

# CRA GUIDE TO SELECTION OF STAINLESS STEELS

| Alloy Family                | Alloy Type         | API Category                        | Trade Names                 | UNS Number | Chemical Composition                           |              |            |            |            |             |            |   |              | PREN     | API Grade       | 0.2% Yield Str. (ksi)     |                  | Tensile Str. (ksi) | Elong. (%)                             |  | CVN Impact (ft-lbs) | Hardness                         | NACE MR0175/ISO 15156  |  | Alloy Family      |
|-----------------------------|--------------------|-------------------------------------|-----------------------------|------------|--|--------------|------------|------------|------------|-------------|------------|---|--------------|----------|-----------------|---------------------------|------------------|--------------------|--|--|---------------------|----------------------------------|--|--|-------------------|
|                             |                    |                                     |                             |            | max. wt % or range, unless otherwise indicated |              |            |            |            |             |            |   |              |          |                 | long. at room temperature |                  |                    |  | trans. at 14F                          | (HRC)               | H <sub>2</sub> S Limits          |  |  |                   |
|                             |                    |                                     |                             |            | C  | CR           | Ni         | Mo         | Cu         | Ti          | V          | W | N            |          |                 | min.                      | max.             | min.               | min.                                   |  | min.                | max.                             | Tables   | Sour Service Limits                    |                   |
| Martensitic Stainless Steel | 13 Chrome          | 5CT 13Cr L80                        | 13CR<br>420 Mod<br>13Cr L80 | S42000     | 0.15 to 0.22                                   | 12.0 to 14.0 | 0.5        | —          | 0.25       | —           | —          | — | —            | 12 to 14 | 80              | 80                        | 95               | 95                 | function of specimen size              | function of wall thickness             | 23                  | A.19                             | H <sub>2</sub> S ≤ 1.5 psi, pH ≥ 3.5   |  |                   |
|                             | Modified 13 Chrome | N/A                                 | 13CRM                       | N/A        | 0.03   | 11.0 to 14.0 | 4.0 to 6.0 | 0.2 to 1.2 | —          | —           | —          | — | —            | 12 to 18 | 80              | 80                        | 95               | 90                 | function of specimen size and strength | 29<br>29<br>29/30                      | 27<br>28<br>32      | not recommended for sour service |  |  |                   |
|                             |                    |                                     | HP1                         | N/A        | 0.04   | 12.0 to 14.0 | 3.5 to 4.5 | 0.8 to 1.5 | —          | —           | —          | — | —            | 15 to 19 | 110             | 100                       | 140              | 115                |  |  |                     |                                  |  |  |                   |
|                             | Super 13 Chrome    | 5CRA Group 1<br>13-5-2<br>PSL 1 & 2 | 13CRS<br>CR13S              | S41426     | 0.03   | 11.5 to 13.5 | 4.5 to 6.5 | 1.5 to 3.0 | —          | 0.01 to 0.5 | 0.5        | — | —            | 16 to 23 | 80<br>95<br>110 | 80<br>95<br>110           | 95<br>105<br>140 | 90<br>105<br>115   | function of specimen size and strength | 29<br>29<br>29/30                      | 27<br>27<br>32      | A.19                             | H <sub>2</sub> S ≤ 1.5 psi, pH ≥ 3.5<br>110 Gr. not recommended for sour service           |  |                   |
|                             |                    |                                     | S13CR                       | S41425     | 0.05   | 12 to 15     | 4.0 to 7.0 | 1.5 to 2.0 | 0.03       | —           | —          | — | 0.06 to 0.12 | 17 to 22 | 80<br>95<br>110 | 80<br>95<br>110           | 95<br>105<br>140 | 90<br>105<br>115   |  |  |                     |                                  |  | function of specimen size and strength | 29<br>29<br>29/30 |
|                             |                    | 5CRA Group 1<br>13-5-2<br>PSL 1     | SCR13                       | S41427     | 0.03   | 11.5 to 13.5 | 4.5 to 6.0 | 1.5 to 2.5 | —          | 0.01 to 0.5 | 0.1 to 0.5 | — | —            | 16 to 22 | 80<br>95<br>110 | 80<br>95<br>110           | 95<br>105<br>140 | 90<br>105<br>115   | function of specimen size and strength | 29<br>29<br>29/30                      | 27<br>29<br>32      | A.21                             | 1.5 psi H <sub>2</sub> S, pH ≥ 3.5, Cl ≤ 6 g/l<br>110 Gr. not recommended for sour service |  |                   |
|                             |                    |                                     | HP2                         | N/A        | 0.04   | 12.0 to 14.0 | 4.5 to 5.5 | 1.8 to 2.5 | —          | —           | —          | — | —            | 18 to 22 | 80<br>95<br>110 | 80<br>95<br>110           | 95<br>105<br>140 | 90<br>105<br>115   |  |  |                     |                                  |  | function of specimen size and strength | 29<br>29<br>29/30 |
|                             | 15 Chrome          | N/A                                 | 15 Cr                       | S42500     | 0.08 to 0.2                                    | 14.0 to 16.0 | 1.0 to 2.0 | 0.3 to 0.7 | —          | —           | —          | — | 0.2          | 15 to 18 | N/A             | 80                        | 95               | 90                 |  |  | 22                  | A.19                             | H <sub>2</sub> S ≤ 1.5 psi, pH ≥ 3.5   |  |                   |
|                             |                    |                                     | UHP-15CR<br>Super 15Cr      | N/A        | 0.04   | 14.0 to 16.0 | 6.0 to 7.0 | 1.8 to 2.5 | 1.5        | —           | —          | — | —            | —        | 20 to 24        | 125                       | 125              | 150                | 135                                    | function of specimen size and strength |                     | 37                               | not recommended for sour service   |  |                   |
|                             | 17 Chrome          | N/A                                 | 17CRS<br>Super 17Cr         | N/A        | 0.03   | 16.0 to 18.0 | 4.0 to 5.5 | 2.0 to 3.0 | 2.0 to 3.0 | —           | 0.1        | — | —            | 23 to 28 | 125             | 125                       | 145              | 130                | function of specimen size and strength |  |                     |                                  |  |  | 38                |

