

### Oil Wash, Electro-Zinc-Plated, and Hot-Dipped Galvanized Steel Specifications

- 1 Low carbon steel specification ranges from LTP's steel mills are as below. LTP uses the steel for plain oil finish products (oil wash) for general purpose applications, electro-zinc plated products for applications that require excellent corrosion resistance, and hot-dipped galvanized products that provide corrosion resistance for harsh environments.
  - Products will meet the chemical and physical requirements for SAE J429 Grade 1 and metric Property Class 4.6 (ASTM F568 1979), but LTP does not provide the mechanical testing results. Products 3/4-10 and larger will meet the tensile requirements of SAE J429 Grade 2.
  - Products will meet specifications for ASTM A108 and for the tensile of ASTM A307 grade A only.
  - LTP relies upon the steel mills and suppliers to provide tensile and chemical tests only.
  - LTP will not sell products certified to SAE Grade 1, metric Property Class 4.6 or A307.
  - Steel designations are 1008 through 1022 and may vary depending on product diameter. LTP normally uses C1018 for all applications. LTP may use other grades upon customer requirement or approval or general industry standards.
- 2 Rod sizes: range from 1/4-20 through 3/4-10 pitch diameter sizes cold-drawn from hot-rolled coil
- 3 Bar sizes: above 3/4-16 through 2-4 1/2 pitch diameter sizes
- 4 Wire diameter sizes: sizes 4-40 through 12-24
- 5 Low carbon non-resulfurized steel chemistry and minimum tensile varies on material designation and amount of cold-drawing in the process. Raw material melt specifications are as follows (per Gerdau Ameristeel, restricted within AISI spec. as of 8/1/2000).
- 6 Chemical and physical information per IFI manual (except C1008-C1022 which LTP determined with its suppliers).
- 7 Chemical Analysis for C, MN, P, S required to be in spec.

#### Grade 1008:

	C	MN	P	S	SI	CU	NI	CR	MO	SN	N	B	AL	V	CB
Min	.050	0.30	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Max	.100	0.50	.040	.050	.200	.400	.400	.400	.200	.060	.020	.000	.000	.000	.000

#### Grade 1018

	C	MN	P	S	SI	CU	NI	CR	MO	SN	N	B	AL	V	CB
Min	.150	0.60	.000	.000	.150	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Max	.200	0.90	.040	.050	.250	.270	.150	.150	.100	.025	.010	.000	.000	.000	.000

#### Grade 1038

	C	MN	P	S	SI	CU	NI	CR	MO	SN	N	B	AL	V	CB
Min	.350	0.60	.000	.000	.000										
Max	.420	0.90	.040	.050	.300										

#### Grade 1040

	C	MN	P	S	SI	CU	NI	CR	MO	SN	N	B	AL	V	CB
Min	.370	0.60	.000	.000											
Max	.440	0.90	.040	.050											

#### Grade 1045

	C	MN	P	S	SI	CU	NI	CR	MO	SN	N	B	AL	V	CB
Min	.430	0.60	.000	.000											
Max	.500	0.90	.040	.050											

#### Grade 4140

	C	MN	P	S	SI	CU	NI	CR	MO	SN	N	B	AL	V	CB
Min	.380	0.75	.000	.000	.150			.080							
Max	.430	1.00	.035	.040	.350			1.10							

Grade	C1008-C1022 low carbon	ASTM A193 B7 (Chromium Molybdenum)	304 Stainless	316 Stainless
<b>Tensile Strength (psi)</b>	60,000 minimum APPROX. max. depends on area reduction in drawing	125,000 minimum 1,100 deg. F tempering temp	70,000 minimum	70,000 minimum
<b>Yield Strength (psi)</b>	45,000 minimum APPROX. max. depends on area reduction in drawing	100,000 minimum	30,000 minimum	30,000 minimum
<b>C</b>		0.37-0.49	0.08 max.	0.08 max.
<b>Mn</b>		0.65-1.10	2.00 max.	2.00 max.
<b>P max.</b>		0.035	.045 max.	.045 max.
<b>S max.</b>		0.040	.030 max.	.030 max.
<b>Silicon</b>		0.15-0.35	1.00 max.	1.00 max.
<b>Chromium</b>		0.75-1.20	18.00-20.00	16.00-18.00
<b>Nickel</b>			8.00-10.50	10.00-14.00
<b>Molybdenum</b>		0.15-0.25		2.00-3.00
<b>Hardness</b>	Rockwell B mid 80's to upper 90's *	Rockwell C26-32 through-hardened		

\* ESTIMATES ONLY - hardness in low carbon varies by product diameter, drawn raw material diameter, and depth of test.

#### Additional Comparison Information

Steel	Proof Load (minimum lbs.)	Yield (minimum lbs.)	Tensile (minimum lbs.)
1045			92,000
4140			110,000
Grade 5			120,000
4140 heat-treated quenched and tempered to ASTM A193B7			125,000
Grade 8 (heat treated after threading)	120,000	130,000	150,000