

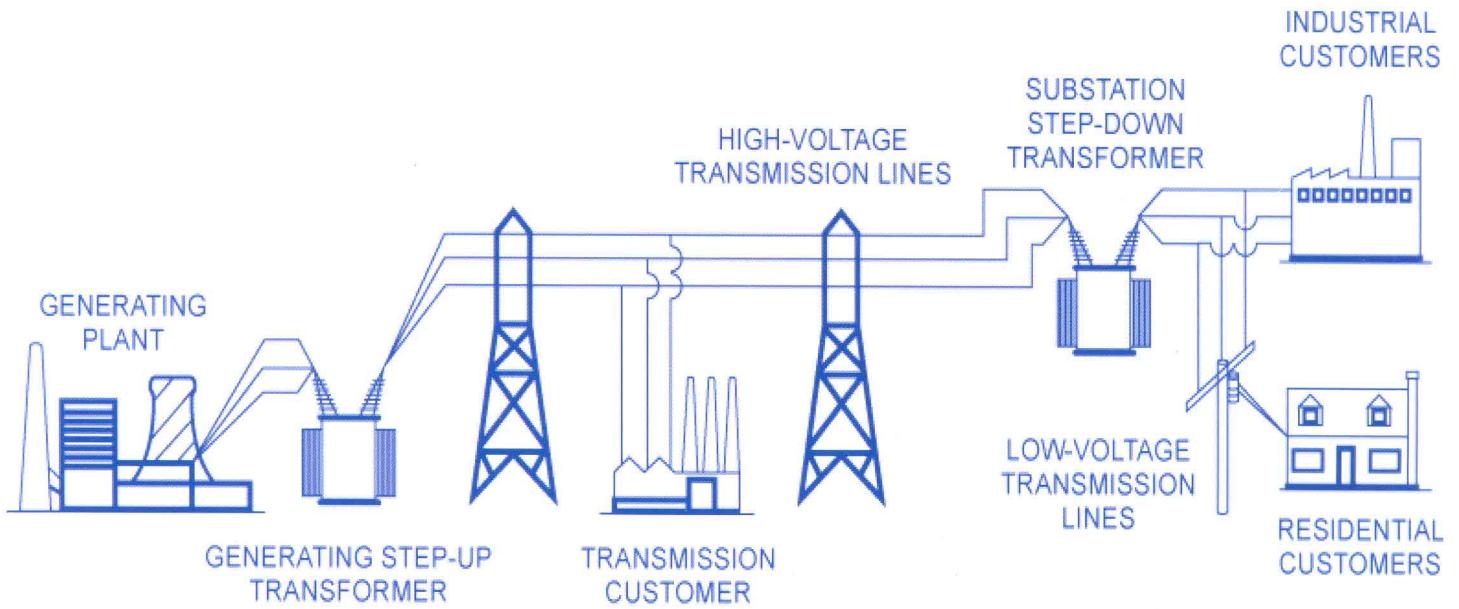
# DISTRIBUTION TRANSFORMER UP TO 5000 KVA



Made in Bangladesh  
**crafted with pride**  
in Bangladesh

 **Energypac®**

[www.energypac-bd.com](http://www.energypac-bd.com)



Energypac Engineering Ltd, Bangladesh is an ISO 9001:2008 and 14001:2004 certified power engineering company and the country leader in providing end-to-end power solutions for over three decades.

With years of expertise, state-of-the-art manufacturing technology and testing facilities, Energypac produces a wide range of power products in operation, in power generation, transmission and distribution systems as well as in electro-intensive industries and commercial and residential complexes. Energypac's products are designed, manufactured and tested as per the highest international standards.

All our power products have undergone rigorous full-acceptance testing prior to delivery and are type tested from CPRI, India and CESI, Italy.



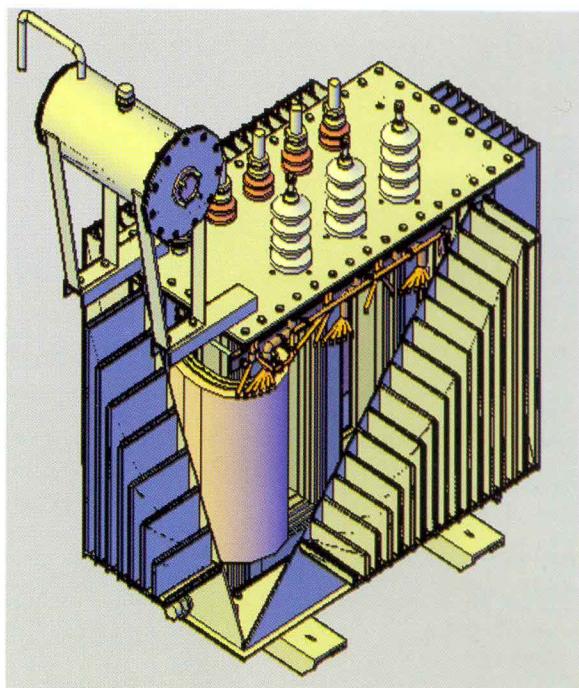
## ROBUST DESIGN

Energypac offers a comprehensive range of distribution transformers up to 36kV and 5MVA that are in successful operation in industries, residential and commercial complexes as well as transmission and distribution networks across Asia-Pacific. Our transformers are produced in ISO:9001 and 14001 accredited facilities and tested to the stringent requirements of the IEC/ANSI standards in our ISO:17025/NABL accredited laboratories. Each design is meticulously tested and refined by our dedicated R&D team, comprised of leading transformer experts from Europe and Asia.

### Energypac transformers boast:

1. Foil windings: Much lower axial stress than generic wire type designs. Much better short circuit strength. Quick to manufacture.
2. Cores: Obound - excellent short circuit withstand capacity like round cores, but occupy much less space. Compact designs.
3. Insulation - High quality insulation means excellent mechanical strength, and increased transformer life.

**The result:** robust yet compact transformers, that ensure years of reliable service, at budget friendly prices, with minimal environmental impact.



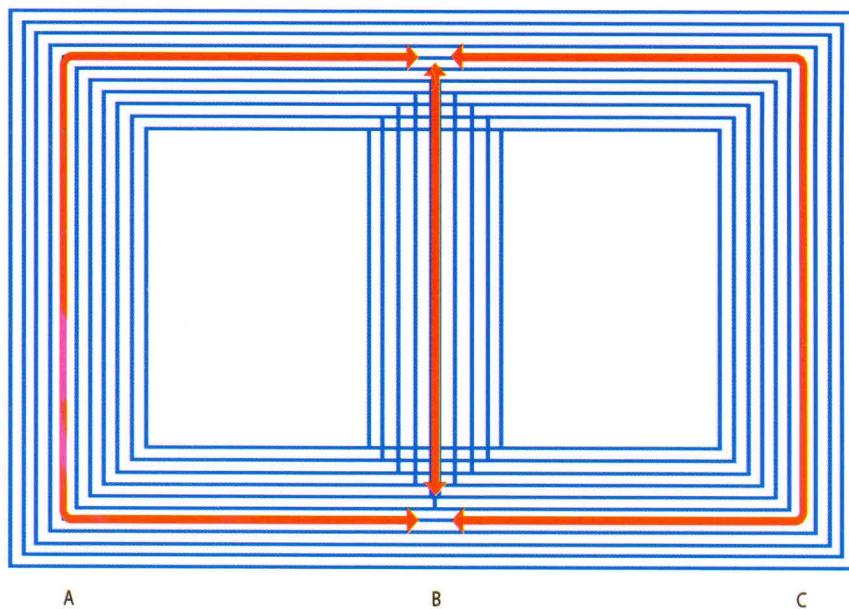
## CORE

Energypac uses an obround core design that marries the excellent short circuit withstand capability of the round core with the production convenience and space saving features of the rectangular core. A compact core reflects in the overall dimensions of the tank, resulting in a slimmer design with lower tank and oil costs.

Each core is made from CRGO silicon steel source from Japan. The cores are cut at 45° to guarantee optimum flow of magnetic flux and are stacked in an overlapping pattern using our automated core-cutting lines and core-stacking beds.

### The result:

Low loss, low noise compact cores that have excellent short circuit strength, but also cut costs.



## FOIL WINDINGS

Energypac is the only manufacturer in Bangladesh to have adapted the modern foil-winding transformer technology that is favoured by major manufacturers in Europe.

In the wire wound type low-voltage coil, ampere turn distribution is never fully balanced since the individual wire/conductor strips distribution with insulation are intermittent and there are axial sections where current becomes zero (region with a break). This unbalance causes a force in axial direction which can cause failure by producing collapse of the winding or bending it or fracture of the end rings or clamping system. However, in foil winding transformer, a single turn is distributed all over the axial directions symmetrically with no break. This ensures high and low voltage winding ampere-turns are always in balance whether or not some tappings are in or out of circuit in HV. As a result, the axial stress is much smaller in such a transformer. In foil winding, the maximum voltage between each turn is only few tens of volts. This allows the use of sheets of fine kraft paper only a few hundreds of a millimetre thick for the insulation required between the turns (foils).

High voltage windings are almost exclusively of layered construction. The insulation between the layers consists of pre-coated kraft paper, applied in sheet form. The special diamond pattern of epoxy adhesive coated onto the kraft paper cures during the drying process and bonds the windings into a single structure. Another important feature is that the high voltage windings are wound directly onto the low voltage winding, forming the main gap. It ensures maximum mechanical strength, rigidity and compactness. These characteristics are of the utmost importance since the windings have to sustain very high radial repellent forces during operation.

### The result:

mechanically stronger designs with less stress both axially and radially, and a resultant decrease in insulation material that reflects in the cost.



## INSULATION

Good quality Diamond Dotted Paper is used for insulating the windings. The paper is produced by coating modified epoxy-resin in diamond-dotted patterns on electrical insulating paper.

In the process of coil desiccation, the coated epoxy-resin melts at a certain temperature and becomes adhesive. With the temperature increased, the melted resin would cure and firmly adhere each adjoining layer or turn of the coil, thus forming a winding section. If a short circuit occurs in the coil, the resin bond strength would sufficiently prevent the displacement of each winding layer/turn, which ensures the long-term mechanical and physical properties of the insulation structure. As the resin coating distributes in a diamond-dotted pattern, little quantity of the resin would soak into the insulating paper during the melting and curing process, which ensures the elimination of air content in the insulating paper and guarantees the soakage of oil, minimizing the damages of corona and partial discharge.

### The result:

increased mechanical strength, low partial discharge, long transformer life.



## TANK

Most of distribution transformer tanks are built with cooling fins. The purpose of cooling fins is to increase the available contact surface for the cooling air. Energypac also uses compact hermetically sealed tank designs. In such designs the cooling fin enables a degree of flexibility which is needed to accommodate the expansion and contraction of the liquid as it heats and cools, due to load and ambient temperature. The benefit is prolonged service life expectancy and reduced maintenance. However customers can also ask for traditional conservator fitted on top of the transformer tank if they need.

The skill and craftsmanship of our highly experienced welders and leak tests during production ensure leak-free finished tanks.

An effective and efficient cooling system is an inseparable part of a transformer. The operating

temperature of liquid-filled transformers is limited to around 100°C. A higher operating temperature can reduce the size, weight and cost of a transformer for a given power rating, but it shortens the service life expectancy by accelerating the ageing of the insulating materials. So we optimise the cooling in accordance with the maximum permissible temperature as per IEC standard and also targeting a long operating life for the product.

These tasks represent high requirements for fine transformer fluid: it must be insensitive to high temperatures, to the influence of air, oxygen and catalysts; furthermore it has to be noncorrosive and resistant to ageing. Energypac uses adequate fluid for each customer requirement and application. Mineral oil, which complies with the specifications of the international standards for insulating oils (IEC-60296) is used for distribution transformers .





## MONEY MATTERS

We take pride in the reputation we have earned for manufacturing quality products that provide both satisfactory performance as well as significant savings. Energypac has adopted a unique oval shaped core design along with foil windings, good insulation material and hermetically sealed tanks to ensure maximum electrical energy efficiency and reduced electricity bills, leading to faster payback.

Better insulation materials = Less insulation required, increased transformer life.

Foil windings = Dramatically reduced manufacturing times

Oval magnetic cores = Reduced size and hence reduced transformer oil costs, lower sound levels are indicative of lower losses

Hermetically sealed tanks = More efficient, cheaper and quicker to build

Shorter manufacturing times and reduced insulation requirements mean the transformer is cheaper to produce and quickly ready for delivery. In addition you reap even greater savings in the form of reduced running, maintenance, repair and replacement costs.

## Technical Data for Three Phase Transformer: 11/0.415 kV at 50 Hz

kVA Rating	No Load Loss (Watt)	Full Load Loss (Watt)	Impedance Voltage (%)	Total XFR Length (mm)	Total XFR Width (mm)	Total XFR Height (mm)	Total Weight (Kg)
100	275	2030	4	1250±10	540±10	1250±10	685
200	425	3435	4	1350±10	565±10	1355±10	935
250	520	3300	4	1400±10	535±10	1450±10	1110
315	540	5100	4	1400±10	615±10	1480±10	1200
400	645	5640	4	1445±10	645±10	1505±10	1415
500	770	7010	4	1460±10	705±10	1535±10	1555
630	875	8730	5	1560±10	690±10	1590±10	1830
750	910	11370	5	1545±10	735±10	1690±10	2015
1000	960	16670	6	1555±10	800±10	1855±10	2450
1250	1195	18485	6	1665±10	775±10	1995±10	3000
1500	1255	16875	6	1780±10	1180±10	2410±10	3565
2000	1565	24425	6	1890±10	1275±10	2450±10	3912
2500	1730	29125	6	2310±10	1450±10	2645±10	6213

\*Energypac is happy to accommodate individual customer specifications. All transformers above 2500 kVA are designed as per customer requirements. The above data applies strictly to Energypac's standard product range designed in accordance with IEC.

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The information contained in this booklet is necessarily general in nature. For further information regarding sales, services or any general queries contact us at the email addresses below:

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