

3.4 PVC Insulated Cables

- Paper insulated cables were being used for industrial distribution and as fully impregnated non-draining paper had not then been completely accepted it was necessary to adopt some form of limitation of the amount of impregnating compound in the cable to minimise compound drainage problems.
- This caused either reduction in quality or increased insulation thickness.
- The use of PVC provided cables of excellent quality which were clean and much easier to handle.
- A particular feature of the early development was associated with the fact that, where as wiring cables have circular conductors, the conductors of power cables were sector shaped and the larger sizes pre-spiralled.
- Shaped-solid aluminium conductors had emerged as a strong competitor to copper at the same time.
- The use of shaped dies to extrude PVC to the profile of the conductor presented great concentricity problems which led to the 'float-down' or 'tubing-on' extrusion technique.
- This involves extruding the PVC as an oversize circular tube which is drawn to a snug fit on the conductor by a combination of vacuum and controlled conductor/extrusion speeds.

Applications:

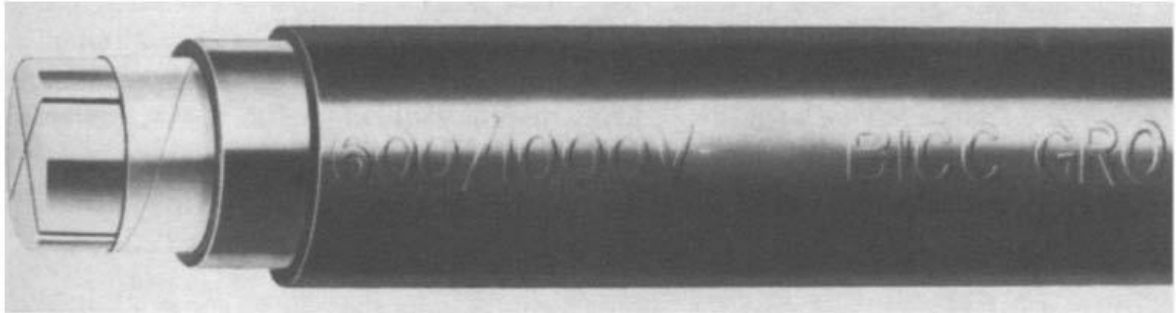
- Especially as PVC from the outset had to compete with impregnated paper, the most important factor to be taken into account was the amount of softening at raised temperatures due to its thermoplastic nature.
- This can result in deformation of the insulation due, for example, to conductor thrust at bends. Paper cables will withstand fairly high short time
- overloads and consequently the fuse co-ordination does not need to be particularly refined.
- PVC cables need adequate protection against overload or alternatively a reduced rating has to be assigned to them

Industrial cables:

- Industrial usage covers distribution in and around factories at voltages up to 3.3 kV.
- PVC cables have been almost universally used throughout the world since around 1960 and over current protection does not present any serious problem.
- In the UK the conductors have been stranded copper or solid aluminium.

Public supply:

- Apart from house service cables, PVC has not been used for public supply in the UK because of the over current protection problem. Normal distribution systems provide little or no protection for the cables, e.g. two electricity supply companies operate with a solid.
- This is not so in many other countries and there has been widespread use of PVC.



Coal mining:

- Much power cable is used for fixed installation along underground roadways to take the supply from a main colliery shaft to the working face.
- Because the point of use is constantly changing, the individual cable lengths are fitted with couplers to enable the distribution system to be moved around as required.
- In the UK the standard voltages are 3.3 kV and 6.6 kV, with some requirement at 11 kV.

High voltage cables:

- Reference to the use of PVC for HV cables is made in a later section.

