

Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures

Chemical Composition of Austenitic Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures

| Standard Designation | Grade, Class, Type, Symbol or Name | Steel Number | UNS Number | Weight, %, max, Unless Otherwise Specified | | | | | | | | |
|---------------------------|------------------------------------|--------------|------------|--|------|------|-------|-------|-------------|------------|-----|--------|
| | | | | C | Mn | Si | P | S | Cr | Ni | Mo | Others |
| ASTM A 213/A 213M-03a | TP304 | --- | S30400 | 0.08 | 2.00 | 0.75 | 0.040 | 0.030 | 18.0-20.0 | 8.00-11.0 | --- | --- |
| ASTM A 249/A 249M-03 | TP304 | --- | S30400 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 8.0-11.0 | --- | --- |
| ASTM A 312/A 312M-03 | TP304 | --- | S30400 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 8.0-11.0 | --- | --- |
| ASTM A 358/A 358M-01 | 304 | --- | S30400 | 0.08 | 2.00 | 0.75 | 0.045 | 0.030 | 18.0-20.0 | 8.0-10.5 | --- | N 0.10 |
| ASTM A 376/A 376M-02a | TP304 | --- | --- | 0.08 | 2.00 | 0.75 | 0.045 | 0.030 | 18.0-20.0 | 8.00-11.0 | --- | --- |
| ASTM A 409/A 409M-01 | TP304 | --- | S30400 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 8.00-11.0 | --- | --- |
| ASTM A 688/A 688M-03 | TP304 | --- | S30400 | 0.08 | 2.00 | 0.75 | 0.040 | 0.030 | 18.00-20.00 | 8.00-11.00 | --- | --- |
| JIS G 3459:1997 | SUS304TP | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 18.00-20.00 | 8.00-11.00 | --- | --- |
| JIS G 3463:1994 | SUS304TB | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 18.00-20.00 | 8.00-11.00 | --- | --- |
| JIS G 3467:1988 | SUS 304 TF | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 18.00-20.00 | 8.00-11.00 | --- | --- |
| JIS G 3468:1994 | SUS304 | --- | --- | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 18.00-20.00 | 8.00-10.50 | --- | --- |
| BS 3605-1:1991 AMD 2:1997 | 304S31 | --- | --- | 0.070 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 8.00-11.00 | --- | --- |
| BS 3605-2:1992 AMD 1:1997 | 304S31 | --- | --- | 0.070 | 2.00 | 1.00 | 0.04 | 0.03 | 17.00-19.00 | 8.00-11.00 | --- | --- |
| DIN 17457:1985 | X 5 CrNi 18 10 | 1.4301 | --- | 0.07 | --- | --- | --- | --- | 17.0-19.0 | 8.5-10.5 | --- | --- |
| DIN 17458:1985 | X 5 CrNi 18 10 | 1.4301 | --- | 0.07 | --- | --- | --- | --- | 17.0-19.0 | 8.5-10.5 | --- | --- |
| DIN 28180:1985 | X 5 CrNi 18 10 | 1.4301 | --- | 0.07 | --- | --- | --- | --- | 17.0-19.0 | 8.5-10.5 | --- | --- |
| DIN 28181:1985 | X 5 CrNi 18 10 | 1.4301 | --- | 0.07 | --- | --- | --- | --- | 17.0-19.0 | 8.5-10.5 | --- | --- |
| AFNOR NF A 49-217:1987 | TU Z 6 CN 18 09 | --- | --- | 0.080 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-20.00 | 8.00-11.00 | --- | --- |
| AFNOR NF A 49-244:1993 | X7CrNi18-9 | --- | --- | 0.070 | 2.00 | 0.75 | 0.040 | 0.015 | 17.0-19.0 | 8.0-10.0 | --- | --- |
| AFNOR NF A 49-247:1981 | TS Z 6 CN 18-09 | --- | --- | 0.080 | 2.00 | 1.00 | 0.040 | 0.030 | 17-20.0 | 8-11.00 | --- | --- |
| ISO 2604-II:1975 | TS 47 | --- | --- | 0.07 | 2.00 | 1.00 | 0.045 | 0.030 | 17.00-19.00 | 8.00-12.00 | --- | --- |
| ISO 2604-V:1978 | TW 47 | --- | --- | 0.07 | 2.00 | 1.00 | 0.045 | 0.030 | 17.00-19.00 | 8.00-11.00 | --- | --- |



Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures

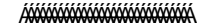
Chemical Composition of Austenitic Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures (Continued)

| Standard Designation | Grade, Class, Type, Symbol or Name | Steel Number | UNS Number | Weight, %, max, Unless Otherwise Specified | | | | | | | | |
|---------------------------|------------------------------------|--------------|------------|--|------|------|-------|-------|-------------|------------|-----|-------------|
| | | | | C | Mn | Si | P | S | Cr | Ni | Mo | Others |
| ASTM A 213/A 213M-03a | TP304L | --- | S30403 | 0.035 | 2.00 | 0.75 | 0.040 | 0.030 | 18.0-20.0 | 8.00-13.0 | --- | --- |
| ASTM A 249/A 249M-03 | TP304L | --- | S30403 | 0.035 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 8.0-13.0 | --- | --- |
| ASTM A 312/A 312M-03 | TP304L | --- | S30403 | 0.035 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 8.00-13.0 | --- | --- |
| ASTM A 358/A 358M-01 | 304L | --- | S30403 | 0.030 | 2.00 | 0.75 | 0.045 | 0.030 | 18.0-20.0 | 8.0-12.0 | --- | N 0.10 |
| ASTM A 409/A 409M-01 | TP304L | --- | S30403 | 0.035 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 8.00-12.0 | --- | --- |
| ASTM A 688/A 688M-03 | TP304L | --- | S30403 | 0.035 | 2.00 | 0.75 | 0.040 | 0.030 | 18.00-20.00 | 8.00-13.00 | --- | --- |
| JIS G 3459:1997 | SUS304LTP | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 18.00-20.00 | 9.00-13.00 | --- | --- |
| JIS G 3463:1994 | SUS304LTB | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 18.00-20.00 | 9.00-13.00 | --- | --- |
| JIS G 3468:1994 | SUS304L | --- | --- | 0.030 | 2.00 | 1.00 | 0.045 | 0.030 | 18.00-20.00 | 9.00-13.00 | --- | --- |
| BS 3605-1:1991 AMD 2:1997 | 304S11 | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 9.00-12.00 | --- | --- |
| BS 3605-2:1992 AMD 1:1997 | 304S11 | --- | --- | 0.030 | 2.00 | 1.00 | 0.04 | 0.03 | 17.00-19.00 | 9.00-12.00 | --- | --- |
| DIN 17457:1985 | X 2 CrNi 19 11 | 1.4306 | --- | 0.030 | --- | --- | --- | --- | 18.0-20.0 | 10.0-12.5 | --- | --- |
| DIN 17458:1985 | X 2 CrNi 19 11 | 1.4306 | --- | 0.030 | --- | --- | --- | --- | 18.0-20.0 | 10.0-12.5 | --- | --- |
| AFNOR NF A 49-217:1987 | TU Z 2 CN 18 10 | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-20.00 | 9.00-12.00 | --- | --- |
| AFNOR NF A 49-244:1993 | X3CrNi18-10 | --- | --- | 0.030 | 2.00 | 0.75 | 0.040 | 0.015 | 17.0-19.0 | 9.0-11.0 | --- | --- |
| AFNOR NF A 49-247:1981 | TS Z 2 CN 18-10 | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 17-20.0 | 9-12.00 | --- | --- |
| ISO 2604-II:1975 | TS 46 | --- | --- | 0.03 | 2.00 | 1.00 | 0.045 | 0.030 | 17.00-19.00 | 9.00-13.00 | --- | --- |
| ISO 2604-V:1978 | TW 46 | --- | --- | 0.03 | 2.00 | 1.00 | 0.045 | 0.030 | 17.00-19.00 | 9.00-12.00 | --- | --- |
| ASTM A 213/A 213M-03a | TP304LN | --- | S30453 | 0.035 | 2.00 | 0.75 | 0.040 | 0.030 | 18.0-20.0 | 8.00-11.0 | --- | N 0.10-0.16 |
| ASTM A 249/A 249M-03 | TP304LN | --- | S30453 | 0.030 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0 | 20.0 | --- | N 0.10-0.16 |
| ASTM A 376/A 376M-02a | TP304LN | --- | --- | 0.035 | 2.00 | 0.75 | 0.045 | 0.030 | 18.0-20.0 | 8.00-11.0 | --- | N 0.10-0.16 |
| ASTM A 688/A 688M-03 | TP304LN | --- | S30453 | 0.035 | 2.00 | 0.75 | 0.040 | 0.030 | 18.00-20.00 | 8.00-13.00 | --- | N 0.10-0.16 |
| DIN 17457:1985 | X 2 CrNiN 18 10 | 1.4311 | --- | 0.030 | --- | --- | --- | --- | 17.0-19.0 | 8.5-11.5 | --- | N 0.12-0.22 |
| DIN 17458:1985 | X 2 CrNiN 18 10 | 1.4311 | --- | 0.030 | --- | --- | --- | --- | 17.0-19.0 | 8.5-11.5 | --- | N 0.12-0.22 |
| AFNOR NF A 49-217:1987 | TU Z 2 CN 18 10 AZ | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 9.00-11.00 | --- | N 0.10-0.20 |
| AFNOR NF A 49-244:1993 | X3CrNiN18-10 | --- | --- | 0.030 | 2.00 | 0.75 | 0.040 | 0.015 | 17.0-19.0 | 9.0-11.0 | --- | N 0.12-0.20 |
| | X6CrNiN19-9 | --- | --- | 0.030 | 2.0 | 0.75 | 0.040 | 0.015 | 18.0-20.0 | 8.0-11.0 | --- | N 0.12-0.20 |

Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures

Chemical Composition of Austenitic Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures (Continued)

| Standard Designation | Grade, Class, Type, Symbol or Name | Steel Number | UNS Number | Weight, %, max, Unless Otherwise Specified | | | | | | | | |
|---------------------------|------------------------------------|--------------|------------|--|------|-----------|-------|-------|-------------|-------------|------|--------|
| | | | | C | Mn | Si | P | S | Cr | Ni | Mo | Others |
| ASTM A 213/A 213M-03a | TP304H | --- | S30409 | 0.04-0.10 | 2.00 | 0.75 | 0.040 | 0.030 | 18.0-20.0 | 8.00-11.0 | --- | --- |
| ASTM A 249/A 249M-03 | TP304H | --- | S30409 | 0.04-0.10 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 8.0-11.0 | --- | --- |
| ASTM A 312/A 312M-03 | TP304H | --- | S30409 | 0.04-0.10 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 8.0-11.0 | --- | --- |
| ASTM A 358/A 358M-01 | 304H | --- | S30409 | 0.04-0.10 | 2.00 | 0.75 | 0.045 | 0.030 | 18.0-20.0 | 8.0-10.5 | --- | --- |
| ASTM A 376/A 376M-02a | TP304H | --- | S30409 | 0.04-0.10 | 2.00 | 0.75 | 0.045 | 0.030 | 18.0-20.0 | 8.00-11.0 | --- | --- |
| JIS G 3459:1997 | SUS304HTP | --- | --- | 0.04-0.10 | 2.00 | 0.75 | 0.040 | 0.030 | 18.00-20.00 | 8.00-11.00 | --- | --- |
| JIS G 3463:1994 | SUS304HTB | --- | --- | 0.04-0.10 | 2.00 | 0.75 | 0.040 | 0.030 | 18.00-20.00 | 8.00-11.00 | --- | --- |
| JIS G 3467:1988 | SUS 304H TF | --- | --- | 0.04-0.10 | 2.00 | 0.75 | 0.040 | 0.030 | 18.00-20.00 | 8.00-11.00 | --- | --- |
| BS 3605-1:1991 AMD 2:1997 | 304S51 | --- | --- | 0.04-0.10 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 8.00-11.00 | --- | --- |
| DIN 17459:1992 | X 6 CrNi 18 11 | 1.4948 | --- | 0.04-0.08 | 2.0 | 0.75 | 0.035 | 0.015 | 17.0-19.0 | 10.0-12.0 | --- | --- |
| AFNOR NF A 49-214:1978 | Z 6 CN 19-10 | --- | --- | 0.04-0.08 | 2.0 | 1.0 | 0.035 | 0.030 | 18-20 | 8-11 | --- | --- |
| ISO 2604-II:1975 | TS 48 | --- | --- | 0.04-0.09 | 2.00 | 0.75 | 0.045 | 0.030 | 17.00-20.00 | 8.00-12.00 | --- | --- |
| ASTM A 249/A 249M-03 | --- | --- | S30615 | 0.16-0.24 | 2.00 | 3.2-4.0 | 0.030 | 0.030 | 17.0-19.5 | 13.5-16.0 | --- | --- |
| AFNOR NF A 49-217:1987 | TU Z 1 CNS 18 15 | --- | --- | 0.015 | 2.00 | 3.50-4.50 | 0.030 | 0.020 | 16.50-18.50 | 13.80-16.00 | 0.50 | --- |
| ASTM A 213/A 213M-03a | TP309S | --- | S30908 | 0.08 | 2.00 | 0.75 | 0.045 | 0.030 | 24.0-26.0 | 12.00-15.00 | 0.75 | --- |
| ASTM A 249/A 249M-03 | TP309S | --- | S30908 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 22.0-24.0 | 12.0-15.0 | --- | --- |
| ASTM A 312/A 312M-03 | TP309S | --- | S30908 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 22.0-24.0 | 12.0-15.0 | 0.75 | --- |
| ASTM A 358/A 358M-01 | 309S | --- | S30908 | 0.08 | 2.00 | 0.75 | 0.045 | 0.030 | 22.0-24.0 | 12.0-15.0 | --- | --- |
| JIS G 3459:1997 | SUS309STP | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 22.00-24.00 | 12.00-15.00 | --- | --- |
| JIS G 3463:1994 | SUS309STB | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 22.00-24.00 | 12.00-15.00 | --- | --- |
| JIS G 3468:1994 | SUS309S | --- | --- | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 22.00-24.00 | 12.00-15.00 | --- | --- |
| ASTM A 213/A 213M-03a | TP309H | --- | S30909 | 0.04-0.10 | 2.00 | 0.75 | 0.045 | 0.030 | 22.00-24.00 | 12.00-15.00 | 0.75 | --- |
| ASTM A 249/A 249M-03 | TP309H | --- | S30909 | 0.04-0.10 | 2.00 | 1.00 | 0.045 | 0.030 | 22.0-24.0 | 12.0-15.0 | --- | --- |
| JIS G 3459:1997 | SUS309TP | --- | --- | 0.15 | 2.00 | 1.00 | 0.040 | 0.030 | 22.00-24.00 | 12.00-15.00 | --- | --- |
| JIS G 3463:1994 | SUS309TB | --- | --- | 0.15 | 2.00 | 1.00 | 0.040 | 0.030 | 22.00-24.00 | 12.00-15.00 | --- | --- |
| AFNOR NF A 49-244:1993 | X15CrNi24-13 | --- | --- | 0.15 | 2.00 | 0.75 | 0.035 | 0.015 | 22.0-24.0 | 12.0-14.0 | --- | --- |
| ASTM A 213/A 213M-03a | TP310S | --- | S31008 | 0.08 | 2.00 | 0.75 | 0.045 | 0.030 | 24.00-26.00 | 19.00-22.00 | 0.75 | --- |
| ASTM A 249/A 249M-03 | TP310S | --- | S31008 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 24.0-26.0 | 19.0-22.0 | --- | --- |
| ASTM A 312/A 312M-03 | TP310S | --- | S31008 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 24.0-26.0 | 19.0-22.0 | 0.75 | --- |
| ASTM A 358/A 358M-01 | 310S | --- | S31008 | 0.08 | 2.00 | 1.50 | 0.045 | 0.030 | 24.0-26.0 | 19.0-22.0 | --- | --- |
| JIS G 3459:1997 | SUS310STP | --- | --- | 0.08 | 2.00 | 1.50 | 0.040 | 0.030 | 24.00-26.00 | 19.00-22.00 | --- | --- |
| JIS G 3463:1994 | SUS310STB | --- | --- | 0.08 | 2.00 | 1.50 | 0.040 | 0.030 | 24.00-26.00 | 19.00-22.00 | --- | --- |
| JIS G 3468:1994 | SUS310S | --- | --- | 0.08 | 2.00 | 1.50 | 0.045 | 0.030 | 24.00-26.00 | 19.00-22.00 | --- | --- |



Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures

Chemical Composition of Austenitic Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures (Continued)

| Standard Designation | Grade, Class, Type, Symbol or Name | Steel Number | UNS Number | Weight, %, max, Unless Otherwise Specified | | | | | | | | |
|---------------------------|------------------------------------|--------------|------------|--|-----------|------|-------|-------|-------------|-------------|-----------|---------------------------|
| | | | | C | Mn | Si | P | S | Cr | Ni | Mo | Others |
| ASTM A 213/A 213M-03a | TP310H | --- | S31009 | 0.04-0.10 | 2.00 | 0.75 | 0.040 | 0.030 | 24.00-26.00 | 19.0-22.00 | --- | --- |
| AFNOR NF A 49-244:1993 | X1CrNi25-20 | --- | --- | 0.015 | 2.00 | 0.40 | 0.025 | 0.010 | 24.0-26.0 | 19.0-22.0 | 0.5 | --- |
| JIS G 3463:1994 | SUS310TB | --- | --- | 0.15 | 2.00 | 1.50 | 0.040 | 0.030 | 24.00-26.00 | 19.00-22.00 | --- | --- |
| JIS G 3467:1988 | SUS310TF | --- | --- | 0.15 | 2.00 | 1.50 | 0.040 | 0.030 | 24.00-26.00 | 19.00-22.00 | --- | --- |
| ISO 2604-II:1975 | TS 68 | --- | --- | 0.15 | 2.00 | 0.75 | 0.045 | 0.030 | 24.00-26.00 | 19.00-22.00 | --- | --- |
| ASTM A 249/A 249M-03 | --- | --- | S31050 | 0.030 | 2.00 | 0.40 | 0.030 | 0.015 | 24.0-26.0 | 21.0-23.0 | 2.00-3.00 | 0.10-0.16 |
| AFNOR NF A 49-217:1987 | TU Z 1 CND 25 22 AZ | --- | --- | 0.020 | 1.50-2.00 | 0.40 | 0.020 | 0.015 | 24.50-26.00 | 21.50-23.00 | 1.90-2.40 | N 0.10-0.15 |
| ASTM A 249/A 249M-03 | --- | --- | S31254 | 0.020 | 1.00 | 0.80 | 0.030 | 0.010 | 19.5-20.5 | 17.5-18.5 | 6.0-6.5 | N 0.18-0.25; Cu 0.50-1.00 |
| ASTM A 688/A 688M-03 | --- | --- | S31254 | 0.020 | 1.00 | 0.80 | 0.030 | 0.010 | 19.5-20.5 | 17.5-18.5 | 6.0-6.5 | N 0.18-0.22; Cu 0.50-1.00 |
| AFNOR NF A 49-217:1987 | TU Z 1 CNDU 20 18 06 AZ | --- | --- | 0.020 | 1.00 | 0.80 | 0.030 | 0.010 | 19.50-20.50 | 17.50-18.50 | 6.00-6.50 | Cu 0.50-1.00 |
| ASTM A 213/A 213M-03a | TP316 | --- | S31600 | 0.08 | 2.00 | 0.75 | 0.040 | 0.030 | 16.0-18.0 | 11.0-14.0 | 2.00-3.00 | --- |
| ASTM A 249/A 249M-03 | TP316 | --- | S31600 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 16.0-18.0 | 10.0-14.0 | 2.00-3.00 | --- |
| ASTM A 312/A 312M-03 | TP316 | --- | S31600 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 16.0-18.0 | 11.0-14.0 | 2.00-3.00 | --- |
| ASTM A 358/A 358M-01 | 316 | --- | S31600 | 0.08 | 2.00 | 0.75 | 0.045 | 0.030 | 16.0-18.0 | 10.0-14.0 | 2.00-3.00 | N 0.10 |
| ASTM A 376/A 376M-02a | TP316 | --- | --- | 0.08 | 2.00 | 0.75 | 0.045 | 0.030 | 16.0-18.0 | 11.0-14.0 | 2.00-3.00 | --- |
| ASTM A 409/A 409M-01 | TP316 | --- | S31600 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 16.0-18.0 | 10.0-14.0 | 2.00-3.00 | --- |
| ASTM A 688/A 688M-03 | TP316 | --- | S31600 | 0.08 | 2.00 | 0.75 | 0.040 | 0.030 | 16.00-18.00 | 10.00-14.00 | 2.00-3.00 | --- |
| JIS G 3459:1997 | SUS316TP | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 16.00-18.00 | 10.00-14.00 | 2.00-3.00 | --- |
| JIS G 3463:1994 | SUS316TB | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 16.00-18.00 | 10.00-14.00 | 2.00-3.00 | --- |
| JIS G 3467:1988 | SUS 316 TF | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 16.00-18.00 | 10.00-14.00 | 2.00-3.00 | --- |
| JIS G 3468:1994 | SUS316 | --- | --- | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 16.00-18.00 | 10.00-14.00 | 2.00-3.00 | --- |
| BS 3605-1:1991 AMD 2:1997 | 316S31 | --- | --- | 0.070 | 2.00 | 1.00 | 0.040 | 0.030 | 16.50-18.50 | 10.50-13.50 | 2.00-2.50 | --- |
| | 316S33 | --- | --- | 0.070 | 2.00 | 1.00 | 0.040 | 0.030 | 16.50-18.50 | 11.00-14.00 | 2.50-3.00 | --- |
| BS 3605-2:1992 AMD 1:1997 | 316S31 | --- | --- | 0.070 | 2.00 | 1.00 | 0.04 | 0.03 | 16.50-18.50 | 10.50-13.50 | 2.00-2.50 | --- |
| | 316S33 | --- | --- | 0.070 | 2.00 | 1.00 | 0.04 | 0.03 | 16.50-18.50 | 11.00-14.00 | 2.50-3.00 | --- |
| DIN 17457:1985 | X 5 CrNiMo 17 12 2 | 1.4401 | --- | 0.07 | --- | --- | --- | --- | 16.5-18.5 | 10.5-13.5 | 2.0-2.5 | --- |
| DIN 17458:1985 | X 5 CrNiMo 17 12 2 | 1.4401 | --- | 0.07 | --- | --- | --- | --- | 16.5-18.5 | 10.5-13.5 | 2.0-2.5 | --- |
| DIN 17457:1985 | X 5 CrNiMo 17 13 3 | 1.4436 | --- | 0.07 | --- | --- | --- | 0.025 | 16.5-18.5 | 11.0-14.0 | 2.5-3.0 | --- |
| DIN 17458:1985 | X 5 CrNiMo 17 13 3 | 1.4436 | --- | 0.07 | --- | --- | --- | 0.025 | 16.5-18.5 | 11.0-14.0 | 2.5-3.0 | --- |
| DIN 28180:1985 | X 5 CrNiMo 17 12 2 | 1.4401 | --- | 0.07 | --- | --- | --- | --- | 16.5-18.5 | 10.5-13.5 | 2.0-2.5 | --- |
| DIN 28181:1985 | X 5 CrNiMo 17 12 2 | 1.4401 | --- | 0.07 | --- | --- | --- | --- | 16.5-18.5 | 10.5-13.5 | 2.0-2.5 | --- |
| AFNOR NF A 49-217:1987 | TU Z 6 CND 17 11 | --- | --- | 0.070 | 2.00 | 1.00 | 0.040 | 0.030 | 16.00-18.00 | 10.00-12.50 | 2.00-2.40 | --- |
| AFNOR NF A 49-244:1993 | X7CrNiMo17-11-2 | --- | --- | 0.070 | 2.00 | 0.75 | 0.040 | 0.015 | 16.0-18.0 | 10.0-12.0 | 2.00-2.50 | --- |
| AFNOR NF A 49-247:1981 | TS Z 6 CND 17-11 | --- | --- | 0.070 | 2.00 | 1.00 | 0.040 | 0.030 | 16-18.0 | 10-12.50 | 2.00-2.40 | --- |

Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures

Chemical Composition of Austenitic Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures (Continued)

| Standard Designation | Grade, Class, Type, Symbol or Name | Steel Number | UNS Number | Weight, %, max, Unless Otherwise Specified | | | | | | | | |
|---------------------------|------------------------------------|--------------|------------|--|------|------|-------|-------|-------------|-------------|-----------|--------|
| | | | | C | Mn | Si | P | S | Cr | Ni | Mo | Others |
| ISO 2604-II:1975 | TS 60 | --- | --- | 0.07 | 2.00 | 1.00 | 0.045 | 0.030 | 16.00-18.50 | 11.00-14.00 | 2.00-2.50 | --- |
| | TS 61 | --- | --- | 0.07 | 2.00 | 1.00 | 0.045 | 0.030 | 16.00-18.50 | 11.00-14.50 | 2.50-3.00 | --- |
| ISO 2604-V:1978 | TW 60 | --- | --- | 0.07 | 2.00 | 1.00 | 0.045 | 0.030 | 16.00-18.50 | 10.50-14.00 | 2.00-2.50 | --- |
| | TW 61 | --- | --- | 0.07 | 2.00 | 1.00 | 0.045 | 0.030 | 16.00-18.50 | 11.00-14.50 | 2.50-3.00 | --- |
| ASTM A 213/A 213M-03a | TP316L | --- | S31603 | 0.035 | 2.00 | 0.75 | 0.040 | 0.030 | 16.0-18.0 | 10.0-15.0 | 2.00-3.00 | --- |
| ASTM A 249/A 249M-03 | TP316L | --- | S31603 | 0.030 | 2.00 | 1.00 | 0.045 | 0.030 | 16.0-18.0 | 10.0-14.0 | 2.00-3.00 | --- |
| ASTM A 312/A 312M-03 | TP316L | --- | S31603 | 0.035 | 2.00 | 1.00 | 0.045 | 0.030 | 16.0-18.0 | 10.0-14.0 | 2.00-3.00 | --- |
| ASTM A 358/A 358M-01 | 316L | --- | S31603 | 0.030 | 2.00 | 0.75 | 0.045 | 0.030 | 16.0-18.0 | 10.0-14.0 | 2.00-3.00 | N 0.10 |
| ASTM A 409/A 409M-01 | TP316L | --- | S31603 | 0.035 | 2.00 | 1.00 | 0.045 | 0.030 | 16.0-18.0 | 10.0-14.0 | 2.00-3.00 | --- |
| ASTM A 688/A 688M-03 | TP316L | --- | S31603 | 0.035 | 2.00 | 0.75 | 0.040 | 0.030 | 16.00-18.00 | 10.00-15.00 | 2.00-3.00 | --- |
| JIS G 3459:1997 | SUS316LTP | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 16.00-18.00 | 12.00-16.00 | 2.00-3.00 | --- |
| JIS G 3463:1994 | SUS316LTB | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 16.00-18.00 | 12.00-16.00 | 2.00-3.00 | --- |
| JIS G 3468:1994 | SUS316L | --- | --- | 0.030 | 2.00 | 1.00 | 0.045 | 0.030 | 16.00-18.00 | 12.00-15.00 | 2.00-3.00 | --- |
| BS 3605-1:1991 AMD 2:1997 | 316S11 | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 16.50-18.50 | 11.00-14.00 | 2.00-2.50 | --- |
| | 316S13 | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 16.50-18.50 | 11.50-14.50 | 2.50-3.00 | --- |
| BS 3605-2:1992 AMD 1:1997 | 316S11 | --- | --- | 0.030 | 2.00 | 1.00 | 0.04 | 0.03 | 16.50-18.50 | 11.00-14.00 | 2.00-2.50 | --- |
| | 316S13 | --- | --- | 0.030 | 2.00 | 1.00 | 0.04 | 0.03 | 16.50-18.50 | 11.50-14.50 | 2.50-3.00 | --- |
| DIN 17457:1985 | X 2 CrNiMo 17 13 2 | 1.4404 | --- | 0.030 | --- | --- | --- | --- | 16.5-18.5 | 11.0-14.0 | 2.0-2.5 | --- |
| DIN 17458:1985 | X 2 CrNiMo 17 13 2 | 1.4404 | --- | 0.030 | --- | --- | --- | --- | 16.5-18.5 | 11.0-14.0 | 2.0-2.5 | --- |
| DIN 17457:1985 | X 2 CrNiMo 18 14 3 | 1.4435 | --- | 0.030 | --- | --- | --- | 0.025 | 17.0-18.5 | 12.5-15.0 | 2.5-3.0 | --- |
| DIN 17458:1985 | X 2 CrNiMo 18 14 3 | 1.4435 | --- | 0.030 | --- | --- | --- | 0.025 | 17.0-18.5 | 12.5-15.0 | 2.5-3.0 | --- |
| AFNOR NF A 49-217:1987 | TU Z 2 CND 17 12 | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 16.00-18.00 | 10.50-13.00 | 2.00-2.40 | --- |
| AFNOR NF A 49-244:1993 | X3CrNiMo17-11-2 | --- | --- | 0.030 | 2.00 | 0.75 | 0.040 | 0.015 | 16.0-18.0 | 10.0-12.0 | 2.00-2.50 | --- |
| | X3CrNiMo17-12-3 | --- | --- | 0.030 | 2.00 | 0.75 | 0.040 | 0.015 | 16.5-18.5 | 11.0-13.0 | 2.5-3.00 | --- |
| | X3CrNiMo18-12-3 | --- | --- | 0.030 | 2.00 | 0.75 | 0.040 | 0.015 | 16.5-18.5 | 11.0-13.0 | 2.25-2.75 | --- |
| | TU Z 2 CND 18 14 | --- | --- | 0.030 | 2.00 | 1.00 | 0.020 | 0.015 | 17.00-18.50 | 13.00-16.00 | 2.20-3.00 | --- |
| AFNOR NF A 49-247:1981 | TS Z 2 CND 17-12 | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 16-18.0 | 10.5-13.00 | 2.00-2.40 | --- |
| ISO 2604-II:1975 | TS 57 | --- | --- | 0.03 | 2.00 | 1.00 | 0.045 | 0.030 | 16.00-18.50 | 11.00-14.00 | 2.00-2.50 | --- |
| | TS 58 | --- | --- | 0.03 | 2.00 | 1.00 | 0.045 | 0.030 | 16.00-18.50 | 11.50-14.50 | 2.50-3.00 | --- |
| ISO 2604-V:1978 | TW 57 | --- | --- | 0.03 | 2.00 | 1.00 | 0.045 | 0.030 | 16.00-18.50 | 11.00-14.00 | 2.00-2.50 | --- |
| | TW 58 | --- | --- | 0.03 | 2.00 | 1.00 | 0.045 | 0.030 | 16.00-18.50 | 11.50-14.50 | 2.50-3.00 | --- |

Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures

Chemical Composition of Austenitic Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures (Continued)

| Standard Designation | Grade, Class, Type, Symbol or Name | Steel Number | UNS Number | Weight, %, max, Unless Otherwise Specified | | | | | | | | |
|---------------------------|------------------------------------|--------------|------------|--|-----------|------|-------|-------|-------------|-------------|-----------|----------------------------------|
| | | | | C | Mn | Si | P | S | Cr | Ni | Mo | Others |
| ASTM A 213/A 213M-03a | TP316LN | - | S31653 | 0.035 | 2.00 | 0.75 | 0.040 | 0.030 | 16.0-18.0 | 11.0-14.0 | 2.00-3.00 | 0.10-0.16 |
| ASTM A 249/A 249M-03 | TP316LN | --- | S31653 | 0.080 | 2.00 | 1.00 | 0.045 | 0.030 | 16.0-18.0 | 10.0-13.0 | 2.00-3.00 | N 0.10-0.16 |
| ASTM A 376/A 376M-02a | TP316LN | --- | --- | 0.035 | 2.00 | 0.75 | 0.045 | 0.030 | 16.0-18.0 | 11.0-14.0 | 2.00-3.00 | N 0.10-0.16 |
| ASTM A 688/A 688M-03 | TP316LN | --- | S31653 | 0.035 | 2.00 | 0.75 | 0.040 | 0.030 | 16.00-18.00 | 10.00-15.00 | 2.00-3.00 | N 0.10-0.16 |
| DIN 17457:1985 | X 2 CrNiMoN 17 13 3 | 1.4429 | --- | 0.030 | --- | --- | --- | 0.025 | 16.5-18.5 | 11.5-14.5 | 2.5-3.0 | N 0.14-0.22 |
| DIN 17458:1985 | X 2 CrNiMoN 17 13 3 | 1.4429 | --- | 0.030 | --- | --- | --- | 0.025 | 16.5-18.5 | 11.5-14.5 | 2.5-3.0 | N 0.14-0.22 |
| AFNOR NF A 49-217:1987 | TU Z 2 CND 17 12 AZ | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 16.00-18.00 | 11.00-13.50 | 2.00-2.40 | N 0.10-0.20 |
| AFNOR NF A 49-244:1993 | X3CrNiMoN17-11 | --- | --- | 0.030 | 2.00 | 0.75 | 0.040 | 0.015 | 16.0-18.0 | 10.0-12.0 | 2.00-2.5 | N 0.12-0.20 |
| | X3CrNiMoN17-12 | --- | --- | 0.030 | 2.00 | 0.75 | 0.040 | 0.015 | 16.0-18.0 | 11.0-13.0 | 2.5-3.0 | N 0.12-0.20 |
| ASTM A 213/A 213M-03a | TP316H | --- | S31609 | 0.04-0.10 | 2.00 | 0.75 | 0.040 | 0.030 | 18.0-18.0 | 11.0-14.0 | 2.00-3.00 | --- |
| ASTM A 249/A 249M-03 | TP316H | --- | S31609 | 0.04-0.10 | 2.00 | 1.00 | 0.045 | 0.030 | 16.0-18.0 | 10.0-14.0 | 2.00-3.00 | --- |
| ASTM A 312/A 312M-03 | TP316H | --- | S31609 | 0.04-0.10 | 2.00 | 1.00 | 0.045 | 0.030 | 16.0-18.0 | 11.0-14.0 | 2.00-3.00 | --- |
| ASTM A 358/A 358M-01 | 316H | --- | S31609 | 0.04-0.10 | 2.00 | 0.75 | 0.045 | 0.030 | 16.0-18.0 | 10.0-14.0 | 2.00-3.00 | --- |
| ASTM A 376/A 376M-02a | TP316H | --- | S31609 | 0.04-0.10 | 2.00 | 0.75 | 0.045 | 0.030 | 16.0-18.0 | 11.0-14.0 | 2.00-3.00 | --- |
| JIS G 3459:1997 | SUS316HTP | --- | --- | 0.04-0.10 | 2.00 | 0.75 | 0.030 | 0.030 | 16.00-18.00 | 11.00-14.00 | 2.00-3.00 | --- |
| JIS G 3463:1994 | SUS316HTB | --- | --- | 0.04-0.10 | 2.00 | 0.75 | 0.030 | 0.030 | 16.00-18.00 | 11.00-14.00 | 2.00-3.00 | --- |
| JIS G 3467:1988 | SUS 316H TF | --- | --- | 0.04-0.10 | 2.00 | 0.75 | 0.030 | 0.030 | 16.00-18.00 | 11.00-14.00 | 2.00-3.00 | --- |
| BS 3605-1:1991 AMD 2:1997 | 316S51 | --- | --- | 0.04-0.10 | 2.00 | 1.00 | 0.040 | 0.030 | 16.50-18.50 | 10.50-13.50 | 2.00-2.50 | --- |
| DIN 17459:1992 | X 6 CrNiMo 17 13 | 1.4919 | --- | 0.04-0.08 | 2.0 | 0.75 | 0.035 | 0.015 | 16.0-18.0 | 12.0-14.0 | 2.0-2.5 | --- |
| AFNOR NF A 49-214:1978 | Z 6 CND 17-12 B | --- | --- | 0.04-0.08 | 2.0 | 1.0 | 0.035 | 0.030 | 16-18 | 11-14 | 2.0-3.0 | --- |
| ISO 2604-II:1975 | TS 63 | --- | --- | 0.04-0.09 | 1.00-2.00 | 0.75 | 0.045 | 0.030 | 16.00-18.00 | 12.00-14.00 | 2.00-2.75 | --- |
| BS 3605-1:1991 AMD 2:1997 | 316S52 | --- | --- | 0.04-0.10 | 2.00 | 1.00 | 0.040 | 0.030 | 16.50-18.50 | 10.50-13.50 | 2.00-2.50 | B 0.0015-0.006 |
| DIN 17459:1992 | X 3 CrNiMoN 17 13 | 1.4910 | --- | 0.04 | 2.0 | 0.75 | 0.035 | 0.015 | 16.0-18.0 | 12.0-14.0 | 2.0-2.8 | B 0.0015-0.0050; N 0.10-0.18 |
| JIS G 3459:1997 | SUS316TiTP | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 16.00-18.00 | 10.00-14.00 | 2.00-3.00 | Ti 5 x C min |
| JIS G 3463:1994 | SUS316TiTB | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 16.00-18.00 | 10.00-14.00 | 2.00-3.00 | Ti 5 x C min |
| DIN 17457:1985 | X 6 CrNiMoTi 17 12 2 | 1.4571 | --- | 0.08 | --- | --- | --- | --- | 16.5-18.5 | 10.5-13.5 | 2.0-2.5 | Ti 5 x C to 0.80 |
| DIN 17458:1985 | X 6 CrNiMoTi 17 12 2 | 1.4571 | --- | 0.08 | --- | --- | --- | --- | 16.5-18.5 | 10.5-13.5 | 2.0-2.5 | Ti 5 x C to 0.80 |
| DIN 28180:1985 | X 6 CrNiMoTi 17 12 2 | 1.4571 | --- | 0.08 | --- | --- | --- | --- | 16.5-18.5 | 10.5-13.5 | 2.0-2.5 | Ti 5 x C to 0.80 |
| DIN 28181:1985 | X 6 CrNiMoTi 17 12 2 | 1.4571 | --- | 0.08 | --- | --- | --- | --- | 16.5-18.5 | 10.5-13.5 | 2.0-2.5 | Ti 5 x C to 0.80 |
| AFNOR NF A 49-214:1978 | Z 8 CNDT 17-13 B | --- | --- | 0.05-0.10 | 2.0 | 1.0 | 0.035 | 0.030 | 16-18 | 12-15 | 2.0-3.0 | Ti 4 x C to 0.75 |
| AFNOR NF A 49-244:1993 | X6CrNiMo17-11-2 | --- | --- | 0.060 | 2.00 | 0.75 | 0.040 | 0.015 | 16.0-18.0 | 10.5-12.5 | 2.00-2.5 | Ti 5 (C+N) to 0.70; Ti/C+N to 15 |

Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures

Chemical Composition of Austenitic Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures (Continued)

| Standard Designation | Grade, Class, Type, Symbol or Name | Steel Number | UNS Number | Weight, %, max, Unless Otherwise Specified | | | | | | | | |
|---------------------------|------------------------------------|--------------|------------|--|------|------|-------|-------|-------------|-------------|-----------|------------------------------------|
| | | | | C | Mn | Si | P | S | Cr | Ni | Mo | Others |
| ASTM A 213/A 213M-03a | TP317 | --- | S31700 | 0.08 | 2.00 | 0.75 | 0.040 | 0.030 | 18.0-20.0 | 11.0-14.0 | 3.00-4.00 | --- |
| ASTM A 249/A 249M-03 | TP317 | --- | S31700 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 11.0-15.0 | 3.00-4.00 | --- |
| ASTM A 312/A 312M-03 | TP317 | --- | S31700 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 11.0-14.0 | 3.0-4.0 | --- |
| ASTM A 409/A 409M-01 | TP317 | --- | S31700 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 11.0-15.0 | 3.0-4.0 | --- |
| JIS G 3459:1997 | SUS317TP | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 18.00-20.00 | 11.00-15.00 | 3.00-4.00 | --- |
| JIS G 3463:1994 | SUS317TB | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 18.00-20.00 | 11.00-15.00 | 3.00-4.00 | --- |
| JIS G 3468:1994 | SUS317 | --- | --- | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 18.00-20.00 | 11.00-15.00 | 3.00-4.00 | --- |
| ASTM A 213/A 213M-03a | TP317L | --- | S31703 | 0.035 | 2.00 | 0.75 | 0.040 | 0.030 | 18.0-20.0 | 11.0-15.0 | 3.00-4.00 | --- |
| ASTM A 249/A 249M-03 | TP317L | --- | S31703 | 0.030 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 11.0-15.0 | 3.00-4.00 | --- |
| ASTM A 312/A 312M-03 | TP317L | --- | S31703 | 0.035 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 11.0-15.0 | 3.0-4.0 | --- |
| JIS G 3459:1997 | SUS317LTP | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 18.00-20.00 | 11.00-15.00 | 3.00-4.00 | --- |
| JIS G 3463:1994 | SUS317LTB | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 18.00-20.00 | 11.00-15.00 | 3.00-4.00 | --- |
| JIS G 3468:1994 | SUS317L | --- | --- | 0.030 | 2.00 | 1.00 | 0.045 | 0.030 | 18.00-20.00 | 11.00-15.00 | 3.00-4.00 | --- |
| AFNOR NF A 49-244:1993 | X3CrNiMo19-15-4 | --- | --- | 0.030 | 2.00 | 0.75 | 0.035 | 0.010 | 17.5-19.5 | 14.0-16.0 | 3.00-4.00 | --- |
| AFNOR NF A 49-247:1981 | TS Z 2 CND 19-15 | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 17.5-19.5 | 14-16 | 3.0-4.0 | --- |
| ASTM A 213/A 213M-03a | TP321 | --- | S32100 | 0.08 | 2.00 | 0.75 | 0.040 | 0.030 | 17.0-20.0 | 9.00-13.0 | --- | Ti 5 X C-0.60 |
| ASTM A 249/A 249M-03 | TP321 | --- | S32100 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 17.0-19.0 | 9.00-12.0 | --- | N 0.10; Ti 5 x (C+N) to 0.70 |
| ASTM A 312/A 312M-03 | TP321 | --- | S32100 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 17.0-19.0 | 9.0-12.0 | --- | N 0.10; Ti 5 x C to 0.70 |
| ASTM A 358/A 358M-01 | 321 | --- | S32100 | 0.08 | 2.00 | 0.75 | 0.045 | 0.030 | 17.0-19.0 | 9.0-12.0 | --- | Ti 5 x (C+N) to 0.70; N 0.10 |
| ASTM A 376/A 376M-02a | TP321 | --- | --- | 0.08 | 2.00 | 0.75 | 0.045 | 0.030 | 17.0-19.0 | 9.00-13.0 | --- | Ti 5 x C to 0.70 |
| ASTM A 409/A 409M-01 | TP321 | --- | S32100 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 17.0-20.0 | 9.00-12.0 | --- | Ti 5 x C to 0.70 |
| JIS G 3459:1997 | SUS321TP | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 9.00-13.00 | --- | Ti 5 x C min |
| JIS G 3463:1994 | SUS321TB | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 9.00-13.00 | --- | Ti 5 x C min |
| JIS G 3467:1988 | SUS 321 TF | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 9.00-13.00 | --- | Ti 5 x C min |
| JIS G 3468:1994 | SUS321 | --- | --- | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 17.00-19.00 | 9.00-13.00 | --- | Ti 5 x C min |
| BS 3605-1:1991 AMD 2:1997 | 321S31 | --- | --- | 0.080 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 9.00-12.00 | --- | Ti 5 x C to 0.80 |
| BS 3605-2:1992 AMD 1:1997 | 321S31 | --- | --- | 0.080 | 2.00 | 1.00 | 0.04 | 0.03 | 17.00-19.00 | 9.00-12.00 | --- | Ti 5 x C to 0.80 |
| DIN 17457:1985 | X 6 CrNiTi 18 10 | 1.4541 | --- | 0.08 | --- | --- | --- | --- | 17.0-19.0 | 9.0-12.0 | --- | Ti 5 x C to 0.80 |
| DIN 17458:1985 | X 6 CrNiTi 18 10 | 1.4541 | --- | 0.08 | --- | --- | --- | --- | 17.0-19.0 | 9.0-12.0 | --- | Ti 5 x C to 0.80 |
| DIN 28180:1985 | X 6 CrNiTi 18 10 | 1.4541 | --- | 0.08 | --- | --- | --- | --- | 17.0-19.0 | 9.0-12.0 | --- | Ti 5 x C to 0.80 |
| DIN 28181:1985 | X 6 CrNiTi 18 10 | 1.4541 | --- | 0.08 | --- | --- | --- | --- | 17.0-19.0 | 9.0-12.0 | --- | Ti 5 x C to 0.80 |
| AFNOR NF A 49-217:1987 | TU Z 6 CNT 18 10 | --- | --- | 0.080 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-20.00 | 9.00-12.00 | --- | Ti 5 x C to 0.6 |
| AFNOR NF A 49-244:1993 | X6CrNiTi18-10 | --- | --- | 0.060 | 2.00 | 0.75 | 0.040 | 0.015 | 17.0-19.0 | 9.0-11.0 | --- | Ti 5 x (C+N) to 0.70; Ti/C+N to 15 |
| AFNOR NF A 49-247:1981 | TS Z 6 CNT 18-10 | --- | --- | 0.080 | 2.00 | 1.00 | 0.040 | 0.030 | 17-20.0 | 9-12.00 | --- | Ti 5 x C to 0.6 |
| ISO 2604-II:1975 | TS 53 | --- | --- | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 17.00-19.00 | 9.00-13.00 | --- | Ti 5 x C to 0.80 |
| ISO 2604-V:1978 | TW 53 | --- | --- | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 17.00-19.00 | 9.00-12.00 | --- | Ti 5 x C to 0.80 |

Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures

Chemical Composition of Austenitic Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures (Continued)

| Standard Designation | Grade, Class, Type, Symbol or Name | Steel Number | UNS Number | Weight, %, max, Unless Otherwise Specified | | | | | | | | |
|---------------------------|------------------------------------|--------------|------------|--|------|-----------|-------|-------|-------------|------------|-----------|---|
| | | | | C | Mn | Si | P | S | Cr | Ni | Mo | Others |
| ASTM A 213/A 213M-03a | TP321H | --- | S32109 | 0.04-0.10 | 2.00 | 0.75 | 0.040 | 0.030 | 17.0-20.0 | 9.00-13.0 | --- | Ti 4 X C-0.60 |
| ASTM A 249/A 249M-03 | TP321H | --- | S32109 | 0.04-0.10 | 2.00 | 1.00 | 0.045 | 0.030 | 17.0-19.0 | 9.00-12.0 | --- | N 0.10; Ti 5 x (C+N) to 0.70 |
| ASTM A 312/A 312M-03 | TP321H | --- | S32109 | 0.04-0.10 | 2.00 | 1.00 | 0.045 | 0.030 | 17.0-19.0 | 9.0-12.0 | --- | Ti 5 x C to 0.60 |
| ASTM A 376/A 376M-02a | TP321H | --- | S32109 | 0.04-0.10 | 2.00 | 0.75 | 0.040 | 0.030 | 17.0-19.0 | 9.00-13.0 | --- | Ti 4 x C to 0.70 |
| JIS G 3459:1997 | SUS321HTP | --- | --- | 0.04-0.10 | 2.00 | 0.75 | 0.030 | 0.030 | 17.00-20.00 | 9.00-13.00 | --- | Ti 4 x C to 0.60 |
| JIS G 3463:1994 | SUS321HTB | --- | --- | 0.04-0.10 | 2.00 | 0.75 | 0.030 | 0.030 | 17.00-20.00 | 9.00-13.00 | --- | Ti 4 x C to 0.60 |
| JIS G 3467:1988 | SUS 321H TF | --- | --- | 0.04-0.10 | 2.00 | 0.75 | 0.030 | 0.030 | 17.00-20.00 | 9.00-13.00 | --- | Ti 4 x C to 0.60 |
| BS 3605-1:1991 AMD 2:1997 | 321S51 | --- | --- | 0.04-0.10 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 9.00-12.00 | --- | Ti 5 x C to 0.80 |
| AFNOR NF A 49-214:1978 | Z 6 CNT 18-12 B | --- | --- | 0.04-0.08 | 2.0 | 1.0 | 0.035 | 0.030 | 17-19 | 10-13 | --- | Ti 4 x C to 0.60 |
| ISO 2604-II:1975 | TS 54 | --- | --- | 0.04-0.10 | 2.00 | 0.20-0.80 | 0.045 | 0.030 | 17.00-20.00 | 9.00-13.00 | --- | Ti 4 x C to 0.60 |
| JIS G 3463:1994 | SUS329J3LTB | --- | --- | 0.030 | 1.50 | 1.00 | 0.040 | 0.030 | 21.00-24.00 | 4.50-6.50 | 2.50-3.50 | N 0.08-0.20 |
| AFNOR NF A 49-217:1987 | TU Z 2 CND 22 05 03 | --- | --- | 0.030 | 2.00 | 1.00 | 0.030 | 0.020 | 21.00-23.00 | 4.50-6.50 | 2.50-3.50 | N 0.08-0.20 |
| JIS G 3463:1994 | SUS329J4LTB | --- | --- | 0.030 | 1.50 | 1.00 | 0.040 | 0.030 | 24.00-26.00 | 5.50-7.50 | 2.50-3.50 | N 0.08-0.30 |
| AFNOR NF A 49-217:1987 | TU Z 2 CND 25 07 03 | --- | --- | 0.030 | 1.70 | 0.70 | 0.030 | 0.020 | 23.50-25.50 | 5.50-7.50 | 2.50-3.50 | N 0.15-0.25 |
| ASTM A 213/A 213M-03a | TP347 | --- | S34700 | 0.08 | 2.00 | 0.75 | 0.040 | 0.030 | 17.0-20.0 | 9.00-13.0 | --- | Cb+Ta 10 X C -1.00 |
| ASTM A 249/A 249M-03 | TP347 | --- | S34700 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 17.0-19.0 | 9.00-12.0 | --- | N 0.40-0.60; Cb 0.10; Cb 10 x C to 1.10 |
| ASTM A 312/A 312M-03 | TP347 | --- | S34700 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 17.0-19.0 | 9.0-13.0 | --- | Cb 10 x C to 1.00 |
| ASTM A 358/A 358M-01 | 347 | --- | S34700 | 0.08 | 2.00 | 0.75 | 0.045 | 0.030 | 17.0-19.0 | 9.0-13.0 | --- | Cb 10 x C to 1.00 |
| ASTM A 376/A 376M-02a | TP347 | --- | --- | 0.08 | 2.00 | 0.75 | 0.040 | 0.030 | 17.0-19.0 | 9.00-13.0 | --- | Cb 10 x C to 1.10 |
| ASTM A 409/A 409M-01 | TP347 | --- | S34700 | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 17.0-19.0 | 9.00-12.0 | --- | (Cb+Ta) 10 x C to 1.10 |
| JIS G 3459:1997 | SUS347TP | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 9.00-13.00 | --- | Nb 10 x C min |
| JIS G 3463:1994 | SUS347TB | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 9.00-13.00 | --- | Nb 10 x C min |
| JIS G 3467:1988 | SUS 347 TF | --- | --- | 0.08 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 9.00-13.00 | --- | Nb 10 x C min |
| JIS G 3468:1994 | SUS347 | --- | --- | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 17.00-19.00 | 9.00-13.00 | --- | Nb 10 x C min |
| BS 3605-1:1991 AMD 2:1997 | 347S31 | --- | --- | 0.080 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 9.00-13.00 | --- | Nb 10 x C to 1.00 |
| BS 3605-2:1992 AMD 1:1997 | 347S31 | --- | --- | 0.080 | 2.00 | 1.00 | 0.04 | 0.03 | 17.00-19.00 | 9.00-12.00 | --- | Nb 10 x C to 1.00 |
| DIN 17457:1985 | X 6 CrNiNb 18 10 | 1.4550 | --- | 0.08 | --- | --- | --- | --- | 17.0-19.0 | 9.0-12.0 | --- | Nb 10 x C to 1.00 |
| DIN 17458:1985 | X 6 CrNiNb 18 10 | 1.4550 | --- | 0.08 | --- | --- | --- | --- | 17.0-19.0 | 9.0-12.0 | --- | Nb 10 x C to 1.00 |
| ISO 2604-II:1975 | TS 50 | --- | --- | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 17.00-19.00 | 9.00-13.00 | --- | Nb 10 x C to 1.00 |
| ISO 2604-V:1978 | TW 50 | --- | --- | 0.08 | 2.00 | 1.00 | 0.045 | 0.030 | 17.00-19.00 | 9.00-12.00 | --- | Nb 10 x C to 1.00 |

Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures

Chemical Composition of Austenitic Stainless Steel Tubes and Pipes for Pressure Purposes and High Temperatures

| Standard Designation | Grade, Class, Type, Symbol or Name | Steel Number | UNS Number | Weight, %, max, Unless Otherwise Specified | | | | | | | | |
|---------------------------|------------------------------------|--------------|------------|--|------|-----------|-------|-------|-------------|-------------|-----------|---|
| | | | | C | Mn | Si | P | S | Cr | Ni | Mo | Others |
| ASTM A 213/A 213M-03a | TP347H | --- | S34709 | 0.04-0.10 | 2.00 | 0.75 | 0.040 | 0.030 | 17.0-20.0 | 9.00-13.0 | --- | Cb+Ta 8 X C -1.0 |
| ASTM A 249/A 249M-03 | TP347H | --- | S34709 | 0.04-0.10 | 2.00 | 1.00 | 0.045 | 0.030 | 17.0-19.0 | 9.00-12.0 | --- | Cb 8 x C to 1.0 |
| ASTM A 312/A 312M-03 | TP347H | --- | S34709 | 0.04-0.10 | 2.00 | 1.00 | 0.045 | 0.030 | 17.0-19.0 | 9.0-13.0 | --- | Cb 8 x C to 1.00 |
| ASTM A 376/A 376M-02a | TP347H | --- | S34709 | 0.04-0.10 | 2.00 | 0.75 | 0.045 | 0.030 | 17.0-19.0 | 9.00-13.0 | --- | Cb 8 x C to 1.10 |
| JIS G 3459:1997 | SUS347HTP | --- | --- | 0.04-0.10 | 2.00 | 1.00 | 0.030 | 0.030 | 17.00-20.00 | 9.00-13.00 | --- | Nb 8 x C to 1.00 |
| JIS G 3463:1994 | SUS347HTB | --- | --- | 0.04-0.10 | 2.00 | 1.00 | 0.030 | 0.030 | 17.00-20.00 | 9.00-13.00 | --- | Nb 8 x C to 1.00 |
| JIS G 3467:1988 | SUS 347H TF | --- | --- | 0.04-0.10 | 2.00 | 0.75 | 0.030 | 0.030 | 17.00-20.00 | 9.00-13.00 | --- | Nb 8 x C to 1.00 |
| BS 3605-1:1991 AMD 2:1997 | 347S51 | --- | --- | 0.04-0.10 | 2.00 | 1.00 | 0.040 | 0.030 | 17.00-19.00 | 9.00-13.00 | --- | Nb 10 x C to 1.20 |
| DIN 17459:1992 | X 8 CrNiNb 16 13 | 1.4961 | --- | 0.04-0.10 | 1.5 | 0.30-0.60 | 0.035 | 0.015 | 15.0-17.0 | 12.0-14.0 | --- | Nb 10 x C to 1.2 |
| AFNOR NF A 49-214:1978 | Z 6 CN Nb 18-12 B | --- | --- | 0.04-0.08 | 2.0 | 1.0 | 0.035 | 0.030 | 17-19 | 10-13 | --- | (Nb+Ta) 8 x C to 1.00 |
| ISO 2604-II:1975 | TS 56 | --- | --- | 0.04-0.10 | 2.00 | 0.20-0.80 | 0.045 | 0.030 | 16.00-20.00 | 11.00-14.00 | --- | Nb 10 x C to 1.4 |
| ASTM A 213/A 213M-03a | --- | --- | S31725 | 0.03 | 2.00 | 0.75 | 0.040 | 0.030 | 18.0-20.0 | 13.5-17.5 | 4.0-5.00 | N 0.10; Cu 0.75 |
| ASTM A 249/A 249M-03 | --- | --- | S31725 | 0.03 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 13.5-17.5 | 4.0-5.0 | N 0.20 |
| ASTM A 312/A 312M-03 | --- | --- | S31725 | 0.03 | 2.00 | 1.00 | 0.040 | 0.030 | 18.0-20.0 | 13.5-17.5 | 4.0-5.0 | N 0.10; Cu 0.75 |
| ASTM A 358/A 358M-01 | --- | --- | S31725 | 0.030 | 2.00 | 0.75 | 0.045 | 0.030 | 18.0-20.0 | 13.5-17.5 | 4.0-5.0 | N 0.20 |
| ASTM A 376/A 376M-02a | --- | --- | S31725 | 0.030 | 2.00 | 0.75 | 0.045 | 0.030 | 18.0-20.0 | 13.5-17.5 | 4.0-5.0 | N 0.20; Cu 0.75 |
| ASTM A 409/A 409M-01 | --- | --- | S31725 | 0.030 | 2.00 | 1.00 | 0.045 | 0.030 | 18.0-20.0 | 13.5-17.5 | 4.0-5.0 | N 0.020 |
| DIN 17457:1985 | X 2 CrNiMoN 17 13 5 | 1.4439 | --- | 0.030 | --- | --- | --- | 0.025 | 16.5-18.5 | 12.5-14.5 | 4.0-5.0 | N 0.12-0.22 |
| DIN 17458:1985 | X 2 CrNiMoN 17 13 5 | 1.4439 | --- | 0.030 | --- | --- | --- | 0.025 | 16.5-18.5 | 12.5-14.5 | 4.0-5.0 | N 0.12-0.22 |
| AFNOR NF A 49-244:1993 | X3CrNiMoN18-14-5 | --- | --- | 0.030 | 2.00 | 0.75 | 0.035 | 0.010 | 17.0-19.0 | 13.0-15.0 | 4.0-5.0 | N 0.12-0.20 |
| ASTM A 358/A 358M-01 | --- | --- | N08904 | 0.020 | 2.00 | 1.00 | 0.045 | 0.035 | 19.0-23.0 | 23.0-28.0 | 4.0-5.0 | Cu 1.0-2.0; N 0.10 |
| ASTM A 249/A 249M-03 | --- | --- | N08904 | 0.020 | 2.00 | 1.00 | 0.040 | 0.030 | 19.0-23.0 | 23.0-28.0 | 4.0-5.0 | N 0.10; Cu 1.00-2.00 |
| JIS G 3459:1997 | SUS890LTP | --- | --- | 0.020 | 2.00 | 1.00 | 0.040 | 0.030 | 19.00-23.00 | 23.00-28.00 | 4.00-5.00 | Cu 1.00-2.00 |
| JIS G 3463:1994 | SUS890LTB | --- | --- | 0.020 | 2.00 | 1.00 | 0.040 | 0.030 | 19.00-23.00 | 23.00-28.00 | 4.00-5.00 | Cu 1.00-2.00 |
| AFNOR NF A 49-244:1993 | X2NiCrMoCu25-20 | --- | --- | 0.020 | 2.00 | 0.40 | 0.035 | 0.010 | 19.0-21.0 | 24.0-26.0 | 4.0-5.0 | Cu 1.00-2.00 |
| ASTM A 240/A 240M-03c | 800 | --- | N08800 | 0.10 | 1.50 | 1.00 | 0.045 | 0.015 | 19.0-23.0 | 30.0-35.0 | --- | Cu 0.75; Ti 0.15-0.60 |
| JIS G 3467:1988 | NCF 800 TF | --- | --- | 0.10 | 1.50 | 1.00 | 0.030 | 0.015 | 19.00-23.00 | 30.00-35.00 | --- | Cu 0.75; Al 0.15-0.60; Ti 0.15-0.60 |
| DIN 17459:1992 | X 5 NiCrAlTi 31 20 | 1.4958 | --- | 0.03-0.08 | 1.5 | 0.70 | 0.015 | 0.010 | 19.0-22.0 | 30.0-32.5 | --- | Al 0.20-0.50; Ti 0.20-0.50; Al+Ti 0.70; |
| AFNOR NF A 49-244:1993 | X5NiCr32-21 | --- | --- | 0.05 | 1.50 | 0.75 | 0.035 | 0.015 | 19.0-24.0 | 30.0-33.0 | --- | Al 0.15-0.60; Ti 0.15-0.60 |
| DIN 17459:1992 | X 8 NiCrAlTi 32 21 | 1.4959 | --- | 0.05-0.10 | 1.5 | 0.70 | 0.015 | 0.010 | 19.0-22.0 | 30.0-34.0 | --- | Al 0.25-0.65; Ti 0.25-0.65; Co 0.5; |
| ASTM A 240/A 240M-03c | 800H | --- | N08810 | 0.05-0.10 | 1.50 | 1.00 | 0.045 | 0.015 | 19.0-23.0 | 30.0-35.0 | --- | Cu 0.75; Ti 0.15-0.60; |
| JIS G 3467:1988 | NCF 800H TF | --- | --- | 0.05-0.10 | 1.50 | 1.00 | 0.030 | 0.015 | 19.00-23.00 | 30.00-35.00 | --- | Cu 0.75; Al 0.15-0.60; Ti 0.15-0.60 |
| ASTM A 249/A 249M-03 | --- | --- | N08367 | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 20.0-22.0 | 23.5-25.5 | 6.0-7.0 | N 0.18-0.25; Cu 0.75 |
| | --- | --- | N08926 | 0.020 | 2.00 | 0.50 | 0.030 | 0.010 | 19.0-21.0 | 24.0-26.0 | 6.0-7.0 | N 0.15-0.25; Cu 0.50-1.50 |
| ASTM A 312/A 312M-03 | --- | --- | N08926 | 0.020 | 2.00 | 0.50 | 0.030 | 0.010 | 24.0-26.0 | 19.0-21.0 | 6.0-7.0 | N 0.15-0.25; Cu 0.50-1.50 |
| ASTM A 688/A 688M-03 | --- | --- | N08367 | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 20.00-22.00 | 23.50-25.50 | 6.00-7.00 | N 0.18-0.25; Cu 0.75 |
| | --- | --- | N08926 | 0.020 | 2.00 | 0.5 | 0.03 | 0.01 | 19.00-21.00 | 24.00-26.00 | 6.0-7.0 | N 0.15-0.25; Cu 0.5-1.5 |
| JIS G 3463:1994 | SUS836LTB | --- | --- | 0.030 | 2.00 | 1.00 | 0.040 | 0.030 | 19.00-24.00 | 24.00-26.00 | 5.00-7.00 | N 0.25 |