

NMRA Recommended Practices
Fine:TT Scale
Curved Switch Turnout

**TURNOUT
DIMENSIONS**

Revised: February 2015

RP-12.14

Design and calculations by Van S. Fehr

(1)	FROG NUMBERS	4	5	6	7	8	9	10	11	12
PROPERTIES OF CURVED SWITCHES										
(2)	Switch Rail Length	1.385	1.391	1.424	2.367	2.432	2.488	2.500	2.535	3.737
(3)	Switch Point Angle (deg.)	1.624	1.617	1.580	0.950	0.924	0.904	0.899	0.887	0.601
(4)	Switch Heel Spread	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074
(5)	Switch Heel Angle (deg.)	4.525	4.505	4.401	2.647	2.576	2.518	2.506	2.471	1.676
(6)	Switch Rail Radius	27.348	27.591	28.918	79.918	84.353	88.292	89.125	91.703	199.191
(7)	Switch Mid-Ordinate	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
LEAD TO THEORETICAL POINT OF FROG										
(8)	Lead	3.583	4.044	4.504	6.269	6.804	7.271	7.710	8.148	10.329
CLOSURE DISTANCE										
(9)	Straight Rail Length	1.811	2.232	2.625	3.338	3.758	4.026	4.437	4.767	5.654
(10)	Curved Rail Length	1.850	2.263	2.652	3.360	3.777	4.044	4.453	4.781	5.667
(11)	Curved Rail Radius	10.901	18.751	29.640	34.845	47.289	60.308	79.263	100.189	104.896
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL										
(12)	1st Point Y1	0.120	0.127	0.132	0.123	0.126	0.127	0.131	0.133	0.125
(13)	1st Point X1	1.838	1.949	2.080	3.201	3.371	3.494	3.609	3.727	5.150
(14)	Mid-Point Y2	0.184	0.196	0.205	0.192	0.196	0.197	0.203	0.206	0.195
(15)	Mid-Point X2	2.290	2.507	2.737	4.036	4.311	4.501	4.718	4.919	6.564
(16)	3rd Point Y3	0.268	0.282	0.292	0.281	0.286	0.283	0.290	0.293	0.284
(17)	3rd Point X3	2.743	3.065	3.393	4.870	5.250	5.507	5.827	6.111	7.978
PROPERTIES OF FROGS										
(18)	Frog Angle (deg.)	14.250	11.421	9.527	8.171	7.153	6.360	5.725	5.205	4.772
(19)	Overall Length	0.871	0.988	1.105	1.322	1.440	1.757	1.824	2.062	2.242
(20)	Toe Length	0.387	0.421	0.455	0.564	0.614	0.757	0.774	0.846	0.938
(21)	Heel Length	0.483	0.567	0.650	0.758	0.825	1.000	1.050	1.217	1.304
(22)	Toe Spread	0.096	0.084	0.076	0.080	0.077	0.084	0.077	0.077	0.078
(23)	Heel Spread	0.120	0.113	0.108	0.108	0.103	0.111	0.105	0.110	0.109
(35)	Wing Rail Extension	0.296	0.336	0.375	0.415	0.454	0.494	0.533	0.573	0.613
(36)	Wing Rail Flare Length	0.150	0.150	0.150	0.150	0.200	0.200	0.267	0.267	0.300
(37)	Wing Rail Flare Width	0.020	0.020	0.020	0.020	0.019	0.019	0.018	0.018	0.018
(38)	Wing Rail Bend Width	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(39)	Wing Rail End Chamfer	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
POINT OF FROG TO INTERSECTION OF CENTERLINES										
(24)	PF to ICL	1.884	2.355	2.826	3.297	3.768	4.239	4.710	5.181	5.652
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS										
For Track Centers of:		1.300	(13 prototype feet)							
(25)	Straight Track Dist.	1.351	1.725	2.094	2.460	2.823	3.186	3.548	3.908	4.269
(26)	Crossover Track Dist.	1.513	1.855	2.202	2.552	2.905	3.258	3.613	3.968	4.323
For Track Center Increment of:		0.100	(1 prototype foot)							
(28)	Straight Track Incr.	0.394	0.495	0.596	0.696	0.797	0.897	0.998	1.098	1.198
(29)	Crossover Track Incr.	0.406	0.505	0.604	0.704	0.803	0.903	1.003	1.102	1.202
GUARD RAILS										
(30)	Parallel End Setback	0.067	0.071	0.075	0.079	0.083	0.088	0.092	0.096	0.100
(31)	Bevel Length	0.108	0.108	0.108	0.108	0.108	0.108	0.108	0.108	0.108
(32)	Flare Length	0.242	0.242	0.242	0.242	0.275	0.275	0.275	0.275	0.275
(33)	Overall Length	0.825	0.825	0.825	0.825	1.100	1.100	1.100	1.100	1.100
(34)	Parallel Length	0.342	0.342	0.342	0.342	0.550	0.550	0.550	0.550	0.550
(37)	Flare Width	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
(38)	Plane Width	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
(39)	End Chamfer	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025

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(1)	FROG NUMBERS	13	14	15	16	17	18	19	20
PROPERTIES OF CURVED SWITCHES									
(2)	Switch Rail Length	3.774	3.820	3.877	3.932	4.840	4.908	4.957	5.012
(3)	Switch Point Angle (deg.)	0.596	0.588	0.580	0.572	0.464	0.458	0.453	0.448
(4)	Switch Heel Spread	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074
(5)	Switch Heel Angle (deg.)	1.660	1.640	1.616	1.593	1.294	1.276	1.264	1.250
(6)	Switch Rail Radius	203.205	208.136	214.446	220.506	334.124	343.579	350.536	358.360
(7)	Switch Mid-Ordinate	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
LEAD TO THEORETICAL POINT OF FROG									
(8)	Lead	10.814	11.298	11.775	12.271	14.027	14.525	15.023	15.521
CLOSURE DISTANCE									
(9)	Straight Rail Length	6.046	6.430	6.758	7.186	7.940	8.275	8.710	9.140
(10)	Curved Rail Length	6.058	6.442	6.768	7.196	7.949	8.284	8.719	9.148
(11)	Curved Rail Radius	126.433	150.589	176.053	207.540	219.480	249.031	285.254	324.663
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL									
(12)	1st Point Y1	0.127	0.129	0.130	0.132	0.128	0.129	0.131	0.132
(13)	1st Point X1	5.286	5.427	5.567	5.728	6.825	6.976	7.135	7.297
(14)	Mid-Point Y2	0.198	0.201	0.202	0.205	0.200	0.201	0.204	0.206
(15)	Mid-Point X2	6.797	7.035	7.256	7.525	8.810	9.045	9.312	9.582
(16)	3rd Point Y3	0.287	0.290	0.290	0.294	0.290	0.290	0.293	0.296
(17)	3rd Point X3	8.309	8.643	8.945	9.321	10.794	11.114	11.490	11.867
PROPERTIES OF FROGS									
(18)	Frog Angle (deg.)	4.405	4.091	3.818	3.580	3.369	3.182	3.015	2.864
(19)	Overall Length	2.422	2.602	2.698	2.878	3.058	3.238	3.337	3.435
(20)	Toe Length	0.993	1.048	1.140	1.153	1.248	1.342	1.355	1.369
(21)	Heel Length	1.429	1.554	1.558	1.725	1.810	1.896	1.981	2.067
(22)	Toe Spread	0.076	0.075	0.076	0.072	0.073	0.075	0.071	0.068
(23)	Heel Spread	0.110	0.111	0.104	0.108	0.106	0.105	0.104	0.103
(35)	Wing Rail Extension	0.679	0.746	0.785	0.867	0.906	0.946	1.013	1.079
(36)	Wing Rail Flare Length	0.391	0.443	0.462	0.517	0.536	0.554	0.606	0.658
(37)	Wing Rail Flare Width	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
(38)	Wing Rail Bend Width	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
(39)	Wing Rail End Chamfer	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
POINT OF FROG TO INTERSECTION OF CENTERLINES									
(24)	PF to ICL	6.123	6.594	7.065	7.536	8.007	8.478	8.949	9.420
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS									
For Track Centers of:		1.300	(13 prototype feet)						
(25)	Straight Track Dist.	4.629	4.989	5.348	5.708	6.067	6.426	6.785	7.144
(26)	Crossover Track Dist.	4.679	5.035	5.392	5.748	6.105	6.462	6.819	7.176
For Track Center Increment of:		0.100	(1 prototype foot)						
(28)	Straight Track Incr.	1.298	1.398	1.498	1.598	1.699	1.799	1.899	1.999
(29)	Crossover Track Incr.	1.302	1.402	1.502	1.602	1.701	1.801	1.901	2.001
GUARD RAILS									
(30)	Parallel End Setback	0.104	0.108	0.113	0.117	0.121	0.125	0.129	0.133
(31)	Bevel Length	0.108	0.108	0.108	0.108	0.108	0.108	0.108	0.108
(32)	Flare Length	0.275	0.300	0.300	0.300	0.300	0.342	0.342	0.342
(33)	Overall Length	1.100	1.300	1.300	1.300	1.300	1.650	1.650	1.650
(34)	Parallel Length	0.550	0.700	0.700	0.700	0.700	0.967	0.967	0.967
(37)	Total Flare at End	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
(38)	Bevel Cut at End	0.009	0.008	0.008	0.008	0.008	0.008	0.008	0.008
(39)	End Chamfer	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025