or something and the water contains some scaling elements some mineral elements. So, that deposition may cause some scratches on the glass, whereas, on the other side water is not getting stick to the glass. So, cleaning will be very very easy and then there would not be any feeling any marks on the glass.

So, that is why when a customer is going for a longer period of time and selecting this glass in the modern bathroom of course, we will be willing to have such kind of coating. So, here we can explain that how it is going to benefit to the clients.

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Shower Enclosure : Add on Features

- Sand Frosting
 - Sand frosting is a permanent frosted effect on the glass that is caused by the sand blasting on high pressure which rub the glossy finish off the glass producing the frosted opaque effect.

Second add on feature was frosting. So, here you can see the complete glass in centre you can see a line which is basically frosted area. So, frosted area you can see you cannot see through it. So, that is the benefit of it if you need you can make the complete glass frosted. So, the person who is taking shower would not be able to see through the other side, the person who is using w c would not be able to see through the other side.

So, that is the one benefit to create some partition people are using it and then the another partition is beautification; you can see the half of the glass is frosted the other glass is clear. So, it is giving a different aesthetic appeal to the bathroom space as we have discuss the shower enclosure is going to enhance our aesthetic appeal. So, this is how you can utilize this add on features to beautification. So, in chapter I; we understood that: what is a shower enclosure, just to some of the key learning's in first chapter. The first thing we understood the shower enclosure it is a basic need why because it is going to separate dry and wet area that is number one.

Second it is going to give you more space; because its dry area can be utilized there will be safety in that. They would not be any unhygienic things because once water is being not allowed to come out of that shower area; the entire area will remain dry and will be more hygienic. And then of course, as we discuss as we saw in that there is some anti lime scale think can be done, some frosting can be done, which is going to enhance the aesthetic appeal of a bathroom.

So, these are the major benefit that why people are looking for shower enclosure nowadays in mostly modern bathroom concepts.

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Summary:

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

- Shower enclosure
- Benefits of shower enclosure
- Components of shower enclosure
- Features of toughened glass
- Add-on features to the glass

