

Compact, Lightweight, Low Cost, Rectangular Core Power Transformers

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Abstract : One of the sectors where the competition is experienced at the highest level in the world is the transformer sector, and sales can be made with a limited profit margin. For this reason, manufacturers must develop cost-cutting designs to achieve higher profits. The use of rectangular cores and coils in transformer design is one of the methods that can be used to reduce costs. According to the best knowledge we have obtained, we think that we are the first company producing rectangular core power transformers in our country. BETA, to reduce the cost of this project, more compact products to reveal, as we know it to increase the alleviate and competitiveness of the product, will perform cored coil design and production rectangle for the first-time power transformers in Turkey. The transformer to be designed shall be 16 MVA, 33/11 kV voltage level. With the rectangular design of the transformer core and windings, no-load losses can be reduced. Also, the least costly transformer type is rectangular. However, short-circuit forces on rectangular windings do not affect every point of the windings in the same way. Whereas more force is applied inwards to the mid-points of the low-voltage winding, the opposite occurs in the high-voltage winding. Therefore, the windings tend to deteriorate in the event of a short circuit. While trying to reach the project objectives, the difficulties in the design should be overcome. Rectangular core transformers to be produced in our country offer a more compact structure than conventional transformers. In other words, both height and width were smaller. Thus, the reducer takes up less space in the center. Because the transformer boiler is smaller, less oil is used, and its weight is lower. Biotemp natural ester fluid is used in rectangular transformer and the cooling performance of this oil is analyzed. The cost was also reduced with the reduction of dimensions. The decrease in the amount of oil used has also increased the environmental friendliness of the developed product. Transportation costs have been reduced by reducing the total weight. The amount of carbon emissions generated during the transportation process is reduced. Since the low-voltage winding is wound with a foil winding technique, a more resistant structure is obtained against short circuit forces. No-load losses were lower due to the use of a rectangular core. The project was handled in three phases. In the first stage, preliminary research and designs were carried out. In the second stage, the prototype manufacturing of the transformer whose designs have been completed has been started. The prototype developed in the last stage has been subjected to routine, type and special tests.

Keywords : rectangular core, power transformer, transformer, productivity

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