

# TT Scale

## Straight Switch Turnout

# TURNOUT DIMENSIONS

Revised: February 2015

RP-12.33

Design and calculations by Van S. Fehr

(1)	FROG NUMBERS	4	5	6	7	8	9	10	11	12
<b>PROPERTIES OF STRAIGHT SWITCHES</b>										
(2)	Switch Rail Length	1.426	1.409	1.421	2.144	2.218	2.223	2.339	2.930	2.955
(4)	Switch Heel Spread	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077
(5)	Switch Heel Angle (deg.)	3.107	3.145	3.118	2.066	1.996	1.992	1.893	1.511	1.498
<b>LEAD TO THEORETICAL POINT OF FROG</b>										
(8)	Lead	3.742	4.233	4.725	6.179	6.767	7.192	7.833	9.140	9.617
<b>CLOSURE DISTANCE</b>										
(9)	Straight Rail Length	1.917	2.389	2.831	3.450	3.910	4.185	4.690	5.331	5.687
(10)	Curved Rail Length	1.954	2.419	2.857	3.472	3.929	4.202	4.705	5.344	5.700
(11)	Curved Rail Radius	10.049	16.745	25.538	32.580	43.653	55.122	70.357	82.897	99.766
<b>GAGE LINE OFFSETS ON CURVED CLOSURE RAIL</b>										
(12)	1st Point Y1	0.115	0.121	0.126	0.120	0.122	0.124	0.126	0.123	0.125
(13)	1st Point X1	1.905	2.006	2.128	3.006	3.196	3.269	3.512	4.263	4.377
(14)	Mid-Point Y2	0.176	0.186	0.194	0.185	0.189	0.190	0.194	0.191	0.192
(15)	Mid-Point X2	2.384	2.603	2.836	3.869	4.173	4.315	4.684	5.595	5.799
(16)	3rd Point Y3	0.260	0.273	0.282	0.274	0.278	0.276	0.282	0.279	0.280
(17)	3rd Point X3	2.863	3.200	3.544	4.732	5.151	5.362	5.857	6.928	7.221
<b>PROPERTIES OF FROGS</b>										
(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	0.883	1.003	1.123	1.343	1.464	1.784	1.854	2.095	2.278
(20)	Toe Length	0.399	0.436	0.473	0.585	0.639	0.784	0.804	0.879	0.974
(21)	Heel Length	0.483	0.567	0.650	0.758	0.825	1.000	1.050	1.217	1.304
(22)	Toe Spread	0.099	0.087	0.079	0.083	0.080	0.087	0.080	0.080	0.081
(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
<b>POINT OF FROG TO INTERSECTION OF CENTERLINES</b>										
(24)	PF to ICL	1.880	2.350	2.820	3.290	3.760	4.230	4.700	5.170	5.640
<b>DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS</b>										
<b>For Track Centers of:</b>		1.300	<b>(13 prototype feet)</b>							
(25)	Straight Track Dist.	1.359	1.735	2.106	2.474	2.839	3.204	3.568	3.930	4.293
(26)	Crossover Track Dist.	1.521	1.865	2.214	2.566	2.921	3.276	3.633	3.990	4.347
<b>For Track Center Increment of:</b>		0.100	<b>(1 prototype foot)</b>							
(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
<b>GUARD RAILS</b>										
(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
<b>PROPERTIES OF STRAIGHT SWITCHES</b>									
(2)	Switch Rail Length	3.001	3.052	4.068	4.071	4.102	4.137	4.195	4.257
(4)	Switch Heel Spread	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077
(5)	Switch Heel Angle (deg.)	1.476	1.451	1.088	1.088	1.079	1.070	1.055	1.040
<b>LEAD TO THEORETICAL POINT OF FROG</b>									
(8)	Lead	10.132	10.648	12.575	13.067	13.544	14.021	14.567	15.112
<b>CLOSURE DISTANCE</b>									
(9)	Straight Rail Length	6.100	6.506	7.322	7.794	8.143	8.488	8.959	9.426
(10)	Curved Rail Length	6.111	6.517	7.332	7.803	8.152	8.496	8.967	9.434
(11)	Curved Rail Radius	119.527	141.423	153.877	179.392	203.979	230.504	262.221	296.306
<b>GAGE LINE OFFSETS ON CURVED CLOSURE RAIL</b>									
(12)	1st Point Y1	0.126	0.128	0.123	0.125	0.126	0.127	0.128	0.129
(13)	1st Point X1	4.526	4.679	5.899	6.020	6.137	6.259	6.435	6.614
(14)	Mid-Point Y2	0.195	0.197	0.190	0.194	0.195	0.196	0.198	0.200
(15)	Mid-Point X2	6.050	6.305	7.729	7.968	8.173	8.381	8.675	8.971
(16)	3rd Point Y3	0.283	0.285	0.280	0.284	0.284	0.284	0.287	0.290
(17)	3rd Point X3	7.575	7.932	9.559	9.917	10.209	10.503	10.914	11.327
<b>PROPERTIES OF FROGS</b>									
(18)	Frog Angle (deg.)	4.405	4.091	3.818	3.580	3.369	3.182	3.015	2.864
(19)	Overall Length	2.461	2.644	2.743	2.926	3.109	3.292	3.394	3.495
(20)	Toe Length	1.032	1.090	1.185	1.201	1.299	1.396	1.412	1.429
(21)	Heel Length	1.429	1.554	1.558	1.725	1.810	1.896	1.981	2.067
(22)	Toe Spread	0.079	0.078	0.079	0.075	0.076	0.078	0.074	0.071
(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
<b>POINT OF FROG TO INTERSECTION OF CENTERLINES</b>									
(24)	PF to ICL	6.110	6.580	7.050	7.520	7.990	8.460	8.930	9.400
<b>DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS</b>									
<b>For Track Centers of:</b>		1.300	<b>(13 prototype feet)</b>						
(25)	Straight Track Dist.	4.655	5.017	5.378	5.740	6.101	6.462	6.823	7.184
(26)	Crossover Track Dist.	4.705	5.063	5.422	5.780	6.139	6.498	6.857	7.216
<b>For Track Center Increment of:</b>		0.100	<b>(1 prototype foot)</b>						
(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
<b>GUARD RAILS</b>									
(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	0.300	0.300	0.300	0.300	0.342	0.342	0.342	0.342
(33)	Overall Length	1.300	1.300	1.300	1.300	1.650	1.650	1.650	1.650
(34)	Parallel Length	0.700	0.700	0.700	0.700	0.967	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	0.008	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