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Vol.18
2015 No.3

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What is a Creep Test or Creep Rupture Test?

In both thermal and nuclear power plants as well as chemical plants that operate at high temperature over long periods, heat resistant steels that are high in temperature strength as well as corrosion resistance are required. When evaluating materials, long-term creep strength is an important factor.

Creep is a physical phenomenon in which elastic deformation gradually progresses at high temperatures, weakening the strength of a metallic material even though the stress on the material is small enough not to cause deformation at room temperature.

The international standards of creep and creep rupture tests are outlined in the following:

(1) JIS Z 2271:2010, Methods of creep and creep rupture test for metallic materials.
(2) ISO 204:2009, Metallic materials -- Uniaxial creep testing in tension – Methods of test
(3) ASTM E139-11, Standard Test Methods for Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials

Figure 1: Schematic creep test device

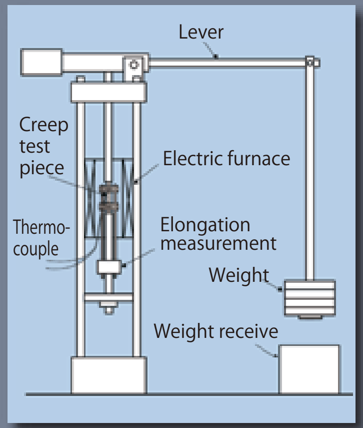
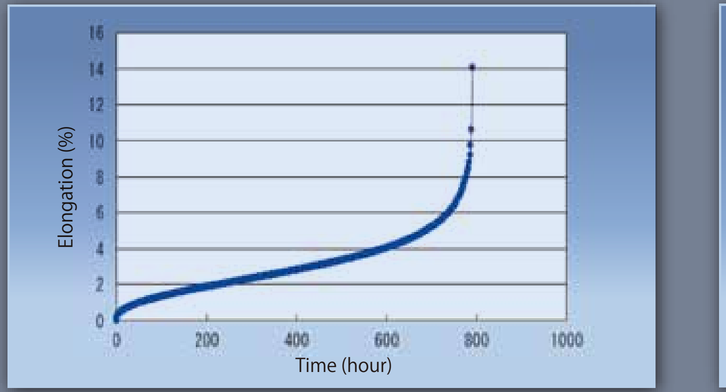


Figure 2: Creep test piece set up

Figure 3: Creep curve (before conversion)



A creep test measures the amount of creep strain by converting the amount of elongation measured in a test piece to strain, while a creep rupture test measures the amount of time for creep rupture to occur. Figure 1 shows a schematic of a creep test device. It can conduct both creep tests and creep rupture tests. A creep test piece is set up in the device shown in Figure 2. Figures 3 and 4 show the typical creep curves before and after conversion respectively. Tested time, fractured elongation, fractured reduction as well as fractured position were measured by the creep test.

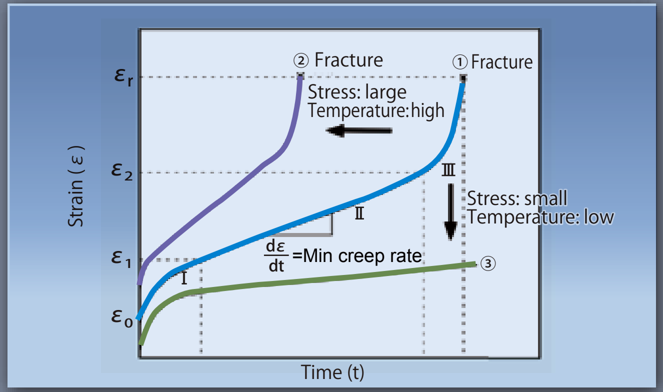
A creep curve generally consists of three stages: I, II and III stages as shown in the curve ① (Figure 4).

•ε_0 : Initial strain, generated right after test stress; also called instantaneous strain.
•ε_0～ε_1: Stage I, when the creep rate decreases continuously; also called transition creep or primary creep.
•ε_1～ε_2: Stage II, when the creep rate is in a constant state; also called constant creep or secondary creep.
•ε_2～ε_r: Stage III, when creep rupture occurs following a continuous increase in creep; also called accelerated creep or third creep.

Whereas the creep curve ① is standard, the curve ② appears when test stress or temperature increases to such a high degree that the test piece breaks quickly; in contrast, the curve ③ is seen when low test stress or temperature result in a longer time being required until the test piece ruptures.

When designing plants or equipment, creep tests are performed in those cases when the total amount of strain during operation is specified and the distortion quantity or strain rate in stages I or II become critical. By contrast, in those cases when plants or equipment are used until destruction, creep rupture tests are conducted.

Figure 4: Creep curve (after conversion)



The third Shinyokai established in China: based on a relationship of trust

Dear KWT readers! Thank you very much for your continuous patronage of Kobelco group products. Although we faced and were influenced by many challenges in the economic environment this year, such as falling crude oil prices, unseasonable weather in the North America and Thailand, the financial problems in Greece, and the downturn in economic growth in China, the biggest market in the world, our activities remained stable under these circumstances, thanks to the kind understanding and support of KWT readers. I am especially grateful to the people in our local distributors and agents.

Presently Kobe Steel has been establishing a new mid-term business plan (for 2016 through 2020). In the Welding Business, which aims to remain "the most reliable enterprise for total welding solutions in the world," we have been studying action plans and setting up targets that meet the needs of the diverse regions we operate in. I believe what is most important in order to provide our customers with excellent products and services is to strengthen our ability to respond to inevitable changes in the business environment and to establish structures strong enough to survive those changes. On the other hand, there is one thing that never changes even if the environment changes to a considerable extent. It is our vision to value the long-time and trusting relationships with our end-users, local distributors and agents. I promise to give more emphasis to this in the new mid-term plan.

This year saw as excellent example of how we build a relationship based on trust. In June, the Kobelco agents group in China was formed and named "China Shin-yo-kai," it is the third Shinyokai after the ones in Japan and Thailand. The Shinyokai, established in Japan in 1952, has contributed to Japanese welding societies through the introduction of welding consumables as well as welding technologies. The relationship built on trust by members of the Shinyokai has been a driving force of sales and marketing. The vison of the Shinyokai is represented by the three colors in its logo: violet for tradition, red for innovation, and gold for prosperity. We would like to extend those colors in the years to come. And we would like to deepen our relationship of trust so that we might create the fourth and fifth Shiyokai.

In 2015, we have displayed our latest welding consumables and robotic welding systems in China, Russia, Brazil, the USA and India, while at the same time enhancing the friendships we have cultivated among many KWT readers. In April, 2016, the welding exhibition will be held in Osaka, Japan and we look forward to seeing all of you there. Although there are only a few months left in this year, we wish you the best of luck for a fruitful year.

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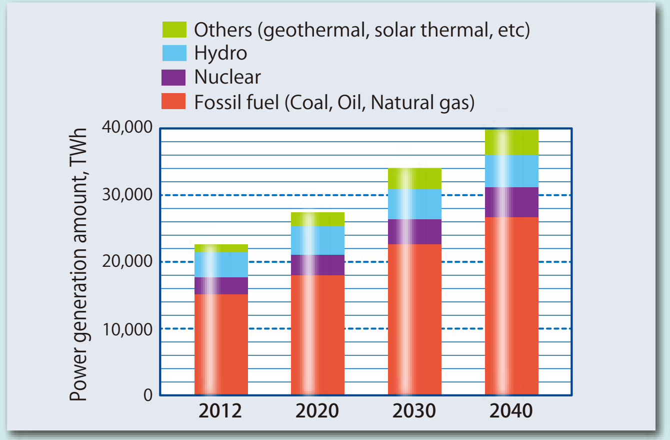
TRUSTARC™ CM-95B91 (E9015-B91) and TRUSTARC™ CM-96B91 (E9016-B91) applied to ASTM T91/P91 heat resistant steels for fossil-fuel thermal power generation

1 Preface

Today, 60% of electric power worldwide is generated from fossil-fuels such as coal, petroleum, and natural gas as shown in Figure 1, and it is forecast that the similar ratio will be maintained even after 2020.

Figure 1: Forecast of worldwide sources of electric power generation (1)



Note: TWh=Terawatt hour

Because the generation of thermal power from fossil fuels raises such issues as conservation of resources and reduction of costs as well as the emissions of carbon dioxide (CO_2), the improvement of power generation efficiency has long been a topic of intense research. Currently, efficiency is gained by forcing high temperature steam into power generating turbines at high pressure, which, naturally, means that steel materials are utilized under harsh steam conditions. One type of steel engineered to withstand such severe conditions is high Cr ferritic heat resistant steel containing 9 to 12 % Cr.

Because its thermal expansion coefficient is smaller than austenitic heat resistant steel, high Cr ferritic heat-resistant steel is more useful in thermal power generation, which requires repeated starts and stops in response to electric power demand. The typical high Cr ferritic heat resistant steel is ASTM T91 and P91 steel (modified 9Cr-1Mo steel, hereinafter called T91/P91), which has been applied in large numbers of thermal power boilers.

Kobe Steel has developed and marketed welding consumables for T91/P91 steel such as the 9Cb series, which has been applied in thermal power plants in Japan for decades, and the B9 series, which matches with AWS specifications. In this issue, we discuss some recent trends in international standards as well as the covered arc electrodes, TRUSTARC™ CM-95B91 and TRUSTARC™ CM-96B91, both of which have newly been developed to meet AWS A5.5: 2014 specifications for T91/P91 steel.

[Trade designation is omitted later.]

2 Recent trends in international standards

International standards related to welding consumables for T91/P91 steels have significantly changed in the last ten years. Key changes relate to the requirements for Mn+Ni content and the post weld heat treatment (PWHT) temperatures that are closely related to the Mn+Ni content. Tables 1 and 3 show how the standards have been modified by the American Standard of Mechanical Engineers (ASME, the manufacturing standard), while Table 2 shows the AWS standards (the welding consumable standard) and Table 4, those of the Electric Power Research Institute (EPRI, the industry organization).

For T91/P91 steel welded joints, PWHT is indispensable in order to reduce residual stress. However, the creep rupture strength and/or notch toughness of those weld metals can become unstable if the PWHT temperature exceeds their A_{c1} transformation temperature (A_{c1}), because fresh martensite* microstructure can begin to form.

*Fresh martensite can form through a martensitic transformation occurring during a high temperature austenitic phase as temperature drops due to the PWHT temperature exceeding A_{c1}. Fresh martensite shows the same high strength/low toughness features as martensite because it has not been tempered by PWHT.

Table 1: ASME B31.1 trends

Year	Mn+Ni content (mass %)	Upper limit of PWHT temperature for production (°C)		Reference (Year of revision)
		Recommended condition	Mandatory condition	
2008 and before	Not regulated	760	Base metal A_{c1} : about 800	Table 132 P-No. 5B Group No. 1→ Group No. 2 (2007)
2009 -2013	Filler metal: unknown	775	Base metal A_{c1} : about 800	Table 132 P-No. 15E Group No. 1 (2009)
	1.0≤Filler metal <1.50	790		
	Filler metal<1.0	800		
2014 and after	Filler metal<1.2	775	Base metal A_{c1}: about 800 and filler metal A_1 or A_{c1}*2	Table 132 P-No. 15E Group No. 1 (2014)
	<1.0 *1	――		125.1.3 (2014) For repairing castings

Note: *1 B9: SMAW, SAW, GTAW and FCAW
*2 A_1 or A_{c1} in filler metals is determined either by analysis and calculation or by actual measurement.

Table 2: AWS B9/B91 trends

Year	Upper limit of Mn+Ni content in deposited metal *1 (mass %)	Upper limit of PWHT temperature at classification test (°C)	Reference (Year of revision) *2
2004 and before	Not regulated *3	759 (SMAW)or 760	B9: SMAW, GMAW, GTAW (1996), SAW (1997)
2005 -2010	1.5 or 1.50	775	B9: GMAW, GTAW (2005), SMAW (2006), SAW (2007), FCAW (2010)
2011 and after	1.40	775	B9 deleted→B91 newly established B91: SAW (2011), FCAW (2012), SMAW (2014) *4

Note: *1 Wire or cut rod chemistry in case of GMAW and GTAW
2 AWS Specification No.: SMAW: A5.5; SAW A5.23; GMAW & GTAW: A5.28; FCAW: A5.36.
*3 Sum of both Mn and Ni specified upper limit is 2.25.
*4 Revision of GMAW and GTAW is under discussion as of 2015

Table 3: ASME trends (other specifications)

Year	Upper limit of Mn+Ni content (mass %)	Upper limit of PWHT temperature for production (°C)	Reference
2012	1.0 *1	――	Code Case 2192-8 B9 For repairing cast products
2013	1.2 *2	――	Sect. I, PW-5.4, B9 For high-pressure resistant members

Note: *1 SMAW, SAW, GTAW and FCAW
*2 SMAW, SAW, GTAW, FCAW and GMAW

Table 4: Trends in published EPRI reports

Year	Upper limit of Mn+Ni content (mass %)	Upper limit of PWHT temperature for production (°C)	Reference
2011	1.00 (FCAW: 1.50)	770	Report No. 1023199 SMAW, SAW, FCAW, GMAW/GTAW
2014	―― *1	――	Report No. 3002003472 Proposal of optimizing chemical compositions for P91 steel
	――	―― *2	Report No. 3002004370 Proposal of manufacturing guidance for P91 steel
2015	1.00 *4 (FCAW: 1.50*4)	770 *4	Report No. unknown *3 SMAW, SAW, FCAW, GMAW/GTAW

Note: *1 Sum of both Mn and Ni specified upper limits is 0.70.
*2 Upper limit of tempering temperature is 770°C.
*3 Revision of Report No. 1023199 (2011) is under discussion.
*4 Estimated figures due to *3, report above under discussion.

For the reasons discussed above, the upper limits on ① Mn+Ni content and ② PWHT temperature have been continuously revised in all the standards. What they all have in common is to prevent the formation of fresh martensite.

The latest versions of typical international standards specify as follows:

- ASME (B31.1: 2014) ① 1.2 %; ② A_1 or A_{c1}
- AWS (A5.5: 2014) ① 1.40 %; ② 775 °C
- EPRI report (No. 2023199: 2011) ① 1.00 %; ② 770 °C

One may ask how A_{c1} is measured internationally. ASTM A1033-04 specifies a method for measuring the transformation point of carbon steel and low alloy steel. However, no international standard specifies test conditions such as measuring method or rates of increasing or decreasing temperatures in order to measure A_{c1} for high Cr ferritic heat resistant steels.

Kobe Steel has frequently discussed those conditions, and the round robin test for T91/P91 steels has finally been adopted at the International Institute of Welding (IIW) in 2013. We were the only welding consumable manufacturer in the world to participate in it.

3 CM-95B91 (AWS A5.5 E9015-B91) and CM-96B91 (AWS A5.5 E9016-B91)

Japanese laws and regulations specify a maximum PWHT temperature of 760°C for T91/P91 steels. Because Kobe Steel's 9Cb series, such as CM-9Cb (AWS A5.5 E9016-G), TG-S9Cb (AWS A5.28 ER90S-G), have been tested and confirmed as acceptable for PWHT temperature over Ac1 and up to 780°C(2), they continue to be recommended for projects of the like in Japan

Kobe Steel has proposed to the AWS A5 committee modified specifications to the 9Cb series, such as an upper limit of 760°C as the PWHT temperature at classification test.

On the other hand, as discussed above, a PWHT temperature of 760°C or higher is now specified in recent international standards and has been requested by many fabricators for recent overseas projects that are meant to comply with international standards like AWS, ASME, EPRI. In response, Kobe Steel has recently developed CM-95B91 (E9015-B91) and CM-96B91 (E9016-B91). CM-95B91 is for direct current (DC) use while CM-96B91 is recommended for alternate current (AC.)

3.1 Features of CM-95B91 and CM-96B91

These covered electrodes were designed to achieve the following three requirements:

(1)No appearance of fresh martensite microstructure, even at 760°C or higher PWHT temperature.
(2)Prevention of residual δ ferrite (which degrades long term creep rupture strength) remaining in the deposited metal.
(3)Long-term creep rupture strength of deposited metal that is equal or better than T91/P91 steel.

Table 5: Chemical compositions of CM-95B91 and CM-96B91 deposited metals (mass %)

	C	Si	Mn	P	S	Cu	Ni	Co	Cr	Mo	V	Nb	Al	N	Mn+Ni	N/Al	X bar※3, ppm
CM-95B91	0.10	0.20	0.64	0.008	0.004	0.02	0.10	0.40	8.20	0.90	0.20	0.05	<0.01	0.03	0.74	14	7
CM-96B91	0.10	0.21	0.63	0.008	0.004	0.03	0.10	0.40	8.45	0.98	0.19	0.05	<0.01	0.03	0.73	15	7
AWS A5.5:2014 E901X-B91※1	0.08～0.13	0.30 max.	1.20 max.	0.01 max.	0.01 max.	0.25 max.	0.80 max.	※2	8.0～10.5	0.85～1.20	0.15～0.30	0.02～0.10	0.04 max.	0.02～0.07	1.40 max.	(4 min.)	(15 max.)

Note: *1 X in E901X shall be either 5 (for DC only) or 6 (DC or AC).
*2 If intentionally added, it must be reported.
*3 X bar = (10P + 5Sb + 4Sn + As)/100 (ppm)

CM-95B91 and CM-96B91 are designed to maintain the lower limit of PWHT temperature as specified in AWS, that is, 745 °C (=760-15). Table 5 shows the typical chemical compositions of their deposited metals as well as the latest AWS A5.5: 2014 specifications.

3.1.1 Optimum addition of Mn and Ni

Because a large amount of Cr (a ferrite forming element) is contained in welding consumables for T91/P91 steels, δ ferrite, which lowers long-term creep rupture strength, tends to remain in the weld metal. Therefore, by adding Mn+Ni, an effective chemical composition is created that prevents δ ferrite from remaining in the weld metal(3). On the other hand, as seen in Figure 2, the addition of Mn+Ni content lowers Ac1, leading to a higher risk of fresh martensite formation.

Figure 2: Relationship between Mn+Ni and A_{c1} of weld metal for high Cr ferritic steel

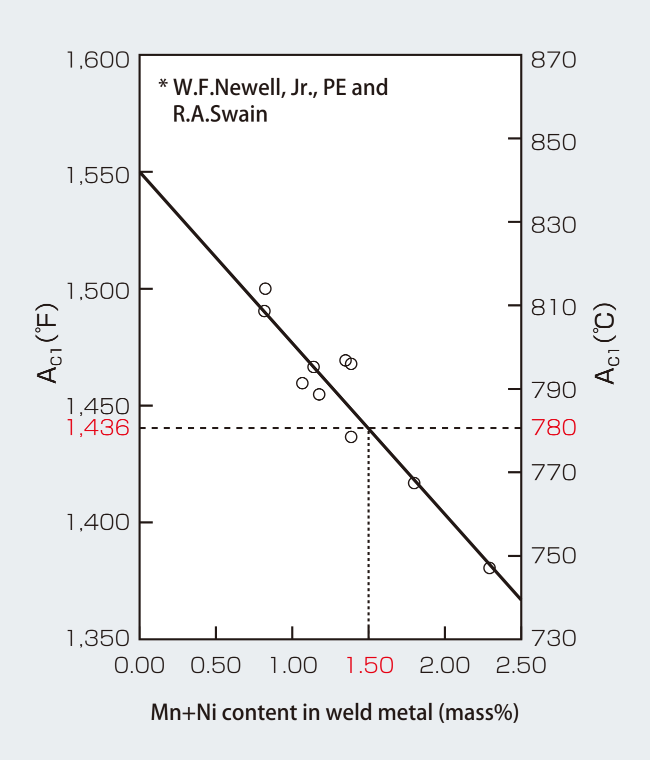
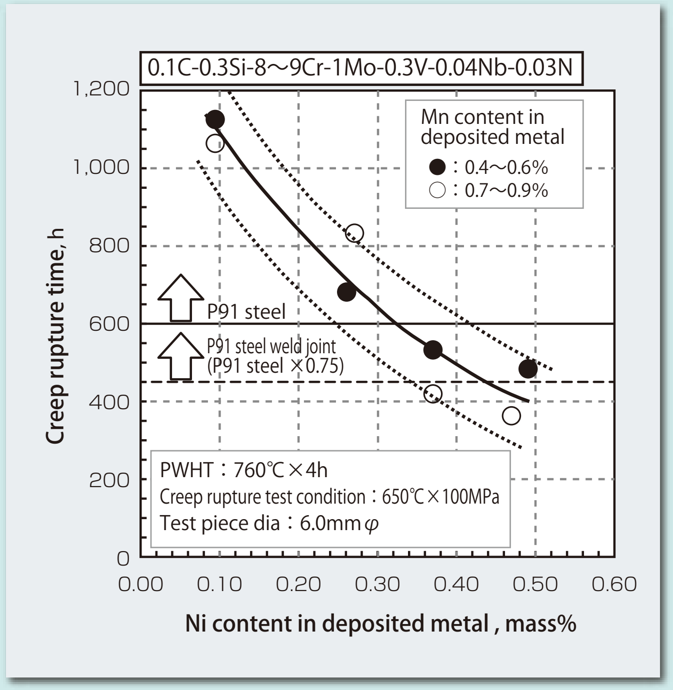


Figure 3 indicates the relationship between Mn and Ni and creep rupture time of deposited metal for T91/P91 steel. It can be seen that Mn is less influential than Ni on creep rupture time, which becomes longer as Ni content is reduced. It is believed that longer creep rupture life is related to the delay of lath microstructure recovery.

For these reasons, CM-95B91 and CM-96B91 are designed to contain the minimum amount of Ni necessary to lower the residual δ ferrite, and enough Mn so that the total Mn+Ni content amounts to 1.0 %.

Figure 3: Relationship between Mn, Ni and creep rupture time of deposited metal for T91/P91 steel



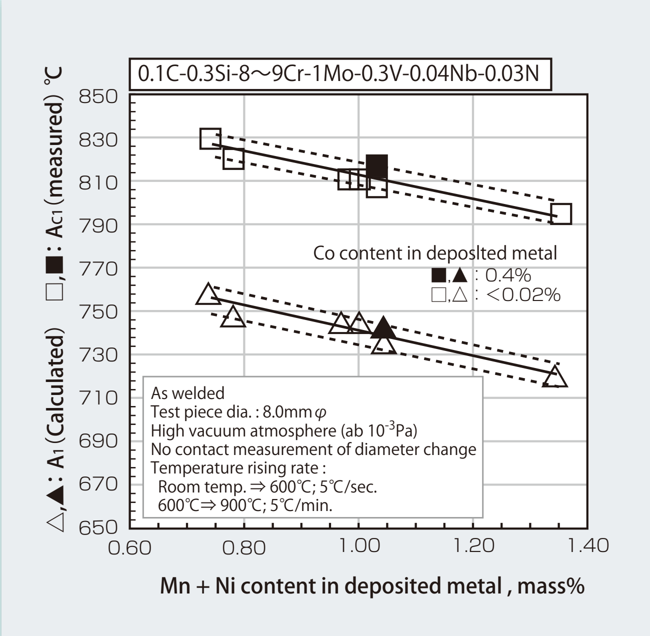
3.1.2 CNB (Cr equivalent – Ni equivalent balance)

EPRI Report No. 1023199 states that T91/P91 steel products shall have a martensite single-phase structure with no δ ferrite in order to secure creep rupture strength and proposes an index by the following equation(4):

$$\text{CNB} = (\text{Cr equivalent}) - (\text{Ni equivalent})$$
$$= (Cr+6Si+4Mo+1.5W+11V+5Nb+9Ti+12Al) - (40C+30N+4Ni+2Mn+1Cu)$$
$$< 10\ \%\ (\text{mass }\%)$$

CM-95B91 and CM-96B91 are also designed to comply with the above CNB index, so that long-term creep rupture strength can be maintained by reducing residual δ ferrite in deposited metal. Furthermore, in addition to Mn and Ni, Co is also added, which also reduces residual δ ferrite in deposited metal. Figure 4 shows the relationship between the Mn+Ni and Co content and A_{c1} (measured value) and A_1 (calculated by Thermo-calc.) in a deposited metal of T91/P91 steel. It can be seen that Co does not lower A_{c1} and A_1 even if it is added in with Mn and Ni.

Figure 4: Relationship between Mn+Ni and Co and A_{c1} and A_1 of deposited metal for P91 steel



The microstructure of CM-95B91 deposited metal is shown in Photo 1. A uniform martensite single-phase microstructure can be seen with no δ ferrite or fresh martensite.

Photo 1: Microstructure of final pass deposited metal (PWHT: 779℃ × 8.0 hour)

The method of measuring the A_{c1} discussed in this article involves raising the temperature of a cylindrical test piece and using a high precision LED light-emitting device to detect changes in diameter (elongation and contraction) according to temperature rise. The accuracy of this method has been verified by an advanced preliminary study (5).

3.2 Mechanical properties

The relationship between tensile properties and heat treatment parameter, commonly referred to as the Larson-Miller Parameter (LMP), on CM-95B91 deposited metal is shown in Figure 5 and the relationship between impact properties and LMP, in Figure 6, respectively.

Figure 5: Relationship between tensile properties and LMP

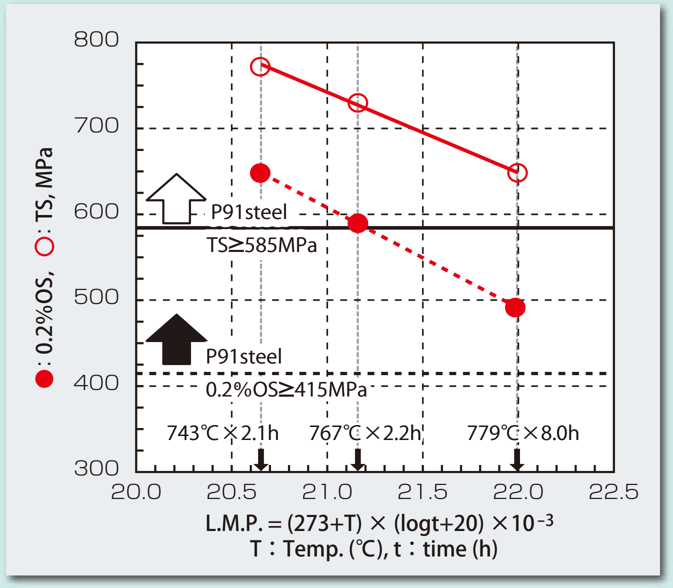
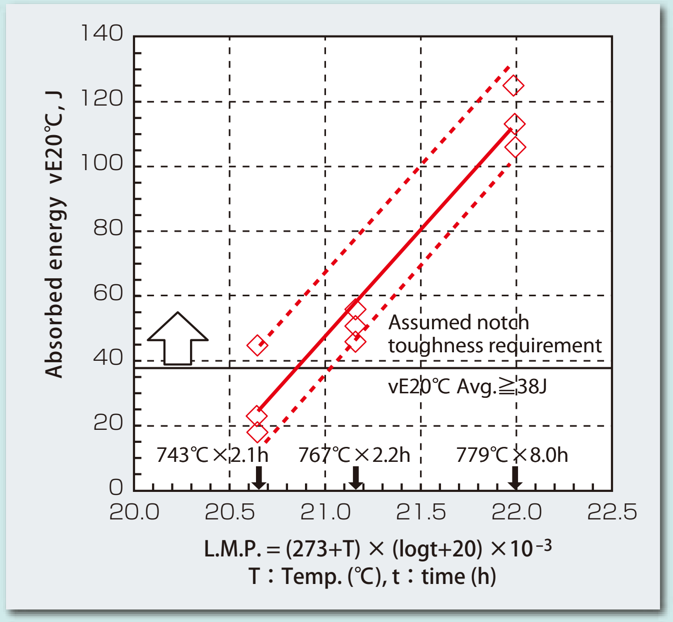


Figure 6: Relationship between impact properties and LMP



It is understood that the tensile strength of CM-95B91 deposited metal is equal to or more than that of T91/P91 steel when PWHT ranges from LMP ($\times 10^{-3}$): 20.6 (743 °C × 2.1 hr) to LMP ($\times 10^{-3}$): 22.0 (779 °C × 8.0 hr).

Although there is no formal requirement for the impact properties, we have used $vE_{20°C} \geq 38$J average as an example for comparison. If PWHT is equal to or more than 760°C × 2.7 hr (LMP $\times 10^{-3}$= 21.1), it is considered that CM-95B91 deposited metal can secure the practical level of impact properties.

3.3 Creep rupture property

Figures 7 and 8 show the creep rupture properties of CM-95B91 deposited metal at the test temperatures of 650 °C and 600 °C, respectively.

Figure 7: Creep rupture property at 650°C

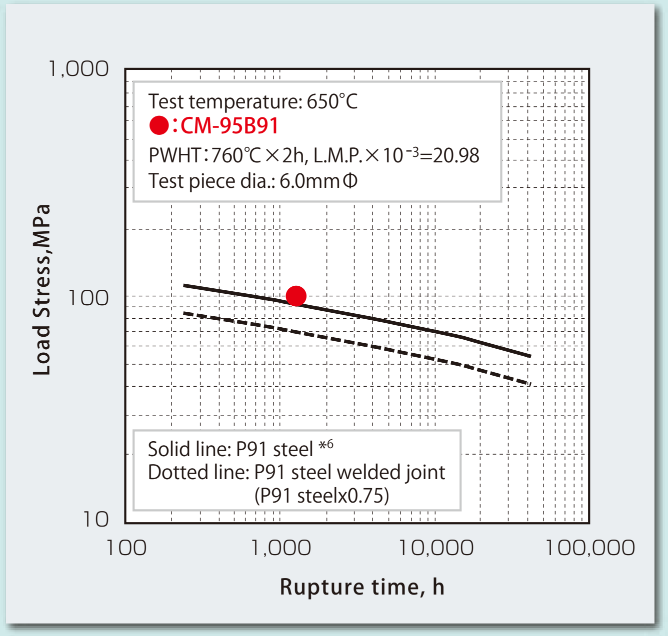
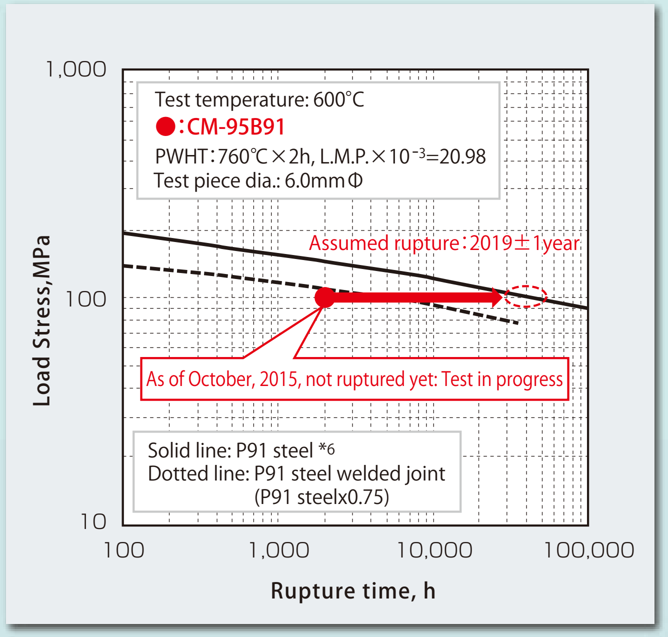


Figure 8: Creep rupture property at 600°C



The test result of CM-95B91 deposited metal at 650°C indicates its creep rupture strength is higher than that of T91/P91 steel. The long-term creep rupture test at 600°C, based on an assumption of rupture time of about 40,000 hours (about 4.5 years) as shown in Figure 8 is in progress.

4 Notes on usage

A high Cr ferritic heat resistant steel weld metal is more susceptible to delayed cracking due to its self-hardening properties than 1.25Cr-0.5Mo or 2.25Cr-1Mo heat resistant steel weld metal. Therefore, the following notes on usage are important:

(1) It is necessary to maintain preheating and interpass temperatures between 250 and 350°C for preventing delayed cracks.

(2) It is also essential to re-dry electrodes before use for one hour at 350-400°C to satisfy the H4 (AWS diffusible hydrogen level) requirement.

(3) Excessively high welding currents and speeds have to be avoided to prevent hot cracks as well. Kobe Steel's welding consumables for high Cr ferritic heat resistant steels are designed to contain low amounts of P and S to prevent hot cracks. However, the deposited metal of T91/P91 steel has a wider solid-liquid coexisting temperature range than that of 1.25Cr-0.5Mo or 2.25Cr-1Mo heat resistant steel, resulting in higher susceptibility for hot cracks.

5 Postscript

This article has discussed some recent trends in international standards related to T91/P91 heat resistant steels for fossil-fuel thermal power generation, as well as the features of CM-95B91 and CM-96B91, covered arc electrodes that have been newly developed to meet these standards. These electrodes show superior qualities related to N/Al, X bar (see Table 5), H4 as well as electrode burning resistance, and they offer excellent welding workability for T91/P91 heat resistant steels for fossil-fuel thermal power generation. Given their excellent qualities for these applications, their use should become more widespread, leading to further reductions in CO_2 emissions control through improved power generation efficiency.

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Reporting on the latest Round Robin Tests at IIW Annual Assembly 2015

Dear KWT readers! My name is Naoki Suzuki of the Intellectual Property Section, Technical Center in Fujisawa. It is my great honor to describe how international standards are discussed and reviewed.

In the crafting of international standards, Kobe Steel has continuously participated in meetings of two relevant organizations. One is the International Organization for Standardization - Technical Committee 44 - Subcommittee 3 (ISO/TC44/SC3) titled "Welding Consumables." Another is the International Institute of Welding - Commission II (IIW/C-II) "Arc Welding and Filler Metals," as well as IIW/C-IX, "Behaviour of Metals Subjected to Welding." These meetings allow a welding consumable manufacturer such as us to obtain information on international standards quickly and to offer our opinions on the issues as well.

Founded in 1948, the IIW has become an International Standardizing Organization since gaining approval by the ISO. The current IIW membership consists of 59 countries, organized into 16 commissions and numerable sub-commissions (SCs). The 68th IIW Annual Assembly (see photo) was held in Helsinki from June 28 to July 3, 2015.

The status of two round robin tests (RRTs) in IIW/C-II/SC-E, under the theme of standardization and classification of weld filler metals, and one in IIW/C-IX/SC-C, under the theme of creep and heat resistant welds, was introduced and discussed. I would like to summarize these three RRTs.

1. Analysis of trace elements (P, Sn, As, Sb, Pb, and Bi) in 2.25Cr-1Mo-V steel weld metal

17 laboratories participated in the analysis, and sufficient reproducibility of the X-bar and J-Factor was confirmed, but not of K-Factor (= Pb + Bi + 0.03Sb). Inductively Coupled Plasma - Mass Spectrometry (ICP-MS) and Gas Chromatography Mass Spectrometry (GD-MS) were shown to have achieved nearly the same precise results among various methods of analysis. Further discussions will be held at meetings in the near future, followed by an official IIW document publication.

2. Analysis of submerged arc welding flux.

13 laboratories participated in the analysis of five different commercially available fluxes that meet the ISO 14174 (classification standard).

Analysis of major components of these fluxes showed that they were reproducible. On the other hand, classification of fluxes according to ISO 14174:2012 was not reproducible. In four of the five cases considered herein, commercial fluxes could be assigned more than one classification. Further discussion will be required in the future.

3. Transformation temperature measurement of 9Cr steel

14 laboratories participated in the measurement tests. P91 steel was used as a specimen, with two different heating rates. Ac_1, Ac_3, Ms and Mf temperatures were determined by each laboratory's own measuring system and with the data given to the participants in advance by a German university. The result showed differences among the laboratorie's own measurement systems to be large with the fast heating rate (Ac_1 and Ac_3: both about 100°C) but small with the given data (Ac_1: about 6°C, Ac_3: about 21°C).

Measuring conditions such as transformation percentage, the pressure in the chamber at each laboratory, the load during measurement, the type of cooling gas, the test piece shape, thermocouple accuracy, and differences between calculation methods, must be clearly defined to reduce the differences described above. An official IIW document showing RRT progress will be published at a future meeting after the above conditions have been clarified.

By taking part in the IIW meeting, I got the impression that those who make rules have more advantages than those following them. Therefore, we, as a welding consumable manufacturer, must participate actively in the development of international standards of welding consumables in order not to allow those to become unrealistic for welding consumable manufacturers.

IIW/C-IX/SC-C was held in Helsinki. Mr Suzuki is in the center of the front row.

Kobelco group exhibits in FABTECH Mexico 2015 for the first time

FABTECH Mexico 2015, the leading metal manufacturing event in Mexico was held at Cintermex in Monterrey, Mexico, from May 5 to 7, 2015.

Monterrey, the capital of the northeastern state of Nuevo Leon with a population of about 4 million, is Mexico’s third largest city after Mexico City and Guadalajara. As one of the main cities for business and industry, it has large numbers of foreign companies operating there as well.

The exhibition attracted 530 exhibitors and 11,000 visitors from all over the Americas. It was reported later that the event had become the largest manufacturing exhibition in Central and South America with the highest-ever number of exhibitors and visitors.

FABTECH Mexico is a co-located event, with AWS Weldmex (welding and cutting), METALFORM Mexico (industrial machines) and COATech (painting) sharing the exhibition space.

At AWS Weldmex, about 150 companies, from local distributors to world-renowned welding manufacturers, displayed their products. Kobelco Welding of America (KWAI) took part, representing the Kobelco group for the first time. Displayed were panels of our main products: flux cored wires for mild steel as well as stainless steels that we have selected for expanding our business in the rapidly growing Mexican market.

Mexico is a large country in Latin America, with an area of 1,960,000 km² (5.2 times bigger than Japan) and a population of 120 million (11th in the world). Mexico’s geography, which features a northern border with the USA, a huge market; a port in the Gulf of Mexico with easy access to Brazil, the largest market in South America; and another port on the Pacific Ocean that connects it with Asia is so favorable that it draws in many foreign companies (such as carmakers) to set up manufacturing operations. In addition, energy-related businesses are expected to expand due to liberalization of Mexico’s oil sector.

Under the motto that we remain “the most reliable enterprise for total welding solutions in the world” we, the Kobelco group, will make the utmost effort to provide Latin American customers with our high-quality welding consumables as well as to establish an organizational structure for supplying the level of technical services expected by customers for their quality-oriented projects in Mexico.

The annually held FABTECH Mexico rotates each year between Monterrey and Mexico City. We are going to set up our booth again and look forward to seeing you there in 2016.

Reported by
Mr Ryusaku (Ray) Yanagimoto,
National Marketing Manager, KWAI


Entrance of FABTECH Mexico 2015


Attendees posing at the Kobelco booth
(Mr Yanagimoto, KWAI, extreme right)

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Kobelco group in China announces new slogan at Beijing Essen 2015

The 20th Beijing Essen Welding & Cutting Fair (BEW) (sponsored by Chinese Mechanical Engineering Society, among others) was held at Shanghai New International Expo Center on June 16 – 19, 2015. BEW is the largest and most influential welding exhibition in China and attracted 989 exhibitors from 28 countries this year.

While the news media has been reporting a drop in the Chinese economy, China is still the biggest market for welding consumables in the world, a fiercely competitive environment, not only for international manufacturers but domestic Chinese ones as well. Against this backdrop, the Kobelco Group participated in this year’s exhibition in order to help the Kobelco brand and presence penetrate more deeply into the Chinese market.


Kobelco booth entrance with new slogan

As shown in the above photo, the entrance to the Kobelco booth featured a new slogan in Chinese: “Technology develops Kobe Steel and Quality (Products) create the future.”

We displayed some of our latest technologies, including a live demonstration of the ARCMAN™ robot welding system with FAMILIARC™ DW-110EV - a flux cored wire (FCW) for vertical upward welding that has been exclusively developed for the Chinese market. Demonstrations of both PREMIARC™ DW-309LP (FCW for stainless steel in all positions) and FAMILIARC™ MG-50CH (a solid wire for large current welding of construction machinery) were also performed. In addition, the booth panels and displays of welding consumables and bead samples highlighted our offerings for such industries as shipbuilding, offshore structures, automobile, construction machinery and chemical vessels.

All of the displays attracted the interest of many visitors from all over the world as well as from China.

By the time the fair ended, I was convinced that in the globally-significant Chinese market, it is essential that we establish our position as a reliable solution partner who can propose outstanding welding processes, systems and consumables. I also felt that our three local companies - Kobe Welding of Tangshan Co., Ltd.; Kobe Welding of Qingdao Co., Ltd.; and Kobe Welding of Shanghai Co., Ltd. - together with Kobe Steel, must increase their presence in the Chinese market and establish a position as the world’s most reliable company for welding solutions as soon as possible.

Reported by
Masafumi Yamakami,
International Sales & Marketing Section,
Marketing Department, Welding Business


Live welding demonstration of the ARCMAN™ robot welding system


Attendees posing in front of the Kobelco booth.
(Mr Yamakami is at the extreme right in the second row.)