

Ndf Scale

Curved Switch Turnout

TURNOUT DIMENSIONS

Revised: February 2015

RP-12.50

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	1.129	1.150	1.190	1.934	2.001	2.058	2.081	2.122	3.069
(3)	Switch Point Angle (deg.)	1.814	1.780	1.720	1.058	1.022	0.994	0.983	0.964	0.666
(4)	Switch Heel Spread	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068
(5)	Switch Heel Angle (deg.)	5.053	4.958	4.793	2.947	2.849	2.770	2.739	2.687	1.857
(6)	Switch Rail Radius	19.967	20.735	22.187	58.640	62.757	66.376	67.915	70.567	147.693
(7)	Switch Mid-Ordinate	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
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	1.247	1.540	1.815	2.308	2.599	2.780	3.068	3.297	3.911
(10)	Curved Rail Length	1.276	1.564	1.835	2.324	2.614	2.793	3.080	3.308	3.921
(11)	Curved Rail Radius	7.949	13.863	22.212	25.490	34.797	44.591	59.098	75.263	77.064
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL										
(12)	1st Point Y1	0.101	0.106	0.110	0.104	0.106	0.107	0.109	0.111	0.105
(13)	1st Point X1	1.440	1.535	1.644	2.511	2.651	2.753	2.848	2.946	4.047
(14)	Mid-Point Y2	0.148	0.156	0.163	0.153	0.157	0.157	0.161	0.163	0.156
(15)	Mid-Point X2	1.752	1.920	2.097	3.088	3.300	3.448	3.615	3.770	5.025
(16)	3rd Point Y3	0.207	0.217	0.224	0.216	0.220	0.218	0.223	0.224	0.219
(17)	3rd Point X3	2.064	2.305	2.551	3.665	3.950	4.143	4.383	4.595	6.003
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	1.432	1.790	2.148	2.506	2.864	3.222	3.580	3.938	4.296
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS										
For Track Centers of:		0.975	(13 prototype feet)							
(25)	Straight Track Dist.	0.975	1.246	1.513	1.778	2.042	2.304	2.566	2.827	3.088
(26)	Crossover Track Dist.	1.097	1.344	1.595	1.848	2.102	2.358	2.614	2.871	3.128
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	3.114	3.164	3.222	3.279	3.999	4.066	4.119	4.176
(3)	Switch Point Angle (deg.)	0.657	0.646	0.635	0.624	0.511	0.503	0.496	0.490
(4)	Switch Heel Spread	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068
(5)	Switch Heel Angle (deg.)	1.830	1.801	1.769	1.738	1.425	1.402	1.384	1.365
(6)	Switch Rail Radius	152.037	156.973	162.774	168.528	250.725	259.150	265.991	273.413
(7)	Switch Mid-Ordinate	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
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	4.183	4.450	4.675	4.975	5.496	5.727	6.032	6.333
(10)	Curved Rail Length	4.192	4.458	4.683	4.983	5.503	5.733	6.038	6.339
(11)	Curved Rail Radius	93.279	111.566	130.924	155.044	162.180	184.509	212.094	242.234
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL									
(12)	1st Point Y1	0.107	0.108	0.109	0.110	0.108	0.108	0.109	0.110
(13)	1st Point X1	4.160	4.277	4.391	4.523	5.373	5.497	5.627	5.759
(14)	Mid-Point Y2	0.158	0.160	0.161	0.163	0.159	0.160	0.162	0.164
(15)	Mid-Point X2	5.206	5.389	5.560	5.766	6.747	6.929	7.135	7.343
(16)	3rd Point Y3	0.221	0.223	0.223	0.226	0.223	0.223	0.225	0.227
(17)	3rd Point X3	6.251	6.502	6.729	7.010	8.121	8.361	8.643	8.926
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	4.654	5.012	5.370	5.728	6.086	6.444	6.802	7.160
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS									
For Track Centers of:		0.975	(13 prototype feet)						
(25)	Straight Track Dist.	3.348	3.609	3.869	4.129	4.389	4.648	4.908	5.168
(26)	Crossover Track Dist.	3.386	3.643	3.901	4.159	4.417	4.676	4.934	5.192
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