DATA MANUAL FOR V-MAG 340© & V-MAG 70©

CE

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Manufacturer:
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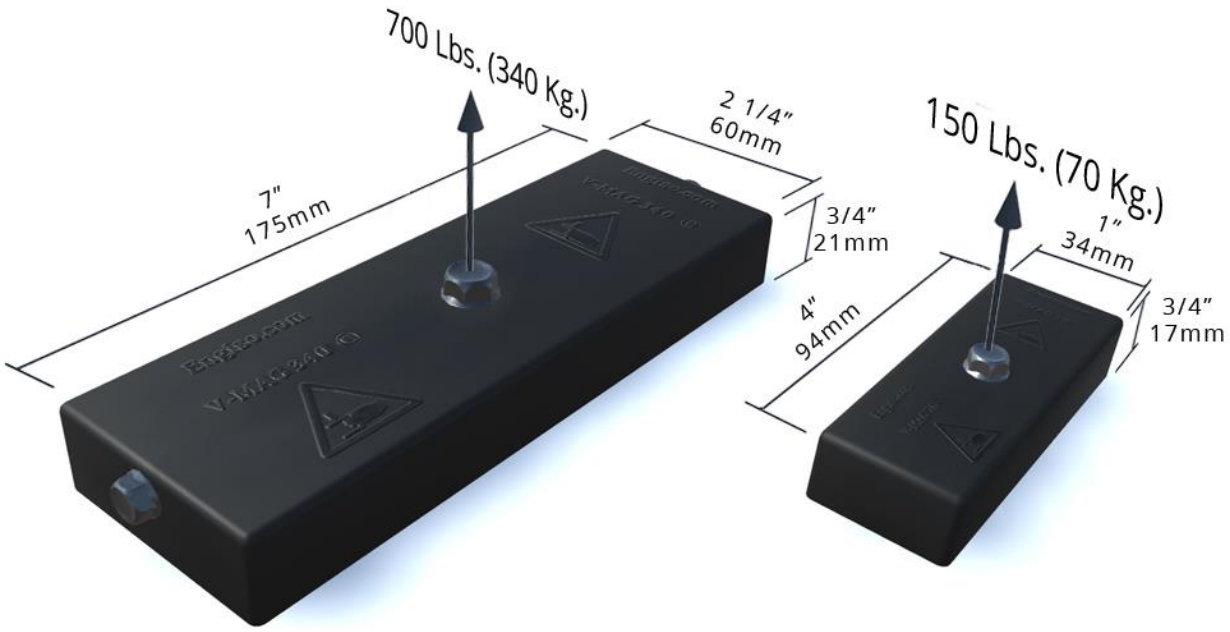
V-MAG DATA

ENGISO V-MAG© is produced utilizing Neodymium N42 thus making them permanent. ENGISO guarantee no more than 2% loss off magnetic force over 30 years. During the certified testing done by DNV-GL the V-MAG© 340's lowest pull force was 380 KG, which means that even after +50 years the pull force is still above the guaranteed 340 KG.

The ENGISO V-MAG© is coated with a layer of black EPDM rubber for ideal corrosion protection, friction optimization and surface protection (paint).

ENGISO V-MAG© is delivered with pre-mounted bolts in A4 / AISI 316 stainless steel.



THIRD PARTY TEST AND VERIFICATION

See appendix for more details. Full Test documentation can be given on request. Please contact Engiso.

ISO 9001 BY BUREAU VERITAS

Engiso ApS has been ISO 9001 certified by Bureau Veritas in the Sales of permanent magnets for mounting.

DNV GL PULL TEST

The V-Mag 340® have passed a withness Torque and Pull test, conducted by DNV-GL.

GS PULL TEST V-MAG 70

The V-MAG 70® passed a Pull test conducted by GS Grane & Equipment.

DANAK CORROSION TEST

The V-MAG 70® and V-Mag 340® have passed the stringent

ISO 9227 at a C5 High corrosion resistance level.

FORCE TECHNOLOGY: MARITIME MAGNETIC TEST

The V-MAG 70® and V-Mag 340® passed a maritime magnetic force test, conducted by Force Technology.

DECLARATION OF CONFORMITY

See appendix for more details.

V-MAG 340. EU DECLARATION OF CONFORMITY

V-MAG 340 Item no.: 30002

is in conformity with the provisions of the following directive(s):

2014/30/EU – Electromagnetic compatibility (EMC)

CE

V-MAG 70. EU DECLARATION OF CONFORMITY

V-MAG 70 Item no.: 30001

is in conformity with the provisions of the following directive(s):

2014/30/EU – Electromagnetic compatibility (EMC)

CE

V-MAG 340. UK DECLARATION OF CONFORMITY

V-MAG 340 Item no.: 30002

is in conformity with designated standards (Statutory Instruments 2016 No. 1091 and its amendments) for: Electromagnetic Compatibility Regulations 2016

UKCA

V-MAG 70. UK DECLARATION OF CONFORMITY

V-MAG 70 Item no.: 30001

is in conformity with designated standards (Statutory Instruments 2016 No. 1091 and its amendments) for: Electromagnetic Compatibility Regulations 2016

UKCA

V-MAG 340©

V-MAG-340©

Part no: 30002

Size:
175 x 60 x 21mm.
6.89” x 2.36” x 0.83”

Pull force capacity: 340 Kg. / 749 lbs.

Coating: EPDM rubber, Shore A 55

Pre-mounted Bolts:
- Material: A4 / AISI 316 stainless steel.
- M8 x 16 mm (1 ea.).
- M6 x 20 mm. (2 ea.)

V-MAG 70©

V-MAG-70©

Part no: 30001

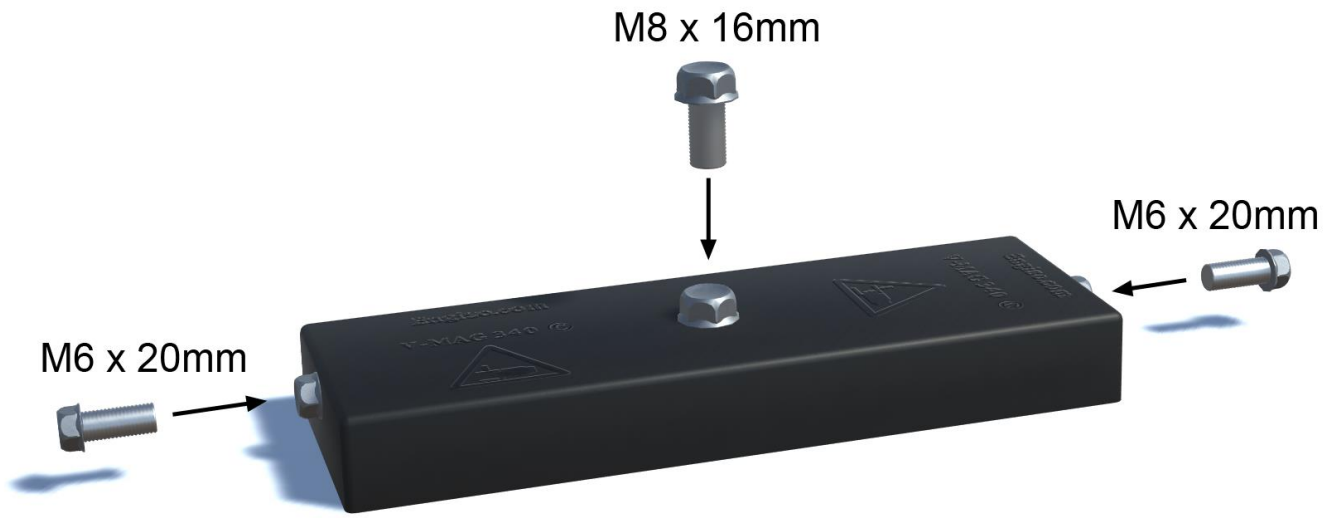
Size:
94 x 34 x 17mm
3.7” x 1.3” x 0.67”

Pull force capacity: 70 Kg. / 154 lbs.

Coating: EPDM rubber, Shore A 55

Pre-mounted Bolt:
- A4 / AISI 316 stainless steel
- M6 x 16 mm. (1 ea.)

BOLTS STRENGTH (DIN-NORM)



Bolts are produced according to the DIN-Norm (Deutsches Institut für Normung).

Quality	Breaking Strength N/mm^2	Yield Strength N/mm^2
A4 / AISI 316 stainless steel	700	450

Bolt	Cross section of area of thread in mm^2	Breaking Strength N	Yield Strength N
M6, A4, 70	20,1 mm^2	14070 N	9045 N
M8, A4, 70	36,6 mm^2	25620 N	16470 N

1 kN = 100kg

Example calculation: Maximum Yield = Yield Strength N/mm2 x Cross section of area of thread in mm^2

450 N/mm^2 x 20,1 = 9045 N (904,5 Kg)

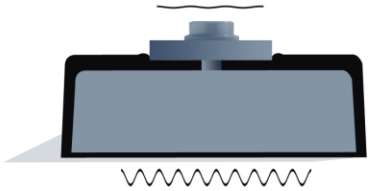
EPDM & NEODYMIUM TECHNICAL DATA SHEET

MECHANICAL, PHYSICAL AND CHEMICAL PROPERTIES

Measured characteristics	Standard	Value	
MECHANICAL			
Rubber compound - black		EPDM	●
Density		1.17 ± 0.05	g/cm
Hardness	ASTM D2240	50 ± 5	Shore A
Tensile strength	ISO 37	≥9	MPa
Elongation at break	ISO 37	≥450	%
Tear resistance	ISO 34-1	≥23	N/mm
Compression set after 22 h at 70 °C	ISO 815-1	≤35	%
TEMPERATURE			
Working temperature		-40/+115	°C
AGING			
▲ Hardness after 70 h at 70 °C	ASTM D573	≤5	Shore A
▲ Tensile strength after 70 h at 70 °C	ASTM D573	≤ - 15	%
▲ Elongation at break after 70 h at 70 °C	ASTM D573	≤ - 40	%
Ozone resistance, 200 pphm, 48 A. 38 C, 20 %	ASTM DA149 type A	No crack	
CHEMICAL RESISTANCE			

Diluted acids and bases	*Concentrated acids and bases*	*Ozone*	*Fully "Submerged" in Sea & Salt Water*	*Fully "Submerged" in Oils and hydrocarbons*
Very good	Good	Very good	Very good	Non suitable

The The ENGISO V-MAG is coated with approximately 3 mm. EPDM rubber on the top and sides. The bottom has an EPDM rubber coating of 0,4 mm.



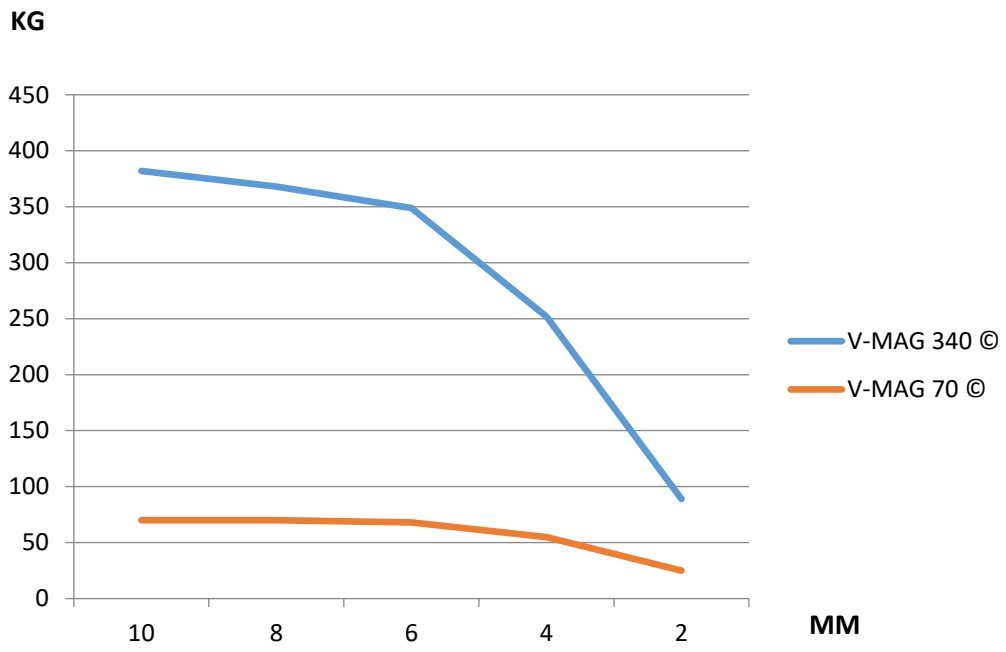
ENGISO V-MAG is produced utilizing Neodymium N42 permanent magnets.

Working temperature: -40/+80 degrees Celsius.

With the safety margin incorporated in the Engiso V-MAG design, we guarantee the 70 kg. and 340 kg. pull force for +50 years.

The V-MAG 70® and V-Mag 340® are tested for 1440 hours neutral salt spray according to ISO 9227 to give a C5-H corrosion classification according to ISO 12944-6.

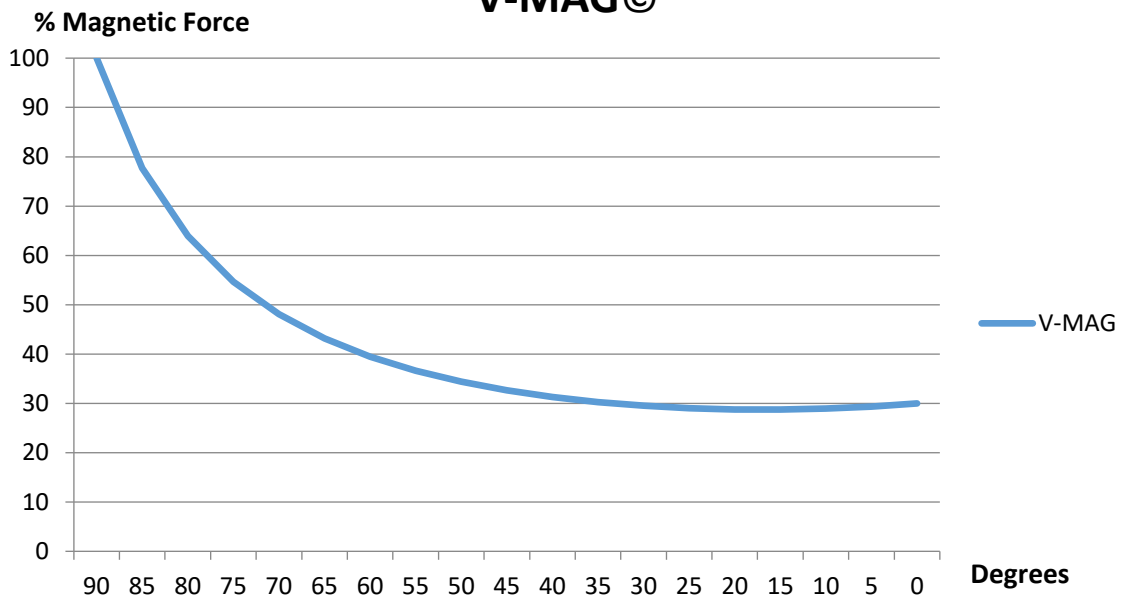
MAGNETIC FORCE ON DIFFERENT MATERIAL THICKNESSES (CARBON STEEL)



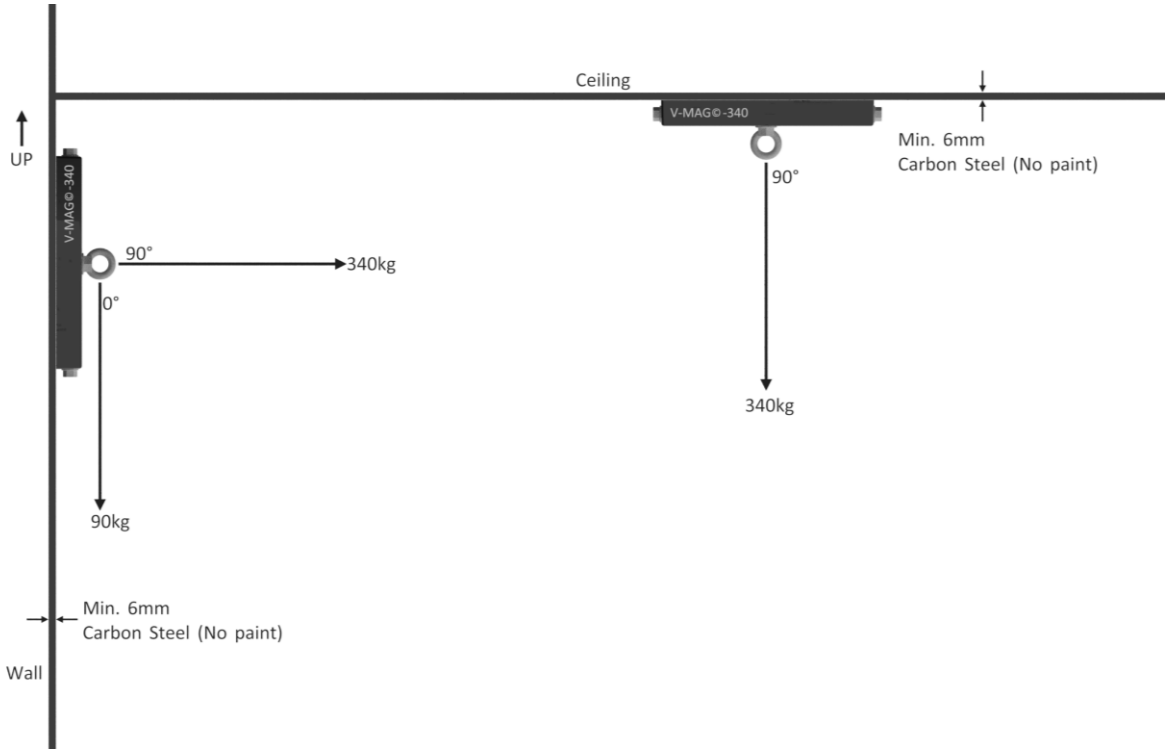
* Forces indicated on uncoated black steel

MAGNETIC FORCE OVERVIEW AT ANGLE IMPACT

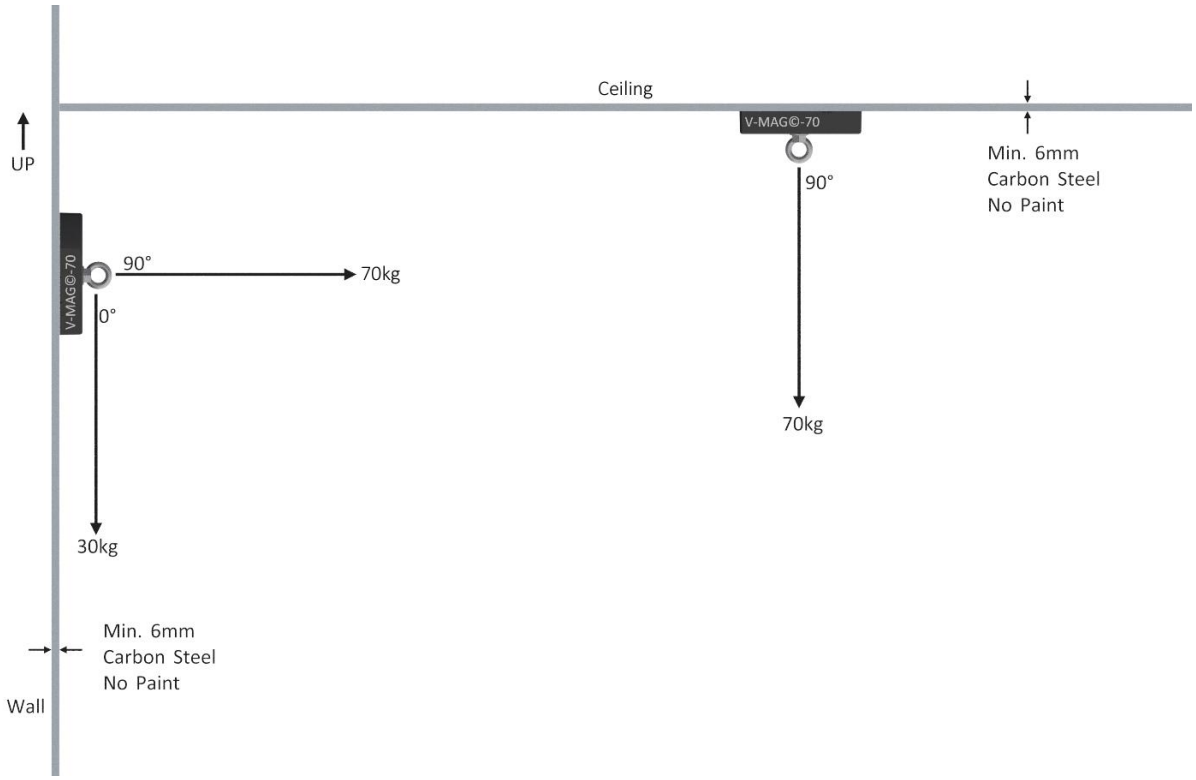
V-MAG©



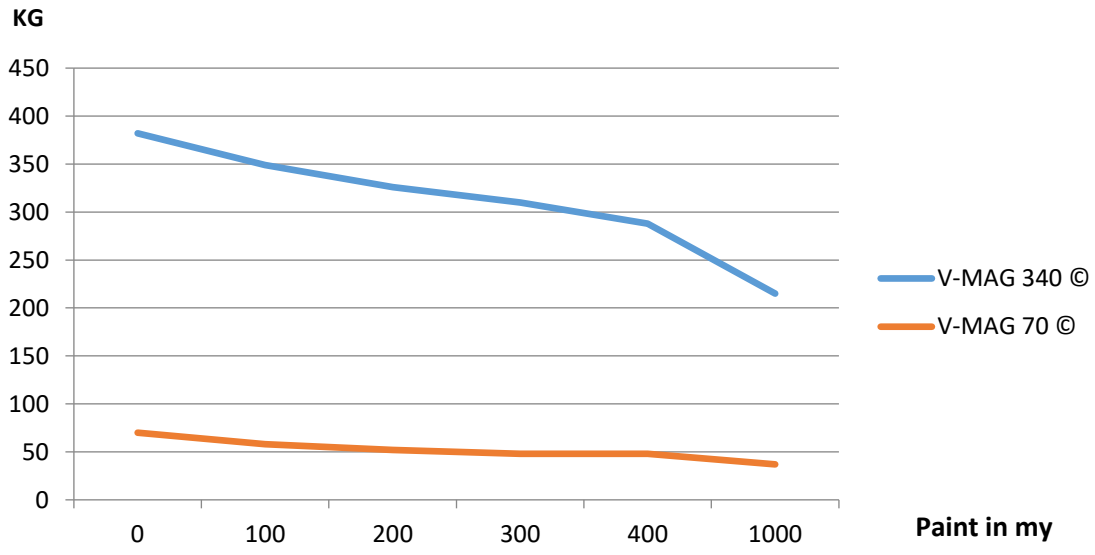
V-MAG 340© example



V-MAG 70© example

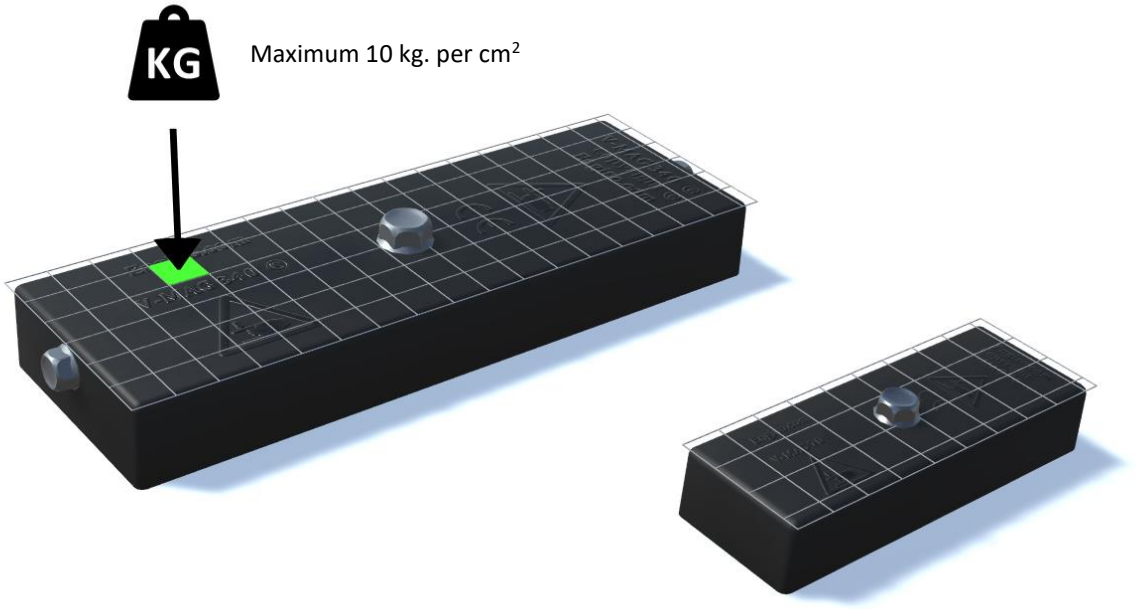


MAGNETIC FORCE OVERVIEW ON PAINTED SURFACE



* 100 my = 0,1 mm = 0,0039370078740157 Inches

SURFACE PREASSURE ON V-MAG MAGNETS



V-MAG 340:

Surface area approximately 105cm^2

Pressure per cm^2, max 10kg.

Total appliable pressure 1050kg.

V-MAG 70:

Surface area approximately 27cm^2

Pressure per cm^2, max 10kg.

Total appliable pressure 270kg.

COMPASS SAFETY DISTANCE

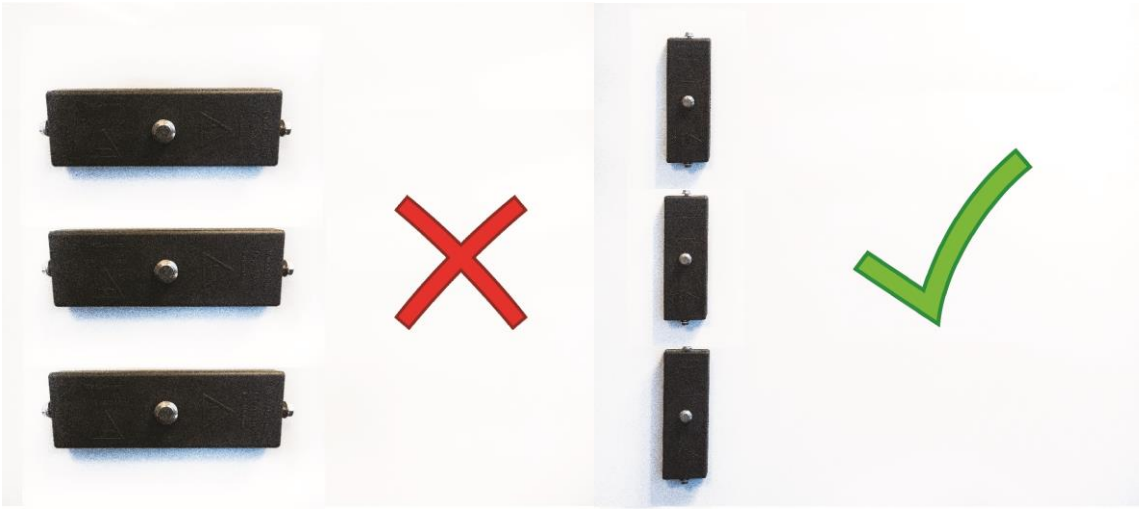
Conducted by Force Technology			
Test method	EN / (IEC) 60945: 2002	**Temperature**	22 ° C
		Humidity	32% RH
Test equipm.	Outside EMC room Hørsholm 49522, Uncertainty 5% 4 9596	**Uncertainty**	0.7 dB

Test object Condition	Distance for 1 deg compass deviation (Horizontal Magn. Flux of 316 nT) [cm]	Limit from IEC 60945 94 nT [cm]
V-MAG 340	247	390
V-MAG 70	137	210
Comments:	The magnets were turned and rotated in front of the sensor to determine the worst case orientation. This orientation was used during testing	

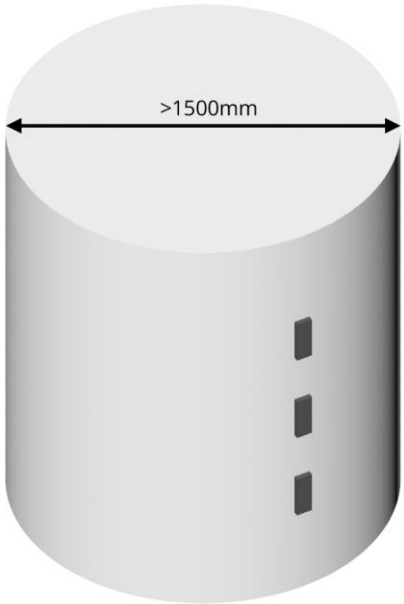
CORRECT USAGE

The V-MAG must be used in the prescribed way.

When attaching the V-MAG on a wall, attach it in a vertical orientation for optimal force.



The minimum diameter of a concave or convex surface, as for example a pipe, is 1500mm. Smaller diameters can result in the magnet surface not getting fully in contact with the wall and greatly reduce its force.



Engiso can design brackets to fit/perform on smaller diameters and pipes on request.

CALCULATING THE CORRECT NUMBERS OF V-MAG® TO BE UTILIZED

Calculation of load

The following are examples of, but not limited to, what to consider when calculating the maximum load.

- Weight.
- Wind load (depending on location).
- Ice load (depending on location).
- Dynamic forces (acceleration / de-acceleration).
- Vibrations (amplitude and frequency) (Building, Ship, equipment).
- Seismic Activity / Earthquake (depending on location).
- Calculated Weight.

Defining magnetic force

The following must be taken into consideration, when calculating the necessary magnetic force to ensure a safe and reliable solution.

- Material.
- Plate thickness (see resulting force in diagram above).
- Paint thickness (see resulting force in diagram above, for plate thickness above 6mm).
- Angle of force direction according to magnet (see reduction in diagram above).
- Calculated magnetic force.

Other considerations

- Temperature: If outside the range -40C^0 to +80C^0.
- Surface shape (Flat / Convex /Concave): If diameter is below 1500 mm.
- Installation: Correct alignment on curved surfaces.
- Design and tolerances of interface equipment.
- Surface roughness: Standard is clean steel with primer and top-coat paint (No pitting / No Bulging).
- Cleaning of all surfaces before installation.

To cover these considerations, ENGISO recommends a safety factor of 1:3.

Recommended magnet force: (Without test)

3 x Calculated weight < Calculated magnet force.

Recommended magnet force: (With test)

When the project includes a large number of V-MAG®s, it can be beneficial to conduct a physical test to measure the actual pull force relevant to the specific application.

The safety factor will then be based on the risk assessment for the application.

Based on the test and the risk assessment, the minimum number of V-MAG®s can be defined.

Actual safety factor x Calculated weight < Actual pull force.

If in doubt, please consult with ENGISO.

ENGISO can upon request, conduct tests for specific customer applications. ENGISO can also upon request, send instructions on how to conduct pull tests in the field.

TRAINING & CERTIFICATION IN THE USE OF V-MAG'S

V-Mag User Manual

www.engiso.com/v-mag-manual

V-Mag Online training

Engiso offers online training and certification in the use of V-Mag 70 & V-Mag 340.

For more information:

www.engiso.com/v-mag-manual

APPENDIX

BUREAU VERITAS

Bureau Veritas Certification

Engiso ApS

Skolegade 85, sal 4, 6700 Esbjerg, Denmark

Bureau Veritas Certification Denmark A/S certifies that the Management System of the above organization has been audited and found to be in accordance with the requirements of the management system standards detailed below.

Standard

ISO 9001:2015

Scope of certification

Sales of permanent magnets for mounting.

Original Cycle Start Date:	**27-01-2022**
Expiry date of previous cycle:	**NA**
Certification/Recertification Audit date:	**NA**
Certification/Recertification cycle start date:	**27-01-2022**
Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on:	**26-01-2025**

Certificate No.: **DK015390** Version: **1** Issue Date: **27-01-2022**

DANAK
SYSTEM Reg.nr. 5005

Certification Office: Bureau Veritas Certification Denmark A/S
Oldenborggade 25-31, 7000 Fredericia, Denmark

Further clarifications regarding the scope of this certificate and the applicability of the Management System requirements may be obtained by consulting the organization. To check this certificate validity, please call: (+45) 77 311 000.

1/1

DNV·GL

VERIFICATION STATEMENT

FOR V-MAG 340

Statement No:
N141YZ7H
Rev.02

Valid for products not subject to DNV GL classification requirements.

Particulars of Product

Product Name:	**V-MAG 340**
Type designation:	**Magnet**
Application/context:	
ID/Serial/Tag no:	**N.A.**
The product is intended for:	**ENGISO ApS**
Requirements are based on:	**Test as per ENGISO requirements.**

Deviations and limitations, if any, are stated on page 2 onwards.

Particulars of Vendor and Purchaser

Vendor:	**ENGISO ApS**
Vendor reference:	**PO: Kim Baarsøe**
Purchaser:	
Purchaser reference:	

Issued at **Esbjerg Verification** on **2020-04-23**

for **DNV GL**

This document has been digitally signed and will therefore not have handwritten signatures

Jensen, Jesper Skott Weismann
Surveyor

Verification extent and result

Verification extent:
Witness pull and torque tests as per ENGISO requirements.

Verification result/comments:
Test's witnessed as per drawing / test table no. 2019-33_Test_unit_0000 ver06 sheet 1 of 6.

Ref. also DNV GL test report no. O-ED-202000569, dated 2020-04-23.

Declaration of conformity

We, the undersigned

Engiso ApS
Company reg. no.: DK 36 97 66 08

declare under our sole responsibility that the product

V-MAG 340
Item no.: 30002

is in conformity with designated standards
(Statutory Instruments 2016 No. 1091 and its amendments) for:

Electromagnetic Compatibility Regulations 2016

We furthermore declare that the following international standards have been (partly) used during the construction of the product:

- IEC 60945:2002
- RTCA DO-160G Section 15

Management of technical dossier is the responsibility of:

Engiso ApS
Skolegade 85, 4th floor
6700 Esbjerg, Denmark

Declaration no.:
20221011-0002/UK

Date:
11 October 2022

On behalf of Engiso ApS:

Kim Baarsøe
Marine Engineer

As internal auditor:

Kevin Svenningsen

Declaration of conformity

We, the undersigned

Engiso ApS
Company reg. no.: DK 36 97 66 08

declare under our sole responsibility that the product

V-MAG 70
Item no.: 30001

is in conformity with designated standards
(Statutory Instruments 2016 No. 1091 and its amendments) for:

Electromagnetic Compatibility Regulations 2016

We furthermore declare that the following international standards have been (partly) used during the construction of the product:

- IEC 60945:2002
- RTCA DO-160G Section 15

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Kevin Svenningsen

Declaration of conformity

We, the undersigned

Engiso ApS
Company reg. no.: DK 36 97 66 08

hereby declare that the product

V-MAG 340
Item no.: 30002

is in conformity with the provisions of the following directive(s):

2014/30/EU – Electromagnetic compatibility (EMC)

We furthermore declare that the following harmonized norms and international standards have been partly used during the construction of the product:

- EN/IEC 60945:2002
- RTCA DO-160G Section 15

Management of technical dossier is the responsibility of:

Engiso ApS
Skolegade 85, 4th floor
6700 Esbjerg, Denmark

Declaration no.:
20190918-0002

Date:
18 September 2019

On behalf of Engiso ApS:

Kim Baarsøe
Marine Engineer

As internal auditor:

Kevin Svenningsen

Declaration of conformity

We, the undersigned

Engiso ApS
Company reg. no.: DK 36 97 66 08

hereby declare that the product

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Item no.: 30001

is in conformity with the provisions of the following directive(s):

2014/30/EU – Electromagnetic compatibility (EMC)

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- RTCA DO-160G Section 15

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Declaration no.:
20190918-0001

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CONTACT INFORMATION

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