Cr=25%

Ni=25.5%

Mo=6.5%

N=0.45%

Cu=1.5%

C=0.020%

Si=0.25%

S=0.001%

the remainder, with the exception of iron, consisting of impurities resulting from the production.

This steel was manufactured in the form of a bar 500 nun in diameter, obtained after cooling in air. The mechanical chracteristics were the following:

Re=490 MPa

TS=890 MPa

E=57%

Kcv at 20° C.=285 joules

Kcv at −50° C.=280 joules

Kcv at 20° C. at the disc core=250 joules.

This last value is the sign of a very good structural stability.

A test for localized corrosion in a chloride medium according to US ASTM standard G 48 gave a pitting temperature higher than or equal to the boiling temperature.

A test for generalized corrosion in sulphuric medium at a concentration of 10% of H_2SO_4 at 80° C., deaerated and contaminated with up to 500 ppm of chlorine did not reveal any corrosion after 96 hours (0 mdd=0 mg/dm^2/day) whereas in the case of the grades of the prior state of the art, in the same conditions, the corrosion is of the order of 100 mdd.

This steel has an additional advantage which stems from the fact that the product E×TS of the elongation at break and of the ultimate tensile strength is very high (approximately twice that of the steels of the prior art employed for transport), with the result that the impact strength of the walls produced with this steel is very high and especially much higher than in the case of the steels of the prior art.

This characteristic has the advantage of making it possible to produce tankers, receptacles or pipes for conveying corrosive products that are much safer in the case of impact than the equivalent equipment produced with steels according to the prior art.

The properties of this steel make it particularly suitable for the manufacture of reactors (scrubbers, scrubbing tower, filter vessels, digesters), pipes (welded and seamless), chimneys, joint components such as flanges, manifolds, flow lines, separators and tankers for road or rail transport, for industries in which this equipment is subjected to very severe corrosion by chloride and/or pure or polluted sulphuric media and especially for offshore oil exploitation platforms, for plants for removing pollutants from combustion fumes of thermal power stations or for incinerating household waste, for the preparation of paper pulp, in particular by the so-called "bisulphite" process, and especially for filtration, bleaching and delignification equipment, for the chemical industry and more particularly for hydrometallurgy equipment and for the fertilizer industry making use of the digestion of ores with concentrated sulphuric media.

More particularly:

in offshore platforms for the exploitation of underwater petroleum or gas fields the steel according to the invention is employed for producing process equipment subject to corrosion by seawater, especially flare supports, heat exchangers and separators and, especially, tube plates, pipework for conveying seawater and pipework employed for the processing of oil or of gas, protection for the region of the pylons which is in the vicinity of the free sea surface, earth rods, pump shafts and connecting flanges subjected to corrosion by sea-water, wellheads, manifolds and risers;

in the pollutant removal industries, for producing equipment subjected to corrosion either by hydrochloric acid or by sulphuric acid or by mixtures of these acids, sometimes in the presence of hydrofluoric acid, and especially for the production of scrubbing towers for gases or combustion fumes from thermal power stations and waste incineration plants, and for the manufacture of the ducts leading to the chimneys; in the particular case of scrubbing towers for gases from a thermal power station, the equipment is, in particular: the reactor, the presaturator, the internal structure of the absorber and the chimney;

in the paper pulp industry for the manufacture of delignification equipment in particular using the bisulphite process and of equipment for filtration and bleaching with highly oxidizing chlorine compounds such as Cl_2 and ClO_2 and also with compounds of the hydrogen peroxide and ozone type; in the delignification, this is especially the preheaters, digesters, impregnators and continuous digesters; in scrubbing and bleaching, this is especially the scrubber, the filtration trough, the tower for bleaching with chlorine and chlorine dioxide and its distributing, scrubbing and filtration equipment and the hypochlorite bleaching tower with its scrubber and its filtration trough;

in the chemical industry the steel according to the invention can be advantageously employed for producing especially troughs, storage vessels, reactors, pipes, pump bodies and pump shafts which are in contact with highly chloride-containing media or acidic media.

This steel also makes it possible to produce any component subjected to abrasion/corrosion in chloride and/or acidic media.

For all these applications, in fact, a person skilled in the art is continuously searching for the steel which has the best possible mechanical characteristics and the highest possible corrosion resistance without, however, its price being exorbitant, in order to produce equipment which is as reliable as possible and which has the longest possible lifetime, this being at a cost compatible with its industrial use. As a result of its chemical composition and its properties, the steel according to the invention is much more advantageous from this point of view than nickel-based superalloys.

The applications described do not imply any limitation and a person skilled in the art will be capable of choosing this steel when he or she deems it useful.

We claim:

1. An austenitic stainless steel with high mechanical strength and corrosion resistance comprising iron, and, by weight:

$20\% \leqq Cr \leqq 30\%$

$25\% \leqq Ni \leqq 32\%$

$6\% \leqq Mo \leqq 7\%$

$0.35\% \leqq N \leqq 0.8\%$

$0.5\% \leqq Mn \leqq 5.4\%$

$C \leqq 0.06\%$

$Si \leqq 1\%$

optionally $0.5\% \leqq Cu \leqq 3\%$

optionally $0.001\% \leqq Nb \leqq 0.3\%$