

## DESIGN & ENGINEERING

The design is total computerized. Powerful and sophisticated software tools are used to develop the mechanical and electrical design of all transformers. These tools help in ensuring optimum electrical design and determining core and copper losses accurately. The high reliability of these transformers ensures maximum availability, lower maintenance cost and reduced life cycle costs.



## MANUFACTURING FACILITIES

**VEL** is located in a charming and green environment beside the Dhaka- Mymensingh highway. Separate shops for core processing; coil winding, tank fabrication, surface treatment and painting, assembling and testing are developed and furnished with modern machinery. Full testing facilities as per ANSI/IEC are available. The shop floors are adequately high and have level floor area with overhead Cranes. All shops are equipped with appropriate handling facilities. Major manufacturing and testing equipments are imported from Canada and Japan.

## TRANSFORMER FEATURE

### CORE

Transformer core is made of thin cold rolled grain oriented (CRGO) insulated silicon steel laminations with extremely low loss. The physical characteristics of the core meet the international standard such as the inherent loss due to hysteresis & eddy currents, thickness, brittleness, degree of waviness, the permeability etc. The silicon steel laminations are insulated on both sides. Primary consideration is to reduce the no load loss and the excitation current and noise level. CRGO's are being imported from Nippon Steel, Japan and JFE, Japan.



For wound core transformers slitted cores are cut in a CNC control progressive shearing machine. Round core coils are made by means of core winding machine. Then the round core is shaped to rectangular core by core forming machine. Annealing restore the original magnetic properties of core by releasing all internal stresses that developed on core. **VEL** is having a Bell type annealing furnace for annealing the core at suitable temperature.



## WINDING

**VEL** transformer winding are designed to meet the three fundamental requirements, a) electrical stability b) Mechanical stability c) Thermal stability. During design, service factors such as high electrical & mechanical strength of insulation coil characteristics, uniform electric flux distribution, prevention of coronal formation and minimum restriction of free oil circulation, winding surge due to lightning & circuit breaker operations etc are taken in to consideration. HV windings are made of super enameled copper wires or paper covered strip. Whereas for LV winding one or more copper strips insulated with pure cellulose paper is used.



## INSULATION AND IMPREGNATION

The quality of transformer and especially the dielectric strength response of its insulation depend on the treatment of its active part. **VEL** transformers the treatment consists in an alternation of hot air heating and prolonged vacuum so as to remove all moisture from the insulating materials. Pre compressed press board spacers used in the active part provide a rigid insulation structure with low partial discharge levels. A clean, dust free environment ensures the highest standards in quality. By using automated oil filling and processing system and by virtue of leak proof joints in the transformers, there is no oil spillage. The oil used for impregnation complies with BS-171 and every consignment received is tested before being pumped into storage tanks.



## DRYING

Drying is carried out on active parts by means of electrical heated ovens to remove moisture and air for a period of time and then immersed under vacuum condition in freshly filtered oil and allow to stand for a period until all trapped air has escaped.



## TANK

Tank is made of a steel plate suitable for electric welding. All tanks are pressure tested before leaving the fabrication shop. All parts-plates, Shape, Hoisting lugs etc. are welded to ensure greater mechanical strength. Tanks are sand blasted to remove rust and welding scale. In case of small tanks seven tank phosphating is done for surface treatment. Then powder paint is applied which has high resistance to chemicals and transformer oil. All gasket surfaces at the tank are treated with utmost care to prevent unwanted oil leakage.



## TANKING

After inserting the active part into the tank, processed insulating oil is added. The oil passes through a special flushing process in a filter system during which remaining impurities are removed. An advanced gasket system used in the grooves ensures the joints are secure, making the transformer leak proof. Processing and handling of oil is done by means of an automated oil handling system, which eliminates any chance of oils intermixing.

