

COPPER ALLOYS

| <u>UNS Number</u> | <u>Type</u> | <u>Cu</u> | <u>Pb</u> | <u>Fe</u> | <u>Sn</u> | <u>Zn</u> | <u>P</u> | <u>Mn</u> | <u>Si</u> | <u>Ni(Incl Co)</u> | <u>Other Elements</u> |
|--------------------------|--------------------|------------------|------------------|------------------|------------------|------------------|-----------------|------------------|------------------|---------------------------|------------------------------|
| C16200 | Cadmium Copper | Rem. | | 0.02 | | | | | | | 0.7-1.2 Cd |
| C18900 | High Copper Alloy | Rem. | 0.02 | | 0.6-0.9 | 0.100 | 0.05 | 0.1-0.3 | 0.15-0.40 | | Al 0.01 |

BRASSES

| | | | | | | | | | | | |
|--------|-------------------------|-----------|------|------|--|------|--|--|--|--|--|
| C22000 | Commercial Bronze, 90% | 89.0-91.0 | 0.05 | 0.05 | | Rem. | | | | | |
| C22600 | Jewelry Bronze, 87-1/2% | 86.0-89.0 | 0.05 | 0.05 | | Rem. | | | | | |
| C23000 | Red Brass, 85% | 84.0-86.0 | 0.05 | 0.05 | | Rem. | | | | | |
| C24000 | Low Brass, 80% | 78.5-81.5 | 0.05 | 0.05 | | Rem. | | | | | |
| C26000 | Cartridge Brass, 70% | 68.5-71.5 | 0.07 | 0.05 | | Rem. | | | | | |
| C27000 | Yellow Brass, 65% | 63.0-68.5 | 0.10 | 0.07 | | Rem. | | | | | |

COPPER-ZINC-TIN ALLOYS

| | | | | | | | | | | | |
|--------|-----------|-----------|------|------|---------|------|--|--|--|--|--|
| C41100 | Tin Brass | 89.0-92.0 | 0.10 | 0.05 | 0.3-0.7 | Rem. | | | | | |
| C43600 | Tin Brass | 80.0-83.0 | 0.05 | 0.05 | 0.2-0.5 | Rem. | | | | | |

PHOSPHOR BRONZES

| | | | | | | | | | | | |
|--------|----------------------|------|------|------|---------|-------|----------|--|--|--|--|
| C50700 | Phosphor Bronze | Rem. | 0.05 | 0.10 | 1.5-2.0 | | 0.03 | | | | |
| C50900 | Phosphor Bronze | Rem. | 0.05 | 0.10 | 2.5-3.8 | 0.300 | 0.03-.30 | | | | |
| C51000 | Phosphor bronze, 5%A | Rem. | 0.05 | 0.10 | 4.2-5.8 | 0.300 | 0.03-.35 | | | | |
| C52100 | Phosphor bronze, 8%C | Rem. | 0.05 | 0.10 | 7.0-9.0 | 0.200 | 0.03-.35 | | | | |

SILICON BRONZES

| | | | | | | | | | | | |
|--------|-----------------------|------|------|------|------|-------|--|----------|---------|-----|---------|
| C65100 | Low Silicon Bronze B | Rem. | 0.05 | 0.80 | | 1.500 | | 0.7 | 0.8-2.0 | | |
| C65500 | High Silicon Bronze A | Rem. | 0.05 | 0.80 | | 1.500 | | 0.50-1.3 | 2.8-3.8 | 0.6 | |
| C65600 | Silicon Bronze | Rem. | 0.02 | 0.50 | 1.50 | 1.500 | | 1.5 | 2.8-4.0 | | Al 0.01 |

COPPER-NICKEL ALLOYS

| | | | | | | | | | | | |
|--------|-------------------|------|------|------|--|-------|--|------|--|-----------|--|
| C71000 | Copper-Nickel 20% | Rem. | 0.05 | 1.00 | | 1.000 | | 1.00 | | 19.0-23.0 | |
|--------|-------------------|------|------|------|--|-------|--|------|--|-----------|--|

NICKEL-SILVER ALLOYS

| | | | | | | | | | | | |
|--------|----------------------|-----------|------|------|--|------|--|-----|--|-----------|--|
| C74500 | Nickel-Silver, 65-10 | 63.5-66.5 | 0.10 | 0.25 | | Rem. | | 0.5 | | 9.0-11.0 | |
| C75700 | Nickel-Silver, 65-12 | 63.5-66.5 | 0.05 | 0.25 | | Rem. | | 0.5 | | 11.0-13.0 | |

STAINLESS AND HEAT RESISTING STEELS

| <u>UNS Number</u> | <u>Type</u> | <u>C</u> | <u>Mn</u> | <u>P</u> | <u>S</u> | <u>Si</u> | <u>Cr</u> | <u>Ni</u> | <u>Mo</u> | <u>Other Elements</u> |
|--------------------------|--------------------|-----------------|------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------------------|
| S30200 | 302 | 0.15 | 2.00 | 0.045 | 0.03 | 1.000 | 17.00/19.00 | 8.00/10.00 | | |
| S30430 | 302HQ | 0.08 | 2.00 | 0.045 | 0.03 | 1.000 | 17.00-19.00 | 8.00-10.00 | | Cu 3.00-4.00 |
| S30300 | 303 | 0.15 | 2.00 | 0.20 | 0.15 min | 1.000 | 17.00/19.00 | 8.00/10.00 | 0.06 | |
| S30400 | 304 | 0.08 | 2.00 | 0.045 | 0.03 | 1.000 | 18.00/20.00 | 8.00/10.50 | | |
| S30403 | 304L | 0.03 | 2.00 | 0.045 | 0.03 | 1.000 | 18.00/20.00 | 8.00/10.50 | | |
| S30500 | 305 | 0.12 | 2.00 | 0.045 | 0.03 | 1.000 | 17.00/19.00 | 10.50/13.00 | | |
| S31000 | 310 | 0.25 | 2.00 | 0.045 | 0.03 | 1.500 | 24.00/26.00 | 19.00/22.00 | | |
| S31400 | 314 | 0.25 | 2.00 | 0.045 | 0.03 | 1.5/3.00 | 23.00/26.00 | 19.00/22.00 | | |
| S31600 | 316 | 0.08 | 2.00 | 0.045 | 0.03 | 1.000 | 16.00/18.00 | 10.00/14.00 | 2.00/3.00 | |
| S31603 | 316L | 0.03 | 2.00 | 0.045 | 0.03 | 1.000 | 16.00/18.00 | 10.00/14.00 | 2.00/3.00 | |
| S31703 | 317L | 0.03 | 2.00 | 0.045 | 0.03 | 1.000 | 18.00/20.00 | 11.00/15.00 | 3.00/4.00 | |
| S32100 | 321 | 0.08 | 2.00 | 0.045 | 0.03 | 1.000 | 17.00/19.00 | 9.00/12.00 | | Ti 5xC Min. |
| N08330 | 330 | 0.08 | 2.00 | 0.03 | 0.03 | 0.75-1.50 | 17.0-20.0 | 34.0-37.0 | | Cu 1.0; Sn 0.025; Fe 0.005 |
| S34700 | 347 | 0.08 | 2.00 | 0.045 | 0.03 | 1.000 | 17.00/19.00 | 9.00/13.00 | | Cb+Ta 10xC Min |
| S41000 | 410 | 0.15 | 1.00 | 0.04 | 0.03 | 1.000 | 11.50-13.50 | | | |
| S41003 | 410L | 0.03 | 1.50 | 0.04 | 0.03 | 1.000 | 10.5-12.5 | 1.5 | | |
| S43000 | 430 | 0.12 | 1.00 | 0.04 | 0.03 | 1.000 | 16.00-18.00 | | | |
| S43400 | 434 | 0.12 | 1.00 | 0.04 | 0.03 | 1.000 | 16.00-18.00 | | 0.75-1.25 | |

HIGH NICKEL ALLOYS

| <u>UNS Number</u> | <u>Type</u> | <u>Ni</u> | <u>C</u> | <u>Mn</u> | <u>Fe</u> | <u>Si</u> | <u>Cu</u> | <u>Cr</u> | <u>Al</u> | <u>Ti</u> | <u>Cb</u> | <u>Other Elements</u> |
|-------------------|--------------------|-------------|----------|-----------|-----------|-----------|-----------|-------------|-----------|-----------|-----------|--|
| K93601 | Invar®, Alloy 36 | 35.00/37.00 | 0.10 | 0.50 | Rem. | 0.45 | | 0.50 | | | | P .025, S .025, Mo 0.50, Co 0.50 |
| N02200 | Nickel 200 | 99.00 | 0.15 | 0.35 | 0.40 | 0.350 | 0.25 | | | | | S 0.01 |
| N02201 | Nickel 201 | 99.00 | 0.02 | 0.35 | 0.40 | 0.350 | 0.25 | | | | | S 0.01 |
| N04400 | Monel 400 | 63.0-67.0 | 0.30 | 2.00 | 2.50 | 0.500 | Rem. | | | | | S 0.024 |
| N06003 | Nichrome®, 80/20 C | Rem. | 0.15 | 2.50 | 1.00 | 0.75/1.6 | | 19.00/21.00 | | | | S 0.01 |
| N06004 | Nichrome®, 60/15 B | 57 Min | 0.15 | 1.00 | Rem. | 0.75/1.6 | | 14.0/18.0 | | | | S 0.01 max |
| N06600 | Inconel® 600 R | 72.00 | 0.15 | 1.00 | 6.0-10.0 | 0.500 | 0.5 | 14.0-17.0 | | | | S 0.015 |
| N06601 | Inconel® 601 | 58.00-63.0 | 0.10 | 1.00 | Rem. | 0.500 | 1.0 | 21.0-25.0 | 1.0-1.7 | | | S 0.015 |
| N06625 | Inconel® 625 | Rem. | 0.10 | 0.50 | 5.00 | 0.015 | | 20.0-23.0 | 0.4 | 0.4 | 3.15-4.15 | S 0.015; Mo 8.0-10.0; P 0.015 |
| N08800 | Incoloy® 800 | 30.0-35.0 | 0.10 | 1.50 | Rem. | 1.000 | 0.75 | 19.0-23.0 | 0.15-0.60 | | | S 0.015 |
| N10276 | Hastelloy® C276 | Rem. | 0.02 | 1.00 | 4.00/7.00 | 0.080 | | 14.50/16.50 | | | | Mo 15.00/17.00, W 3.0/4.5, Co 2.5, V 0.35, P 0.03; S 0.03 |

B 316/B 316M – 02

TABLE 1 Chemical Composition Limits A,B,C

| <u>Alloy</u> | <u>Silicon</u> | <u>Iron</u> | <u>Copper</u> | <u>Manganese</u> | <u>Magnesium</u> | <u>Chromium</u> | <u>Zinc</u> | <u>Titanium</u> | <u>Other Elements D</u> | | <u>Aluminum</u> |
|--------------|----------------|-------------|---------------|------------------|------------------|-----------------|-------------|-----------------|-------------------------|----------------|-----------------|
| | | | | | | | | | <u>Each</u> | <u>Total E</u> | |
| 1100 | 0.95 Si + Fe | | 0.05-0.20 | 0.05 | ... | ... | 0.10 | ... | 0.05 | 0.15 | 99.00 min F |
| 2017 | 0.20-0.8 | 0.7 | 3.5-4.5 | 0.40-1.0 | 0.40-0.8 | 0.10 | 0.25 | 0.15 | 0.05 | 0.15 | remainder |
| 2024 | 0.50 | 0.50 | 3.8-4.9 | 0.30-0.9 | 1.2-1.8 | 0.10 | 0.25 | 0.15 | 0.05 | 0.15 | remainder |
| 2117 | 0.8 | 0.7 | 2.2-3.0 | 0.20 | 0.20-0.50 | 0.10 | 0.25 | ... | 0.05 | 0.15 | remainder |
| 2219 | 0.20 | 0.30 | 5.8-6.8 | 0.20-0.40 | 0.02 | ... | 0.10 | 0.02-0.10 | 0.05G | 0.15G | remainder |
| 3003 | 0.6 | 0.7 | 0.05-0.20 | 1.0-1.5 | ... | ... | 0.10 | ... | 0.05 | 0.15 | remainder |
| 5005 | 0.30 | 0.7 | 0.20 | 0.20 | 0.50-1.1 | 0.10 | 0.25 | ... | 0.05 | 0.15 | remainder |
| 5052 | 0.25 | 0.40 | 0.10 | 0.10 | 2.2-2.8 | 0.15-0.35 | 0.10 | ... | 0.05 | 0.15 | remainder |
| 5056 | 0.30 | 0.40 | 0.10 | 0.05-0.20 | 4.5-5.6 | 0.05-0.20 | 0.10 | ... | 0.05 | 0.15 | remainder |
| 6053 | H | 0.35 | 0.10 | ... | 1.1-1.4 | 0.15-0.35 | 0.10 | ... | 0.05 | 0.15 | remainder |
| 6061 | 0.40-0.8 | 0.7 | 0.15-0.40 | 0.15 | 0.8-1.2 | 0.04-0.35 | 0.25 | 0.15 | 0.05 | 0.15 | remainder |
| 7050 | 0.12 | 0.15 | 2.0-2.6 | 0.10 | 1.9-2.6 | 0.04 | 5.7-6.7 | 0.06 | 0.05' | 0.15' | remainder |
| 7075 | 0.40 | 0.50 | 1.2-2.0 | 0.30 | 2.1-2.9 | 0.18-0.28 | 5.1-6.1 | 0.20 | 0.05 | 0.15 | remainder |
| 7178 | 0.40 | 0.50 | 1.6-2.4 | 0.30 | 2.4-3.1 | 0.18-0.28 | 6.3-7.3 | 0.20 | 0.05 | 0.15 | remainder |

