WELDWELL

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SERVICE TO THE WELDING COMMUNITY

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SPECTRUM

Mr. C.C.Girotra, MD, Weldwell Speciality Pvt. Ltd, is being felicitated by Mr. R.Srinivas, President, IIW-India, at the Golden Jubilee Celebration function of IIW-India at Mumbai on 30th April, 2016

HIGHLIGHTS

- Welding of Super 304H
- Demystifying AWS Specifications for FCW electrodes
- Explaining Carbon Equivalent

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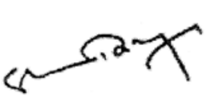
INSIDE

Editorial

Dear Readers,

The Purchasing Managers' Index (PMI) which is an indicator of the economic health of the manufacturing sector is constantly fluctuating. This is happening despite reporting a healthy GDP growth rate of 7.6%. Since PMI is more closely related to manufacturing therefore, it reflects more accurately the welding industry fortune. Without showing a robust PMI figure welding industry will continue to crawl. More investment in infrastructure is needed for welding industry to flourish.

Most of India's future power generation capacity is set to continue using coal as fuel despite the obvious environmental concerns though it may be addressed using fuel utilisation more efficiently. This calls for construction of super critical boilers and ultra-super critical boilers for power generation units. Welding is a critical activity in the boiler construction and one requires a good understanding of the process to produce quality welds that perform well in service. The present edition devotes its lead article to selection and welding of material of construction suitable for super critical boilers and ultra-super critical boilers. The AWS Specifications AWS A5.20 for carbon steel Flux-cored Wires has recently been revised and renumbered to AWS A5.36. The Education section explains some of the salient features of the classification system to help those who are new to welding. The Technical section explains Carbon Equivalent, its determination and importance. In welding, carbon equivalent content value is used to understand how the different alloying elements affect hardness of the steel being welded. It is most commonly used to determine weldability of a steel. The case study on QuickPurge shows how a problem of getting shiny weld bead while welding titanium pipe was solved using an improved QuickPurge systems for better shielding of the weld. This edition also has the regular features for you to enjoy reading.



Dr. S. Bhattacharya
Editor

Event

Welding Research and Collaboration Colloquium

The 6th Welding Research and Collaboration Colloquium was organized by IIW Foundation and hosted by The Indian Institute of Welding, Hyderabad Branch at Hyderabad from 7 - 9 April, 2016 under the aegis of The International Institute of Welding. The key objective of the colloquium was to provide recommendations for future course of R&D activities in welding. The Chief Guest was Dr.G.Sateesh Reddy, Scientific Advisor to Raksha Mantri, Govt. of India, who emphasised the importance of R&D to remain relevant in any field. The colloquium sessions covered a large number of themes.

There were thirty invited talks delivered by prominent national and international speakers besides twenty four Flash Talks and twenty poster paper presentations.

Major Recommendations were:

- There is a necessity of setting up National Centre of Excellence in materials joining technologies
- IIW-India could set up a platform for the interaction between welding researchers / experts and industry / agencies needing assistance and create a database of research capabilities in India.

Some of the collaborations arrived at were:

- India-Australia-Netherlands : Joint Collaboration in AHSS welding
- Automotive steels fabrication/repair (University of Wollongong, Australia & IIT-Madras)
- Internal stellite cladding for high temperature applications between WRI, Trichy, BIAS, Bremen and ARCI
- Cu-Al Bimetallic Joint (ABB-ARCI-WRI-Magpulse Technologies)
- Friction stir welding of high strength aluminium alloys (IIT Bombay and DRDL/DMRI Hyderabad).

Super 304H Stainless Steel and its Welding

INTRODUCTION

Most of India's future power generation capacity is set to continue using coal as fuel, despite the obvious environmental concerns, since it is the cheapest and most abundant fuel available. Power generation in the most efficient way lends criticality to selection of proper technology while designing a new project.

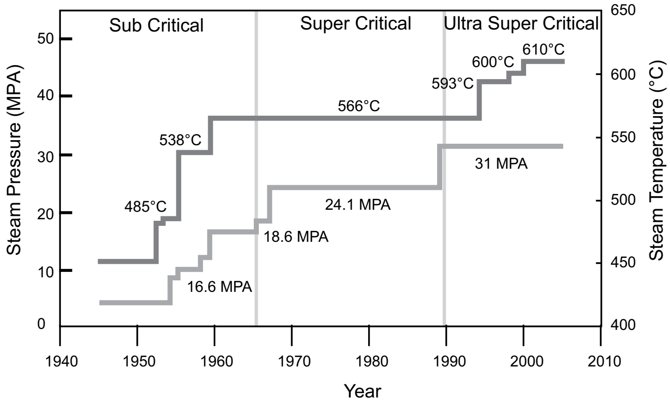


Fig.1 *Transition design of pressure and temperature in steam power plant*

Emergence of super critical boilers (SCB) and ultra-super critical boilers (USCB) is a major step in this direction and demand to construct suitable boilers is on the rise. Efforts to increase efficiency of thermal power stations, a function of temperature and pressure, logically lead to the research of new materials which have to withstand the required temperatures and operating pressure at critical boiler spots. Among the critical boiler pressure section components to be distinguished, the thin-wall pipes of steam superheater and re-heaters whose materials can be operated at up to 600ºC and 25-30 MPa in systems with super critical parameters are prominent.

Selection of appropriate material of the boiler tubes in these sections gain importance. The materials more often used for components of steam superheater with so high operating parameters are nonferrous alloys, mainly based on nickel, as well as, high temperature corrosion resistant steels of austenitic structure.

Stainless steels resist general corrosion but are susceptible to localized corrosion such as pitting, and stress corrosion cracking (SCC) in chloride environments. SCC is the most likely life limiting failure in boilers with austenitic stainless steel tubing, caused by the synergic and simultaneous action of environment, tensile stress and susceptible microstructure. It may be noted that the metal temperature of the tubes is nearly 50ºC more than the steam outlet temperature.

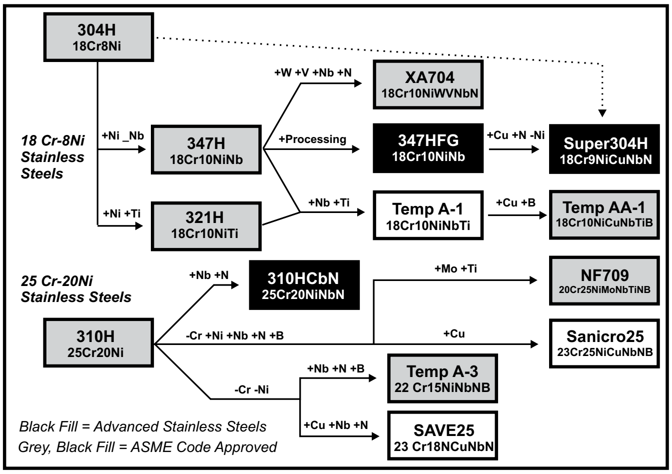


Fig. 2 *Process evolution of lean highly alloyed advanced Austenitic Steels*

Super 304H steel (UNS 30432) developed by Nippon Steel and Sumitomo Metals (NSSMC) in 1990 as a proprietary product in the form of tubes. Subsequently Salzgitter Mannesmann Stainless Tubes – GMBH introduced DMV-04HCu EN10216-5:X10CrNiCuNb 18 9 3 - ASTMA213:S30432 specifications. The importance of this alloy can be gauged by the fact that in India, IGCAR, in collaboration with MIDHANI have also developed MDN304H in 2003. The tubes fabricated by BHEL are being tried out.

304H stainless steel modified with about 3% copper, 0.5% niobium, and small amounts of nitrogen, aluminium, and boron is Super 304H, as shown in the following table.

Steel	Mn	S	Si	Cu	Nb	N	Al	B
Super 304H	1.00	0.010	0.30	2.5 to 3.5	0.30 to 0.60	0.05 to 0.12	0.003 to 0.030	0.001 to 0.010
304H	2.00	0.030	1.00	—	—	—	—	—

The Cu, Nb and N additions help improve creep performance at service temperatures of approximately 600°C although the relevant ASME code case specifies allowable stresses up to 815°C.

The yield strength of Super 304H in comparison is not much higher, the creep rupture strength is double than regular 304H, thereby the design limits of the boiler tubes for higher temperature and / or pressure are extended.

Super 304H has been further modified by increased addition of Cr (27%) and Ni (20%). The N content is also slightly increased to 0.3%. This new material is becoming popular for use in USC boiler applications.

Welding

Welding is a critical activity in the boiler construction and one requires a good understanding of the process to produce quality welds that perform well in service. Since these are modified austenitic materials, welding must be performed paying attention mainly to cracking in hot i.e. the thermal input.

The filler metal compositions vary slightly from actual base material compositions. As of now, there are no filler metals specifications, laid by AWS or any other authority that approximately matches the composition and properties of the proprietary base metals. Initially, the only solution was use of expensive nickel based alloys such as, 617, but later the need for suitable austenitic stainless consumables was deeply felt.

Strategic welding consumables matching NSSMC's advanced heat-resistant boiler tube and corrosion resistant steel for coal fired power plant have been developed by Nippon Steel-Sumikin Welding Co. NSSW – a subsidiary of NSSMC.

Super 304H pipes find use mainly in the critical sections i.e. final stages of the primary and secondary super-heater and re-heater section. Since, all the elements in this section are not subjected to same temperature / pressure, it is normal practice that material of construction of the tubes used is the one which is the most appropriate to the local conditions.

Therefore welding involves joining of similar austenitic material (304H) and dissimilar i.e. welding of austenitic with other high alloy steels. For welding of Super 304H the brand developed is YT-304H for similar composition and YT-HR3C for welding of tubes made of similar material (e.g 310HCbN) which has better properties.

Base Material grade/brand	Recomm. Filler Metal	Nippon brand	Typical chemistry of filler wire
Super 304H * (UNS 30432)	304 with Cu	YT-304H *	18Cr,16Ni,3Cu,0.6Nb,0.9Mo,0.2N
HR3C* TP310HCbN	310 H Nb	YT-HR3C*	27Cr,20Ni,3Cu,0.4Nb,0.9Mo,0.3N

**Registered trade mark*

The filler metal composition for super 304H contains a nominal level of 16% Ni, whereas the base materials contain 9%Ni. The increased nickel content in the filler metal ensures a fully austenitic weld metal (confirmed by increased Ni eq. in WRC1992 diagram) and reduces the potential to ferrite formation.

Thermanit 304H Cu of Bohler Welding and Thermet MT 304H of Metrode are other consumables in use. However, YT-304H is considered the leader.

Welding Methodology

Being susceptible to solidification cracking, manufacturers of filler metals offer these compositions only in the form of rods or wires for gas tungsten arc welding (GTAW) and covered electrodes for shielded metal arc welding (SMAW).

The pipe butt joints are executed in the root layer using GTAW in a protective atmosphere of inert gas. Other filler layers in case of thicker walls, are performed with SMAW.

In order to ensure repeatability and quality of the weld joints, orbital automated GTAW is preferred. For heavy wall thicknesses, narrow-groove GTAW joint designs are adopted. In the orbital welding technology, the welding parameters in individual sections/positions gradually change according to pre-tested and pre-programmed setting. Input heat for all layers is thus controlled within a limit. It is helpful to use welding conditions to produce a somewhat convex weld bead shape to provide improved resistance to solidification

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Demystifying AWS Specifications for carbon steel Flux-cored Wires

The purpose of this article is to help all new entrants to have a quick grasp of the applicable standards.

Classification

AWS A5.20 classifies the flux cored or tubular electrodes - both self and auxiliary shielded ones according to the mechanical properties of the weld metal along with polarity and positional welding capabilities. They are all tubular electrodes with fluxing elements inside the electrode that among other things, produce a slag covering of the weld. Self-shielded wires produce their own shielding and do not require external or auxiliary shielding. They can be compared to Shielded Metal Arc Welding (SMAW) or stick electrodes.

These usability designators can be sub-divided into the two main categories as follows*:

Self-Shielded, Flux-Cored Electrodes:
T-3, -4, -6, -7, -8, -10, -11, -13, -14, -G, -GS

Gas-Shielded, Flux-Cored Electrodes:
T-1, -2, -5, -9, -12, -G, - GS

A summary of the main points of each usability designation group are included in this article in below table.

Dual or Tri classification

The electrodes may be dual or tri-classified such as 'T-1' & 'T-9' or 'T-1', 'T-9' & 'T-12' type. E.g. E71T-1M/E71T-9M/E71T-12M. This article has focused on carbon steel electrodes. However, there are also low alloy flux-cored electrodes available that are classified in the AWS document A5.29:A5.29M: These electrodes produce welds that are typically stronger than welds made with carbon steel electrodes, and have minimum tensile strengths of 80 to 120 ksi (550 – 827 MPa).

Their electrode classification numbers are similar to carbon steel electrodes, including similar (but less) usability designation classifications. The mechanical properties and weld metal chemical composition requirements of each usability classification can

A5.20/A5.20M CLASSIFICATION SYSTEM
Examples: E70T-5C, E71 T-9M-JH4

Mandatory Classification Designators	E	X	X	T	-	X	X	-	J	X	H X
Current carrying electrode	E										
multiply by 10 MPa to get minimum tensile strength		X									
Welding Position: 'O' - flat/ horizontal and '1" - all positions			X								
Tubular or Flux-cored electrode				T							
1 to 14 refers to polarity and general operating characteristics. When "G" – it is not specified and 'GS' - suitable for single pass welding.						X					
Shielding gas: 'C' = 100% CO2, 'M' = 75-80% Argon/balance CO2. Blank = self-shielded or no external shielding.							X				
Optional supplemental designators											
'J' meets Charpy V-Notch properties of min 27J at —40ºC when the welds are made in a manner prescribed by this specification.									J		
"D or 'Q' refers to low or high heat input welding procedures										X	
H4, H8 or H16 ml/100gm Diffusible hydrogen											H X

** The dual numbering system for filler metal specifications (e.g. A5:20/A5:20M) means that they include both English units and metric units. The year of publication is also included at the end of the document number.*

vary with different alloy types and alloy levels in each electrode. These usability designators for low alloy flux cored electrodes can by sub-divided into the two main categories of electrodes as follows:

Self-Shielded, Flux-Cored Electrodes:
T4, 6, 7, 8, G

Gas-Shielded, Flux-Cored Electrodes:
T1, 5, G

One slight difference with low alloy electrodes' classification numbering system is that the usability designator, following the "T" designator, now precedes the dash, with the deposition composition or alloy designator now following the dash. For example, a carbon steel electrode might have the classification number "E71T-1M-JH8", while a low alloy electrode might have the classification number "E81T1-K2M-JH4".

New Classification AWS A5.36/A5.36M

A new filler metal specification AWS A5.36/A5.36M, "Specification for Carbon and Low-Alloy Steel Flux Cored Electrodes for Flux Cored Arc Welding and Metal Cored Electrodes for Gas Metal Arc Welding" combines both carbon steel and low alloy flux-cored electrodes, as well as carbon steel and low alloy metal cored electrodes. It is effective since January 2016 and supersedes previous classifications A5.20 and A5.29. However, discussion of this new A5.36 specification is for a future column.

FCAW Electrode Useability Designations

The useability of FCW electrodes are summarised in the following table.

Usability Designator	Chemistry	Slag	Shielding	Impact	Polarity	C/Mn/Si levels	Radiography	Fillet weld	Passes
T1	Required	Rutile	C or M	27J/-20°C	DCEP	Normal	Not Required	Reqwuired	Multi
T5		Basic		27J/-30°C	DCEP /DCEN				
T9		Rutile			DCEP				
T12	Required	Rutile	C or M	27J/-30°C	DCEP	Lower Mn		Required	Multi
T4	Required	Rutile	None	NS	DCEP	Higher C Lower Si	Not Required	Required	Multi
T6				27J/-30°C					
T7				NS	DCEN				
T8				27J/-30°C					
T11				NS					
T2	Not Specified	Rutile	C or M	Not Specified	DCEP	Not Applicable	Required	Required	Single
T3			None					Not Required	
T10									
T13					DCEN			Required	
T14									

"A human being is a part of a whole, called by us 'universe', a part limited in time and space. He experiences himself, his thoughts and feelings as something separated from the rest... a kind of optical delusion of his consciousness. This delusion is a kind of prison for us, restricting us to our personal desires and to affection for a few persons nearest to us. Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures and the whole of nature in its beauty." - Albert Einstein

Carbon Equivalent

INTRODUCTION

Carbon Equivalent (CE) is an empirical value in weight percent, relating the combined effects of different alloying elements used in the making of carbon steels to an equivalent amount of carbon. In welding, equivalent carbon content (CE) is used to understand how the different alloying elements affect hardness of the steel being welded. This is then directly related to hydrogen-induced cold cracking, which is the most common weld defect for steel, thus it is most commonly used to determine weldability.

In terms of welding, the Carbon Equivalent governs the hardenability of the parent metal. It is a rating of weldability related to carbon, manganese, chromium, molybdenum, vanadium, nickel and copper content. Most commonly this concept is used in welding, but it is also used when heat treating and casting cast iron. By varying the amount of carbon and other alloying elements in the steel, the desired strength levels can be achieved by proper heat treatment. A better weldability and low temperature notch toughness can also be obtained.

CALCULATION OF CE

Carbon equivalent calculation formulae were originally developed to give a numerical value for a steel composition which would give an indication of a carbon content which would contribute to an equivalent level of hardenability for that steel. These formulae were later extended to represent the contribution of the composition to the hydrogen cracking susceptibility of steel. They are also used as compositional characterising parameters for other properties that may be linked to hardness, such as toughness and strength.

Higher concentrations of carbon and other alloying elements such as manganese, chromium, silicon, molybdenum, vanadium, copper and nickel tend to increase hardness and decrease weldability. Each of these elements tends to influence the hardness and weldability of the steel to different magnitudes, however, making a method of comparison necessary to judge the difference in hardness between two alloys made of different alloying elements lead to development of CE.

These kind of relationships originated in about 1940 when a carbon equivalent formula was proposed to predict steel strength, hardenability and HAZ hardness. In 1967, the International Institute for Welding (IIW) adopted a somewhat simplified form of the formula for hardenability which became a generally accepted measure of steel weldability - CEIIW

$$CE_{IIW} = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$$

There are two commonly used formulae for calculating the equivalent carbon content. One is from the American Welding Society (AWS) and recommended for structural steels and the other is the formula based on the International Institute of Welding (IIW).

Since its adoption by IIW, the equation has been incorporated into a number of material and codes, including EN 1011-2:2001 and in a modified form in AWS D1.1, with a “+Si/6” term added to the equation.

The value of CE can be calculated using a mathematical equation.

$$CE = \%C + \left(\frac{\%Mn+\%Si}{6}\right) + \left(\frac{\%Cr+\%Mo+\%V}{5}\right) + \left(\frac{\%Cu+\%Ni}{15}\right)$$

There are several other commonly used equations for expressing Carbon quivalent.

If some of the values are not available, the following formula is sometimes used:

$$CE = \%C + \frac{\%Mn}{6} + 0.05$$

Ceq carbon equivalent short formula used in carbon steels C + (Mn/4) + (Si/4).

A CE value of 0.3 or less is considered safe.

EFFECTS OF CE

The carbon equivalent is a measure of the tendency of the weld to form martensite on cooling and to suffer brittle fracture. When the carbon equivalent is between 0.40 and 0.60 weld preheat may be necessary. When the carbon equivalent is above 0.60, preheat is necessary, postheat may be necessary. The AWS states that for an equivalent carbon content above 0.40% there is a potential for cracking in the heat-affected zone (HAZ) on flame cut edges and welds. However, structural engineering standards rarely use CE, but rather limit the maximum percentage of certain alloying elements. This practice started before the CE concept existed, so just continues to be used. This has led to issues because certain high strength steels are now being used that have a CE higher than 0.50% that have brittle failures.

The weldability based on a range of CE values can be defined as follows:

Carbon equivalent (CE)	Weldability
Up to 0.35	Excellent
0.36–0.40	Very good
0.41–0.45	Good
0.46–0.50	Fair
Over 0.50	Poor

The ability to form hard metallurgical constituents such as martensites or any other hard phases is dependent on the carbon equivalent and the cooling rate of the steel involved in cooling from the transformation temperature. The higher the carbon equivalent value, the faster the cooling rate, the higher the tendency for hard, brittle phases to form during cooling.

The metallurgical characteristics of steels are mainly determined by its chemical composition. As such, any small changes in its chemical composition of the base and filler metals can substantially increase cracking tendency. The risk of cracking also increases with increasing hardness of the Heat Affected Zone (HAZ) in welding for a particular hydrogen level and joint restraint. The diagram below shows the influence of carbon content and the transformation temperature on the HAZ microstructure and toughness.

Hot cracking occurs immediately after solidification in a weld, caused by the segregation of certain alloying elements during the solidification process. Sulphur, boron and other elements that tend to segregate excessively are reduced in order to prevent hot cracking. Cold cracking, also known as delayed or hydrogen-induced cracking develops after solidification of the fusion zone as the result of residual stress. It generally occurs below 200oC, sometimes several hours, or even days after welding.

As such, the value of the Carbon Equivalent is a useful guide to the possibility of cracking in alloy steels by comparison with an equivalent plain carbon steel. The two main problems faced in the cracking of the welded metals are hot cracking and cold cracking.

CONCLUSION

Carbon Equivalent (CE) is an empirical value in weight percent, relating the combined effects of different alloying elements used in the making of carbon steels to an equivalent amount of carbon. This value can be calculated using a mathematical equation. By varying the amount of carbon and other alloying elements in the steel, the desired strength levels can be achieved by proper heat treatment. A better weldability and low temperature notch toughness can also be obtained.

Although a carbon equivalent is sometimes useful in planning welding procedures, its value is limited because only the chemical composition of the steel is considered. The section size being welded and joint restraint is of equal or greater importance, because of their relations to heat input and cooling rate.

"The further the spiritual evolution of mankind advances, the more certain it seems to me that the path to genuine religiosity does not lie through the fear of life, and the fear of death, and blind faith, but through striving after rational knowledge."

"The whole of science is nothing more than a refinement of everyday thinking."

"Everything should be made as simple as possible, but not simpler."

"Common sense is the collection of prejudices acquired by age eighteen."

- Albert Einstein

Quick Purge

INTRODUCTION

A large plant of Purified Terepthalic Acid (PTA) of 1.25 MMT p.a. capacity is being set up in Mangalore-Karnataka.

The project involved fabrication of various hi-tech equipments in factory, and also integrating the same at the site. The material of construction included various grades of stainless steels and exotic metals like titanium and tantalum.

A part of the project has been awarded to one of the Chennai based customers of Weldwell Speciality Pvt. Ltd., Mumbai, who are single source of solution provider in the Indian welding industry for over two decades. The customer specialized in fabrication of custom built equipment of special metals like Titanium, Tantalum, Zirconium, Nickel, Nickel Alloy, Copper & Copper Alloy and Stainless Steel.

The project involved fabrication of long conduits of Titanium, made from cylindrical sections that required welding at site. The fabricator extended their vast experience of welding of SS to Titanium at factory to site for the purpose.

They employed Quick Purge Systems of sizes 59”, 32” & 48” of Huntingdon Fusion Technique, UK which are commonly used for SS applications. In this case the same was adapted to high quality onsite welding of 20mm thick Titanium shells with a “special purge gate arrangement”. Purge gate arrangement is used to maintain inflated state of such large sized bladders for several days by a special arrangement stopping the gas flow, but maintaining the inflated state.

DEFINING THE PROBLEM

Initially the Quick purge systems used were with 3 inlet purging ports and 2 outlet ports which are suitable for purging of Stainless Steel Pipes, but since the fabricator wanted to use these Quick Purge systems for Titanium pipes the fabricator did not get shinning weld bead and was getting blue discoloration in weld bead which was not acceptable. (Photo 1).

The customer contacted Weldwell for a suitable solution. After due inspection it was concluded that insufficient amount of purging gas was the cause of discolouration. Weldwell contacted Huntingdon Fusion Techniques (HFT) U.K., - a pioneer in providing pipe weld purging systems for suitable recommendations.

RECOMMENDATIONS

After technical deliberations and presentation by Weldwell it was concluded that increasing the purging gas may solve the problem. HFT recommended use of versatile purging systems QuickPurge II (Photo 2) which are based on inflatable seals and would be the ideal product for use in this application. Accordingly, the number of inlet of purging ports was increased from 3 to 5 ports and outlet was increased from 2 to 3 ports. By doing so the purging became sufficient for Titanium welding and the discolouration problem was resolved.

However, during the initial setting the QuickPurge bladders were inflated with Argon gas. The gas connection from cylinder was removed during the shift change or at night and bladders deflated and they had to again fill these bladders in morning or during next shift. This caused a huge loss of Argon gas.

The manufacturers then explained the special features of PURGE GATE. If the Argon Gas pressure is set to 0.45 bar, only the bladders will inflate but purging will not happen. Thus after inflation the Argon gas from cylinder will stop and no further consumption will take place and can be kept throughout the night without any Argon gas loss.

This meant that a positive pressure of 0.45 bar was to be maintained and for the purging to start the pressure to be increased above 0.5 bar – this feature of Purge Gate resolved the gas loss problem as well.

Photo 3 shows silver bright weld bead. With the help of the QuickPurge® the pipe was purged in just 55 minutes in the next shift. The dramatic savings in time and gas paid for the system in just one weld.

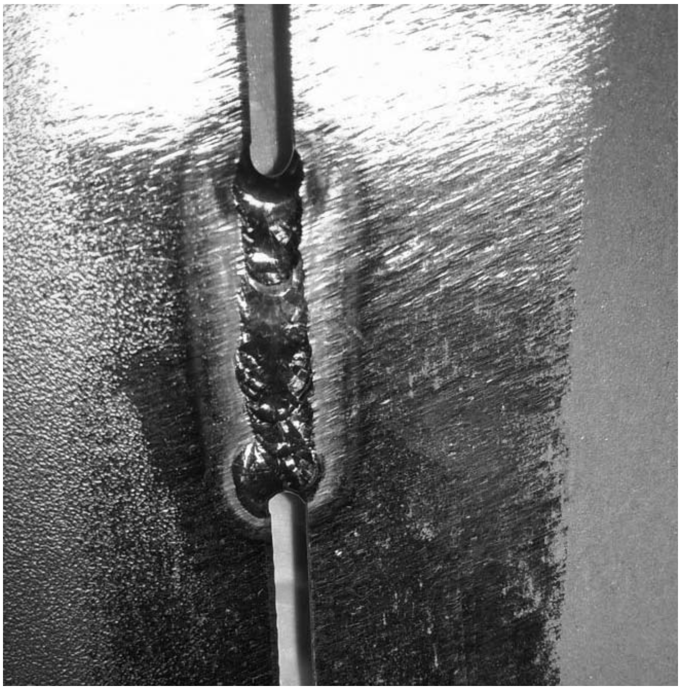

Photo 1: *Discoloured weld bead of titanium*

Photo 2: *Quick purge bladders with increase inlets and outlets*

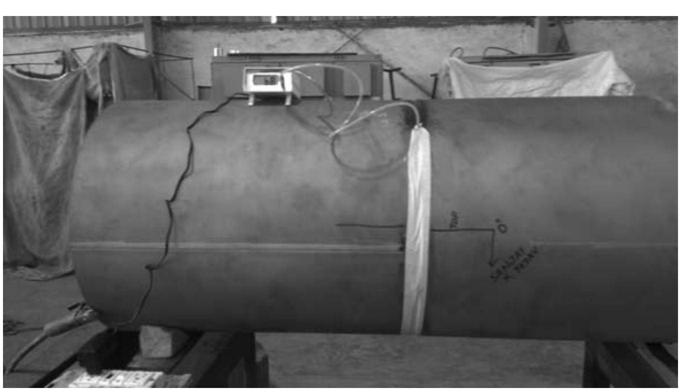

Photo 3: *Silver bright weld bead*

...Lead Article continued from Page 8

cracking.

Post Welding Heat Treatment

The processes of welding and heat treatment cause structural changes (hardening phase precipitation and coarsening of grains in the overheating zone) but changes in the mechanical properties are not significant.

After welding homogeneous welds and welds between austenitic materials do no longer have to be heat treated. Solution annealing is to be done only in case of materials to be used in corrosive environment including chlorine. Heterogeneous welded joints, such as, with P92 material must be subjected to post-weld heat treatment (PWHT) to the temperature indicated with a longer holding time and subsequent controlled cooling.

SUMMARY

- Super 304H - highest strength among 18Cr-8Ni austenitic stainless steels utilizing Cu-rich phase.
- Fine-grained microstructure by Thermo-Mechanical Process contributes to superior steam oxidation resistance to conventional coarse grained TP347H.
- Impact energy for material within the temperature range is much higher than the minimum requirements
- Superior weldability to TP347H due to smaller amount of niobium.
- PWHT is not mandatory
- Inexpensive Austenitic matching welding consumable is available for both similar and dis-similar joints
- Good phase stability proven by long term creep-rupture tests and actual operation results

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"Any intelligent fool can make things bigger, more complex, and more violent. It takes a touch of genius and a lot of courage to move in the opposite direction."

- Albert Einstein

GOLDEN JUBILEE CELEBRATION OF IIW

The Indian Institute of Welding, India celebrated a glorious journey of fifty years on 22nd April, 2016 at The Stadel, Kolkata in a glittering function. The celebration started with flag hoisting at IIW-India House followed by opening ceremonies at The Stadel where Mr.Cris Smallbone, the representative of The International Institute of Welding addressed the gathering after the welcome address by the President Mr. R.Srinivasan. The Chief guest Mr. Sumit Mazumder, CMD, TIL Ltd, delivered the inaugural address which was followed by falicitation of Past Presidents, Vice Presidents, Hon. Secretaries and Members of 1966 and award giving ceremonies. Awards were Golden Jubilee Excellence, Golden Jubilee Excellence Award for International Relations and Golden Jubilee Welding Ratna Award. Mr. C.C.Girotra, MD, Weldwell Speciality, also received the Welding Ratna Award.

The initial celebrations was followed by a seminar on Welding for Nation Building. The speakers were by invitation. The key note speech was by Dr.Baldev Raj, Past President IIW-India and a prominent nuclear technologist. The subsequent lecturers were Mr. Y.S.Trivedi, Sr. Vice President, L&T, who spoke on status of welding fabrication in India, Mr. D.S.Honavar, MD, Honavar Electrodes, elaborated on the present needs and future requirements of welding consumables in the country whereas Mr. A.C.Lahiri, formerly MD of Sur Iron and Steel Co. Ltd., elaborated the same for welding power sources, automation etc. Status of R&D in India by Mr.S.Gopinath, Executive Director, BHEL, Modular welding education and skilling by Prof. G.L.Dutta, formerly Chancellor, K. L.University, and Building up a National Welding Capability by Mr. Chris Smallbone, Past President, IIW, concluded the seminar.

Career options in Weldwell Speciality Pvt. Ltd., Mumbai

Interested in making or furthering your career in sales or marketing welding related products involving technical acumen and knowledge!!

Here are our options.

Weldwell group of companies is in running marketing activities of selling high tech segment of welding products namely welding consumables, equipment and specialised accessories for over quarter century and is growing at a healthy rate. The organisation is planning for a quantum jump in its growth and is therefore looking for competent sales and marketing personnel to make it happen.

We represent a large number of respectable international consumable brands such as INCONEL/ KOBE/TASETO/SANDVIK/SAFRA/AMPCO METALS and machines of PANASONIC /KEMPPI and HYPERTHERME.

Our business model is ‘Stock & Sale’ and also facilitate direct import from our principals if customer so desires.

We have a large customer base all over India comprising oil / gas / petrochemical companies / process engg / capital equipment manufacturers .

Our Head Office is in Chembur, Mumbai, and have representative offices in Chennai, Vadodara and Bangalore.

We have a good active team of techno-commercial engineers to sell and are looking to strengthen by inducting more engineers who have knowledge of the welding industry, products and processes.

Option is also open to fresh Mechanical / Electronics / Metallurgical engineers interested in making career in sales and marketing.

Vacancies exist at senior / middle and junior level. Compensation package matches the industry norms, if not exceed. The package consists of salary, PF, LTA and other benefits.

The positions are at HO (Mumbai), Vadodara and Pune locations.

Please send your resume to technical@weldwell.com. For more information please visit our website www.weldwell.com

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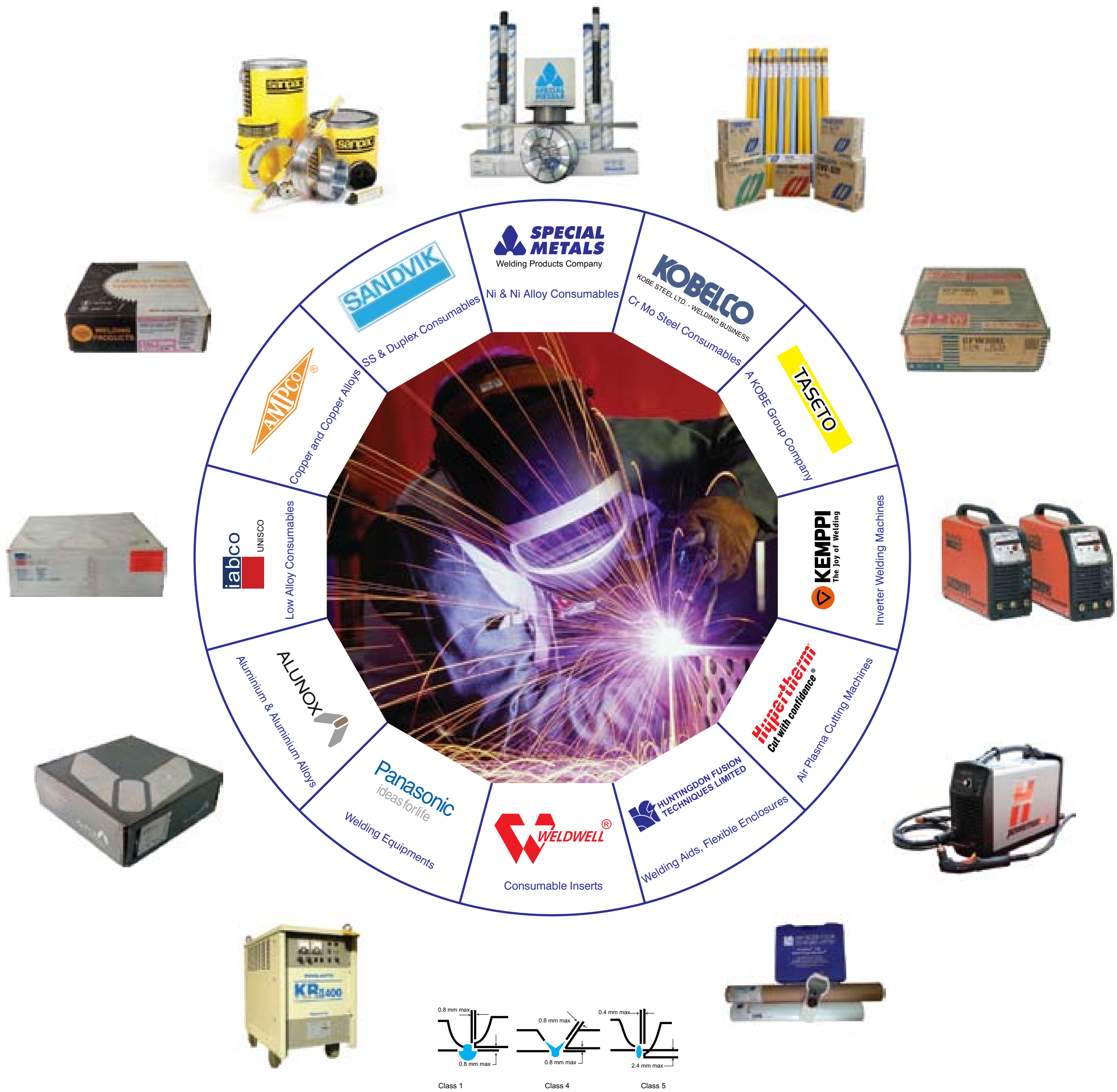

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