2018

G-iron

E.L.F. MAGNETIC SHIELD

MISSION

When we think of our children's future we wish that they grow up healthy and happy and that they are always safe.

To take care of them and protect them, at school, at home and in their workplace is a responsibility of each one of us.

We commit all our resources and energy, with pride and passion, to reaching this important purpose, so that the protection from magnetic radiation becomes a standard requirement for all projects, and not only the choice of few.

Because safeguarding the right to be healthy and guaranteeing a quality future is everyone's duty.

G-iron team, the 14th of April 2017


G-iron®
E.L.F. MAGNETIC SHIELD

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MAGNETIC FIELDS AND INTERACTIONS

SHIELDING PRACTICES: ENGINEERING GUIDELINES

PREVENTION:
AVOIDING THAT A RISK TURNS INTO DAMAGE

To prevent means to take any possible action to avoid the risk of damage, whether it results from a direct relation of cause and effect due to exposure to electromagnetic fields, or indirectly from the malfunctioning of electronic equipment, a medical diagnosis, or a financial analysis.

In the end, the term **risk** suggests the likelihood to suffer damage. Can we afford it?

What does **"preventing"** mean?

Essentially **TO PREVENT** means:

to protect people from the risk of suffering harm due to the exposure to an electromagnetic field - a danger that usually requires to set limits of exposure below the level which causes a proven biological effect or negative interactions with electronic equipment.

In 2002, the **International Agency for Research on Cancer (I.A.R.C.)** published a monograph which classifies magnetic fields as "possibly carcinogenic to humans". [...] Such classification is based on the pool analysis of epidemiological studies demonstrating a consistent pattern of a two-fold increase in childhood leukemia associated with average exposure to residential power-frequency magnetic field above 0.3 to 0.4 μT **(3-4 mG)**.

According to another **I.A.R.C.** report amended in June 2007 the lack of complete evidence linking E.L.F. magnetic fields and their carcinogenicity is due to the lack of reliable studies and to the fact that relevant interactions are not observed at significantly low levels of exposure. Therefore, **when building new power stations and designing new equipment, including appliances, it is essential to consider solutions which aim to reduce magnetic field exposure**.

A GLIMPSE TOWARDS THE FUTURE AND TODAY'S CONCERNS

Electromagnetic fields represent an unwanted phenomenon occurring in the environment for three main reasons:

1

The exposure of biological organisms to *very* intense fields, even for a short period of time, can have serious health implications.

2

The suspicion has been raised that *prolonged* exposure of people to electromagnetic fields, even at levels within regulations, could represent a risk factor for some serious diseases.

3

Electromagnetic fields, even of low intensity, can *interfere with the proper operation* of electronic equipment, whose malfunction can cause damage, a risk or an inconvenience (standard ref. IEC EN 61000 4-8; 61602, etc...)

CLASSIFICATIONS OF THE EFFECTS OF MAGNETIC FIELDS ON THE HUMAN BODY

Acute effects

Immediate and objective, determined by experimentation on volunteers:

with low frequency:
due to induced electric current.

with high frequency:
causing tissue heating.

Long-term health effects,

though it is difficult to prove the link between cause and effect (epidemiological studies), include:

more or less subjective symptoms (tiredness, irritability, impaired concentration, headaches, etc...)

objective and usually severe symptoms (cancer, degenerative diseases and the like)

QUOTIDIANI LOCALI

il mattino di Padova

HOME | CRONACA | SPORT | TEMPO LIBERO | VENETO | NORDEST ECONOMIA | ITALIA MONDO | FOTO

Sei in: HOME > VENETO > «CAMPI ELETTROMAGNETICI CAUSA DEL...

«Campi elettromagnetici causa del tumore»: vince la causa

Verona, impiegato ottiene l'indennità professionale: aveva lavorato per dieci anni sopra a cavi elettrici ad alta potenza

ELETTROMAGNETISMO TUMORI CAUSE

29 maggio 2017

"Electromagnetic fields caused the tumor": employee wins trial
Verona (Italy), an employee is granted compensation: he had been working above cables with a strong current for ten years.

DETERMINING LIMITS OF EXPOSURE TO PROTECT PEOPLE'S HEALTH. CURRENT ITALIAN REGULATIONS

The Italian legislator divides the population into **two main categories**:

1 PROFESSIONALLY EXPOSED WORKERS

Directive 2013/35/EU – Law 159 signed on the 1st of August 2016

Professionally exposed workers, namely the operators of the source of induction, for instance an MRI operator, electric maintenance staff and all personnel authorized to access technical rooms such as substations and other related areas. In this case the regulation to be referred to is the Consolidated Law on Health and Safety at Work (Law 81, signed on the 9th of April 2008, Coordinated Law and subsequent modifications Decree Law 106 signed on the 3rd of August 2009 and Directive 2013/35/EU of the European Parliament and of the Council of the 26th June 2013 on the minimum health and safety requirements on workers' exposure to risks related to physical agents (electromagnetic fields) that repeals Directive 2004/40/CE). For people who are not exposed to magnetic radiations because of their occupation (namely the general population, see point 2) the applicable law is the Prime Ministerial Decree signed on the 8th of July 2003 (f=50Hz).

2 POPULATION AND NON-PROFESSIONALLY EXPOSED WORKERS

Framework law n. 36 of 02/2001 – DPCM 8/7/2003

NON-professionally exposed workers, namely all employees who are not in charge of maintenance nor granted access to restricted areas, and the general population who might pass by or access the mentioned areas/sources belong to this category. In short, it includes all those who are not supposed to be exposed to magnetic radiation and have to be protected through the prevention of potential risks, by establishing limits of exposure significantly lower than the potentially harmful level, as recommended by the World Health Organization (WHO).

The right to health should not be intended as the right to be treated for a disease but the one of staying healthy.

For the general population, namely NON-occupationally exposed workers, the current regulation, DPCM 08/07/2003, establishes the obligation to comply with the values of exposure to 50Hz magnetic fields (ELF) shown in the table below.

Description	B [μT]	Note
Exposure limit	100	maximum value of exposure for general population in any condition
Attention value (in areas with presence of people for more than 4 hours)	10	to be considered as the average of the values reached in 24 hours in standard operating conditions
Quality goal (in areas with presence of people for more than 4 hours)	3	Starting from 2003. To be regarded as the average of the values reached in 24 hours in standard operating conditions

Table 1 – Excerpt from the DPCM 08/07/2003 for the exposure to 50 Hz magnetic fields (ELF)

Exposure has to be calculated based on the nominal current, as established by the Italian regulation for the calculation of the exclusion zone around HV/LV substations.

For professionally exposed workers the "target value" for the exposure to magnetic fields is 25/f, with f being the frequency expressed in KHz. Therefore, at 50 Hz it is equal to 500μT (Decree Law 81/2008 and amended "Consolidated Law on Health and Safety at Work"). The target value determines the level of magnetic induction above which any necessary action must be taken to reduce or remove the risk for professionally exposed workers. Such limit has been increased by the Directive 2013/35/EU as defined by the table below.

Range of frequencies	Magnetic induction Target Value [microT] (RMS)
1 Hz ≤ f < 8 Hz	$2.0 \times 10^5/f^2$
8 Hz ≤ f < 25 Hz	$2.5 \times 10^4/f$
25 Hz ≤ f < 300 Hz	1×10^3
300 Hz ≤ f < 3 kHz	$3.0 \times 10^5/f$
3 kHz ≤ f ≤ 10 MHz	1.0×10^2

Table 2 – Excerpt from the Directive 2013/35/EU

ENGINEERING AND ELECTROMAGNETIC COMPATIBILITY

Electromagnetic compatibility (EMC) is the ability of a certain device to operate to its full potential in an electromagnetic environment without interfering with the operation of other electronic equipment working in the same area.

In Europe, EMC is nowadays regulated by the **Directive 2004/108/CE of the European Parliament and of the Council of the 15th of December 2004** on the approximation of laws of the Member States relating to electromagnetic compatibility and repealing the Directive 89/336/CEE.

Such Directive provides for shared objectives regarding safety regulations, making sure that equipment approved by one Member State of the European Union is suitable in all other countries of the EU.

The interference of electromagnetic fields with electronic equipment or with a machine can vary from minor operation disruptions to irreparable damage, consequently losing its functionality.

OTHER RELATED STANDARDS:

IEC EN 61000-4-8: electromagnetic compatibility

It establishes the immunity requirements of equipment, under operational conditions, to magnetic disturbances at power frequencies (50-60 Hz).

LEVEL	MAGNETIC FIELD STRENGTH	
1	1 A/m	1.26 µT
2	3 A/m	3.78 µT
3	10 A/m	12.6 µT
4	30 A/m	37.8 µT
5	100 A/m	126 µT
6	Special	Special

WHERE THE "MAGNETIC" SOURCES ARE MANY AND STRONG AND VITALLY IMPORTANT DATA MUST BE PROTECTED

- **IEC EN 60601:** Medical electrical equipment where technology is sensitive and requires a clean signal.
- **IEC EN 45502-2-X:** requirements for active implantable medical devices (pacemakers, defibrillators, hearing aids).
- **IEN EN 50500:** measurement procedure for electromagnetic levels in the railway environment.

OUR MOST COMMON APPLICATIONS

Our shielding systems are designed to protect the population and electronic equipment from the negative effects of magnetic induction and can be installed in any architectural context, thanks to G-iron products' unique features, such as their flexibility, lightness and high performance. This is the reason why we work with a wide range of customers belonging to the industrial field, but also MEP, military, hospital sector, etc.

HEALTH

The protection of people

Most of the time we potentially come in contact with all those invisible elements which are harmful for our health. For example, LV substations are an important source of magnetic radiation.

UNIVERSITY

Labs with equipment

In universities, where protecting the future generations of students and their research labs requires a safe and "magnetically clean" environment.

HOSPITALS

Medical equipment

In hospitals, where medical devices have a very low tolerance towards electromagnetic pollution and need to operate in the best possible conditions in order to yield reliable results and supply proper diagnosis; where people's health is already compromised and a safe environment is essential to speed up the healing process.

DATA CENTERS
Databases and archives

In data centers, the most critical and sensitive archiving system of any company, where the sources of electromagnetic induction are many and strong and where the electronic equipment is sensitive.

HIGH TECH ENVIRONMENTS
High-accuracy equipment

In high-tech environments, where results must be accurate and in all those locations where technology is involved in everyday life, namely in schools, on various means of transportation, in the construction industry, in research centers, where SEM and TEM microscopes tolerate extremely low levels of static and dynamic induction and in places where people are exposed daily both for work and for leisure.

WATERCRAFTS
Strong induction

On ships and yachts, where a strong induction in a confined space causes an increased exposure to magnetic fields. A shielding system provides peace of mind and a high quality of life.

G-IRON SNAPSHOT

September 2017

MARCO ALVELLI
Owner – R&D

OVIDIO VILIGIARDI
Senior Technical team

SAURO PAPERINI
Senior Technical team

LUCA CANESCHI
Junior Technical team

RICCARDO FORNAINI
Junior Technical team

CLAUDIA GALLORINI
Front Desk

FRANCESCA BUONCOMPAGNI
Sales Manager

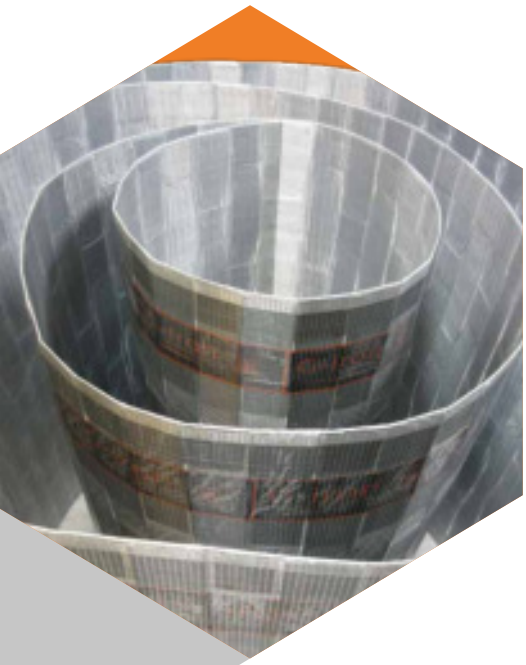
NICOLAS GIRARD
Senior Sales team

AZZURRA MORMII
Senior Sales team

JESSICA JENNY BERTI
Junior Sales team

OUR COMPANY

G-iron Srl has been Italy's leader in magnetic shielding in the range of frequency **0 Hz – 50 kHz** for more than 15 years. We are also very active abroad where the company is directly represented through partnerships with different companies operating in the same sector.



INNOVATION = G-iron SuperFlex®

A G-iron® shielding system includes our 20-year performance warranty as the producer of the material. We pride ourselves in giving special attention to customers' needs and in constantly improving our performance. For our research we work in close contact with Centro Sviluppo Materiali in Rome (CSM SpA), a high-end research center specialized in magnetic materials, along with our collaboration with the National Research Council in Florence and Lecco and the National Institute for Nuclear Physics in Naples. The result of all this work is G-iron SuperFlex®, the new generation of shielding system which provides high-performance results in terms of "mitigation of the magnetic field".

FLEXIBILITY = G-iron SuperFlex®

With a bending radius of 50 mm it can easily be adapted to any surface and be bent by hand to a 90° angle.

LIGHTNESS = G-iron SuperFlex®

In most shielding projects, it allows to avoid the use of conductive aluminum alloy sheets, thus removing the rigid and heavy part of a shielding system, yielding an excellent attenuation with a weight of only 3.6 kg/m^2 per layer (see page 31).

FAST installation

Few nails and the job is done, putting each strip of the material close to another, or better yet, overlapping the strips by few millimeters without screws or welding. G-iron SuperFlex® can be applied directly to any surface and it can be bent to a 90° angle and shaped by hand as needed. Fast and easy, in just few steps.

See how it is done

EVOLUTION of the product

The fact that the installation can be carried out without having any particular skills is certainly one of G-iron SuperFlex®'s main advantages. While G-iron Flex™ was already electrically insulated and protected from corrosion, G-iron SuperFlex® is even more so, thanks to its ultra-resistant plastic film which can withstand temperatures up to 70°C (158°F). For particular applications we can also provide a different plastic covering which resists to much higher temperatures, up to 220°C (428°F).

SERVICES provided to our Customers

Support to MEP consultants when drafting an electrical project, carrying out site surveys, evaluating the electromagnetic impact with certified equipment, and 3D simulations of magnetic fields are just a few of the services provided to our customers to complete the engineering and production of G-iron® shielding systems.

WARRANTY

The 20-year performance warranty, which comes with each project, is always provided along with the product liability and quality insurance offered in partnership with Allianz S.p.A. to protect our customers from the inconvenience of hidden manufacturing defects.

CERTIFICATION

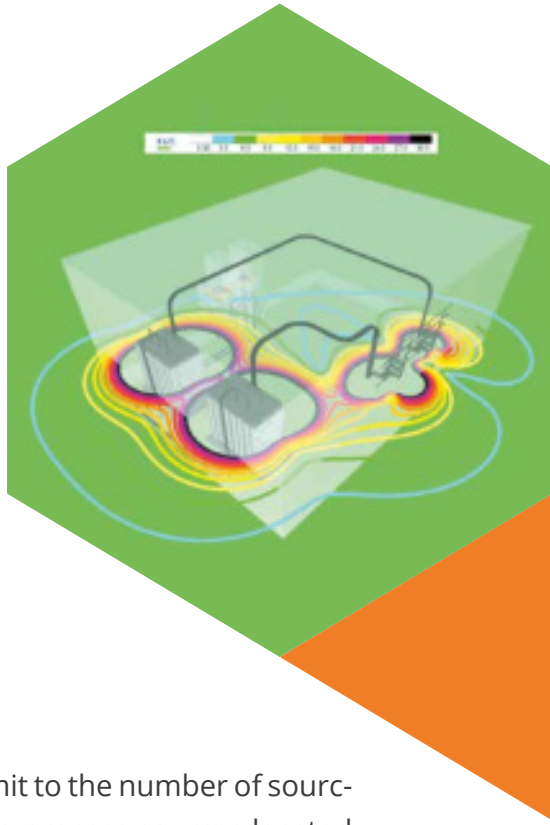
G-iron® is the first Italian company to be ISO 9001:2008 certified for the shielding of low frequency magnetic fields.

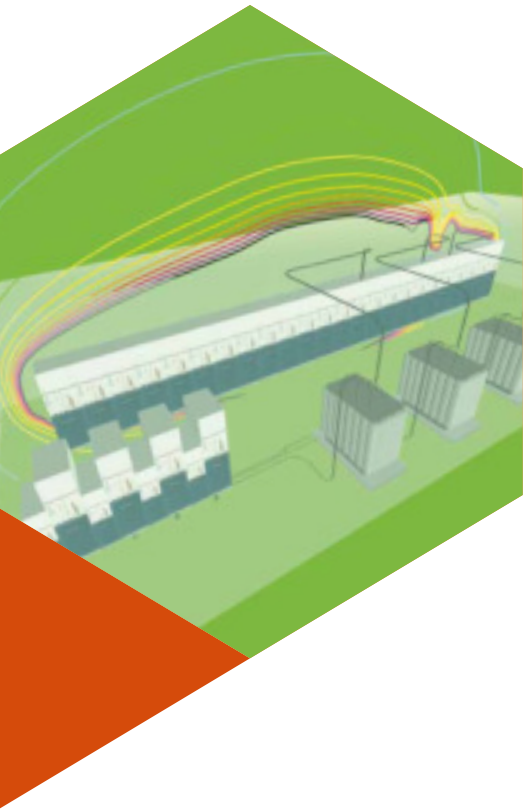
Member of CISQ Federation
RINA
ISO 9001
Certified Quality System

3D MAGNETIC SIMULATIONS

The assessment of electromagnetic impact is one of the steps in the process of analysis of the magnetic propagation during the engineering phase. The more accurate the data is, the more precise the simulation will be. For a thorough assessment CAD files are required:

- Architectural and electrical layout of the source: plan views and sections.
- Type and power of each source: HV switchgear, transformer, LV switchgear, UPS, etc.
- Distribution: busbar trunking, section and number of cables per phase, etc.

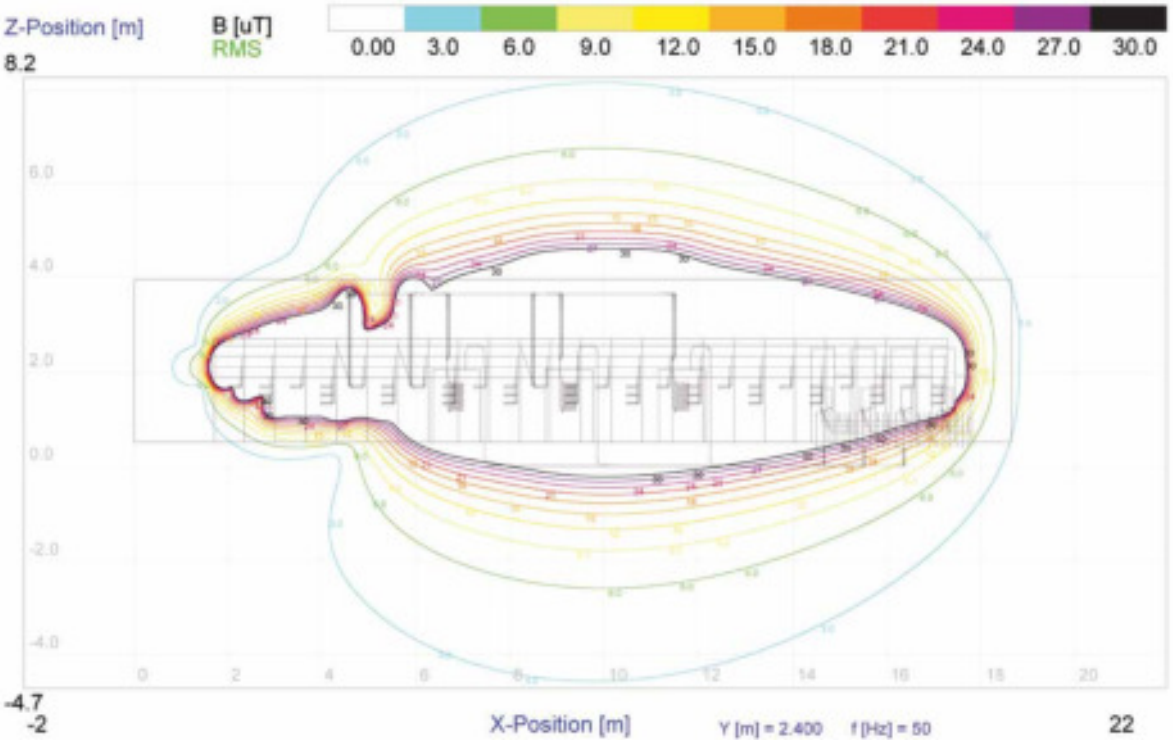


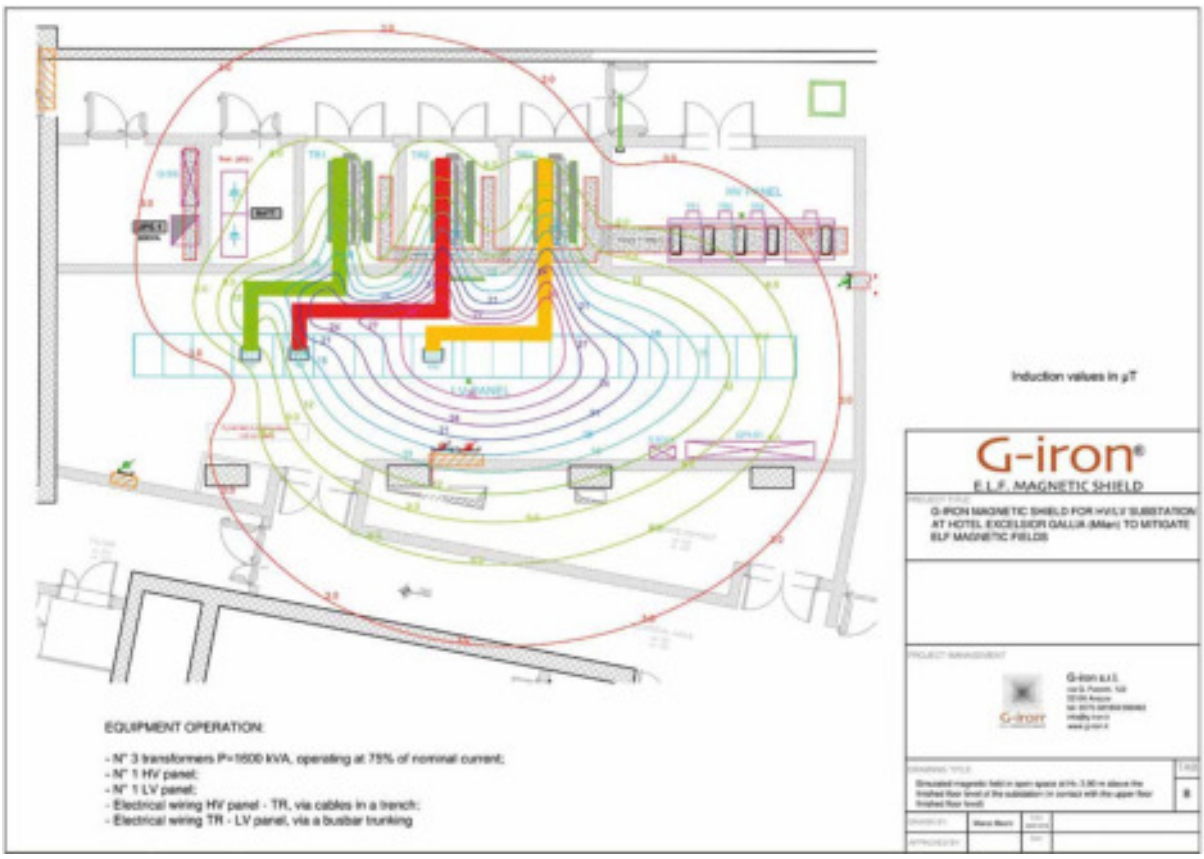


The simulation does not set a limit to the number of sources and the 3D function allows to process sources located on different floors.

The software we use operates between 5 Hz and 32 kHz and comes with a database, regularly updated by its German software house, that contains the features of the main brands of transformers, HV and LV switchgear, along with all kinds of cables available on the market. Cables are divided into categories based on the internal structure of the cable's conductors, also distinguishing between aluminum and copper. All these components can be edited and customized to fit the actual situation at hand for the purpose of obtaining an accurate final result. All basic components can hence be customized to meet the customer's demand. The simulation results will vary based on the load considered and they can also be represented in a specific area on a plan view or a sectional view. The magnetic simulation can be certified for engineering use.

SECTIONAL VIEW OF A SIMULATION OF AN LV PANEL





Gauss lines on a plan view (showing the line for 3μT or 30 mG as per the limit set by Italian legislations)

PHOTO GALLERY

Milan, Italy
EXPO 2015
Installation of the G-iron shielding system inside 24 HV/LV substations

Genoa, Italy
SIEMENS SPA
Installation of the G-iron shielding system inside an HV/LV substation

Milan, Italy
CITYLIFE SPA
Design and installation of a G-iron shield on walls and floor, and of shielding cable trays

New York, USA
COLUMBIA UNIVERSITY
G-iron Flex™ tested in view of future installations of shielding systems in certain areas of the building

Rome, Italy
ALSTOM Ferroviaria SpA
Shielding of the ceiling, floor and busbars

Milan, Italy
HOTEL EXCELSIOR GALLIA
Shielding of a substation to protect the conference room

Valenza, Italia
BULGARI ITALIA SpA
Shielding of the floor inside a sub-station to protect the workers

Milan and Arezzo, Italy
ABB
Installation of a shielding system serving the purpose of protecting employees on their workplace

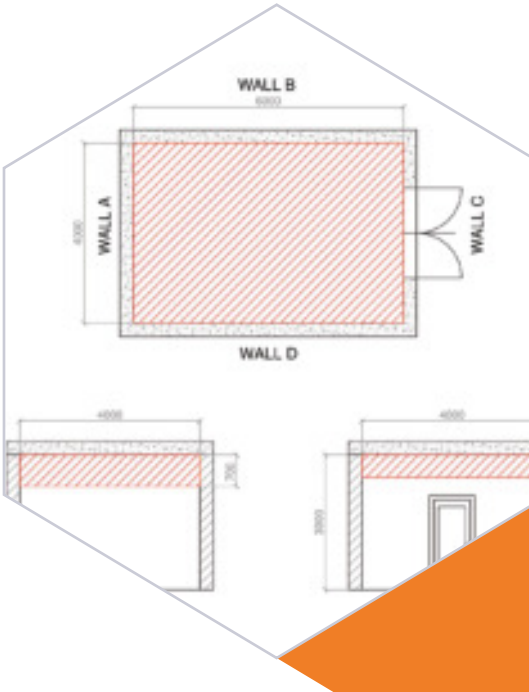
Lorca, Spain
GUARDIA CIVIL
The shielding system was designed and installed inside an HV/LV substation

ENGINEERING A SHIELDING SYSTEM

The design of a shielding system is based on simulations of the magnetic field and on our company know-how gained through nearly 20 years of experience in assessing all possible conditions. G-iron's international approach has enriched its "points of view" and encompassed new ideas on how to proceed because designing a shielding system does not only require calculations but **also creativity and excellent knowledge of construction techniques and of industrial technologies**. **We are already directly represented in the United States, Canada, Spain, United Arab Emirates, England and Singapore** and further news are expected throughout 2018.

The efficiency of our shields is based on the intensity of the magnetic field and the target level requested by our customers or by applicable regulations. The magnetic readings always refer to the area to be protected and a complete enclosure is usually not necessary in order to yield the desired result.

The shielded surfaces are usually shaped like a "lid": a flat surface with side extensions to avoid the concentration of magnetic induction by the edge of the flat shield (fringe fields). In some cases, the flat part of the shield alone can be enough, assuming its surface is bigger than the source's.



INSTALLATION: G-iron® Factory G-iron® Customer Customer

G-iron® Factory

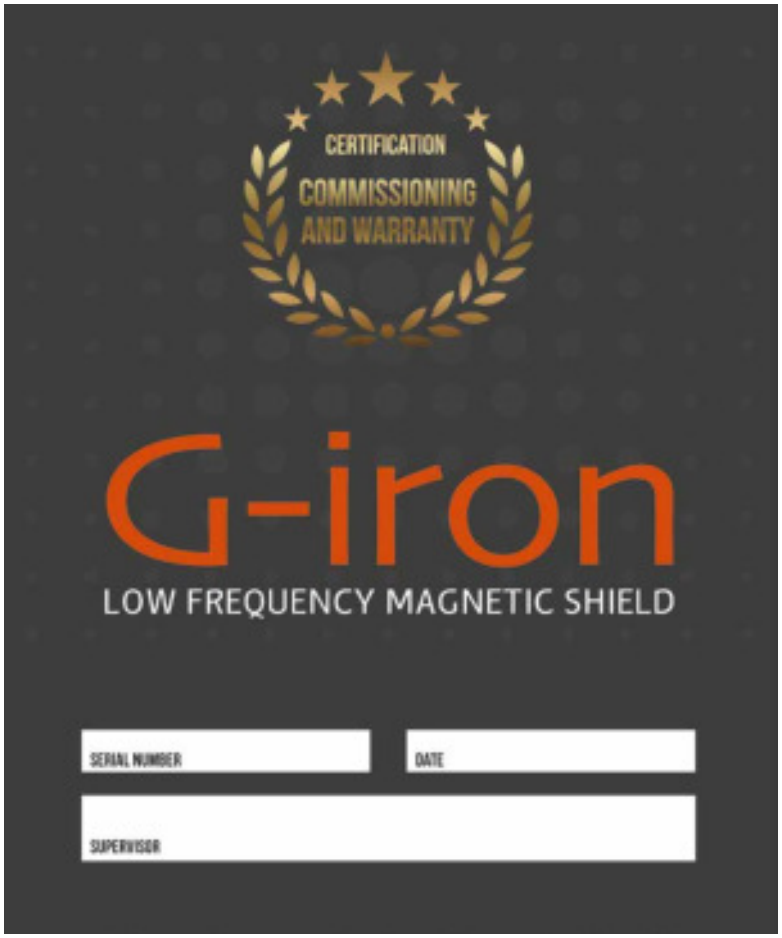
The installation is carried out by **"G-iron® Factory"** authorized subcontractors. Installation teams, usually formed of a maximum of 5 workers, are trained in a professional manner at our HQ in Arezzo and on construction sites until they are able to carry out an installation scope autonomously. Our Quality Supervisor goes on site during the installation whenever necessary.

G-iron® Customer

The installation is completed by the Customer's labor force with the constant guidance of G-iron's **"Quality Supervisor"**. The minimum level of skills required is that of a plasterboard worker. The number of people needed is decided in advance based on the quantity of shielding system and on the complexity of the scope. Moreover, a detailed list of the tools needed for the installation will be provided.

Customer

When the shielding surface is small and the installation is simple, customers can complete it on their own. In this case a specific installation manual will be prepared to facilitate the procedure. A **Quality Supervisor** will provide remote assistance over the phone. The conformity of the installation will be confirmed upon assessing pictures of the work received via smartphone or email.



Once the installation is completed the Supervisor will commission the installation if part of the scope. Otherwise he will state the completion of the site and fill out the **"commissioning and warranty certificate"** which will have to be applied to one of the shielded surfaces or archived with the contract and related paperwork.

COMMISSIONING METHODS: ON SITE | SPOT | H24

The commissioning procedure is determined in the scope and can be based on local or international standards. When no pre-established regulation can be applied to the commissioning of our works, we decide with our customer the proper procedure to confirm the conformity of our installation. Once this has been established the following methods can be applied:

"ON SITE" COMMISSIONING

Carried out by G-iron® staff once the installation is completed. Adequate sources of magnetic fields (coils, rods) are used to generate a magnetic field similar in strength and orientation to the peak of induction the real source would produce (open space field). The "shielded magnetic field" is then read with professional field analyzers. A calculation of the efficiency is done by comparing the open space value and the reading on the shielded side. This kind of commissioning method complies with an internal protocol based on the attenuation curves of the material tested in our labs.

"SPOT" COMMISSIONING

Carried out by G-iron® staff with the equipment working at minimum 25% of its nominal current. Specific marks for the readings are located in the protected area and, constantly checking the load on the equipment, readings of the shielded magnetic field are carried out. A simple calculation will then allow to determine what the value of the magnetic field would be if the equipment were working at its maximum load.

"H24" COMMISSIONING

Carried out by a trusted professional with the equipment working under operational conditions. All the regulations with regards to magnetic readings are strictly followed. In Italy the regulatory bodies require that the readings last 24 hours. The field analyzer will be positioned according to the applicable standard and remain on site for the duration of the procedure, so as to allow readings every 60 seconds. It will be the customer's responsibility to keep the field analyzer safe. A complete report of the results will be supplied, containing all the conclusions certifying the conformity of the protected area with the current regulations.

PERFORMANCE WARRANTY AND ALLIANZ PRODUCT LIABILITY PREMIUM

PERFORMANCE WARRANTY

The shielding system's performance warranty is activated by our **"Quality Supervisor"** once the work on the construction site is completed and all the documentation has been filled out. It is not linked to the result of its commissioning because all G-iron® shielding systems are designed and manufactured to give a performance warranty.

Our warranty is valid for 20 YEARS

Limitations to the warranty

- The electrical layout and the loads shall remain the same as those analyzed during the engineering phase of the shielding system
- The shield shall not be exposed to infiltrations of water
- The shielding material shall not be exposed to flames
- Any change, including drilling holes in the shield, must be approved by G-iron S.r.l. in writing
- The shielding system shall not be altered
- The installation must be carried out as per G-iron S.r.l.'s instructions
- The warranty refers to the sources and to the technical data analyzed to design the shield. It does not include potential interference coming from other sources which were not considered during the engineering phase.

PRODUCT LIABILITY INSURANCE AND HIDDEN MANUFACTURING DEFECTS

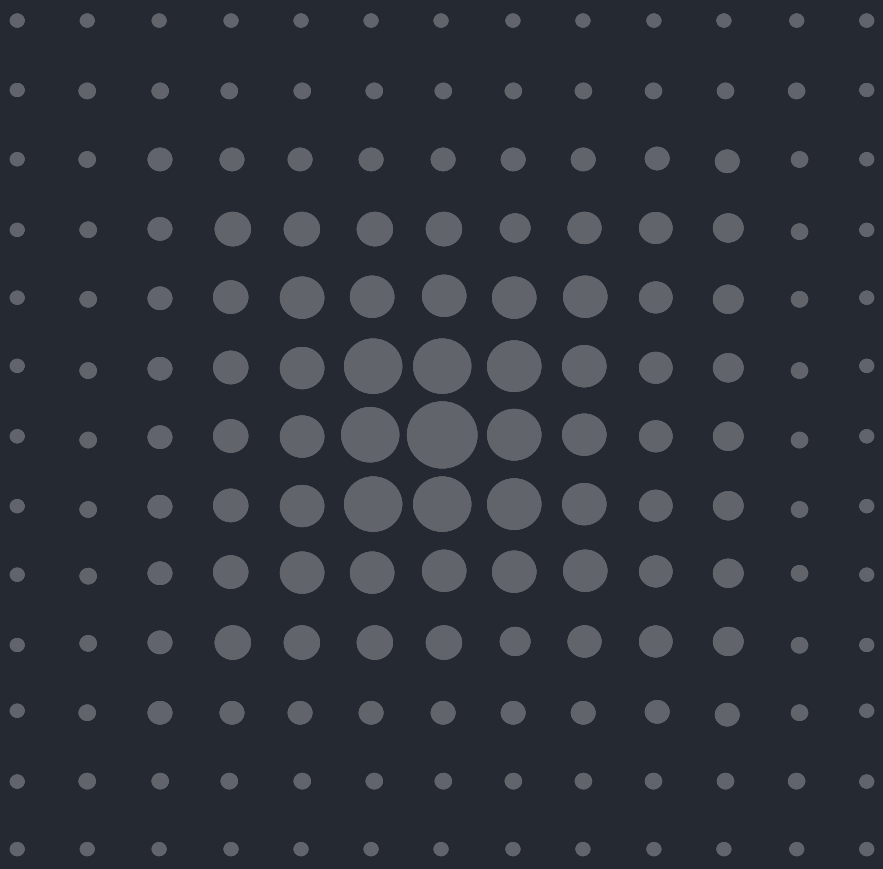
Thanks to a partnership with Allianz S.p.A. G-iron offers their customers the product liability premium n°731205277 with a maximum coverage of €2,500,000.00. The insurance is certified and verifiable by calling the toll-free phone number 800686868.

Excerpt from Article 5.1 of the General Terms and Conditions of insurance (translated):
Bearing liability under civil law, the Company shall indemnify the Insured in respect of the amount he/she has to pay by way of compensation (capital, interest and expenses) ***for damages involuntarily caused to third parties by the defects of the products manufactured by the Insured and included in the insurance****. Such compensation is due in case of death, personal injury and in case of destruction or deterioration of objects caused by an event related to any of the hazard the insurance is covering for. The insurance also includes a compensation, within the limit stated above, for the inconvenience caused by complete or partial interruptions of industrial, business, commercial and agricultural activities or services provided that they are caused by an incident covered by the insurance.*

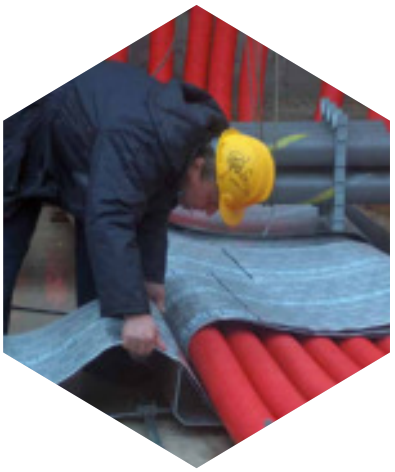

G-iron®
E.L.F. MAGNETIC SHIELD

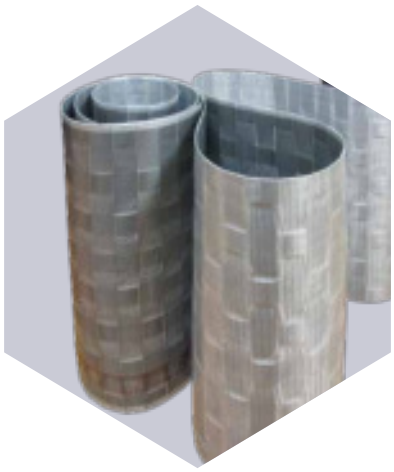
SHIELDING PRACTICES

ENGINEERING GUIDELINES:
Superflex® - HE™ - Exad™



G-iron SuperFlex®





G-iron SuperFlex® has transformed the engineering of shielding systems. Indeed, its guaranteed performance shows a high shielding efficiency on all three components of a magnetic field.

It is installed directly on the surfaces with wall plugs, nails, double-sided tape, glue, resins, etc. In case corners or curved surfaces have to be shielded G-iron SuperFlex® will have to be appropriately shaped by hand with the aid of a straight edge. On the floor the material should preferably be installed under the screed, option made possible by the fact that the material is protected against corrosion by a polypropylene film. The magnetic continuity is guaranteed by the installation “side by side” of the various strips making the shield or by overlapping the strips slightly. Various shielding thicknesses can be used, from 0.6 mm (one layer) up to 1.8 mm (three layers).

Supply: Rolls	**Length: 24.5 m**	**Width: 642 mm**	**Weight: 3.6 kg/m²**
Minimum bending radius: 50 mm thickness 0.6 mm			
Protected from corrosion and electrically insulated with the appropriate plastic film			
Attenuation, one layer: see choice of configuration page 31		Attenuation, two layers: see choice of configuration page 31	
Saturation: Data not available		Relative permeability μr: Data not available	
Loss of efficiency due to mechanical deformation: max. 2 dB			
*Maximum operating temperature: 550°C (**70°C or 158°F) *Without any protective film/**With standard protective film			

Choice of configuration***

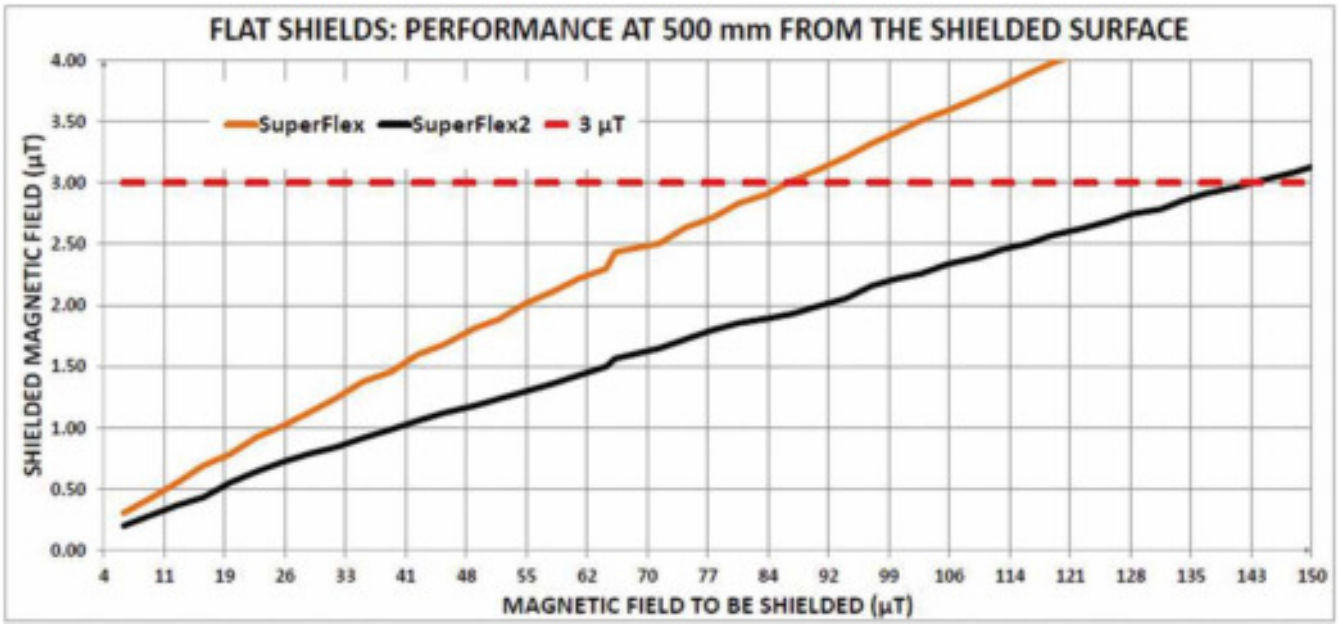


TABLE OF THE VALUES SHOWN IN THE GRAPH IN µT											
OPEN SPACE INDUCTION	3.2	6.4	9.6	12.9	16.1	19.3	22.5	25.7	28.9	32.1	35.3
SuperFlex	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.4
SuperFlex2	0.1	0.2	0.3	0.4	0.4	0.6	0.6	0.7	0.8	0.8	0.9
OPEN SPACE INDUCTION	38.7	41.9	45.1	48.8	51.8	55.0	58.2	61.5	64.7	65.9	71.2
SuperFlex	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5
SuperFlex2	1.0	1.1	1.1	1.2	1.2	1.3	1.4	1.4	1.5	1.6	1.6
OPEN SPACE INDUCTION	74.4	77.6	80.8	84.0	87.3	90.5	93.7	96.8	99.7	102.9	106.1
SuperFlex	2.6	2.7	2.8	2.9	CHANGE OF CONFIGURATION						
SuperFlex2	1.7	1.8	1.9	1.9	1.9	2.0	2.1	2.2	2.2	2.3	2.3
OPEN SPACE INDUCTION	109.9	112.6	115.8	118.6	122.3	125.7	128.3	131.9	134.5	137.2	141.3
SuperFlex	CHANGE OF CONFIGURATION										
SuperFlex2	2.4	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.9	2.9	3.0

*** average values, source: G-iron lab

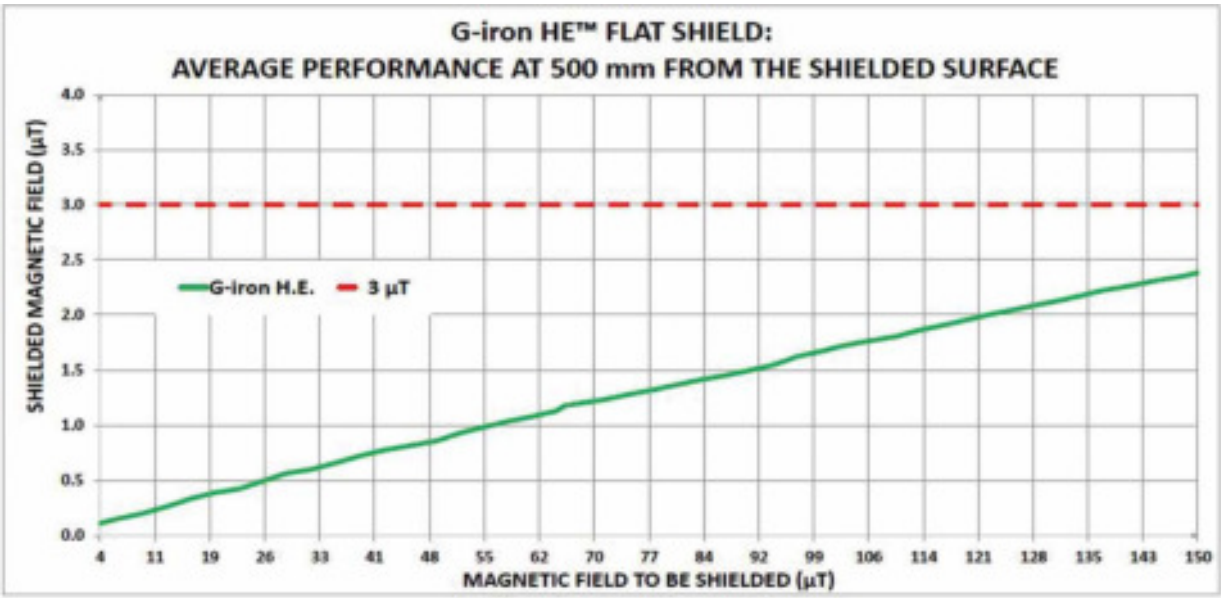
G-iron HE™



G-iron HE™ shielding systems, on the market for nearly 20 years, yield great results in terms of mitigation, obtained by coupling aluminum alloy sheets with one or more layers of G-iron SuperFlex®. In this configuration the high mitigation properties of G-iron SuperFlex® are coupled with the magnetic reflection offered by the Al sheets when exposed to a low frequency magnetic field. The thickness of the shielding system goes from a minimum of 3 mm up to a maximum of 5.7 mm. Based on the specific features of the shielding project, the conductivity of the shielding surface may be increased with the most effective and least invasive manner for the context of installation at hand. These modular configurations allow to install the shield in layers in order to work with smaller and therefore lighter parts.

Supply: Rolls + Shaped Al alloy sheets Weight: 8.25-18 kg/m²	
Minimum bending radius: 50 mm	
Resistance to corrosion: standard resistance of Al sheets based on the context	
Attenuation: see Choice of configuration page 33	
Saturation: >> 2T	Relative permeability μr: Data not available
Loss of efficiency due to mechanical deformation: max. 2 dB	
*Maximum operating temperature: 550˚C (**70˚C or 158˚F) *Without any protective film/**With standard protective film	

Choice of configuration***



Limit 3µT or 30 mG as per the Italian legislation for general population

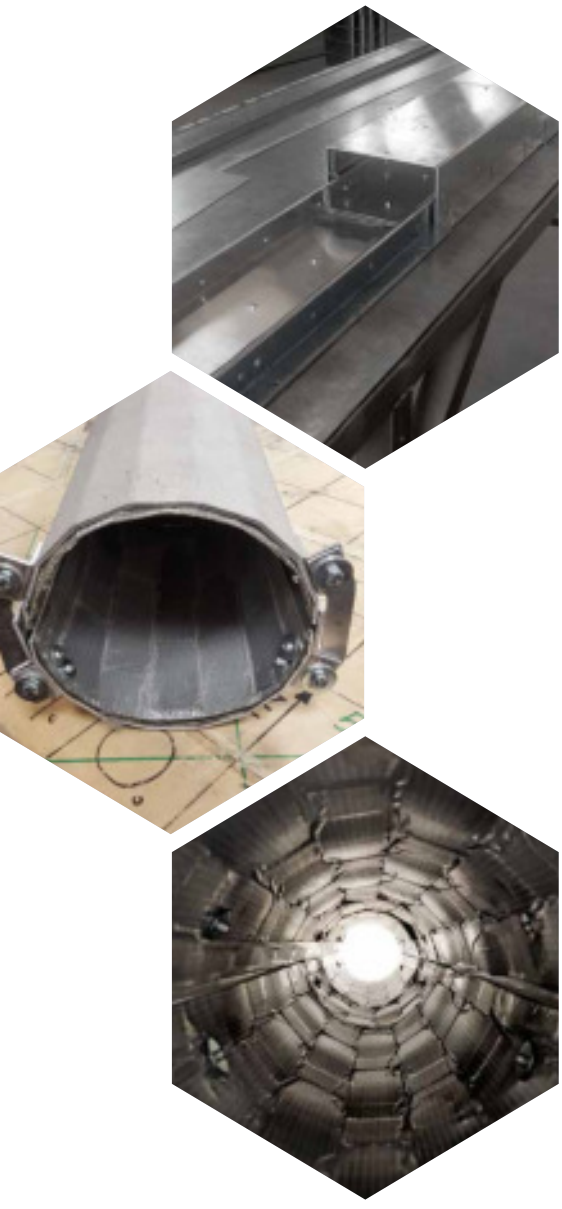
DISTANCE FROM THE SHIELD: 500 MM	
KIND OF SHIELD	
G-iron HE™: average values	
OPEN SPACE (µT)	SHIELDED FIELD (µT)
3	0.10
13	0.26
22	0.42
32	0.60
42	0.77
52	0.93
61	1.08
71	1.23
81	1.37
90	1.50
100	1.67
110	1.81
119	1.94
128	2.09
137	2.22
148	2.35
157	2.49

*** average values, source: G-iron lab

G-iron shielded cable trays

G-iron Exad™ / G-iron Icos™: Shield and chic

A new shielding approach for cable trays. These trays are different from the traditional ones constructed with a rectangular base and lid, which are still produced in all sizes on request. G-iron Exad™, internal diameter 170 mm, is the medium size model of a series of polygonal tray tables available since September 2017. On the other hand, G-iron Icos™, internal diameter 300 mm, is currently the biggest model available. The complete range of these products is available with a rough, anodized or sandblasted finish, as well as painted in RAL colors available on request to differentiate the paths. Special pieces and anchoring systems are defined during the design phase and custom-made. These are “elegant” and light-weight industrial products which definitely provide an improved shielding performance compared to the traditional rectangular models.



ITALBREVETTI

Consulenza Tecnica e Legale

Pontedera 30.11.2016

Spett.le
G-IRON S.R.L.
Via G. Puccini, 122
52100 AREZZO (AR)

Italbrevetti S.r.l. è stata incaricata di curare per Vs conto il deposito e la prosecuzione di una domanda di:

BREVETTO
PER INVENZIONE INDUSTRIALE

Ns. Rif.:	Lb1007
Vs. Rif.	
Stato:	ITALIA
Titolare/i:	G-IRON S.R.L.
Numero di domanda:	102016000121212
Data di Deposito	30/11/2016
Titolo	Canala portacavi schermante

ESTENSIONE ALL'ESTERO: dopo 90 giorni e prima di 12 mesi dal deposito in Italia

- Il brevetto ha una durata di 20 anni con decorrenza dal deposito.
- Il pagamento delle tasse di mantenimento è annuale ed inizia dopo quattro anni dal mese di deposito.
- L'emissione del rapporto di ricerca è prevista entro 9 mesi dal deposito.

LIMITI DI RESPONSABILITA'

Italbrevetti S.r.l. ha dedicato e dedicherà all'incarico affidato la massima cura e competenza, ciò premesso:

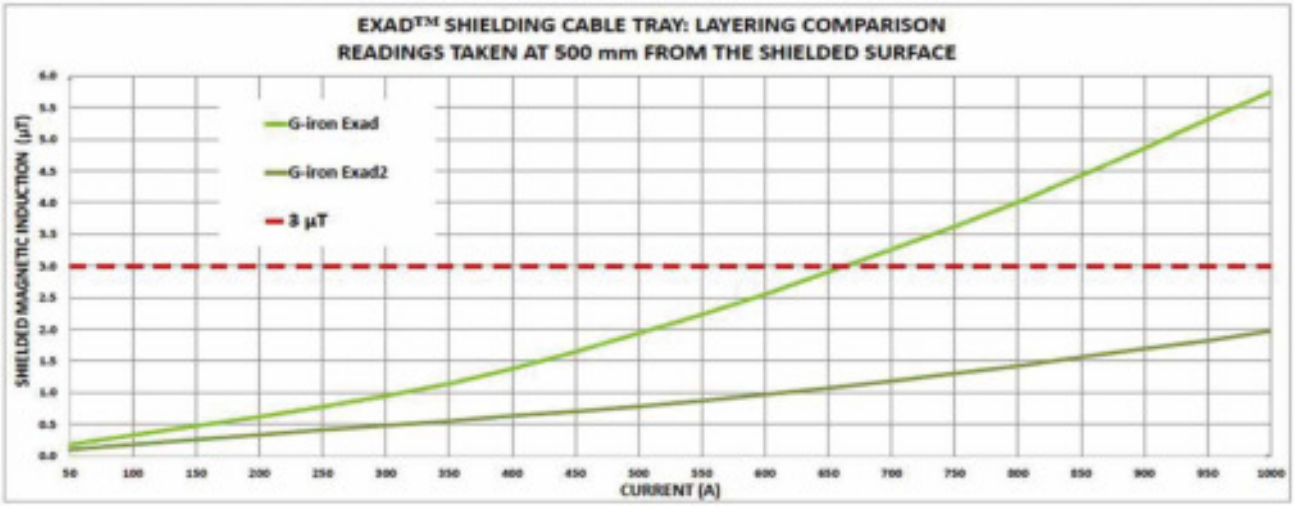
- La Società ha informato il richiedente sui requisiti di validità del brevetto ed in particolare sul fatto che non deve essere avvenuta divulgazione in nessuna parte del mondo anche da parte dello stesso richiedente.
- La Società può ricorrere a corrispondenti esteri e collaboratori (anche italiani) per lo svolgimento di specifiche attività quali ricerche, traduzioni, pagamenti di annualità. La Società si assume la responsabilità di collaborare persone che gestiscono di elevata reputazione ed affidabilità, tuttavia la responsabilità non può estendersi che alla scelta oculata e non già ad errori od omissioni imputabili a terzi (cioè non alla Società).
- La società offre di inviare avvisi di scadenza dei termini per l'esecuzione di future attività a titolo gratuito e comunque non come obbligo contrattuale. Pertanto, la Società non si assume responsabilità per eventuali errori od omissioni rispetto a tali avvisi.
- Le ricerche sono effettuate con la massima cura e diligenza su banche dati pubbliche o privati di varia natura, ma non su pratiche curate direttamente dalla Società stessa, in ottemperanza delle normative sulla Privacy e sul segreto professionale. Si fa presente comunque che le ricerche brevettuali non sono mai esaustive per cui non si assumono responsabilità per eventuali omissioni che possono intervenire nei relativi rapporti.
- Le rivendicazioni che concludono i testi brevettuali, così come le liste di prodotti o servizi contraddistinti da marchi, vengono inviate o mostrate per verifica, rielaborazione ed accettazione al cliente prima del deposito della relativa domanda. Non si assumono responsabilità per sei di rivendicazioni o liste di prodotti o servizi che non siano contestati per iscritto dal richiedente entro 30 giorni dalla notifica delle stesse.
- I pareri espressi da membri della Società su diversi problemi riflettono opinioni personali, sulla base di uno studio tecnico e/o legale competente e qualificato dei problemi stessi. Resta inteso che nessun parere di nessun professionista è assistito da garanzia di accoglimento da parte di terzi. Pubbliche Amministrazioni, Autorità Giudiziarie o Amministrative.
- Foro Competente è il Foro di Firenze. La legge applicabile è quella italiana.

Allegati: Verbale di deposito;
Copia testo brevettuale completo;
Nota di debito.

ITALBREVETTI S.r.l.

PATENT REGISTERED FOR G-IRON EXAD™ AND ICOS™ CABLE TRAYS

Choice of configuration***



Limit 3μT or 30 mG as per the Italian legislation for general population

VALUES EXPRESSED IN μT MEASURED AT 500 MM FROM THE SHIELD			
VALUE OF CURRENT (A)	OPEN SPACE	SHIELDED FIELD	
		G-IRON EXAD	G-IRON EXAD 2
100	7.82	0.330	0.180
250	19.43	0.770	0.410
400	31.02	1.380	0.630
550	38.67	2.230	0.870
700	53.88	CHANGE OF CONFIGURATION	1.180
850	65.22		1.560
1000	76.17		1.970

*** average values, source: G-iron lab

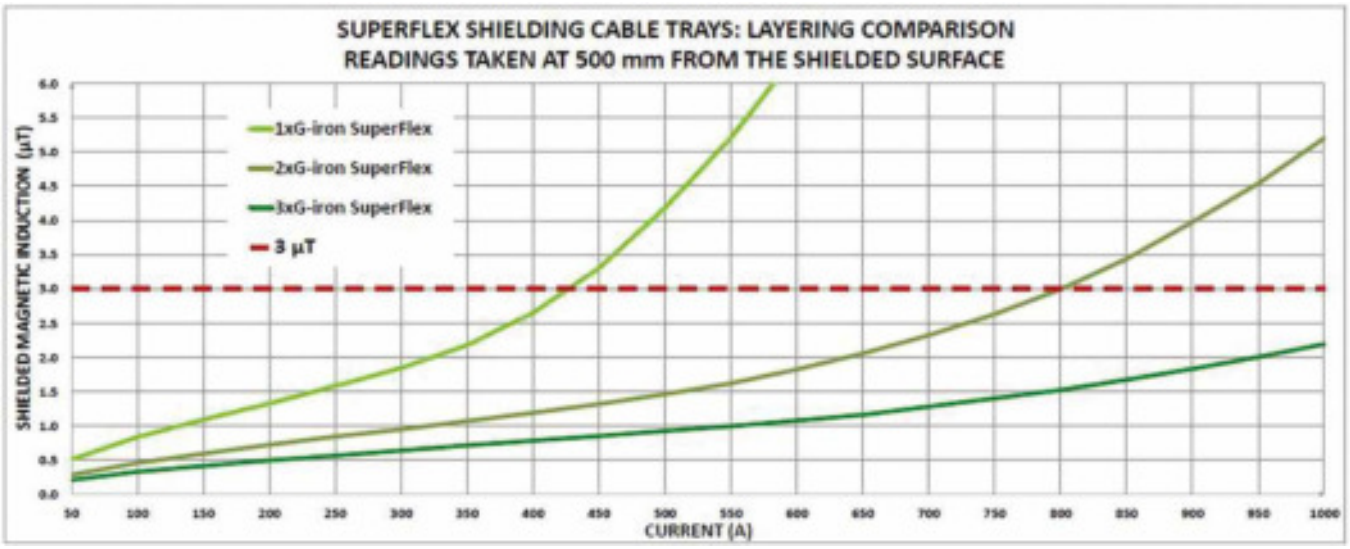
G-iron SuperFlex® shielded cable trays

G-iron SuperFlex® is also perfectly suitable for the shielding of cables. Its high performance, quick installation and low cost make it a multipurpose product. After being wrapped around the cables it can be fastened with some simple zip ties of the appropriate size that can be purchased by the customer or provided on request. The method just described is the most cost-efficient and fastest manner to shield overhead cables while yielding excellent results. The shield can be made of a maximum of 3 layers based on the attenuation required.

SUPERFLEX SHIELDED CABLE TRAYS: TECHNICAL DATA PER LINEAR METER

WIRE MESH TRAY	SuperFlex	Q.ty m²/m	Weight kg/m	Installation time for 10 m
mm 100x54	1 layer	0.404	1.495	55 minutes
	2 layers	0.808	2.990	65 minutes
	3 layers	1.212	4.484	90 minutes
mm 150x54	1 layer	0.560	2.072	55 minutes
	2 layers	1.120	4.144	65 minutes
	3 layers	1.680	6.216	90 minutes
mm 200x54	1 layer	0.680	2.516	55 minutes
	2 layers	1.360	5.032	65 minutes
	3 layers	2.040	7.548	90 minutes
mm 300x54	1 layer	1.020	3.774	55 minutes
	2 layers	2.040	7.548	65 minutes
	3 layers	3.060	11.322	90 minutes
mm 400x54	1 layer	1.200	4.440	60 minutes
	2 layers	2.400	8.880	75 minutes
	3 layers	3.600	13.320	100 minutes
mm 450x54	1 layer	1.320	4.884	60 minutes
	2 layers	2.640	9.768	75 minutes
	3 layers	3.960	14.652	100 minutes
mm 500x54	1 layer	1.480	5.476	60 minutes
	2 layers	2.960	10.952	75 minutes
	3 layers	4.440	16.428	100 minutes
mm 600x54	1 layer	1.720	6.364	60 minutes
	2 layers	3.440	12.728	75 minutes
	3 layers	5.160	19.092	100 minutes

Choice of configuration***



Limit 3µT or 30 mG as per the Italian legislation for general population

	SHIELDED INDUCTION AT A 500 MM DISTANCE FROM THE SHIELD		
	KIND OF SHIELDING SYSTEM		
CURRENT PER PHASE I (A)	1 x G-iron SuperFlex	2 x G-iron SuperFlex	3 x G-iron SuperFlex
	SHIELDED INDUCTION (µT)		
100	0.838	0.458	0.326
250	1.578	0.840	0.567
400	2.649	1.190	0.779
550	CHANGE OF CONFIGURATION	1.620	0.995
600		1.820	1.075
650		2.060	1.160
700		2.320	1.278
750		2.630	1.400
800		2.990	1.525
850		CHANGE OF CONFIGURATION	1.672
900			1.830
950			2.007
1000			2.193

*** average values, source: G-iron lab

G-iron® Testing Lab

G-iron's testing lab takes up a surface of 200 m^2 and represents one of the key points of our daily product development activities. It is fundamental step in the certification of particular applications, since we can generate magnetic fields between 0 Hz and 100 kHz and current values nearing 2000 A, along with impulsive magnetic fields.

Our field analyzers, always up-to-date with the latest upgrades and certifications, can be used to take magnetic readings in the range of frequencies from 0 Hz (static fields) to 400 kHz, besides being updated to measure impulsive fields by using the “weighted peak” function. These tools are also equipped with sensors to measure electric fields.

DESCRIPTIONS FOR SCOPES

G-iron SuperFlex®

SCOPE FOR ELECTROMAGNETIC SHIELDING, ELECTRIC ROOM
Scope for MEP contractor and subcontrator for shielding ELECTROMAGNETIC FIELDS, from 5 Hz to 50 kHz.
Supply and installation of shielding system, referred to as **G-iron Superflex®**, 0.6 mm thick flexible metal fabric, made in a warp and woof pattern, protected from corrosion and electrically isolated with a fiberglass-reinforced 250 µm thick polyester film on one side, whilst it is protected from corrosion and electrically isolated with a fiberglass-reinforced 125 µm thick polypropylene film on the other side, design and installation in compliance with local regulations and international standards (IEC EN 61000-4-8, WHO, etc.).
G-iron SuperFlex® does not require any additional conductive elements, unless required by the shield's working plan.
The installation includes every fastening element necessary to hand over the work fully finished and tested.
Thickness: 0.60-1.30 mm. Weight: 3.60-7.20 kg / m^2.
The **turnkey supply is provided in full** and includes:
design and electromagnetic impact analysis carried out with the certified software EFC400 (margin of error +/- 1.4%); architectural survey; production and customization of the goods; delivery to construction site; installation.
Performance warranty valid for 20 years.
Product: **G-iron SuperFlex®**

G-iron HE™

SCOPE FOR ELECTROMAGNETIC SHIELDING, ELECTRIC ROOM

Scope for MEP contractor and subcontrator for shielding magnetic fields, from 5 Hz to 50 kHz.

Supply and installation of shielding system, referred to as **G-iron HE™**, realized with a permeable element named **G-iron SuperFlex®**, 0.6 mm thick flexible metal fabric, made in a warp and woof pattern, protected from corrosion, electrically isolated with a 125 µm thick fiberglass-reinforced polypropylene film covered with a conductive element of appropriate thickness. Installation in compliance with international standards (IEC EN 61000-4-8, WHO, etc.).

The installation includes every fastening element necessary to hand over the work fully finished and tested, anchoring system included.

Thickness: 3-5.70 mm. Weight: 8.25-18 kg/m^2.

Turnkey supply is provided in full and includes:

design and electromagnetic impact analysis through the certified software EFC400 (margin of error +/- 1.4%); architectural survey; manufacturing and customization of the goods; delivery to the construction site; installation.

Performance warranty valid for 20 years.

Product: **G-iron HE™**

G-iron Exad™ shielded cable trays

SCOPE FOR ELECTROMAGNETIC SHIELDING

Scope for MEP contractor and subcontrator for the supply of shielding cable trays for magnetic fields with a frequency of between 5 Hz and 50 kHz.

Supply and installation of **shielded cable trays with a hexadecagonal section**, referred to as **G-iron Exad™**, with a permeable element named G-iron SuperFlex® (0.6 mm thick flexible metal fabric, made in a warp and woof pattern, protected from corrosion, electrically isolated with a 125 µm thick fiberglass-reinforced polypropylene film) and conductive elements of appropriate thickness. Design and installation in compliance with international standards (IEC EN 61000-4-8, WHO, etc.).

The installation includes every fastening element necessary to hand over the work fully finished and tested, anchoring system excluded.

Internal diameter: 170 mm

Weight: 7.50-11.50 kg/linear meter.

Turnkey supply is provided in full and includes:

design and electromagnetic impact analysis through the certified software EFC400 (margin of error +/- 1.4%); architectural survey; manufacturing and customization of the goods; delivery to the construction site; installation.

Performance warranty valid for 20 years.

Product: **G-iron Exad™**

G-iron HE™ shielded cable trays

SCOPE FOR ELECTROMAGNETIC SHIELDING

Scope for MEP contractor and subcontrator for the supply of shielding cable trays for magnetic fields with a frequency of between 5 Hz and 50 kHz.

Supply and installation of **rectangular shielded cable trays**, referred to as **G-iron HE™**, with a permeable element named **G-iron SuperFlex®** (0.6 mm thick flexible metal fabric, made in a warp and woof pattern, protected from corrosion, electrically isolated with a 125 µm thick fiberglass-reinforced polypropylene film) and conductive elements of appropriate thickness.

The design and installation aims to comply with international standards (IEC EN 61000-4-8, WHO, etc.).

The installation includes every fastening element necessary to hand over the work fully finished and tested, anchoring system excluded.

Thickness: 3-5.70 mm

Weight: 8.25-18 kg/m^2

Turnkey supply is provided in full and includes:

design and electromagnetic impact analysis through the certified software EFC400 (margin of error +/- 1.4%); architectural survey; manufacturing and customization of the goods; delivery to the construction site; installation.

Performance warranty valid for 20 years.

Product: **G-iron HE™**

G-iron SuperFlex® shielding cable trays

SCOPE FOR ELECTROMAGNETIC SHIELDING

Scope for MEP contractor and subcontrator for the supply of shielding cable trays for magnetic fields with a frequency of between 5 Hz and 50 kHz.

Supply and installation of **shielding cable trays with an oval section**, referred to as **G-iron SuperFlex®**, constructed with one or more layers of the permeable material **G-iron SuperFlex®** (0.6 mm thick flexible metal fabric, made in a warp and woof pattern, protected from corrosion and electrically isolated with a fiberglass-reinforced 250 µm thick polyester film on one side, whilst it is protected from corrosion and electrically isolated with a fiberglass-reinforced 125 µm thick polypropylene film on the other side) wrapped around an existing tray table.

Design and installation in compliance with international standards (IEC EN 61000-4-8, WHO, etc.).

The installation includes every fastening element necessary to hand over the work fully finished and tested.

Thickness: 0.60-1.80 mm

Weight: 3.60-10.80 kg/m^2

Turnkey supply is provided in full and includes:

design and electromagnetic impact analysis through the certified software EFC400 (margin of error +/- 1.4%); architectural survey; manufacturing and customization of the goods; delivery to the construction site; installation.

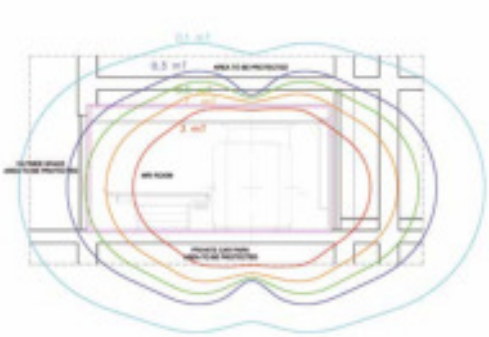
Performance warranty valid for 20 years.

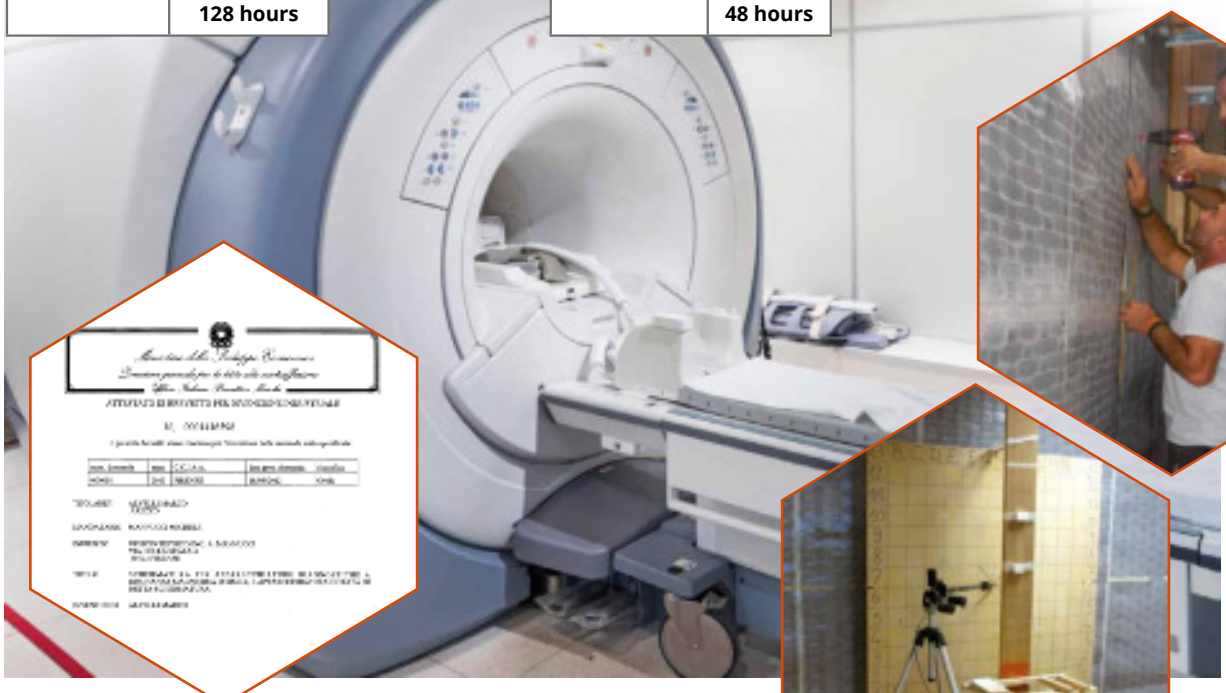
Product: **G-iron SuperFlex®**

M.R.I.
MAGNETIC CONFINEMENT PATENT N°0001416598

IRON SHEETS vs G-IRON SUPERFLEX
With equal shielding results

DATA MEASURED ON SITE: MAGNETIC CONFINEMENT MRI 1,5 T					
Iron FE235JR 8 Kg/m²/mm		VS Shielded surface		G-iron SuperFlex 3,6 Kg/m²/1 layer	
Thickness (mm)	Weight (Kg)	Mark	Qty (m²)	Layers N°	Weight (Kg)
18	1.728	a	12	2	86,4
6	864	b	18	1	64,8
9	864	c	12	1	43,2
10	1.440	d	18	1	64,8
12	2.400	e	25	1	90
10	2.000	f	25	1	90
Metallic structure	2.500			Wooden structure	10
Total Kg	11.796			Total Kg	449,2
Installation	8 days 2 men			Installation	3 days 2 men
	128 hours				48 hours





G-iron
E.L.F. MAGNETIC SHIELD

In partnership with
MORVIDUCCI S.r.l.
Edilizia e tecnologie Ospedaliere

I could have closed with a famous quotation or a dedication, instead I want to thank all G-iron's coworkers for having given their contribution to the realization of this important tool which communicates our Company's trend, brand, habits and, above all, the passion which defines us when it comes to reaching the desired goals.

Thank you and Go for it!

Marco Alvelli
Founder and CEO

G-iron®

E.L.F. MAGNETIC SHIELD

G-iron dreams by day to be cognizant of the many things that escape those who dream only by night

Edgar Allan Poe and Marco

Member of CISQ Federation
RINA
ISO 9001
Certified Quality System

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