



Opti-Consult

Solution Partner in Transformer Business

Providing cost savings for transformer manufacturers and buyers...



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Who are we?

- ❖ OPTI-CONSULT is a consultancy company located in Belgium.
- ❖ OPTI-CONSULT is providing complete transformer solution consulting services to its esteemed customers for more than 20 years.
- ❖ OPTI-CONSULT team has more than 25 years of experience in transformer design.
- ❖ OPTI-CONSULT consists of electrical and industrial engineers.



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What we are doing?

For Transformer Manufacturers;

- ❖ Selling customizable transformer design programme for cast resin and oil type distribution and medium power transformers which have great optimization and capitalization features
- ❖ Adding an optimization algorithm to your existing design programme
- ❖ Transformer factory lay-out design
- ❖ Finding new sources- machineries, raw-materials, accessories etc.
- ❖ Working instructions preparation
- ❖ Quality system documents preparation
- ❖ Giving training about transformers
- ❖ Technical consultancy
- ❖ Network consultancy for sales
- ❖ Establishing transformer factory from scratch
- ❖ Designing special transformers



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What we are doing?

For Transformer Buyers;

- ❖ Technical consultancy
- ❖ Third party inspection consultancy
- ❖ Writing technical specifications for distribution utilities
- ❖ Supplier audit
- ❖ Giving training about transformers



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References

- ❖ Pauwels Trafo / Belgium - 1997-2007
- ❖ Crompton Greaves / International - 2007-2008
- ❖ PEL / Pakistan - 2008-...
- ❖ Energypac / Bangladesh - 2009-...
- ❖ Elsewedy / Egypt - 2010-...
- ❖ Eurogulf Transformers / UAE - 2010-2012
- ❖ Erea Transformers / Belgium - 2010-...
- ❖ Arya / Iran - 2014-...
- ❖ SEM / Turkey - 2015-...
- ❖ Others can not be disclosed



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A New Concept for Transformer Design

Expectations of transformer companies from a transformer design programme;

❖ *Capability of Flexibility*

Essentially transformer manufacturers want their design programme to be able to make round, oval, Aluminium, Copper windings and is capable of making designs with different grades of core materials. They are searching flexibility in their design programmes to cover very wide range of different technical specifications of different countries.

❖ *Design Optimization*

Transformer manufacturers want to be sure that the design is the most optimum one with the given weights and dimensions in terms of material cost.

❖ *Customization*

Usually transformer design programme sellers are offering a package programme that can not be customized but transformer manufacturers want it to be fully customizable according to their machinery, workmanship, material constraints etc.



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Expectations of transformer companies from a transformer design programme;

❖ *Short Design Time*

Transformer manufacturers want the design (electrical and mechanical) finishes as quickly as possible.

❖ *Safe Design*

Transformer manufacturers also want to be sure that the design is the safest design in terms of electrical characteristics.

❖ *Turn to Account*

Transformer manufacturers usually want to turn their existing materials waiting in their stock to account. In most cases using an existing material in the design decreases the delivery time and also lead to a better stock management.



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ALL IN ONE DESIGN PROGRAMME !

OPTI-DESIGN is created to satisfy all these expectations as a full solution package.

Capability of Flexibility

Design Optimization

Customization

Short Design Time

Safe Design

Turn to Account



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Feature 1: Wide Range Technological Choices

User can choose very wide technological options such as;

- ❖ LV and HV winding materials (AL or CU)
- ❖ core shape (round or oval)
- ❖ number of parallel wires
- ❖ HV interlayer insulation (uniform or non-uniform)
- ❖ cooling type (corrugated walls or radiators)
- ❖ core clamp type (U-shape or L-shape)
- ❖ tank arrangement (hermetically sealed, with conservator or with gas cushion)
- ❖ yoke type (flat or normal)
- ❖ core raw materials (M5, M4, M3, 27MOH, 23MOH, ZDKH85, ZDKH90, ZDKH95) and more.

Core material to consider (1 is consider, 0 is not)	
M5	1
M5S	0
M3	0
ZDKH *85(LTC)	0
27 MOH	0
23 MOH	0
ZDKH 95	0
ZDKH 90	0
ZDKH 85	0

Technological choices										
core shape	round		Low voltage winding	Foil		Cooling	Corrugations	number of finwalls	core clamps	L-shape
flat yoke	No		maximal parallel foils	1		Corrugation pitch	45	4	tank arrangement	expansion tank
LV material	cu		max parallel wires (rectangular)	2		Extra tolerance LV dia	0		HV 2 enameled wires	No
HV material	cu		HV interlayer insulation	non-uniform		Extra tolerance HV dia	0		HV wire type	rectangular paper insulated wire
										LV wire type rectangular paper insulated wire



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Feature 2: Cost Optimization and Captilization According to Raw Material Prices

- ❖ After filling the prices of raw materials into price list section, Opti-Design can **easily optimize the transformer according to these prices after checking thousands of possibilities** thanks to its great optimization algorithm.
- ❖ Opti-Design also has great **capitilization feature to help manufacturers to give most optimum capitilized tender prices** according to related formula.

Core:	Unit	Price (\$)
M5	kg	2,3
M5S	kg	2,8
M3	kg	2,25
27 MOH	kg	2,85
23 MOH	kg	2,35
ZDKH 95	kg	3
ZDKH 90	kg	3,1
ZDKH 85	kg	3,3
ZDKH *85(LTC)	kg	2,8
Copper (LME)	kg	5,3
Alluminum (LME)	kg	1,7
Transformer oil	liter	1
Radiators	kg	2,85
Corrugations	kg	1,12
Tank Material	kg	0,8



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Feature 3: Full Customization According to Your Factory and Supplier Limits

- ❖ We know that every manufacturer has different capabilities. Hence we believe that any design programme must be customized according to its user's capabilities. **Opti-Design is excel based, very flexible and fully customizable design programme.** Your machinery, factory and supplier limits can be easily integrated to the programme.
- ❖ Since it is an excel based-open coded software, it is **very easy to adapt it to your future investments.**
- ❖ In addition to above points, you can always and **easily update the formulas based on your measurements/experiments.**



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Feature 4: Short Design Time

For us, design time is as important as design itself. We know that many manufacturers are spending more than a day for finalizing the design of even one transformer and giving related working instructions (both electrical and mechanical) to production line.

- ❖ Opti-Design gives you **the most optimum ready design of one transformer (both electrical and mechanical) and related working instructions in averagely 30-40 minutes** depends on the speed of computer. This is a considerable time and money saving.
- ❖ Opti-Design **works integrated with all CAD programmes which have excel compatibility.** This means when the design output data is ready, mechanical design will automatically be created through an excel interface.



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Feature 5: Safe Design Based On Experiments

- ❖ First of all, **formulas** integrated to Opti-Design are **created based on huge amount of experiments conducted in one of the most powerful transformer manufacturers** of the world. They were verified many times by our customers (transformer manufacturers) we worked before.
- ❖ In addition to this, we are also **conducting experiments in client's factory to verify and fine tune the formulas**. We know that each factory has its own capabilities and formulas must be checked and adapted to these capabilities. For example no load-loss formulas must be fine tuned for each factory.

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Feature 6: Optimizing Design with a Fixed Raw Material

We know that especially for small quantity orders, at design stage, using raw materials which are available in stock can also bring some cost savings. For 1-3 units, nearly all manufacturers prefer to use raw materials from stock instead of buying them.

- ❖ In these kind of cases, Opti-Design can **easily make optimization with a fixed raw material** such as a fixed foil. It is very beneficial also for transformer repairing.

fixed parameters (if filled in, parameter is fixed)	
number of LV turns	
height foil	
total foil thickness	
total LV wire height	
LV wire thickness	
total HV wire height	
HV wire thickness	



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Feature 7: Considerable Cost Saving



Between 8% - 40% cost saving !

- ❖ According to experiments, cost savings that we reached in the factories of our past customers by using Opti-Design change between 8% to 40%. Percentage is changing of course according to their used technologies, machineries etc.

Case Study:

	Before Opti-Design	After Opti-Design	
		8% Cost Saving	
Material Cost	60	55,2	
Sales Price	100	100	Increase
Profit Margin	1,67	1,81	14%



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Special Designs

We can also provide design programmes for below special transformers;

- ❖ Earthing transformers
- ❖ Rectifiers
- ❖ Phase shifting transformers
- ❖ Very low loss transformers
- ❖ Start-up transformers
- ❖ Arc-furnace transformers
- ❖ Dual voltage transformers
- ❖ SLIM transformers- invented by Opti-Consult
- ❖ With on-load tap changer transformers
- ❖ And more...



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