

TT Scale

Curved Switch Turnout

TURNOUT DIMENSIONS

Revised: February 2015

RP-12.34

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	1.421	1.432	1.470	2.431	2.501	2.562	2.578	2.618	3.842
(3)	Switch Point Angle (deg.)	1.647	1.634	1.592	0.962	0.935	0.913	0.907	0.893	0.609
(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.)	4.587	4.551	4.436	2.682	2.606	2.544	2.528	2.489	1.696
(6)	Switch Rail Radius	27.689	28.129	29.616	80.999	85.782	90.028	91.148	93.988	202.407
(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	1.763	2.175	2.561	3.253	3.664	3.924	4.328	4.651	5.513
(10)	Curved Rail Length	1.801	2.206	2.588	3.275	3.683	3.942	4.344	4.666	5.526
(11)	Curved Rail Radius	10.681	18.402	29.120	34.181	46.415	59.183	77.846	98.430	102.938
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL										
(12)	1st Point Y1	0.122	0.129	0.134	0.125	0.128	0.129	0.133	0.135	0.127
(13)	1st Point X1	1.862	1.976	2.110	3.244	3.417	3.544	3.660	3.781	5.220
(14)	Mid-Point Y2	0.185	0.196	0.205	0.192	0.197	0.197	0.203	0.206	0.196
(15)	Mid-Point X2	2.303	2.520	2.750	4.057	4.333	4.525	4.742	4.944	6.599
(16)	3rd Point Y3	0.267	0.281	0.291	0.279	0.284	0.282	0.289	0.291	0.283
(17)	3rd Point X3	2.743	3.064	3.391	4.870	5.249	5.506	5.824	6.106	7.977
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	0.883	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
POINT OF FROG TO INTERSECTION OF CENTERLINES										
(24)	PF to ICL	1.880	2.350	2.820	3.290	3.760	4.230	4.700	5.170	5.640
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS										
For Track Centers of:		1.300	(13 prototype feet)							
(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
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	3.885	3.935	3.998	4.057	4.983	5.056	5.111	5.170
(3)	Switch Point Angle (deg.)	0.602	0.594	0.585	0.576	0.469	0.462	0.458	0.452
(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.)	1.678	1.656	1.630	1.607	1.308	1.289	1.275	1.260
(6)	Switch Rail Radius	206.932	212.347	219.116	225.639	340.470	350.539	358.108	366.530
(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	5.897	6.273	6.592	7.013	7.745	8.073	8.500	8.922
(10)	Curved Rail Length	5.909	6.284	6.603	7.023	7.754	8.081	8.508	8.930
(11)	Curved Rail Radius	124.116	147.875	172.899	203.908	215.513	244.546	280.217	319.032
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL									
(12)	1st Point Y1	0.129	0.131	0.132	0.134	0.130	0.131	0.133	0.134
(13)	1st Point X1	5.359	5.504	5.646	5.810	6.919	7.074	7.236	7.401
(14)	Mid-Point Y2	0.199	0.201	0.203	0.206	0.201	0.201	0.204	0.207
(15)	Mid-Point X2	6.833	7.072	7.294	7.563	8.856	9.093	9.361	9.631
(16)	3rd Point Y3	0.286	0.288	0.289	0.293	0.288	0.289	0.292	0.295
(17)	3rd Point X3	8.307	8.640	8.942	9.316	10.792	11.111	11.486	11.862
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	2.461	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
POINT OF FROG TO INTERSECTION OF CENTERLINES									
(24)	PF to ICL	6.110	6.580	7.050	7.520	7.990	8.460	8.930	9.400
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS									
For Track Centers of:		1.300	(13 prototype feet)						
(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
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	0.300	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