



Howard amorphous core transformers

The Amorphous Advantage

More than ever, electric utilities and other users of distribution transformers are emphasizing sustainability and looking for technologies that can lower operating costs, improve energy savings, and reduce environmental impact. Howard's amorphous metal distribution transformer (AMDT) is the product of choice to help achieve these important objectives.

Efficient and environmentally friendly

The ultra-low core (no-load) loss of an amorphous core transformer yields substantial energy and cost savings for its owner. In fact, amorphous core transformers can lower core loss by 60-70 percent compared to transformers made with conventional cold-rolled grain-oriented (CRGO) cores, resulting in cost avoidance from reduced generation and deferral of generation and transmission capacity expansions.

The reduced core loss of an AMDT lessens impact on the environment by reducing carbon emissions over the transformer's entire operating life. Also, the amorphous metal core manufacturing process is more efficient, using less energy than required to manufacture CRGO cores. And, amorphous metal cores, along with the copper, aluminum, and oil components of an AMDT, can be recycled, promoting conservation of these valuable resources.

Quality and dependability

The Howard quality process assures that its AMDT's will provide exceptional reliability and long service life. Higher quality means fewer problems, and that translates into lower maintenance costs and greater profits for transformer users. Howard's advanced design, manufacturing, and testing systems produce consistent quality. Our ISO-9001:2008 registered quality management system links all aspects of the company's operations, including marketing, engineering, manufacturing, and shipping functions to make sure that not only our products, but everything we do for customers is of the highest quality.

Howard amorphous core distribution transformers are available in a wide range of single-phase and three-phase types, including overhead, padmounted, subsurface, secondary network, and small power designs. And Howard's flexible design process can readily accommodate many unique requirements to satisfy special customer needs. Howard AMDTs are guaranteed to meet or exceed all applicable industry standards, including the U.S. Department of Energy minimum efficiency standards as applicable.

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The AMDT story

Amorphous metal is a unique alloy that exhibits a molecular arrangement that is random in structure, rather than the organized crystalline structure of CRGO core steel. Due to its unique molecular structure, amorphous metal cores are more readily magnetized and demagnetized when energized, resulting in significantly lower energy loss compared to CRGO steel.

AMDT technology is considered mature and has been proven to be reliable. Distribution transformers containing amorphous metal cores were first made commercially available in the late 1980's. Since then over 1.3 million AMDT's have been installed worldwide (including approximately 500,000 in the U.S.), with exceptionally good field experience. Howard Industries was one of the early commercial adopters of amorphous core technology and beginning in 1990 has manufactured nearly 100,000 AMDT's.

AMDTs and total owning cost

Most transformer users appreciate the need to base purchasing decisions on a transformer's total owning cost (TOC), rather than on initial price alone. Using TOC methodology, both core loss and winding losses are evaluated by assigning them economic values in equivalent first cost (or "present worth").

A basic TOC evaluation formula is shown below, where "A" is the discounted present value of core loss in dollars per Watt, and "B" is the discounted present value of winding loss in dollars per Watt. Core loss is incurred continuously as long as the transformer is energized. Winding loss is incurred only when supplying load and is a function of load current.

$$\text{TOC} = (\text{Purchase Price}) + (A \times \text{Core Loss}) + (B \times \text{Winding Loss})$$

The core loss factor (A) and the winding loss factor (B) are calculated by considering the user's annual levelized costs for capital, energy, and other factors, along with load factor, expected rate of return, and anticipated transformer life.

Amorphous metal cores are particularly valuable for transformer users with relatively high "A" factors, because the lower core loss of AMDTs results in substantially reduced cost of ownership, with only a moderate increase in purchase price. For users wanting to go beyond DOE's minimum efficiency requirements, Howard's AMDT's are the logical choice.

Note:

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The AMDT advantage for wind farms

Many wind farm owners are taking advantage of AMDTs to increase plant output and profitability, while reducing environmental impact. The substantially lower no-load loss of Howard's amorphous wind turbine step-up transformers is important to wind farm owners, particularly at times when power is not being generated. The typically higher A/B ratio of wind farm transformer applications strongly favors AMDT's.

Take advantage of Howard's amorphous core distribution transformer technology. For more information please contact:

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