

## Creep resistant basic electrode

### Classification

AWS A5.5 : E9018-B3-H4  
EN 1599 : E CrMo2 B 32 H 5

### General description

Basic very low hydrogen all position electrode ( $H_{DM} < 5$  ml/100g)  
For welding 2.25% Cr 1% Mo-creep and hydrogen resistant steels  
Excellent weldability for pipe and site welding  
Reliable X-ray properties  
Good mechanical properties in the as welded and stress relieved condition  
Applicable for service temperature from -20 to 600°C  
SL 20G (STC) meets the actual "step cool" requirements including the Bruscato factor  $X < 15$   
Only available in vacuum sealed Sahara ReadyPack® (SRP)

### Welding positions



ISO/ASME PA/1G PB/2F PC/2G PF/3Gup PE/4G PF/5Gup

### Current type

AC / DC + / -

### Chemical composition (w%), typical, all weld metal

| C    | Mn  | Si   | P    | S    | Cr  | Mo  | Bruscato    | H <sub>DM</sub> |
|------|-----|------|------|------|-----|-----|-------------|-----------------|
| 0.10 | 0.6 | 0.35 | 0.01 | 0.01 | 2.3 | 1.0 | max. 15 ppm | 3 ml/100g       |

### Mechanical properties, all weld metal

|                    | Condition        | 0.2% Proof strength<br>(N/mm <sup>2</sup> ) | Tensile strength<br>(N/mm <sup>2</sup> ) | Elongation<br>(%) | Impact ISO-V(J) |       |
|--------------------|------------------|---|--|-------------------|-----------------|-------|
|                    |                  |   |  |                   | +20°C           | -20°C |
| Required: AWS A5.5 | SR <sup>1)</sup> | min. 530                                    | min. 620                                 | min. 17           | not required    |       |
| EN 1599            | SR <sup>2)</sup> | min. 400                                    | min. 500                                 | min. 18           | min. 47         |       |
| Typical values     | SR <sup>3)</sup> | 540   | 640                                      | 20                | 160 80          |       |

Stress relieved: SR<sup>1)</sup> = 690±14°C/1h, SR<sup>2)</sup> = 690-750°C/1h, SR<sup>3)</sup> = 695°C/1h

Shifting CVN at 55 J(DeltaT55): +10°C after "STC" (step cool treatment)

### Packaging and available sizes

|           | Diameter (mm)        | 2.5 | 3.2 | 4.0 | 5.0 |
|-----------|----------------------|-----|-----|-----|-----|
|           | Length (mm)          | 350 | 350 | 350 | 450 |
| Unit: SRP | Pieces / unit        | 67  | 51  | 28  | 23  |
|           | Net weight/unit (kg) | 1.4 | 2.0 | 1.5 | 1.6 |

### Identification

Imprint: 9018-B3 / SL 20 G (STC)

Tip Color: White

SL®20G(STC): rev. EN 21

## Materials to be welded

| Steel grades/Code | Type         |
|-------------------|--------------|
| EN 10028-2        | 10 CrMo 9-10 |
| EN 10222-2        | 12 CrMo 9-10 |

## Creep data

| Test temperature             | (°C)                 | 400 | 450 | 500 | 550 | 600  |
|------------------------------|----------------------|-----|-----|-----|-----|------|
| Yield strength Rp-0,2%       | (N/mm <sup>2</sup> ) | 480 | 460 | 430 |     |      |
| Creep strength Rm/1000       | (N/mm <sup>2</sup> ) |     |     | 240 | 160 | -100 |
| Creep strength Rm/10.000     | (N/mm <sup>2</sup> ) |     |     | 210 | 110 | -60  |
| Creep resistance Rp1%/10.000 | (N/mm <sup>2</sup> ) |     |     | 160 | 85  | -45  |

## Calculation data

| Sizes<br>Diam. x length<br>(mm) | Current<br>range<br>(A) | Current<br>type | Arc time<br>- per electrode at max. current -<br>(s)* | Energy<br>E(kJ) | Dep.rate<br>H(kg/h) | Weight/<br>1000 pcs.<br>(kg) | Electrodes/<br>kg weldmetal<br>B | kg Electrodes/<br>kg weldmetal<br>1/N |
|---------------------------------|-------------------------|-----------------|---|-----------------|---------------------|------------------------------|----------------------------------|---------------------------------------|
| 2.5 x 350                       | 60 - 95                 | DC+             | 63  | 114             | 0.72                | 21.0                         | 79                               | 1.67                                  |
| 3.2 x 350                       | 80 - 145                | DC+             | 70  | 233             | 1.3                 | 37.6                         | 40                               | 1.49                                  |
| 4.0 x 350                       | 120 - 185               | DC+             | 75  | 348             | 1.7                 | 56.7                         | 28                               | 1.56                                  |
| 5.0 x 450                       | 160 - 260               | DC+             | 100   | 754             | 2.6                 | 107.6                        | 14                               | 1.47                                  |

\* stub end 35 mm

## Welding parameters, optimum fill passes

| Welding positions<br>Diameter (mm) | PA/1G | PB/2F | PC/2G | PF/3G up | PE/4G | PF/5G up |
|------------------------------------|-------|-------|-------|----------|-------|----------|
| 2.5                                | 80A   | 85A   | 80A   | 85A      | 80A   | 80A      |
| 3.2                                | 130A  | 120A  | 130A  | 120A     | 120A  | 120A     |
| 4.0                                | 150A  | 145A  | 140A  | 140A     | 140A  | 140A     |
| 5.0                                | 225A  | 225A  | 210A  |          |       |          |

## Remarks/ Application advice

Recommended preheat temperature: 200 - 300°C

Recommended tempering heat treatment range: 680 - 750°C (time depends on material thickness)

Stepcooling requirements: Bruscato factor X = (10 P + 5 Sb + 4 Sn + As)/100 \_ 15 ppm and Mn + Si < 1.1