

# INOSSIDABILE

Edited and published by Centro Inox Servizi S.r.l.

## Summary

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

### COVER/PAGES 3/4

#### A STAINLESS STEEL SARCOPHAGUS FOR THE CHERNOBYL NUCLEAR POWER STATION (Un sarcophago inossidabile per la centrale di Chernobyl)

New Safe Confinement (NSC). This is the name of a huge arch (a sort of sarcophagus) intended to contain nuclear radiations for over 100 years, in order to provide the old concrete shell, which was fearlessly built all around and above the building destroyed on April 26, 1986 by the explosion of reactor n° 4 of the power station of Chernobyl, with an additional cover. The huge and stunning arch has been built at a distance of about 200 m from the damaged reactor, and has been assembled on site, divided into two large parts that will slide on rails up to completely cover the old sarcophagus. NSC has an overall thickness of 12 m, it weighs 25,000 tons, and its measurements are: 108 m height, 162 m length, and 257 m width.

The supporting lattice structure made of carbon-manganese steel has been covered with stainless steel panels having a total weight of 1,200 tons.

EN 1.4404 (AISI 316L) stainless steel coils have been used for the entire surface of the external vault of 88,000 sq. m. These coils, which are 0.6 mm thick, 489 mm wide, have been supplied in 2B finish in order to avoid any reflection of the material in case of overflights of the site. For the internal part of the cover, the choice fell on 2R finish EN 1.4301 (AISI 304) stainless steel (0.5 mm thickness and 439 mm width) in order to provide inside the sarcophagus an almost natural brightness and light reflectance. This material was chosen also because of its non-magnetic characteristics in order to avoid any accumulation of radioactive powders, which would reduce its efficiency and integrity over time. The use of stainless steel was an inevitable and winning choice. This unique material, due to its corrosion resistance properties will ensure a lifespan of more than 100 years to the structure, and the possibility to minimize its planned maintenance operations.

**Stainless steel produced and supplied by:** Aperam Stainless Europe - [www.aperam.com](http://www.aperam.com) - **Slab casting:** Aperam - Châtelet and Genk (Belgium) - **Slab hot rolling:** Aperam - Châtelet (Belgium) - **Slab cold rolling and cutting:** Aperam - Gueugnon (France) / **In Italy:** Aperam Stainless Services & Solutions Italy S.r.l. - Divisione Massalengo - I-26815 Massalengo LO - Loc. Priora, phone +39 0371 49041, fax +39 0371 490475, [leonardo.frosali@aperam.com](mailto:leonardo.frosali@aperam.com), [www.aperam.com](http://www.aperam.com) / **Cover:** ©ChNPP / **Pict. 1:** ©ChNPP / **Pict. 2,3,4,5:** ©Novarka / **Contractor:** Novarka

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#### NOT ONLY PRODUCTION: LOADING, UNLOADING AND DOSAGE IN THE CHEMICAL INDUSTRY (Non solo produzione: carico, scarico e dosaggio nell'industria chimica)

In this article, we describe a tanker truck loading and unloading system equipped with a glycerine and propylene glycol dosage system into barrels, entirely made of stainless steel, which has been installed in a well-known chemical company based in the district of Milan. The storage area, located in a containment basin includes four tanks, three of which designed

to contain propylene glycol, while the fourth tank contains glycerine. Each tank has a capacity of 100,000 l and is entirely made of EN 1.4404 (AISI 316L) stainless steel. The four tanks have been obtained from cold-rolled sheets. The tank that contains glycerine is heated through electric circuits. Thermal insulation is ensured by a stainless steel external casing obtained from 2B finish EN 1.4301 (AISI 304) stainless steel sheets. All the tanks are equipped with a washing system and a hydraulic control system to ensure nitrogen blanketing. The ladders and the gangways for ascending the top of the tanks have been made using EN 1.4301 (AISI 304) structural stainless steel shapes. Product handling is PLC controlled and makes use of a pump, a volumetric counter, pneumatic and hand-operated valves, all made of EN 1.4401 (AISI 316). All the dosage plants are identical, except the glycerine plant, which is equipped with a power heating cable and is thermally insulated by a AISI 304 stainless steel casing.

**Construction company:** Omniaplant Srl - Via Fulcheria 31 - I-26010 Chieve CR, phone +39 0373 236882, [info@omniaplant.it](mailto:info@omniaplant.it), [www.omniaplant.it](http://www.omniaplant.it) / **Company:** Gamma Chimica - Via Bergamo 8 - I-20020 Lainate MI, phone +39 02 9317901, [www.gammachimica.it](http://www.gammachimica.it)

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#### FROM OUR MEMBERS TECNOFAR S.P.A HAS REDOUBLED (Tecnofar S.P.A raddoppia)

Forty years after its establishment, Tecnofar S.p.a. moves its administrative offices and opens a new production site, which redoubles the operational area reaching 20,000 sq. m. Respectful of the social impact and the environment, the company has successfully tested a floor heating system through stainless steel tubes, and has equipped itself with new eco-sustainable washing plants.

This is a first step ahead for Tecnofar Spa, which is actively working in the consortium for the development of the local industrial area by implementing an optical fibre system, and by planning ancillary services, such as a new social dining hall, a nursery school, and a well-equipped parking area for the truck drivers.

In the charming industrial area of Gordona in Valtellina (Sondrio) located in at the foot of the mountains, an industrial centre is being created, where Tecnofar SpA will work by developing above all the production of drawn and cut to length micro-tubes made of stainless steel and special nickel alloys, which will support the main electro-welded tube production unit, already working since 2000.

**PRODUCTION** - The production capacity of Tecnofar SpA is based on eleven TIG and Plasma welding lines, equipped with continuous heat treatment, which can weld round section tubes of diameters ranging from 3 to 76 mm and thickness ranging from 0,12 to 3 mm. A part of this production is converted into drawn tubes available both in bars and in coils with a reduction of their diameter and their thickness. The cutting departments, equipped with advanced technological finishing and deburring tools, can produce tubes of any length (even few millimeters) cut with centesimal precision available in customized and on-demand finishing options, as well as bent tubes. **USED MATERIALS:** 200 series and 300 series austenitic steel grades; 400 series ferritic steel grades; duplex; nickel alloys.

**TECNOFAR S.p.A.** - Via al Piano, 54/A - I- 23020 Gordona SO, Phone +39 0342 684115, fax +39 0342 684500, [info@tecnofar.it](mailto:info@tecnofar.it), [www.tecnofar.it](http://www.tecnofar.it)

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#### CHARACTERISTICS AND ADVANTAGES OF FERRITIC STAINLESS STEELS COUPLED WITH GLASS IN ARCHITECTURE (Caratteristiche e vantaggi degli acciai inox ferritici per realizzazioni architettoniche in giunzione con il vetro)

Stainless steel is extensively used for architectural purposes. Particularly interesting is the use of stainless steel coupled with other materials, for example glass, for the design and production of structural panels to be used for cladding purposes or for the production of self-supporting façades. One of the basic characteristics that make the use of this material extremely advantageous in its ferritic version, is its behaviour in case of thermal expansion, which is similar to the behaviour of glass. The main advantage offered by the use of the super-ferritic 470LI stainless steel grade are hereafter analysed, starting from its behaviour to thermal expansion, in constructions providing for the combination of stainless steel and glass. **1.1 Thermal expansion of claddings** - Vertical and horizontal claddings are subject both to thermal expansion and/or to shrinkage depending on the fluctuations of the external temperature. In principle, it is advisable to design structures of different materials having similar thermal expansion coefficients, since this choice allows designers to obtain greater flexibility in the planning of large size structures and panels. Ferritic stainless steels, and especially the 470LI super-ferritic grade, show lower deformation values both during the expansion and the shrinkage stages compared to traditionally used materials, as it has a thermal deformation coefficient similar to that of glass (**Pict. 1**). **1.2 Possibility to reduce thickness** - Thickness being equal, stainless steels offer considerably greater mechanical properties than some other traditional materials, as for example aluminium. The super-ferritic 470LI grade is the most advantageous stainless steel option because it presents higher yield strength values than other materials (**Pict. 2**). **1.3 Fire resistance** - Safety can be improved through the use of stainless steels, since they better resist to high temperatures compared to other materials, such as galvanized steel and aluminium. The mechanical properties of stainless steels decrease more gradually than those of carbon steels as the temperature increases, since the mechanical characteristics of the latter suddenly drop when the temperature reaches about 500 °C. The mechanical characteristics of the super-ferritic 470LI grade remain stable at very high temperatures and are very similar to those of the austenitic stainless steel AISI 316 and 304 grades (**Pict. 3**).

**1.4 Aesthetical durability and corrosion resistance** - This article reports, by way of example, the results of exposure tests of samples of different stainless steel grades (304, 316L, 470LI) with different finishing options (BA, Scotch Brite, satin) performed at the port of Genoa. Test results point out the substantially equivalent behaviour of the austenitic 316 and the super-ferritic 470LI stainless steel grades (**Pict. 4,5,6**). **Conclusions** - Compared to austenitic stainless steels,

ferritic grades are characterized by lower and more stable prices. This allows designers to have greater flexibility and greater freedom in planning large size panels. The choice of the 470LI grade is clearly a winning option in the case of stainless steel and glass structures, since this type of stainless steel is capable of combining very high corrosion resistance, structural resistance, and planning freedom at the same time.

**Acciai Speciali Terni S.p.A.** – Viale B. Brin 218 – I-05100 Terni TR, phone +39 0744 490282, fax +39 0744 490907, marketing.ast@acciaitermi.it, www acciaitermi.it

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### HOW AN IDEA IS BORN

#### (Come nasce un'idea)

The company we are talking about was established in 1975, and today has become a successful reality in the automotive area, in the agricultural and earth-moving machine industry, and in general in the area of automation. The use of a material as stainless steel has facilitated the birth of a project, leading the company to extend its production range from automotive industry products to the manufacture of little designer furnishing objects.

The company conceived the idea to create some peculiar furnishing elements, and the idea was put into practice with the production of a stainless steel brazier for fireplaces. The brazier could be obtained by optimizing as a "nesting" an 8 mm thick EN 1.4301 (AISI 304) stainless steel sheet. Considering its end use, the brazier can be also produced using ferritic stainless steel, and it can be shaped in different forms and sizes depending on needs and choices. The making of this particular brazier provides for the assembly of laser cut parts tightened by joints and bolts.

**Manufacturing company:** Sarzi Lamiere Spa – Via Domenico Giunti 27/29 – I-46018 Sabbioneta MN, phone +39 0375 220122, fax +39 0375 52544, info@sarzilamiere.com, www.sarzilamiere.com

### A MIRROR EFFECT FLOWER BOX

#### (Una fioriera "a specchio")

With a total weight of about 20 tons, the 70 m long flower box installed in the "Gold and Silver Lounges" of the new Hamad International Airport in Doha, Qatar, is really a very special object. This project required the use of a material capable of providing mirror finish, sharp edges, and absolute corrosion resistance. These characteristics were imperative, since the structure in which the plants had to be housed provided also for the installation of an irrigation system. The par excellence material that succeeded in fully meeting these requirements was of course stainless steel, supplied in mirror finish EN 1.4404 (AISI 316L) grade. In addition, other tanks were installed in the different business lounges located in the airport. These tanks house fountains and other water features, as well as the related service pipes, and cover a total surface of about 700 sq. m. In this case, too, the choice fell again on EN 1.4404 (AISI 316L) stainless steel, the weight of which totalled about 30 tons.

**Contractor:** Della Cagnoletta Srl – Via Gerone 4 – I-23010 Albosaggia SO, phone +39 0342 510190, fax +39 0342 511501, info@dellacagnoletta.com, www.dellacagnoletta.com

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### STAINLESS STEEL FOR THE AQUEDUCT OF SARRE

**(L'acciaio inossidabile per l'acquedotto di Sarre)**  
About 800 kg of stainless steels were used for strengthening and upgrading the municipal aqueduct of the town of Sarre (Aosta Valley). The project provided for the installation of pipes, and in addition, for the construction and the setting up of the tank control rooms as well as underground control rooms along the whole network.

2 mm thick, 2B finish EN 1.4301 (AISI 304) stainless steel was used, except in the case of some doors and frames for which a polished finishing was chosen.

The aqueduct included pipes, tubes and related fittings, such as flanges, curved fittings, T joints, etc. and threaded tightening fittings of different diameters. EN 1.4301 (AISI 304) stainless steel grade, in the form of 2 mm thick round, square, and rectangular section profiles, was also used for ladders, stairs, decking, and railing. The humidity created by the condensation produced by the pipes, due to the temperature gap between water and air, heavily affects these environments, and especially the control rooms, which are placed along the track of the conduits, since they are subject to the seepage of rain water. Stainless steel was successfully used in this case, too, thanks to its well-known characteristics and its inalterability over time.

**Planning and construction supervision:** Studio associato di ingegneria Zimatec Srl - Ingg. Piero Bal and Davide Touscoz / **Contractor:** Saudin Srl / **Stainless steel processing company:** So.Ge.A. Società Gestione Acquedotti di Francesconi E. & C. SnC – Loc. Preille – I-11100 Saint Pierre AO 18/A, phone +39 0165 555187

### ...AND IN THE MOTOR WORLD, SPRINT BENEATH THE BONNET

#### (...E nel mondo dei motori, sprint sotto il cofano)

We present an application developed by a company established in 1953, which has always focused on the production of quality parts aimed at enhancing the performance of our cars. These products are highly innovative and eco-friendly, since they are in a position to offer end users several advantages in terms of efficiency and durability over time. These elements are made of a supporting stiff structure capable of ensuring optimal mechanical tightness and a very high resistance level to air flows and high temperatures. The filtering surface consists of an EN 1.4301 (AISI 304) and EN 1.4306 (AISI 304L) micro-mesh fabric, and gives these accessories named "TECNIFILTER®", very high efficiency levels, which remain constant over time, thus contributing to grant the vehicle optimal performance.

**Planning, design, production and patent:** Colombo Angelo snc – Via Statale 6 – I-22045 Lambrugo CO, phone +39 031 607309, fax +39 031 608248, info@colomboangelo.it, www.colomboangelo.it, www.tecnifilter.it

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### CORROSION: STAINLESS STEELS AND SUPER-ALLOYS ADVANCED THEORETICAL AND PRACTICAL COURSE

**Milan – November, 23 - 24 - 30 and December, 1, 2016**  
**(Corrosione: acciai inossidabili e superleghe. Corso teorico-pratico avanzato)**

Considering the successful outcome of the previous editions, Centro Inox, and the Polytechnic of Milan – Laboratorio di Corrosione dei Materiali (Material Corrosion Lab) "Pietro Pedeferrì" – Dipartimento di Chimica, "G. Natta", decided to organize the fourth edition of this course. The course is divided into four days consecrated to examining in depth the phenomenon of corrosion on stainless steel and super-alloy grades, in the light of the most recent developments obtained in this area. Enough time will be left to participants for discussions, questions, and exchange of opinions. The theoretical lessons, aimed at studying in depth these topics, will be supported and supplemented by practical laboratory activities.

**For additional information:** Centro Inox – phone +39 02 86450559/69 – eventi@centroinox.it, www.centroinox.it

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### 36TH NATIONAL AIM CONVENTION

**Parma, September 21-23, 2016**  
**(36° convegno nazionale AIM)**

In 2016, Associazione Italiana di Metallurgia (AIM) celebrates its 70th anniversary. The ceremony will take place during the 36th edition of its National Convention, which will be held in the city of Parma. During this event, several awards will be given,

among which the "Stainless Steel Medal" established in memory of Prof. Gabriele Di Caprio. The event will be supported by Centro Inox. The process that led to the birth of this peculiar medal, made of EN 1.4404 (AISI 316L) stainless steel, was described in issue 182 of "Inossidabile".

**Further information:** www.aimnet.it/36aim.htm

### FASTENER FAIR ITALY

**Exhibition for Fastener & Fixing Technology**  
**September 28-29, 2016, MiCo, Milano Congressi - Milan**

#### (Fiera della viteria, bulloneria e sistemi di fissaggio)

Fastener Fair Italy is a showcase of prime importance for all the suppliers of fasteners, bolts & screws, and fixing elements. Centro Inox cooperates in this event by organizing the meeting: "Stainless steel screws and bolts". The meeting offers an overview of the fastener industry in Italy, including issues in connection with regulations and standards, as well as imports of non-complying products.

**For additional information:** www.fastenerfairitalia.com – www.centroinox.it

### PUBLICATION OF UNI 10897:2016

#### STANDARD "LOADS OF SCRAP METAL – RADIONUCLIDE DETECTION BY X AND GAMMA MEASUREMENTS"

**(Pubblicata la UNI 10897:2016 "Carichi di rottami metallici - Rilevazioni di radionuclidi con misure X e gamma")**

The technical committee dealing with nuclear technologies and radioprotection has published the new UNI 10897 standard concerning the detection of radionuclides by X and gamma measurements in loads of scrap metal. This new standard repeals and replaces the previous UNI 10897:2013 version. This standard identifies the methods to be used for determining the radiometric anomalies that can be associated to radionuclides present in the loads of scrap metal to be recycled.

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### A MASTERPIECE IN A STAINLESS STEEL VERSION

#### (Un capolavoro in versione inox)

"Everlasting" by Helidon Xhixha exhibited at the Malpensa Airport of Milan, is the latest installation of a long series of public artworks created by this sculptor, and is the capstone of his iconic style appreciated all over the world. Well-known for his mirror-polished stainless steel installations, with "Everlasting", the artist celebrates from a contemporary point of view Leonardo da Vinci's Renaissance masterpiece "The Last Supper". Each EN 1.4404 (AISI 316L) stainless steel pillar represents one of the thirteen figures mentioned in the Gospel, with their own shapes and peculiarities. The pillars representing the twelve Apostles are symmetrically placed around a larger central pillar representing Jesus Christ. While fluid shapes tend to harmonize the installation, a wise and targeted use of the materials excludes the figure of Judas, the traitor, whose pillar is cast in non-reflecting corten steel. However, Xhixha does not only transform the scene into a three-dimensional space, but underlines the universal nature of a work of Catholic imprint by cleverly narrating what is represented beyond a religious surface.

**The Artist:** Helidon Xhixha, info@helidonxhixha.com, www.helidonxhixha.com

### CENTRO INOX

**The Italian Stainless Steel Development Association**

**Via Rugabella, 1 - 20122 Milano - Italy**  
**Telephone +39 02 86450559 - +39 02 86450569**  
**Fax +39 02 86983932**

**redazione.inossidabile@centroinox.it**  
**www.centroinox.it**

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