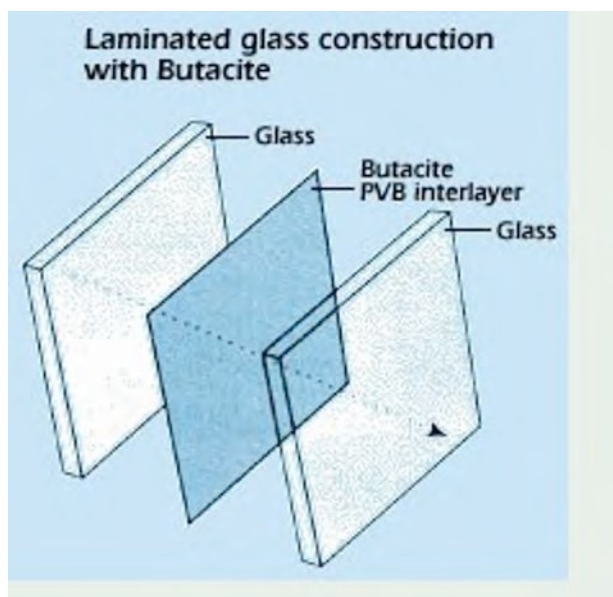


Glass Types and Management:

Types of glass found on vehicle's today

Laminated Glass - this was found primarily in windshields of vehicles but is now being used for side and rear windows on newer vehicles on the roads today.



Tempered Glass - this type of glass is found more commonly on the side and rear windows and is easily managed.

Typically with a center punch, it will break into small pieces, creating contamination risks to the casualty's injury's, rescuers and slip hazards on hard road surfaces.



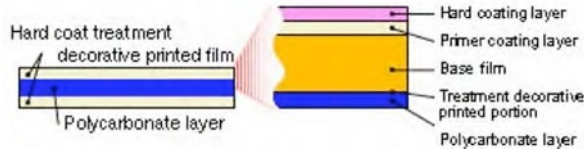
EPG (Enhanced Protective Glass) - this is a newer type of safety glass introduced as a stronger, lighter and thinner type of glass. It utilizes the same principle as laminated glass, with two pieces of glass sandwiched around a new type of material called PVB (polyvinyl butyral).

This material is considered safer than laminated glass but we will need to use a reciprocating saw or similar type of glass tool to gain entry at every window location.

Polycarbonate Glass - some manufacturers are considering using polycarbonate materials for their windows. It will be used initially in non-moving windows, such as the side windows on minivans.



Cross Section of Polycarbonate Window



Below is a list of Vehicles with side laminated windows fitted either standard or optional:
Enhanced protective glass provides added protection against injury to vehicle occupants in case of an accident

Standard

Model - Glass Position

Bentley Continental GT - Four doors
 Bentley Continental Flying Spur - Four doors
 Buick Enclave - Front doors
 Buick LaCrosse (2010 model) - Front doors
 Buick LaCrosse (current) - Front doors
 Buick Lucerne - Four doors
 Cadillac STS - Front doors
 Cadillac DTS - Four doors
 Cadillac SRX (2010) - Front doors
 Chevy Equinox (2010) - Front doors
 Chevy Malibu (acoustic) - Front doors
 Ferrari Superamerica - Roof
 Ford Taurus (2010) (acoustic) - Front doors
 Hyundai Genesis (acoustic) - Front doors
 Jaguar XJ
 Lamborghini Murcielago
 Lexus LX 570 - (acoustic) - Front doors
 Lexus RX 350 (2010) (acoustic) - Front doors
 Lexus GS 450h - Front doors
 Lexus LS 600h - Front doors
 Lincoln MKS - Front doors
 Mercedes CL 500 - Front door
 Mercedes CL 550 - Front door
 Mercedes S-Class (acoustic) - All glass
 Mercedes R-Class
 Mercedes S 400h (acoustic) - All glass
 Mercedes SL 650 AMG Black (acoustic) - All glass
 Mercedes Maybach (57 & 62) (acoustic) - All glass
 Infiniti QX56 - Front doors
 Porsche 911 Targa - Roof
 Porsche GT
 Rolls Royce Phantom - Four doors
 Saab 9-4X (2010) - Front doors
 Saturn Aura (acoustic) - Front doors

Optional

Model - Glass Position

Audi A8L - Four doors
 BMW 7 Series - Four doors
 Ford Flex Limited - Roof and - Front doors
 Ford Mustang - Roof
 Land Rover LR3 - Roof
 Land Rover Range Rover Sport - Front doors
 Land Rover Range Rover - Front doors
 Lexus LS 460 (acoustic) - Front doors
 Maserati Quattroporte
 Mercedes E-Class - Front doors
 Mercedes G-Class - Front doors
 Mercedes M-Class - Front doors
 Porsche Carrera - Roof
 Porsche Cayenne - Four doors, - Roof
 Subaru Forrester - Roof
 Subaru Outback - Roof
 Volkswagen Toureg - Four doors
 Volvo S-80 - Four doors, quarter window

How to deal with these different types of glazing at incidents:

Before any glass is managed use the correct PPE including a dust mask, and preferable cover the casualty in a clear plastic sheet for their protection. Also use a dust mask for the casualty if they are not on positive pressure Oxygen.

Tempered Glass:

This is dealt with in the normal way with the use of many tools such as a center punch, pliers, Glass-master, small hammer and so on.

Use full casualty protection, I prefer the use of a small sheet instead of a Tear Drop as it can then be used to push the glass out of the window away from the vehicle, but having said that a Tear Drop can be useful to reach areas that are just out of arms reach with a sheet. Use a small sheet on the floor to collect the glass for removal so as not to contaminate the work area and it also prevents creating a slip hazard, however don't waste valuable resources to clear the glass, unless it creates a significant risk, as more critical jobs may have to take priority.

An example of a center punch can be seen below



Laminated and EPG Glass

Dealing with this type of glass is no mystery. You can manage this type of glass the same way we manage windshield glass. However casualty protection is paramount due to the glass dust that can be produced from cutting it.

If at first we have tried to break the side glazing with a center punch and after 2 -3 attempts nothing happens, we should take this as a sign that we are now dealing with Laminated or EPG glass. Software such as Moditech's CRS data will give you this information.

Firstly we must ask ourselves, do we have casualty access? If we do, is there a need to manage this glass, Laminated glass will not suddenly break like toughened glass if left un-managed. So there is no real need to waste time cutting it away, but a good idea may be to cover the glass to prevent any glass particles from flying around whilst carrying out certain cutting evolutions. Cutting with the glass in place is an acceptable practice.

A tip for cutting this type of glass with a reciprocating saw is to use a blade of around 6-8 TPI (teeth per inch) this creates slightly larger glass particles and very slightly reduces fine glass dust, a blade with higher TPI at high speed will cause the saw to melt the middle plastic layer of the glass which will in turn coat the blade in molten rubber and blunt it.

An easy way to deal with side door glass is to either cut across the top of the glass with a saw, and then hook the glass out so that you can then lever it down, which in effect folds the glass down the outside of the door and out of the way.

Secondly another way is to cut straight across the bottom of the glass and into the window frame; you can then hook the glass out and pull the whole upper piece down and away completely from the door.



If the Laminated glass doesn't need to be managed for casualty access it can be left in situ and work carried out with it in place, if we are going to penetrate through the glass to cut pillars etc, we must put in place the correct PPE and casualty protection.

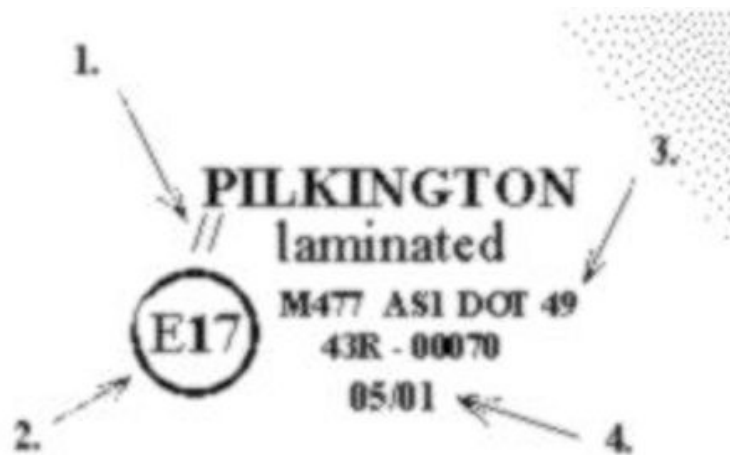
Polycarbonate glass

This will either be fixed with adhesive or by screw type fixings, other means of fixing are used in the race circuit, it can be managed by cutting or prying out with spreaders or pry bar etc, or left in place. It is similar in material to a tear drop. If a reciprocating saw is used to cut the material, if the wrong saw speed and blade is used it will melt the plastic and cause the blade to be in-effective.



How do we know what type of glass it is

On some vehicles the glass will be marked either Toughened, Tempered or Laminated, this obviously is simplest way to determine what the type of glass is. There are also many other markings on the glass that can give us this information, such as two lines above the country mark, here you can see the country mark is E17 in a circle, number one shows the two lines, these two lines tell us its Laminated. Look at this link for better information on markings "[LINK](#)"



Let us not get too worried, and waste valuable time at a crash scene by trying to read these markings to try and find exactly what type of glass we are dealing with.

Reading the vehicle damage and deformity, we should be able to see how the glass has reacted to the impact damage, this will give you a good indication as to what glass we are dealing with.

Keep it simple, if you try to break the side window with a center punch and after 2-3 attempts there is no break, we now know it will be Laminated or EPG glass, so do we need to remove it or leave in situ? Only the situation will dictate this.

"If you have the knowledge and are able to decipher the glass markings to determine the glass type" in an ideal situation this will be best practice, but again we must not waste valuable time and delay rescue operations.

Only manage the glass that needs to be managed, but plan ahead, do we want to have to manage glass later into the incident because our plan has changed? Plan ahead !!

Whilst carrying out some training we found that the use of duct tape to minimise the glass dust created from cutting Laminated glass had little to no effect, it didn't hinder the cutting but the glass dust produced was substantial.



The use of water or shaving foam takes time to apply and does not do a very good job of reducing contaminants.

There are some brilliant tools available for glass management such as adhesive films, centre punches and powered glass management tools. Familiarise yourself with your services glass management tools and procedures.

Modern Laminated glass does not have the silica in it that poses the greatest health risk, but we still do not want to be breathing in airborne particles. *I am not an expert so only take this in context, do not assume that there is no silica in the glass, its better to be safer than sorry later in your career.

Only manage the glass that needs to be managed for the extrication plan, do not break all the glass if its not part of the plan or isn't required to be broken.

Generic glass control measures:

- Manage the glass appropriately
- Controlled break
- Leave in situ
- Remove intact
- Wind down and cover
- Cover and leave