

SPECIFIER'S GUIDE TO METAL

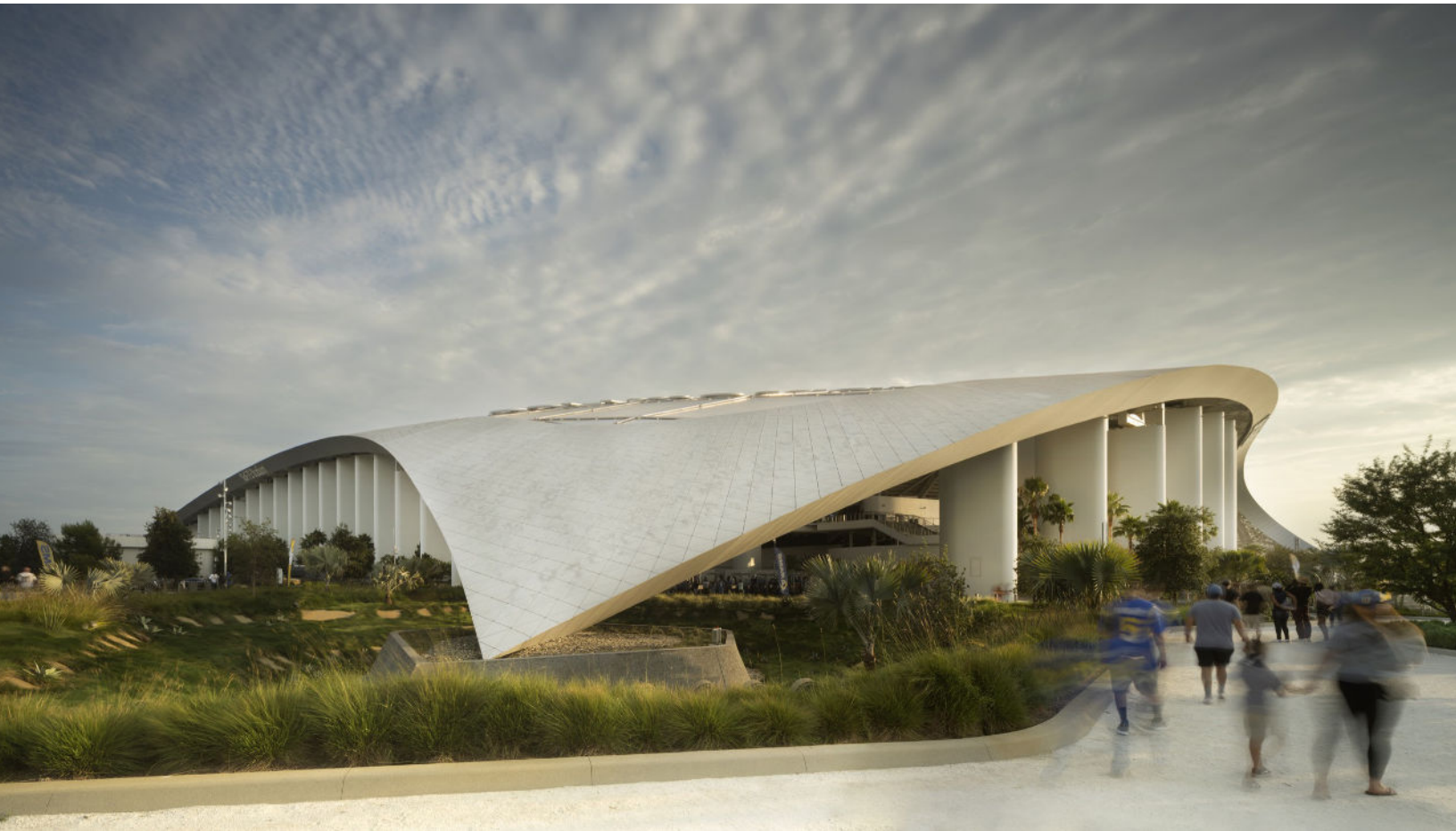
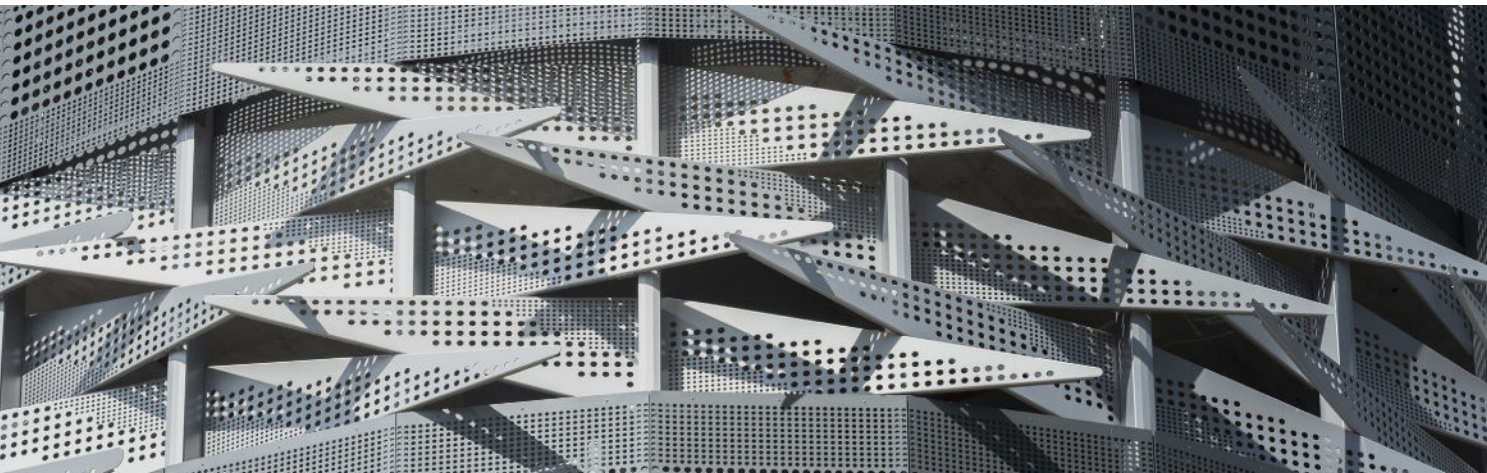


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INTRODUCTION



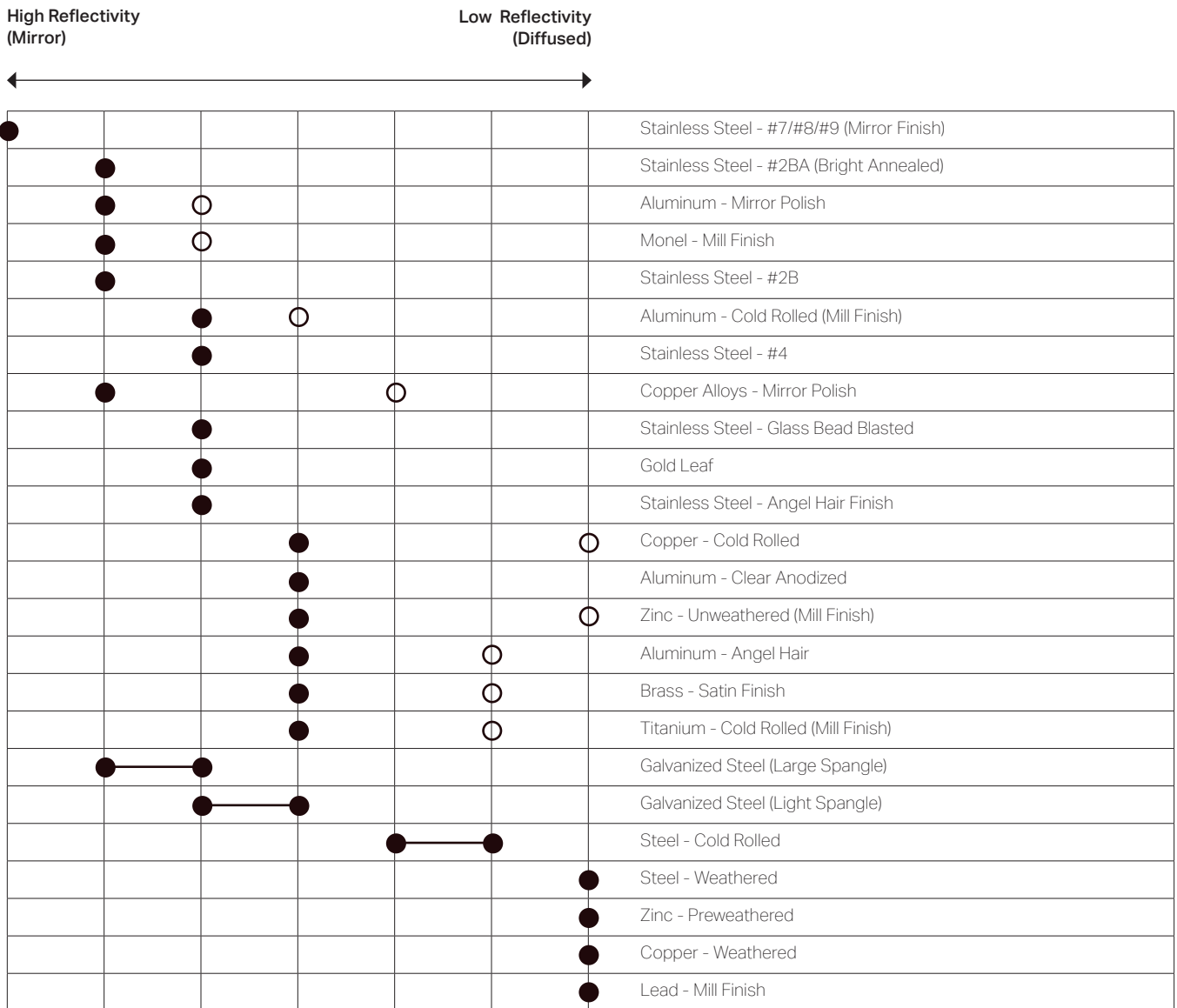
METAL HARDNESS

Metal	Alloy & Temper	Hardness Rockwell B-Scale	Yield Strength (KSI)	Yield Strength (MPa)	Ductility Degree 1. Very Ductile 5: Stiff
Aluminum	A93003-H14	20 to 25	21	145	1
Aluminum	A93003-H34	35 to 40	29	200	1
Aluminum	A93003-H14	20 to 25	20	138	1
Aluminum	A96061-T6	60	40	275	4
Copper	1/8 hard (cold roll)	10	28	193	1
Gliding Metal	1/4 hard	32	32	221	1
Commercial Bronze	1/4 hard	42	35	241	2
Jewelry Bronze	1/4 hard	47	37	255	2
Red Brass	1/4 hard	65	49	338	2
Cartridge Brass	1/4 hard	55	40	276	1
Yellow Brass	1/4 hard	55	40	276	2
Muntz Metal	1/8 hard	55	35	241	3
Architectural Bronze	As Extruded	65	20	138	4
Phosphor Bronze	1/2 hard	78	55	379	3
Silicon Bronze	1/4 hard	75	35	241	3
Aluminum Bronze	As Cast	77	27	186	5
Nickel Silver	1/8 hard	60	35	241	3
Steel (Low Carbon)	Cold-rolled	60	25	170	2
Cast Iron	As Cast	86	50	344	5
Stainless Steel - 304	Temper Pass	88	30	207	2
Lead	Sheet Lead	5	0.81	5	1
Monel	Temper Pass	60	27	172	3
Zinc-Cu Tn Alloy	Rolled	40	14	97	1
Titanium	Annealed	80	37	255	3

Case hardening refers to a surface heat treatment process used to produce a hard, wear-resistant surface on metal. Methods of case-hardening include carburization, cyaniding, nitriding, flame hardening, and electroinduction hardening.

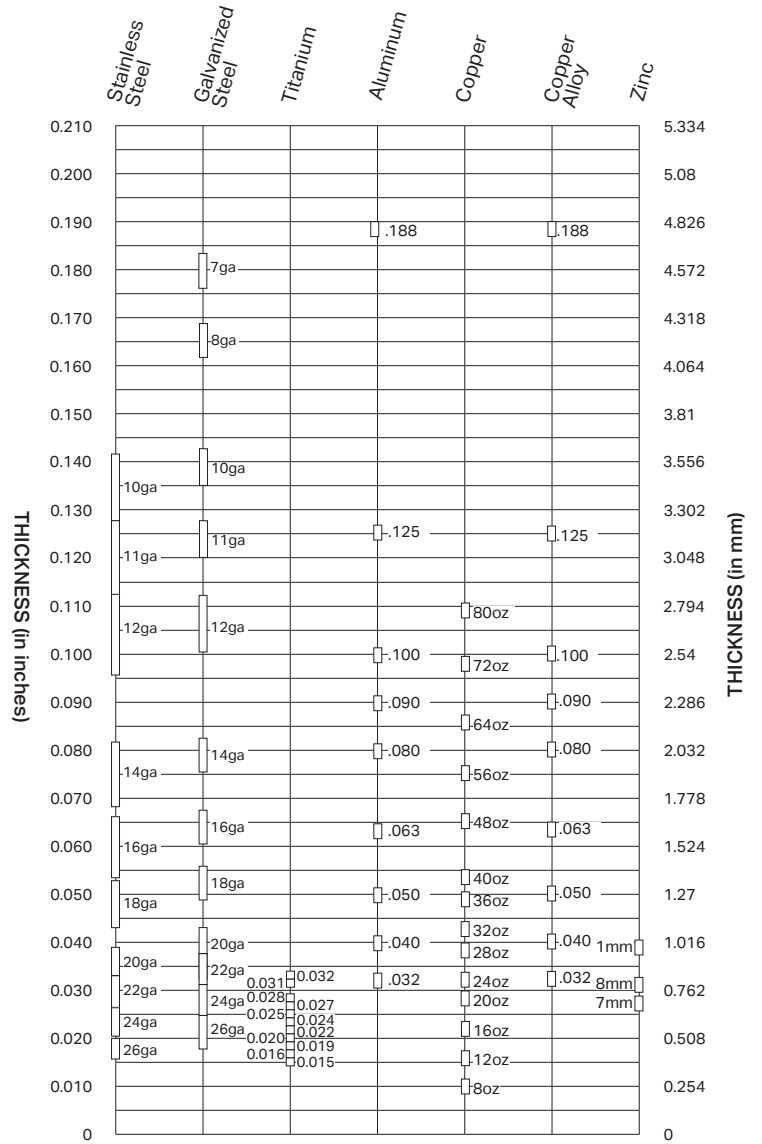
METAL REFLECTIVITY

RELATIVE REFLECTIVITY OF VARIOUS METALS



- Solid dot indicates reflectivity at new stage
- Hollow dot indicates reflectivity after aging

METAL THICKNESS



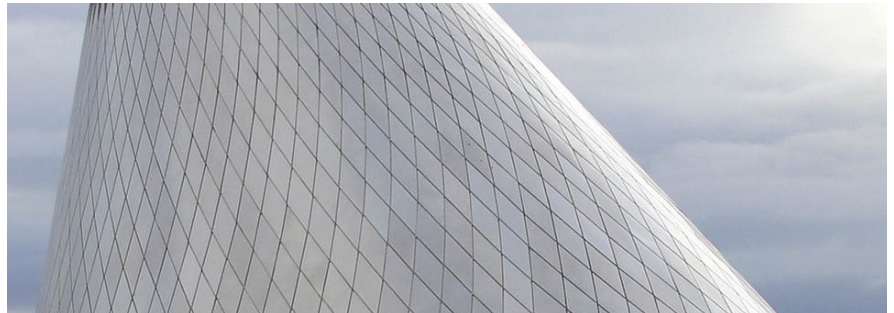
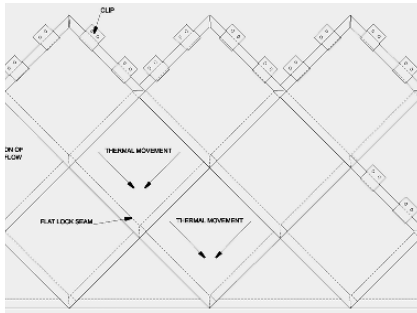
METAL RELATIVE COSTS

METAL DENSITY

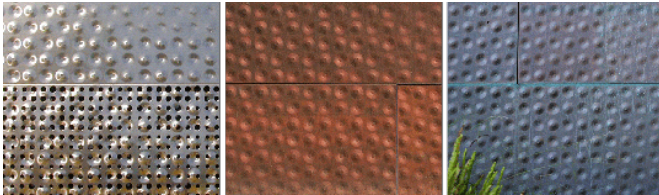
Metal	Density (lb/in 3)	Specific Gravity
Magnesium	0.064	1.77
Aluminum	0.098	2.7
Titanium	0.161	4.51
Chromium	0.25	6.92
Zinc	0.258	7.14
Tin	0.264	7.3
Stainless Steel (Type 410)	0.278	7.7
Iron / Steel	0.284	7.87
Stainless Steel (Type 304)	0.285	7.9
Muntz Metal	0.303	8.39
Cartridge Brass	0.308	8.53
Commercial Bronze	0.318	8.8
Monel	0.319	8.83
Nickel	0.321	8.9
Nickel Silver	0.323	8.95
Copper	0.323	8.96
Silver	0.379	10.49
Lead	0.409	11.34
Gold	0.687	19.32

METAL THERMAL MOVEMENT

Metal	Coefficient of Thermal Expansion u in./in. C	Expected Expansion of a 120 inch sheet* (in)	Expected Expansion of a 3 meter sheet* (mm)
3003 Aluminum	23.2	0.11	2.79
5005 Aluminum	23.8	0.11	2.79
6063 Aluminum	23.4	0.11	2.79
Copper	16.8	0.08	2.03
Gliding Metal	18.1	0.08	2.03
Commercial Bronze	18.4	0.08	2.03
Jewelry Bronze	18.6	0.08	2.03
Red Brass	18.7	0.09	2.29
Cartridge Brass	19.9	0.09	2.29
Yellow Brass	20.3	0.09	2.29
Muntz Metal	20.8	0.09	2.29
Architectural Bronze	20.9	0.10	2.54
Phosphor Bronze	18.2	0.08	2.03
Silicon Bronze	18.0	0.08	2.03
Aluminum Bronze	16.8	0.08	2.03
Nickel Silver	16.2	0.07	1.78
Iron	11.7	0.05	1.27
Steel	11.7	0.05	1.27
Cast Iron	10.5	0.05	1.27
304 Stainless Steel	16.5	0.08	2.03
Lead	29.3	0.13	3.30
Monel	14.0	0.06	1.52
Tin	23.0	0.10	2.54
Zinc - rolled	32.5	0.15	3.81
Zinc - Cu, Tn Alloy	24.9 with grain	0.11	2.79
Zinc - Cu, Tn Alloy	19.4 across grain	0.09	2.29
Titanium	8.4	0.04	1.02
Gold	14.2	0.05	1.27



METAL AGING





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