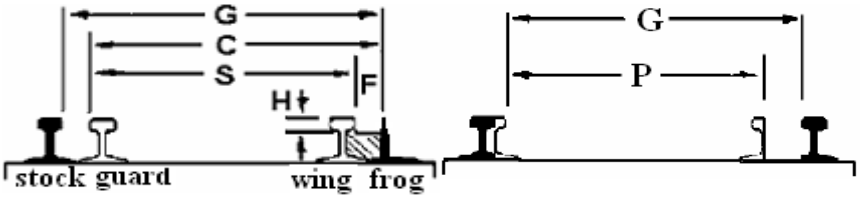
NMRA STANDARDS
S-3.3 STANDARDS, GUARDED TRACK, FOR DEEP FLANGES



NMRA STANDARD	
Standards	
Deep Flanges For Guarded Track	
February 20, 2010	**S-3.3**

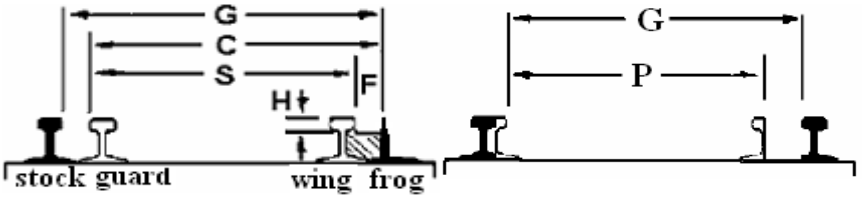
Scale	Scale Ratio		Standard S3.3 Deep Flange with Asymmetric Tolerance																
			G			C			S			F			P			Rail	H
			Gage at Frog			Check Gage			Span			Flangeway			Points				
			Target	Plus	Minus	Target	Plus	Minus	Target	Plus	Minus	Target	Plus	Minus	Target	Plus	Minus	Min	Min
LS_{df}	Varied		Large Scale Standards on Separate Page																
O_{df}	1:48	Inch	1.252	0.012	0.002	1.162	0.013	0.002	1.021	0.004	0.036	0.154	0.002	0.021	1.135	0.002	0.004	175	0.094
		mm	*31.80*	*0.30*	*0.05*	*29.51*	*0.33*	*0.05*	*25.93*	*0.10*	*0.91*	*3.91*	*0.05*	*0.53*	*28.83*	*0.05*	*0.10*		*2.39*
O_{27}	1:48	Inch	1.252	0.012	0.002	1.162	0.013	0.002	1.021	0.004	0.036	0.154	0.002	0.021	1.135	0.002	0.004	175	0.094
		mm	*31.80*	*0.30*	*0.05*	*29.51*	*0.33*	*0.05*	*25.93*	*0.10*	*0.91*	*3.91*	*0.05*	*0.53*	*28.83*	*0.05*	*0.10*		*2.39*
S_{df}	1:64	Inch	0.885	0.010	0.002	0.841	0.007	0.002	0.793	0.004	0.002	0.048	0.002	0.013	0.820	0.002	0.004	125	0.094
		mm	*22.48*	*0.25*	*0.05*	*21.36*	*0.18*	*0.05*	*20.14*	*0.10*	*0.05*	*1.22*	*0.05*	*0.33*	*20.83*	*0.05*	*0.10*		*2.39*
HO_{df}	1:87.1	Inch	0.651	0.010	0.002	0.607	0.007	0.002	0.559	0.004	0.002	0.048	0.002	0.013	0.586	0.002	0.004	100	0.047
		mm	*16.54*	*0.25*	*0.05*	*15.42*	*0.18*	*0.05*	*14.20*	*0.10*	*0.05*	*1.22*	*0.05*	*0.33*	*14.88*	*0.05*	*0.10*		*1.19*
N_{df}	1:160	Inch	0.355	0.004	0.002	0.325	0.001	0.002	0.297	0.001	0.002	0.028	0.002	0.001	0.312	0.002	0.002	83	0.035
		mm	*9.02*	*0.10*	*0.05*	*8.26*	*0.03*	*0.05*	*7.54*	*0.03*	*0.05*	*0.71*	*0.05*	*0.03*	*7.92*	*0.05*	*0.05*		*0.89*
Z_{df}	1:220	Inch	0.252	0.008	0.002	0.238	0.004	0.002	0.215	0.004	0.002	0.023	0.002	0.008	0.222	0.002	0.002	60	0.024
		mm	*6.40*	*0.20*	*0.05*	*6.05*	*0.10*	*0.05*	*5.46*	*0.10*	*0.05*	*0.58*	*0.05*	*0.20*	*5.64*	*0.05*	*0.05*		*0.61*

Scales with deep flanges were developed to accommodate the needs of modelers who wish to operate model trains on very sharp curves or on track that has twists which is common in outdoor environments. Compromises are often made to both selectively compress the model and/or develop mechanisms that have the ability to navigate very sharp curves. In general models in this class use wheels with larger flanges and usually use track with a larger code size

Track NOTES:

1. 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.
2. For Gauge widening in curves for long wheelbase equipment see RP-8.
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 x Fmax. Flare angle shall not exceed 10 degrees, and the Flare must disappear before reaching the guard 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. Models built to the deep flange standards typically do not operate on track built to the S.3.2 standards unless the trackwork has been built to accommodate the deeper flanges. Models built to the S-3.3 standards shall be clearly labeled in order to not confuse the modeler.
7. The term LS scale is used to refer to range of scales developed to be able to be operated together, typically in an outdoors setting, for example a garden. LS models all use the same wheel and track profiles to facilitate interchange.

NMRA STANDARDS
S-3.3 STANDARDS, GUARDED TRACK, FOR DEEP FLANGES



NMRA STANDARD	
Standards	
Deep Flanges For Guarded Track	
February 20, 2010	**S-3.3**

TRACK (S3.3 Large Scales Deep Flange):

Scale	Scale Ratio	**Standard S3.3** Guarded using Target and Asymmetric **Imperial (inch)** Tolerance															
		G			C			S			F			P			H
		Gage at Frog			Check Gage			Span			Flangeway			Points			
		Target	Plus	Minus	Target	Plus	Minus	Target	Plus	Minus	Target	Plus	Minus	Target	Plus	Minus	MIN
LSdf	Varied	1.772	0.010	0.006	1.652	0.010	0.004	1.537	0.018	0.002	0.116	0.002	0.025	1.629	0.003	0.005	0.118

Scale	Scale Ratio	**Standard S3.3** Guarded using Target and Asymmetric ***METRIC (mm)*** Tolerance															
		G			C			S			F			P			H
		Gage at Frog			Check Gage			Span			Flangeway			Points			
		Target	Plus	Minus	Target	Plus	Minus	Target	Plus	Minus	Target	Plus	Minus	Target	Plus	Minus	MIN
LSdf	Varied	*45.01*	*0.25*	*0.15*	*41.96*	*0.25*	*0.10*	*39.04*	*0.46*	*0.05*	*2.95*	*0.05*	*0.64*	*41.38*	*0.08*	*0.13*	*3.00*

Track NOTES:

1) The term “LS” for ”Large Scales” standards covers all common commercial scales running on LS 45mm gauge track (1:32, 1:29, 1:24, 1:22.5, and 1:20.3) without regard as to whether the trains are standard or narrow gauge.
2) Due to the inherent nature of large scale trains, the wheel and track standards for “Standard” (Sx.2) and “Deep Flange” (Sx.3) are identical except in terms of flange width and depth, thus the track H depth also is changed.
3) With regard to 1:20.3 (also designated "F" scale), trains built to that scale running on LS 45mm gauge track are also classified Fn3. Standards for Fn3 track and wheels are identical to those for LS, with exception given to more specific targets given wheel for tread width and flange depth. Track standards for Fn3 are to be identical to those used for LS 45mm gauge.