

Glass in buildings: Design and Application
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Lecture - 43
Glass in Passive Fire Protection

So, next I am going to take you through the use of specialty fire resistant glass. I will talk about what are the different classifications and how are these, how do these, each of this fire resistant glasses perform in each scenario.

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So, the different types of fire resistant glass, as you can see in the moving GIF is E integrity, EW which means radiation control, and EI which stands for insulation. So, if you see, the moving GIF, you can very well see or if I would have to explain, you will see three elements in the motion graphic. One is you see a fire you see a source of fire, second you see a physical barrier between the fire and the person who is the new evacuated. But, the only difference in all the three is that the color of the person gifs changing, or the sorry, the color of the physical barriers GIF's changing and also another very important observation here is that, use also see how the heat radiation coming from a fire, changes in each.

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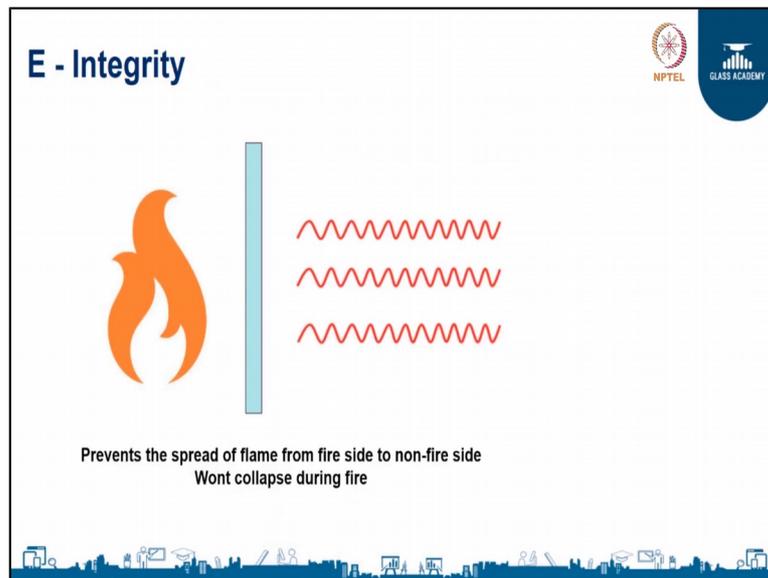
So, the different types of fire resistant glass can be classified as E, EW and EI. Now, I will take you through each of these, in detail and then you will have a clear understanding of what each stands for. So, E or any Integrity Fire Resistant Glass, means that, any fire resistant glass which will prevent the spread of flame from a fire side to the non-fire side. It is called an integrity fire rated glass. It is represented by the alphabet E and so, the most basic property of any Fire Resistant Glass is the integrity, it should not lose its structural rigidity due to temperature rise or from the pressure arising from a fire.

So, if you look at the infographic, that have put that, you can see that the physical barrier between the fire and the person being evacuated is still has not collapse. It is still, maintaining, it is structural rigidity, but at the same time you can see, that the whole graphic is represented in red, which means that the whole graphic is represented in red, which means a there will be a lot of heat transfer through the glass. So, although an integrity rated glass, does not collapse during a fire. It does is allow heat to pass through the glass, glass has a property has its own, thermal transmittance. So, at the end of the day, the heat is definitely going to be, passed through the glass unless, we add some value, unless we carry out some value addition process on the glass.

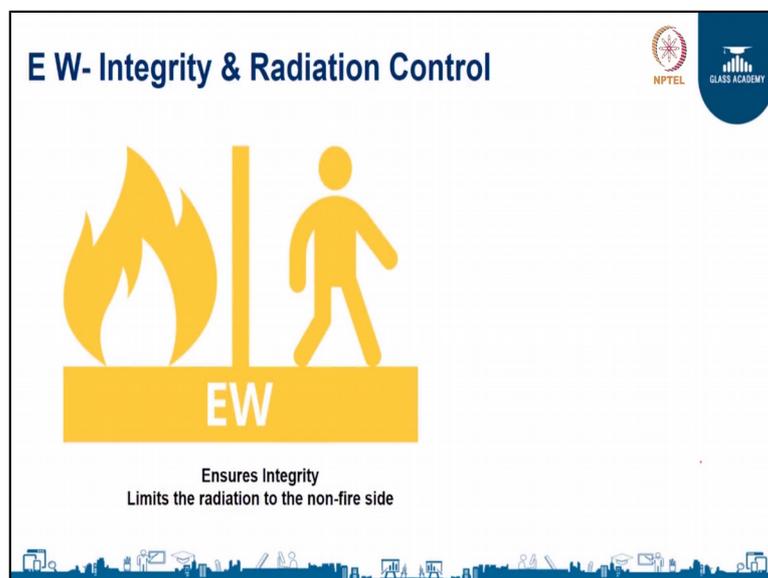
So, there are other types of, Fire Resistant Glasses as well which are much superior in performance which can cut down the, amount of heat, that is coming through. So, if I will like to go back to previous slide and take you through the motion graphic once again. So, if

you see on the left, if you see on the left, you can see, that in an integrity rated glass. You can see, that the heat radiation. You can see, that the heat radiation coming through the glass forces person in the vicinity to move further away from the glass, because of the heat transfer.

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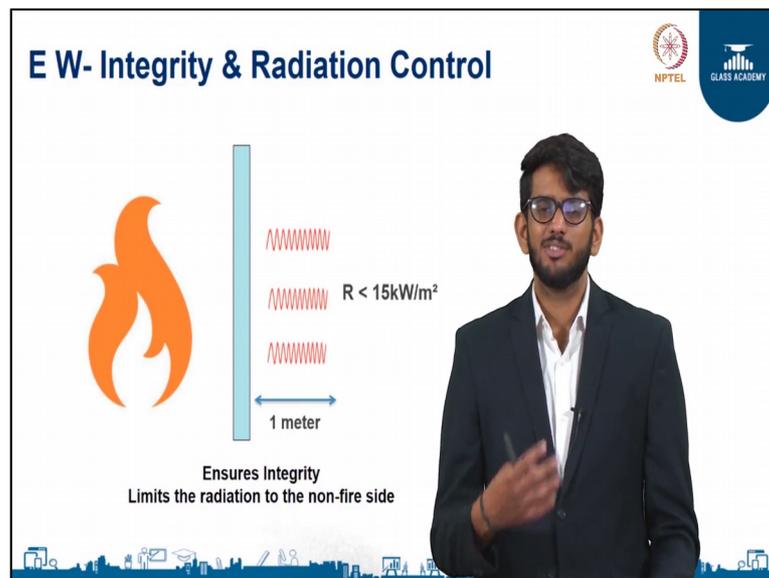
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He has a very, very simple representation of what, of how, how the heat would be transmitted, in an integrity rated fire resistant glass. The heat would transmit for, through the glass, since, there is no mechanism, in place to cut down the amount of radiation heat transfer through the glass.

Next of the second type of Fire Resistant Glass, we have is called the EW type of the resistance glass, which is Integrity and Radiation Control. If you look at the infographic it is more or less very similar to the one, you saw before for integrity rated glass, but you can observe, that there is a difference in the color of the infographic.

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It is yellow in color. And also the person, who is standing next to the physical barrier is not trying to run from the glass, but trying to walk. So, these are clear indications that, in an EW rated glass. The amount of heat radiation coming to the non fire side is limited. So, if you look at an EW glass or if you were to compare an EW glass against an E rated glass.

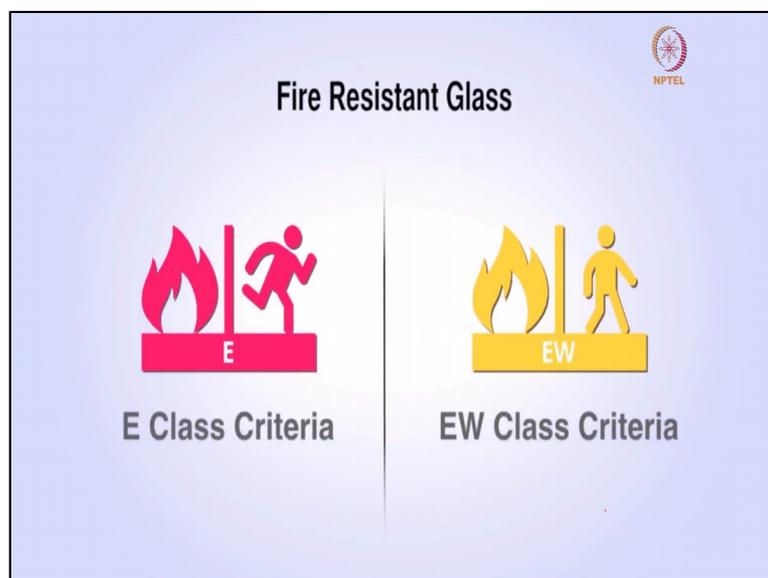
You would observe, that the amount of radiation coming through an EW glass is less than 15 kilowatt per meter square, when measured at a distance of 1 meter. So, if I was to stand 1 meter away from, EW rated glass or 1 meter in front of an EW rated glass and if I was to measure the radiation, the radiation that I would be measuring would be less than 15 kilowatt, throughout the duration of less than 15 kilowatt throughout the duration of it is fire protection.

So, again so, the E in the EW stands for integrity and the W stands for radiation control. So, an rated glass is in advanced E, I say, it is an advanced type of classification when you compare it against an E rated glass, because an E rated glass. It does not cut down the amount

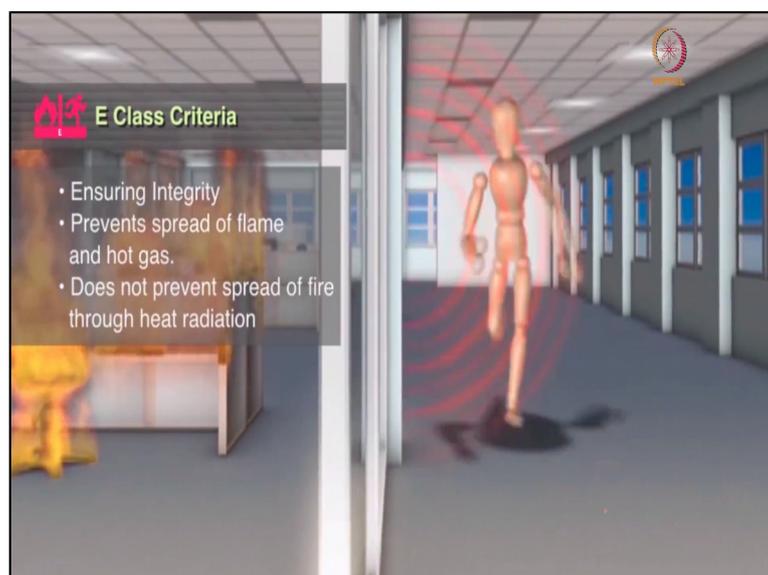
of radiation, coming through the glass, but it does not, but it does provide, integrity and structural rigidity to the glass barriers.

On the other hand, EW rated glass, it has both integrity and which is basic or which is the most, basic property of all fire is stimulus. In addition, to it also has something called W, which stand for radiation control, which means, that it will control the amount of heat passing through the glass. Now, I will take you through some videos which will show you the advantages of using an EW glass.

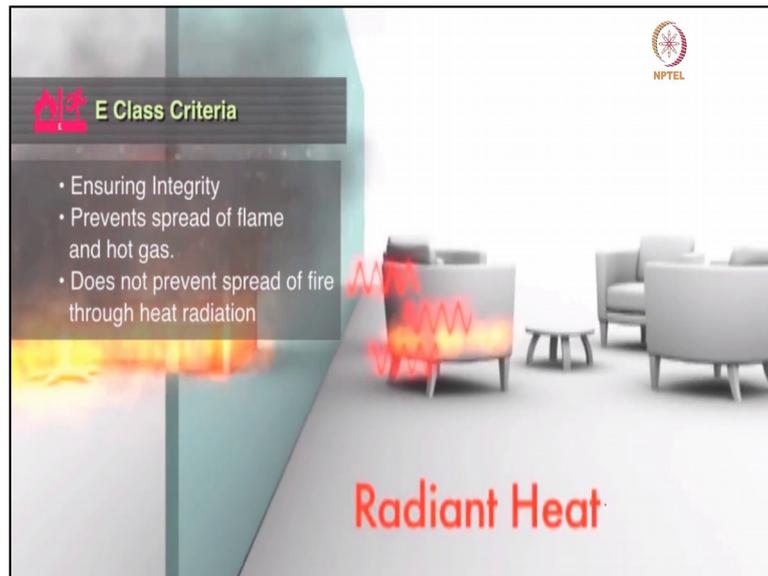
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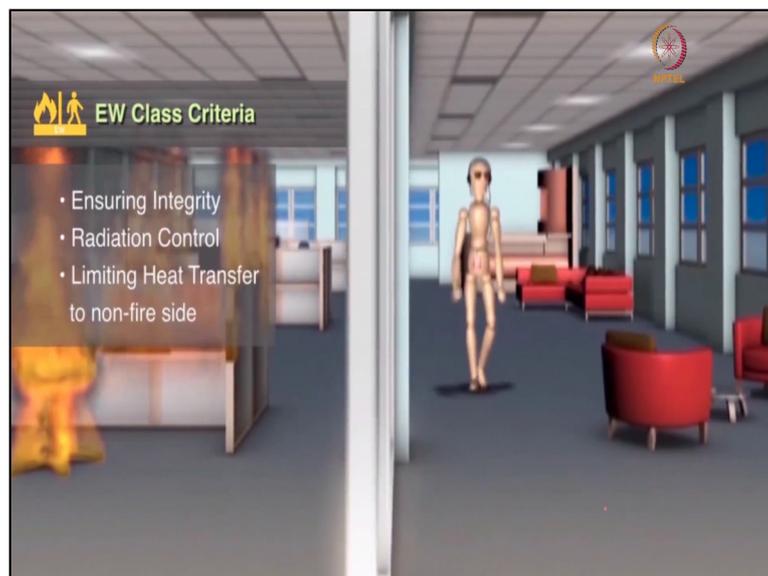
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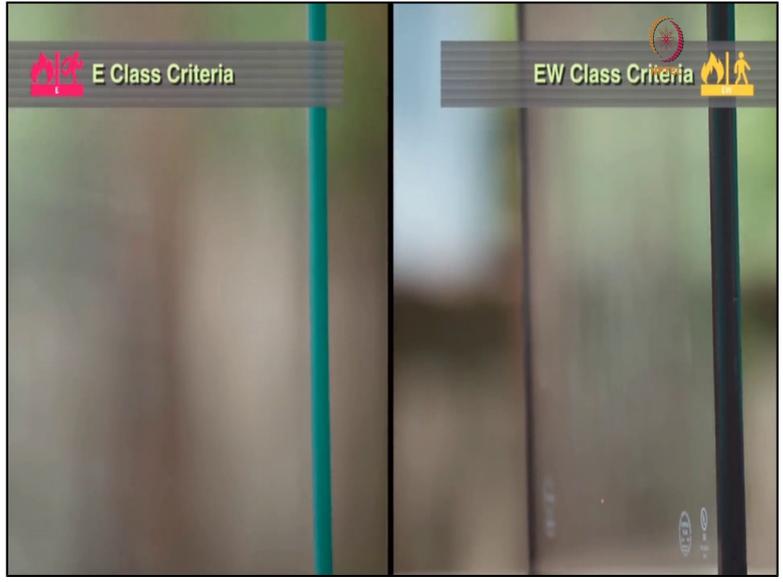
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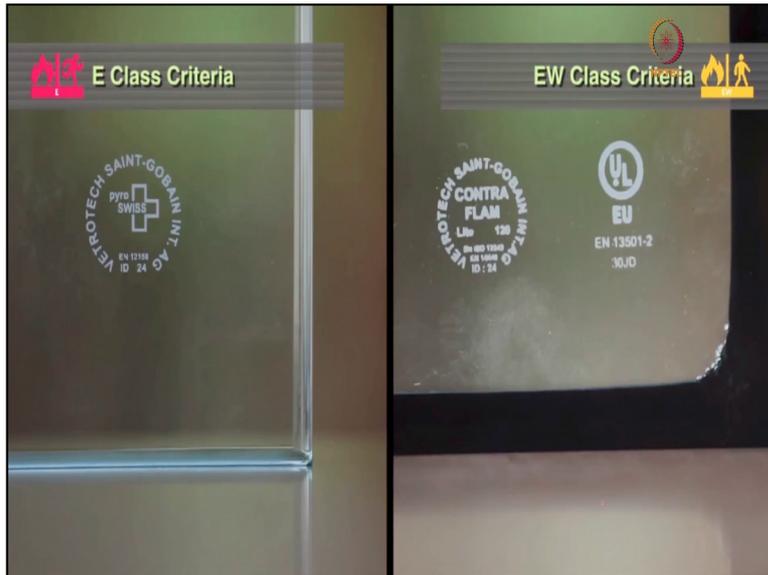
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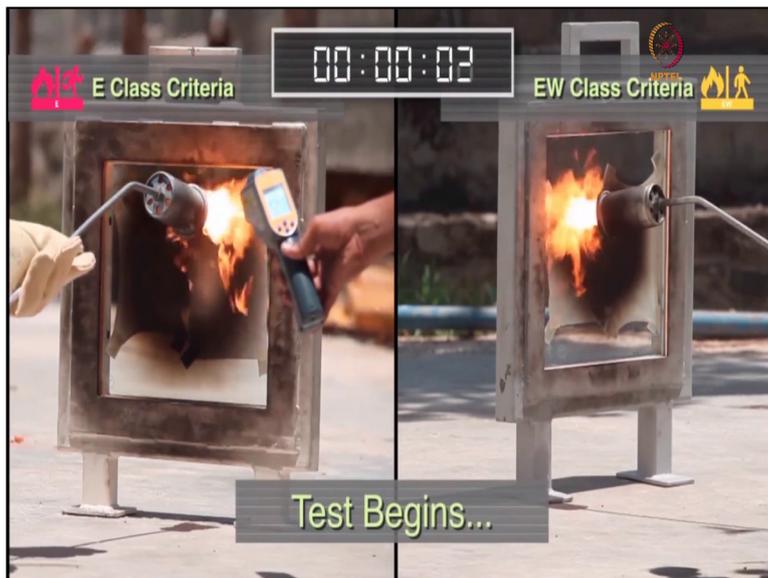
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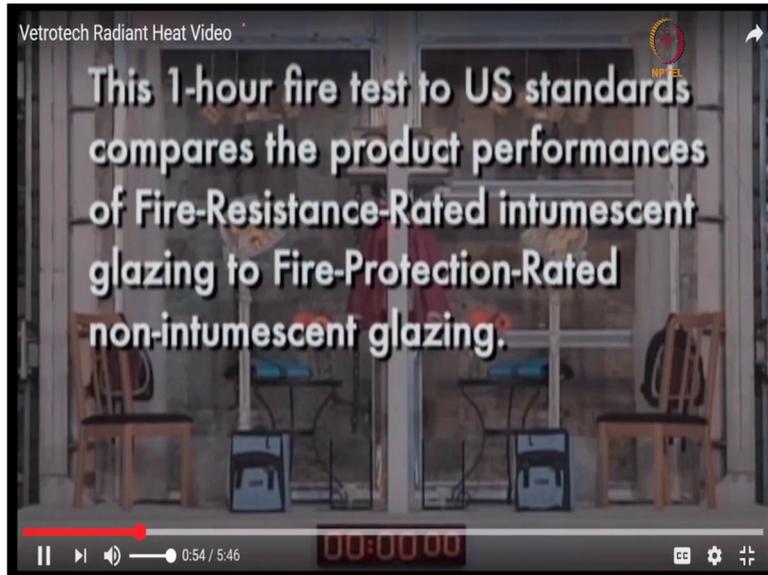
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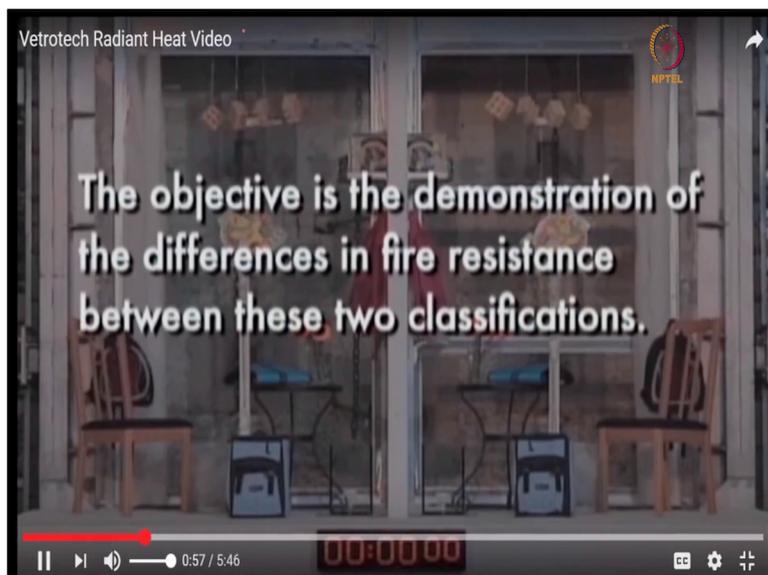
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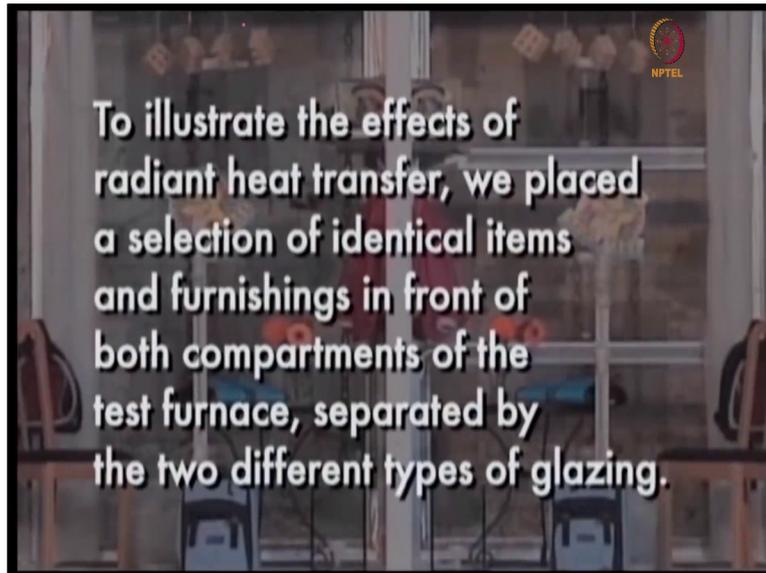
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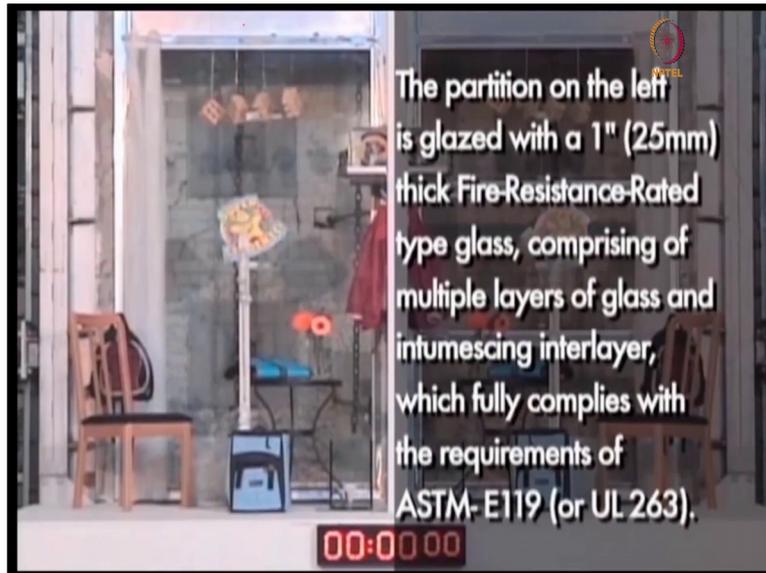
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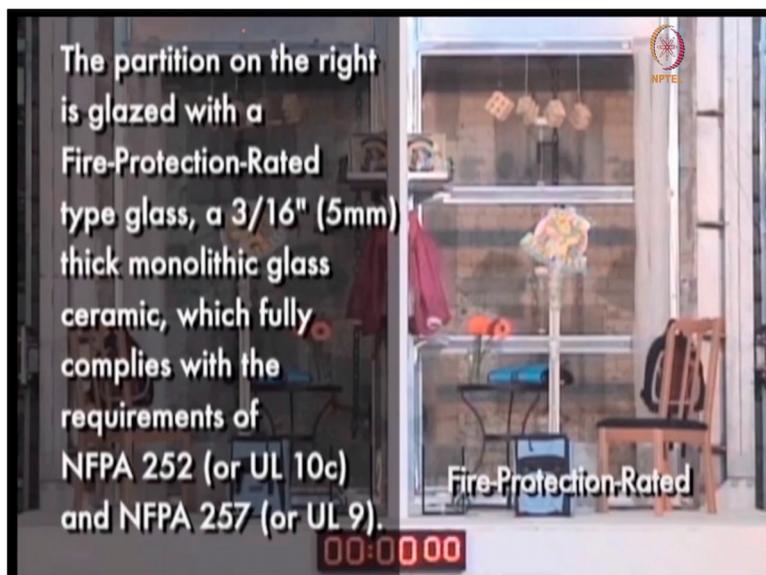
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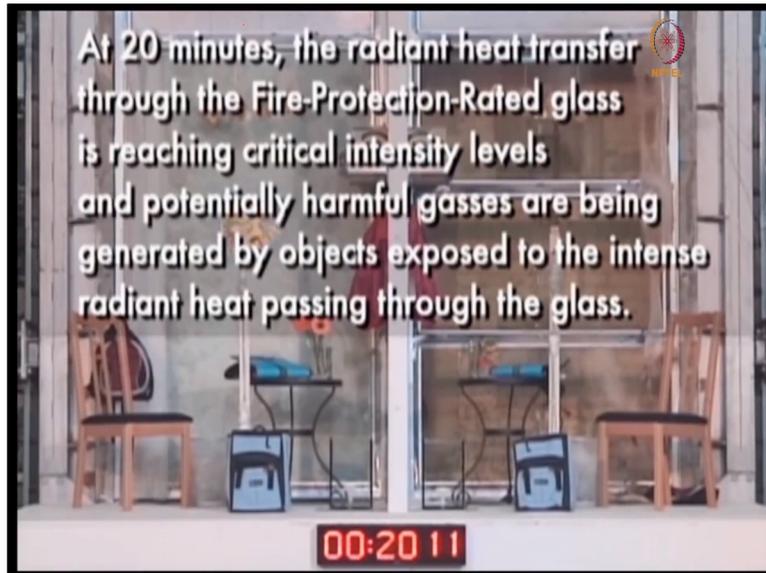
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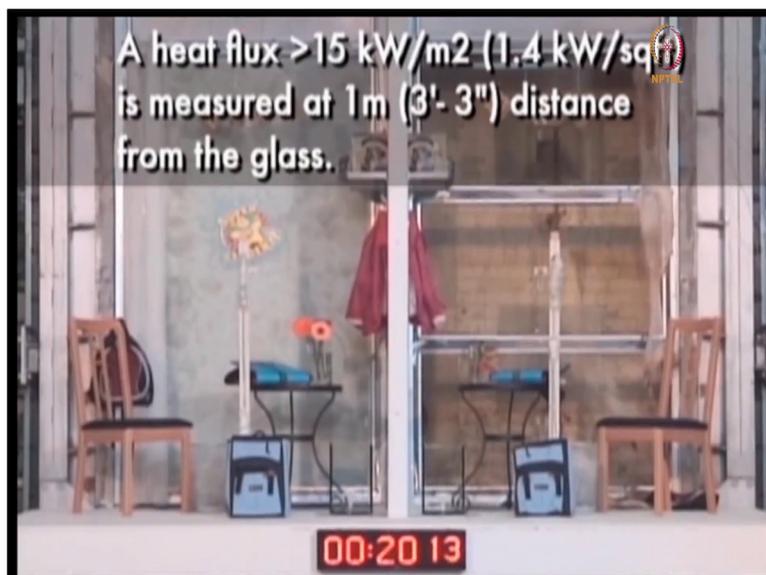
So, to explain this demo, before we go ahead with this I will take you through the same; so, on the, this is a test furnace. So, what you see behind this setup, is a furnace which we will throw fire at the set, that we have made. We have divided this set into two parts on the right we have installed, fire rated, fire resistance rated an EW glass on the right and on the left, we have used an E rated glass which is an integrity only.

So, you will see a combination of integrity with radiation control on one side and you will see a glass, glass which has only integrity on the other side and we have kept identical materials on both sides of the glass. So, you are, you will get to see that, in a real fire scenario, how each of these glasses behave and as, as a result, what is the consequence of behavior of this glass; or the performance of this glass on the things, on the combustible materials.

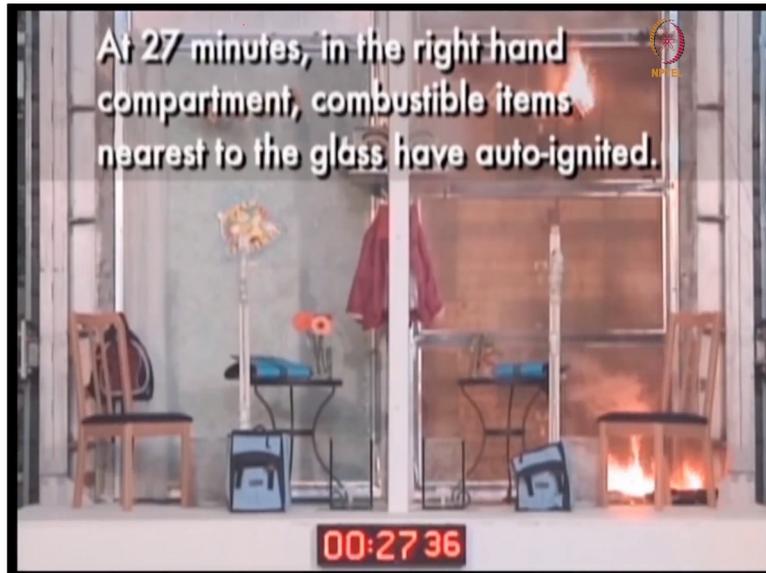
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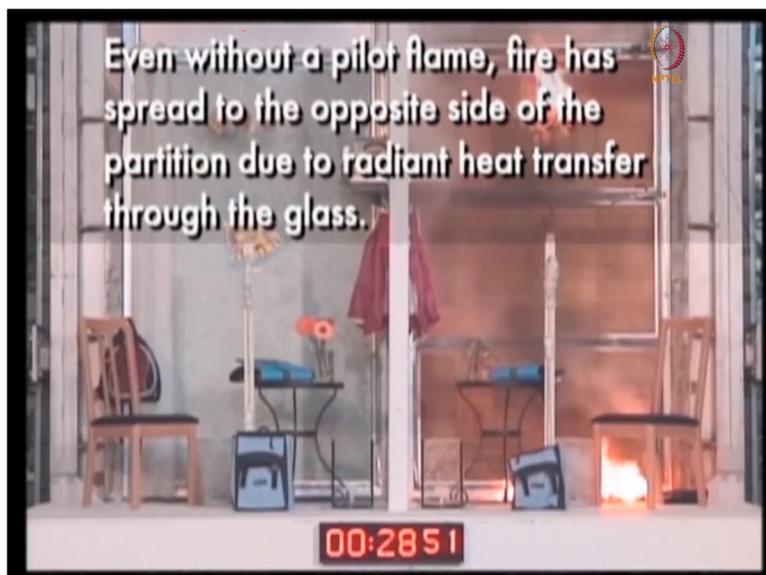
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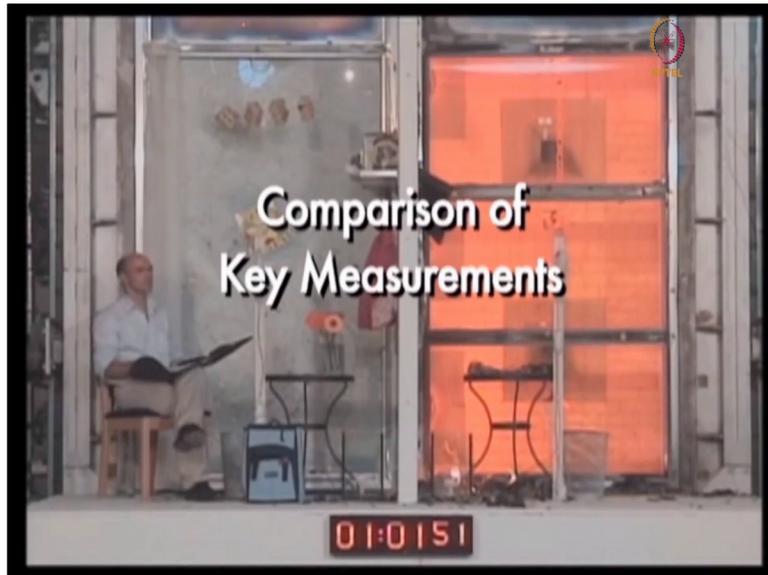
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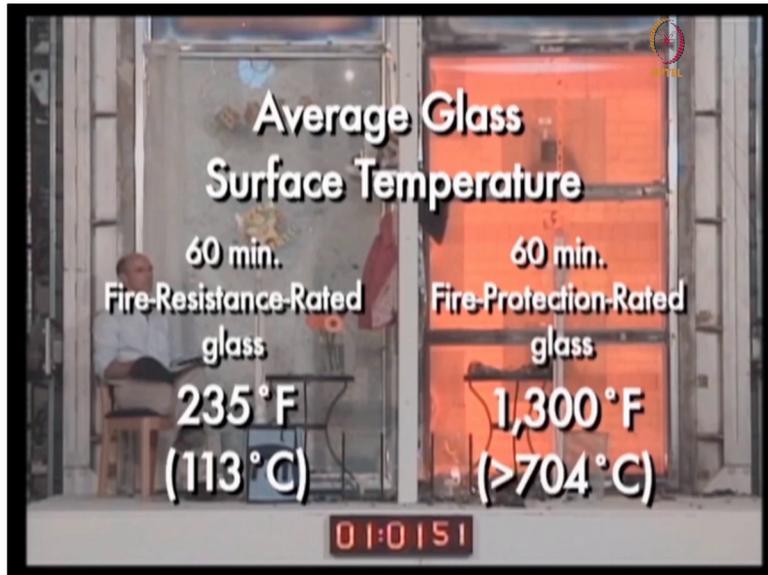
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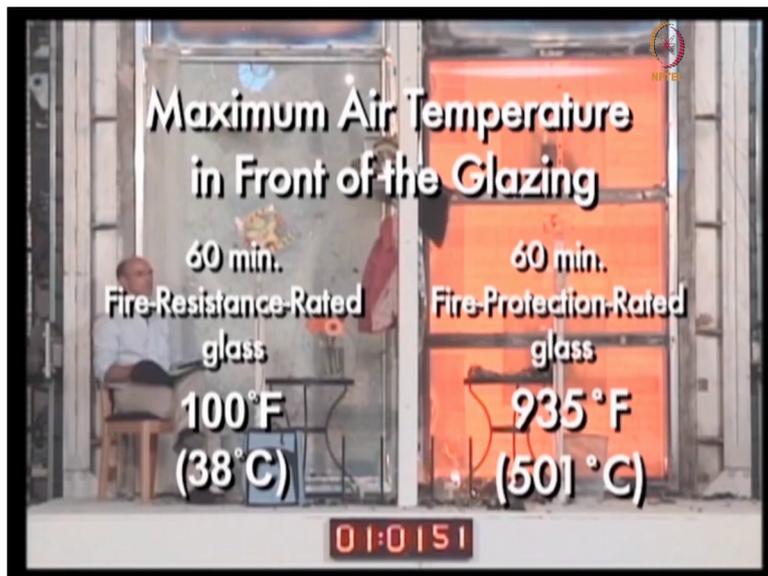
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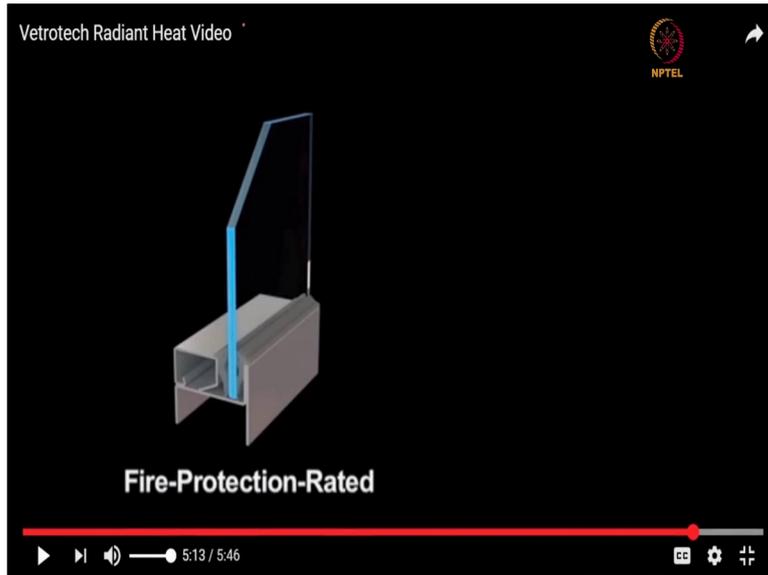
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In the vicinity of the glass, through each of this video you would have observed, the main advantages that come with the EW rated fire resistant glass, if the biggest advantage with an EW rated fire resistant glass is that, it can cut down the amount of radiant heat, that passes through it. As a result, it does not initiate secondary fire in the non-fireside, by setting a blaze all, then not all the combustible items.

In the first video, you saw that pieces of paper and cloth that is stuck on the EW glass, did not char whereas, the piece of cloth in paper stuck on an rated glass begin to ignite few minutes into the fire. Whereas, in the second video you saw some numbers attached to the test, that

we did the difference in radiation. For example, in an E rated glass, you would have observed that the radiation can go as high as 30 kilowatt from meter square when measured at 1 meter distance or you would have seen, how the temperature on the glass grows as high as 900 degrees or how the temperature of the vicinity can go up as high as 500 degrees in an E rate in glass.

Whereas, in an EW rated glass, because it can cut the amount of radiation, coming through, the, the temperature values are very less. As a result, if you were to or for example, if you were to correlate these values, to a real scenario of evacuation. During fire, you can imagine, high temperatures can cause an hindrance for evacuation not just for the occupants of the building, but also, for the fire fighters, who will be coming into rescue people.

So, radiation is going to be a very big, game changer or for the fire fighters, who will be coming in for the evacuation. So, as you can see a radiation is going to be, is a very big disadvantage, when it comes to evaporation process also it can put lot of people and property into the path of harm and danger. It is not just life safety, but also property protection, which is also one of the biggest course of fire protection. If you look at the example bank or jewelry store or a data server room, where you have so, was kept, kept within an area, it is very important to protect such property also from the (Refer Time: 17:12) fire.

So, if you, if you were to imagine the use of an EW rated glass, in a data server room against an E rated glass. It is clearly, we can clearly understand or we can picturize, how the amount of radiant heat, coming into the data server room will be cut down in an EW rated glass, whereas, in an E rated glass will be very high. As a result, it will damage all the equipment's in a room. So, it is not just life safety, but also property protection, that we need to look at when it comes to the use of, when it comes to choosing the right fire resistant glass.

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Summary:

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

- Types of Fire rated Glass:
 - Integrity
 - Radiation control
 - Insulation
- Advantages of EW rated glass

