U-GET

ULTRA EFFICIENT TRANSFORMER CORES

ISO 9001 : 2008 Certified Company

M/s UNIQUE GREEN ENERGY TECHNOLOGIES PVT LTD

Plot No. 72, Survey No. : 1043/2, Industrial Development Park
Kadapa, Andhra Pradesh - 516 002, India
Tel: +91 - 7829901416
E-mail: info@ugetamc.com | workshead@ugetamc.com
Web: www.ugetamc.com

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ULTRA EFFICIENT TRANSFORMER CORES

(Under Technology arrangement with Metglas USA. (A Unit of HITACHI Metglas, Japan)

Amorphous Core Loops
for
Distribution Transformers

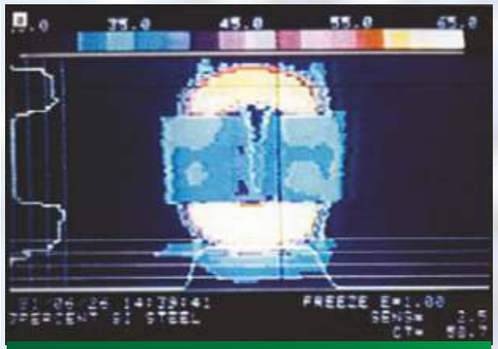
ECO FRIENDLY

AMORPHOUS METAL CORES

UGET produces high quality Amorphous Metal(AM) distributed gap (wound) cores according to customer specification for single phase and three phase Distribution Transformers(DT) under technology licence from Metglas Inc. USA, a fully owned subsidiary of Hitachi Metals Ltd, Japan. These high quality, state-of- the art AM core loops can be used both for Oil immersed and dry type Distribution Transformers.

Infrared Photographs

(a) Metglas® Amorphous Metal



(b) Grain Oriented Steel Distribution Transformer Core

Heat Spectrum Radiated in Grain Oriented Core is significant compared to Metglas® Amorphous Metal Distribution Transformer Core due to its significant core losses

Advantages - Amorphous Metal Distribution Transformers:

Common Metallic Solids are Crystalline, Regular & Periodic having Structural Anomalies in Atomic arrangement which hinder Magnetization Process due to no crystal grain boundary

Amorphous Structure Randomized by Process having absence of Regular Structure which helps Magnetization Process

1) COST benefit :

Utility can save cost in terms of TOC*, though initial cost is little high** to minimize lifetime costs.

2) Proven technology (for installation in grid) :

(1) No special technique required to use AMDT. Just replace CRGO-DT*** with AMDT.

(2) Can reduce losses in distribution system.

3) Proven technology (for production) :

(1) Can produce AMDT by standard industry technology, UGET will teach technology and support start-up of production at transformer makers.

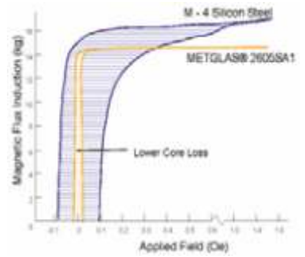
4) AMDT can contribute to reduce losses in T&D network (can contribute to enhance efficiency in T&D network)

5) Reduce Greenhouse Gas Emissions from Generation Facilities

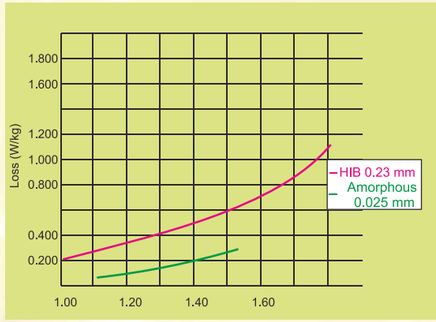
6) Reduce Cost of Generation per kWh Consumed

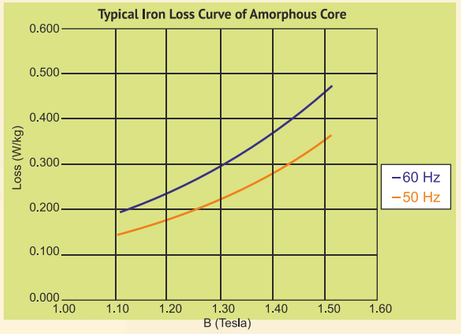
Features

- Lower Hysterias Loss
- Low Eddy Current Loss
- Lower temperature rise, Reliable
- Low loss under harmonic, Power Quality
- Flexible manufacturing processes
- Consistent Properties



MAGNETIC PERFORMANCE





The losses due to induction in the cores produced with various transformers sheet.

MATERIAL CHARACTERISTICS

The material characteristics of amorphous alloy are mentioned at below table

BASIC PARAMETERS	AMORPHOUS METAL MATERIAL
Strip Thickness (µm)	25 (+/- 4)
Density (gr/cm3)	7.18
Lamination Factor	≥ 84
Saturation Induction-Bs (Tesla)	1.56
Typical Core Loss (50Hz, 1.3T)(W/kg)	0.17 to 0.20
Standard widths (mm)	3 widths: (142, 170, 213)

Why Use Amorphous Core Loops for Transformers?
Very Low No Load Losses

No Load Losses

Hysteresis Loss

Random molecular structure of amorphous metal causes less friction than SiFe when a magnetic field is applied. This unique property which allows ease of magnetization & demagnetization significantly lowers hysteresis losses in amorphous metals.

Eddy Current Loss

Amorphous metals have very thin thickness (25 micron). Thin laminations result in lower eddy current losses as compared to SiFe.

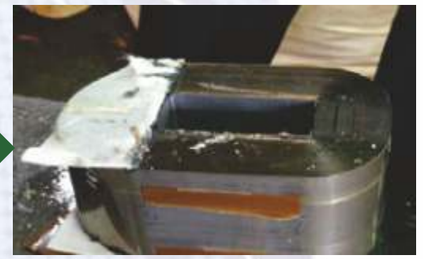
No special technique required to use AMDT
AMDT Adoption is Easy

1) Just replace to finished AMDT from CRGO-DT.
   Don't need any special equipment to install in grid.
2) AMDT will conform to standard of each country/utility.
3) Lifetime : No difference with CRGO-DT.
   It depends on oil and insulation, etc, and not core.
4) AMDT also can be recycled.

Recycle Flow of AMT

AMDT


Discard AMDT


Retrieve AM core from AMDT


Crush and Screen


Wash and Dry


Crushed AM core


AMDT core

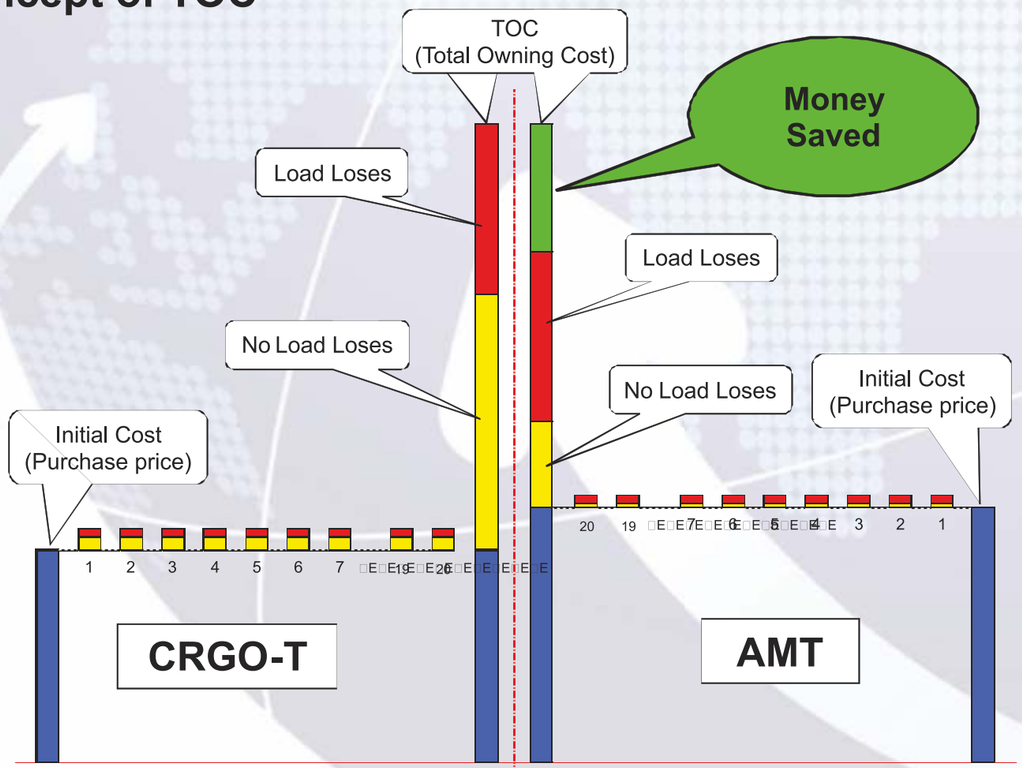

Energy saving and
Resource circulation

AMDT can be produced by standard technology

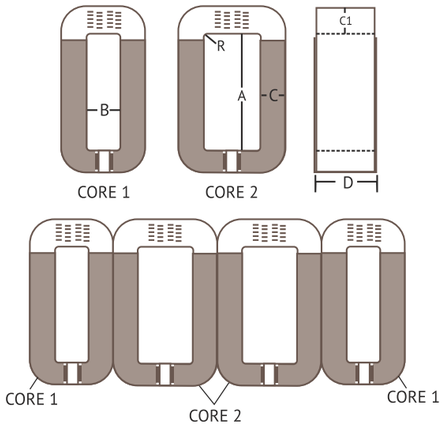
Example: Oil-Immersed
Single Phase DT

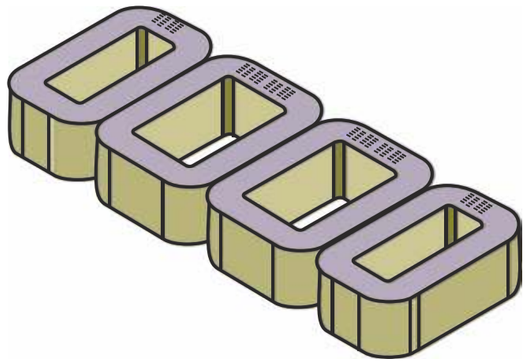
- ◎ Main Difference in DT between AMDT and CRGO-DT is just a core.
- ◎ You can produce AMDT using traditional technique.
- ◎ Many people are worried that AM-core is very difficult to handle. But handling of AMC becomes easy after they have some experience.
- ◎ Several AMDT makers have mastered its production –UGET will support

Concept of TOC

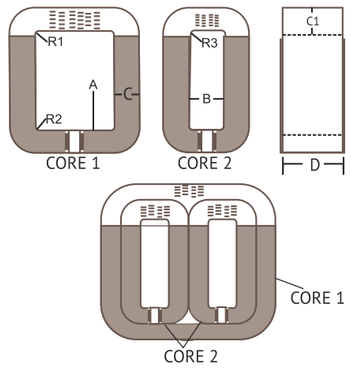


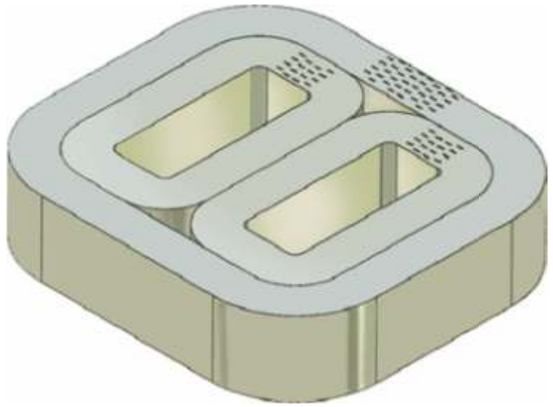
3 PHASE- 5 LIMBS TRANSFORMER CORE GROUP





3 PHASE- 3 LIMBS TRANSFORMER CORE GROUP*





ORDERING INFORMATION

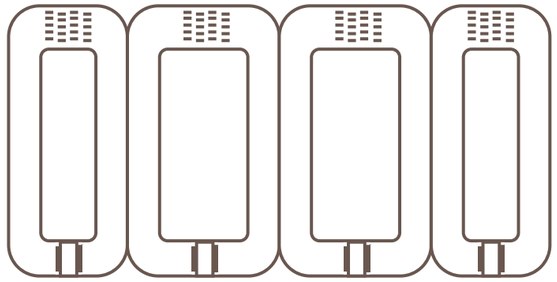
TEST CONDITIONS	
Power	(kVA)
Frequency	(Hz)
Test Voltage Per Turn	(V / Turn)
Maximum Core Loss	(W)
Induction	(T)

MECHANICAL PROPERTIES

		TOLERANCE
Ribbon Width	(mm)	
Window Height	A (mm)	+3/-0
Window Width	B (mm)	+3/-0
Core Build	C (mm)	Maximum
Core Width+Epoxy Coating	D (mm)	Maximum
Window Corner Radius	R (mm)	+/-1.5
*Window Corner Radius	R1=R2&R3 (mm)	+/-1.5
Core Net Area	(cm2)	Minimum
Unit Weight	(kg)	Minimum
Quantity	(pcs)	-
Total Weight	(kg)	Minimum

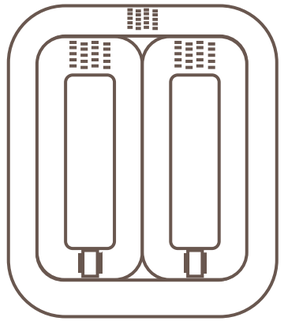
TYPICAL CORE LOOP DESIGNS

The pictures below are showing different design of cores loops for single phase and 3 phase cores.



SOME SAMPLES FOR TRANSFORMERS CORES

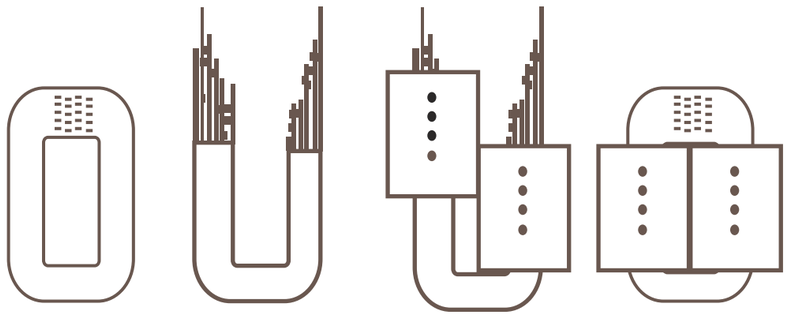
3 phase 5 limbs transformers core group



3 phase 3 limbs transformers core group

CORE COIL ASSEMBLY

In order to assemble the active part, rectangular shaped windings have to be used.



The picture above shows opening the upper yoke of the core, inserting the winding and closing the upper yoke of the cores.

Single phase, Shell Type core loop