AUSTRALIAN WELDING INSTITUTE

WeldED

AWI™ Certification is now available

AUSTRALIAN WELDING INSTITUTE

Welding Supervisor

This is to certify that

AWI Member

has complied with the pre-examination
and has passed the examination

AS2214-20

Certification of Weld
Structural Ste

Certificate Number: AWI/

Date of issue: August 20

Signature:

AWI E&C Coordinat

AUSTRALIAN WELDING INSTITUTE

Welding Supervisor

This is to certify that

AWI Member

has complied with the pre-examination requirements
and has passed the examination specified in

AS1796-2001

Certification of Welders and
Welding Supervisors

Certificate Number: AWI/WS-B1/001

Date of issue: August 2013

Signature:

AWI E&C Coordinator

Sponsors

South Pacific Welding Group
http://www.spwgroup.com.au/home.asp

Smenco
http://www.smenco.com.au

Victor Technologies 'Cigweld'
www.cigweld.com.au

SafeTac
http://www.safetac.com.au

Bureau Veritas
http://www.bureauveritas.com.au

Southern Cross Industrial Supplies
http://www.scis.com.au

Technoweld
http://www.technoweld.com.au

Hardface Technologys
http://www.hardface.com.au

3834 Weld Management
weldtraining@iinet.net.au

Index

Cover Page

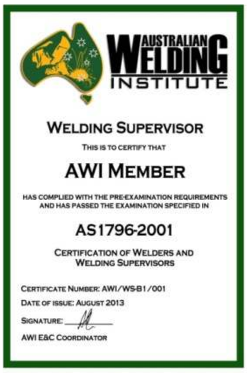
AWI™ has recently launched its certification program for AS1796 Certifications 1 to 9, it has now extended its offering to include Certifications 10 and Welding Supervisors to AS2214.

AWI™ Certification is now available for Welding Supervisors.

Streamlined, relevant and practical certification.

The Australian Welding Institute AWI™ has been successful in introducing and running a program for AS 1796 Certifications 1 to 9. The AWI™ is now extending the program to include Certifications 10 and Welding Supervisors to AS 2214.

The industry has been waiting for the return of a practical, relevant qualification, which is cost competitive to the WTIA.
Wait no longer, the AWI™ are making this happen!


AUSTRALIAN WELDING INSTITUTE

WELDING SUPERVISOR

THIS IS TO CERTIFY THAT

AWI MEMBER

HAS COMPLIED WITH THE PRE-EXAMINATION REQUIREMENTS AND HAS PASSED THE EXAMINATION SPECIFIED IN

AS1796-2001

CERTIFICATION OF WELDERS AND WELDING SUPERVISORS

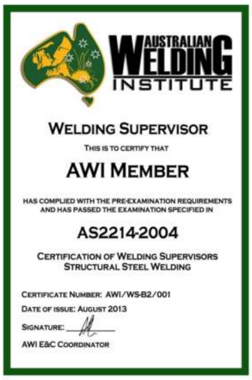
CERTIFICATE NUMBER: AWI/WS-B1/001
DATE OF ISSUE: AUGUST 2013
SIGNATURE:
AWI E&C COORDINATOR

AWI™ examination papers have been written and validated by industry experts that have extensive experience in the relevant disciplines.

Feedback from running the first round of examinations are exampled below:

'they are based much more on what we need to know in the workshop' and 'it was a very detailed exam but based on practical application of being a supervisor'.

The AWI™ has listened to key stakeholders - Industry, but more importantly -YOU - and have provided a certification system that measures the skills and knowledge of welding supervisors. For example, there will not be questions on MIAB or Laser welding in the exam. Instead, we have elected to use the examination period to focus on the more 'relevant skills'.


AUSTRALIAN WELDING INSTITUTE

WELDING SUPERVISOR

THIS IS TO CERTIFY THAT

AWI MEMBER

HAS COMPLIED WITH THE PRE-EXAMINATION REQUIREMENTS AND HAS PASSED THE EXAMINATION SPECIFIED IN

AS2214-2004

CERTIFICATION OF WELDING SUPERVISORS STRUCTURAL STEEL WELDING

CERTIFICATE NUMBER: AWI/WS-B2/001
DATE OF ISSUE: AUGUST 2013
SIGNATURE:
AWI E&C COORDINATOR

EXAMINATION DATES 2013
to be held in all capital cities *based on demand

Friday **6th December 2013** Paper A
Saturday **7th December 2013** Paper B1 and B2
At the very least the examinations will be held in Adelaide and Perth, but other sites will be included based on demand.

If you would like to sit your examinations with the AWI, contact your local AWI™ representative (details on back cover) or email **admin@austwelding.com.au.**

Application forms will be forwarded to you.
Your intention to sit for the examinations needs to be in by 23/11/13 with formal applications closing on 30/11/13.

'don't expect it to be easy, AWI™ is raising the bar on these important industry qualifications'

„Considerations for preheating when welding mild- and low alloyed structural steels”

Fred Neessen, Lincoln Smitweld B.V.
Vincent van der Mee, Lincoln Electric Europe

Introduction

If it was up to the welder there would never be preheating as it is not convenient.
If it was up to the construction company there would never be preheating as it only adds cost. However, for certain materials and thicknesses preheating is required. So, everyone is right but why?

Why preheating

In practice, preheating is often a point of discussion. A low carbon equivalent (CE) in today's steels quite often allows for no preheating. For instance Standard EN 1011-2, would not require any preheating when a construction in S460 (with CE = 0.44) with an "unlimited wall thickness" would be welded with a standard arc process with a minimum heat input (HI) of
1.0 kJ/mm and a diffusible hydrogen content of max 5 ml/100g deposited weld metal (H_{DM}), figure 1.
However, in some instances, preheat might be beneficial. Main reasons for preheating are:

- Lowering the cooling rate of weld- and base material softens the metal and reduces the susceptibility to cold cracking.
- A lower cooling rate, allows for diffusion of the hydrogen as well as for reducing residual stresses, resulting in a lower risk for cold cracking.
- It reduces the shrinkage stresses in the weld- and base metal,
- It brings some steels above the temperature at which brittle fracture could occur during manufacture.

Furthermore, preheat may improve mechanical properties, such as impact toughness at lower temperature.

When preheating

Considerations for preheating include:

- Grade of base material,
- Chemical composition base material,
- (Combined) material thickness,
- Internal stresses (restraint),
- Ambient conditions (temperature, relative humidity) during welding
- Welding process
- Diffusible hydrogen level resulting from consumables applied,
- Fabricator's practice and experience with cracking phenomena
- Code requirements

If there is a requirement in the code, it is usually the minimum preheat temperature specified for a given steel grade, material thickness and welding process. This minimum value is then maintained, regardless of actual stresses or variations in the composition. It is allowed to use a higher (but restricted) preheat temperature. In anyway, an adequate interpass temperature shall be maintained.
If there are no requirements in the code listed, one must independently determine whether preheating is required, and if so at what temperature. In general, preheating is not necessary in steels up to S460 (or equivalent) with thickness below 25 mm. However, for higher
strength steel grades, preheat shall be considered when a higher hydrogen content, higher stresses and/or thicker materials are being applied.

Optimal preheat temperature

There are several ways to determine the preheat temperature. The simplest, though not always practical, is when the minimum preheat temperature is prescribed in the code, like in EN 1011-2 (part 2) ISO 15614-1, or AWS D1.1 Table 3.2.

If no code is required, different approaches can be chosen:
1. Hardness
2. Diffusible hydrogen level
3. Pre-heat equations from literature
4. Software tools
5. Experience (internal or client)

Hardness

Controlling the hardness is based on the assumptions that the cracking does not occur if (HAZ) hardness is below a certain critical value. This can be accomplished by limiting cooling rate. The critical cooling rate for a given hardness is related to the Carbon Equivalent. In literature [1] many equations are given. For example, Pcm, CE, CEN, etc. as indicated in Table 1.

Table 1. The most widely used formulas for calculating the C-eq. at a glance	
Pcm	= C + (Si/30) + [(Mn + Cu + Cr)/20] + (Ni/60) + (Mo/15) + (V/10) + 5*B
CE	= C + (Si/25) + [(Mn + Cu)/20] + (Ni/40) + (Mo/15) + (V/10)
CET	= C + [(Mn + Mo)/10] + [(Cr + Cu)/20] + (Ni/40)
CE_{IIW}	= C + (Mn/6) + [(Cr + Mo + V)/5] + [(Cu + Ni)/15]
CEN	= C + A(C)*{(Si/24) + (Mn/6) + (Cu/15) + (Ni/20) + [(Cr + Mo + Nb + V)/5] + 5*B} A(C) = 0,75 + 0,25*tanh*[20*(C – 0,12)]

In Figure 1 the relationship between C-equivalents is indicated.

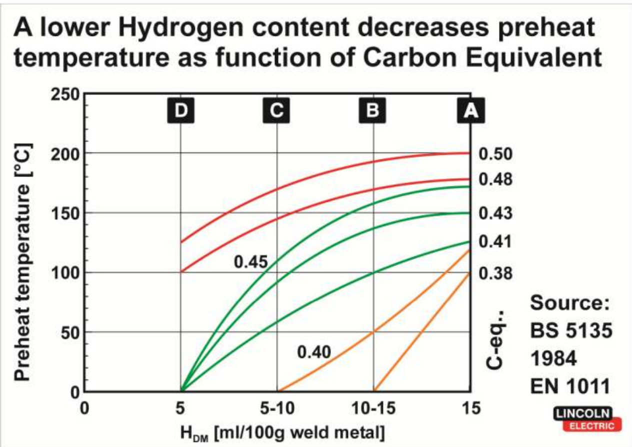


Figure 1.
Preheating temperature in relation to C-eq. and diffusible hydrogen content

Experiments have been carried out on various steels indicating that the CE_{IIW} equivalent is well described for C- and CMn-steel, while the Pcm is more suitable for low carbon low alloy steel.

Table 2. Chemical composition of some steels (see Figure 2).										
Steel	**C**	**Si**	**Mn**	**Cu**	**Ni**	**Cr**	**Mo**	**Nb**	**V**	**B**
A	0.05	0.28	0.56	1.09	0.84	0.38	0.19		0.04	
B	0.07	0.28	1.38			0.21			0.04	0.002
C	0.15	0.43	1.59							
D	0.15	0.29	1.42							
E	0.14	0.37	1.43							
F	0.14	0.27	1.20							
G	0.11	0.31	1.31					0.02		
H	0.10	0.24	1.28							
I	0.15	0.18	0.73							

As shown in Figure 2, with "low" levels of carbon, the equivalent according to CEN and Pcm result in similar values, while at "higher" carbon contents, the CEN and CE_{IIW} are more comparable.

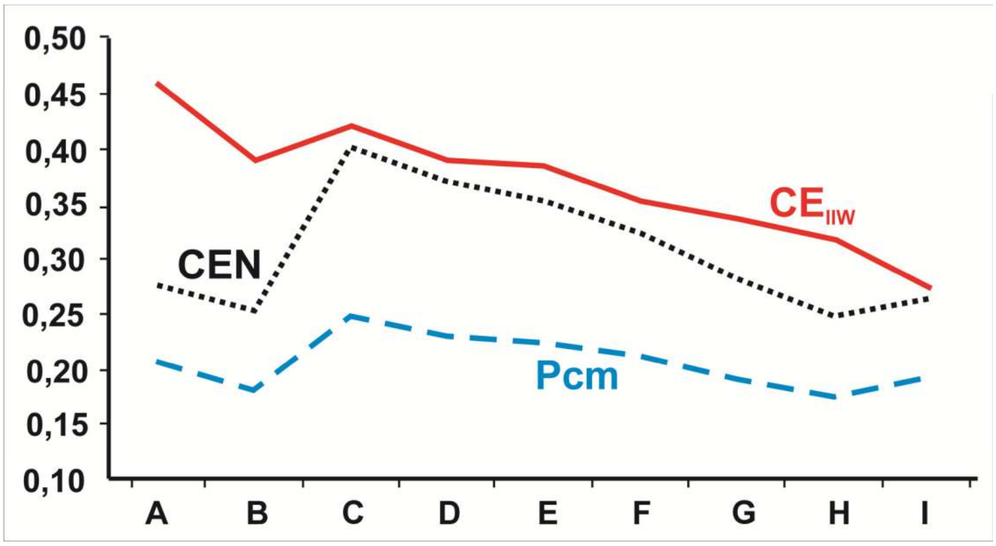


Figure 2. CE_{IIW}, CEN and Pcm values for steels in Table 2.

In the production of high-strength structural steels, major developments over the past decades resulted in better steel grades as S355 and S460. Normalized steel with C = 0.15 to 0.20% and a carbon equivalent > 0.48 is thereby often replaced by TMCP and Q & T steels with a much lower CE (typical 0.3 to 0,45) and a chemical composition as C = 0.10% and Mn = 1.2 to 1.5%. Heavier thicknesses may be alloyed with 0.2 to 0.5%Ni and sometimes micro-alloyed with Ti (~ 0.015%). Today's steel grades show low levels of impurities. For instance sulfur content is typically at a level of 0.001%.

Base metal composition determines to a large extend the microstructure in the HAZ. A low carbon equivalent will result in limited undesired bainite/martensite with adequate heat input and preheat / interpass temperature in heavy plate thicknesses is being applied. The hardness of these microstructures is determined by carbon and alloying elements.

For example, according to the formula:

HV = 802 x C + 305 for martensite

HV = 350 x CE + 101 for bainite

In the HAZ of these structural steels, a maximum hardness of 350 HV is recommended.

Diffusible hydrogen level

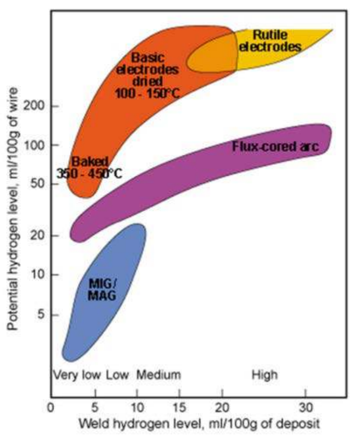
Effect of hydrogen content on preheat temperature

Covered electrodes, tubular cored wires and wire / flux combinations are the most common welding consumables. For heavy wall structures low hydrogen consumables need to be used. In this context, welding consumables are being classified by hydrogen under standardized conditions as per ISO 3690. In EN 1011-2 the following levels are indicated: (see table 3).

ISO 3690 is based on standardized measurements on weld metal. The heat balance in the weld has a major impact on the actual amount of diffusible hydrogen. Notwithstanding the ISO 3690, a weld metal hydrogen levels class "E" is added. This is

Table 3. Classification by hydrogen content in EN 1011-2

Scale	diffusible hydrogen contents H_{DM} ml/100g deposited weld metal
A	> 15
B	10 ≤ 15
C	5 ≤ 10
D	3 ≤ 5
E	< 3



needs to be put in perspective taken into account the accuracy of the measurement at a level below 3 ml/100g.

For most low-hydrogen products, class “D” should be considered valid. Only moisture resistant coated electrodes in vacuum packaging, a solid wire for Gas Metal Arc Welding, special tubular (flux) cored wires, may achieve a level of about 2 ml/100g and through this low level reducing the risk of Hydrogen Cold Cracking. For these filler materials, the use of scale E is correct.

Pre-heat equations from literature

Florian [2] published an overview indicating calculations for preheat temperatures. Using five different formulas (Thyssen, Okuda, Nippon Steel, Hart and Chakravarti), various methods of the preheat temperature are discussed.

Thyssen Krupp concept [3]:

The formula for the required preheat temperature to prevent cold cracking in weld metal is similar to that of the HAZ, but the C equivalent for the weld metal must be increased by 0.03.

$$\mathbf{Tp = 700 * (CET + 0.03) + 160 * \tanh * (d/35) + 62 * H^{0.35\ IIW} + [53 * (CET + 0.03) - 30.4] * Q - 330}$$

with

CET	= C + [(Mn + Mo) / 10] + [(Cr + Cu) / 20] + (Ni/40)
d	= plate thickness [mm]
H_{IIW}	= diffusible hydrogen level according ISO 3690 [ml/100g molten metal = H_{FM}]
Q	= heat input [kJ/cm]

Okuda concept [4]:

$$Tp = 0.614 * Rm + 318.6 \log H_{GC} - 554.3$$

with
Rm = ultimate tensile strength welding material [MPa]
H_{GC} = diffusible hydrogen using a gas chromatographic method
H_{GC} = H_{IIW}

Nippon Steel concept [5]:

$$Tp = 120 + 120 \log (H_{JIS}/3.5) + 5.0 * (hw - 20) + 0.815 * (Rm - 846)$$

for 15 < hw <30 ... 40 mm

hw = ½ d for X (Double-V) seams, K (double bevel) seams and double U-joint
H_{JIS} = diffusible hydrogen using glycerin method
H_{JIS} = 0.79 H_{IIW} - 1.74 g

$$Tp = 120 + 120 \log (H_{JIS}/3.5) + 5.0 * (hw - 20) - 0.05 * (hw - 30) + 0.815 * (Rm - 846)$$

for 30 < hw <50 mm

$$Tp = 250 + 120 \log (H_{JIS}/3.5) + 0.185 * (Rm - 846)$$

for 50 > hw mm

Hart concept [6]:

$$Tp = 188.4 * (CE_W - 0.012 * \Delta t_{8/5} + 0.039 * H_{IIW}) - 108.3$$

with
CE_W = C + 0.378*Mn + 0.145*Ni + 0.468*Cr + 0.298*Mo
$\Delta t_{8/5}$ = cooling time between 800-500℃

Chakravarti concept [7]:

$$Tp = 487 * (CE_C + 0.012 * H_{IIW} - 0.006 * \Delta t_{8/5}) - 15.3$$

with
CE_C = C + 0.16*Si + 0.07*Mn + 0.22*Cr + 0.03*Ni – 0.27*Cu

If these concepts are compared, the influence of various factors can be as described in Table 4. Figures 3 and 4 provide a graphical representation.

Table 4. Differences of the five concepts

	f (H_{IIW})	f (Rm)	constant
Thyssen [1]	62 * (H_{IIW})exp0,35	700 * (CET + 0,03) + 160 * tanh(d/35) + (53 * (CET + 0,03) - 30,4) * Q	- 330
Okuda [2]	318 * log(H_{IIW})	0,614 * Rm	- 554,3
Nippon-steel [3]	120 * log(H_{JIS}/3,5)	0,815 * Rm + 5 * (d-20)	- 569,5
Hart [4]	7,348 * H_{IIW}	188,4 8 CEW - 2,261 * $\Delta t_{8/5}$	- 108,3
Chakravarti [5]	5,844 * H_{IIW}	487 * CEC - 2,922 * $\Delta t_{8/5}$	- 15,3

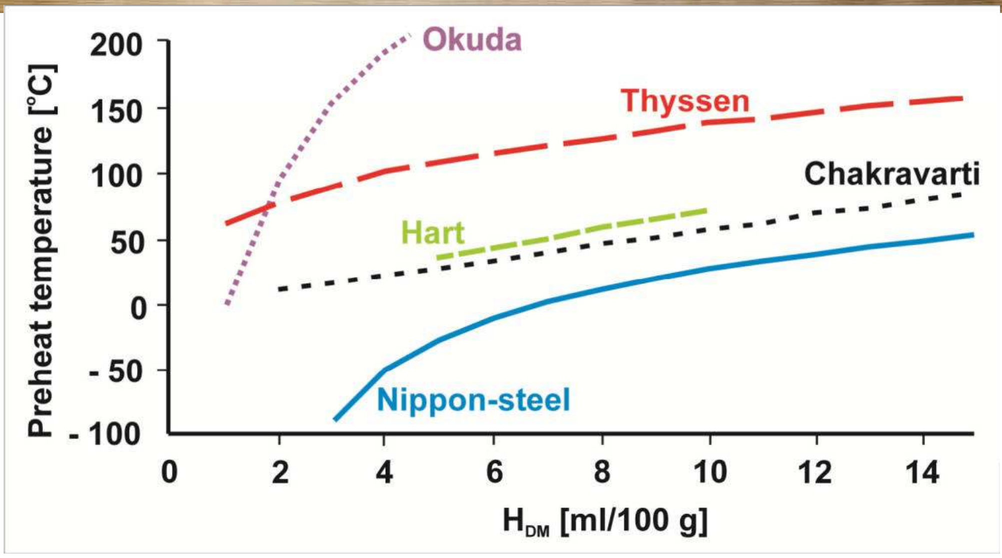


Figure 3. Effect of Hydrogen level on preheat temperature

When comparing these concepts and what is practical, the following equation for calculating the preheat temperature to avoid Hydrogen Induced Cold Cracking has been established:

$$Tp = 0.195 * Rm + 62 * H_{IIW}^{0.35} - 115$$

This equation has been established from Tekken tests and "bead-on-plates" tests (one layer) and has proved to be valid for steels with a yield strength of 420-690 MPa.

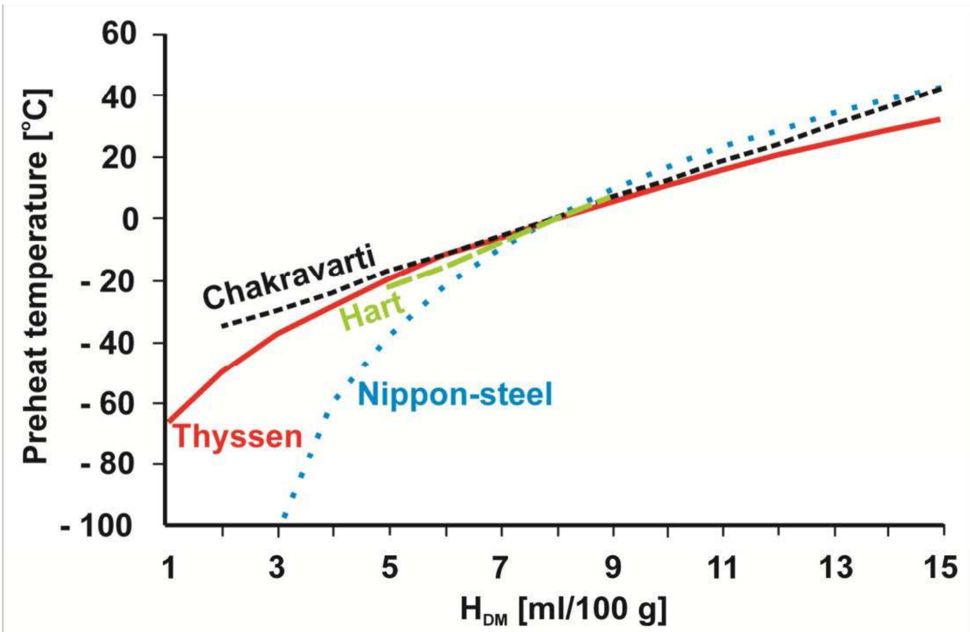


Figure 4. Effects of Hydrogen content on the level of preheat temperature, with H_{IIW} 8 ml/100g is standardized to 0".

Software tools

Several software programs are available in the market for determining the preheat temperature. When these programs are used, it is important to know how the recommended preheat temperature is calculated. A "black box" approach should be avoided [8].

During the presentation an example of a software program [9] will be shown, which is based upon both EN 1011-2 and AWS D1.1. The program also allows for a full explanation of how the recommended pre-heat temperature has been established.

Experiences (internal or client)

An absolute number for preheat is difficult to indicate in practice. What works for one Construction Company, does not work for another, even though the welding supposedly is "identical".

Good workmanship, materials, welding process, nature of the construction through the chemical composition, heat balance and internal stresses, finally determine the intrinsic factors responsible for H-cold cracks as:

- the microstructure;
- the amount of diffusible hydrogen locally available;
- the local stresses.

Below figure 5 is a model for crack formation in both the HAZ and weld metal.

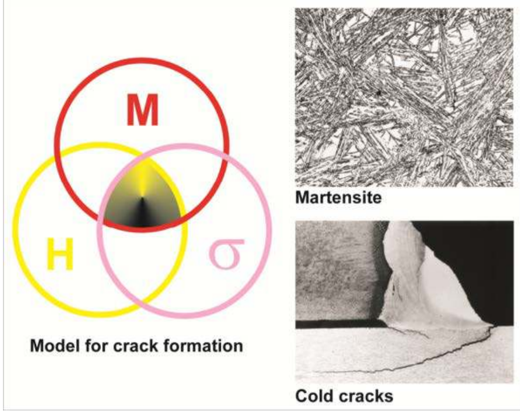


Figure 5. Model for crack formation in both the HAZ and weld metal

3. Summary

- Preheating may minimize risk for cold cracking and improve mechanical properties such as impact toughness;
- Preheating is necessary when prescribed in the applicable code. If not specified, it is the welding engineer who decides whether preheat (and at what temperature) is necessary, based upon applied welding process, filler materials, base materials, material thicknesses, etc;
- There are several tools (experience, code tables, equations, specific software, etc.) to determine the appropriate preheat temperature;
- For "ordinary carbon steel", the minimum/maximum preheat temperature is not that important. For higher strength steels, the heat balance (preheat and interpass temperature as well as PWHT) is crucial due to the temper temperature used for manufacturing the steel;
- An absolute value for preheat temperature to avoid cold cracking cannot be given.
  Depending on circumstances and risk analysis, a minimum pre-heat temperature should be used.

Literature:

1) [1] Costa, L., R. Molfino, M. Scasso: A new software to preheat temperature and evaluate cost, IIW-Doc. 1515-1500 (ex-doc. XV 1055-00)
2) [2] Wolfgang Florian: Cold cracking in high strength weld metal. Possibilities to calculate the preheat temperature Necessary, IIW-Doc. IX-2006-01
3) [3] D. und H. Höhne: Ermittlung angemessener Mindestvorwärmtemperaturen für das kaltrißsichere Schweißen von Stählen, Schweissen und Schneiden 43 (1991) H. 5, S. 282-286
4) [4] Okuda, N., Y. Ogate, Y. Nishikawa, T. Aoki, A. Goto and T. Abe: Hydrogen induced cracking susceptibility in high strength weld metal, Welding Journal 66 (1987) S. 141-s - 146-s
5) [5] Yurioka, N.: Predictive methods for prevention and control of hydrogen assisted cold cracking, IIW-Doc. IX-1938-1999
6) [6] Hart, P. H. M.: Resistance to Hydrogen Cracking in Steel Weld Metals, Welding Research suppl. January 1986. S 14 to 22
7) [7] Chakravarti, A. P. and S. R. Bala: Evaluation of weld metal cold cracking Using G- BOP testing, Welding Journal 68 (1989) S. 1-s - 8 s
8) [8] Bekkers, K., F. Neessen: Erfahrung beim Bau der Oosterschelde-Sturmflutwehr, Schweißtechnik 1 / 87, SZA
9) [9] Preheat Calculation Program, serving 75th anniversary edition Lincoln Smitweld B.V.
Software developed in collaboration with Center for Nature and Technology in Utrecht.

FERROUS FORGINGS

are Australia's leading precision forging specialists. Located in Albion, Victoria, the company's 5200m²floor area has an impressive array of equipment to forge a large range of ferrous and non-ferrous materials.

The company has an unenviable turnaround time on their work, usually a maximum 3-5 day delivery from receipt of an order……great news for any asset managers who need precision forgings for that 'break-down' situation!!

The company have a number of large hydraulic forging presses. With two 5,000t and two 3,500t presses; for those larger forging jobs as well as two 1,500t and three 1,000t press forges to cope with other forging work. If you couple this capability with a new forging manipulator, thenit's easy to see that the shop floor staff can easily and quickly complete a whole range of jobs.

If you need a rolled ring, then the company have the capability of quickly rolling 1600mm outside diameter rings with a face height of 300mm. Larger rings (2000mm diameter, 600mm face height) are easily dealt with; under one of those 3,500t press forges.

If you have a speciality material, Ferrous forgings will no doubt be able to supply from their own in-house stock.

The company makes the impressive claim of having *"every plain carbon steel and alloy steel available in Australia…including all the stainless steels used in Australia".* They have a large range of chrome-moly steels and duplex stainless steel grades with the carbon steel up to 1000mm diameter and the stainless steels up to 750mm diameter.

If you want tool steel, hi-carbon, hi-chrome, special corrosion resistant steels - Monel, Hastelloy, Inconel then Ferrous Forgings can meet your needs…..and don't forget they also have a large non-ferrous selection (Al-bronze, Copper, Beryllium-copper to name a few!)

An impressive array of very heavy forging equipment, closed-die forging and drop hammers up to 6t capacity plus a huge range of materials makes this company'sclaim to be "*Australia's leading precision forging specialists"* an easy one to substantiate.

It doesn't stop there. Ferrous Forgings have vertical borers capable of turning 3.6m diameter and lathe machining facilities that can rotate 1.8m diameter items, at 7.5m between centres as well as an extensive bandsaw cutting service up to 520mm diameter.

One great example of the company's innovative approach to a particular client problem was the ability to trepan a 530mm diameter hole through a forged round billet thereby giving the customer a very heavy walled hollow bar…. And the great costs saving for the customer was the centre 'slug' was put back into stock saving the customer a large portion of the material costs.

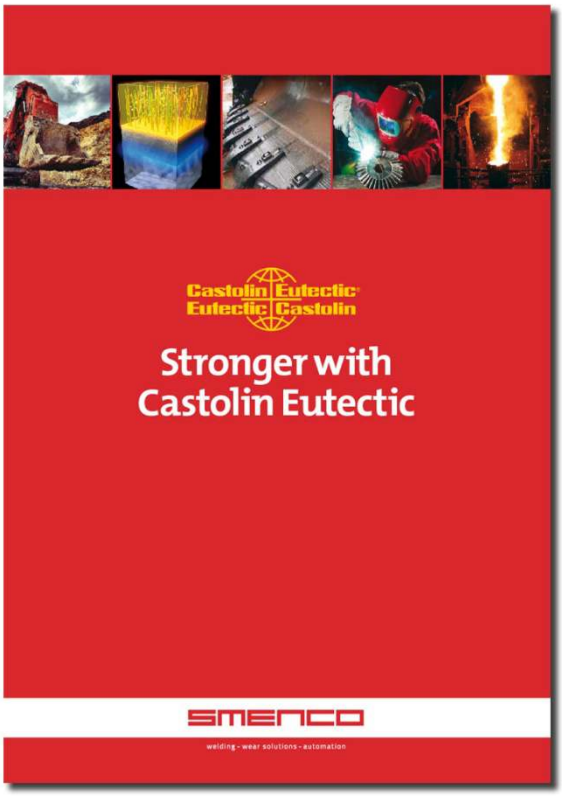
Of course, a couple of very vital facts are that the company has *"total conformance to ISO9002 and NATA control standards"*. They can offer metallurgical and technical advice on any critical forging job.

If you need some further information, then email ferrousforgings@ferrousforgings.com.au

or visit their website www.ferrousforgings.com.au

Global leader in wear and metal fusion technologies, Castolin Eutectic and its national distributors in Australia, SMENCO, has released a new product brochure designed specifically for Australia.

Highlighting the most popular and innovative products from Castolin Eutectic's extensive range, the brochure covers welding equipment and consumables through thermal spray coating and brazing equipment, Wearplate and CastoTube.



Serving a wide variety of industries including mining, oil and gas, power generation, rail, ship building, recycling, agriculture and engineering, Castolin Eutectic, says: ' wear phenomena costs the production industry millions of dollars every year reducing efficiencies which can lead to downtime, unplanned stoppages and expensive replacement parts.'

'Castolin Eutectic's huge range of alloys, processes and fully automated systems for welding, brazing and thermal spray coating technologies can be your protection against future wear,' said Russell Croft, National Manager.

About Castolin Eutectic:

For over 107 years, Castolin Eutectic has been a pioneer and leader in wear and fusion technologies. Welding, brazing, thermal spray and wear plates - these are our core technologies for providing innovative, cost-effective and complete solutions for prolonging the service life of equipment in the Mining industry as well as many other industries experiencing wear problems.

About SMENCO:

SMENCO is one of Australia's leading distributors of welding equipment, consumables and associated welding technology from around the world.

Among other leading international brands, SMENCO is the national distributor for Fronius welding equipment and Castolin Eutectic – both recognised as leaders in Welding Technology and Wear Solutions, Messer and BugO pipe welding systems as well as BOA Bore Repair Systems.

Further information contact:

Russell Croft

National Manager

Eutectic Products

Ph: +61 (0) 7 3899 0155

rcroft@smenco.com.au

www.eutectic.com.au

Progress of the AWI™

Certification

A key responsibility of the AWI™ is to provide a credible, transparent and user friendly welding qualification system for its members. To do this the AWI™ earlier established an Educational and Certification Working Group (E&C) to meet the following primary objectives:

- To undertake, arrange and promote education, training, qualification and certification for the benefit of members of the Institute and the welding industry as a whole

- To work closely with Australian TAFE bodies, Registered Training Organisations (RTO's) related government agencies and departments to enhance National training agendas.

AWI™ actively supports and promotes the AS 1796 and AS 2214 Welding Supervisors qualifications and encourage all members and the Metal Fabrication Industry to embrace these qualifications. AWI™ has established an alliance with a number TAFE Colleges around the country and takes pleasure in supporting

and promoting these Colleges and programs and are now endorsing Welder Qualification AS 1796 Certificates 1 – 9, Welding supervisors AS1796 and AS2214.

Application forms are available through selected TAFE Colleges and from admin@austwelding.com.au.

Compliance to AS/NZS ISO 3834 - AWI™ Guidance for Fabricators

The AWI™ has received some information revealing a high degree of confusion regarding Certification for AS/NZS ISO 3834 Quality Requirements for Fusion Welding. Therefore we have decided to re-print a previous guidance note.

Certification
Certification for AS/NZS ISO 3834 Quality Requirements for Fusion Welding is not required. As a standard, AS/NZS ISO 3834 simply lays down requirements for compliance. It is not a mandatory standard to be enforced by law.

A fabricator wishing to comply with 3834, can simply consider the relevant sections of the standards and satisfy themselves of their compliance, which they can then declare to potential customers. As part of this declaration, they are required to detail the documents used and the controls implemented.

Developing a competitive edge
Compliance with 3834 provides a global recognition of a fabricator's capability, can reduce costs associated with rework, wastage etc. and can enhance a company's ability to sell its products in both domestic and international markets.

Improved client confidence
AS/NZS ISO 3834 contains three levels of quality requirements and the appropriate level for your company will depend on the degree of complexity of the Company's welding operations.

In an endeavour to increase your company's capability in the welding quality market, AWI™ can assist in 3834 compliance after completion of our application document by:

1. A review of the application documentation.
2. AWI™ will conduct an assessment of your company's current quality system, procedures etc.

3. Determining which level of welding quality is appropriate for your company and which is in the most practical for your company to achieve and maintain.

The outcome of the AWI™ assessment will determine if your company's system is in need of additional controls and procedures or is already successful in compliance to the relevant section/s of 3834.

We can assist in building a 3834 document structure and develop the required controls and procedures or fill in any gaps to your existing quality structure.


AUSTRALIAN WELDING INSTITUTE

CERTIFICATE OF COMPLIANCE

AS/NZS ISO 3834 - PART 2
QUALITY REQUIREMENTS FOR FUSION WELDING OF METALLIC MATERIALS

PART 2 COMPREHENSIVE QUALITY REQUIREMENTS

COMPANY: ABC ENGINNERING
LOCATION: TOO LONG RD. WA

THIS DOCUMENT CONFIRMS THE ABOVE COMPANY MEETS COMPLIANCE TO AS/NZS ISO 3834-2 COMPREHENSIVE STANDARD IN BOTH WORKSHOP AND FIELD INSTALLATIONS.

THE REQUIREMENTS PERTAINING TO THIS STANDARD HAVE BEEN ADOPTED IN FULL.

SIGNATURE: __________ DATE:

PHIL RICHARDSON
DIRECTOR/FOUNDER

AUSTRALIAN WELDING INSTITUTE

Successful applicants will be issued with a "Certificate of Compliance" indicating which level of compliance has been achieved. Certification can be addressed at a later stage if the company decides it wants to address this option.

For further details contact:

Phil Richardson on: 0438 991 860 or contact admin@austwelding.com.au

Inspection Equipment

Inspection Kits

Managing quality of welds requires quality inspection equipment.

Technoweld supplies the finest quality inspection

equipment, whether its inspection kits or individual gauges we have popular gauges in stock.

Technoweld is committed to providing competitively priced professional quality products.

For more Information:
Technoweld Pty. Ltd.
admin@technoweld.com.au
M: 0409 698 968
W: www.technoweld.com.au

AUSTRALIAN WELDING INSTITUTE

AUSTRALIAN WELDING INSTITUTE

WWW.AUSTWELDING.COM.AU

QLD, NSW, VIC & TAS
ALEC 0408 420 150
SHAMUS 0413 640 526

WA
PHIL 0433 174 575

SA & NT
GRAHAM 0409 698 968

ADMIN@AUSTWELDING.COM.AU