

# INOSSIDABILE

Edited and published by Centro Inox



## Summary

For more detailed information please contact directly the names indicated at the end of each notification

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#### STAINLESS STEEL ALSO SHONE AT THE TURIN 2006 WINTER OLYMPICS (L'inox ha brillato anche sulle Olimpiadi invernali 2006 di Torino)

The new Palahockey is similar to a large rectangular box that measures approximately 183 m x 100 m, is covered with stainless steel panels and is suspended over a 5-metre high cement and glass base. To reduce the building's height as much as possible (15 m in total), the hockey rink was positioned at a height of 7.5 m and the galleries partly sunk and partly placed outside the ground. In this way, the public entrances are found on a level with the external terrain.

The covering of the higher volume was produced with more than 2,000 embossed panels in EN 1.4404 (AISI 316L) stainless steel sheet measuring 5,400 mm x 500 mm, and 1.2 mm thick. The satin finishing was performed prior to manufacture. The large oval bosses were obtained through cold working and create a "vibrating" effect on the facades. The oval shape of the bosses was chosen not only for its aesthetic value but also to reduce the tensions produced in the steel during press forming. In total, there are 7,500 m<sup>2</sup> of sheet for a total weight of approximately 70,000 kg. Several windows measuring 2,700 mm x 500 mm open on the facades. The panels have double folds on four sides which, as well as giving them their rigidity, allow the fixture on the perimeter with hidden screws, small holes and special washers to allow the movements generated by thermal expansions and acting loads. The external ceilings, which cover the lower part of the large box, were also made with stainless steel sheet, with a brushed opaque circular finish and measuring 5,400 mm x 500 mm and are connected to the internal ceilings.

**Client:** Agenzia Torino 2006, Torino / **Definitive project:** Arch. Arata Isozaki, Arch. Pier Paolo Maggiora - Arata Isozaki & Associates Co. Ltd con Arup Srl, Milano / **Coordination planning and architectural planning developments:** A. Isozaki & Associates - ArchA SpA, Torino / **Engineering planning developments:** Arup Srl, Milano / **Architectural and structural executive project:** Favero & Milan Ingegneria - Via Varotara 57 - Zianigo - I-30035 Mirano VE, phone +39 041 5785711, fax +39 041 5785700, fm@favero-milan.com, www.favero-milan.com / **Plant-engineering executive project:** Milano Progetti SpA, Milano / **General Contractor (for walls in aluminium, glass and stainless steel):** Lorenzon Techmec System SpA - Via Pacinotti 5 - I-30020 Noventa di Piave VE, phone +39 0421 5712, fax +39 0421 571333, info@lorenzons.it, www.lorenzons.it / **Stainless sheet processing:** Gatti Precorvi SpA - Via Lombardia 1 - I-24030 Medolago BG, phone +39 035 4993311, fax +39 035 4993404, info@gattiprecorvi.com, www.gattiprecorvi.com

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#### THE QUALITY OF PRODUCTION PROCESSES AND THE RESPECT FOR STANDARDS: TOOLS FOR PROTECTING CONSUMERS (Qualità dei processi di produzione e rispetto della normativa: strumenti al servizio della tutela del consumatore)

Increasingly, stainless steel flat and long products of poor quality, "uncertain" type or origin but competitively priced is coming onto western markets and the Italian market in particular. Sometimes, primary steel products although corresponding to European or international standards, are low in quality. Sometimes, actual non-conformity with European and international standards can be noted, where identification of the material or of the product proves to be manifestly "false" or at the very least "misleading".

**The cost of quality** - If the example of European steel mills, and mills present in the Italian market associated to Centro Inox in particular, is taken, it can be underlined that the cost of material is significantly influenced by the quality control of the steel product in all the various phases of its production. Indeed, the entire production cycle of these companies is ISO 9000 certified. Furthermore, the international ISO and European EN reference product standards are scrupulously respected, as well as those linked to environmental protection

in the ISO 14000 series. Although this represents a cost which is reflected in the final price of the product, it nevertheless also represents a "basic" guarantee for the user. Finally, it should not be forgotten that, even if the incidence of cost on each cast stainless steel ton proves to be very small, there is a cost born by the above-mentioned steel mills for their association to Centro Inox. This ensures a further guarantee for the final client because a point of reference for all sorts of advice can be provided. Indeed, one of the main institutional aims of Centro Inox, beyond its promotional activities on the Italian market, is precisely to protect users of stainless steel. This is also considered to be a component of the quality of the product.

**The "instruments" available for the final user** - The Italian market annually registers the highest per-capita rate of stainless steel consumption in Europe and it is also amongst the highest in the world. This means that Italy must be considered to be a country that owns a very large number of stainless steel fabricators and that has reached an image of absolute excellent production range, especially in certain sectors (e.g. food, pharmaceutical, electrical household appliances, household goods and design products) and the companies which operate in these sectors have to be able to count on products of proven quality.

**But which instruments can the final user draw upon to be guaranteed?** The material must be ordered correctly, making use of all the standards available in the ISO or EN field, giving precise indications about which modalities to use to execute the order to have the guarantees of exact correspondence of the requested chemical-physical properties and of the product tracing. Further, **the final user can always request the 3.1 certificate, according to the EN 10204**, to discover the exact origin of the material. If on the other hand a stainless steel component must be ordered, it should be checked whether specific product standards exist.

**Some real life examples!** - The first case concerns the use of stainless steel in the food sector: the manufacturer of the equipment placed his order on an extra-European market and only with the generic abbreviation of the material without a standards reference. The result: oxidised material within a few months with consequent damage for the food substances.

The second case concerns steel casting for the petrochemical industry, again of extra-European origin. In this instance, though fully corresponding with the reference standards concerning chemical analysis, a below standard quality of the casting surface (porosity, inclusions, etc.) with consequent corrosive phenomena occurred approximately three months from the start of use.

**When non-conformity is fraud** - There are two cases here too: the first concerns cutlery which, as can be seen in figures 1 and 2, is marked 18-10. These abbreviations identify the equipment as austenitic AISI 304 (EN 1.4301) steel containing 18% chrome and 8/10% nickel. Analysis of the component instead revealed that it is not a chrome-nickel austenitic stainless steel, but rather a chrome-manganese austenitic stainless steel, with very low content of nickel, identifiable therefore as a 200 series stainless steel of not well identified origin. The second case concerns screws which have recently come onto the European market, as can be seen (Figure 3) marked A2. This abbreviation, according to the international standard UNI EN ISO 3506, should always correspond with a 300 series Cr-Ni austenitic stainless steel; instead, laboratory analyses (figure 4 and table 1) revealed that it was a chrome-manganese material with nickel content much lower than those foreseen in the above mentioned ISO standards concerning the A2 class and, consequently, with lower performance from the point of view of resistance to corrosive phenomena.

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#### FROM OUR MEMBERS CALVI NETWORK STEEL PROFILES

Calvi Network Steel Profiles is the world leader in the designing and production of special steel profiles according to the customer's specifications. A total of 6 independent business units form a network of competence, tradition, innovation and technology:

**Siderval S.p.A.** is the world leader in the production of special

hot extruded steel sections. 15% of the more than 4,000 profiles produced over the years is stainless steel: austenitic 300 series (for architecture, chemical, pharmaceutical and food plants); austenitic-martensitic/ferritic series (for aeronautics, naval and petrochemical). Further, profiles in nickel-based alloys (alloy 800 and 825) (for energy) and titanium Gr 5 (Ti6Al4V) (for aeronautics) are produced. The company's strong point is the horizontal press, at the base of the hot extrusion process and with a capacity of 2,400 tons. Siderval profiles are directed at the following sectors: forklift trucks, railways, viaducts, nuclear, hydroelectric and thermoelectric power stations and heating plants, automotive and agriculture industry, electric motors and alternators, lift systems, machine tools and drawing mills.

**Address:** Via Roma 39/C - I-23018 Talamona SO, phone +39 0342 674.111, Fax +39 0342 670.400, siderval@siderval.it - www.siderval.it

**Calvi S.p.A.** was established in 1950 with the purpose of manufacturing special cold drawn steel profiles with sections of complex geometry according to the customer's specifications, which are used in the following sectors: linear guides, textiles, automotive, machine tools and architecture. The company has consolidated its own position among the world leaders in the production of special steel profiles, both through enlarging the range on offer and through the complexity of the sections.

**Address:** Via IV Novembre 2 - I-23807 Merate LC, phone +39 039 9985.1, fax +39 039 9985.240, calvispa@calvi.it - www.calvi.it

**Sipa S.p.A.** has been at the service of many European and international companies since 1981 with the production of special cold drawn steel profiles. In 25 years, it has managed to produce more than 1,000 shapes and establish itself in emerging countries too, characterising itself as a flexible company quick to adapt itself to changing market conditions. The special shapes are used in many fields of application: automotive, cycles and motorcycles, machine tools, electric machinery, weapons, oenological, chemical and food plants, agricultural machinery, paper machinery, safes and locks.

**Address:** Via Galileo Galilei 32 - I-20040 Carnate MI, phone +39 039 6076488, fax +39 039 673649, info@sipaspa.com - www.sipaspa.com

**Cefival S.A.** has its headquarters in France and has a one hundred-year old history in extrusion and drawing of metals. Since 1905, the company has made continual improvement an essential factor for customer satisfaction. Amongst the most important sectors in which it is particularly specialised aeronautics stands out (it has been the certified supplier of Boeing since 2006) with the production of rings of reactors for aircraft and helicopter engines, as well as the fabrication of profiles dedicated to energy, mechanics and the medical sector.

**Address:** 35, Rue du Docteur-Touati - F-95340 Persan - France, phone +33 (0)1 3937.1227, fax +33 (0)1 3937.1220, commercial@cefival.fr - www.cefival.fr

**Fiaf L. Mazzacchera S.p.A.** is one of the greatest tradition companies in the Calvi Network Steel Profiles company team. Founded in Milan by Luigi Mazzacchera in 1913, the company was one of the first in Italy to produce special steel profiles. It is directed particularly towards the energy sector thanks to the production of stator blade profiles for turbines, the linear mini-rails sector and not forgetting the chemical and pharmaceutical industry, electro-mechanics, the arms sector and aerospace.

**Address:** Via S. Faustino 62 - I-20134 Milano, phone +39 02 2109.5411, fax +39 02 2109.5531, infoandsale@fiav.it - www.fiav.it

**Hoesch Schwerter Profile GmbH:** the current company was founded in Schwetzer, Germany, in 1868. Since 1926, the company has specialised in the production of special hot rolled profiles and, 80 years later on 1 January 2006, the company became part of the Calvi Network Steel Profiles. As well as hot rolled profiles, HSP today produces hot extruded and cold drawn profiles for the automotive sector, agricultural machinery and machine tools, linear guide rails, forklift trucks, constructions and joint systems.

**Address:** Eisenindustriestraße 1 - D-58239 Schwerte - Germany, phone +49 (0)2304 106.0, fax +49 (0)2304 106.591, info@hoesch-profile.com - www.schwerter-spezialprofile.de



**MIC – MICROBIOLOGICALLY INFLUENCED CORROSION**

Verified cases of MIC are increasing: the typical systems that are subject to failure include: heat exchangers, fire protection systems, building water piping systems, potable water mains, sewerage systems, storage tanks, marine and cooling systems, oil pipelines. The most representative cases are linked to the presence of fresh water untreated and not properly drained.

The predominant MIC-related bacteria are: sulphate-reducing bacteria; iron-related bacteria; low nutrient bacteria; anaerobic bacteria; aerobic bacteria. They grow and produce wastes (corrosive to metals) that also produce tubercles and bio films which create oxygen-depleted micro-environments where anaerobic bacteria attack the metal surface. In order for microbes to cause MIC, four other conditions must be present: metals, nutrients, water and oxygen. The bacterial growth typically occurs within specific temperature ranges: an ideal range is often reported as 4° to 49° C.

In stainless steels MIC is a form of localized corrosion. It exhibits many of the morphological characteristics of chloride pitting and crevice corrosion and the ability of the chloride ion to locally depassivate the protective film on a stainless steel.

It is useful to summarize the characteristics which are helpful to distinguish MIC action: the presence of soft, coloured deposits; large cavities under surface pinholes or open pitting, gouging or tunnelling; rapid rate of penetration. Localized attacks feature: large sub-surface cavities or tunnels, frequently in the welded zones; broad open pits in crevices.

Despite efforts to heighten the awareness of MIC on stainless steels by associations and corporations, as Nickel Institute, failures continue to occur. Many could have been prevented by the simple practice of draining and drying immediately following a hydro test or run-in procedure.

Fig. 1 – Large pit at edge of weld found after removal of the deposit - Fig. 2 – Mound-like deposit along weld seam in the bottom of type EN 1.4306 (AISI 304L) tank after several months exposure to well water at ambient temperature - Fig. 3 – Metallographic mount of a cross section through a pitted weld seam - Fig. 4 – MIC due to Gallionella, an iron-oxidizing bacterium, in a EN 1.4301 (AISI 304) fire water storage tank that had not had the welds properly cleaned and passivated after fabrication - Fig. 5 – Gallionella bacteria caused this "tiger strip" corrosion in an EN 1.4301 (AISI 304) dairy tank after hydro testing water storage that went on for too long.

We would like to thank Nickel Institute ([www.nickelinstitute.org](http://www.nickelinstitute.org)) and Les Boulton & Associates Ltd. ([www.corrosioncontrol.co.nz](http://www.corrosioncontrol.co.nz)) for the supply of photographs.

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**STAINLESS STEEL MULTI-LAYER PROTECTED ROOFING (Copertura in acciaio inox a protezione multistrato)**

The "iGuzzini" plant (lighting fixtures manufacturer) by Recanati (Macerata) was recently renovated with a new covering, of Coverib multi-layer protected steel roofing and Polilux fretted sheets in compact polycarbonate.

The multi-layer protected coating has a thickness of 0.45 mm with an upper finish in corrugated EN 1.4401 (AISI 316) stainless steel sheet. Starting from the inner façade of the multi-layer, we find: aluminium sheet, bituminous primer, central support in zinc-coated steel, bituminous-based composed plastic, higher metallic sheet (natural or pre-varnished aluminium, copper or stainless steel) (fig. 4). When the latter is of stainless steel (even with shallow depths up to 0.05 mm), the most advanced technological solution in the sector of metallic covers can be obtained, able to guarantee reliability, durability, thermo-acoustic comfort and notable strength.

The AISI 316 stainless steel was chosen because its molybdenum content makes it particularly suitable for use in severe exposure conditions, such as in industrial environments or coastal areas. The stainless steel covering can be applied on both façades of the coating or only to one, depending on where the aggressive attack is concentrated.

**Client:** iGuzzini Illuminazione SpA, Recanati MC / **Execution:** Tecnocoperture di Principi Fabio & C. Snc – Via Sant'Antonio 10 - I-60027 Osimo AN, phone and fax +39 071 7230184, [info@tecnocoperture.net](mailto:info@tecnocoperture.net) / **Ondulit-Coverib multi-layer protected steel roofing production:** Ondulit Italiana SpA - Via Portuense 95/E - I-00153 Roma, phone +39 06 58330880, fax +39 06 5812977, [info@ondulit.it](mailto:info@ondulit.it)

**JEWELLERY AND BODY PIERCING: STAINLESS STEEL IS THE FASHION LOVED BY YOUNG PEOPLE (Gioielli e body piercing: è inox la moda che piace ai giovani)**

Produced in EN 1.4404 (AISI 316L) stainless steel, also known as "surgery steel" because it is used in prosthetic implantology, it is particularly suitable for body piercing and is finished with electro-polishing which makes the jewellery smooth and shiny. Some models are put through another finishing procedure

known as PVD (Physical Vapour Deposition) which creates a highly adhesive and compact covering with particular superficial toughness, high resistance to wear and a low coefficient of friction and gives the jewellery a unique reflection of light.

**"Kikà" jewellery importation:** S.IT.EL.M. Srl – Via S. Colombano 7/4 – I-20142 Milano, phone +39 02 89181277, fax +39 02 89180650, [info@sitelm.com](mailto:info@sitelm.com), [www.kikaitalia.it](http://www.kikaitalia.it)

**STAINLESS STEEL POTS AND FURNITURE FOR TERRACES (Vasi e arredi inox per terrazzi)**

Two elegant adjacent terraces located on the 9<sup>th</sup> floor of a building in the heart of old Milan were furnished in 2002 with numerous elements of EN 1.4301 (AISI 304) stainless steel: basins and tubs in different shapes and sizes made with stainless steel sheet with a depth of 3 mm and 1.8 mm with an (anti-reflection) satin finish able to contain the numerous plants which frame the large terraces. The supports for the creepers (dividing and pergola trellis) are also made of stainless steel.

The use of this material was motivated by the architect of the gardens who followed the realization, not only for aesthetic requirements but also to get the maximum lightness because of the strong burden limitations of the attics. The owners, garden enthusiasts, declared that they were very satisfied with the good result of the very innovative choice which also meant that frequent maintenance and replacements could be avoided.

**Project:** Arch. Marco Bay, [www.marcoabay.it](http://www.marcoabay.it)

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**FERRITIC STAINLESS STEEL IN BARBECUES (Acciaio inox ferritico nei barbecue)**

It is possible to prepare an entire lunch by cooking in the open air if you have the right equipment (grill + gas stove + oven) like these barbecues: real professional mobile kitchens.

The aesthetic aspect (stainless steel + wood) creates a sense of cleanliness and hygiene and means that they can be included in all sorts of terraces or gardens, even the most refined ones.

The 90409 charcoal model is equipped with brazier and windscreen and is made of EN 1.4016 (AISI 430) ferritic stainless steel with handy solid wood side trays and shelf.

The Gas 4065 inox model has a cooking plate in vitrified cast iron and scratch-proof chromed grill, heated by the lava rock stone for a differentiated cooking. The fire box, the wind screen, the cover which allows oven cooking and the lower shelf are in EN 1.4016 (AISI 430) stainless steel. The hinges and screws are in AISI 440 martensitic stainless steel.

**Production:** Ompagrill Srl – Via delle Industrie 25 – I-36050 Cartigliano VI, phone +39 0424 590800, fax +39 0424 592315, [ompagrill@ompagrill.it](mailto:ompagrill@ompagrill.it), [www.ompagrill.it](http://www.ompagrill.it)

**FROM FIRE TO WATER: CHAINS FOR NAVIGATION (Dal fuoco all'acqua: catene per la nautica)**

The chains are used in various sectors: nautical, naval, industrial, agricultural, zootechnics and ironmongery. As well as chains rigorously corresponding to European standards, personalized products can be supplied.

As regards the nautical field, the stainless steel range (with a diameter of 1.5 mm to 16 mm) includes the genovese chain, the long link chain (DIN 763) and the calibrated chain for nautical use (DIN 766), as well as many accessories.

EN 1.4301 (AISI 304) and EN 1.4401 (AISI 316) stainless steels are used which are particularly suitable for the nautical sector (304 for lake areas, 316 for marine areas) tanks to their unique resistance to corrosion. The AISI 304 and the AISI 316 are also widely used in the zootechnical field and the food sector.

**Production:** Catenificio Rigamonti SpA – Via Industriale 26 (Loc. Levata) – I-23804 Monte Marengo LC, phone +39 0341 634879, fax +39 0341 634957, [info@catenificiorigamonti.com](mailto:info@catenificiorigamonti.com), [www.catenificiorigamonti.com](http://www.catenificiorigamonti.com)

**STEAM GENERATORS: ENERGY AND ECOLOGY WORKING FOR MANKIND****(Generatori di vapore: energia ed ecologia al servizio dell'uomo)**

Energy increases human possibilities and ecology ensures a better quality of life: these two sectors can be seen as connected in a single system. From this perspective, which was adopted by the Bono Energia company from its beginnings in 1958, the modern steam generators were born: they minimise energy consumption through heat recovery processes and reduce emissions through innovative electronic control systems. These particularly large plants are often located in industrial settings or in places where the environmental conditions (humidity, chemical substances, etc.) can be a cause of corrosion on common carbon steel. For this reason, exterior bodies are made of EN 1.4301 (AISI 304) stainless steel sheet, smooth or fretted, with a polished BA finish.

Fig. 1 – Water tube steam generator - Fig. 2 – Turbogas heat recovery steam generator - Fig. 3 – Fire tube steam generator.

**Production:** Bono Energia SpA – Via Resistenza 12 – I-20068 Peschiera Borromeo MI, phone +39 02 55302848, fax +39 02 55301473, [www.bono.it](http://www.bono.it)

**PUMPING SYSTEMS AND RAKING MACHINES FOR ORBETELLO LAGOON (Impianti di pompaggio e sgrigliatori per la laguna di Orbetello)**

Works aiming to improve the circulation of water, both for environmental reasons and for those connected to fishing, have been carried out on the canals of Nassa, Fibbia and Ansedonia, part of the Orbetello lagoon complex. The lagoon is a very aggressive environment because the concentration of salt is particularly high. For this reason, the components installed are, for the most part, made of EN 1.4401 (AISI 316), EN 1.4404 (AISI 316L), EN 1.4571 (AISI 316Ti) and also EN 1.4301 (AISI 304) stainless steel. Interventions on the Nassa and Fibbia canals consisted of constructing new basins for the water-pumping machines, connected to a new barrage with sluice gates and raking machines. This structure and the new fish farm are completed by a walkway with a stainless steel parapet.

In the past, the Ansedonia canal let the waters go out from the lagoon charged of seaweed which were poured onto the nearby beaches, degrading their quality. The main intervention carried out consisted of a complex of 10 raking machines composed of stainless steel belts, 3 metres wide in rectangular meshes, and a walkway with a stainless steel parapet. The frames of the collection belts are made of EN 1.4401 (AISI 316). The nets drive occurs through gears mounted on stainless steel axles.

**Construction:** Friulana Costruzioni Srl – Via Pedrada 16, Z.I. La Croce – I-33070 Vigonovo di Fontanafredda PN, phone +39 0434 999606, fax +39 0434 998637, [info@friulanacostruzioni.it](mailto:info@friulanacostruzioni.it), [www.friulanacostruzioni.it](http://www.friulanacostruzioni.it)

**INTERNATIONAL CONFERENCE & EXPO DUPLEX 2007-Grado, 18-20 June 2007**

Organised by AIM (Italian Metallurgy Association)

Duplex stainless steels, with a two-phase structure, were created in 1930 but particularly developed during the final twenty years of the last century, increasingly awake interest because of all their unique characteristics of resistance to corrosion. The conference consisting in two parallel sessions, a poster session and a reach social programme, will deal with innovations, with particular reference to competitiveness as regards traditional stainless steels and future applicative prospects. The full programme is available on the convention's website: [www.aimnet.it/duplex2007.htm](http://www.aimnet.it/duplex2007.htm)

For the exhibition please contact: Honegger srl - phone +39 02 47791422, fax +39 02 47791493, [duplex@honegger.it](mailto:duplex@honegger.it). For further information please contact the **Organizing Secretariat:** Associazione Italiana di Metallurgia, P.le Rodolfo Morandi 2 – I-20121 Milano, phone +39 02 76021132, fax +39 02 76020551, [aim@aimnet.it](mailto:aim@aimnet.it)

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**PONTEREDERA CINEMAX: A SPECTACLE EVEN BEFORE ENTERING (Il Cinemax di Pontederà: uno spettacolo ancora prima di entrare)**

Cinemas have undergone a radical transformation over the last few years, the old style has given way to multi-rooms. The aesthetic aspect, including the exterior, has also been adjusted to match this tendency.

For the façades of the Pontederà Multiplex Cinemax a profile known as Ecaille 500 was chosen. It consists of profiles in EN 1.4301 (AISI 304) stainless steel sheet, 1.5 mm thick, with a BA finish and a weight of 16.5 kg/m<sup>2</sup>, characterised by an invisible "male-female" fixture system.

The production, which consists of developing an area of approximately 1,000 m<sup>2</sup> of facade with module of 500 mm (from which the product takes its name) and which requires a fixture every 1.5 m, highlights a serrated profile, pointing up the mirror finishing which, as well as creating a very striking effect, lightens the impact of such a ponderous building with large blind walls.

This profile is particularly suitable for producing ventilated walls or external double-layered coverings.

**Designer:** Studio Pini-Castellani, Pontederà PI / **Stainless steel profiles:** PMA Groupe Arcelor, Cerons (Francia), [www.pma.fr](http://www.pma.fr) / **Installation:** Hoesch Contecna GmbH Agenzia Italia – Via V. Bellini 13 – I-20122 Milano, phone +39 02 799568, fax +39 02 799520, [pmaitalia@gpaolletti.191.it](mailto:pmaitalia@gpaolletti.191.it)

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