



Pushing Performance

HARTING EMC protection for plastic housings



EMC protection for plastic housings

Arc spray technology improves EMC shielding

With the introduction of a fully automated, robotic coating production plant, HARTING can plate a variety of different plastic housings. The innovative process utilizes arc spray technology with zinc as the coating metal. Zinc is a highly conductive material that, when applied with high layer thickness through the coating process, provides a performance similar to that of full metal hoods. It creates a plating surface that is robust and also offers outstanding attenuation values. Additionally it is possible to solder directly on the coated plastic. The process offers the ability to coat a wide range of plastics in everyday use. A wide portfolio of sizes can be coated ranging from parts the size of a coin, to items such as mobile phone covers and monitors, to applications as large as passenger cabins. A flexible manufacturing system allows for easy set up to meet small prototyping and development batch requirements, all the way through to high volume production needs.

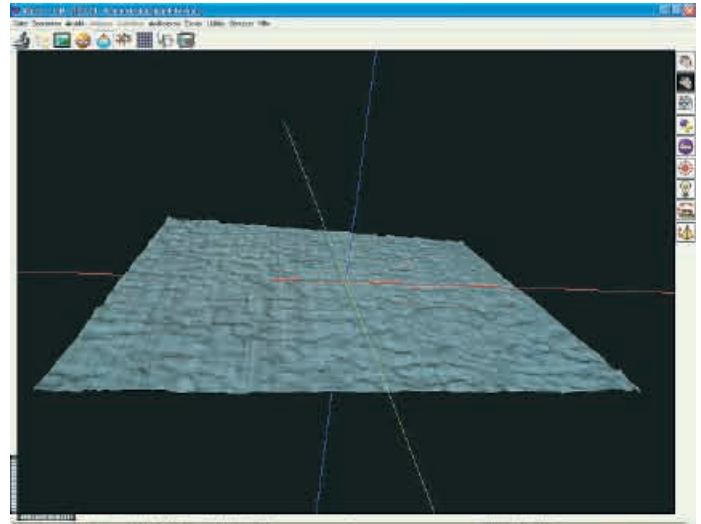
EMC properties of zinc

The electrical screening properties of various coating methods were investigated at the Fraunhofer-Institute for Surface Engineering and Thin Films (IST) in Braunschweig and their results were compared with those of the zinc arc spraying technique. The results of the zinc layer are impressive. Across the entire spectrum it is possible to achieve attenuation in the range **70 to 110 dB** for a frequency range between 10 MHz and 1 GHz.

During a direct comparison of the transfer impedance between zinc coating and aluminium, done by vapor procedures, the superiority of the zinc coating becomes clearly visible.

The coating process

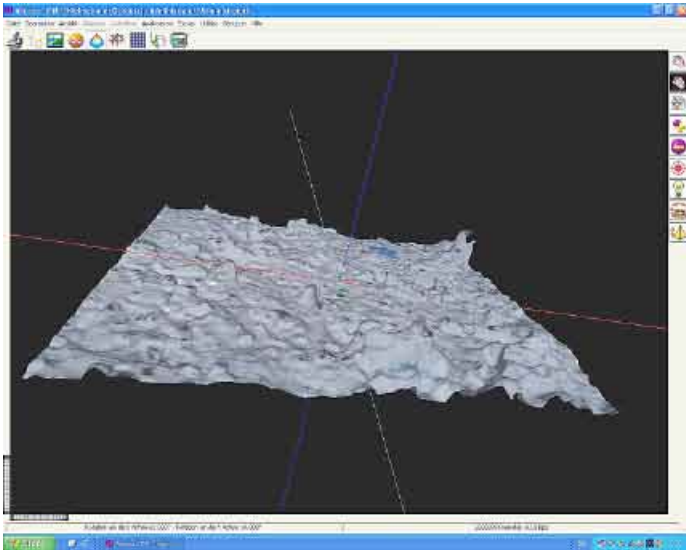
Prior to coating the plastic surface must first be prepared. Here HARTING has established a high degree of expertise using a procedure that activates the surface by bombarding it with specially selected particles. This requires a set of carefully defined parameters for each individual application in which the angle of incidence, size, quantity and speed of impact of the particles are all carefully determined.



Untreated plastic surface



Arc-spray technology



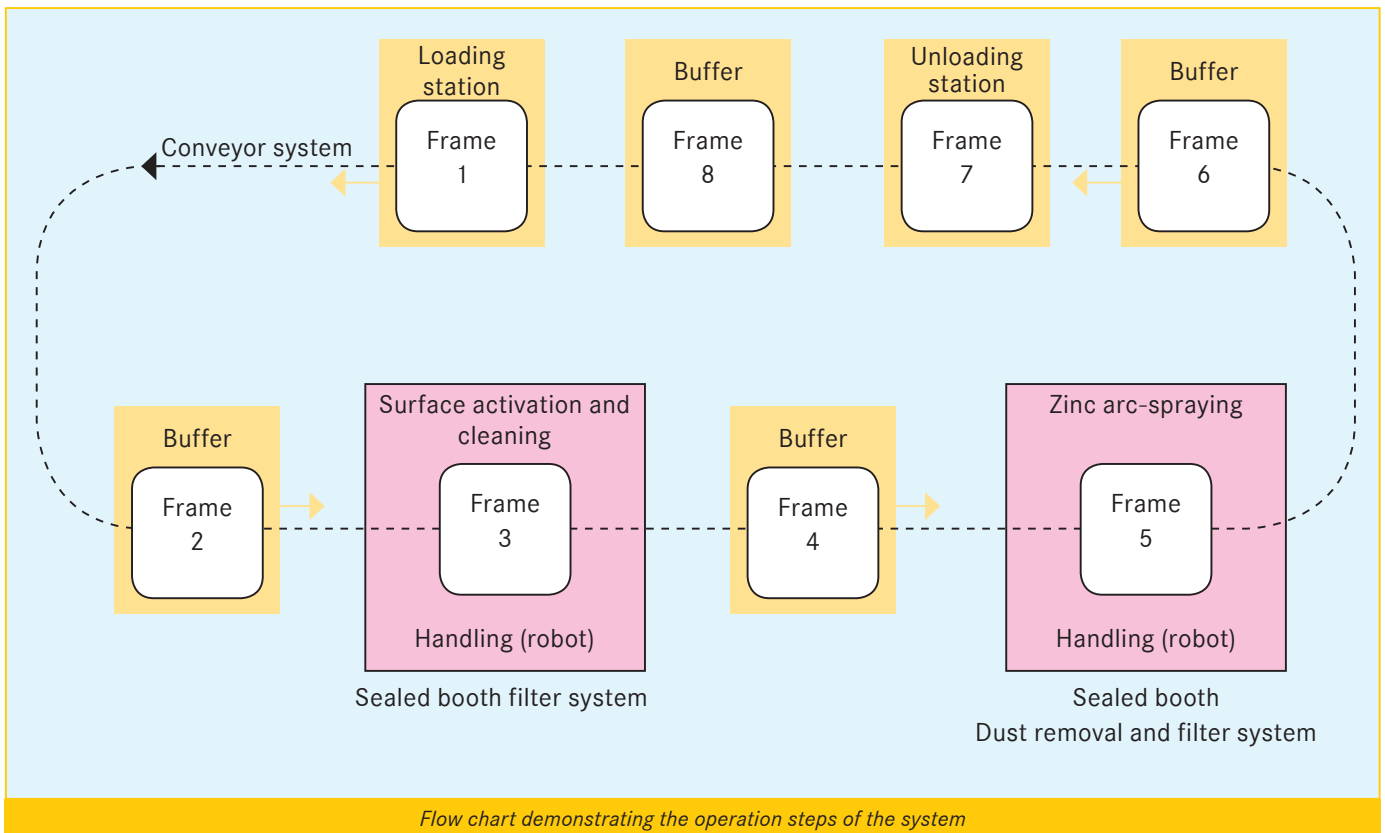
Roughened plastic surface, corresponding to UL 746C



Surface activation through bombardment with granulated particles



Coating production plant

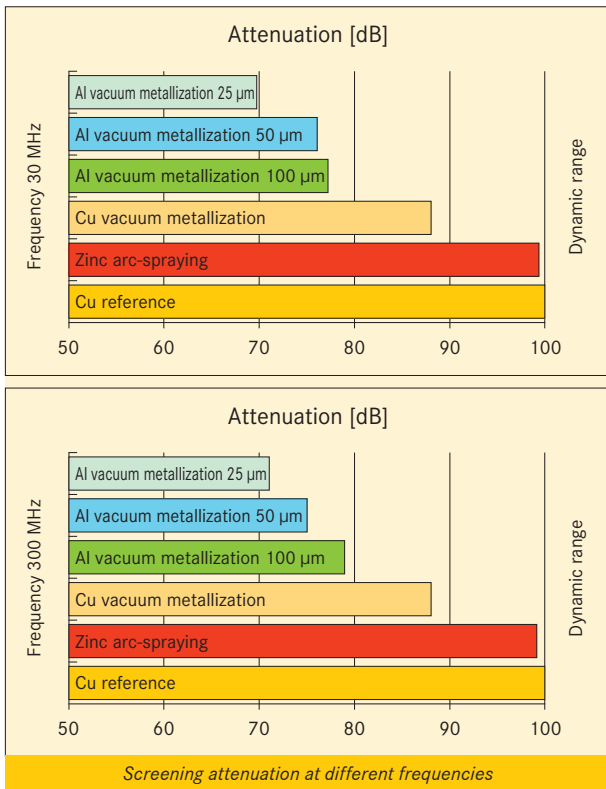


After being bombarded with the particles the surface is rough, thus generating the optimal bonding surface for the zinc. The resulting adhesion force is 3-5 N/mm² (1935.48-3225.8 N/in²), which corresponds to UL 746C.

Application of the zinc to the prepared surface is achieved as two zinc wires are fed continuously into the tip of a spray gun. There they act as electrodes forming an electric arc hot enough to melt them. The molten zinc is then applied from the spray gun to the plastic surface with a jet of compressed air. The optimal plating layer ranges in thickness of around 150 μm (5.91 μin). Within this range an extremely robust surface layer is assured, guaranteeing a long service life. Additionally the surface retains sufficient elasticity properties to compensate for different coefficients of thermal expansion. Since it is possible to solder directly on the zinc coating, grounding and potential equalization with single wires is quite simple.

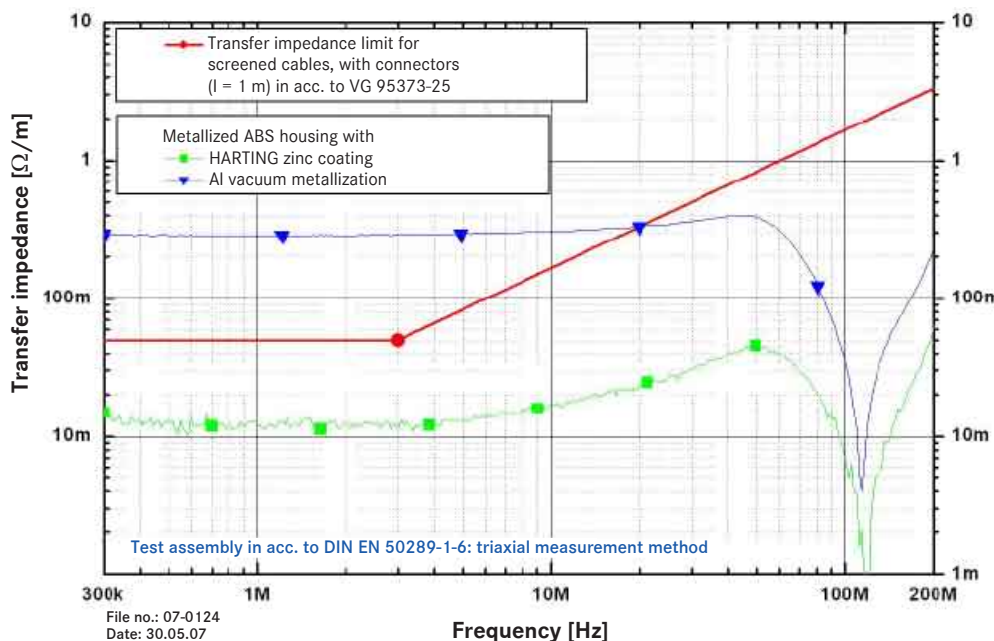


Selectively plated plastic housing



Technical characteristics

Size of the products	min. 10 mm x 10 mm up to 1500 mm x 1600 mm [min. 0.394 in x 0.394 in up to 59.055 in x 62.992 in]
Plating layer (typically)	150 µm 5.906 µin
Adhesion	3 – 5 N/mm ²
Melting temperature of the solderable zinc surface	419 °C
Conductivity	17 m/Ωmm ²
Screening attenuation	70 – 110 dB at 10 MHz up to 1 GHz



Direct comparison of transfer impedance

Flexibility in production

HARTING has invested in the production plant to fully realize the benefits of the zinc coating process. Plastic housings are mounted into carrier frames measuring 1500 mm x 1200 mm (59.06 in x 47.24 in) and are transported through the production unit by a fully automated conveyor system. Eight frames can be carried by the conveyor system, each one with four dual purpose masking frames that hold the part of the housing to be plated and also screen any parts on the external or unscreened side. With these 100 % custom-made masks, there is a selective coating realized with a high degree of accuracy.

The frames are transported through two hermetically sealed booths for surface preparation and arc spraying. Transponders connected to each masking frame communicate each individual program to the robots. This allows for maximum flexibility with up to 32 different orders possible in a single production run. Furthermore it is possible to combine volume production of individual articles with smaller lots of prototypes and development.

Summary

Throughout a vast range of potential applications, the properties of zinc allow for optimized EMC performance, providing a robust and enduring surface for a variety of plastic materials. Through innovation and by establishing expertise in this specialized field HARTING has the processes necessary to maximize the performance properties of zinc.

Highly automated production techniques ensure that HARTING provides an unrivalled level of flexibility and efficiency in delivering effective solutions to meet your specific EMC requirements.

Subsidiary companies – worldwide



Austria

HARTING Ges. m. b. H.
Deutschstraße 19, A-1230 Wien
Phone +431/6162121
Fax +431/6162121-1
E-Mail: at@HARTING.com

Belgium

HARTING N.V./S.A.
Z.3 Doornveld 23, B-1731 Zellik
Phone +322/4660190
Fax +322/4667855
E-Mail: be@HARTING.com

Brazil

HARTING Ltda.
Av. Dr. Lino de Moraes
Pq. Jabaquara, 255
CEP 04360-001 –
São Paulo – SP – Brazil
Phone +5511/5035-0073
Fax +5511/5034-4743
E-Mail: br@HARTING.com
Internet: www.HARTING.com.br

China

Zhuhai HARTING Limited
Shanghai branch
Room 5403, 300 Huaihai Zhong Road
Hong Kong New World Tower
Luwan District, P.R.C
Shanghai 200021, China
Phone +86 21 – 63 86 22 00
Fax +86 21 – 63 86 86 36
E-Mail: cn@HARTING.com

Czech Republic

HARTING spol. s.r.o.
Mlýnská 2, 16000 Praha 6
Phone +420 220 380 460
Fax +420 220 380 461
E-Mail: cz@HARTING.com
Internet: www.HARTING.cz

Finland

HARTING Oy
Teknobulevardi 3-5, PL 35
FI-01530 Vantaa
Phone +358 9 350 873 00
Fax +358 9 350 873 20
E-Mail: fi@HARTING.com

France

HARTING France
181 avenue des Nations
Paris Nord 2
BP 66058 Tremblay en France
F-95972 Roissy Charles de Gaulle Cédex
Phone +33149383400
Fax +33148632306
E-Mail: fr@HARTING.com

Germany

HARTING Deutschland GmbH & Co. KG
Postfach 2451, D-32381 Minden
Simeons carré 1, D-32427 Minden
Phone +49 571 8896-0
Fax +49 571 8896-282
E-Mail: de@HARTING.com
Internet: www.HARTING.com

Office Germany

HARTING Deutschland GmbH & Co. KG
Blankenauer Straße 99
D-09113 Chemnitz
Phone +49 0371 429211
Fax +49 0371 429222
E-Mail: de.sales@HARTING.com

Great Britain

HARTING Ltd., Caswell Road
Brackmills Industrial Estate
GB-Northampton, NN4 7PW
Phone +441604/766686, 827500
Fax +441604/706777
E-Mail: gb@HARTING.com
Internet: www.HARTING.co.uk

Hong Kong

HARTING (HK) Limited
Regional Office Asia Pacific
3512 Metroplaza Tower 1
223 Hing Fong Road
Kwai Fong, N. T., Hong Kong
Phone +852/2423-7338
Fax +852/2480-4378
E-Mail: ap@HARTING.com
Internet: www.HARTING.com.hk

Hungary

HARTING Magyarországi Kft.
1119 Budapest, Fehérvári út 89-95.
II. emelet 217/A.
Phone +36-1-205 3464
Fax +36-1-205 3465
E-Mail: hu@HARTING.com
Internet: www.HARTING.hu

India

HARTING India Private Limited
No. D, 4th Floor, 'Doshi Towers'
No. 156 Poonamallee High Road,
Kilpauk, Chennai 600 010,
Tamil Nadu, Chennai
Phone +91-44-4356 0415/6
Fax +91-44-4356 0417
E-Mail: in@HARTING.com
Internet: www.HARTING.com

Italy

HARTING SpA
Via Dell' Industria 7
I-20090 Vimodrone (Milano)
Phone +3902/250801
Fax +3902/2650597
E-Mail: it@HARTING.com

Japan

HARTING K. K.
Yusen Shin-Yokohama 1 Chome Bldg., 2F
1-7-9, Shin-Yokohama
Kohoku-ku, Yokohama
222-0033 Japan
Phone +81 45 476 3456
Fax +81 45 476 3466
E-Mail: jp@HARTING.com
Internet: www.HARTING.co.jp

Korea

HARTING Korea Limited
#308 Leaders Bldg., 342-1, Yatap-dong
Bundang-gu, Sungnam-City, Kyunggi-do
463-828, Korea
Phone +82-31-781-4615
Fax +82-31-781-4616
E-Mail: kr@HARTING.com

Netherlands

HARTING B.V.
Larenweg 44
NL-5234 KA 's-Hertogenbosch
Postbus 3526
NL-5203 DM 's-Hertogenbosch
Phone +3173/6410404
Fax +3173/6440699
E-Mail: nl@HARTING.com

Norway

HARTING A/S
Østensjøveien 36, N-0667 Oslo
Phone +4722/700555
Fax +4722/700570
E-Mail: no@HARTING.com

Poland

HARTING Polska Sp. z o. o
ul. Kamieńskiego 201-219
51-126 Wrocław
Phone +48 71-352 81 71
Phone +48 71-352 81 74
Fax +48 71-320 74 44
E-Mail: pl@HARTING.com
Internet: www.HARTING.pl

Portugal

HARTING Iberia, S. A.
Avda. Josep Tarradellas, 20-30, 4^a 6^a
E-08029 Barcelona
Phone +351.219.673.177
Fax +351.219.678.457
E-Mail: es@HARTING.com

Russia

HARTING ZAO, ul. Tobolskaja 12
Saint Petersburg, 194044 Russia
Phone +7/812/3276477
Fax +7/812/3276478
E-Mail: ru@HARTING.com
Internet: www.HARTING.ru

Singapore

HARTING Singapore Pte Ltd.
No. 1 Coleman Street
#B1-21 The Adelphi
Singapore 179803
Phone +6562255285,
Fax +6562259947
E-Mail: sg@HARTING.com

Spain

HARTING Iberia S.A.
Josep Tarradellas 20-30 4^a 6^a
E-08029 Barcelona
Phone +34 933 638 475
Fax +34 934 199 585
E-Mail: es@HARTING.com

Sweden

HARTING AB
Gustavslundsvägen 141 B 4tr
167 51 Bromma
Phone +468/4457171
Fax +468/4457170
E-Mail: se@HARTING.com

Switzerland

HARTING AG
Industriestrasse 26
CH-8604 Volketswil
Phone +4144 9082060
Fax +4144 9082069
E-Mail: ch@HARTING.com

Taiwan

HARTING R.O.C. Limited
Room 1, 5th Floor,
No. 495 GuangFu South Road
Taiwan – Taipei 110
Phone +886 02-2758-6177
Fax +886 02-2758-7177
E-Mail: tw@HARTING.com
Internet: www.HARTING.com.tw

USA

HARTING Inc. of North America
1370 Bowes Road
Elgin, Illinois 60123
Phone +1 (877) 741-1500 (toll free)
Fax +1 (866) 278-0307 (Inside Sales)
Fax +1 (847) 717-9430 (Sales and
Marketing)
E-Mail: us@HARTING.com
Internet: www.HARTING-USA.com

Eastern Europe

HARTING Eastern Europe GmbH
Bamberger Straße 7, D-01187 Dresden
Phone +49 351 / 4361760
Fax +49 351 / 4361770
E-Mail: Eastern.Europe@HARTING.com



Pushing Performance

www.HARTING.com