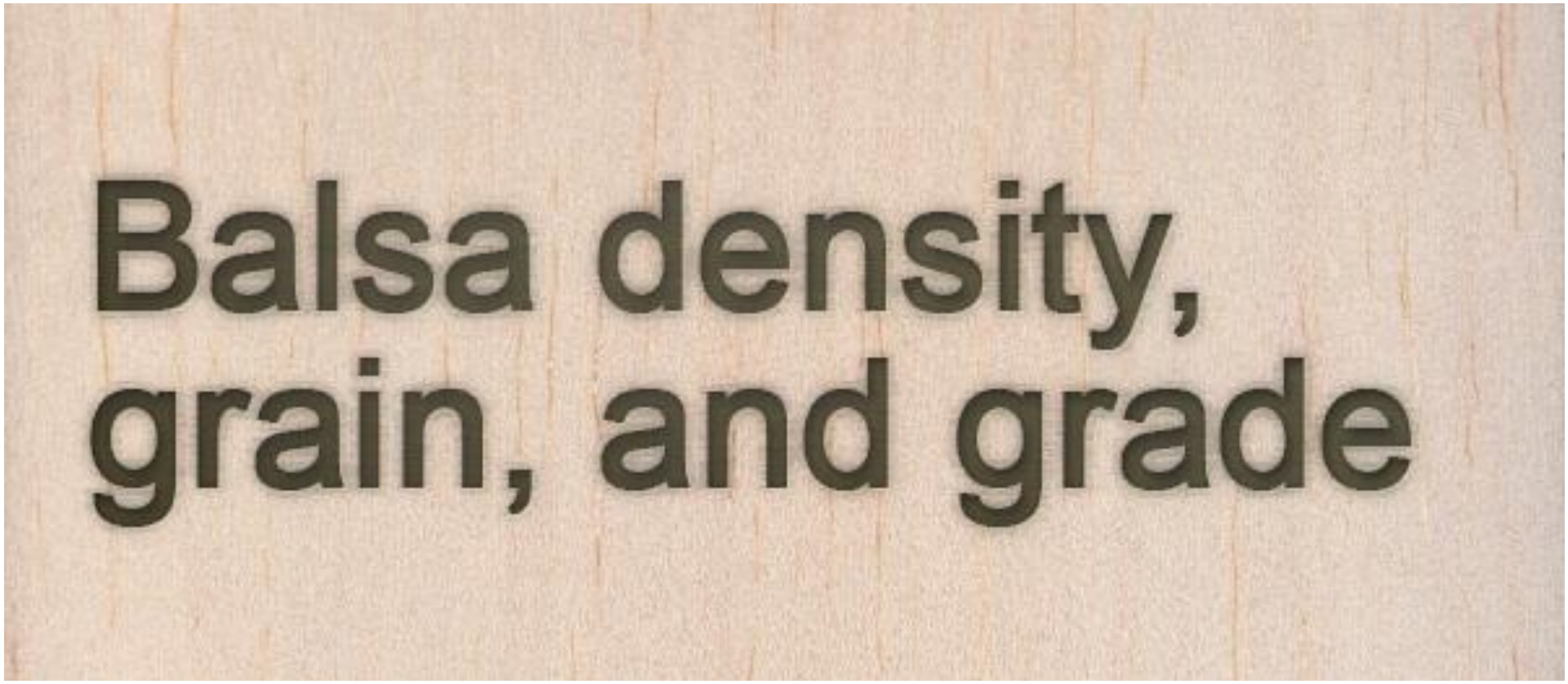
Balsa Density, Grain, and Grade



Written by Al and Rod Clark

Learn about balsa, grades, densities, grains, and proper applications. Information and tips for any balsa kit, plans, or scratch build project

When you are tackling your next balsa project, spend a few moments to learn about the different densities, grades, and grains of balsa. Not all balsa is created equal and its application depends on the characteristics.

Balsa Density

Grade	Ultra Light	Light	Light Medium	Medium	Medium Hard	Hard
Density in lb/cu.ft	4-5.4	5.5-6.0	6.1-7.5	7.6-9.5	9.6-12	14 +
	|----Contest Grade Balsa----|		|----------Non Contest Grade Balsa---------|			

So how do you determine the density and grade of balsa?

It is a two step process to determine the various density ranges shown above.

First, weigh the sheet of balsa.

While there are very accurate electronic scales, I'd suggest you use a small postage scale (the kind with a weight and clip).

Once you know the weight of the balsa refer to the nomographs below to determine the density.

Balsa Wood Density Info

	Ultra Light		Light		Light Medium		Medium		Medium Hard		Hard
Lb. per cubic foot:	4.0	5.4	5.5	6.0	6.1	7.5	7.6	9.5	9.6	12	14
Oz. per cubic foot:	64	86.4	88	96	97.6	120	121.6	152	153.6	192	224

Thickness				
Fraction	Decimal	Width	Length	Cu. In.
1/32	0.03125	3	36	3.375
1/16	0.06250	3	36	6.750
3/32	0.09375	3	36	10.125
1/8	0.12500	3	36	13.500
3/16	0.18750	3	36	20.250
1/4	0.25000	3	36	27.000

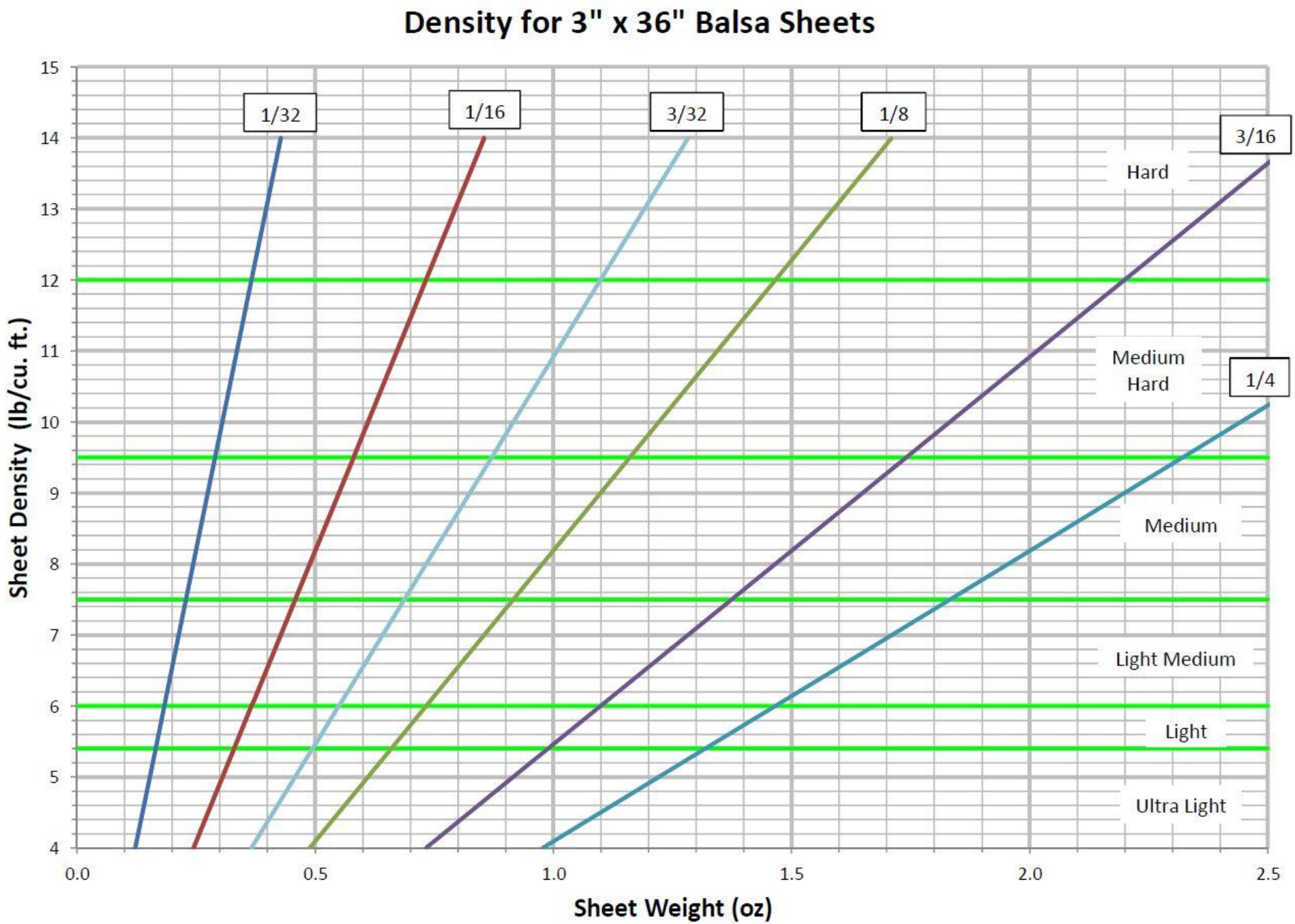
1768 Cu. In. per Cu. Ft.
28.34952 grams per oz

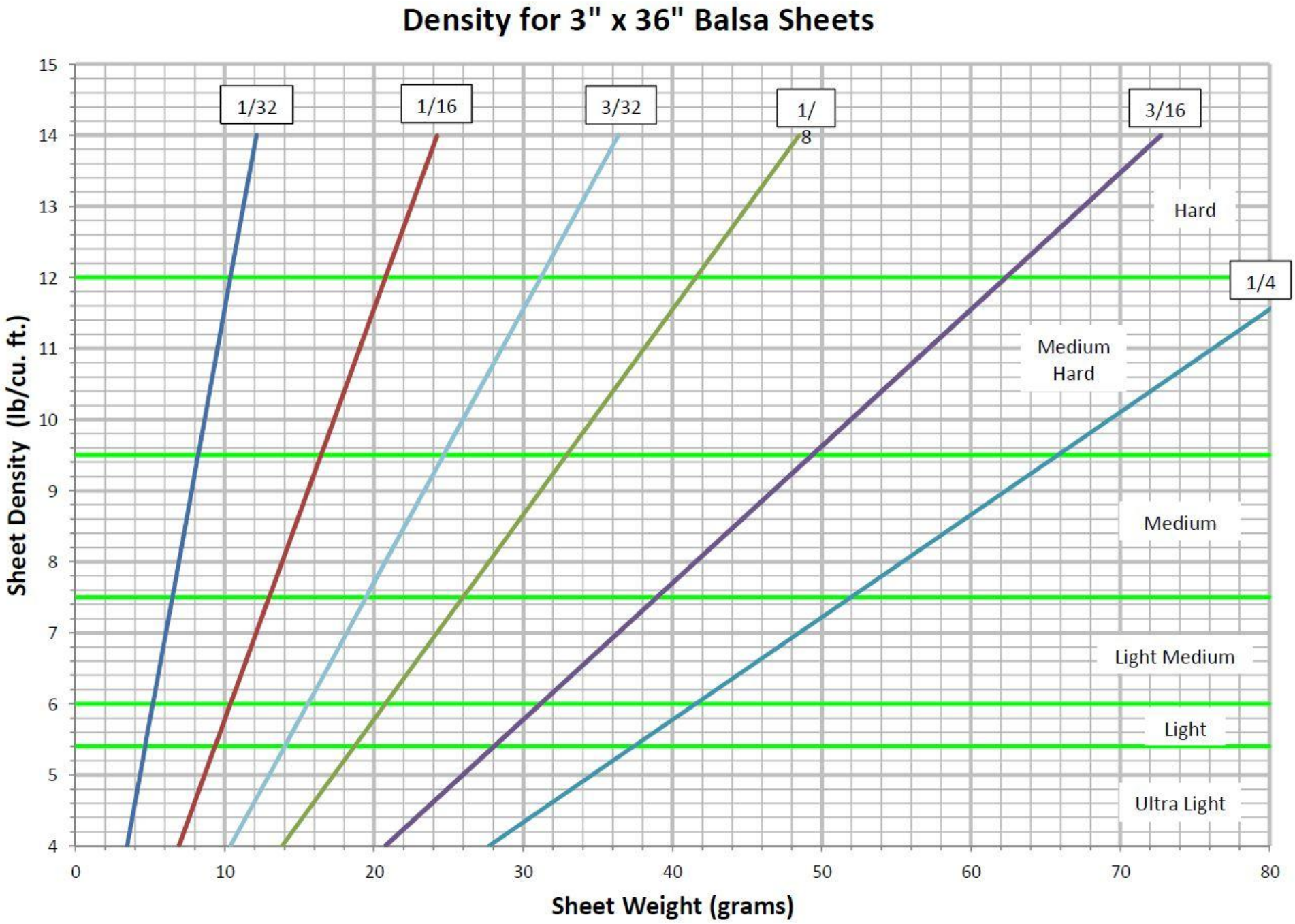
	Weight (oz.)										
1/32	0.122	0.165	0.168	0.183	0.186	0.229	0.232	0.290	0.293	0.367	0.428
1/16	0.244	0.330	0.336	0.367	0.373	0.458	0.464	0.580	0.586	0.733	0.855
3/32	0.367	0.495	0.504	0.550	0.559	0.687	0.696	0.870	0.880	1.100	1.283
1/8	0.489	0.660	0.672	0.733	0.745	0.916	0.929	1.161	1.173	1.466	1.710
3/16	0.733	0.990	1.008	1.100	1.118	1.374	1.393	1.741	1.759	2.199	2.566
1/4	0.977	1.319	1.344	1.466	1.490	1.833	1.857	2.321	2.346	2.932	3.421

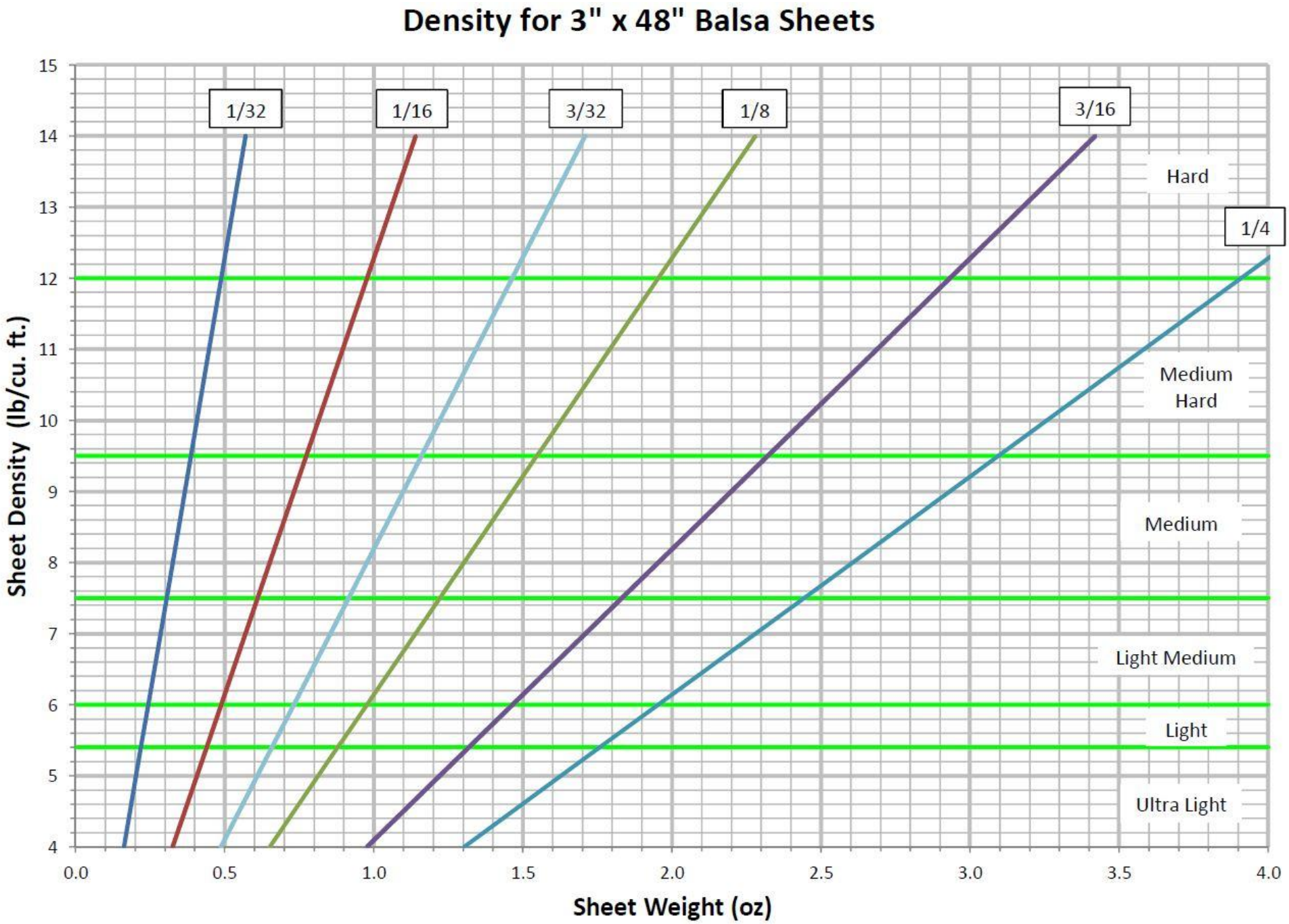
	Weight (grams)										
1/32	3.4635	4.6757	4.7623	5.1953	5.2819	6.4941	6.5807	8.2259	8.3124	10.391	12.122
1/16	6.927	9.3515	9.5247	10.391	10.564	12.988	13.161	16.452	16.625	20.781	24.245
3/32	10.391	14.027	14.287	15.586	15.846	19.482	19.742	24.678	24.937	31.172	36.367
1/8	13.854	18.703	19.049	20.781	21.127	25.976	26.323	32.903	33.25	41.562	48.489
3/16	20.781	28.054	28.574	31.172	31.691	38.965	39.484	49.355	49.875	62.343	72.734
1/4	27.708	37.406	38.099	41.562	42.255	51.953	52.645	65.807	66.5	83.124	96.978

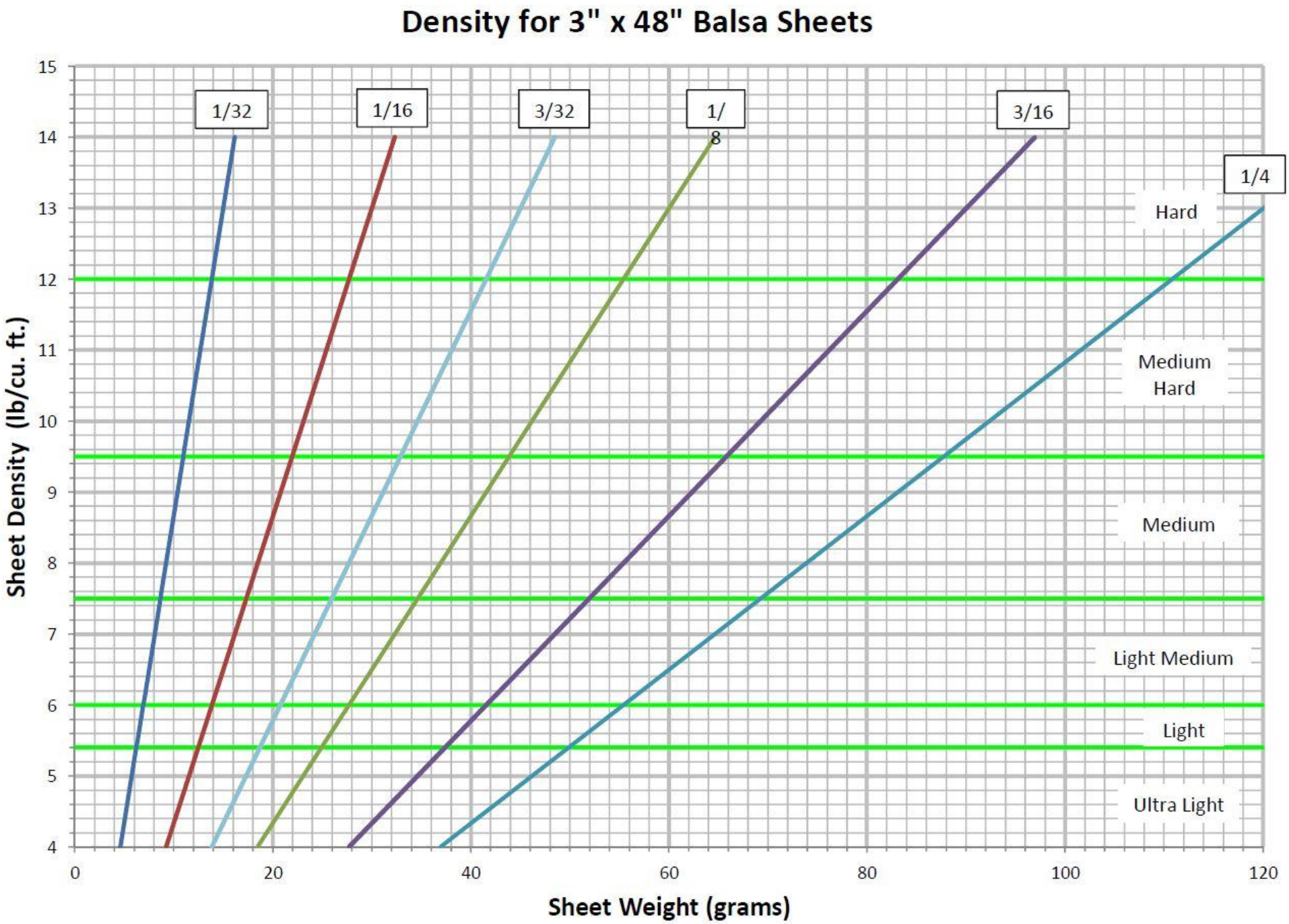
Balsa Density Nomographs

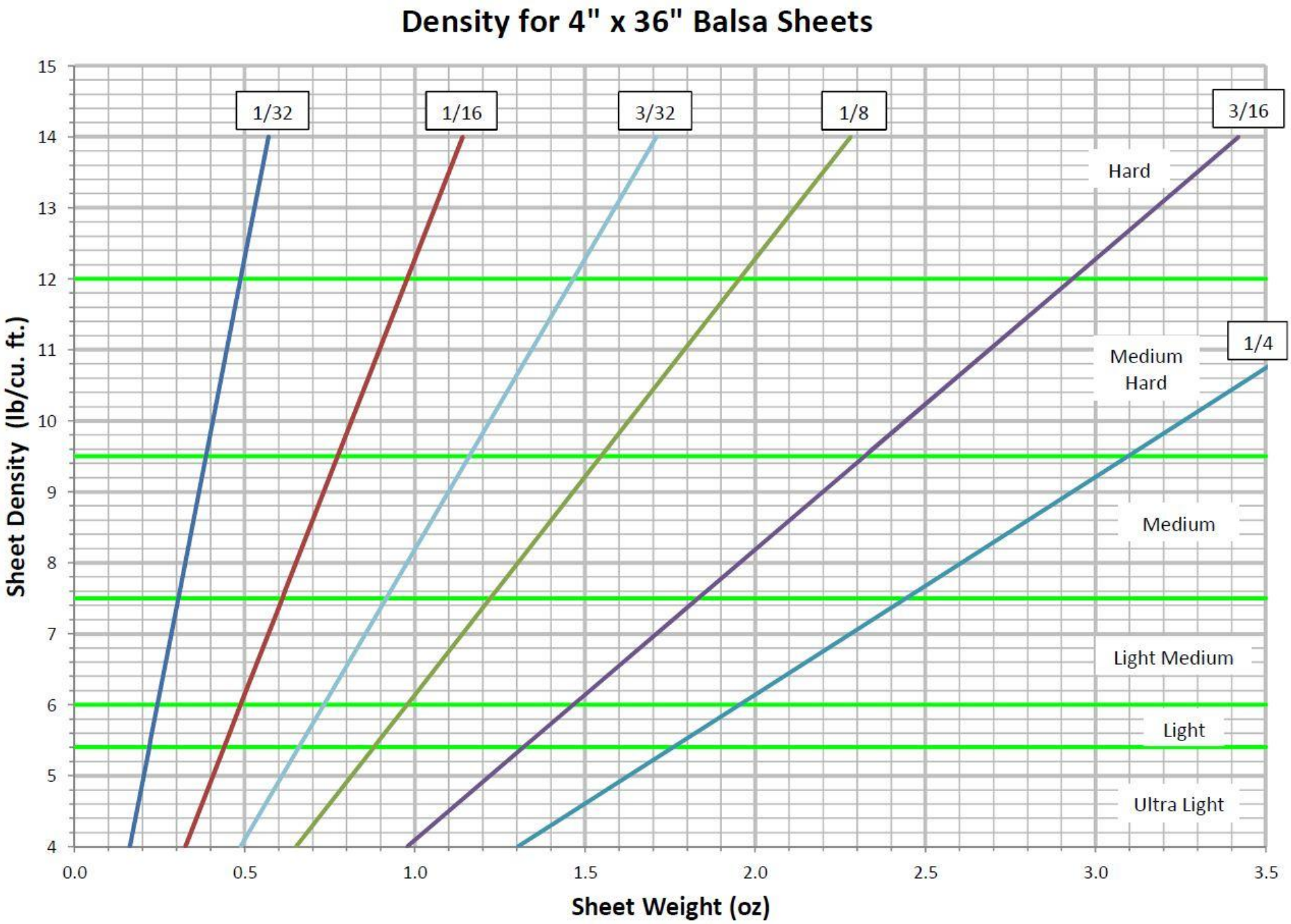
After you weight a sheet of balsa, the following nomographs are used to identify the balsa density and grade.

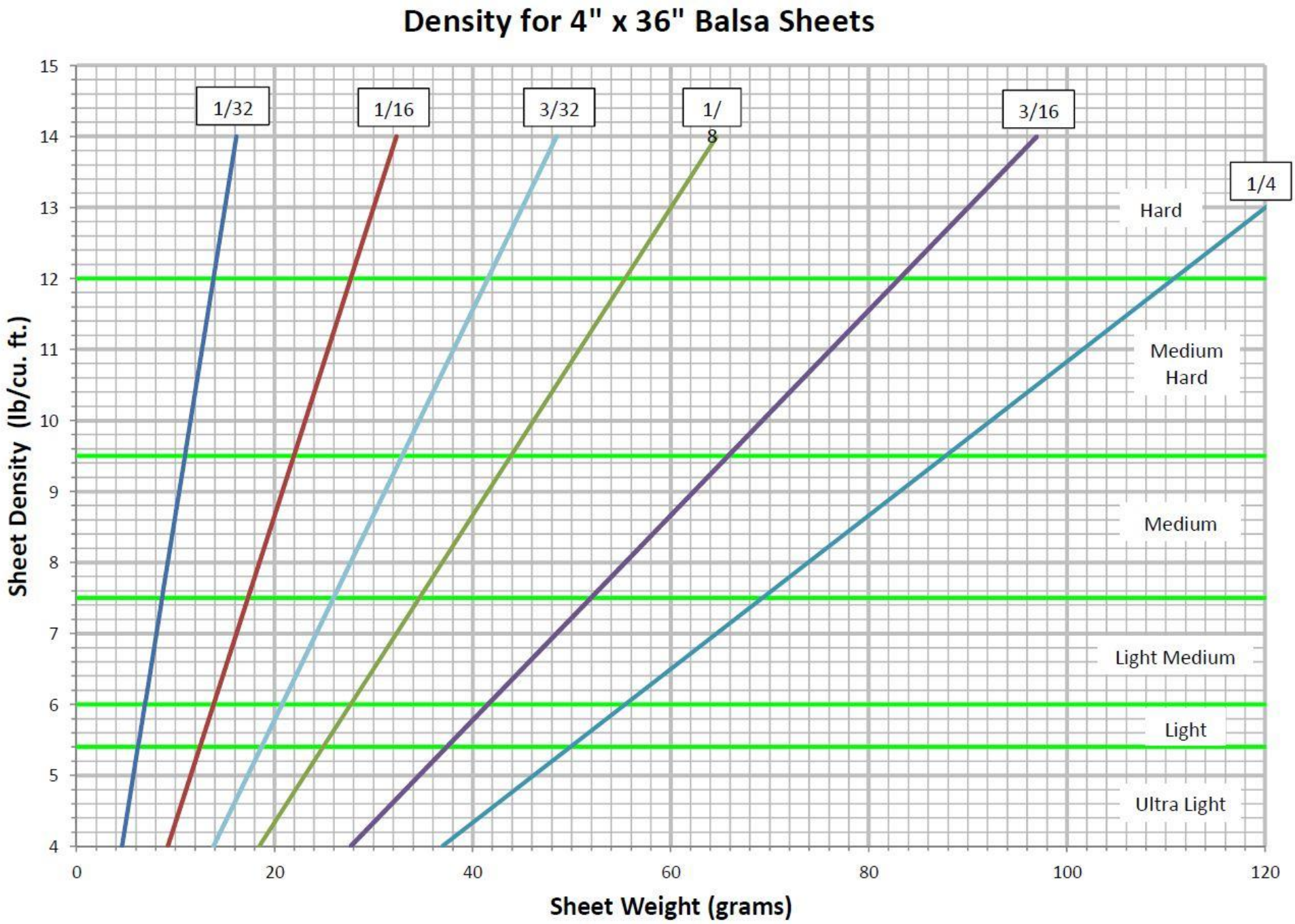

Density for 3" x 36" Balsa Sheets
Sheet Density (lb/cu. ft.)
15
14
13
12
11
10
9
8
7
6
5
4
0.0
0.5
1.0
1.5
2.0
2.5
Sheet Weight (oz)
1/32
1/16
3/32
1/8
3/16
1/4
Hard
Medium Hard
Medium
Light Medium
Light
Ultra Light

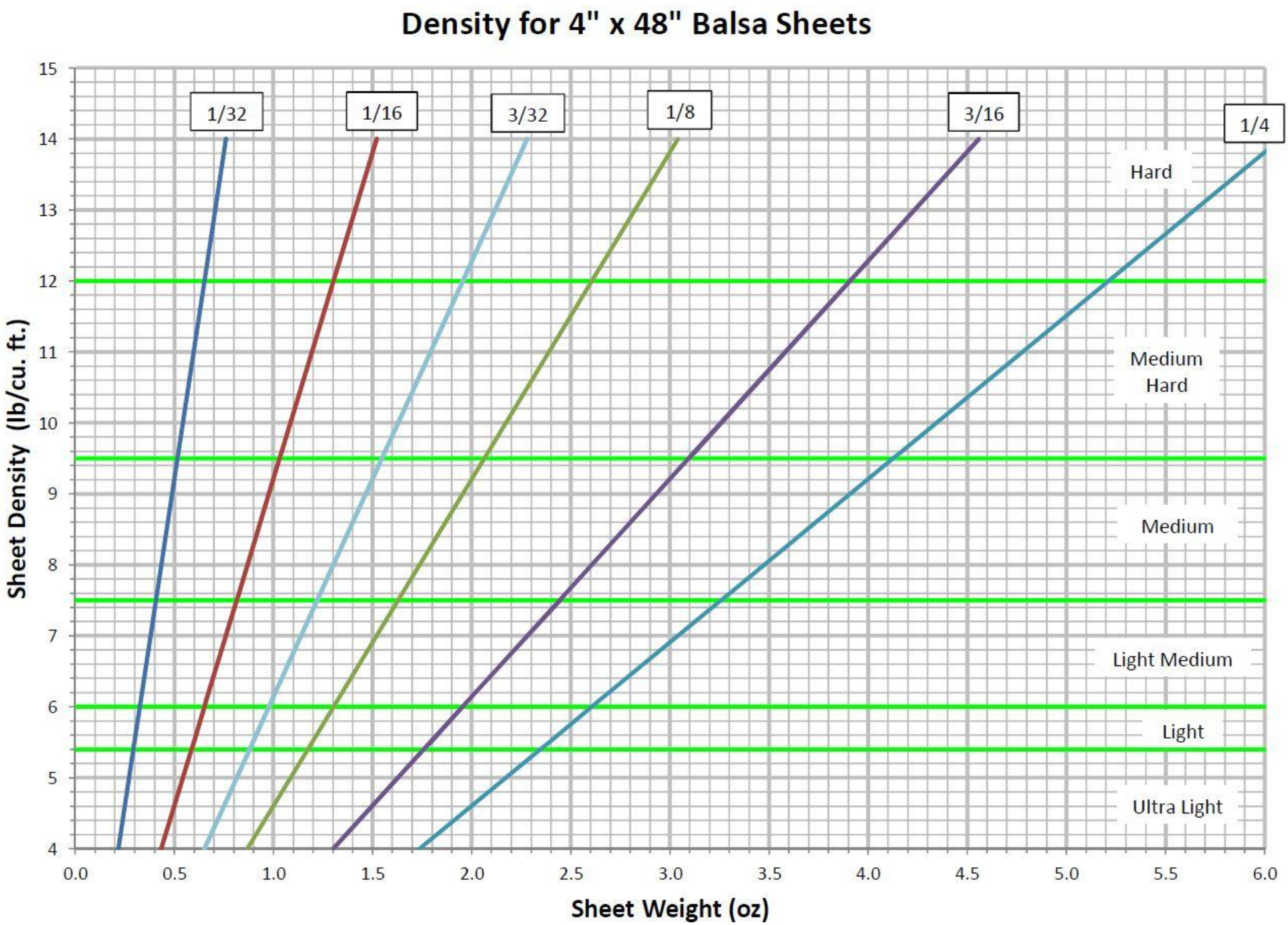

Density for 3" x 36" Balsa Sheets
Sheet Density (lb/cu. ft.)
Sheet Weight (grams)
15
14
13
12
11
10
9
8
7
6
5
4
0
10
20
30
40
50
60
70
80
1/32
1/16
3/32
1/8
3/16
1/4
Hard
Medium Hard
Medium
Light Medium
Light
Ultra Light


Density for 3" x 48" Balsa Sheets
Sheet Density (lb/cu. ft.)
15
14
13
12
11
10
9
8
7
6
5
4
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Sheet Weight (oz)
1/32
1/16
3/32
1/8
3/16
1/4
Hard
Medium Hard
Medium
Light Medium
Light
Ultra Light

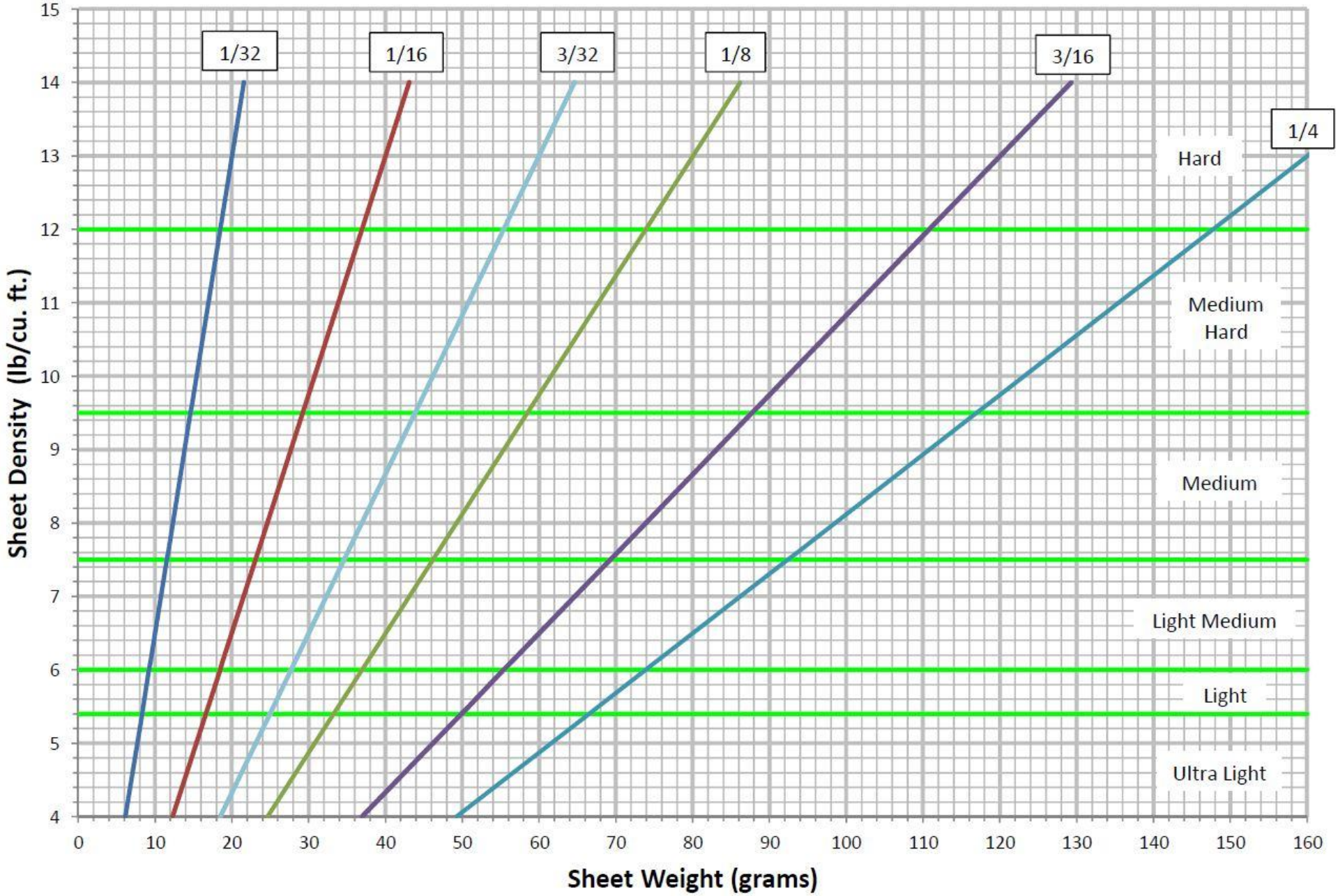

Density for 3" x 48" Balsa Sheets
Sheet Density (lb/cu. ft.)
15
14
13
12
11
10
9
8
7
6
5
4
0
20
40
60
80
100
120
Sheet Weight (grams)
1/32
1/16
3/32
1/8
3/16
1/4
Hard
Medium Hard
Medium
Light Medium
Light
Ultra Light


Density for 4" x 36" Balsa Sheets
Sheet Density (lb/cu. ft.)
15
14
13
12
11
10
9
8
7
6
5
4
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
Sheet Weight (oz)
1/32
1/16
3/32
1/8
3/16
1/4
Hard
Medium Hard
Medium
Light Medium
Light
Ultra Light


Density for 4" x 36" Balsa Sheets
Sheet Density (lb/cu. ft.)
15
14
13
12
11
10
9
8
7
6
5
4
0
20
40
60
80
100
120
Sheet Weight (grams)
1/32
1/16
3/32
1/8
3/16
1/4
Hard
Medium Hard
Medium
Light Medium
Light
Ultra Light


Density for 4" x 48" Balsa Sheets
Sheet Density (lb/cu. ft.)
15
14
13
12
11
10
9
8
7
6
5
4
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
Sheet Weight (oz)
1/32
1/16
3/32
1/8
3/16
1/4
Hard
Medium Hard
Medium
Light Medium
Light
Ultra Light

Density for 4" x 48" Balsa Sheets



Balsa Grains



Builders should take note of the different balsa grains. Each grain type has different characteristics and should be used in different applications.

C-GRAIN:

Notice that the C-grain balsa sheet has a mottled appearance and distinct checkerboard pattern. It is very stiff across the sheet and splits easily. It will not easily wrap around curved surfaces without cracking. C-grain is used for sheet balsa wings and tails, flat fuselage sides, wing ribs, formers, and trailing edges. C-grain is usually hard to find in local hobby shops. I mainly use it for sheet tail surfaces.

B-GRAIN:

B-grain grain lines are shorter than A-grain and it is less stiff than C-grain. If you look at the narrow edge of the balsa sheet, B-grain will look the same as it does on the wide, flat side. B-grain can go around soft curves without cracking. This grain is used for flat fuselage sides, wing ribs, formers, planking gradual curves, and wing leading edge sheeting.

A-GRAIN:

A-grain has long fibers that show up as long grain lines. If you look at the narrow edge of the balsa sheet, A-grain will have a checkerboard appearance. This is the most flexible of all grains, and it is quite easy to wrap around curved surfaces. A-grain is typically used for sheet covering rounded fuselages and wing leading edges, planking fuselages, forming tubes, strong flexible spars, and hand launch glider fuselages.