# EF-200K+KD-42

SUBMERGED ARC WELDING

KISWEL

Rev.0

# EF-200K+KD-42

KISWEL

## ■ Description & Application

- **Single and multi-layer welding of ship buildings, structural steels, pressure vessels and other fabrications.**
- **Outstanding welding characteristics and bead profile.**
- **Excellent impact toughness and crack resistibility.**

## ■ Classification

### Sub-arc Wire

- **AWS A5.17 : EM12K**
- **EN ISO 14171 : S2Si**
- **JIS Z 3351 : YS-S3**
- **KS B ISO 14171 : S2Si**

### Sub-arc flux

- **EN ISO 14174 : SA CS 1 57 AC**
- **JIS Z 3352 : SA CS 1 AC- 12x65**
- **KS B ISO 14174 : SA CS 1 57 AC**

### Flux/Wire-combination

- **AWS A5.17 : F7A(P)6-EM12K**
- **EN ISO 14171 : S 46 5 CS S2Si**
- **JIS Z 3183 : S502-H**
- **KS B ISO 14171 : S 46 5 CS S2Si**

## ■ Typical Chemical Composition of Wire(%)

| Item | C | Mn | Si | S | P | Cu |
|---|---|---|---|---|---|---|
| AWS Spec. EM12K | 0.05-0.15 | 0.80-1.25 | 0.10-0.35 | ≤0.030 | ≤0.030 | ≤0.35 |
| RESULT | 0.10 | 0.93 | 0.29 | 0.009 | 0.018 | 0.07 |

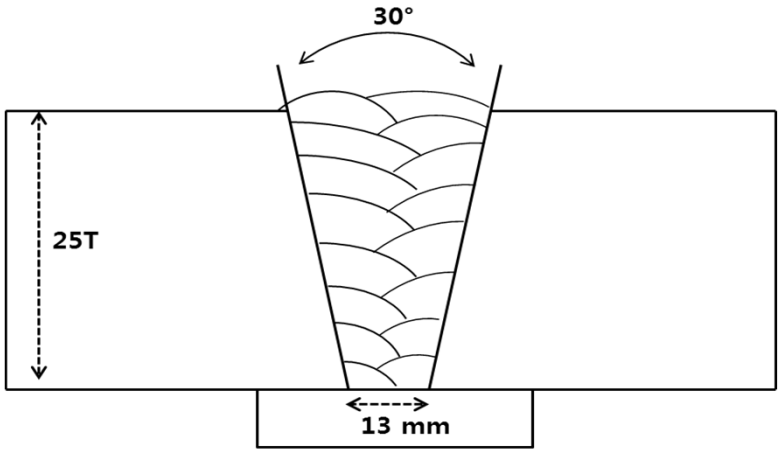
## ■ Typical Chemical Composition of Weld Metal(%)

| Item | C | Mn | Si | S | P | Cu |
|---|---|---|---|---|---|---|
| RESULT | 0.08 | 1.59 | 0.31 | 0.009 | 0.029 | 0.06 |

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## ■ All Weld Metal Test Specimen




| | |
|---|---|
| Pass | 1~16 |
| Diameter | 4.0mm |
| Current / Voltage | 520A / 30V |
| Travel Speed | 42 CPM |
| Stick out | 30 mm |
| Interpass Temp. (℃) | 150±15 |

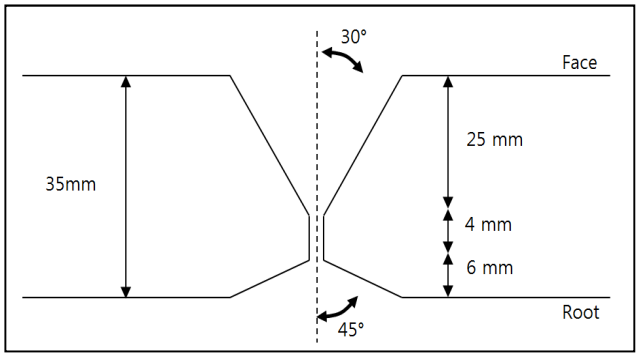
| Base Metal | Thick (mm) | Size (mm) | Grove Design | Remark |
|---|---|---|---|---|
| SM490 | 25 | 300Lx125W | V-Grove | AWS A5.17 |

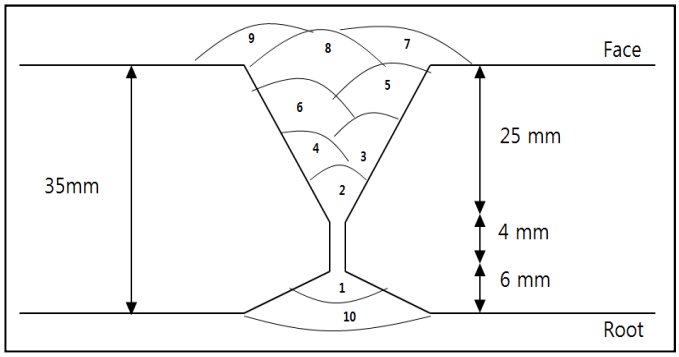
## ■ Typical Mechanical Properties of Weld Metal

| Item [Flux+Wire] | Tensile Test | | | Impact Test | Remark |
|---|---|---|---|---|---|
| | Y.S [MPa] | T.S [MPa] | E.L [%] | Impact Value [J] | |
| AWS Spec. [A5.17 F7A(P)6-EM12K] | ≥ 400 | 480-660 | ≥22 | ≥27 @ -51℃ | - |
| EF-200K+KD-42 | 510 | 570 | 30 | 171 @ -40℃<br>126 @ -51℃ | As Welded |

## ■ Two-Run Welding Test Condition

| Pass | Process | Dia. (mm) | Polarity | Amp. (A) | Volt. (V) | Speed (CPM) | H.I (kJ/㎝) |
|---|---|---|---|---|---|---|---|
| Sealing | GMAW | 1.2 | DC | 220/250 | 25/30 | 31/38 | 8.0 / 14.5 |
| Face | SAW | 4.0 | DC | 550/700 | 25/29 | 45 | 18.3 / 27.1 |
| | SAW | 4.0 | DC | 500/600 | 26/29 | 65 | 24.4 / 32.2 |
| | | 4.0 | AC | 480/530 | 28/33 | | |
| | SAW | 4.0 | DC | 550/650 | 24/29 | 65 | 25.4 / 32.2 |
| | | 4.0 | AC | 530/600 | 27/34 | | |
| Root | SAW | 4.0 | DC | 650/750 | 28/34 | 65 | 16.8 / 23.5 |




**⋆ Base Metal : EN 10025-3 S355NL**

## ■ Mechanical Property of Two-Run Welding

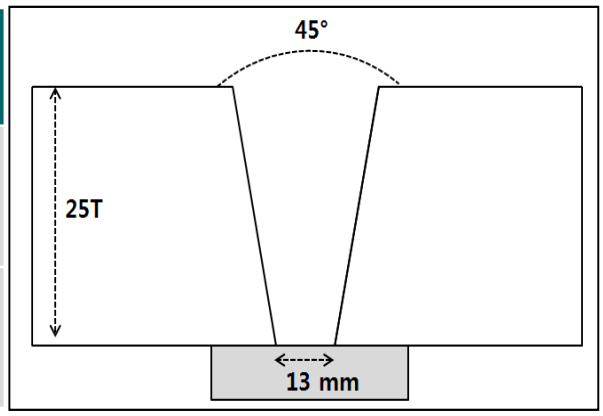
| Tensile Test | | | | | | |
|---|---|---|---|---|---|---|
| Class. | Width [mm] | Thick [mm] | Area [mm2] | Tensile Load [kN] | T.S [MPa] | Broken Position |
| Result | 25 | 35.1 | 881.0 | 512.3 | 581.5 | B.M |
| | 25 | 35.1 | 881.0 | 513.3 | 582.7 | B.M |

| Impact Test | | | | | |
|---|---|---|---|---|---|
| Class. | Test Temp. [℃] | Weld Metal [FACE] | HAZ [FACE] | Weld Metal [ROOT] | HAZ [ROOT] |
| Result | -50 | Av. 66 | Av. 178 | Av. 54 | Av. 124 |

## ■ Additional Welding Test Specimen (AWS D1.8)

| Base Metal | Thick (mm) | Size (mm) | Grove Design | Remark |
|---|---|---|---|---|
| ASTM A36 | 25 | 300Lx125W | V-Grove | AWS D1.8 |

| Class. | Pol. | Size (mm) | H.I (kJ/㎝) | Preheat Temp. (℃) | Interpass Temp. (℃) |
|---|---|---|---|---|---|
| High H.I | DC+ | 4.0 | ≥31.0 | ≥120 | ≥240 |
| Low H.I | DC+ | 4.0 | ≤12..0 | ≤40 | ≤120 |




## ■ Mechanical Property of Additional Test

| Item [Flux+Wire] | Tensile Test | | | Impact Test |
|---|---|---|---|---|
| | Y.S [MPa] | T.S [MPa] | E.L [%] | Impact Value [J] |
| AWS D1.8 Spec. | ≥ 400 | ≥ 480 | ≥22 | ≥54 @ 21℃<br>≥27 @ -18℃ |
| EF-200K+KD-42 [High H.I] | 466 | 550 | 34 | 382 @ 21℃<br>264 @ -18℃ |
| EF-200K+KD-42 [Low H.I] | 581 | 622 | 28 | 229 @ 21℃<br>185 @ -18℃ |

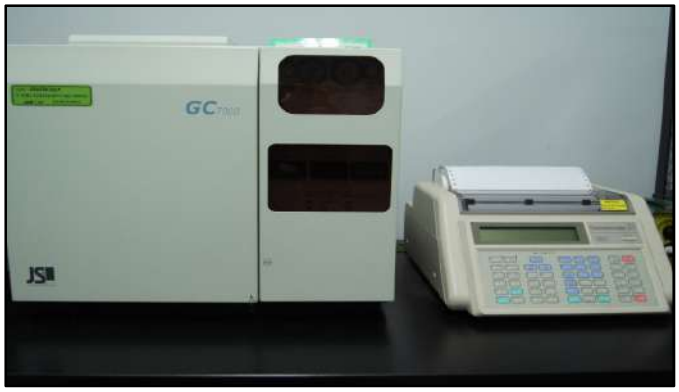
## ■ Diffusible Hydrogen Test

| Class. | Diffusible Hydrogen Content (㎖) / 100g Weld Metal | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | Av. |
| Result | 3.70 | 4.76 | 4.72 | 3.82 | 4.25 |

**⋆ Test Information**

**▶ Test Method : Reference to EN ISO 3690**

**▶ Test Equipment : G.C (Gas Chromatograph)**



< Gas Chromatography equipment >

# EF-200K+KD-42

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## ■ Packaging




## ■ Size and Weight

| Item | Size | Package | Weight [kg] |
|---|---|---|---|
| Flux | 12*30 / 12*60 | Steel Can / Paper Bag | 15 / 20 |

| Item | Package | Weight [kg] |
|---|---|---|
| Diameter [mm] | | 2.0, 2.4, 3.2, 4.0, 4.8 |
| Wire | Coil | 25, 100, 150, 300, 400, 500, 600 |
| | POP | 200, 250, 300, 400, 450 |

## ■ Approval

| ABS | BV | DNV*GL | LR | KR | NK |
|---|---|---|---|---|---|
| 3YTM | A3TM<br>A3YTM | III YTM | BF 3YM | 3YTM | KAW53TM |

## ■ Handling and Storage

### ◆ Storage

- **Unopened flux must be stored in the following conditions :**
  **→ Temperature : 20±10℃, Relative humidity : As low as possible not exceeding 60% max**
- **Flux shall not be stored longer than 2 years**
- **The content of unheated flux hoppers must shift after 8 hour, it be placed in a drying cabinet or heated flux hopper at a temperature of 150±25℃**
- **Remaining flux from opened cans must be kept at a temperature of 150±25℃**

### ◆ Re-Drying

- **When handled and stored as above, fluxes can normally be used without re-drying**
- **In severe applications, stipulated by the applicable material specification, re-drying of the flux is recommended**
- **Re-drying shall be performed as follows :300~350 for about 60~180 minutes**
- **Re-drying must be done in equipment that turns the flux so the moisture can evaporate easily or in an oven shallow plates with a flux height not exceeding 5 cm.**
- **Re-dried flux not immediately used must be stored at 150±25℃ before use**

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The Management System of KISWEL LTD, 704, Gongdan-ro, Seongsan-gu, Changwon-si, Gyeongnam 51544, Republic of Korea, 70, Saebyeok-ro 63beon-gil, Sasang-gu, Busan 47018, Republic of Korea has been approved by Lloyd's Register Quality Assurance to : IATF 16949:2016, ISO 14001:2015, applicable to : Manufacture of solid welding wires & rods, flux cored wires, submerged arc welding wires & fluxes, stainless steel welding wires & rods and covered electrodes.
More information : www.kiswel.com

