

The SCR Hybrid Magnet

by Bakker Magnetics B.V.

- Magnetic switch according ISO 22241-4
- Tested on all available nozzles, worldwide
- Lower price than current magnets
- Lower weight than current magnets
- Stability at all conditions (temperature, opposite magnetic fields, vibrations)

Requirements according to ISO 22241-4

- 1 – Neck
- 2 – Magnet holder
- 3a – Stationary Magnet neck side
- 3b – Magnet switch nozzle side
- 4 – Nozzle

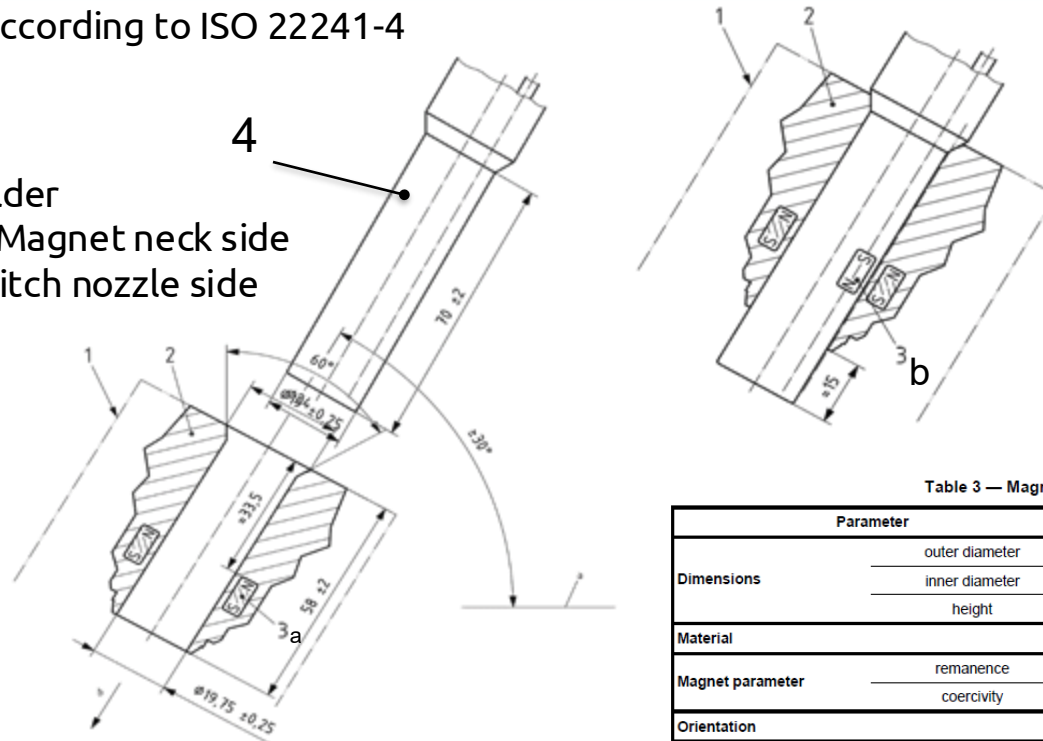


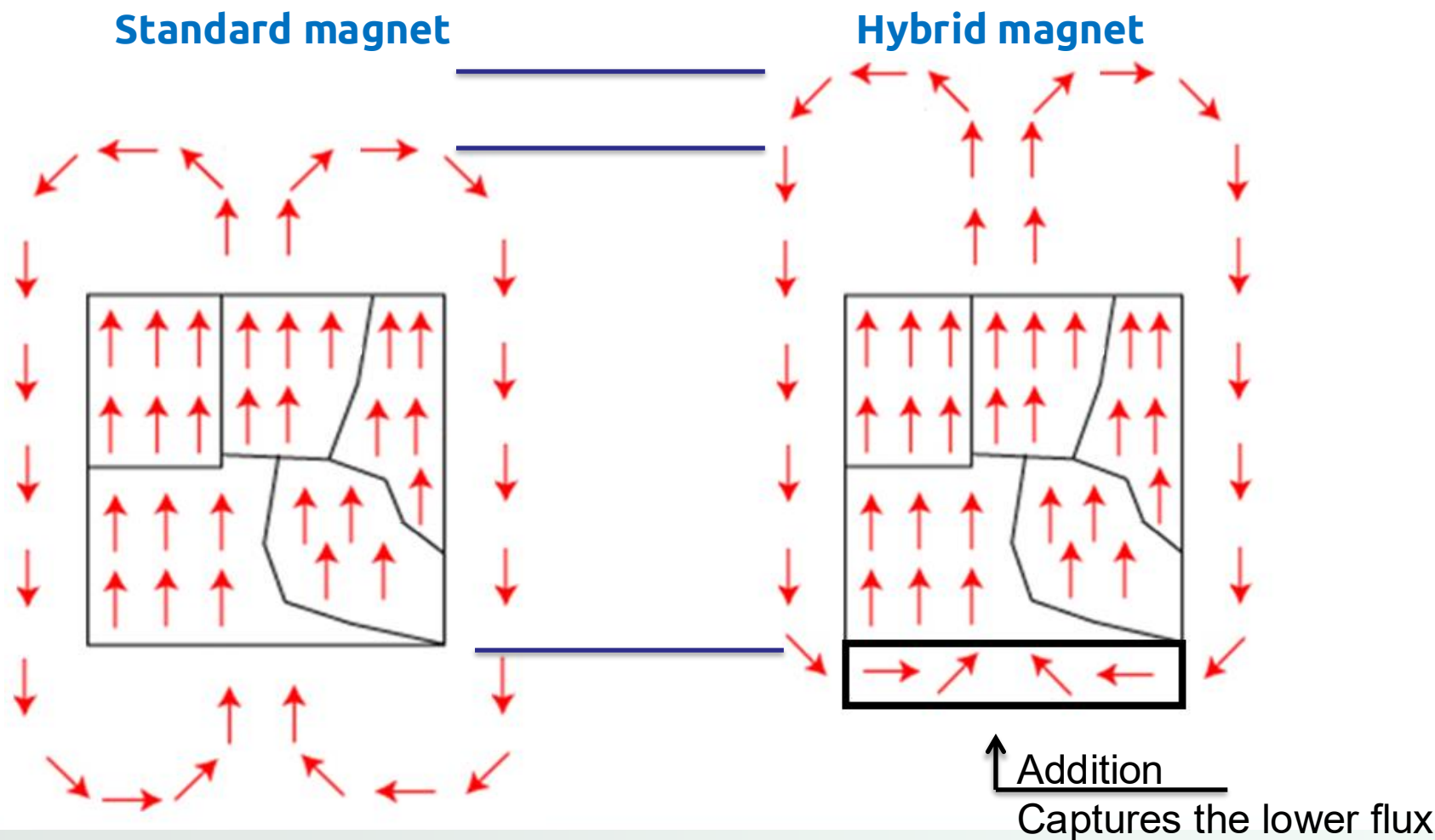
Table 3 — Magnet ring characteristics

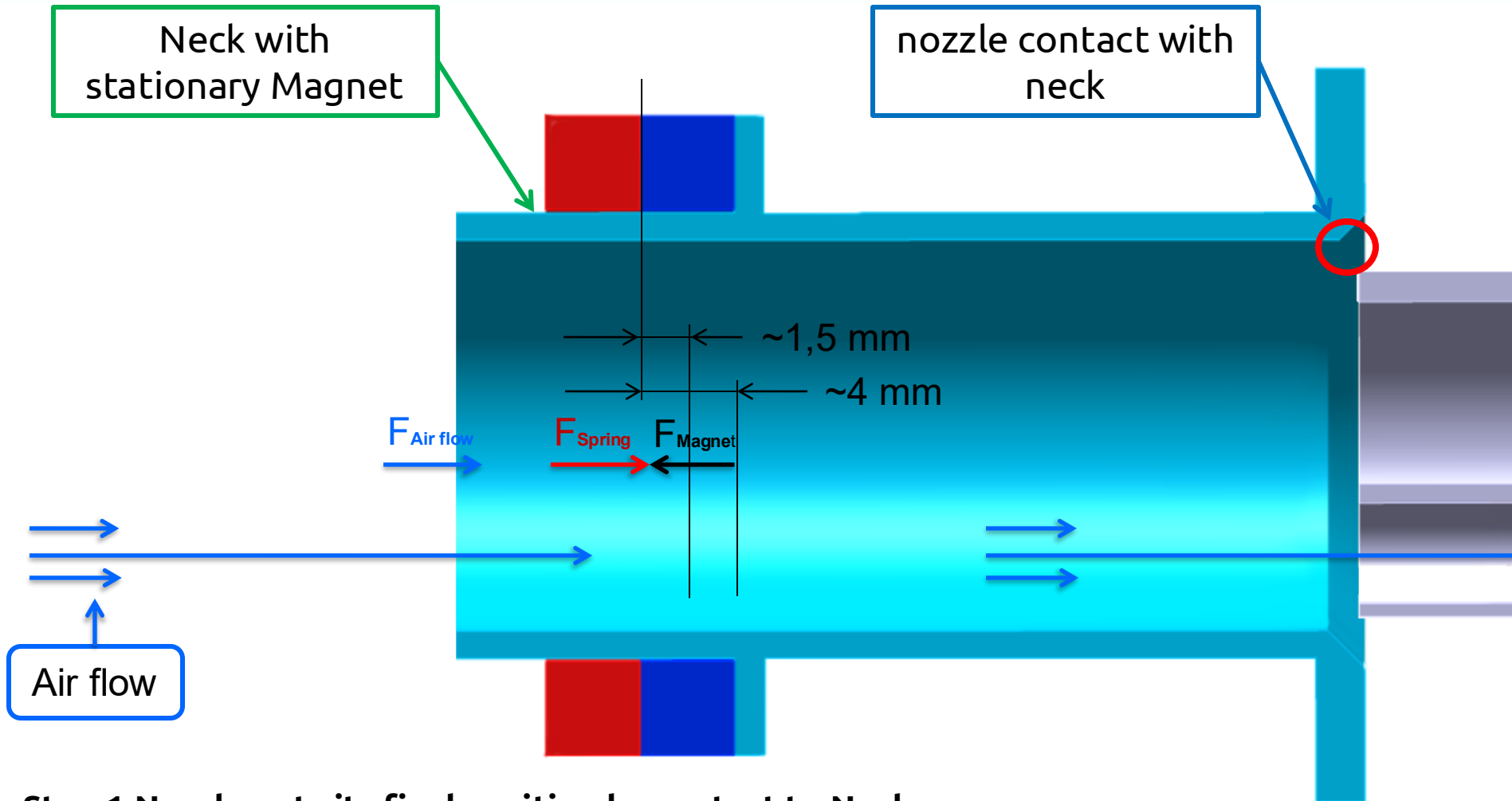
Parameter		Requirements
Dimensions	outer diameter	34 mm
	inner diameter	24 mm
	height	10 mm
Material		Neodymium-Iron-Boron (NdFeB)
Magnet parameter	remanence	1,2 T to 1,3 T
	coercivity	800 kA/m to 900 kA/m
Orientation		North pole pointing outwards from the tank

The reasons for ISO to specify a Neodymium magnet:

- 1- High power density
- 2- Stability against vibrations and demagnetization
- 3- Life-time guarantee

Optimizing the forces, concentrating the magnetic flux at the side and location where we need it

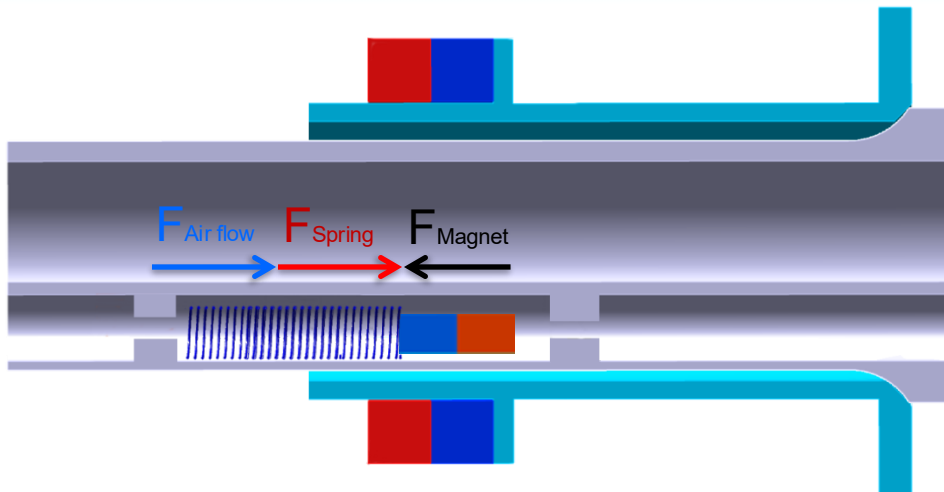




Step 1 Nozzle gets its final position by contact to Neck

Step 2 Magnet switch starts to move from around 4mm (distance to neck magnet)

Step 3 Magnet switch stops at equilibrium point around 1,5mm (distance to neck magnet)



Equilibrium estimation



1) Minimum required Force of Magnetic field

$$F_{\text{Magnet}} = F_{\text{Spring}} (0,15 \text{ N}) + F_{\text{Air Flow}} (0,20 \text{ N}) + F_{\text{Friction / Gravity / Vibration}} (0,15 \text{ N})$$

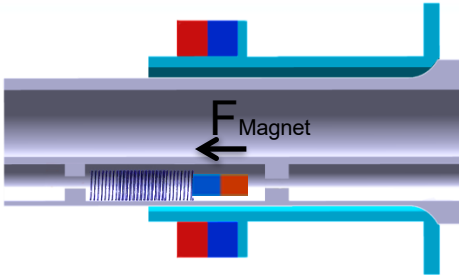
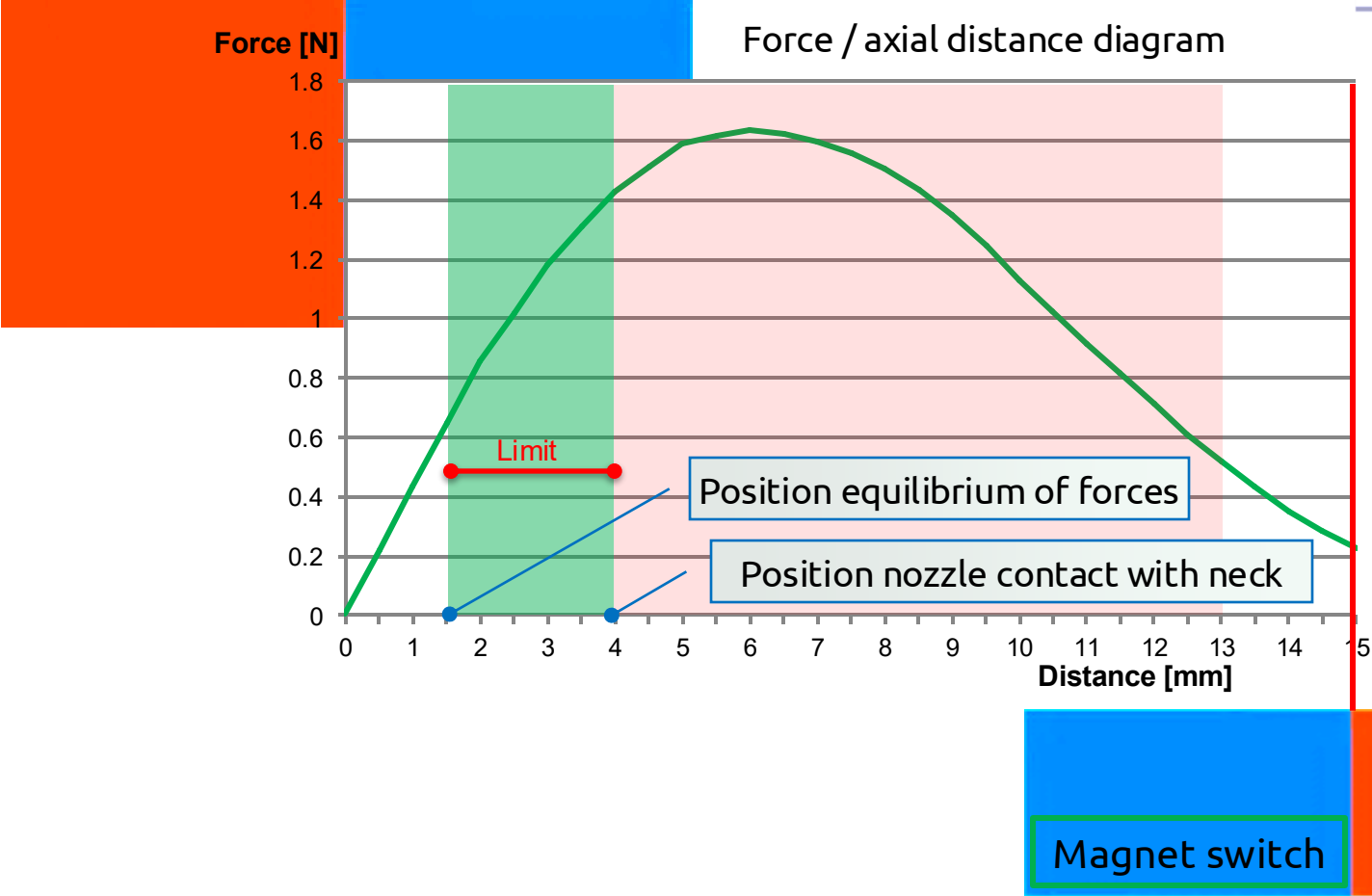
$$F_{\text{Magnet}} = 0,5 \text{ N}$$

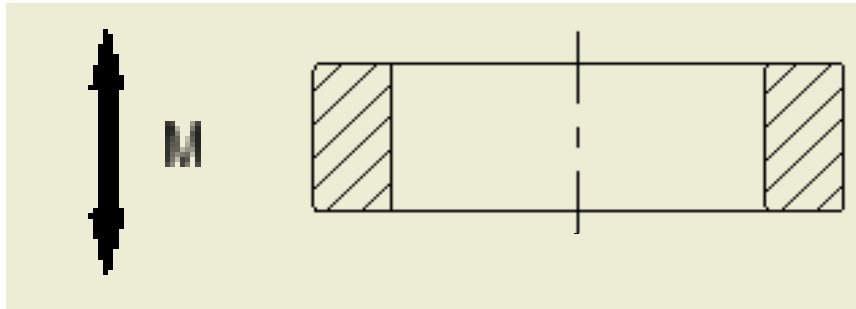
2) Ensure the necessary Force of Magnet field on right position:

Distance = 1,5 mm (from middle to middle of magnets)

3) Ensure that the force at 1,5 mm is the same as the standard magnet

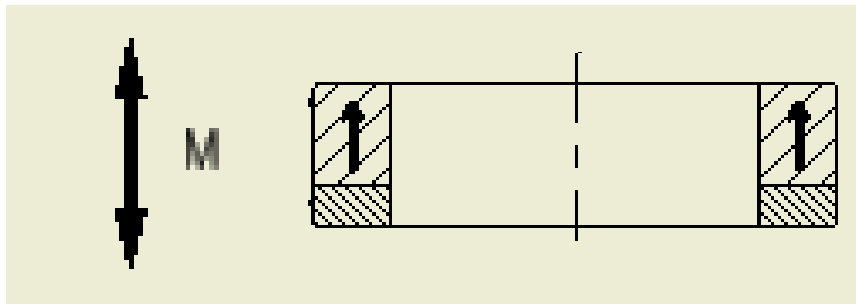
Stationary Magnet





Standard according ISO 22241:

Nd Fe B



Patented:

Hybrid Magnet

A combination of Nd Fe B magnetic material and ferromagnetic material

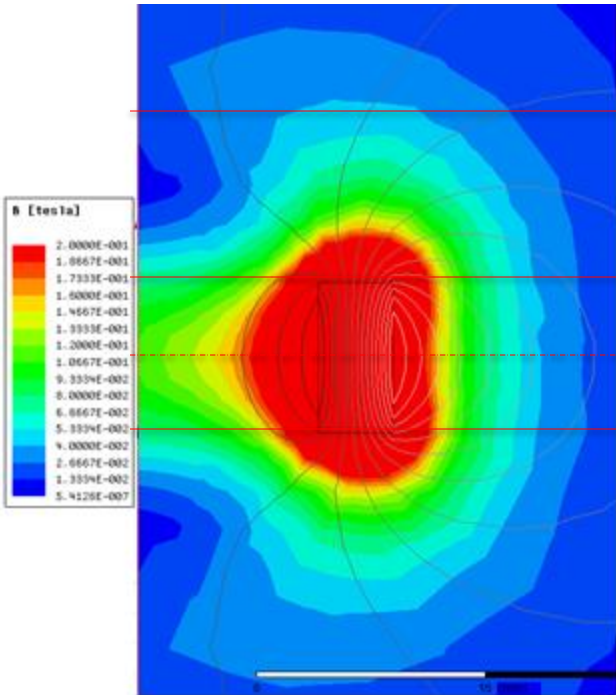
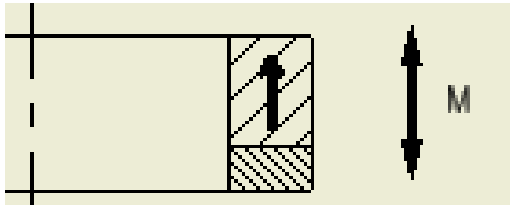
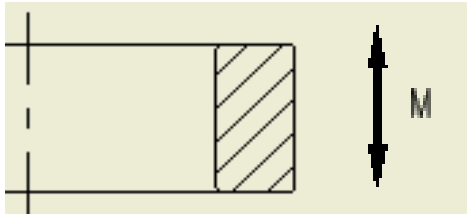
The Hybrid family



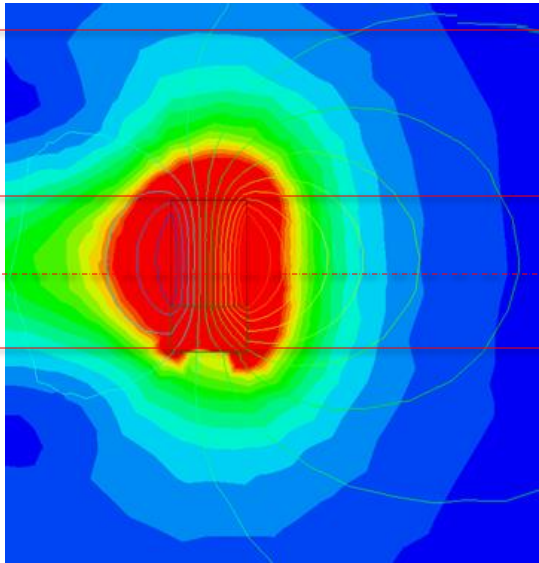
Available in 5 heights:

5, 6, 7, 8 and 9 mm.

Shown: Epoxy coated magnets
(AdBlue resistant)



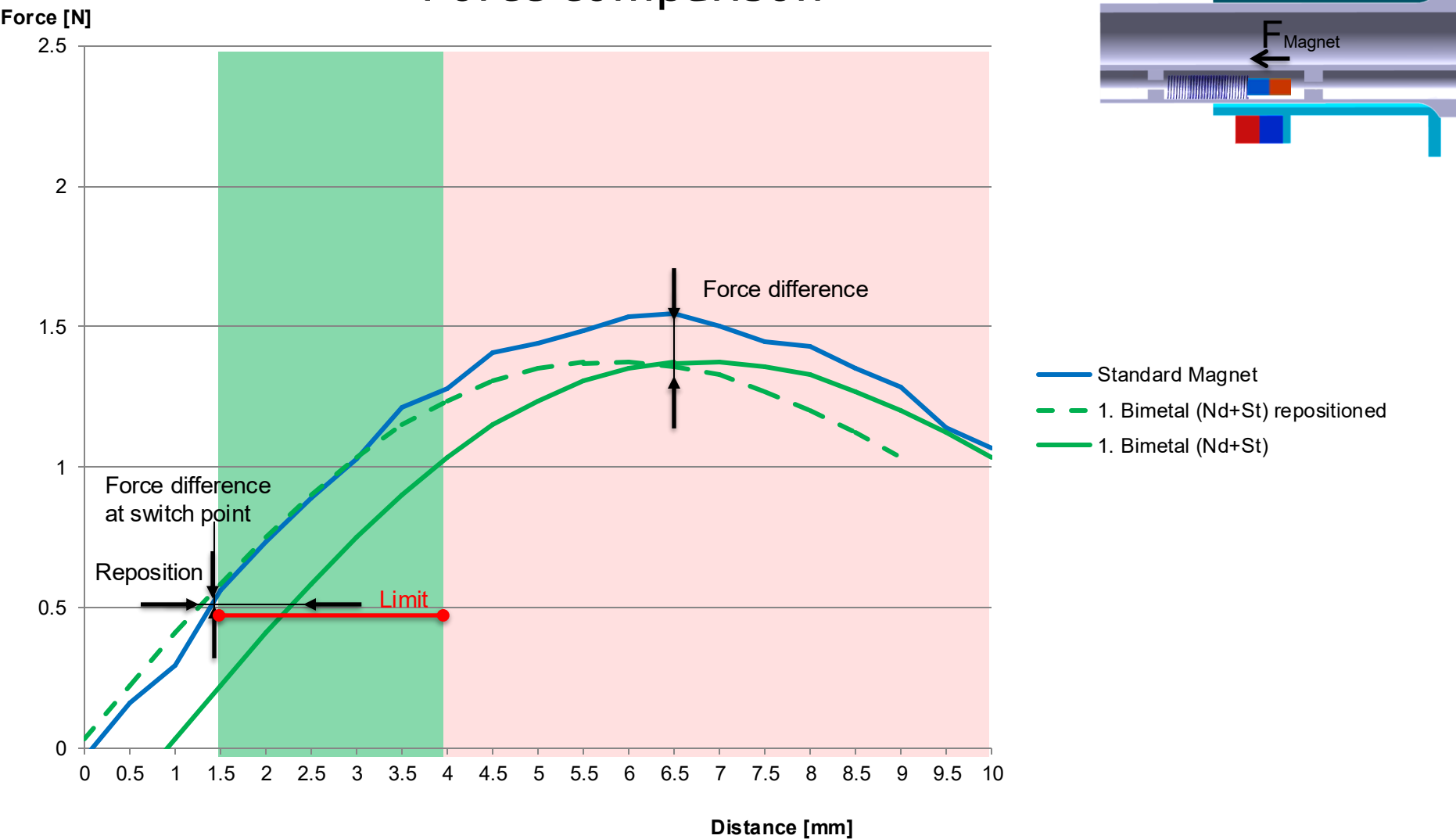
The magnetic field of a standard (ISO defined) magnet



The magnetic field of a Hybrid magnet

Both fields are almost equal but the magnet is much smaller. There are no losses at the lower side of the magnet.

Force comparison



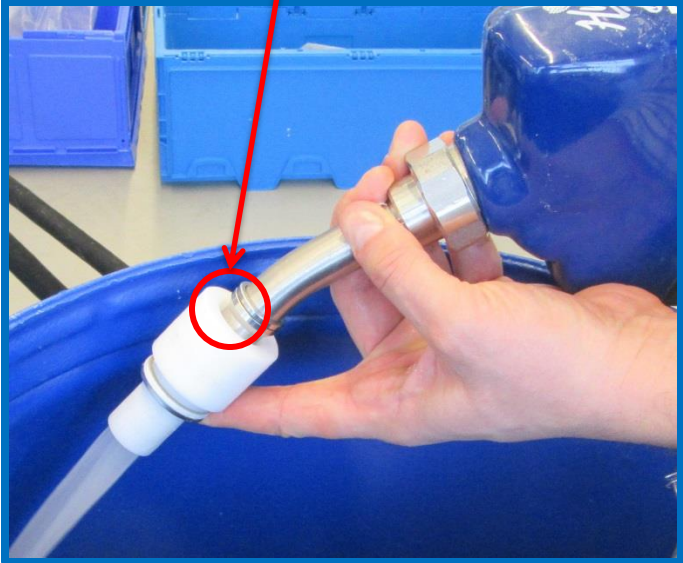
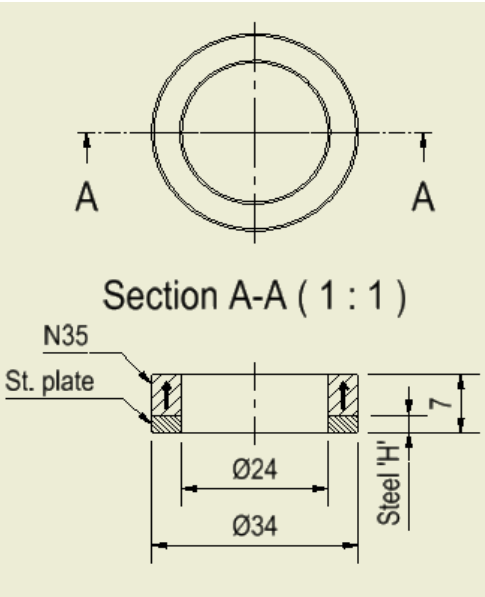
Elaflex



Piusi



Husky



The Hybrid Family



“Naked magnet” (NiCuNiEpoxy coated)
Outside diameter = 34 mm
Inside diameter = 24 mm
Heights from 5 to 9 mm

HDPE or POM overmoulded
Standard dimensions available
Tailored dimensions possible

The Advantages of the Hybrid Magnet

- 1- Cost advantage
 - Minus 45% compared to the current magnet
- 2- Weight advantage
 - Minus 30% compared to the current magnet
 - Minus 46% compared to ferrite
- 3- Fully compatible with ISO 22241-4
- 4- Stability at all conditions (temperature, opposite magnetic fields, vibrations)
- 5- Interaction with all available nozzles (worldwide) at all conditions.