KOBELCO WELDING TODAY

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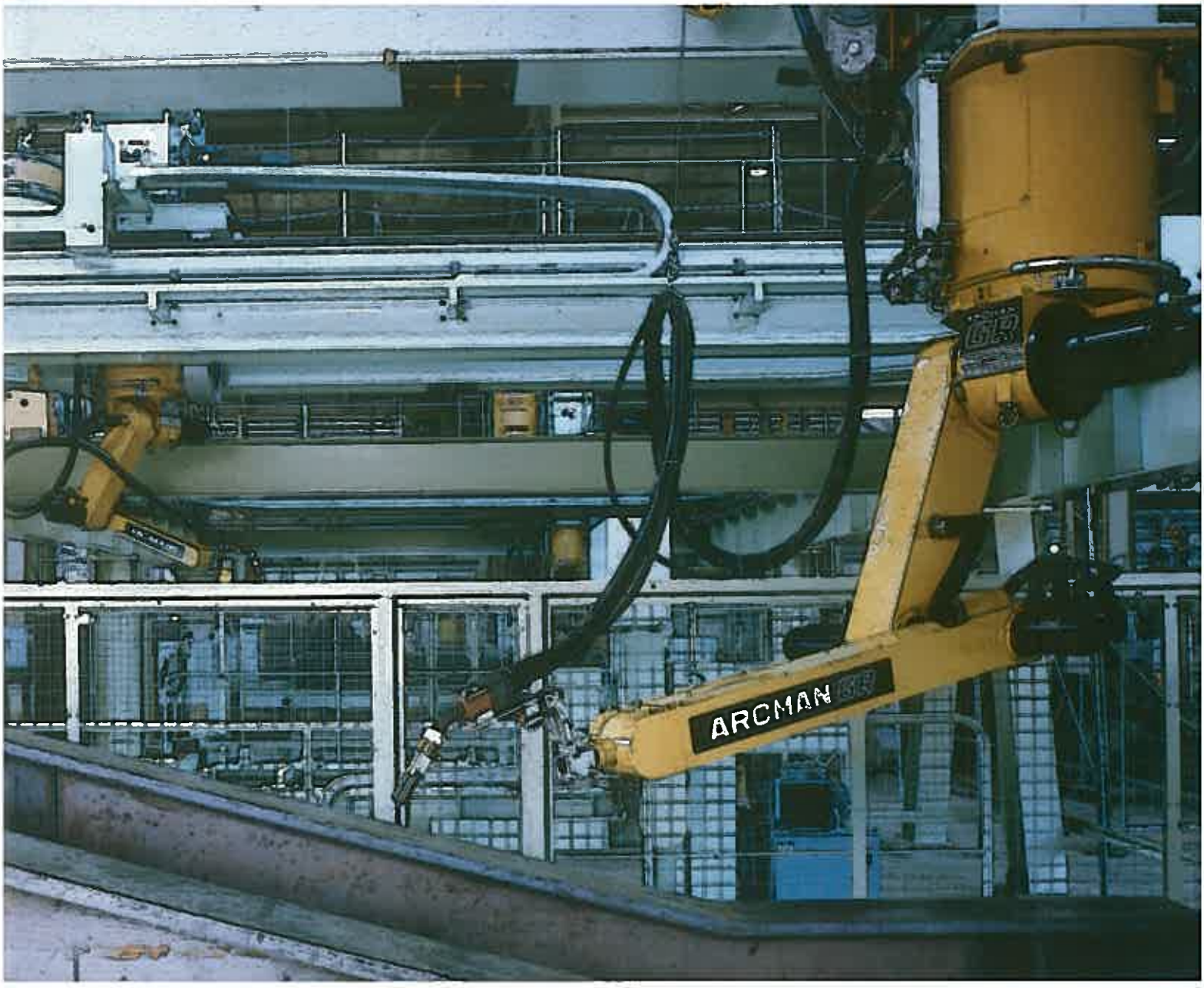

Boost your Quality and Productivity.
Count on KOBELCO Solid and Flux-Cored Wires!

LB-7018-1 Shines as a Versatile Electrode in Low-Temperature Service Offshore Structures

Photo courtesy of Kansai Design Co., Ltd., Japan

LB-7018-1 is an iron-powder low-hydrogen electrode for all-position welding. It offers excellent notch toughness at low temperatures and unsurpassed usability with DCEP currents. Being classified with a supplementary designation suffix as E7018-1 per AWS A5.1, LB-7018-1 meets the low temperature impact requirement of 27J at –46°C (as-welded). In addition, this electrode offers excellent properties in crack tip opening displacement (CTOD) at 0°C. Table 1 shows the typical chemical and mechanical properties of LB-7018-1 weld metal.

Table 1: Typical chemical and mechanical properties of LB-7018-1 weld metal (1)

	Electrode size	3.2 mmØ	4.0 mmØ
Chemical composition (mass%)	C	0.06	0.06
	Si	0.39	0.36
	Mn	1.50	1.48
	P	0.012	0.011
	S	0.003	0.003
	Ti	0.03	0.03
	B	0.004	0.004
Mechanical properties	Yield strength (MPa) (2)	503	483
	Tensile strength (MPa)	582	565
	Elongation (%)	31	32
	Reduction of area (%)	67	73
	Charpy vE–46°C (J) (3)	138	127
	Charpy vE–60°C (J) (3)	96	85

1. Welding conditions as per AWS A5.1 — 3.2 mmØ: 110A, 6 layers with 12 passes; 4.0 mmØ: 160A, 8 layers with 16 passes; DCEP; Preheat and interpass temperature: 125°C.
2. At 0.2% offset.
3. The average of three values as per AWS A5.1.

Figure 1 shows the results of Charpy V-notch impact testing on a 50-mm thick joint welded in the vertical position. The impact specimens were removed from three locations (1st side, center, and 2nd side of the groove) in the weld. Table 2 shows weld joint CTOD values obtained with full-thickness specimens. These elaborate procedures reveal that LB-7018-1 possesses excellent notch toughness and fracture toughness. This is because the microstructure of the Ti-B-bearing weld metal consists of fine crystal grains as shown in Figure 2.

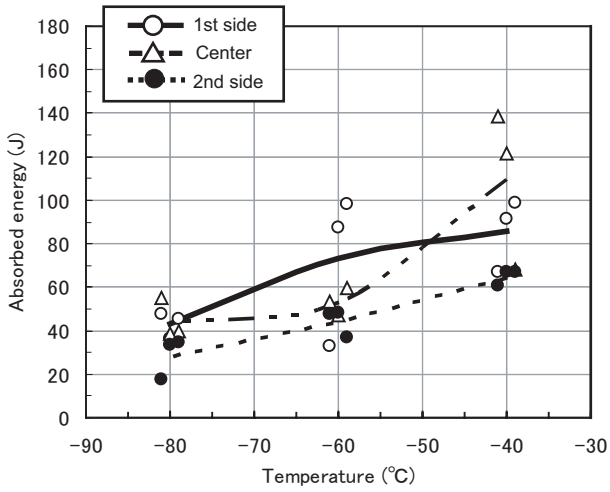

Figure 1: Charpy V-notch impact test results of a weld joint made with LB-7018-1 (3.2 and 4.0 mmØ) and SM490A base metal (50-mm thick double-V groove) in the vertical position. (Heat input: 2.5-2.9 kJ/mm).

Table 2: CTOD test results of an LB-7018-1 weld joint (1)(2)

Plate thick.	Test temp.	Fracture type	CTOD
50 mm	0°C	Stable fracture	1.13 mm 0.98 mm 1.09 mm

1. Testing method: BS7448-1991 (W = B).
2. Base metal: Rolled steel of JIS G 3106 SM490A grade.

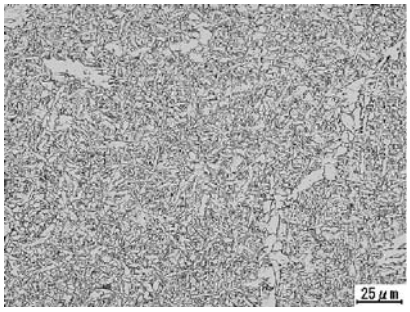

Figure 2: Fine grain microstructure of LB-7018-1 weld metal (as-cast zone) obtained from the 1st side of the 50-mm thick double-V groove weld joint.

More Diversified Activities for Customer Satisfaction

Masakazu Tojo
General Manager
International Operations Dept.
Welding Company
Kobe Steel, Ltd.

A Happy New Year to our dear readers! In Japan we traditionally celebrate the New Year from January 1-3. In many countries, people may celebrate the New Year on January 1 only, while in some cultures the celebration takes place on a different month and day altogether. These differences remind me that the world is wide and with many different cultures, traditions, and customs. For instance, when I was a small boy I thought everybody in foreign countries outside Japan celebrated Christmas, but that was a misunderstanding. The world is not as simple as I thought.

We are gradually expanding our activities around the world to provide not only better products but improved technical services, quicker deliveries, and comprehensive sales consultations. As you may have heard, we have opened a new sales office in Shanghai, China last summer. Additionally, we are going to start the production of mild steel FCWs in the Netherlands this spring. These new activities will help us evolve our global services.

I know that the KOBELCO group companies are highly customer-oriented suppliers for everything related to the welding business. I will make sure that this character will be maintained for many years to come. Your advice, opinions, and comments on our group companies, products, and services are very important for us to improve our activities. I hope this issue of KOBELCO WELDING TODAY will help you understand our activities.

Gearing up for Future Challenges

Toshiyuki Okuzumi
General Manager
International Operations Dept.
Welding Company
Kobe Steel, Ltd.

A Happy New Year to you! How did your last year turn out to be after all? I think that the economic climate was generally fine globally. However, some worrisome events also occurred, such as abnormal weather in some regions that may have been caused by the global warming and a sharp rise in oil prices.

As regards significant business events occurred in the world last year, I want to cite (1) a sharp increase in demand for welding materials needed largely for repair of the 100 or more offshore structures damaged by the year-before-last violent hurricanes in the US, (2) a newly opened Kobelco representative office in Shanghai, China, (3) brisk business in the shipbuilding industry in Korea, (4) the 15th anniversary of the Thai Shin-yokai in Thailand, (5) vigorous and stable business with increased building of offshore structures and ship repair in Singapore, (6) the deteriorated economy due to rising interest rates and oil prices and a decrease in production and sales of motorcycles and autos in Indonesia, and (7) the picked-up demand for welding materials for pipelines due to good business in the gas and oil industry in Russia.

As for the economic environment for this year, there is a prevalent view that the world economy will continue to be as robust as last year, unless there is a break out of such unexpected events as terrorism or sudden financial instability. There is a minority view that the US economy could sag due to a decline in the housing market. Nevertheless, let us endeavor to pursue our challenges together in a forward-looking manner, and act with the confidence that a bright future will open before us if we rush headlong just like a wild boar, the zodiac sign of this year.

CONTENTS

WELDING OF LPG STORAGE TANKS

Part 1: How to Select Filler Metals

Liquefied petroleum gases (LPG) are used as a fuel in heating appliances and vehicles. LPG consists of a mixture of propane (C_3H_8) and butane (C_4H_{10}) prepared in different ways to exhibit specific properties. It is manufactured during the refining of crude oil, or extracted from oil or gas streams as they emerge from the ground.

Varieties of LPG storage tanks

At normal temperatures and pressures, LPG will evaporate. Therefore, to maintain LPG in its liquid state, it must be stored either at normal-temperature but high-pressure, or under normal-pressure but low-temperature.

For normal-temperature high-pressure storage, cylindrical or spherical tanks can be used, depending on storage applications, capacity and pressure. Cylindrical tanks (Figure 1) are used to store relatively small quantities of LPG of up to several tens of tons. These tanks are typically placed underground when constructed in residential and commercial areas (for example at gas stations), where environmental safety is strictly required. Spherical tanks (Figure 2) are suitable for storing LPG in industrial locations, such as large refineries, where quantities as large as several thousand tons may require storage.

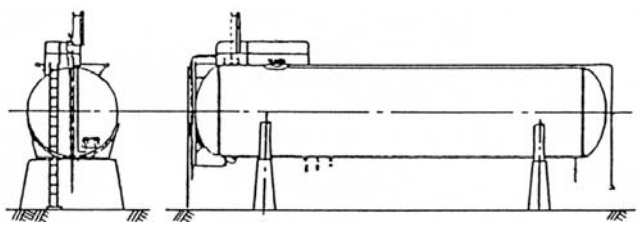

Figure 1: Cylindrical LPG storage tank.

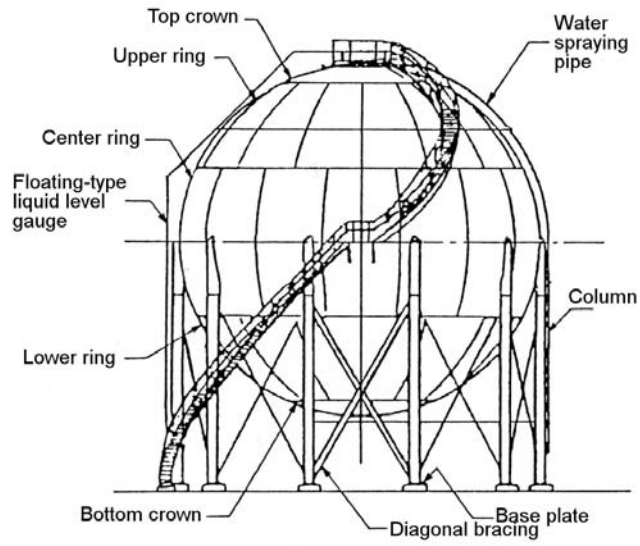

Figure 2: Spherical LPG storage tank.

For abovegroud storage under normal-pressure and low-temperature, flat-bottom cylindrical tanks (single- or double-walled, or with a suspended deck) and spherical tanks (single- or double-walled) are used, depending on storage applications, temperature and pressure. Flat-bottom cylindrical tanks are suitable for storing bulk LPG. Single-walled tanks are appropriate for storing gases such as butane at relatively high temperatures of 0°C to –10°C. However for low temperature storage (e.g. propane at –45°C), double-wall tanks (Figure 3) are required. Flat-bottom cylindrical tanks with suspended decks (Figure 4) can be constructed at lower cost than double-walled tanks, but they are appropriate only in countries where earthquakes are of little concern. Spherical tanks (Figure 5) are suitable for storing smaller quantities of gas at relatively high pressures. LPG can also be stored partially underground (in-ground tanks), or in wholly underground tanks.

Clearly the specified storage temperature, pressure and capacity as well as the location of the tank will influence the type of LPG tank used. However, LPG stored at normal-temperature and high-pressure will typically require aboveground spherical tanks, while normal-pressure low-temperature storage will mostly utilize aboveground flat-bottom double-wall cylindrical tanks.

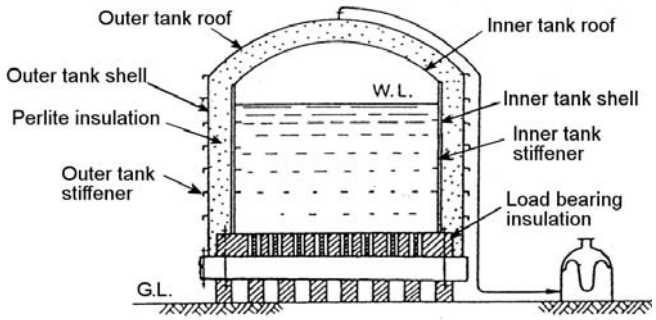

Figure 3: Cross sections over flat-bottom double-wall cylindrical tank.

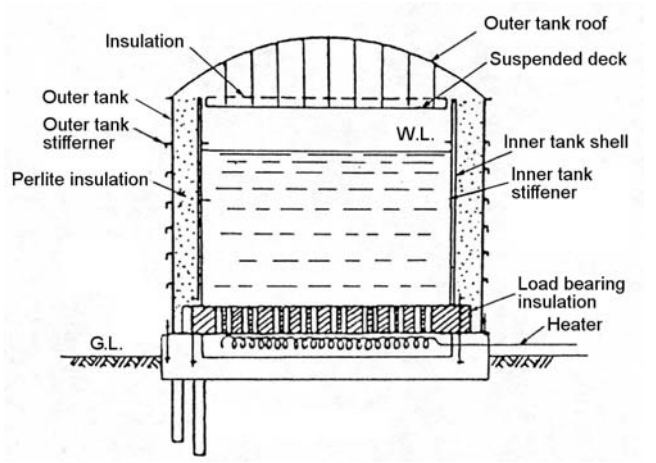

Figure 4: Cross sections over flat-bottom suspended-deck cylindrical tank.

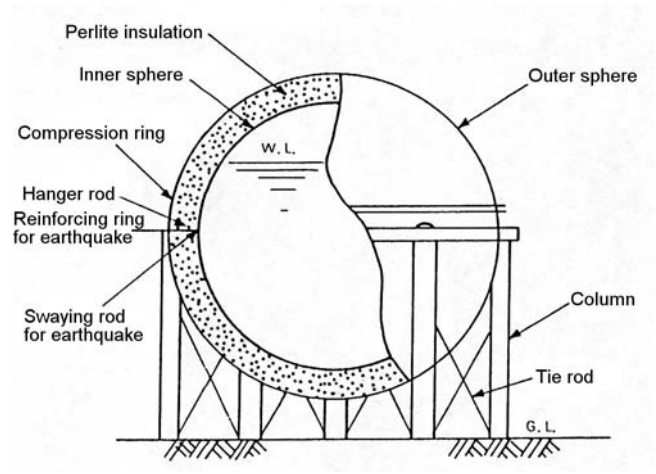

Figure 5: Cross sections over double-wall spherical tank.

Steels for LPG tanks

Steels for LPG tanks are selected according to the type of tank and design temperature. For normal-temperature high-pressure tanks, mild steel and high tensile strength steels of the 490-, 550-, 610-, and 780-MPa classes are used. Of these steels, 550-610MPa high tensile strength steels predominate due to their strength and sufficient weldability. For normal-pressure low-temperature tanks, aluminum-killed fine-grained steels (mild steel, 490-, and 550-MPa class high tensile strength steels) are applied for the low-temperature inner tanks due to their high notch toughness at low temperatures of –60°C or warmer. For the ambient-temperature outer tanks, mild steels such as JIS G 3101 SS400 and G3106 SM400 are used. Tables 1 and 2 show typical steel grades for moderate and low temperature service and their chemical and mechanical properties per the JIS and ASTM standards, respectively.

Table 1: Typical steel grades for LPG tanks and their chemical and mechanical properties per JIS G 3115 and G 3126

Steel grade	G 3115 SPV 490	G 3126 SLA 235A	G 3126 SLA 235B	G 3126 SLA 325A
Lowest design temp. (°C)	–10	–30	–45	–45
C (mass%)	0.18 max.	0.15 max.	0.15 max.	0.16 max.
Si (mass%)	0.15-0.75	0.30 max.	0.30 max.	0.55 max.
Mn (mass%)	1.60 max.	0.70-1.50	0.70-1.50	0.80-1.60
YS (MPa)	490 min. (1)	235 min. (2)	235 min. (2)	325 min.
TS (MPa)	610-740	400-510	400-510	440-560

1. Plate thickness: 6-50 mm.
2. Plate thickness: 40 mm max.

Table 2: Typical steel grades for LPG tanks and their chemical and mechanical properties per ASTM A516 and A537

Steel grade	A516 Gr.55	A516 Gr.60	A516 Gr.65	A537 Cl.2
Min. impact test temp. (°C) (1)	–51	–45	–45	–67
C (mass%) (2)	0.20 max.	0.23 max.	0.26 max.	0.24 max.
Si (mass%)	0.13-0.45	0.13-0.45	0.13-0.45	0.13-0.55
Mn (mass%) (2)	0.55-1.30	0.79-1.30	0.79-1.30	0.64-1.46(3)
YS (MPa)	205 min.	220 min.	240 min.	415 min. (4)
TS (MPa)	380-515	415-550	450-585	550-690 (4)

1. Per ASTM A20/A20M-99a (Standard Specification for General Requirements for Steel Plates for Pressure Vessels). Plate thickness: 25.4-50.8 mm.
2. Plate thickness: 12.5-50 mm for C, and 12.5 mm min. for Mn.
3. Plate thickness: 40 mm max.
4. Plate thickness: 65 mm max.

Table 3: Suitable filler metals for cylindrical and spherical normal-temperature high-pressure LPG tanks

Min. tensile strength of base metal (MPa)	Welding process	Product name	Feature	AWS classification
550-610	SMAW	LB-62UL	Moisture-resistant ultra-low hydrogen. AC or DCEP	A5.5 E9016-G
	SAW	MF-38/US-40	Fused flux / solid wire	A5.23 F8P6-EA3-A3 A5.23 F9A6-EA3-A3
	GMAW	MG-60	CO_2 shielding	A5.28 ER80S-G
		MGS-63B	Ar-CO_2 shielding	A5.28 ER90S-G
	FCAW	DW-60	CO_2 shielding	A5.29 E81T1-Ni1
	GTAW	TGS-60A	Ar shielding. Automatic TIG.	A5.28 ER80S-G
780	SMAW	LB-80UL	Moisture-resistant ultra-low hydrogen. AC	A5.5 E11016-G
		LB-116	Moisture-resistant extra-low hydrogen. AC or DCEP	A5.5 E11016-G
	SAW	PFH-80AK/US-80BN	Bonded flux / solid wire	A5.23 F12A10-EG-G
	GMAW	MG-80	CO_2 shielding	A5.28 ER110S-G
		MGS-80	Ar-CO_2 shielding	A5.28 ER110S-G
	GTAW	TGS-80AM	Ar shielding. Automatic TIG	A5.28 ER110S-G

Welding filler metals for LPG tanks

The process of constructing normal-temperature high-pressure spherical tanks of high tensile strength steel typically employs shielded metal arc welding with low hydrogen electrodes. The low hydrogen electrode offers low amounts of diffusible hydrogen in the weld metal and thus is resistant to cold cracking. A moisture-resistant ultra-low hydrogen electrode is also available, which is even more immune to hydrogen-assisted cold cracking and moisture absorption. As shown in Figure 6, a moisture-resistant low-hydrogen electrode picks up moisture at slower rates — thus containing lower amounts of diffusible hydrogen for a longer time in the air — when compared with a conventional low-hydrogen electrode. Submerged arc welding is used on main welding joints of cylindrical tanks. Table 3 lists suitable filler metals for various welding processes for normal-temperature high-pressure LPG tanks of 550-610MPa and 780MPa high tensile strength steels.

Flat-bottom cylindrical tanks for normal-pressure low-temperature storage are constructed mainly by using automatic and semi-automatic welding processes such as submerged arc, gas metal arc, flux cored arc and gas tungsten arc welding.

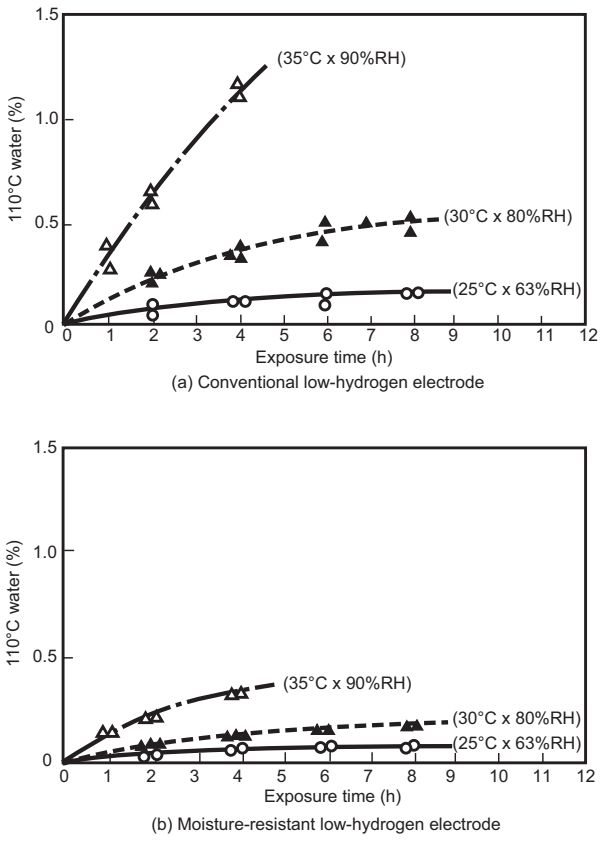

Figure 6: Moisture absorption curves of a moisture-resistant low-hydrogen electrode and a conventional low-hydrogen electrode tested under conditions of controlled temperature and relative humidity.

Table 4: Suitable filler metals for cylindrical normal-pressure low-temperature LPG tanks of 490-MPa high tensile strength steel [1]

Joint component	Type of joint	Welding position[2]	SMAW	GMAW	FCAW	GTAW	SAW
Roof plate	Lap joint	HF	NB-1SJ • Extra-low hydrogen • AC or DCEP • AWS A5.5 E8016-G LB-52NS • Extra-low hydrogen • AC or DCEP • AWS A5.5 E7016-G	MGS-50LT • Solid wire • Ar-CO_2 shielding • Pulsed power source is needed for vertical welding • AWS A5.18 ER70S-G	DW-55LSR • CO_2 shielding • AWS A5.29 E81T1-K2C	-	-
Shell plate	Butt joint	V				TGS-1MT • Solid wire • Ar shielding • Automatic TIG • AWS A5.18 ER70S-G	-
		H					PF-100H/US-36LT • Bonded flux • DCEP • AWS A5.17 F7A8-EH14
Shell to annular plate	T joint (Double bevel groove)	HF				-	MF-38/US-49A • Fused flux • AC • AWS A5.17 F7A6-EH14 MF-38/US-36 • Fused flux • AC • AWS A5.17 F7A6-EH14 PF-100H/US-36LT • Bonded flux • DCEP • AWS A5.17 F7A8-EH14
Annular plate	Butt joint	F				TGS-1MT • Solid wire • Ar shielding • Automatic TIG • AWS A5.18 ER70S-G	MF-38/US-49A • Fused flux • AC • AWS A5.17 F7A6-EH14 PF-100H/US-36LT • Bonded flux • DCEP • AWS A5.17 F7A8-EH14
Bottom plate	Lap joint	HF				-	MF-38/US-49A • Fused flux • AC • AWS A5.17 F7A6-EH14 MF-38/US-36 • Fused flux • AC • AWS A5.17 F7A6-EH14
Nozzle to shell plate	Butt joint	F				-	-

1. SMAW: shielded metal arc welding; GMAW: gas metal arc welding; FCAW: flux cored arc welding; GTAW: gas tungsten arc welding; SAW: submerged arc welding.
2. HF: horizontal fillet; V: vertical; H: horizontal; F: flat.

The inner tank of a normal-pressure low-temperature tank uses low-temperature steels. Therefore the filler metals that have sufficient notch toughness matching to the base metal must be used. Tables 4 and 5 can be used as selection guides to filler metals suitable for flat-bottom cylindrical tanks of 490- and 550-MPa aluminum-killed fine-grained steels, respectively. To be listed, a weld metal minimum impact energy of 27J at –46°C is a prerequisite. Spherical tanks commonly employ shielded metal arc welding in all positions. Because the outer tank is made of mild steel, ordinary carbon steel type filler metals can be used for individual welding processes.

Table 5: Suitable filler metals for cylindrical normal-pressure low-temperature LPG tanks of 550-MPa high tensile strength steel (1)

Joint component	Type of joint	Welding position(2)	SMAW	GMAW	FCAW	GTAW	SAW
Roof plate	Lap joint	HF	NB-1SJ • Extra-low hydrogen • AC • AWS A5.5 E8016-G LB-62L • Moisture-resistant extra-low hydrogen • DCEP • AWS A5.5 E8016-C1	MGT-1NS • Solid wire • Ar-CO_2 shielding • AWS A5.18 ER80S-G	DW-55LSR • CO_2 shielding • AWS A5.29 E81T1-K2C DWA-55LSR • Ar-CO_2 shielding • AWS A5.29 E81T1-Ni1M	-	-
Shell plate	Butt joint	V				TGS-60A • Solid wire • Ar shielding • Automatic TIG • AWS A5.28 ER80S-G	-
		H					MF-33H/US-49A • Fused flux • DCEP • AWS A5.17 F7A6-EH14
Shell to annular plate	T joint (Double bevel groove)	HF				-	MF-38/US-49A • Fused flux • AC • AWS A5.17 F7A6-EH14
Annular plate	Butt joint	F				TGS-60A • Solid wire • Ar shielding • Automatic TIG • AWS A5.28 ER80S-G	-
Bottom plate	Lap joint	HF				-	MF-38/US-49A • Fused flux • AC • AWS A5.17 F7A6-EH14
Nozzle to shell plate	Butt joint	F				-	-

1. SMAW: shielded metal arc welding; GMAW: gas metal arc welding; FCAW: flux cored arc welding; GTAW: gas tungsten arc welding; SAW: submerged arc welding.
2. HF: horizontal fillet; V: vertical; H: horizontal; F: flat.

The chemical and mechanical properties of most of the filler metals listed in Tables 3, 4, and 5 are described in the Kobelco Welding Handbook. Table 6 shows the chemical and mechanical properties of filler metals that are not contained in the handbook.

Table 6: Typical chemical and mechanical properties of filler metals described in Tables 3-5 but not in the handbook

Product name (1)	Chemical composition (mass%)							Mechanical properties (as-welded)				
	C	Si	Mn	Ni	Mo	Ti	B	YS (MPa)	TS (MPa)	vE–20°C	vE–46°C	vE–60
DW-60	0.05	0.40	1.40	1.00	0.09	0.05	0.003	570	630	80	-	-
TGS-1MT	0.03	0.04	0.68	4.01	-	-	-	410	540	-	-	250
PF-100H/US-36LT	0.06	0.19	1.36	-	-	0.03	0.004	490	540	-	220	190
MGT-1NS	0.06	0.33	1.36	1.07	0.27	-	-	590	670	-	-	57

1. Shielding gas: 100%CO_2 for DW-60; 80%Ar-20%CO_2 for MGT-1NS.

CARBON EQUIVALENT

In arc welding of carbon and low alloy steels, hardening of the heat-affected zone (HAZ) of the base metal is normally caused by the transformation of austenite to martensite that results from the rapid cooling of the weld metal. The degree of hardening depends on the alloy content and the cooling rate. For carbon and low alloy steels the effect of composition is assessed by means of the empirically developed carbon equivalent (Ceq). The following formula is most commonly used for determining Ceq, which is adopted by the International Institute of Welding:

$$Ceq = C + \frac{Mn}{6} + \frac{(Cu + Ni)}{15} + \frac{(Cr + Mo + V)}{5}$$

In Japan the following formula is commonly used for evaluating the hardenability of carbon and low alloy steels:

$$Ceq = C + \frac{Si}{24} + \frac{Mn}{6} + \frac{Ni}{40} + \frac{Cr}{5} + \frac{Mo}{4} + \frac{V}{14}$$

In these formulas, C and other alloying elements represent mass percent.

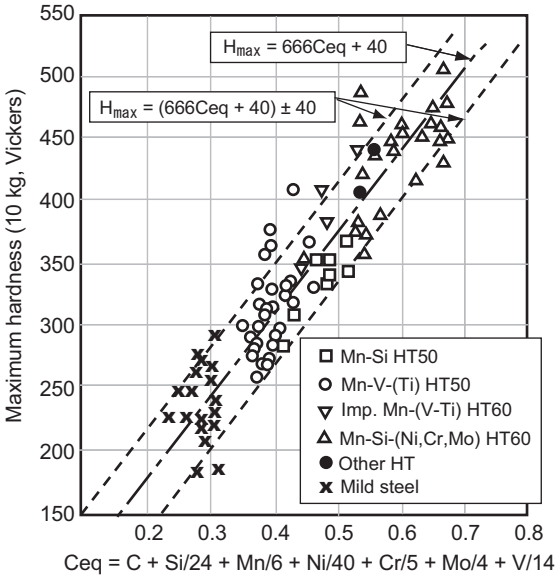

Figure 1: Maximum HAZ hardness vs. Ceq of 20-mm thick mild steel and high tensile strength steels (Bead-on-plate welding with a D5016 electrode) [Ref. 1].

As shown in Figure 1 the maximum HAZ hardness increases as the Ceq increases, illustrating the profound and direct effect that carbon has on hardness. Other alloying elements also affect hardness, but with less influence. In total, they affect the hardenability of the weld. As indicated in the figure, the maximum HAZ hardness of a carbon or low alloy steel can be estimated as per the formula $H_{max} = (666Ceq + 40) \pm 40$. However, the most important use of this concept has been not to predict hardness, but the minimum preheat temperature needed to avoid the formation of hard martensite or a microstructure with poor ductility.

Such a microstructure, in conjunction with weld joint restraint and weld metal hydrogen content, can cause cold cracking of the weld. As shown in Figure 2, underbead cracking, a type of cold cracking occurring in the HAZ, increases with an increase in Ceq.

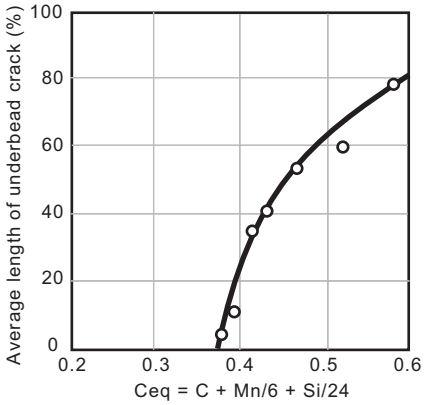

Figure 2: Effect of base metal Ceq on underbead cracking (Base metal: 38-mm thick C-Mn steel; Covered electrode: E6010 of 3.2 mmØ; Welding conditions: 100A/25V/25cpm; Bead length: 32 mm) [Ref. 2].

For the reasons discussed, Ceq is an indicator that can help predict the hardenability or weldability of the base metal. That is, the higher the Ceq, the greater the expected hardness and the higher the preheat temperature. This is why Ceq may be included in material specifications and welding construction codes as either a recommended or mandatory guide for regulating steel selection or for controlling welding procedures.

» References «
[1] H.Suzuki and H.Tamura. Welding Metallurgy. Complete Book of Welding-Series 1, Sanpo Publications Inc.
[2] S.Yamamoto. The ABC's of Arc Welding and Inspection. Shinko Welding Service Co., Ltd.

KWAI at FABTECH Int'l & AWS Welding Show 2006

Top: Georgia World Congress Center (Photo source: fmafabtech.com)

The KOBELCO Spool of Excellence

The 2006 FABTECH International & AWS Welding Show was held at the Georgia World Congress Center in Atlanta, Georgia from October 31-November 2. The objective with the move to Atlanta was to expand the reach of the event outside of the traditional Midwest and to open new markets and industries for exhibitors. Show management's research identified and targeted thousands of metal fabricating and welding technology users in the southeast region of the country that had never previously been to the event. Results showed many of these users visited the event. The show stats indicated that there were 21,383 attendees (including exhibitors), 873 exhibiting companies, and a total of 307,600 net square feet.

Kobelco Welding of America (KWAI) attended as an exhibitor, making its 17th appearance in an AWS show, secured a large booth of 9 m x 9 m and showed various types of welding consumables such as stainless and mild steel flux-cored wires, mild steel MIG wires, and mild steel stick electrodes. We have also renovated our welding demonstration booth by adding a shaded window on the side this year so that visitors can see the arc condition very clearly. We added color and atmosphere to our booth by hiring a woman to greet visitors while dressed in traditional Japanese clothing (Kimono/Yukata). These added features contributed to bring-in over 200 visitors to the Kobelco booth.

The 2007 FABTECH International & AWS Welding Show will be held in Chicago, Illinois (Nov. 11-14). We are looking forward to having a great show next year.

Reported by Andrew Sawada, KWAI

Greetings from new members in the IOD

Haruzo Imamura
IOD, KSL

A Happy New Year to you! My name is Haruzo Imamura. I was transferred to the International Operations Dept. last October. Since I joined Kobe Steel 40 years ago, I had been engaged in research and development of fillet welding electrodes, technical service for users, sales of welding consumables, and marketing for metallurgical test and investigation.

Throughout my careers particularly as a salesman and service engineer in the domestic market, my business slogan was not to sell welding materials but to offer “good deposited metals” or, in other words, to provide the customers with the best welding results. I always suggested customers to use good welding equipment, welding robots and power sources in order to get the best performance out of our welding materials. This was from my desire to produce good deposited metals.

Though the Chinese market which I am in charge of now may be very different in business culture from the Japanese market, my sales slogan of offering good deposited metals will remain unchanged. I hope you will extend to me your advice and support.

Ryusaku Yanagimoto
Assistant Manager
IOD, KSL

A Happy New Year to readers of Kobelco Welding Today! I am Ryusaku Yanagimoto in charge of the chemical machinery manufacturers in China. I came to the International Operations Dept. (IOD) last June from the Saijo Plant in Hiroshima Prefecture, where Kobe Steel manufactures covered electrodes. Since I joined Kobe Steel in 1998, I had been engaged mainly in accounting and purchasing at the domestic plants. To me, therefore, working in the IOD is full of new, stimulating, sometimes bewildering events.

When I visited China for the first time in September last year, I was overwhelmed by its vast territory and bustling and lively atmosphere of town streets. At the same time, I felt a strong desire in my mind to permeate this fast growing, attractive Chinese market with KOBELCO welding materials as quickly as possible. I am determined to make my best efforts to satisfy my customers in China in every way. Your warm advice and guidance will be appreciated.

Onka Kin
IOD, KSL

Hello to dear readers of Kobelco Welding Today! My name is Onka Kin. I joined Kobe Steel last year, and I feel very privileged to greet you from Kobelco Welding Today. From my name, you may think that I am a Korean. Actually, I am a Chinese national, but with Korean ethnicity. So, my national language is Chinese and my mother tongue is Korean. While the differences in the two languages are noticeable, there are also many interesting differences between the Korean customs at home and the Chinese customs outside home. Being accustomed to this double-culture life, I am very interested in foreign culture. This interest was one of the motives that led me to come to Japan. Since 2003, when I came to Japan as a foreign student, Japan has become my second home country. It is a very pleasant place to live particularly as the winters are not so cold. The temperature in mid-winter in my hometown in Liaoning Province in the northeastern part of China goes down frighteningly to as low as 20 degrees below zero or even lower. As a matter of fact, I am losing the courage to go back home in winter

I joined Kobe Steel in April, 2006 and was assigned to the International Operations Dept. as I wished, where I am working every day with enjoyment. At present, I am mainly engaged in the delivery to Kobelco Welding of America (KWAI) as an assistant in charge of the American market. “Accuracy and swiftness” is my motto in discharging my daily job. I am determined to go all out to respond to the customers' requests with a fresh mind and pleasure every day. I would be grateful for your support.

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