

LS Scale

Curved Switch Turnout

TURNOUT DIMENSIONS

Revised: February 2015

RP-12.24

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	4.996	4.985	5.080	8.530	8.736	8.916	8.931	9.039	13.435
(3)	Switch Point Angle (deg.)	1.566	1.569	1.540	0.917	0.895	0.877	0.875	0.865	0.582
(4)	Switch Heel Spread	0.258	0.258	0.258	0.258	0.258	0.258	0.258	0.258	0.258
(5)	Switch Heel Angle (deg.)	4.363	4.372	4.290	2.554	2.494	2.444	2.440	2.411	1.622
(6)	Switch Rail Radius	102.337	101.900	105.823	298.424	313.002	326.000	327.110	335.101	740.228
(7)	Switch Mid-Ordinate	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
LEAD TO THEORETICAL POINT OF FROG										
(8)	Lead	13.437	15.164	16.890	23.508	25.515	27.265	28.914	30.555	38.734
CLOSURE DISTANCE										
(9)	Straight Rail Length	7.017	8.634	10.145	12.910	14.529	15.573	17.148	18.418	21.863
(10)	Curved Rail Length	7.164	8.753	10.246	12.993	14.602	15.639	17.208	18.474	21.912
(11)	Curved Rail Radius	41.515	71.148	112.101	132.540	179.596	228.831	300.128	378.753	398.547
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL										
(12)	1st Point Y1	0.430	0.456	0.478	0.442	0.453	0.458	0.472	0.480	0.451
(13)	1st Point X1	6.750	7.144	7.616	11.758	12.369	12.809	13.218	13.644	18.900
(14)	Mid-Point Y2	0.677	0.721	0.755	0.704	0.722	0.724	0.747	0.758	0.718
(15)	Mid-Point X2	8.504	9.302	10.153	14.986	16.001	16.702	17.505	18.249	24.366
(16)	3rd Point Y3	1.001	1.053	1.091	1.047	1.066	1.057	1.083	1.093	1.061
(17)	3rd Point X3	10.258	11.461	12.689	18.213	19.633	20.595	21.792	22.853	29.832
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	3.237	3.670	4.103	4.911	5.344	6.527	6.773	7.659	8.327
(20)	Toe Length	1.424	1.545	1.665	2.067	2.250	2.777	2.835	3.097	3.436
(21)	Heel Length	1.813	2.125	2.438	2.844	3.094	3.750	3.938	4.563	4.891
(22)	Toe Spread	0.353	0.307	0.277	0.295	0.281	0.308	0.283	0.281	0.286
(23)	Heel Spread	0.450	0.423	0.405	0.405	0.386	0.416	0.393	0.414	0.407
(35)	Wing Rail Extension	1.110	1.258	1.407	1.555	1.703	1.852	2.000	2.149	2.297
(36)	Wing Rail Flare Length	0.563	0.563	0.563	0.563	0.750	0.750	1.000	1.000	1.125
(37)	Wing Rail Flare Width	0.075	0.075	0.075	0.075	0.071	0.071	0.068	0.068	0.067
(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	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
POINT OF FROG TO INTERSECTION OF CENTERLINES										
(24)	PF to ICL	7.064	8.830	10.596	12.362	14.128	15.894	17.660	19.426	21.192
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS										
For Track Centers of:		4.875	(13 prototype feet)							
(25)	Straight Track Dist.	5.067	6.471	7.855	9.227	10.592	11.952	13.308	14.662	16.014
(26)	Crossover Track Dist.	5.677	6.959	8.261	9.575	10.896	12.222	13.552	14.884	16.218
For Track Center Increment of:		0.375	(1 prototype foot)							
(28)	Straight Track Incr.	1.477	1.856	2.234	2.612	2.988	3.365	3.741	4.116	4.492
(29)	Crossover Track Incr.	1.523	1.894	2.266	2.638	3.012	3.385	3.759	4.134	4.508
GUARD RAILS										
(30)	Parallel End Setback	0.250	0.266	0.282	0.297	0.313	0.328	0.344	0.360	0.375
(31)	Bevel Length	0.406	0.406	0.406	0.406	0.406	0.406	0.406	0.406	0.406
(32)	Flare Length	0.906	0.906	0.906	0.906	0.906	1.031	1.031	1.031	1.031
(33)	Overall Length	3.094	3.094	3.094	3.094	3.094	4.125	4.125	4.125	4.125
(34)	Parallel Length	1.281	1.281	1.281	1.281	1.281	2.063	2.063	2.063	2.063
(37)	Flare Width	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060
(38)	Plane Width	0.035	0.035	0.035	0.035	0.035	0.032	0.032	0.032	0.032
(39)	End Chamfer	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094

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(1)	FROG NUMBERS	13	14	15	16	17	18	19	20
PROPERTIES OF CURVED SWITCHES									
(2)	Switch Rail Length	13.541	13.680	13.865	14.039	17.353	17.576	17.729	17.905
(3)	Switch Point Angle (deg.)	0.577	0.571	0.564	0.557	0.450	0.445	0.441	0.437
(4)	Switch Heel Spread	0.258	0.258	0.258	0.258	0.258	0.258	0.258	0.258
(5)	Switch Heel Angle (deg.)	1.609	1.593	1.571	1.552	1.256	1.240	1.229	1.217
(6)	Switch Rail Radius	752.045	767.524	788.470	808.318	1234.982	1266.925	1289.155	1314.783
(7)	Switch Mid-Ordinate	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
LEAD TO THEORETICAL POINT OF FROG									
(8)	Lead	40.551	42.367	44.156	46.016	52.601	54.469	56.336	58.203
CLOSURE DISTANCE									
(9)	Straight Rail Length	23.374	24.853	26.117	27.760	30.685	31.981	33.652	35.302
(10)	Curved Rail Length	23.419	24.895	26.157	27.798	30.719	32.014	33.684	35.331
(11)	Curved Rail Radius	479.872	570.978	666.985	785.402	832.659	944.217	1080.600	1228.851
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL									
(12)	1st Point Y1	0.458	0.465	0.469	0.477	0.462	0.465	0.472	0.478
(13)	1st Point X1	19.385	19.893	20.395	20.979	25.024	25.571	26.142	26.730
(14)	Mid-Point Y2	0.729	0.739	0.745	0.757	0.736	0.740	0.750	0.760
(15)	Mid-Point X2	25.228	26.106	26.924	27.919	32.695	33.567	34.555	35.555
(16)	3rd Point Y3	1.072	1.082	1.084	1.099	1.081	1.082	1.095	1.106
(17)	3rd Point X3	31.072	32.320	33.453	34.859	40.366	41.562	42.969	44.381
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	8.995	9.662	10.018	10.685	11.353	12.021	12.384	12.747
(20)	Toe Length	3.635	3.834	4.174	4.217	4.564	4.911	4.954	4.997
(21)	Heel Length	5.360	5.828	5.844	6.469	6.789	7.109	7.430	7.750
(22)	Toe Spread	0.279	0.274	0.278	0.263	0.268	0.273	0.261	0.250
(23)	Heel Spread	0.412	0.416	0.389	0.404	0.399	0.395	0.391	0.387
(35)	Wing Rail Extension	2.547	2.797	2.945	3.250	3.399	3.547	3.797	4.047
(36)	Wing Rail Flare Length	1.466	1.659	1.732	1.940	2.008	2.076	2.272	2.468
(37)	Wing Rail Flare Width	0.065	0.065	0.065	0.064	0.064	0.064	0.064	0.063
(38)	Wing Rail Bend Width	0.065	0.065	0.065	0.064	0.064	0.064	0.064	0.063
(39)	Wing Rail End Chamfer	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
POINT OF FROG TO INTERSECTION OF CENTERLINES									
(24)	PF to ICL	22.958	24.724	26.490	28.256	30.022	31.788	33.554	35.320
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS									
For Track Centers of:		4.875	(13 prototype feet)						
(25)	Straight Track Dist.	17.365	18.715	20.064	21.412	22.759	24.106	25.453	26.799
(26)	Crossover Track Dist.	17.553	18.889	20.226	21.564	22.903	24.242	25.581	26.921
For Track Center Increment of:		0.375	(1 prototype foot)						
(28)	Straight Track Incr.	4.868	5.243	5.619	5.994	6.369	6.745	7.120	7.495
(29)	Crossover Track Incr.	4.882	5.257	5.631	6.006	6.381	6.755	7.130	7.505
GUARD RAILS									
(30)	Parallel End Setback	0.391	0.406	0.422	0.438	0.453	0.469	0.484	0.500
(31)	Bevel Length	0.406	0.406	0.406	0.406	0.406	0.406	0.406	0.406
(32)	Flare Length	1.031	1.031	1.125	1.125	1.125	1.125	1.281	1.281
(33)	Overall Length	4.125	4.125	4.875	4.875	4.875	4.875	6.188	6.188
(34)	Parallel Length	2.063	2.063	2.625	2.625	2.625	2.625	3.625	3.625
(37)	Total Flare at End	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060
(38)	Bevel Cut at End	0.032	0.032	0.031	0.031	0.031	0.031	0.029	0.029
(39)	End Chamfer	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094