

N Scale

Curved Switch Turnout

TURNOUT DIMENSIONS

Revised: February 2015

RP-12.36

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	1.106	1.120	1.154	1.892	1.953	2.005	2.022	2.057	2.997
(3)	Switch Point Angle (deg.)	1.703	1.681	1.631	0.994	0.964	0.939	0.931	0.915	0.628
(4)	Switch Heel Spread	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
(5)	Switch Heel Angle (deg.)	4.745	4.682	4.545	2.771	2.686	2.616	2.594	2.549	1.749
(6)	Switch Rail Radius	20.823	21.389	22.694	61.021	64.971	68.468	69.669	72.102	153.107
(7)	Switch Mid-Ordinate	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
LEAD TO THEORETICAL POINT OF FROG										
(8)	Lead	2.687	3.033	3.378	4.702	5.103	5.453	5.783	6.111	7.747
CLOSURE DISTANCE										
(9)	Straight Rail Length	1.270	1.570	1.851	2.349	2.647	2.834	3.128	3.362	3.983
(10)	Curved Rail Length	1.299	1.593	1.871	2.366	2.662	2.847	3.139	3.373	3.992
(11)	Curved Rail Radius	7.831	13.547	21.516	25.100	34.142	43.569	57.444	72.764	75.681
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL										
(12)	1st Point Y1	0.095	0.100	0.104	0.098	0.100	0.100	0.103	0.104	0.099
(13)	1st Point X1	1.423	1.513	1.617	2.480	2.615	2.713	2.804	2.897	3.993
(14)	Mid-Point Y2	0.141	0.150	0.156	0.147	0.150	0.150	0.154	0.157	0.149
(15)	Mid-Point X2	1.741	1.905	2.080	3.067	3.276	3.421	3.586	3.738	4.989
(16)	3rd Point Y3	0.201	0.211	0.218	0.210	0.213	0.211	0.217	0.218	0.213
(17)	3rd Point X3	2.058	2.298	2.542	3.654	3.938	4.130	4.368	4.578	5.985
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	0.674	0.767	0.860	1.029	1.122	1.365	1.421	1.605	1.745
(20)	Toe Length	0.312	0.342	0.373	0.460	0.503	0.615	0.633	0.692	0.767
(21)	Heel Length	0.363	0.425	0.488	0.569	0.619	0.750	0.788	0.913	0.978
(22)	Toe Spread	0.077	0.068	0.062	0.066	0.063	0.068	0.063	0.063	0.064
(23)	Heel Spread	0.090	0.085	0.081	0.081	0.077	0.083	0.079	0.083	0.081
(35)	Wing Rail Extension	0.222	0.252	0.281	0.311	0.341	0.370	0.400	0.430	0.459
(36)	Wing Rail Flare Length	0.113	0.113	0.113	0.113	0.150	0.150	0.200	0.200	0.225
(37)	Wing Rail Flare Width	0.015	0.015	0.015	0.015	0.014	0.014	0.014	0.014	0.013
(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	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
POINT OF FROG TO INTERSECTION OF CENTERLINES										
(24)	PF to ICL	1.412	1.765	2.118	2.471	2.824	3.177	3.530	3.883	4.236
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS										
For Track Centers of:		0.975	(13 prototype feet)							
(25)	Straight Track Dist.	1.015	1.296	1.573	1.848	2.122	2.394	2.666	2.937	3.208
(26)	Crossover Track Dist.	1.137	1.394	1.655	1.918	2.182	2.448	2.714	2.981	3.248
For Track Center Increment of:		0.075	(1 prototype foot)							
(28)	Straight Track Incr.	0.295	0.371	0.447	0.522	0.598	0.673	0.748	0.823	0.898
(29)	Crossover Track Incr.	0.305	0.379	0.453	0.528	0.602	0.677	0.752	0.827	0.902
GUARD RAILS										
(30)	Parallel End Setback	0.050	0.053	0.056	0.059	0.063	0.066	0.069	0.072	0.075
(31)	Bevel Length	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081
(32)	Flare Length	0.181	0.181	0.181	0.206	0.206	0.206	0.206	0.206	0.225
(33)	Overall Length	0.619	0.619	0.619	0.825	0.825	0.825	0.825	0.825	0.975
(34)	Parallel Length	0.256	0.256	0.256	0.413	0.413	0.413	0.413	0.413	0.525
(37)	Flare Width	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
(38)	Plane Width	0.007	0.007	0.007	0.006	0.006	0.006	0.006	0.006	0.006
(39)	End Chamfer	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019

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(1)	FROG NUMBERS	13	14	15	16	17	18	19	20
PROPERTIES OF CURVED SWITCHES									
(2)	Switch Rail Length	3.036	3.080	3.133	3.183	3.896	3.958	4.005	4.055
(3)	Switch Point Angle (deg.)	0.620	0.611	0.601	0.591	0.483	0.475	0.470	0.464
(4)	Switch Heel Spread	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
(5)	Switch Heel Angle (deg.)	1.727	1.702	1.674	1.647	1.346	1.325	1.309	1.293
(6)	Switch Rail Radius	157.072	161.671	167.235	172.648	258.716	266.895	273.267	280.255
(7)	Switch Mid-Ordinate	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
LEAD TO THEORETICAL POINT OF FROG									
(8)	Lead	8.110	8.473	8.831	9.203	10.520	10.894	11.267	11.641
CLOSURE DISTANCE									
(9)	Straight Rail Length	4.261	4.534	4.765	5.071	5.599	5.835	6.146	6.454
(10)	Curved Rail Length	4.270	4.542	4.772	5.078	5.606	5.841	6.152	6.460
(11)	Curved Rail Radius	91.357	108.965	127.513	150.578	158.715	180.204	206.701	235.563
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL									
(12)	1st Point Y1	0.101	0.102	0.103	0.104	0.101	0.102	0.103	0.104
(13)	1st Point X1	4.101	4.214	4.324	4.451	5.296	5.416	5.541	5.669
(14)	Mid-Point Y2	0.151	0.153	0.154	0.156	0.153	0.153	0.155	0.157
(15)	Mid-Point X2	5.167	5.347	5.515	5.719	6.696	6.875	7.078	7.282
(16)	3rd Point Y3	0.215	0.216	0.217	0.220	0.216	0.217	0.219	0.221
(17)	3rd Point X3	6.232	6.481	6.706	6.986	8.096	8.334	8.614	8.896
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	1.885	2.025	2.103	2.243	2.383	2.523	2.602	2.681
(20)	Toe Length	0.813	0.859	0.934	0.949	1.025	1.101	1.116	1.131
(21)	Heel Length	1.072	1.166	1.169	1.294	1.358	1.422	1.486	1.550
(22)	Toe Spread	0.062	0.061	0.062	0.059	0.060	0.061	0.059	0.057
(23)	Heel Spread	0.082	0.083	0.078	0.081	0.080	0.079	0.078	0.077
(35)	Wing Rail Extension	0.509	0.559	0.589	0.650	0.680	0.709	0.759	0.809
(36)	Wing Rail Flare Length	0.293	0.332	0.346	0.388	0.402	0.415	0.454	0.494
(37)	Wing Rail Flare Width	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
(38)	Wing Rail Bend Width	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
(39)	Wing Rail End Chamfer	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
POINT OF FROG TO INTERSECTION OF CENTERLINES									
(24)	PF to ICL	4.589	4.942	5.295	5.648	6.001	6.354	6.707	7.060
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS									
For Track Centers of:		0.975	(13 prototype feet)						
(25)	Straight Track Dist.	3.478	3.749	4.019	4.289	4.559	4.828	5.098	5.368
(26)	Crossover Track Dist.	3.516	3.783	4.051	4.319	4.587	4.856	5.124	5.392
For Track Center Increment of:		0.075	(1 prototype foot)						
(28)	Straight Track Incr.	0.974	1.049	1.124	1.199	1.274	1.349	1.424	1.499
(29)	Crossover Track Incr.	0.976	1.051	1.126	1.201	1.276	1.351	1.426	1.501
GUARD RAILS									
(30)	Parallel End Setback	0.078	0.081	0.084	0.088	0.091	0.094	0.097	0.100
(31)	Bevel Length	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081
(32)	Flare Length	0.225	0.225	0.256	0.256	0.256	0.256	0.256	0.256
(33)	Overall Length	0.975	0.975	1.238	1.238	1.238	1.238	1.238	1.238
(34)	Parallel Length	0.525	0.525	0.725	0.725	0.725	0.725	0.725	0.725
(37)	Total Flare at End	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
(38)	Bevel Cut at End	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
(39)	End Chamfer	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019