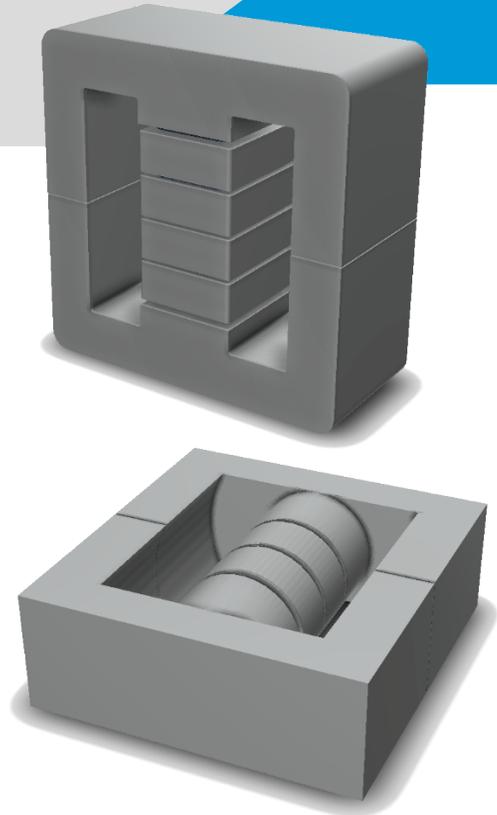


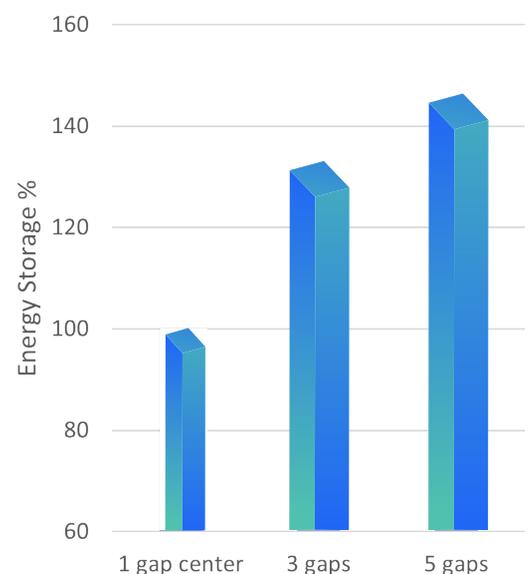
## MULTIGAP FERRITES FOR HIGH CURRENT APPLICATIONS

Ferroxcube's new range of MultiGap cores is ready to be launched in the most demanding high-power conversion units. With the advent of new applications operating under large current and frequency, such as electric vehicle fast DC chargers and photovoltaic inverters, the requirements for high-efficiency inductors have become more and more demanding: powder cores suffer high core losses at relatively high frequency, while standard gapped ferrites generate high winding losses due to the fringing flux around the large air gaps. MultiGap ferrite cores have become the preferred solution.



The MultiGap concept is simple: instead of having one single large air gap in the center leg, the gap is distributed along the center leg by means of spacers along the leg length. Depending on the core and gap size, it is possible to split a single gap into up to seven smaller gaps. These much shorter gaps reduce significantly the fringing flux around them, allowing the coil to be much closer to the center leg and keeping the eddy current losses in the winding very low.

At the same time, MultiGap produces a very low effective permeability ( $\mu_e$ ), not possible with a single gap because the fringing flux prevents it. Thanks to this lower  $\mu_e$ , it is possible to store more energy in the same core size. The chart shows the energy storage capacity of the same core with the same gap length and winding under 3 gap configurations:



Ferroxcube has launched a range of MultiGap shapes and sizes customizable in a number of gaps and lengths. They are available in the same materials as standard gapped cores mainly:

- 3C92: optimum Bsat material for operation between 80 to 120°C
- 3C95: low loss and high Bsat for 40 to 100°C
- 3C97: low loss and high Bsat for 80 to 140°C

Spacers are available in 2 different materials:

- Glass reinforced epoxy laminate (FR-4) for cost effective designs for operation below 150°C. Thermal conductivity is 0.25 W x m-1 x K-1.
- Ceramic for superior performance thanks to its high thermal conductivity (12 W x m-1 x K-1) that allows better heat dissipation in the center leg. The thermal expansion coefficient is negligible and the maximum operating temperature is limited only by the adhesive.

It is possible to build MultiGap cores in almost every shape, but in some cases, new tooling will be needed. Some examples are:

Shape	Size	Material
E	E55/28/25	3C92/3C95/3C97
	E65/32/27	
	E71/33/32	
	E80/38/20	
ETD	ETD54/28/19	3C92/3C95/3C97
	ETD59/25/22	
PQ	PQ35/35	3C92/3C95/3C97
	PQ40/40	
	PQ50/50	

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