

A 292 - 91 (2011)

5.3 Thermal Treatment—Unless stated otherwise, each of the following thermal treatments shall be applied to the material. Each treatment must be specified as a Requirement and Designation.

5.4 Chemical Composition—The chemical composition of the material shall conform to the requirements for chemical composition in Table 1 for the grade specified.

TABLE 1. Chemical Composition and Chemical Composition of Hot-Rolled and Cold-Rolled Steel Bars^a

| Grade | Designation | Chemical Composition, Range and Units, % | | | | |
|-------|-------------|--|-----------|------------|--------|----------|
| | | Carbon | Manganese | Phosphorus | Sulfur | Nitrogen |
| A292 | 1008 | 0.08-0.12 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1009 | 0.08-0.12 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1010 | 0.08-0.12 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1011 | 0.08-0.12 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1012 | 0.08-0.12 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1015 | 0.12-0.18 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1018 | 0.18-0.25 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1020 | 0.20-0.26 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1022 | 0.22-0.28 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1025 | 0.25-0.31 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1027 | 0.27-0.33 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1030 | 0.30-0.36 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1035 | 0.35-0.41 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1040 | 0.40-0.46 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1045 | 0.45-0.51 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1050 | 0.50-0.56 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1055 | 0.55-0.61 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1060 | 0.60-0.66 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1065 | 0.65-0.71 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1070 | 0.70-0.76 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1075 | 0.75-0.81 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1080 | 0.80-0.86 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1085 | 0.85-0.91 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1090 | 0.90-0.96 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1095 | 0.95-1.01 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1100 | 1.00-1.06 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1105 | 1.05-1.11 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1110 | 1.10-1.16 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1115 | 1.15-1.21 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1120 | 1.20-1.26 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1125 | 1.25-1.31 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1130 | 1.30-1.36 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1135 | 1.35-1.41 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1140 | 1.40-1.46 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1145 | 1.45-1.51 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1150 | 1.50-1.56 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1155 | 1.55-1.61 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1160 | 1.60-1.66 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1165 | 1.65-1.71 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1170 | 1.70-1.76 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1175 | 1.75-1.81 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1180 | 1.80-1.86 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1185 | 1.85-1.91 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1190 | 1.90-1.96 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1195 | 1.95-2.01 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1200 | 2.00-2.06 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1205 | 2.05-2.11 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1210 | 2.10-2.16 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1215 | 2.15-2.21 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1220 | 2.20-2.26 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1225 | 2.25-2.31 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1230 | 2.30-2.36 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1235 | 2.35-2.41 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1240 | 2.40-2.46 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1245 | 2.45-2.51 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1250 | 2.50-2.56 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1255 | 2.55-2.61 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1260 | 2.60-2.66 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1265 | 2.65-2.71 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1270 | 2.70-2.76 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1275 | 2.75-2.81 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1280 | 2.80-2.86 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1285 | 2.85-2.91 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1290 | 2.90-2.96 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1295 | 2.95-3.01 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1300 | 3.00-3.06 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1305 | 3.05-3.11 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1310 | 3.10-3.16 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1315 | 3.15-3.21 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1320 | 3.20-3.26 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1325 | 3.25-3.31 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1330 | 3.30-3.36 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1335 | 3.35-3.41 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1340 | 3.40-3.46 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1345 | 3.45-3.51 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1350 | 3.50-3.56 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1355 | 3.55-3.61 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1360 | 3.60-3.66 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1365 | 3.65-3.71 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1370 | 3.70-3.76 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1375 | 3.75-3.81 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1380 | 3.80-3.86 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1385 | 3.85-3.91 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1390 | 3.90-3.96 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1395 | 3.95-4.01 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1400 | 4.00-4.06 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1405 | 4.05-4.11 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1410 | 4.10-4.16 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1415 | 4.15-4.21 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1420 | 4.20-4.26 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1425 | 4.25-4.31 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1430 | 4.30-4.36 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1435 | 4.35-4.41 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1440 | 4.40-4.46 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1445 | 4.45-4.51 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1450 | 4.50-4.56 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1455 | 4.55-4.61 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1460 | 4.60-4.66 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1465 | 4.65-4.71 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1470 | 4.70-4.76 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1475 | 4.75-4.81 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1480 | 4.80-4.86 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1485 | 4.85-4.91 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1490 | 4.90-4.96 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1495 | 4.95-5.01 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1500 | 5.00-5.06 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1505 | 5.05-5.11 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1510 | 5.10-5.16 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1515 | 5.15-5.21 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1520 | 5.20-5.26 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1525 | 5.25-5.31 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1530 | 5.30-5.36 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1535 | 5.35-5.41 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1540 | 5.40-5.46 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1545 | 5.45-5.51 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1550 | 5.50-5.56 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1555 | 5.55-5.61 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1560 | 5.60-5.66 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1565 | 5.65-5.71 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1570 | 5.70-5.76 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1575 | 5.75-5.81 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1580 | 5.80-5.86 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1585 | 5.85-5.91 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1590 | 5.90-5.96 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1595 | 5.95-6.01 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1600 | 6.00-6.06 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1605 | 6.05-6.11 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1610 | 6.10-6.16 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1615 | 6.15-6.21 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1620 | 6.20-6.26 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1625 | 6.25-6.31 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1630 | 6.30-6.36 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1635 | 6.35-6.41 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1640 | 6.40-6.46 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1645 | 6.45-6.51 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1650 | 6.50-6.56 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1655 | 6.55-6.61 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1660 | 6.60-6.66 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1665 | 6.65-6.71 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1670 | 6.70-6.76 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1675 | 6.75-6.81 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1680 | 6.80-6.86 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1685 | 6.85-6.91 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1690 | 6.90-6.96 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1695 | 6.95-7.01 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1700 | 7.00-7.06 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1705 | 7.05-7.11 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1710 | 7.10-7.16 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1715 | 7.15-7.21 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1720 | 7.20-7.26 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1725 | 7.25-7.31 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1730 | 7.30-7.36 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1735 | 7.35-7.41 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1740 | 7.40-7.46 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1745 | 7.45-7.51 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1750 | 7.50-7.56 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1755 | 7.55-7.61 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1760 | 7.60-7.66 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1765 | 7.65-7.71 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1770 | 7.70-7.76 | 0.30-0.60 | 0.015 | 0.005 | — |
| A292 | 1775 | 7.75-7.81 | 0.30-0.60 | | | |

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