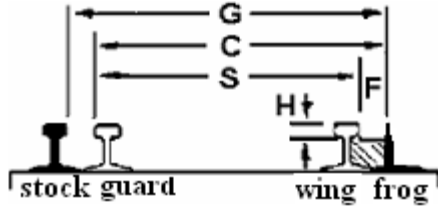


NMRA STANDARDS
S-3.3 STANDARDS, GUARDED TRACK, FOR DEEP FLANGES



| | |
|---------------------------------------|--------------|
| NMRA STANDARD | |
| Standards | |
| Deep Flanges For Guarded Track | |
| Approved: July 2009 | S-3.3 |

| Scale | Scale Ratio | | Standard S3.3 Deep Flange with Asymmetric Tolerance | | | | | | | | | | | | Rail | H |
|------------------|-------------|------|---|-------|-------|------------|-------|-------|--------|-------|-------|-----------|-------|-------|------|-------|
| | | | G | | | C | | | S | | | F | | | | |
| | | | Gage at Frog | | | Check Gage | | | Span | | | Flangeway | | | | |
| | | | Target | Plus | Minus | Target | Plus | Minus | Target | Plus | Minus | Target | Plus | Minus | | |
| LS _{df} | Varied | Inch | 1.768 | 0.004 | 0.002 | 1.662 | 0.007 | 0.002 | 1.558 | 0.004 | 0.002 | 0.104 | 0.002 | 0.007 | 225 | 0.118 |
| | | mm | 44.91 | 0.10 | 0.05 | 42.21 | 0.18 | 0.05 | 39.57 | 0.10 | 0.05 | 2.64 | 0.05 | 0.18 | | 3.00 |
| 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 | 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 | | 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 | 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 | | 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 | 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 | | 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 | 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 | | 1.19 |
| N _{df} | 1:160 | Inch | 0.36 | 0.004 | 0.002 | 0.33 | 0.001 | 0.002 | 0.30 | 0.001 | 0.002 | 0.03 | 0.002 | 0.001 | 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 | | 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 | 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 | | 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

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-3.1 or S.3.2 standards unless the trackwork has been built to accommodate the deeper flanges. Models built to the S-1.3 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.