

# O27 Scale

## Curved Switch Turnout

# TURNOUT DIMENSIONS

Revised: February 2015

RP-12.44

Design and calculations by Van S. Fehr

(1)	FROG NUMBERS	4	5	6	7	8	9	10	11	12
<b>PROPERTIES OF CURVED SWITCHES</b>										
(2)	Switch Rail Length	3.805	3.889	4.031	6.525	6.760	6.953	7.044	7.185	10.364
(3)	Switch Point Angle (deg.)	2.005	1.962	1.893	1.168	1.128	1.096	1.082	1.061	0.735
(4)	Switch Heel Spread	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252
(5)	Switch Heel Angle (deg.)	5.586	5.466	5.273	3.256	3.143	3.055	3.016	2.957	2.050
(6)	Switch Rail Radius	60.883	63.593	68.325	179.106	192.208	203.381	208.734	217.186	451.867
(7)	Switch Mid-Ordinate	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
<b>LEAD TO THEORETICAL POINT OF FROG</b>										
(8)	Lead	8.958	10.109	11.260	15.672	17.010	18.177	19.276	20.370	25.823
<b>CLOSURE DISTANCE</b>										
(9)	Straight Rail Length	3.887	4.797	5.648	7.220	8.124	8.668	9.559	10.260	12.230
(10)	Curved Rail Length	3.989	4.880	5.719	7.278	8.175	8.714	9.602	10.299	12.264
(11)	Curved Rail Radius	26.380	46.951	77.020	84.830	116.815	151.100	203.076	262.421	258.121
<b>GAGE LINE OFFSETS ON CURVED CLOSURE RAIL</b>										
(12)	1st Point Y1	0.365	0.382	0.395	0.374	0.381	0.383	0.392	0.397	0.379
(13)	1st Point X1	4.777	5.088	5.443	8.330	8.791	9.120	9.434	9.750	13.422
(14)	Mid-Point Y2	0.515	0.544	0.565	0.535	0.546	0.546	0.560	0.567	0.543
(15)	Mid-Point X2	5.748	6.287	6.855	10.135	10.822	11.287	11.824	12.315	16.479
(16)	3rd Point Y3	0.703	0.737	0.761	0.734	0.747	0.740	0.757	0.763	0.744
(17)	3rd Point X3	6.720	7.486	8.267	11.940	12.853	13.454	14.214	14.880	19.537
<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	2.475	2.841	3.206	3.823	4.189	5.056	5.297	5.966	6.489
(20)	Toe Length	1.266	1.424	1.581	1.927	2.126	2.556	2.672	2.924	3.228
(21)	Heel Length	1.209	1.417	1.625	1.896	2.063	2.500	2.625	3.042	3.261
(22)	Toe Spread	0.314	0.283	0.263	0.275	0.265	0.284	0.267	0.266	0.269
(23)	Heel Spread	0.300	0.282	0.270	0.270	0.257	0.277	0.262	0.276	0.271
(35)	Wing Rail Extension	0.740	0.839	0.938	1.037	1.136	1.235	1.333	1.432	1.531
(36)	Wing Rail Flare Length	0.375	0.375	0.375	0.375	0.500	0.500	0.667	0.667	0.750
(37)	Wing Rail Flare Width	0.050	0.050	0.050	0.050	0.047	0.047	0.045	0.045	0.045
(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	0.073	0.073	0.073	0.073	0.073	0.073	0.073	0.073	0.073
<b>POINT OF FROG TO INTERSECTION OF CENTERLINES</b>										
(24)	PF to ICL	5.000	6.250	7.500	8.750	10.000	11.250	12.500	13.750	15.000
<b>DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS</b>										
<b>For Track Centers of:</b>		3.250	<b>(13 prototype feet)</b>							
(25)	Straight Track Dist.	2.797	3.588	4.365	5.134	5.898	6.660	7.419	8.176	8.932
(26)	Crossover Track Dist.	3.203	3.913	4.635	5.366	6.102	6.840	7.581	8.324	9.068
<b>For Track Center Increment of:</b>		0.250	<b>(1 prototype foot)</b>							
(28)	Straight Track Incr.	0.984	1.238	1.490	1.741	1.992	2.243	2.494	2.744	2.995
(29)	Crossover Track Incr.	1.016	1.263	1.510	1.759	2.008	2.257	2.506	2.756	3.005
<b>GUARD RAILS</b>										
(30)	Parallel End Setback	0.167	0.177	0.188	0.198	0.208	0.219	0.229	0.240	0.250
(31)	Bevel Length	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.271
(32)	Flare Length	0.604	0.688	0.688	0.688	0.750	0.750	0.854	0.854	0.854
(33)	Overall Length	2.063	2.750	2.750	2.750	3.250	3.250	4.125	4.125	4.125
(34)	Parallel Length	0.854	1.375	1.375	1.375	1.750	1.750	2.417	2.417	2.417
(37)	Flare Width	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
(38)	Plane Width	0.024	0.021	0.021	0.021	0.020	0.020	0.019	0.019	0.019
(39)	End Chamfer	0.063	0.063	0.063	0.063	0.063	0.063	0.063	0.063	0.063

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(1)	FROG NUMBERS	13	14	15	16	17	18	19	20
<b>PROPERTIES OF CURVED SWITCHES</b>									
(2)	Switch Rail Length	10.525	10.702	10.902	11.103	13.521	13.751	13.941	14.144
(3)	Switch Point Angle (deg.)	0.724	0.712	0.699	0.686	0.564	0.554	0.547	0.539
(4)	Switch Heel Spread	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252
(5)	Switch Heel Angle (deg.)	2.018	1.985	1.948	1.913	1.571	1.545	1.524	1.502
(6)	Switch Rail Radius	465.964	481.816	500.011	518.564	769.082	795.429	817.629	841.566
(7)	Switch Mid-Ordinate	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
<b>LEAD TO THEORETICAL POINT OF FROG</b>									
(8)	Lead	27.034	28.245	29.437	30.677	35.068	36.312	37.557	38.802
<b>CLOSURE DISTANCE</b>									
(9)	Straight Rail Length	13.070	13.893	14.581	15.514	17.177	17.882	18.830	19.766
(10)	Curved Rail Length	13.102	13.923	14.609	15.540	17.201	17.906	18.852	19.787
(11)	Curved Rail Radius	314.504	378.784	447.636	534.255	548.014	626.489	724.319	832.133
<b>GAGE LINE OFFSETS ON CURVED CLOSURE RAIL</b>									
(12)	1st Point Y1	0.384	0.388	0.391	0.396	0.386	0.388	0.392	0.396
(13)	1st Point X1	13.792	14.175	14.548	14.981	17.815	18.221	18.649	19.085
(14)	Mid-Point Y2	0.550	0.556	0.559	0.567	0.555	0.557	0.564	0.570
(15)	Mid-Point X2	17.060	17.649	18.193	18.860	22.109	22.692	23.356	24.027
(16)	3rd Point Y3	0.751	0.757	0.758	0.768	0.757	0.757	0.765	0.773
(17)	3rd Point X3	20.327	21.122	21.838	22.738	26.404	27.162	28.064	28.968
<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	7.012	7.535	7.850	8.373	8.896	9.419	9.739	10.059
(20)	Toe Length	3.439	3.650	3.954	4.060	4.370	4.679	4.786	4.892
(21)	Heel Length	3.573	3.886	3.896	4.313	4.526	4.740	4.953	5.167
(22)	Toe Spread	0.264	0.261	0.263	0.254	0.257	0.260	0.252	0.245
(23)	Heel Spread	0.275	0.277	0.260	0.269	0.266	0.263	0.261	0.258
(35)	Wing Rail Extension	1.698	1.865	1.964	2.167	2.266	2.365	2.531	2.698
(36)	Wing Rail Flare Length	0.977	1.106	1.155	1.294	1.339	1.384	1.515	1.646
(37)	Wing Rail Flare Width	0.044	0.043	0.043	0.043	0.043	0.043	0.042	0.042
(38)	Wing Rail Bend Width	0.044	0.043	0.043	0.043	0.043	0.043	0.042	0.042
(39)	Wing Rail End Chamfer	0.073	0.073	0.073	0.073	0.073	0.073	0.073	0.073
<b>POINT OF FROG TO INTERSECTION OF CENTERLINES</b>									
(24)	PF to ICL	16.250	17.500	18.750	20.000	21.250	22.500	23.750	25.000
<b>DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS</b>									
<b>For Track Centers of:</b>		3.250	<b>(13 prototype feet)</b>						
(25)	Straight Track Dist.	9.688	10.442	11.196	11.949	12.702	13.455	14.207	14.959
(26)	Crossover Track Dist.	9.813	10.558	11.304	12.051	12.798	13.545	14.293	15.041
<b>For Track Center Increment of:</b>		0.250	<b>(1 prototype foot)</b>						
(28)	Straight Track Incr.	3.245	3.496	3.746	3.996	4.246	4.497	4.747	4.997
(29)	Crossover Track Incr.	3.255	3.504	3.754	4.004	4.254	4.503	4.753	5.003
<b>GUARD RAILS</b>									
(30)	Parallel End Setback	0.261	0.271	0.281	0.292	0.302	0.313	0.323	0.333
(31)	Bevel Length	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.271
(32)	Flare Length	0.854	0.958	0.958	0.958	0.958	1.063	1.063	1.063
(33)	Overall Length	4.125	4.875	4.875	4.875	4.875	5.750	5.750	5.750
(34)	Parallel Length	2.417	2.958	2.958	2.958	2.958	3.625	3.625	3.625
(37)	Total Flare at End	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
(38)	Bevel Cut at End	0.019	0.018	0.018	0.018	0.018	0.017	0.017	0.017
(39)	End Chamfer	0.063	0.063	0.063	0.063	0.063	0.063	0.063	0.063