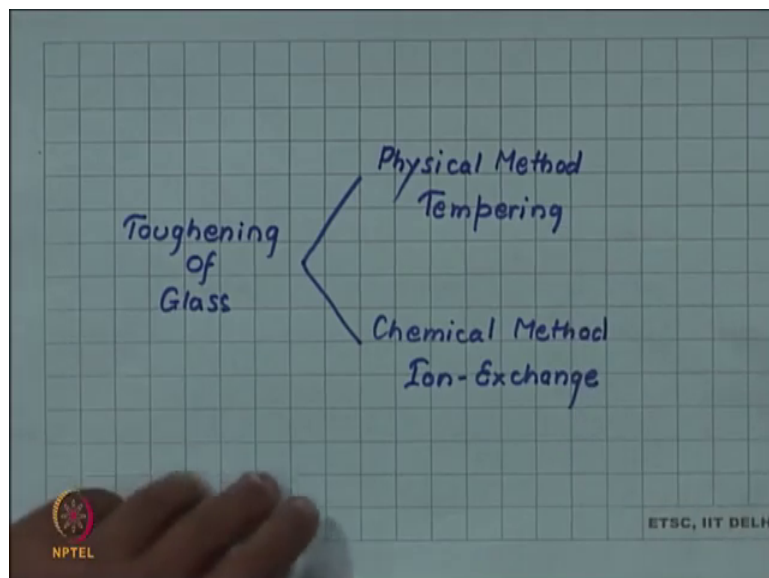**Lecture – 144**
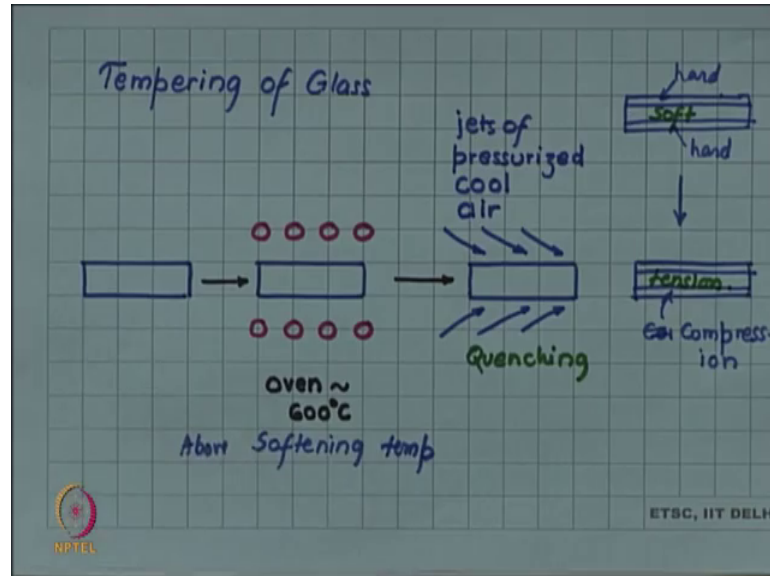**Toughening of glass: Tempering**

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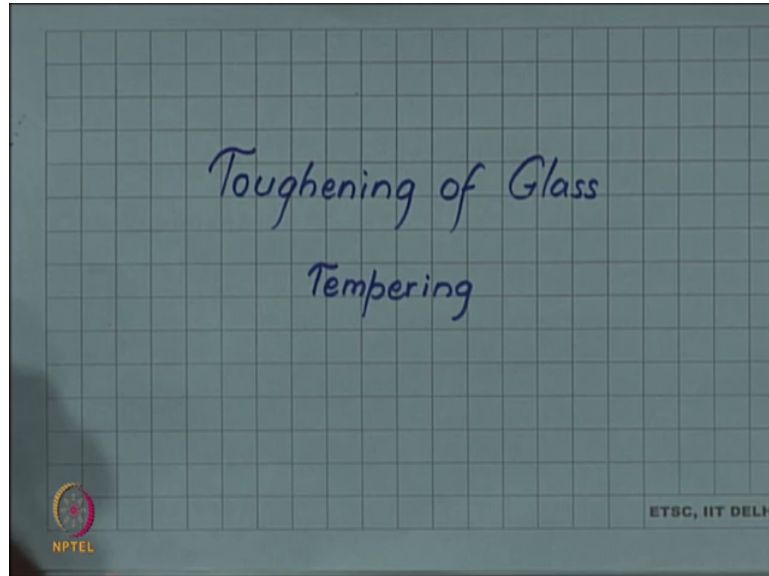
Let us consider Toughening of glass by a process called tempering.

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We have seen that toughening of glass done by a physical method called tempering or a chemical method by ion exchange. Currently, we will discuss this tempering process.

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Tempering of glass is a simple process in which the glass object is heated into a furnace up to 600 degree Celsius. This is above the softening temperature and once the glass is heated, it is taken out of the furnace and is quickly cooled by jets of pressurized cool air playing on its surface.

So, this step is called quenching, this is called quenching. Now, due to quenching a thin surface layer because cooling is very rapid and for a very short duration. So, a very thin surface layer cools quickly and forms a hard glass. So, let us look at the process in detail. The thin surface layer will first form, where is the inside because the thermal conductivity of glass is not very high heat will not so quickly will be lost from inside. So, inside will still be warm and thus inside will still be soft.

But sooner or later; after this quenching the inside will also lose heat and will become glass. In that process, it will try to contract when the glass cools and becomes hard it also contracts. So, when the outer surface contracted inside was soft. So, there was no resistance to its contraction. So, it contracted easily.

But now when the inner surface wants to contract, it is encased by the outer hard layer and so that resists its contraction. So, this leads to this leads to compression in the outer

sorry, yeah this leads to compression in the outer layer and tension the compensating tension in the inner layer; for example, the car windows or any cases where the human safety is important tempered glass is used.