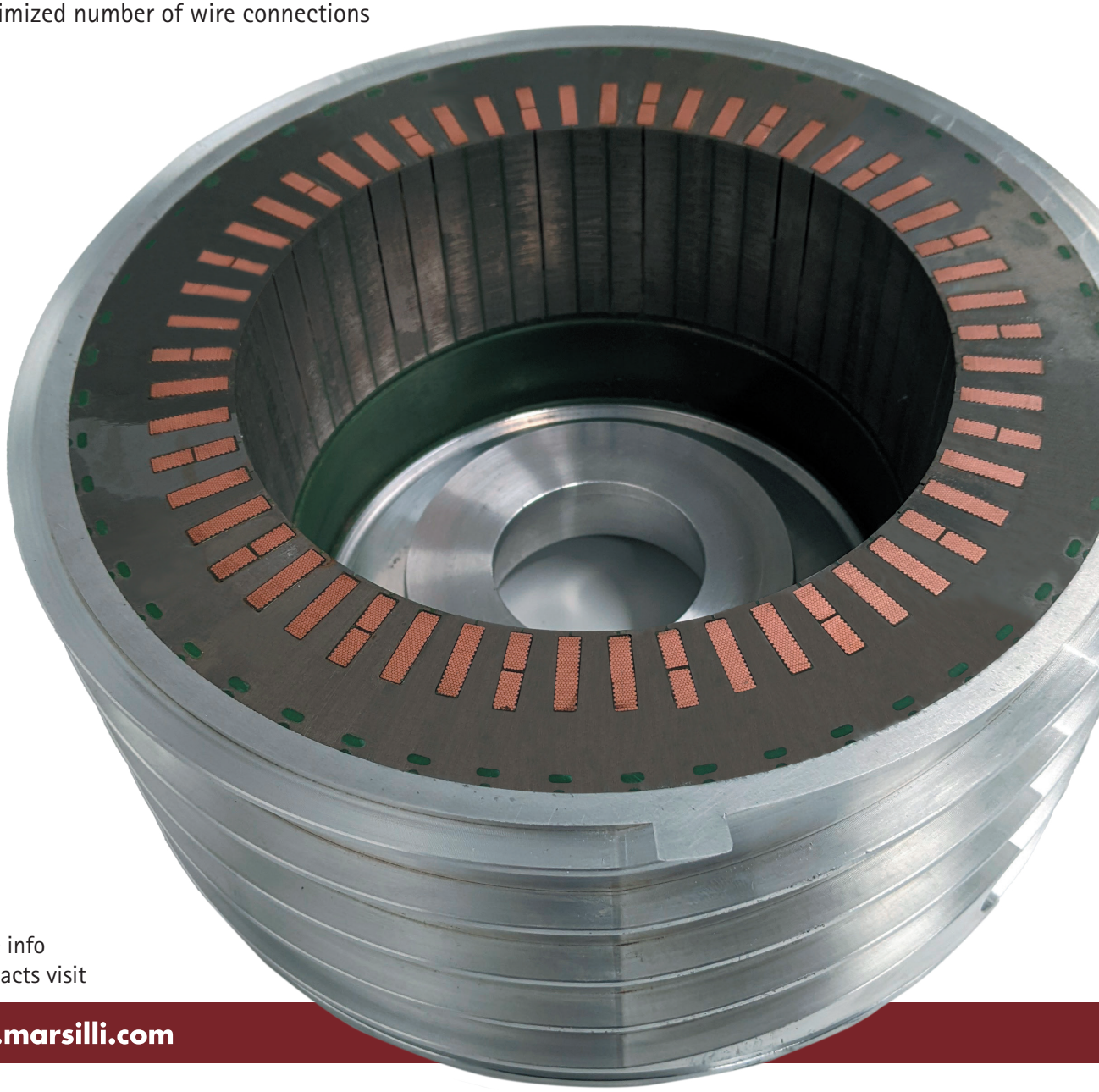
MARSILLI

Distributed High Density Winding Technology

DHD technology is a brand new patented distributed winding solution for electric machines, designed to overpass the limits of the insertion and the hairpin technologies, but keeping their best characteristics.
DHD reaches an encompassing level of power density and the highest efficiency possible.

- Unsurpassed filling factor (from 65 up to 71%)
- Thin and round enamelled copper wire that minimizes the skin effect and saves costs
- Smallest air gap on the pole shoes
- Wire transposing scheme
- Minimized number of wire connections



For more info
and contacts visit

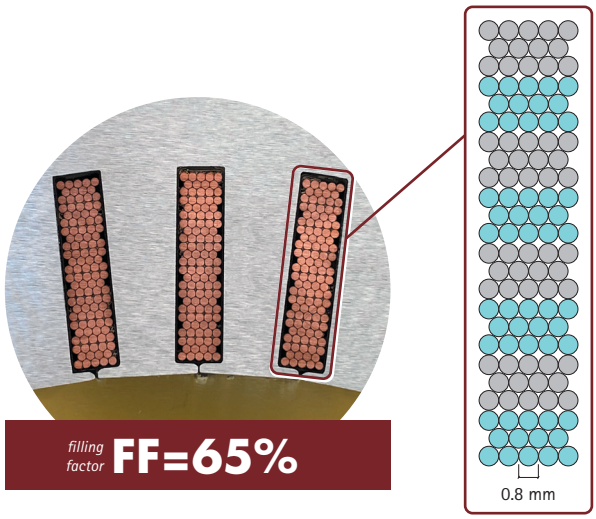
www.marsilli.com

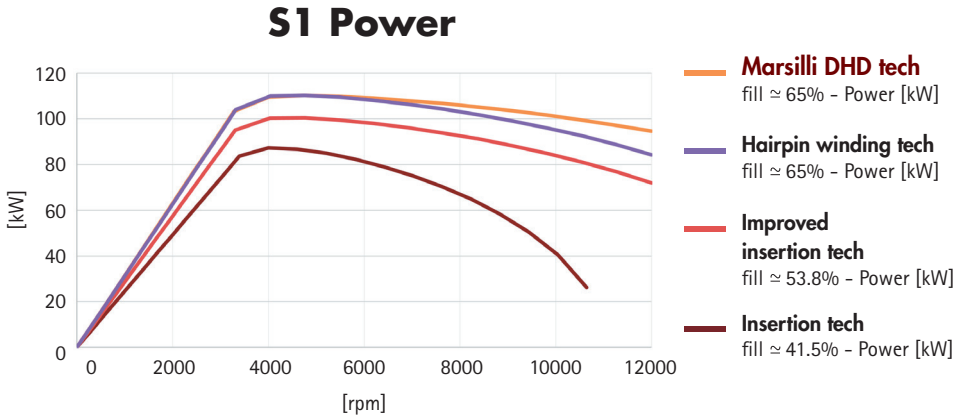
2020

E|DPC

December

After almost two years of development, Marsilli presented, for the first time to the world, the DHD as a pilot project during the Electric Drives Production Conference (E|DPC).

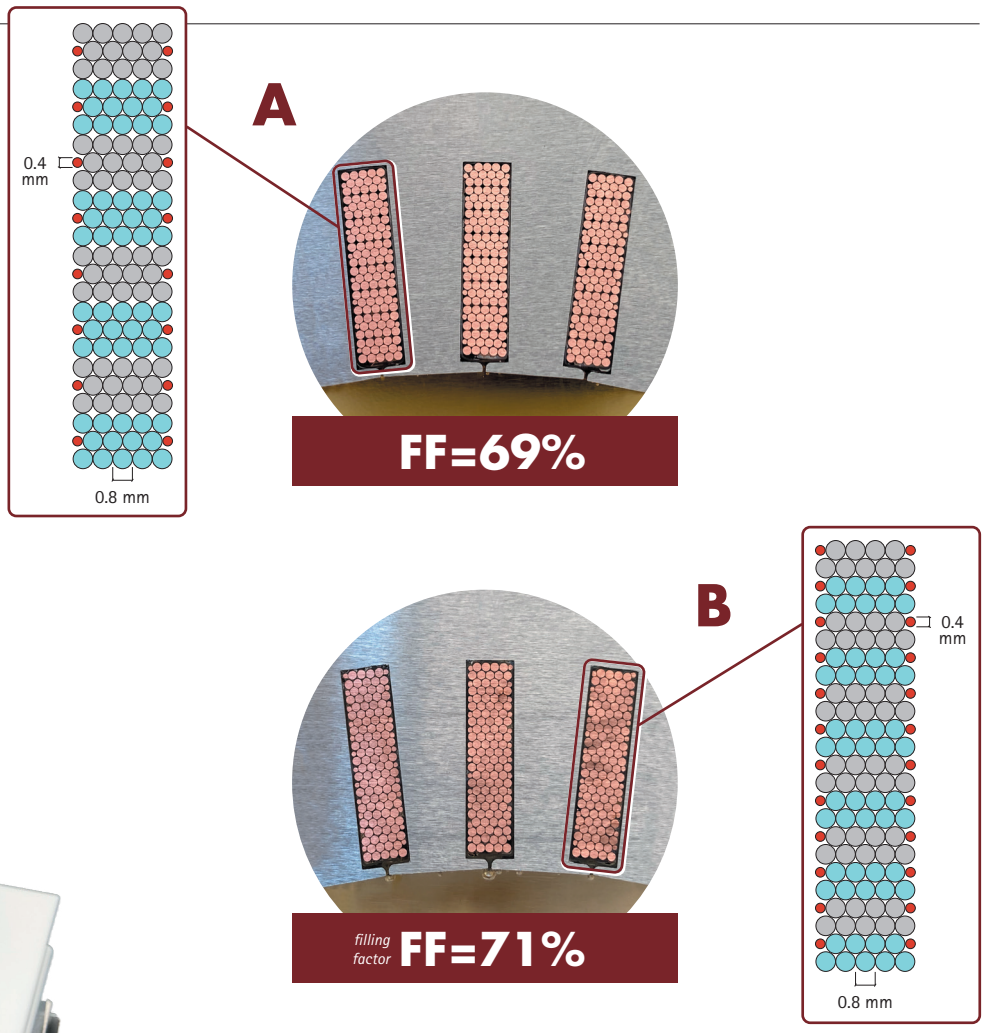




2021

April

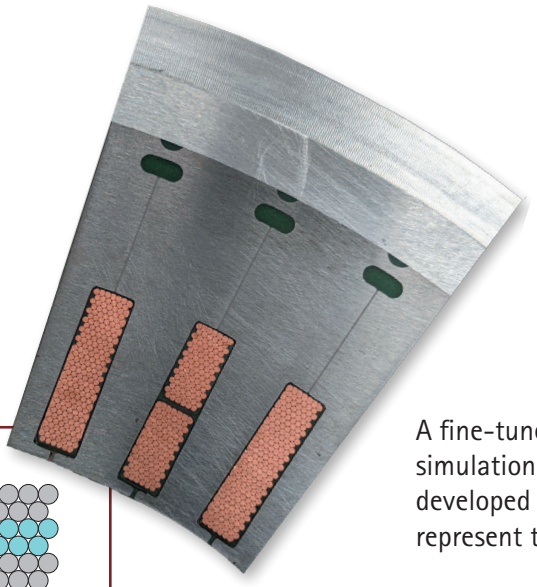
Marsilli R&D Department presented the new achievements.



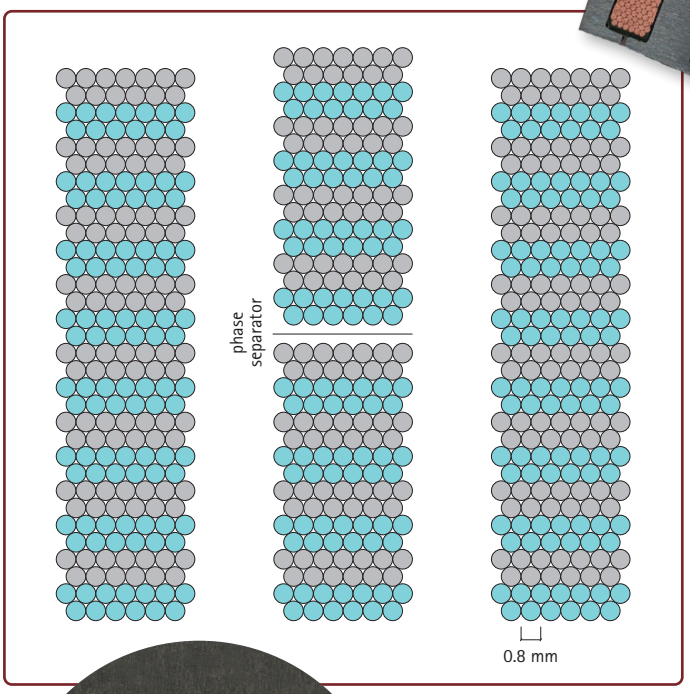
2022

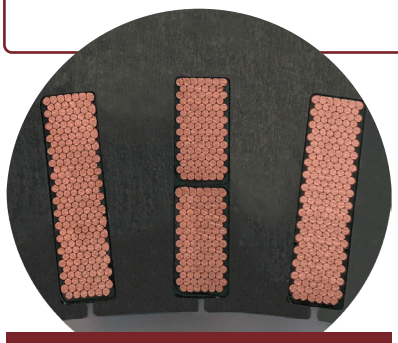
New prototype

Peak power: 130 kW
Max speed: 18.000 RPM
DC-bus voltage: 800V DC
Double layer



A fine-tuned EMAG simulation model has been developed to accurately represent the segmentation.



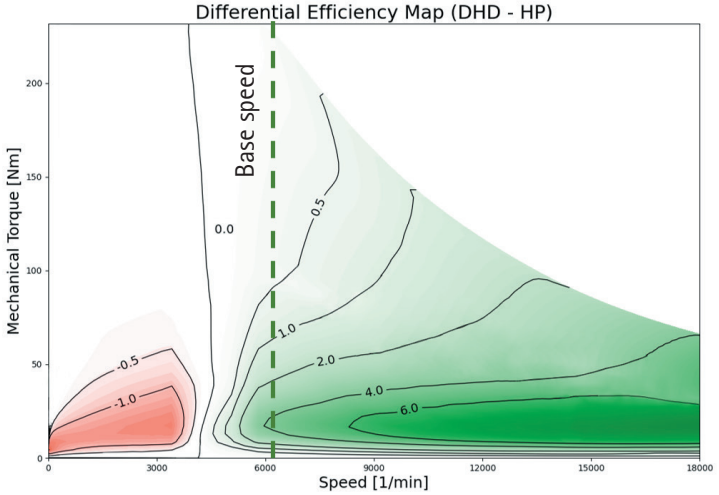


filling factor **FF=67,5%**

Prototype 2022 Characteristics

- Robust and repeatable position of the wires in both integer and shared slots
- Double layer configuration with:
  - Winding with 13 strands in hand layered as 7-6
  - 16 turns for integer slots
  - 8+8 turns for shared slots with phase separator
- Pole shoes with a narrow slot opening
- Turns (layers) transposing

Theoretical differential efficiency map - 8 layers hairpin



The advantages of DHD technology have been measured on several prototypes that reflect the motor design presented here.

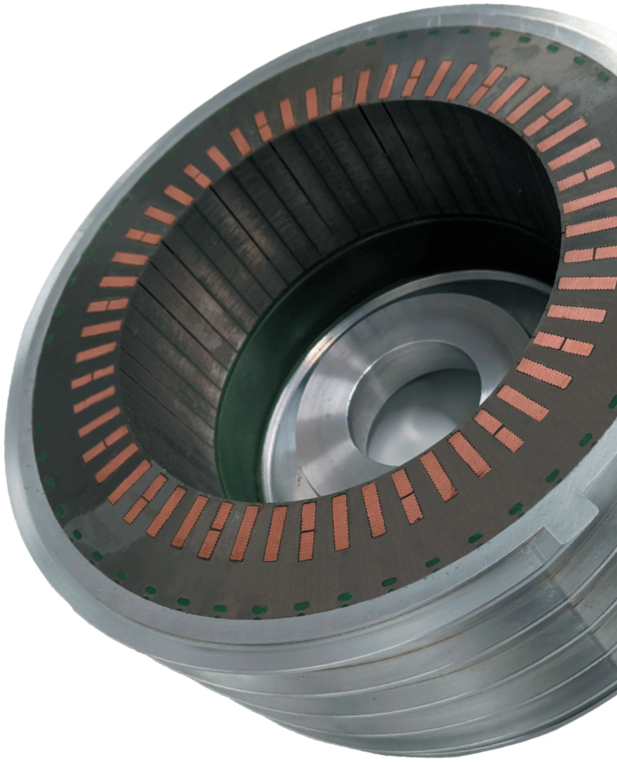
Test performed on benches by:

GETEC Getriebe Technik GmbH | enedym

Marsilli DHD technology

Slot fill factor: **65% -71%**

- No limit on wires per slot
- No limit on wiring schemes
- Very low AC losses
- Wire transposing
- Based on round wire
- Highest slot fill factor
- Designed for high speed motors



A fully equipped Lab at your service

DHD with all its features and advantages is available in our Lab in the Headquarters with a specific set of semi-automatic lab cells for co-design and prototyping:

- Winding
- Coil insulation
- Coil insertion
- Segment closing
- Layer transposing
- Stator assembling
- Housing

Moreover, together with your motor expertise, you can count on our Co-Design team for pilot project development and optimization.