

S Scale

Curved Switch Turnout

TURNOUT DIMENSIONS

Revised: February 2015

RP-12.28

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	2.426	2.411	2.451	4.140	4.232	4.312	4.312	4.359	6.511
(3)	Switch Point Angle (deg.)	1.537	1.546	1.521	0.900	0.880	0.864	0.864	0.855	0.572
(4)	Switch Heel Spread	0.123	0.123	0.123	0.123	0.123	0.123	0.123	0.123	0.123
(5)	Switch Heel Angle (deg.)	4.281	4.308	4.238	2.508	2.454	2.408	2.408	2.382	1.595
(6)	Switch Rail Radius	50.651	50.026	51.677	147.525	154.117	160.025	160.009	163.513	364.820
(7)	Switch Mid-Ordinate	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
LEAD TO THEORETICAL POINT OF FROG										
(8)	Lead	6.719	7.582	8.445	11.754	12.758	13.633	14.457	15.277	19.367
CLOSURE DISTANCE										
(9)	Straight Rail Length	3.615	4.441	5.213	6.640	7.469	8.009	8.812	9.464	11.240
(10)	Curved Rail Length	3.688	4.501	5.264	6.681	7.506	8.042	8.843	9.491	11.265
(11)	Curved Rail Radius	21.198	36.253	57.024	67.596	91.520	116.601	152.757	192.642	203.145
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL										
(12)	1st Point Y1	0.210	0.224	0.235	0.216	0.222	0.225	0.232	0.236	0.221
(13)	1st Point X1	3.330	3.522	3.754	5.800	6.099	6.314	6.515	6.725	9.321
(14)	Mid-Point Y2	0.337	0.359	0.377	0.351	0.360	0.361	0.372	0.378	0.357
(15)	Mid-Point X2	4.234	4.632	5.057	7.460	7.966	8.317	8.718	9.091	12.131
(16)	3rd Point Y3	0.503	0.530	0.549	0.526	0.536	0.531	0.545	0.550	0.533
(17)	3rd Point X3	5.137	5.742	6.361	9.120	9.834	10.319	10.921	11.457	14.941
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	1.584	1.792	2.000	2.396	2.604	3.187	3.301	3.736	4.061
(20)	Toe Length	0.678	0.729	0.781	0.974	1.057	1.312	1.332	1.455	1.616
(21)	Heel Length	0.906	1.063	1.219	1.422	1.547	1.875	1.969	2.281	2.445
(22)	Toe Spread	0.168	0.145	0.130	0.139	0.132	0.146	0.133	0.132	0.135
(23)	Heel Spread	0.225	0.211	0.202	0.203	0.193	0.208	0.197	0.207	0.204
(35)	Wing Rail Extension	0.555	0.629	0.703	0.777	0.852	0.926	1.000	1.074	1.149
(36)	Wing Rail Flare Length	0.281	0.281	0.281	0.281	0.375	0.375	0.500	0.500	0.563
(37)	Wing Rail Flare Width	0.038	0.038	0.038	0.038	0.035	0.035	0.034	0.034	0.034
(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	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055
POINT OF FROG TO INTERSECTION OF CENTERLINES										
(24)	PF to ICL	3.532	4.415	5.298	6.181	7.064	7.947	8.830	9.713	10.596
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS										
For Track Centers of:		2.438	(13 prototype feet)							
(25)	Straight Track Dist.	2.534	3.236	3.927	4.613	5.296	5.976	6.654	7.331	8.007
(26)	Crossover Track Dist.	2.838	3.479	4.131	4.788	5.448	6.111	6.776	7.442	8.109
For Track Center Increment of:		0.188	(1 prototype foot)							
(28)	Straight Track Incr.	0.738	0.928	1.117	1.306	1.494	1.682	1.870	2.058	2.246
(29)	Crossover Track Incr.	0.762	0.947	1.133	1.319	1.506	1.693	1.880	2.067	2.254
GUARD RAILS										
(30)	Parallel End Setback	0.125	0.133	0.141	0.149	0.156	0.164	0.172	0.180	0.188
(31)	Bevel Length	0.203	0.203	0.203	0.203	0.203	0.203	0.203	0.203	0.203
(32)	Flare Length	0.453	0.453	0.453	0.453	0.453	0.453	0.516	0.516	0.516
(33)	Overall Length	1.547	1.547	1.547	1.547	1.547	1.547	2.063	2.063	2.063
(34)	Parallel Length	0.641	0.641	0.641	0.641	0.641	0.641	1.031	1.031	1.031
(37)	Flare Width	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
(38)	Plane Width	0.018	0.018	0.018	0.018	0.018	0.018	0.016	0.016	0.016
(39)	End Chamfer	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047

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(1)	FROG NUMBERS	13	14	15	16	17	18	19	20
PROPERTIES OF CURVED SWITCHES									
(2)	Switch Rail Length	6.554	6.614	6.698	6.776	8.396	8.498	8.565	8.644
(3)	Switch Point Angle (deg.)	0.568	0.563	0.556	0.550	0.444	0.438	0.435	0.431
(4)	Switch Heel Spread	0.123	0.123	0.123	0.123	0.123	0.123	0.123	0.123
(5)	Switch Heel Angle (deg.)	1.584	1.570	1.550	1.532	1.237	1.222	1.212	1.201
(6)	Switch Rail Radius	369.702	376.491	386.090	395.128	606.647	621.445	631.365	643.030
(7)	Switch Mid-Ordinate	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
LEAD TO THEORETICAL POINT OF FROG									
(8)	Lead	20.275	21.184	22.078	23.008	26.301	27.234	28.168	29.102
CLOSURE DISTANCE									
(9)	Straight Rail Length	12.014	12.771	13.421	14.260	15.768	16.434	17.287	18.129
(10)	Curved Rail Length	12.037	12.793	13.441	14.279	15.785	16.451	17.303	18.144
(11)	Curved Rail Radius	244.470	290.744	339.533	399.566	424.067	480.789	549.960	625.119
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL									
(12)	1st Point Y1	0.225	0.228	0.231	0.234	0.227	0.228	0.232	0.235
(13)	1st Point X1	9.558	9.807	10.053	10.341	12.338	12.606	12.887	13.176
(14)	Mid-Point Y2	0.363	0.368	0.371	0.378	0.367	0.369	0.374	0.379
(15)	Mid-Point X2	12.561	13.000	13.408	13.906	16.280	16.715	17.209	17.709
(16)	3rd Point Y3	0.539	0.544	0.545	0.553	0.544	0.544	0.550	0.556
(17)	3rd Point X3	15.565	16.193	16.764	17.471	20.221	20.823	21.531	22.241
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	4.387	4.712	4.881	5.207	5.532	5.857	6.030	6.203
(20)	Toe Length	1.707	1.798	1.959	1.972	2.137	2.303	2.315	2.328
(21)	Heel Length	2.680	2.914	2.922	3.234	3.395	3.555	3.715	3.875
(22)	Toe Spread	0.131	0.128	0.131	0.123	0.126	0.128	0.122	0.116
(23)	Heel Spread	0.206	0.208	0.195	0.202	0.200	0.197	0.195	0.194
(35)	Wing Rail Extension	1.274	1.399	1.473	1.625	1.699	1.773	1.898	2.023
(36)	Wing Rail Flare Length	0.733	0.830	0.866	0.970	1.004	1.038	1.136	1.234
(37)	Wing Rail Flare Width	0.033	0.032	0.032	0.032	0.032	0.032	0.032	0.032
(38)	Wing Rail Bend Width	0.033	0.032	0.032	0.032	0.032	0.032	0.032	0.032
(39)	Wing Rail End Chamfer	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055
POINT OF FROG TO INTERSECTION OF CENTERLINES									
(24)	PF to ICL	11.479	12.362	13.245	14.128	15.011	15.894	16.777	17.660
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS									
For Track Centers of:		2.438	(13 prototype feet)						
(25)	Straight Track Dist.	8.683	9.357	10.032	10.706	11.380	12.053	12.726	13.400
(26)	Crossover Track Dist.	8.776	9.445	10.113	10.782	11.451	12.121	12.791	13.460
For Track Center Increment of:		0.188	(1 prototype foot)						
(28)	Straight Track Incr.	2.434	2.622	2.809	2.997	3.185	3.372	3.560	3.748
(29)	Crossover Track Incr.	2.441	2.628	2.816	3.003	3.190	3.378	3.565	3.752
GUARD RAILS									
(30)	Parallel End Setback	0.195	0.203	0.211	0.219	0.227	0.234	0.242	0.250
(31)	Bevel Length	0.203	0.203	0.203	0.203	0.203	0.203	0.203	0.203
(32)	Flare Length	0.516	0.516	0.516	0.516	0.563	0.563	0.563	0.563
(33)	Overall Length	2.063	2.063	2.063	2.063	2.438	2.438	2.438	2.438
(34)	Parallel Length	1.031	1.031	1.031	1.031	1.313	1.313	1.313	1.313
(37)	Total Flare at End	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
(38)	Bevel Cut at End	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.015
(39)	End Chamfer	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047