

1 Inch Scale

Curved Switch Turnout

TURNOUT DIMENSIONS

Revised: February 2015

RP-12.18

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	12.009	11.806	11.914	20.461	20.803	21.107	21.009	21.167	32.044
(3)	Switch Point Angle (deg.)	1.484	1.510	1.496	0.871	0.857	0.844	0.848	0.842	0.556
(4)	Switch Heel Spread	0.589	0.589	0.589	0.589	0.589	0.589	0.589	0.589	0.589
(5)	Switch Heel Angle (deg.)	4.136	4.207	4.169	2.427	2.387	2.353	2.364	2.346	1.550
(6)	Switch Rail Radius	259.495	250.772	255.399	753.391	778.722	801.718	794.249	806.216	1847.846
(7)	Switch Mid-Ordinate	0.069	0.069	0.069	0.069	0.069	0.069	0.069	0.069	0.069
LEAD TO THEORETICAL POINT OF FROG										
(8)	Lead	35.832	40.436	45.041	62.687	68.041	72.708	77.104	81.479	103.291
CLOSURE DISTANCE										
(9)	Straight Rail Length	20.398	24.976	29.242	37.361	41.977	45.025	49.456	53.068	63.190
(10)	Curved Rail Length	20.797	25.300	29.517	37.587	42.176	45.206	49.620	53.219	63.322
(11)	Curved Rail Radius	117.818	200.950	315.634	374.904	507.085	646.391	845.855	1066.523	1125.928
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL										
(12)	1st Point Y1	1.069	1.146	1.207	1.101	1.135	1.150	1.190	1.215	1.127
(13)	1st Point X1	17.109	18.050	19.225	29.802	31.297	32.364	33.373	34.434	47.842
(14)	Mid-Point Y2	1.775	1.901	1.997	1.848	1.900	1.907	1.972	2.007	1.888
(15)	Mid-Point X2	22.209	24.294	26.535	39.142	41.791	43.620	45.737	47.701	63.639
(16)	3rd Point Y3	2.710	2.855	2.960	2.831	2.885	2.863	2.937	2.965	2.871
(17)	3rd Point X3	27.308	30.538	33.846	48.482	52.285	54.876	58.101	60.968	79.436
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	8.259	9.322	10.385	12.449	13.512	16.576	17.139	19.411	21.100
(20)	Toe Length	3.424	3.654	3.884	4.864	5.261	6.575	6.639	7.244	8.058
(21)	Heel Length	4.835	5.668	6.501	7.584	8.251	10.001	10.501	12.167	13.042
(22)	Toe Spread	0.849	0.727	0.645	0.693	0.656	0.729	0.663	0.658	0.671
(23)	Heel Spread	1.199	1.128	1.080	1.081	1.029	1.109	1.049	1.105	1.086
(35)	Wing Rail Extension	2.960	3.355	3.751	4.147	4.542	4.938	5.334	5.730	6.125
(36)	Wing Rail Flare Length	1.500	1.500	1.500	1.500	2.000	2.000	2.667	2.667	3.000
(37)	Wing Rail Flare Width	0.200	0.200	0.200	0.200	0.189	0.189	0.181	0.181	0.179
(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	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292
POINT OF FROG TO INTERSECTION OF CENTERLINES										
(24)	PF to ICL	19.000	23.750	28.500	33.250	38.000	42.750	47.500	52.250	57.000
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS										
For Track Centers of:		13.000	(13 prototype feet)							
(25)	Straight Track Dist.	13.188	16.850	20.458	24.036	27.594	31.139	34.675	38.205	41.729
(26)	Crossover Track Dist.	14.813	18.150	21.542	24.964	28.406	31.861	35.325	38.795	42.271
For Track Center Increment of:		1.000	(1 prototype foot)							
(28)	Straight Track Incr.	3.938	4.950	5.958	6.964	7.969	8.972	9.975	10.977	11.979
(29)	Crossover Track Incr.	4.063	5.050	6.042	7.036	8.031	9.028	10.025	11.023	12.021
GUARD RAILS										
(30)	Parallel End Setback	0.668	0.709	0.751	0.792	0.834	0.876	0.917	0.959	1.000
(31)	Bevel Length	1.083	1.083	1.083	1.083	1.083	1.083	1.083	1.083	1.083
(32)	Flare Length	2.417	2.417	2.417	2.417	2.417	2.417	2.417	2.417	2.750
(33)	Overall Length	8.250	8.250	8.250	8.250	8.250	8.250	8.250	8.250	11.000
(34)	Parallel Length	3.417	3.417	3.417	3.417	3.417	3.417	3.417	3.417	5.500
(37)	Flare Width	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160
(38)	Plane Width	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.086
(39)	End Chamfer	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250

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(1)	FROG NUMBERS	13	14	15	16	17	18	19	20
PROPERTIES OF CURVED SWITCHES									
(2)	Switch Rail Length	32.148	32.348	32.680	32.985	41.140	41.558	41.802	42.110
(3)	Switch Point Angle (deg.)	0.554	0.551	0.545	0.540	0.433	0.429	0.426	0.423
(4)	Switch Heel Spread	0.589	0.589	0.589	0.589	0.589	0.589	0.589	0.589
(5)	Switch Heel Angle (deg.)	1.545	1.535	1.519	1.505	1.207	1.195	1.188	1.179
(6)	Switch Rail Radius	1859.882	1883.037	1921.878	1957.989	3045.808	3107.941	3144.645	3191.172
(7)	Switch Mid-Ordinate	0.069	0.069	0.069	0.069	0.069	0.069	0.069	0.069
LEAD TO THEORETICAL POINT OF FROG									
(8)	Lead	108.135	112.979	117.750	122.708	140.271	145.250	150.229	155.208
CLOSURE DISTANCE									
(9)	Straight Rail Length	67.490	71.696	75.321	79.952	88.525	92.252	96.965	101.614
(10)	Curved Rail Length	67.614	71.811	75.430	80.054	88.620	92.342	97.050	101.695
(11)	Curved Rail Radius	1354.234	1609.867	1879.971	2211.064	2348.071	2662.094	3043.471	3457.867
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL									
(12)	1st Point Y1	1.149	1.169	1.183	1.204	1.159	1.170	1.188	1.205
(13)	1st Point X1	49.021	50.272	51.510	52.973	63.271	64.621	66.043	67.514
(14)	Mid-Point Y2	1.920	1.949	1.966	2.001	1.939	1.951	1.981	2.008
(15)	Mid-Point X2	65.894	68.196	70.340	72.961	85.403	87.684	90.285	92.917
(16)	3rd Point Y3	2.902	2.930	2.938	2.979	2.928	2.932	2.967	2.998
(17)	3rd Point X3	82.766	86.120	89.171	92.949	107.534	110.747	114.526	118.321
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	22.788	24.477	25.332	27.021	28.710	30.398	31.275	32.151
(20)	Toe Length	8.496	8.935	9.749	9.771	10.605	11.440	11.462	11.484
(21)	Heel Length	14.292	15.542	15.584	17.250	18.104	18.959	19.813	20.667
(22)	Toe Spread	0.653	0.638	0.650	0.610	0.624	0.635	0.603	0.574
(23)	Heel Spread	1.099	1.109	1.038	1.078	1.065	1.053	1.042	1.033
(35)	Wing Rail Extension	6.792	7.459	7.855	8.667	9.063	9.459	10.125	10.792
(36)	Wing Rail Flare Length	3.908	4.425	4.619	5.174	5.355	5.536	6.059	6.582
(37)	Wing Rail Flare Width	0.174	0.173	0.172	0.171	0.171	0.170	0.170	0.169
(38)	Wing Rail Bend Width	0.174	0.173	0.172	0.171	0.171	0.170	0.170	0.169
(39)	Wing Rail End Chamfer	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292
POINT OF FROG TO INTERSECTION OF CENTERLINES									
(24)	PF to ICL	61.750	66.500	71.250	76.000	80.750	85.500	90.250	95.000
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS									
For Track Centers of:		13.000	(13 prototype feet)						
(25)	Straight Track Dist.	45.250	48.768	52.283	55.797	59.309	62.819	66.329	69.838
(26)	Crossover Track Dist.	45.750	49.232	52.717	56.203	59.691	63.181	66.671	70.163
For Track Center Increment of:		1.000	(1 prototype foot)						
(28)	Straight Track Incr.	12.981	13.982	14.983	15.984	16.985	17.986	18.987	19.988
(29)	Crossover Track Incr.	13.019	14.018	15.017	16.016	17.015	18.014	19.013	20.013
GUARD RAILS									
(30)	Parallel End Setback	1.042	1.084	1.125	1.167	1.209	1.250	1.292	1.334
(31)	Bevel Length	1.083	1.083	1.083	1.083	1.083	1.083	1.083	1.083
(32)	Flare Length	2.750	2.750	2.750	2.750	2.750	2.750	2.750	3.000
(33)	Overall Length	11.000	11.000	11.000	11.000	11.000	11.000	11.000	13.000
(34)	Parallel Length	5.500	5.500	5.500	5.500	5.500	5.500	5.500	7.000
(37)	Total Flare at End	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160
(38)	Bevel Cut at End	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.082
(39)	End Chamfer	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250