



**MAGNEQUENCH**

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Preferred partner for  
the bonded neo industry

Magnequench is part of Neo Performance Materials, an industry leader with over 35 years of experience in development, processing, and manufacturing of rare earth and rare metal based functional materials.

Magnequench is a global business with offices located within close proximity to our customer base and with a low cost manufacturing footprint, strategically located near key raw materials.



**PRODUCTION LOCATIONS**

- CHINA
- THAILAND



**TECHNOLOGY CENTER**

- SINGAPORE



**MAGNETIC SOLUTIONS**

- CHINA



**GLOBAL ENGINEERING GROUP**

- CHINA
- THAILAND
- USA



**SALES & MARKETING**

- CHINA
- GERMANY
- JAPAN
- KOREA
- SINGAPORE
- TAIWAN
- USA

Magnequench can better serve the customers through;

- **Broad and Diverse Technical Team**, experts at each stage throughout the development process
- **Professional Philosophy & Culture**, industry leading quality, customer service, and safety practices along with strict adherence to our customers' highest standards
- **Low Cost Focus**, technical and commercial experts driven to identify lowest cost solutions, and production facilities in China and Thailand close to raw material supply



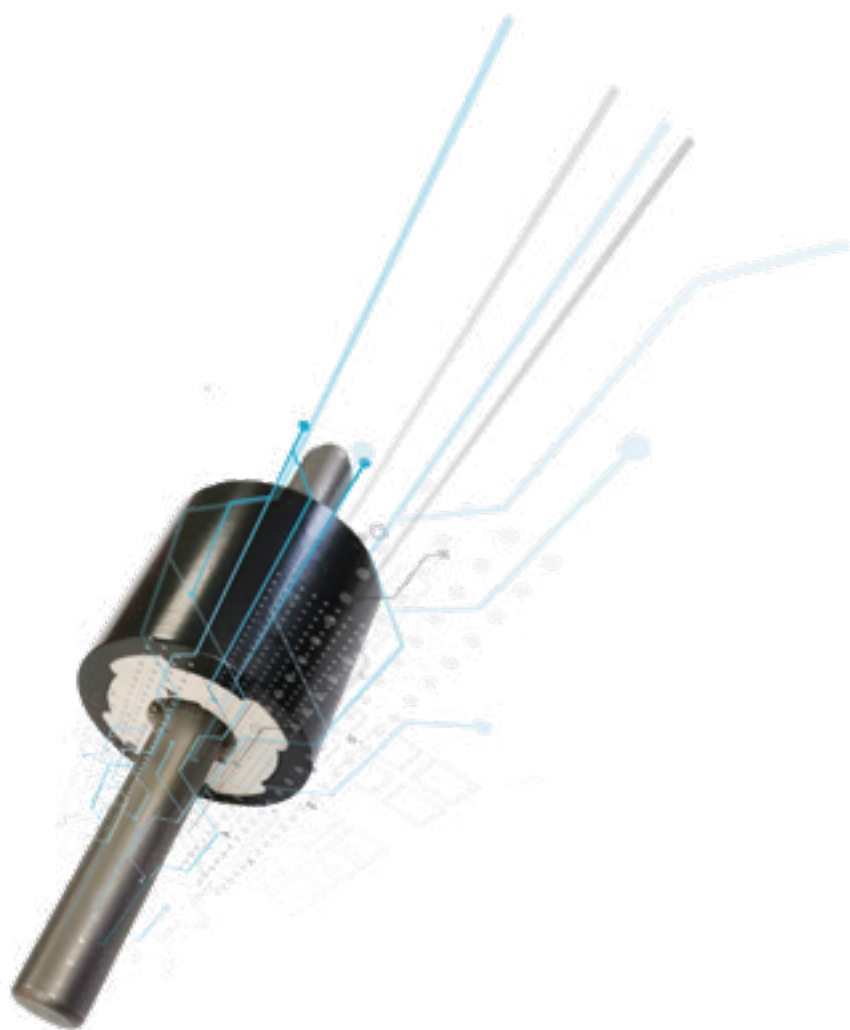
**MAGNETIC PROPERTIES**

| Magnet Grade | Density (g/cm <sup>3</sup> ) | Residual Induction, Br | Coercive force, Hcb | Intrinsic Coercivity, Hci | Energy Product, BHmax    | Temperature Coefficient of Br |
|--------------|------------------------------|------------------------|---------------------|---------------------------|--------------------------|-------------------------------|
|              |                              | mT (kGs)               | kA/m (kOe)          | kA/m (kOe)                | kJ/m <sup>3</sup> (MGOe) | %/°C                          |
| MQ1-12       | 6.2-6.4                      | 740-800 (7.4-8.0)      | 470-530 (5.9-6.7)   | 675-800 (8.5-10)          | 92-99 (11.5-12.5)        | -0.10                         |
| MQ1-11L      | 6.1-6.3                      | 740-800 (7.4-8.0)      | 390-454 (4.9-5.7)   | 520-640 (6.5-8.0)         | 84-92 (10.5-11.5)        | -0.09                         |
| MQ1-11       | 6.1-6.3                      | 720-780 (7.2-7.8)      | 445-510 (5.6-6.4)   | 675-800 (8.5-10)          | 84-92 (10.5-11.5)        | -0.09                         |
| MQ1-10H      | 5.9-6.1                      | 640-700 (6.4-7.0)      | 420-485 (5.3-6.4)   | 875-995 (11-12.5)         | 72-80 (9.0-10.0)         | -0.12                         |
| MQ1-10L      | 5.9-6.1                      | 730-790 (7.3-7.9)      | 375-440 (4.7-5.5)   | 520-640 (6.5-8.0)         | 80-88 (10.0-11.0)        | -0.11                         |
| MQ1-10       | 5.9-6.1                      | 670-730 (6.7-7.3)      | 420-485 (5.3-6.1)   | 675-800 (8.5-10)          | 76-84 (9.5-10.5)         | -0.13                         |
| MQ1-9H       | 5.8-6.0                      | 620-680 (6.2-6.8)      | 414-477 (5.2-6.0)   | 875-995 (11.0-12.5)       | 68-76 (8.5-9.5)          | -0.12                         |
| MQ1-9        | 5.8-6.0                      | 630-690 (6.3-6.9)      | 400-460 (5.0-5.8)   | 675-800 (8.5-10.0)        | 68-76 (8.5-9.5)          | -0.11                         |
| MQ1-8        | 5.9-6.1                      | 610-670 (6.1-6.7)      | 365-430 (4.6-5.4)   | 600-715 (7.5-9.0)         | 60-68 (7.5-8.5)          | -0.13                         |
| MQ1-8H       | 5.8-6.0                      | 620-680 (6.2-6.8)      | 400-454 (5.0-5.7)   | 756-875 (9.5-11.0)        | 68-76 (8.5-9.5)          | -0.14                         |
| MQ1-7        | 5.9-6.1                      | 560-620 (5.6-6.2)      | 335-400 (4.2-5.0)   | 600-715 (7.5-9.0)         | 52-60 (6.5-7.5)          | -0.17                         |
| MQ1-6        | 5.9-6.1                      | 540-600 (5.4-6.2)      | 335-400 (4.2-5.0)   | 480-600 (6.0-7.5)         | 44-56 (5.5-7.0)          | -0.17                         |
| MQ1-5        | 5.9-6.1                      | 510-570 (5.1-5.7)      | 270-335 (3.4-4.2)   | 560-675 (7.0-8.5)         | 40-48 (4.5-6.0)          | -0.14                         |
| MQ1-4        | 5.9-6.2                      | 420-500 (4.2-5.0)      | 263-318 (3.3-4.0)   | 560-675 (7.0-8.5)         | 28-40 (3.5-5.0)          | -0.13                         |
| MQ1-3        | 5.9-6.1                      | 310-470 (3.1-4.7)      | 263-318 (3.3-4.0)   | 560-675 (7.0-8.5)         | 20-32 (2.5-4.0)          | -0.16                         |

| Temperature<br>Coefficient of H <sub>ci</sub> | Curie<br>Temperature | Max.Operating<br>Temperature | Magnetizing<br>Field to ≥ 95%<br>Saturation | Recoil<br>Permeability |
|-----------------------------------------------|----------------------|------------------------------|---------------------------------------------|------------------------|
| %/°C                                          | °C                   | °C                           | kA/m<br>(kOe)                               | μH/M                   |
| -0.34                                         | 370                  | 120-130                      | 1600<br>(20)                                | 1.2                    |
| -0.36                                         | 309                  | 80-120                       | 1600<br>(20)                                | 1.2                    |
| -0.33                                         | 289                  | 130-140                      | 1600<br>(20)                                | 1.2                    |
| -0.34                                         | 306                  | 140-180                      | 1600<br>(20)                                | 1.2                    |
| -0.52                                         | 345                  | 80-120                       | 1600<br>(20)                                | 1.2                    |
| -0.38                                         | 289                  | 130-140                      | 1600<br>(20)                                | 1.2                    |
| -0.31                                         | 306                  | 140-180                      | 1600<br>(20)                                | 1.2                    |
| -0.36                                         | 273                  | 130-140                      | 1600<br>(20)                                | 1.2                    |
| -0.29                                         | 246                  | 130-140                      | 1350<br>(17)                                | 1.2                    |
| -0.34                                         | 260                  | 150-160                      | 1600<br>(20)                                | 1.2                    |
| -0.29                                         | 219                  | 140-150                      | 1270<br>(16)                                | 1.2                    |
| -0.28                                         | 225                  | 100-120                      | 1200<br>(15)                                | 1.2                    |
| -0.34                                         | 246                  | 130-140                      | 1350<br>(17)                                | 1.2                    |
| -0.32                                         | 184                  | 130-140                      | 1270<br>(16)                                | 1.2                    |
| -0.33                                         | 184                  | 120-140                      | 1270<br>(16)                                | 1.2                    |

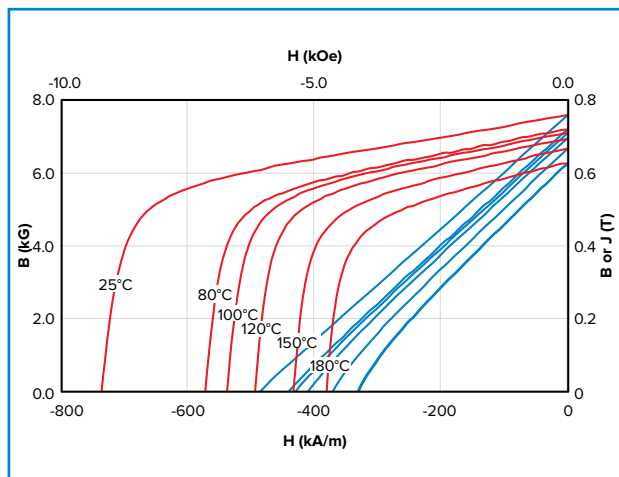
**MECHANICAL PROPERTIES**

| ITEMS                                                   | CONDITIONS | VALUE | STANDARD        | SAMPLE SIZE (MM)    |
|---------------------------------------------------------|------------|-------|-----------------|---------------------|
| Coefficient of linear expansion (*10 <sup>-6</sup> /°C) | 20~100°C   | 10    | GB/T 4339-2008  | Φ6.0*20             |
|                                                         | 20~200°C   | 13    |                 |                     |
| Electrical Resistivity (μΩ*m)                           | /          | 45    | GB/T 351-1995   | 134*29*2<br>59*14*2 |
| Bending Strength (MPa)                                  | 23°C       | 59    | GB/T-228.1-2010 | 30*6.4*5            |
| Modulus (GPa)                                           | 23°C       | 17    | GB/T-22315-2008 |                     |

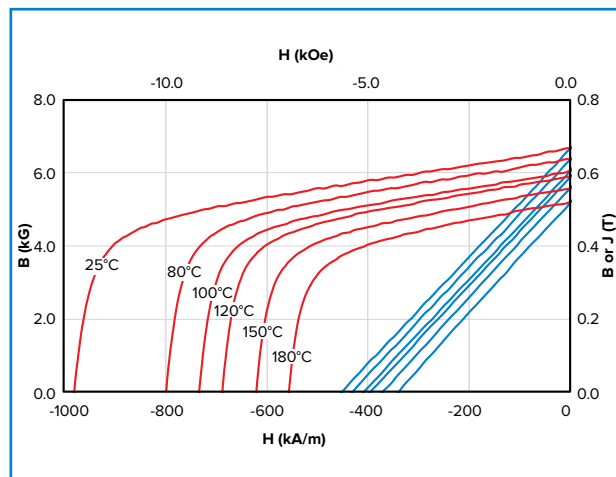


**MAGNETIC PROPERTIES**

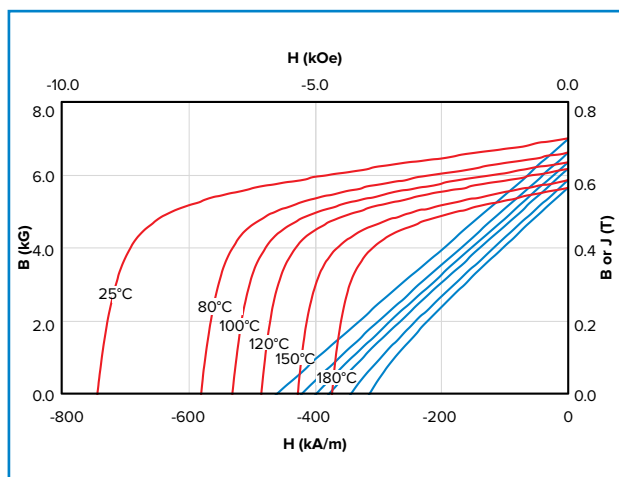
**MQ1-12**



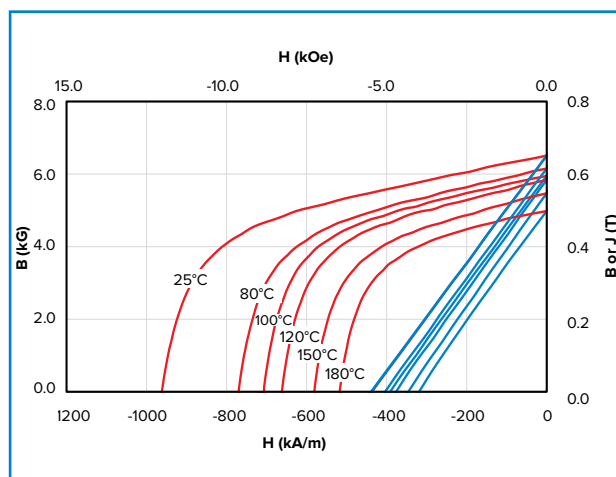
**MQ1-10H**



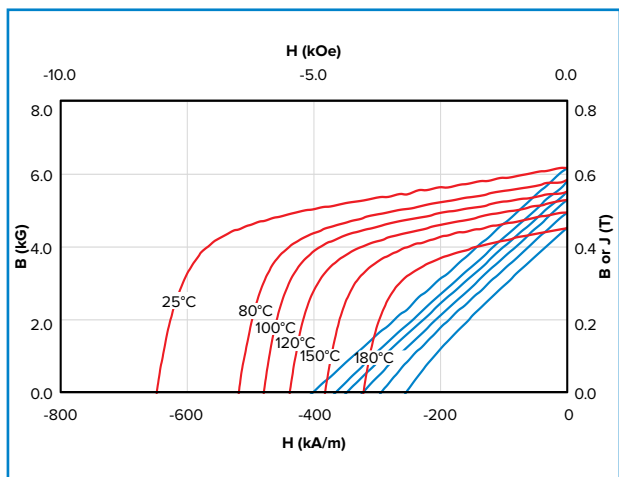
**MQ1-10**



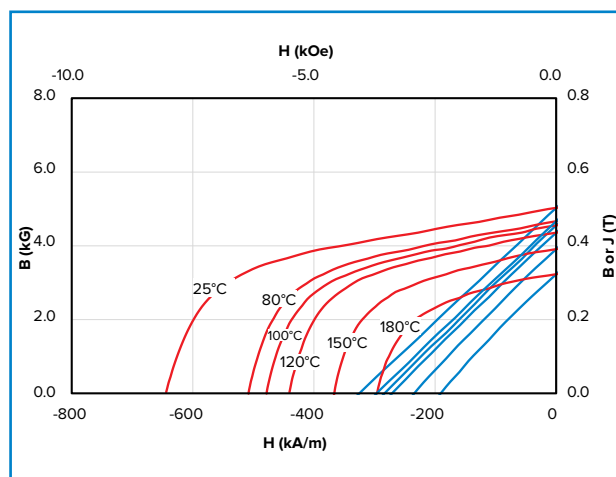
**MQ1-9H**



**MQ1-8**



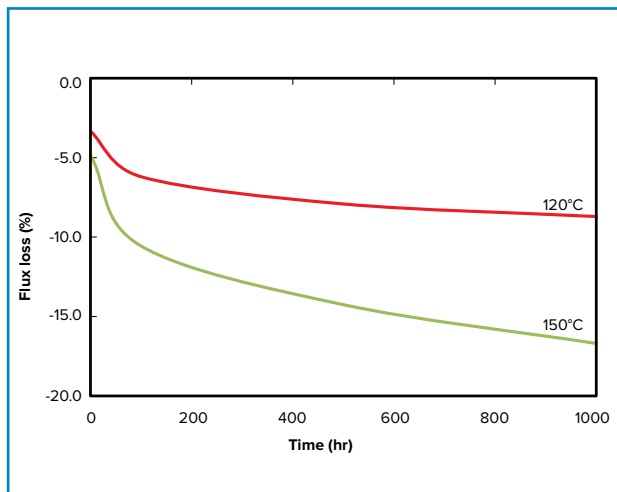
**MQ1-5**



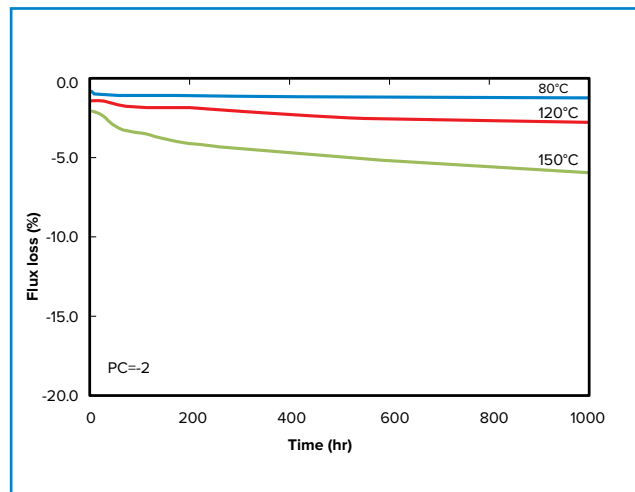
Please visit [www.magnequench.com](http://www.magnequench.com) for more information on other magnet grades.

**TOTAL FLUX LOSS**

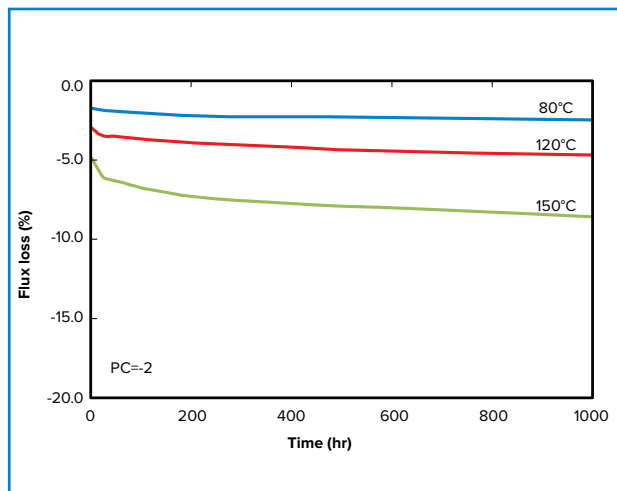
**MQ1-12**



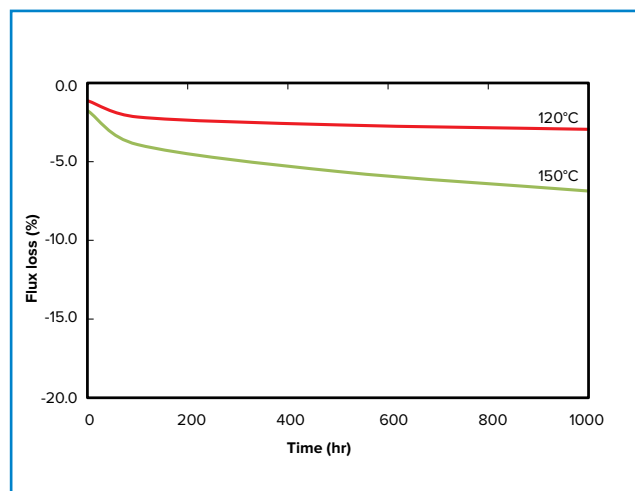
**MQ1-10H**



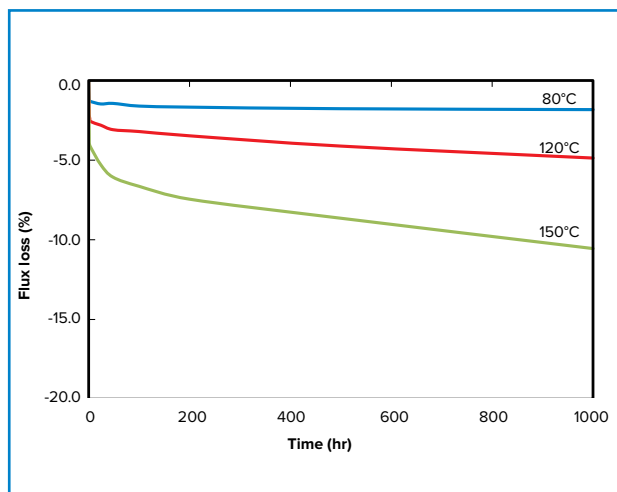
**MQ1-10**



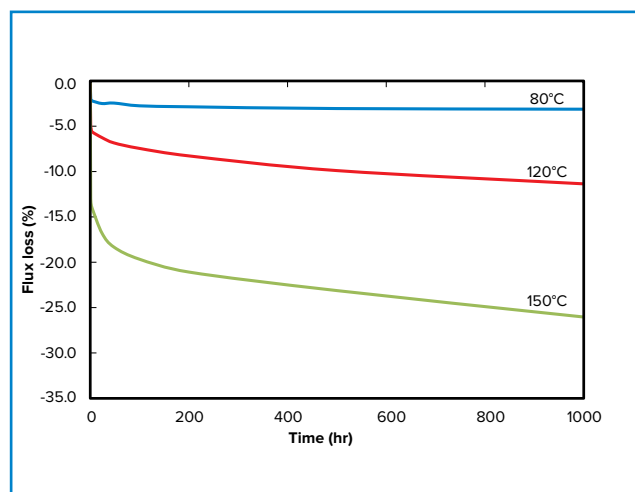
**MQ1-9H**



**MQ1-8**



**MQ1-5**



## TYPE OF ASSEMBLIES

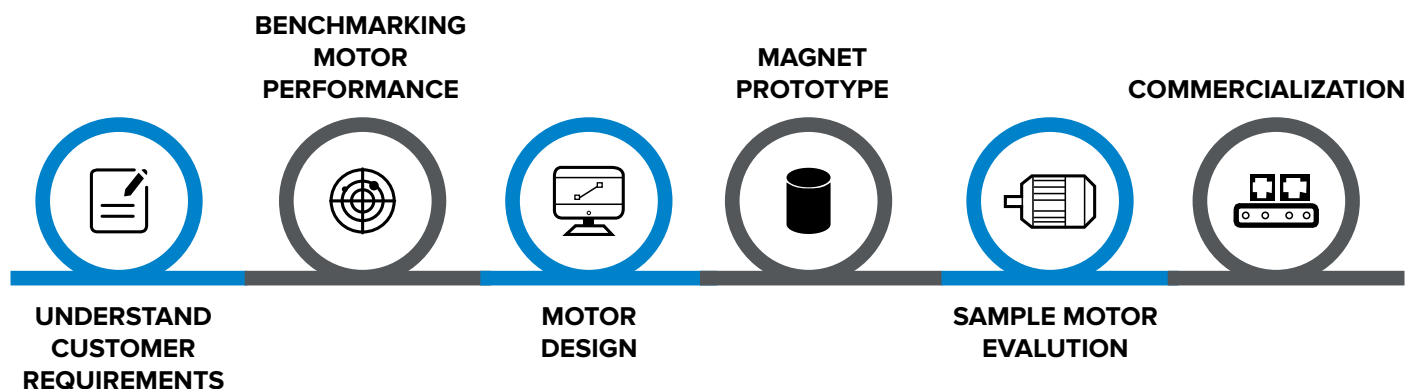
Magnequench specialized in the development and supplies of compression molded magnet assemblies to provide operational efficiencies by eliminating process steps for our customers. This helps to reduce cost and time to market.

Magnequench's customer-specific magnet systems help to improve motor performance due to tighter MQ1™ magnet and their assemblies' tolerance.

| Type          | Sub-assembly Part                          |                                                                                       |
|---------------|--------------------------------------------|---------------------------------------------------------------------------------------|
| Press fitting | Pole housing                               |    |
| Glue assembly | Pole housing                               |   |
|               | Iron core/shaft, steel ring                |  |
| Over-molding  | Compression molding with plastic           |  |
|               | Compression molding with shaft and plastic |   |

Magnequench powders MQP™ and magnets MQ1™ are used to provide high performance magnetics for automotive, consumer electronics, appliances and various other industries.

The Magnequench application team works with our customers to optimize their magnet design and provide a cost optimized MQ1™ magnet.

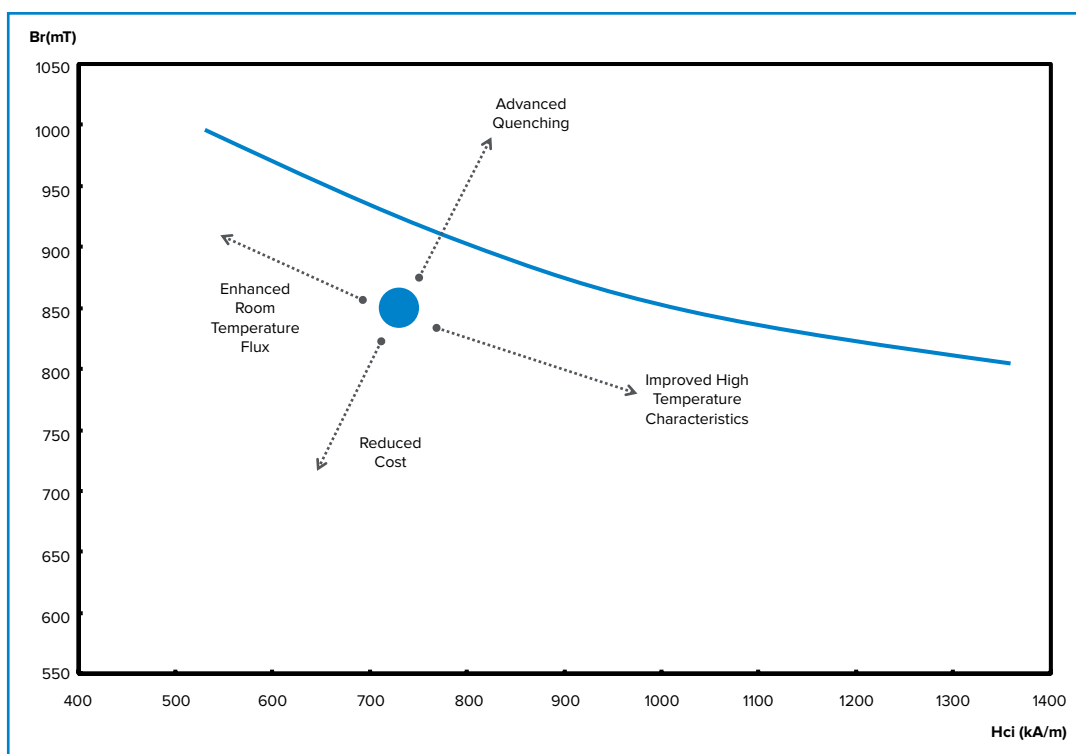


## TAILORED MAGNETIC PROPERTIES

Magnequench scientist can create tailored magnetic materials MQP™ and compounds MQEP™

- Highest magnetic property MQP™ powders in the bonded neo industry using Advanced Quenching “AQ” technology
- Tailored MQEP™ compounds with highest mechanical strength at elevated temperatures

## MAGNEQUENCH IS CONTINUOUSLY DEVELOPING OUR TECHNOLOGIES TO ACHIEVE MAXIMUM MAGNETIC AND COST PERFORMANCE OF OUR PRODUCTS



## MOTOR PERFORMANCE EVALUATION

Magnequench technology center is fully equipped to evaluate motor performance

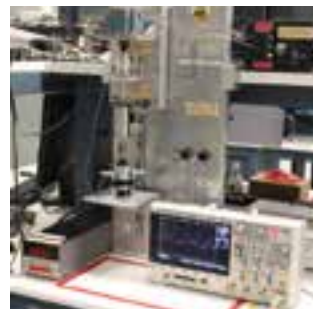
**LOAD CHARACTERISTICS**



**BACK EMF**



**COGGING TORQUE**



## MAGNETIZERS

Multiple magnetizers are available with a peak magnetization energy of 11.3kJ.



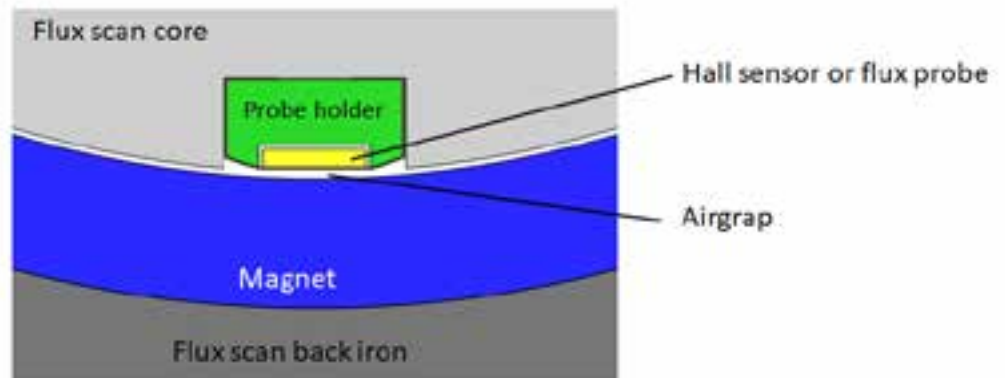
## MAGNETIZATION OF MQ1™

Motor and magnet design engineers use industry standard FEA and motor design software to help customers to achieve optimal magnetization profile of MQ1™ magnets and reduce the time required to develop an application.

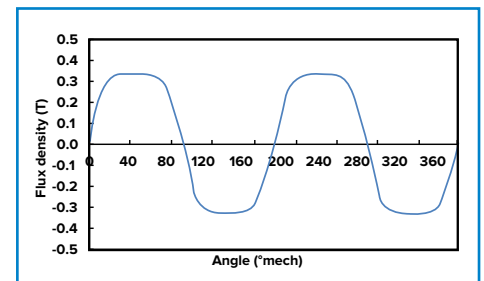
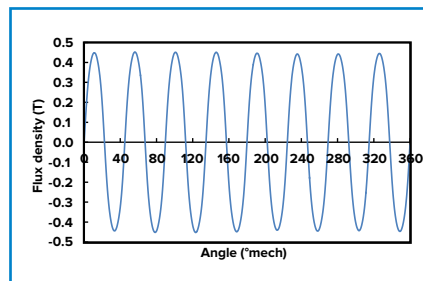
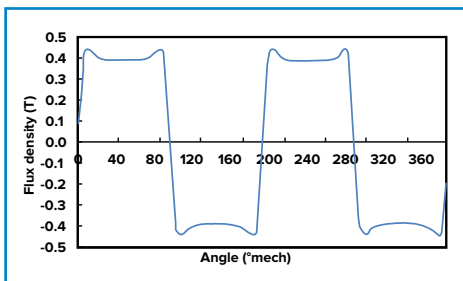


## CLOSED CIRCUIT FLUX

Closed circuit flux scan emulates the situation that is similar to the motor.



## MAGNETIZATION PROFILE



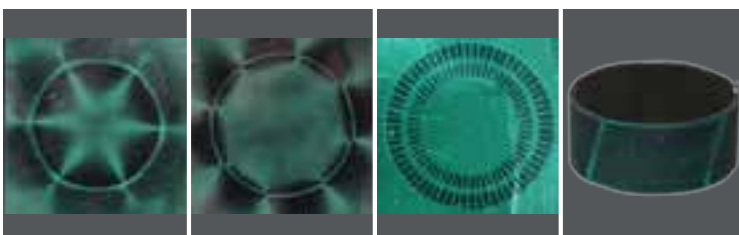
## MAGNETIZATION PATTERN

**MAGNET  
MAGNETIZED  
AT INNER  
PERIPHERY**

**MAGNET  
MAGNETIZED  
AT OUTER  
PERIPHERY**

**SENSOR  
MAGNET**

**SKEWED  
MAGNETIZATION  
ON MAGNET  
SURFACE**



## MAGNETIZATION FIXTURES

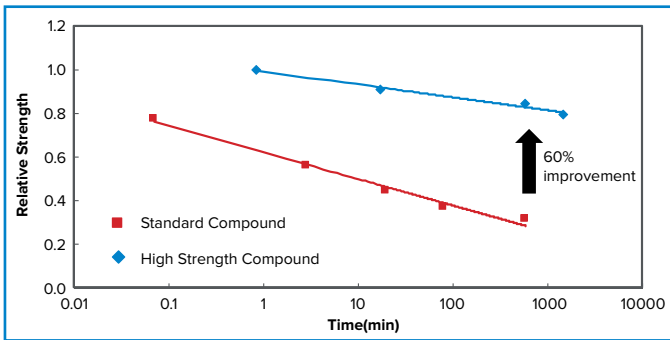
**DESIGNED AND FABRICATED FIXTURES TO  
ACHIEVE FULLY SATURATED MAGNET WITH  
DESIRED MAGNETIZATION PROFILE**



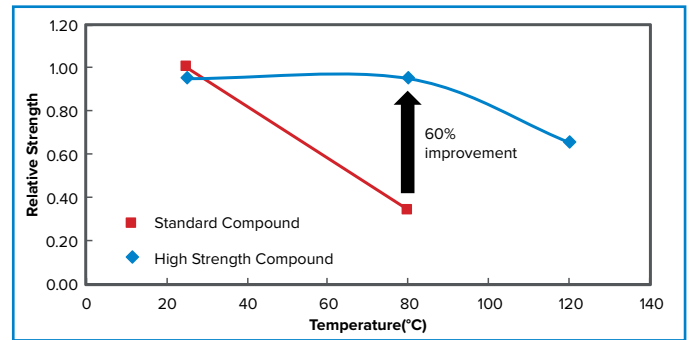
## SUPERIOR MECHANICAL PERFORMANCE AT HIGH TEMPERATURE

MQ1™ magnets using Magnequench high strength and high temperature MQEP™ compounds help high speed motors to perform better at elevated temperatures without an additional physical support.

**CREEP RUPTURE STRENGTH AT 80°C**



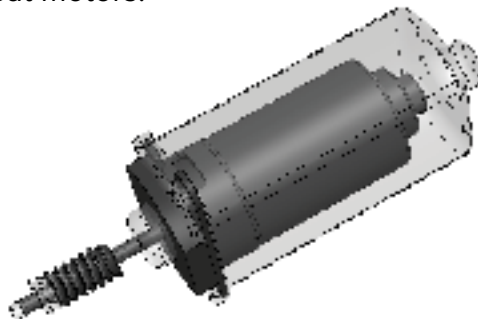
**STRESS RUPTURE STRENGTH AT DIFFERENT TEMPERATURES**



High strength high temperature MQEP™ compounds provide superior performance at elevated temperatures.

## REDUCED WEIGHT AND SIZE

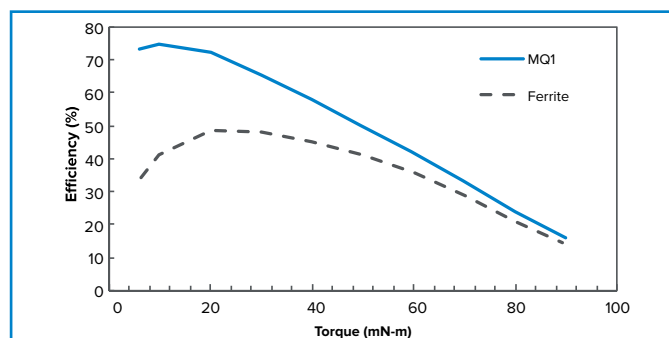
MQ1™ magnets support passenger cars to achieve higher comfort and functionality by reducing the overall weight and size of the seat motors.



## IMPROVED EFFICIENCY

MQ1™ magnets can provide crucial performance improvements required for continuous duty applications like fuel pump. Improvement in fuel pump performance results in improved fuel pump efficiency.

**EFFECT OF MAGNET MATERIAL ON MOTOR PERFORMANCE**



MQ1™ magnets provide higher efficiency as compared to ferrite magnets in an automotive pump.

**ISO 9001:2015**



**ISO 14001:2015**



**ISO/IEC 27001:2013**



**IATF 16949:2016**



**IECQ QC080000:2017**



**OHSAS 18001:2007**



**ROHS**



**MAGNETIC  
PROPERTIES**



Hysteresis Graph Tracer

**FLUX, FLUX PATTERN  
& FLUX LOSS**



Flux Meter &  
Flux Pattern Scanner

**DENSITY**



Density Balance

**CRUSH STRENGTH**



Multifunction Test  
Machine

**CORROSION RESISTANCE**



Pressure Cooker Test



Salt Spray



Temperature & Humidity  
Test Chamber

**DIMENSION**



Coordinate Measuring  
Machine



Image Measuring  
Instrument



Laser Scan Micrometer



Pneumatic Scan  
Micrometer

**APPEARANCE**



Crack Detector

**CLEANLINESS**



Liquid Particle Counter



neo

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