

# S Scale

## Straight Switch Turnout

# TURNOUT DIMENSIONS

Revised: February 2015

RP-12.27

Design and calculations by Van S. Fehr

(1)	FROG NUMBERS	4	5	6	7	8	9	10	11	12
<b>PROPERTIES OF STRAIGHT SWITCHES</b>										
(2)	Switch Rail Length	2.427	2.356	2.347	3.608	3.706	3.684	3.862	4.881	4.896
(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.)	2.907	2.995	3.007	1.956	1.904	1.915	1.827	1.445	1.441
<b>LEAD TO THEORETICAL POINT OF FROG</b>										
(8)	Lead	7.015	7.937	8.859	11.586	12.687	13.484	14.687	17.137	18.031
<b>CLOSURE DISTANCE</b>										
(9)	Straight Rail Length	3.911	4.852	5.731	7.005	7.925	8.488	9.493	10.801	11.519
(10)	Curved Rail Length	3.982	4.909	5.780	7.045	7.961	8.521	9.523	10.827	11.544
(11)	Curved Rail Radius	20.117	33.384	50.788	64.944	86.902	109.837	139.975	165.001	198.558
<b>GAGE LINE OFFSETS ON CURVED CLOSURE RAIL</b>										
(12)	1st Point Y1	0.197	0.209	0.219	0.207	0.212	0.215	0.219	0.213	0.216
(13)	1st Point X1	3.405	3.569	3.780	5.359	5.687	5.806	6.235	7.581	7.776
(14)	Mid-Point Y2	0.319	0.339	0.355	0.338	0.346	0.347	0.355	0.348	0.352
(15)	Mid-Point X2	4.382	4.782	5.212	7.110	7.668	7.928	8.608	10.281	10.656
(16)	3rd Point Y3	0.489	0.514	0.533	0.516	0.525	0.521	0.532	0.527	0.529
(17)	3rd Point X3	5.360	5.995	6.645	8.861	9.649	10.050	10.982	12.982	13.535
<b>PROPERTIES OF FROGS</b>										
(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
<b>POINT OF FROG TO INTERSECTION OF CENTERLINES</b>										
(24)	PF to ICL	3.532	4.415	5.298	6.181	7.064	7.947	8.830	9.713	10.596
<b>DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS</b>										
<b>For Track Centers of:</b>		2.438	<b>(13 prototype feet)</b>							
(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
<b>For Track Center Increment of:</b>		0.188	<b>(1 prototype foot)</b>							
(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
<b>GUARD RAILS</b>										
(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
<b>PROPERTIES OF STRAIGHT SWITCHES</b>									
(2)	Switch Rail Length	4.949	5.015	6.785	6.759	6.784	6.820	6.897	6.983
(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.)	1.425	1.407	1.040	1.044	1.040	1.034	1.023	1.010
<b>LEAD TO THEORETICAL POINT OF FROG</b>									
(8)	Lead	18.998	19.965	23.578	24.500	25.394	26.289	27.312	28.336
<b>CLOSURE DISTANCE</b>									
(9)	Straight Rail Length	12.342	13.151	14.834	15.769	16.473	17.166	18.100	19.024
(10)	Curved Rail Length	12.364	13.172	14.853	15.787	16.490	17.182	18.115	19.039
(11)	Curved Rail Radius	237.745	281.166	306.265	356.661	405.556	458.320	520.997	588.349
<b>GAGE LINE OFFSETS ON CURVED CLOSURE RAIL</b>									
(12)	1st Point Y1	0.220	0.223	0.213	0.217	0.219	0.221	0.224	0.226
(13)	1st Point X1	8.035	8.303	10.494	10.701	10.903	11.112	11.422	11.739
(14)	Mid-Point Y2	0.357	0.362	0.348	0.354	0.356	0.359	0.363	0.368
(15)	Mid-Point X2	11.120	11.591	14.202	14.643	15.021	15.403	15.947	16.495
(16)	3rd Point Y3	0.534	0.539	0.527	0.535	0.536	0.537	0.542	0.548
(17)	3rd Point X3	14.206	14.879	17.910	18.586	19.139	19.695	20.472	21.252
<b>PROPERTIES OF FROGS</b>									
(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
<b>POINT OF FROG TO INTERSECTION OF CENTERLINES</b>									
(24)	PF to ICL	11.479	12.362	13.245	14.128	15.011	15.894	16.777	17.660
<b>DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS</b>									
<b>For Track Centers of:</b>		2.438	<b>(13 prototype feet)</b>						
(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
<b>For Track Center Increment of:</b>		0.188	<b>(1 prototype foot)</b>						
(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
<b>GUARD RAILS</b>									
(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