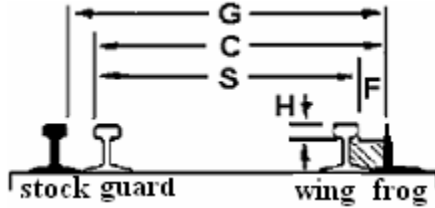


NMRA STANDARDS (IMPERIAL)
S-3.2 STANDARDS, TRACK, STANDARD SCALE



NMRA STANDARD	
Imperial Standards	
Scale Track For Guarded Work	
July 2009	S-3.2

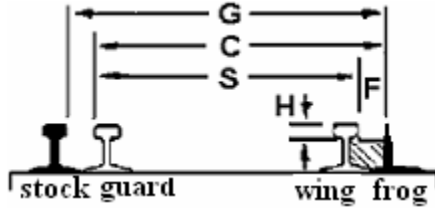
The Span, S, is derived by knowing $S = C - F$.
C is the primary controlling dimension.

Scale	Scale Ratio	Standard S3.2 Guarded using Target and Asymmetric Imperial (inch) Tolerance													
		G			C			S			F			H	Wheel
		Gage at Frog			Check Gage			Span			Flangeway				
		Target	Plus	Minus	Target	Plus	Minus	Target	Plus	Minus	Target	Plus	Minus	MIN	CODE
1"	1:12	4.752	0.056	0.002	4.584	0.013	0.002	4.364	0.002	0.002	0.218	0.002	0.065	0.140	1/2"
3/4"	1:16	3.502	0.034	0.002	3.351	0.016	0.002	3.170	0.002	0.002	0.179	0.002	0.046	0.094	13/32"
F	1:20.32	2.783	0.003	0.002	2.681	0.016	0.002	2.580	0.002	0.002	0.099	0.002	0.015	0.090	256
Fn3	1:20.32	1.768	0.004	0.002	1.662	0.007	0.002	1.556	0.002	0.002	0.104	0.002	0.007	0.090	256
LS	Varied	1.768	0.004	0.002	1.662	0.007	0.002	1.556	0.002	0.002	0.104	0.002	0.007	0.090	256
LSn3	Varied	1.127	0.016	0.002	1.060	0.016	0.002	0.981	0.002	0.002	0.077	0.002	0.028	0.045	175
O	1:48	1.252	0.012	0.002	1.181	0.013	0.002	1.102	0.002	0.002	0.077	0.002	0.021	0.045	145
On3	1:48	0.752	0.012	0.002	0.707	0.010	0.002	0.654	0.002	0.002	0.051	0.002	0.018	0.026	116
On30	1:48	0.651	0.010	0.002	0.607	0.007	0.002	0.557	0.002	0.002	0.048	0.002	0.013	0.025	110
On2	1:48	0.502	0.009	0.002	0.457	0.007	0.002	0.407	0.002	0.002	0.048	0.002	0.012	0.025	110
S	1:64	0.885	0.010	0.002	0.841	0.007	0.002	0.791	0.002	0.002	0.048	0.002	0.013	0.025	110
Sn3	1:64	0.565	0.010	0.002	0.521	0.007	0.002	0.471	0.002	0.002	0.048	0.002	0.013	0.025	110
Sn2	1:64	0.415	0.008	0.002	0.379	0.004	0.002	0.339	0.002	0.002	0.038	0.002	0.008	0.023	88
OO	1:76.2	0.752	0.009	0.002	0.707	0.007	0.002	0.657	0.002	0.002	0.048	0.002	0.012	0.025	110
HO	1:87.1	0.651	0.010	0.002	0.607	0.007	0.002	0.557	0.002	0.002	0.048	0.002	0.013	0.025	110
HOn3	1:87.1	0.415	0.008	0.002	0.379	0.004	0.002	0.339	0.002	0.002	0.038	0.002	0.008	0.023	88
HOn2	1:87.1	0.278	0.007	0.002	0.248	0.004	0.002	0.215	0.002	0.002	0.031	0.002	0.007	0.020	72
TT	1:120	0.473	0.006	0.002	0.439	0.003	0.002	0.403	0.002	0.002	0.034	0.002	0.005	0.023	79
TTn42	1:120	0.355	0.004	0.002	0.325	0.001	0.002	0.295	0.001	0.002	0.028	0.002	0.001	0.020	72
TTn3	1:120	0.302	0.004	0.002	0.272	0.002	0.002	0.242	0.002	0.002	0.028	0.002	0.002	0.020	72
N	1:160	0.355	0.004	0.002	0.325	0.001	0.002	0.295	0.001	0.002	0.028	0.002	0.001	0.020	72
Nn3	1:160	0.258	0.003	0.002	0.232	0.003	0.002	0.207	0.002	0.002	0.023	0.002	0.002	0.016	54
Nn2	1:160	0.179	0.002	0.002	0.152	0.006	0.002	0.127	0.002	0.002	0.023	0.002	0.004	0.016	54
Z	1:220	0.259	0.008	0.002	0.238	0.004	0.002	0.213	0.002	0.002	0.023	0.002	0.008	0.016	54

NOTES:

- When wheels are used with deeper flanges - see **STANDARD S3.3**.
- The F limit applies only to the wing rail, and the C limit applies only to the guard rail. Both apply to the same rail only in special work such as a crossing.
- For a full discussion of minimum radius, minimum turnout and radius equivalents of degrees of curvature, etc., see **S-8** and **RP-11**.
- Guard and wing rails shall be flared to a minimum dimension across the flared flangeway end of $1.5 \times F_{max}$. Flare angle shall not exceed 10 degrees, and the Flare must disappear before reaching the working area of its rail.
- These track dimensions are more restrictive with Gmax for guarded trackwork, for general track - see STANDARD S3.1.**
- Metric measurements are found on page 2.**
- Please see S4.2 and RP-25 Wheel Contour for the appropriate wheel profile.
- O-scale frog flangeway (F) is recommended target for code 145 wheels at 0.071".

NMRA STANDARDS (METRIC)
S-3.2 STANDARDS, TRACK, STANDARD SCALE



NMRA STANDARD	
Metric Standards	
Scale Track For Guarded Work	
July 2009	S-3.2

The Span, S, is derived by knowing $S = C - F$.
C is the primary controlling dimension.

Scale	Scale Ratio	Standard S3.2 Guarded using Target and Asymmetric METRIC (mm) Tolerance													
		G			C			S			F			H	Wheel
		Gage at Frog			Check Gage			Span			Flangeway				
		Target	Plus	Minus	Target	Plus	Minus	Target	Plus	Minus	Target	Plus	Minus	MIN	CODE
1"	1:12	120.70	1.42	0.05	116.43	0.33	0.05	110.85	0.05	0.05	5.54	0.05	1.65	3.56	1/2"
3/4"	1:16	88.95	0.86	0.05	85.12	0.41	0.05	80.52	0.05	0.05	4.55	0.05	1.17	2.39	13/32"
F	1:20.32	70.69	0.08	0.05	68.10	0.41	0.05	65.53	0.05	0.05	2.51	0.05	0.38	2.29	256
Fn3	1:20.32	44.91	0.10	0.05	42.21	0.18	0.05	39.52	0.05	0.05	2.64	0.05	0.18	2.29	256
LS	Varied	44.91	0.10	0.05	42.21	0.18	0.05	39.52	0.05	0.05	2.64	0.05	0.18	2.29	256
LSn3	Varied	28.63	0.41	0.05	26.92	0.41	0.05	24.92	0.05	0.05	1.96	0.05	0.71	1.14	175
O	1:48	31.80	0.30	0.05	30.00	0.33	0.05	27.99	0.05	0.05	1.96	0.05	0.53	1.14	145
On3	1:48	19.10	0.30	0.05	17.96	0.25	0.05	16.61	0.05	0.05	1.30	0.05	0.46	0.66	116
On30	1:48	16.54	0.25	0.05	15.42	0.18	0.05	14.15	0.05	0.05	1.22	0.05	0.33	0.64	110
On2	1:48	12.75	0.23	0.05	11.61	0.18	0.05	10.34	0.05	0.05	1.22	0.05	0.30	0.64	110
S	1:64	22.48	0.25	0.05	21.36	0.18	0.05	20.09	0.05	0.05	1.22	0.05	0.33	0.64	110
Sn3	1:64	14.35	0.25	0.05	13.23	0.18	0.05	11.96	0.05	0.05	1.22	0.05	0.33	0.64	110
Sn2	1:64	10.54	0.20	0.05	9.63	0.10	0.05	8.61	0.05	0.05	0.97	0.05	0.20	0.58	88
OO	1:76.2	19.10	0.23	0.05	17.96	0.18	0.05	16.69	0.05	0.05	1.22	0.05	0.30	0.64	110
HO	1:87.1	16.54	0.25	0.05	15.42	0.18	0.05	14.15	0.05	0.05	1.22	0.05	0.33	0.64	110
HOn3	1:87.1	10.54	0.20	0.05	9.63	0.10	0.05	8.61	0.05	0.05	0.97	0.05	0.20	0.58	88
HOn2	1:87.1	7.06	0.18	0.05	6.30	0.10	0.05	5.46	0.05	0.05	0.79	0.05	0.18	0.51	72
TT	1:120	12.01	0.15	0.05	11.15	0.08	0.05	10.24	0.05	0.05	0.86	0.05	0.13	0.58	79
TTn42	1:120	9.02	0.10	0.05	8.26	0.03	0.05	7.49	0.03	0.05	0.71	0.05	0.03	0.51	72
TTn3	1:120	7.67	0.10	0.05	6.91	0.05	0.05	6.15	0.05	0.05	0.71	0.05	0.05	0.51	72
N	1:160	9.02	0.10	0.05	8.26	0.03	0.05	7.49	0.03	0.05	0.71	0.05	0.03	0.51	72
Nn3	1:160	6.55	0.08	0.05	5.89	0.08	0.05	5.26	0.05	0.05	0.58	0.05	0.05	0.41	54
Nn2	1:160	4.55	0.05	0.05	3.86	0.15	0.05	3.23	0.05	0.05	0.58	0.05	0.10	0.41	54
Z	1:220	6.58	0.20	0.05	6.05	0.10	0.05	5.41	0.05	0.05	0.58	0.05	0.20	0.41	54

NOTES:

1. When wheels are used with deeper flanges - see **STANDARD S3.3**.
2. The F limit applies only to the wing rail, and the C limit applies only to the guard rail. Both apply to the same rail only in special work such as a crossing.
3. For a full discussion of minimum radius, minimum turnout and radius equivalents of degrees of curvature, etc., see **S-8** and **RP-11**.
4. Guard and wing rails shall be flared to a minimum dimension across the flared flangeway end of $1.5 \times F_{max}$. Flare angle shall not exceed 10 degrees, and the Flare must disappear before reaching the working area of its rail.
5. **These track dimensions are more restrictive with Gmax for guarded trackwork, for general track - see STANDARD S3.1.**
6. O-scale frog flangeway (F) is recommended target for code 145 wheels at 1,8mm.
7. **Imperial measurements are found on page 1.**