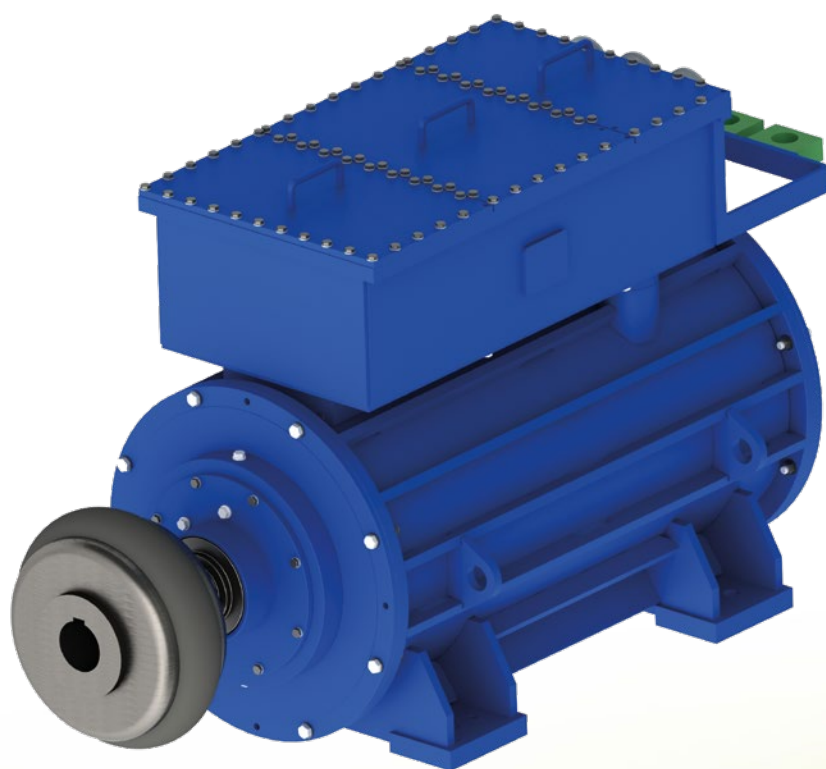


Marotechniek Submersible Permanent Magnet motors

The demand for energy efficient motors is increasing. This is caused by changing standards from the governments and because more users realize that major energy savings can be achieved by using energy efficient motors.



Made in Holland

- Less Energy, more power
- Magnetic Green Drives
- Magnetic Green Power



During the live time of a standard squirrel cage AC electric motor, more than 90% of all costs are energy costs.

With a Permanent magnet motor you can save around 3 to 6% of energy costs. Each hour- day- and year!

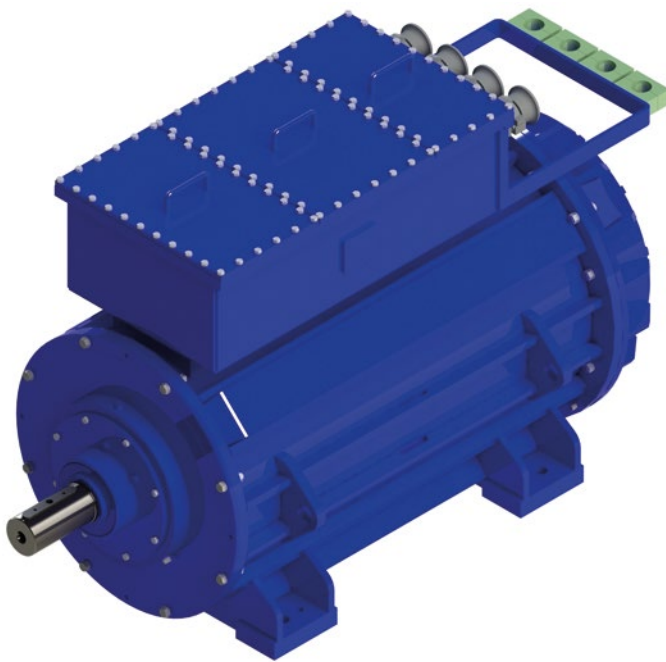
ENERGY EFFICIENT MOTORS

Marotechniek

Innovative Maritime Solutions

Efficiency level IE4

Permanent magnet motor developments made it possible to reach efficiency level IE4 (Super Premium Efficiency). With standard squirrel cage AC motors it is almost impossible to achieve this performance class and therefore permanent magnet motors have been investigated. Permanent magnet motors are known in other markets, except the dredging market. Marotechniek is the first manufacturer in the Dredging market who delivers submersible permanent magnet motors. We have an extended experience in developing and testing these motors, which run successfully on several dredge pumps.



The range consists out of frame sizes 355- 400- 450- 500- and 630 with torques up to 50.000Nm and a power range up to 1600kW. The motors are optimized for the direct drive of machines, thus eliminating a costly and maintenance sensitive gearbox, commonly known as "Direct-Drive". The advantages are:

- **Less space needed in length and diameter.**
- **Low moment of inertia.**
- **Less mechanical components, higher reliability.**
- **Mechanical robustness.**
- **Less weight of the complete drive system.**
- **Easier to install.**
- **Higher efficiency of the system.**
- **Constant high efficiency by partial load.**

Development & testing

During development of our PM-range motors they were subject to extended in- house testing in combination with our Emotron PM- converters.



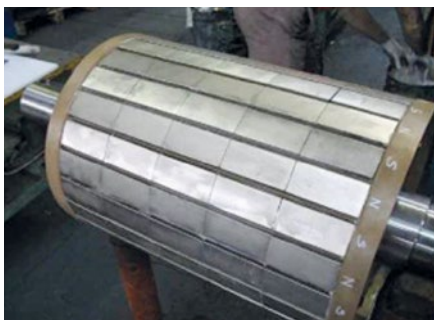
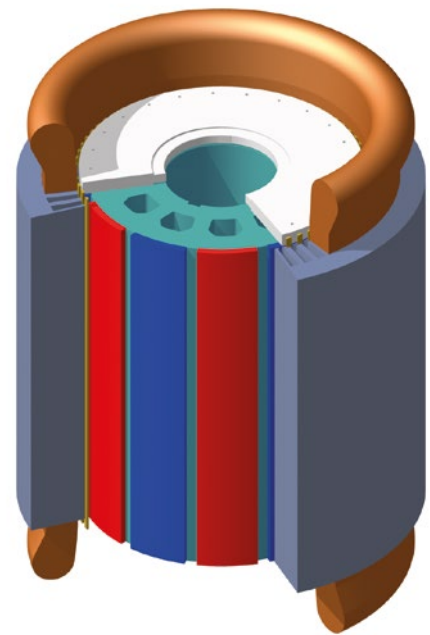
Before market release we tested over 2550 hours with our 500kW test motor on a customers provided suction dredger.



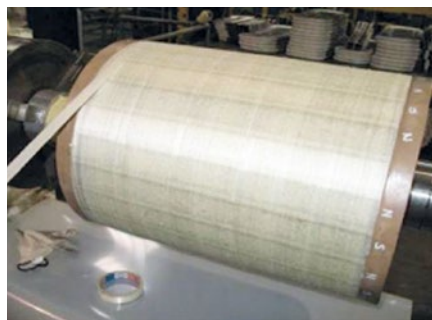
The big difference

The difference between a standard squirrel cage AC motor and a PM- motor, is that the permanent magnets are built into the rotor. Therefore it is not necessary to put extra current into the motor to magnetize the rotor.

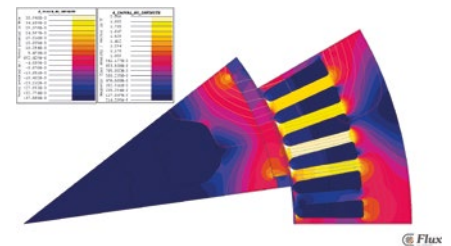
Marotechniek PM- motors are built-up with the highest quality of magnets (Nd-Fe-B High performance UH Magnets). These magnets are fixed to the rotor with special glue, resistant to extreme high temperatures. Furthermore the magnets are packed with glass fiber bandage which increases the centrifugal forces. This way the magnets are protected from incidental blows and vibrations during operation.



Surface mounted permanent magnets (SMPM)



Glass fiber bandage



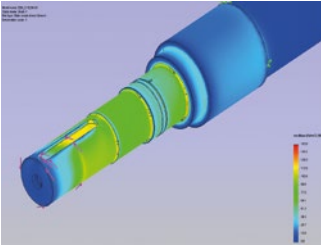
FEM Flux simulation

Standard range PM- motors 400/690V. (Different power and/ or Rpm on request)

Type	Power kW S1	IEC-size	Speed rpm	Efficiency
MTOWM-355-12-250-PM	250	355	630	~ 97%
MTOWM-355-12-315-PM	315	355	630	~ 97%
MTOWM-355-12-355-PM	355	355	630	~ 97%
MTOWM-355-12-400-PM	400	355	630	~ 97%
MTOWM-355-12-450-PM	450	355	630	~ 97%
MTOWM-355-12-500-PM	500	355	630	~ 97%
MTOWM-400-12-600-PM	600	400	630	~ 97%
MTOWM-400-12-800-PM	800	400	550	~ 97%
MTOWM-450-12-1000-PM	1000	450	500	~ 97.5%
MTOWM-450-12-1250-PM	1250	450	450	~ 97.5%
MTOWM-630-12-1400-PM	1400	630	400	~ 98%
MTOWM-710-16-1600-PM	1600	710	350	~ 98%

Marotechniek develops-
manufactures- assembles-
and tests- PM Submersible
motors in-house

Marotechniek Submersible PM motors for:



Engineering



Manufacturing



Load test



Assembling



- Trailing Suction Hopper Dredgers
- Submersible Dredge Pumps
- Cutter Suction Dredgers
- Suction Dredgers
- Bucket wheel Dredgers



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◀ Production location