

# INOSSIDABILE

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## Summary

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

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#### “METALLOCROMIE”: EXAMPLES OF ARTISTIC SYNERGY AMONG NOBLE METALS

**(Metallocromie: esempi di sinergia artistica tra metalli nobili)**

The article reports the description of a series of works of art, “Metallocromie”, created by Arturo Orlandi. The artist uses EN 1.4301 (AISI 304) stainless steel as base material, on which he places, through manual welding, other alloys, mainly Ag-, Ni- and Cu-based ones. These alloys, able to show various chromatic gradations, allow the artist to recreate several and spectacular images.

The only metal that is used as it is and that provides the real support, receiving the other noble alloys with its typical expressive power, is stainless steel, to which the artist has turned since the beginning of his long professional career and which he has never abandoned. His works, many of which are part of private collections, can be defined in part as real bas-reliefs and in part as sculptures.

**Artist:** Arturo Orlandi, aoorlart45@gmail.com, www.arturoorlandi.it

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#### STAINLESS STEEL IN THE HEART OF BOILERS

**(L'acciaio inox nel cuore delle caldaie)**

The introduction of condensing boilers brought a decrease in the stainless steel consumption, because this material was no longer necessary for the chimneys. However, this new type of boilers relies on stainless steel for some of its components.

This is the case of a recent line of condensing boilers just presented by an important Italian company: they have seen the introduction of a new stainless steel heat exchanger: for the realization of this component, stainless steel has been chosen for its well-known resistance to corrosion against acid condensation that can form and that, in the old systems, could cause unexpected failures.

The particular geometry of this heat exchanger offers a constant flow rate in all its sections and inherently limits clogging.

**Manufacturer:** Riello SpA – Beretta – I-23900 Lecco LC – Via Risorgimento 23/A, phone:

+39 199 133131, marketing.riello@carrier.com, www.berettaclima.it

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#### FROM OUR MEMBERS

#### CALVI: STAINLESS STEEL SPECIAL PROFILES USED IN MAGNETIC CONFINEMENT REACTORS FOR NUCLEAR FUSION

**(Calvi: Profili speciali in acciaio inox utilizzati in reattori a confinamento magnetico per fusione nucleare)**

Founded in 1950 by Otmar Calvi as a company specialized in the production of special cold-drawn steel profiles, Calvi SpA, which is part of the Italian group Calvi Holding SpA, has achieved an undisputed technological and market leadership in the design and production of special steel profiles. In 70 years of experience, Calvi has produced more than 5000 different shapes, on the base of customers' design in various types of steel. With an annual production exceeding 10,000 t, stainless steels play an important role, particularly martensitic and austenitic ones.

Among the applications that have seen the use of stainless steel profiles produced by Calvi, the one related to the ITER project plays a role of primary importance. ITER is an international project that aims to build a nuclear fusion reactor. The super conductor is incorporated in radial plates and enclosed in large stainless steel structures. From 2014 to 2016, Calvi has supplied three different profiles (cover plates) made in type 316LN stainless steel used to close the superconductor housings. These profiles (200 tons in total) were used for the construction of the 70 radial plates and were produced by hot rolling and subsequent cold drawing.

**CALVI SpA** – I-23807 Merate LC – Via IV Novembre 2, phone: +39 039 99851, fax: 039 9985240, calvispa@calvi.it, www.calvi.it

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#### CORROSION BEHAVIOUR OF STAINLESS STEEL LONG PRODUCTS WITH DIFFERENT DELIVERY CONDITIONS (FIRST PART)

**(Comportamento a corrosione di prodotti**

#### lunghi di acciaio inossidabile con differenti stati di fornitura (prima parte))

Stainless steels are characterised by different chemical composition and microstructure. These parameters, as well as the surface finish of the product, influence corrosion resistance. Centro Inox has recently carried out an investigation to estimate the different corrosion behaviour of long products (bars) in stainless steel, considering the types of material (AISI 430, AISI 430F, AISI 303, AISI 304 and AISI 316) and the delivery conditions (ground finish and drawn finish) most frequently marketed. Several tests have been conducted, the results of which will be published in this issue and in the next one.

**POTENTIODYNAMIC TESTS** – They are accelerated tests useful to quickly characterize the localized corrosion behaviour of metals. The final results, expressed as pitting potential ( $E_{pit}$ ) can be used to perform a corrosion resistance ranking for the different grades and finish states analysed: the higher the measured  $E_{pit}$ , the higher the corrosion resistance.

The results show that, generally, the measured pitting potential for the different stainless steel grades considered is a function of their P.R.E.N. index: the higher is this parameter, the higher is the measured  $E_{pit}$  and therefore the localized corrosion resistance of that material. The ground finish usually provided greater pitting potential than the same test conducted on samples with drawn finish.

**POTENTIOSTATIC TESTS** – They were performed by immersing the specimens, polarized at +0.1 V vs Ag/AgCl, in a solution with increasing chloride content. The objective was to determine the critical chloride content.

The results obtained are generally a function of the P.R.E.N. index. With the same material analysed, the ground finish generally behaved better than the drawn finish, comparing the critical chloride value and the time needed to have corrosion. This trend is found on all the stainless steels tested, apart from AISI 303, where the parameters characterizing this test are higher for the drawn finish.

*We would like to thank Rodacciai SpA for the material supplied, and RTM Breda and Politecnico di Milano for the tests carried out. We would also like to thank the research group PoliLaPP (Laboratorio di corrosione dei materiali “P. Pedeferrì”) of Politecnico di*



Milano, coordinated by Prof. Marco Ormellese, within which Eng. Giuseppe Diana participated in the investigation as a graduate.

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## YOU DON'T THROW ANYTHING OUT OF STAINLESS STEEL

**(Dell'acciaio inox non si butta via niente)**

A publishing house specializing in the creation of educational tools has recently put on the market a game aimed at speech therapists. This game is used as an evaluation tool in investigations of children with specific language and learning disorders. The board, on which magnetic cards can be attached, must be light and thin, as well as ferromagnetic. Centro Inox directed the publishing house towards the choice of EN 1.4512 (AISI 409) ferritic stainless steel. To add value to the game in terms of recyclability and sustainability, the company requested that the base material for the board should come from processing scraps.

**Manufacturer:** Fabbrica dei Segni Cooperativa Sociale – I-20026 Novate Milanese MI – via Baranzate 72/74, phone: +39 02 92868540, [segreteria@fabbricadeisegni.it](mailto:segreteria@fabbricadeisegni.it) / **Stainless steel furnished by:** Arinox SpA – I-16039 Sestri Levante GE – Via Gramsci 41/A, phone: +39 0185 3661, [sales@arinox.arvedi.it](mailto:sales@arinox.arvedi.it), [www.arvedi.it](http://www.arvedi.it)

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## THE ITALIAN AESTHETIC VALUE IN NEW YORK

**(La valenza estetica italiana a New York)**

Vessel is the name of an imposing steel structure located in New York, right in front of the Hudson River, for which the contribution of the Italian capacities has been decisive in terms of load-bearing structure and aesthetic coatings. The load-bearing structure is composed of 75 painted carbon steel segments, nicknamed “dog bone” for their particular shape. All the claddings have been made of stainless steel and the type EN 1.4404 (AISI 316L) has been chosen, in order to guarantee a suitable durability and inalterability also from an aesthetic point of view. For the surface finish, to meet the specific needs of the architect, the colour “polished copper” was chosen; this colour was obtained on stainless steel through the PVD (Physical Vapour Deposition) technique. Overall, sheets in EN 1.4404 were used, with various thicknesses, for a total of about 220 tons.

In addition to austenitic stainless steel, over 70 tons of EN 1.4462 (2205) duplex stainless steel were also used for the supports of all the balustrades.

**For the claddings and for the components:** Permasteelisa SpA – I-31029 Vittorio Veneto TV – Viale E. Mattei 21/23, phone: +39 0438 505000, [info@permasteelisagroup.com](mailto:info@permasteelisagroup.com),

[www.permasteelisagroup.com](http://www.permasteelisagroup.com) / **For the structural part:** Cimolai SpA, Monfalcone plant – I-34074 Monfalcone GO – Via Timavo 69, phone: +39 0481 281414, [stab\\_monfalcone@cimolai.com](mailto:stab_monfalcone@cimolai.com), [www.cimolai.com](http://www.cimolai.com)

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## ILLUMINATING WITH STAINLESS STEEL

**(Illuminare con l'acciaio inossidabile)**

A company in the province of Lodi has exploited the aesthetic value of stainless steel to create an innovative bedside lamp. It not only illuminates, but also acts as a support for smartphones. The particularity of this object lies in the fact that stainless steel is not used for the structure of the lamp, as usually happens, but for the part that must regulate the brightness of the device, the lampshade. To obtain this component, the company started from an EN 1.4301 (AISI 304) stainless steel sheet having a thickness of 0.8 mm, characterized by a peculiar patterned finish (9EH), which is also known as “elephant skin”. The sheet has been worked by hand in order to give the abatjour a particular effect of lightness and softness, such that this stainless steel component seems to be suspended in the air.

**Manufacturer:** Italy Steel Project - Furniture Division – I-26845 Codogno LO – via G. Ferrari 1, phone: +39 347 8697651, [www.italysteelproject.com](http://www.italysteelproject.com) / **“Elephant skin” 9EH patterned stainless steel produced by Rimex Metals UK and distributed exclusively in Italy by:** Steel Service Srl – I-26845 Codogno LO – Via Armando Diaz 80/C, phone: +39 0377 379821, fax: +39 0377 400818, [commerciale@steelservicegroup.com](mailto:commerciale@steelservicegroup.com), [www.inoxcolorato.com](http://www.inoxcolorato.com)

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## IN THE PANDEMIC PERIOD, A HELP COMES ALSO FROM STAINLESS STEEL

**(Nel periodo di pandemia un aiuto anche dall'inox)**

Perhaps it is because the virus has involved the whole world that the company that created and manufactured stainless steel dispenser holders has named each model after a city. Ingenious was the idea to produce stainless steel equipment and accessories dedicated to support the packets of various disinfectants, gels, etc.. never as in this period used, especially in public places where there is a constant flow of people and consequently where the risk of infection is more marked. Naturally, the choice focused, in terms of choice of material, on stainless steel, for its qualities of hygiene, inalterability and, last but not least, also for its aesthetic value.

The article shows the many models marketed by this company, made entirely of EN 1.4301 (AISI 304) stainless steel characterized by

a satin finish, which differ from each other for the different accessories. All models have been installed at the entrances of companies, in waiting rooms, in meeting rooms such as in shopping malls and in public offices.

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## STAINLESS STEEL SUPERHEROES AND ANGELS

**(Supereroi ed angeli d'acciaio inox)**

An Italian artist, known for his sculptures where stainless steel is harmoniously associated with other materials, wanted to commemorate the cinematic sacrifice of a well-known superhero by creating the sculpture “IRONMAN”, which depicts the protagonist of one of the most profitable film sagas in his iconic pose.

The work (2 m high) was obtained by welding together, mainly using the TIG technique, EN 1.4404 (AISI 316) stainless steel and brass sheets, both mirror polished: using these two materials, characterized by different chromatic tones, the artist was able to reproduce the appearance of the armour that protects and arms the superhero. With the same methodology, the artist has created “GABRIEL”: the body of the angel depicted by this work (5.4 m high) was made through a welding process that involved 350 EN 1.4404 stainless steel mirror polished sheets. Two wings were then fixed to the body, obtained from 47 corten steel tubes. The sculpture was commissioned by the Italian tenor Andrea Bocelli, as set design for one of his shows.

**Artist:** Daniele Basso – Glocal Design – I-13900 Biella BI – Via Salita di Riva 3, phone: +39 015 2543320 / +39 329 2323148, [info@danielebasso.it](mailto:info@danielebasso.it), [www.danielebasso.it](http://www.danielebasso.it) / **Manufacturer:** Laseryacht Srl – I-55049 Viareggio LU – Via Comparini 39/11, phone: +39 335 6631374, [alfiro@laseryacht.it](mailto:alfiro@laseryacht.it), [www.laseryacht.it](http://www.laseryacht.it) / **Photographs:** Stefano Ceretti, Maurizio Bacci

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