

1. Fixing brackets shall be spaced not more than 500m O.C.

F. Ladder Construction

1. GRP ladders shall be hand laminated moldings with a hardwood core in the rails and rungs.
  - a. Minimum laminate thickness shall be 5mm.
  - b. All resin shall be corrosion resistant vinylester.
  - c. All glass shall be corrosion resistant type.
  - d. Hardwood core shall be completely encapsulated.
  - e. Continuous roving shall be used in stringers.
  - f. At least seven layers of 300gm/m<sup>2</sup> CSM and one layer of 30 gm/m<sup>2</sup> glass veil (on outer surface) shall be used in the laminate.
  - g. Resin to glass ratio: 70/30±5%
  - h. Minimum barcol hardness prior to dispatch: 35 by ASTM-D2583.
  - i. Max. Water absorption: 0.15% by ASTM-D570

### 3.2.4 GRP Safety Cages

- A. Unless noted otherwise, GRP Safety cages shall be provided where the distance between ladder landings or floor exceeds 3.5m.
- B. Safety cages shall be constructed of three flat vertical members supported by flat hoops with diameter of 750mm the hoops shall be at a maximum of 700mm centers and first hoop shall be 2.40m above ground or platform level.
- C. Each hoop shall be able to withstand a tangential point load of 740N and a vertical point load of 1200N applied at any point on the loop. The maximum allowable deflection at the point of application of the load shall not exceed 25mm and there shall be no appreciable permanent deflection of the hoops after removal of the load.
- D. Construction shall be similar to ladders but without a hardwood core.

### 3.2.5 GRP Step Rungs

- A. Step rungs shall be of similar construction to ladders.
  1. Size
    - a. 145 mm wide x 235 mm long with a tread length of 120 mm.