

OO Scale

Curved Switch Turnout

TURNOUT DIMENSIONS

Revised: February 2015

RP-12.30

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	2.096	2.095	2.139	3.581	3.670	3.747	3.758	3.806	5.643
(3)	Switch Point Angle (deg.)	1.621	1.621	1.588	0.948	0.925	0.906	0.904	0.892	0.602
(4)	Switch Heel Spread	0.112	0.112	0.112	0.112	0.112	0.112	0.112	0.112	0.112
(5)	Switch Heel Angle (deg.)	4.516	4.517	4.426	2.643	2.578	2.525	2.518	2.486	1.677
(6)	Switch Rail Radius	41.485	41.461	43.195	121.079	127.207	132.619	133.353	136.812	300.680
(7)	Switch Mid-Ordinate	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
LEAD TO THEORETICAL POINT OF FROG										
(8)	Lead	5.643	6.368	7.093	9.872	10.715	11.450	12.142	12.831	16.266
CLOSURE DISTANCE										
(9)	Straight Rail Length	2.945	3.619	4.250	5.417	6.093	6.529	7.185	7.715	9.170
(10)	Curved Rail Length	3.007	3.670	4.293	5.452	6.124	6.557	7.211	7.739	9.191
(11)	Curved Rail Radius	17.702	30.457	48.209	56.507	76.707	97.970	128.838	163.069	170.147
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL										
(12)	1st Point Y1	0.186	0.197	0.206	0.191	0.196	0.198	0.204	0.207	0.195
(13)	1st Point X1	2.832	3.000	3.201	4.935	5.193	5.380	5.554	5.735	7.935
(14)	Mid-Point Y2	0.291	0.310	0.324	0.303	0.310	0.311	0.320	0.325	0.308
(15)	Mid-Point X2	3.569	3.905	4.264	6.289	6.717	7.012	7.350	7.664	10.228
(16)	3rd Point Y3	0.428	0.450	0.466	0.447	0.455	0.451	0.462	0.467	0.453
(17)	3rd Point X3	4.305	4.810	5.326	7.644	8.240	8.644	9.147	9.593	12.520
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	1.363	1.546	1.728	2.068	2.251	2.749	2.853	3.226	3.507
(20)	Toe Length	0.602	0.653	0.704	0.874	0.952	1.174	1.199	1.310	1.453
(21)	Heel Length	0.761	0.893	1.024	1.194	1.299	1.575	1.654	1.916	2.054
(22)	Toe Spread	0.149	0.130	0.117	0.125	0.119	0.130	0.120	0.119	0.121
(23)	Heel Spread	0.189	0.178	0.170	0.170	0.162	0.175	0.165	0.174	0.171
(35)	Wing Rail Extension	0.466	0.528	0.591	0.653	0.715	0.778	0.840	0.902	0.965
(36)	Wing Rail Flare Length	0.236	0.236	0.236	0.236	0.315	0.315	0.420	0.420	0.472
(37)	Wing Rail Flare Width	0.032	0.032	0.032	0.032	0.030	0.030	0.029	0.029	0.028
(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	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046
POINT OF FROG TO INTERSECTION OF CENTERLINES										
(24)	PF to ICL	3.000	3.750	4.500	5.250	6.000	6.750	7.500	8.250	9.000
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS										
For Track Centers of:		2.047	(13 prototype feet)							
(25)	Straight Track Dist.	2.061	2.634	3.198	3.758	4.314	4.868	5.421	5.973	6.524
(26)	Crossover Track Dist.	2.317	2.839	3.369	3.904	4.442	4.982	5.524	6.066	6.610
For Track Center Increment of:		0.157	(1 prototype foot)							
(28)	Straight Track Incr.	0.620	0.780	0.938	1.097	1.255	1.413	1.571	1.729	1.886
(29)	Crossover Track Incr.	0.640	0.795	0.951	1.108	1.265	1.422	1.579	1.736	1.893
GUARD RAILS										
(30)	Parallel End Setback	0.105	0.112	0.118	0.125	0.131	0.138	0.144	0.151	0.158
(31)	Bevel Length	0.171	0.171	0.171	0.171	0.171	0.171	0.171	0.171	0.171
(32)	Flare Length	0.381	0.381	0.381	0.381	0.381	0.433	0.433	0.433	0.433
(33)	Overall Length	1.299	1.299	1.299	1.299	1.299	1.732	1.732	1.732	1.732
(34)	Parallel Length	0.538	0.538	0.538	0.538	0.538	0.866	0.866	0.866	0.866
(37)	Flare Width	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
(38)	Plane Width	0.015	0.015	0.015	0.015	0.015	0.014	0.014	0.014	0.014
(39)	End Chamfer	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039

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(1)	FROG NUMBERS	13	14	15	16	17	18	19	20
PROPERTIES OF CURVED SWITCHES									
(2)	Switch Rail Length	5.691	5.752	5.832	5.909	7.294	7.390	7.458	7.535
(3)	Switch Point Angle (deg.)	0.597	0.590	0.582	0.575	0.465	0.459	0.455	0.451
(4)	Switch Heel Spread	0.112	0.112	0.112	0.112	0.112	0.112	0.112	0.112
(5)	Switch Heel Angle (deg.)	1.663	1.645	1.622	1.601	1.297	1.280	1.269	1.256
(6)	Switch Rail Radius	305.835	312.470	321.262	329.730	502.471	515.789	525.342	536.269
(7)	Switch Mid-Ordinate	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
LEAD TO THEORETICAL POINT OF FROG									
(8)	Lead	17.029	17.792	18.543	19.324	22.090	22.874	23.658	24.442
CLOSURE DISTANCE									
(9)	Straight Rail Length	9.801	10.418	10.945	11.631	12.864	13.406	14.103	14.791
(10)	Curved Rail Length	9.820	10.436	10.962	11.647	12.879	13.420	14.116	14.804
(11)	Curved Rail Radius	205.152	244.456	286.003	337.274	356.099	404.256	463.155	527.288
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL									
(12)	1st Point Y1	0.198	0.201	0.203	0.206	0.200	0.201	0.204	0.206
(13)	1st Point X1	8.141	8.356	8.569	8.816	10.510	10.742	10.984	11.233
(14)	Mid-Point Y2	0.313	0.317	0.320	0.325	0.316	0.318	0.322	0.326
(15)	Mid-Point X2	10.591	10.961	11.305	11.724	13.726	14.093	14.510	14.931
(16)	3rd Point Y3	0.458	0.462	0.463	0.469	0.462	0.462	0.467	0.472
(17)	3rd Point X3	13.041	13.565	14.041	14.632	16.942	17.444	18.035	18.629
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	3.789	4.070	4.220	4.501	4.782	5.064	5.217	5.370
(20)	Toe Length	1.538	1.622	1.766	1.785	1.931	2.078	2.097	2.116
(21)	Heel Length	2.251	2.448	2.454	2.717	2.851	2.986	3.120	3.255
(22)	Toe Spread	0.118	0.116	0.118	0.111	0.114	0.115	0.110	0.106
(23)	Heel Spread	0.173	0.175	0.164	0.170	0.168	0.166	0.164	0.163
(35)	Wing Rail Extension	1.070	1.175	1.237	1.365	1.427	1.490	1.595	1.700
(36)	Wing Rail Flare Length	0.615	0.697	0.727	0.815	0.843	0.872	0.954	1.037
(37)	Wing Rail Flare Width	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
(38)	Wing Rail Bend Width	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
(39)	Wing Rail End Chamfer	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046
POINT OF FROG TO INTERSECTION OF CENTERLINES									
(24)	PF to ICL	9.750	10.500	11.250	12.000	12.750	13.500	14.250	15.000
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS									
For Track Centers of:		2.047	(13 prototype feet)						
(25)	Straight Track Dist.	7.075	7.625	8.175	8.724	9.273	9.822	10.371	10.919
(26)	Crossover Track Dist.	7.154	7.698	8.243	8.788	9.333	9.879	10.425	10.970
For Track Center Increment of:		0.157	(1 prototype foot)						
(28)	Straight Track Incr.	2.044	2.202	2.360	2.517	2.675	2.832	2.990	3.148
(29)	Crossover Track Incr.	2.050	2.208	2.365	2.522	2.679	2.837	2.994	3.152
GUARD RAILS									
(30)	Parallel End Setback	0.164	0.171	0.177	0.184	0.190	0.197	0.203	0.210
(31)	Bevel Length	0.171	0.171	0.171	0.171	0.171	0.171	0.171	0.171
(32)	Flare Length	0.433	0.472	0.472	0.472	0.472	0.472	0.538	0.538
(33)	Overall Length	1.732	2.047	2.047	2.047	2.047	2.047	2.598	2.598
(34)	Parallel Length	0.866	1.102	1.102	1.102	1.102	1.102	1.522	1.522
(37)	Total Flare at End	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
(38)	Bevel Cut at End	0.014	0.013	0.013	0.013	0.013	0.013	0.012	0.012
(39)	End Chamfer	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039