1 General

Equipment should be designed and built to operate satisfactorily at restricted speed (20 scale miles per hour) through the minimum turnouts and minimum radius curvature specified below. For operation at typical main line scale speeds (see **DATA SHEET D4d.1**), specifications for a higher class should be used.

Equipment in each class should be restricted from portions of layouts with less than the specified minimum radius and turnout frog. Use of the largest radius curves, with proper spiral easements (see **DATA SHEETs D3a, D3b.1, D3b.3**), consistent with the design limitations of the individual model railroad, is strongly recommended for best operation and appearance.

1.1 Introduction and Intended Use (Informative)

In this RP, separate tables are provided for traction (streetcars, interurban railroads, light rail, elevated or subway) and for locomotive-hauled (steam, diesel or electric) railroads.

To allow construction of model railroads in available spaces, model railroad equipment is designed to operate on curves and turnouts which are much sharper than the prototype. The values shown below reflect a judgment of the trade-off between practical space requirements and the need to accommodate greater truck rotation by adjusting or eliminating underbody detail. Certain steam locomotives having 10 or more coupled drive wheels may need to have one or two axles with ″blind″ wheels (without flanges) to operate successfully. Certain models, particularly entry level, operate on tighter curves. Highly detailed models may require larger curves.

1.2 References

This standard should be interpreted in the context of the following NMRA Standards, Recommended Practices, Data Sheets, Technical Notes, and Technical Information.

1.2.1 Normative

- None

1.2.2 Informative

- NMRA RECOMMENDED PRACTICE RP-5
- NMRA RECOMMENDED PRACTICE RP-7
- NMRA RECOMMENDED PRACTICE RP-7.2
- NMRA DATA SHEET D3a
- NMRA DATA SHEET D3b.1
- NMRA DATA SHEET D3b.3
- NMRA DATA SHEET D4d.1

2 TRACTION (Streetcars, Interurban, Light Rail)

2.1 CLASSIFICATION OF EQUIPMENT

Class	Key	Description
Street Cars	**A**	Streetcars, single or coupled with a tow bar or couplers.
Interurban using MCB couplers	**B**	Classes C, D and E (below) operating on in-city street car trackage. Also see NMRA RECOMMENDED PRACTICE RP-5
	C	Interurban motors and trailers to 40′ long
	D	Interurban motors and trailers to 50′ long
	E	Interurban motors and trailers to 64′ long; interchanged standard cars to 40′ long with 4-wheel trucks and truck mounted couplers, to 36′ long with body mounted couplers.

2.2 TRACK DIMENSIONS

Classification Key	A	B	C	D	E
Curve (In Degrees)	(Undefined)	180	100	80	60
Prototype Radius	36′	50′	65′	78′	100′
Min. Turnout Frog	2.5	3	3	4	4
Model Radius (inches)					
O Scale	9″	12.5″	16″	19.5″	25″
S Scale	7″	9.5″	12″	14.5″	19″
OO Scale	5.5″	8″	10.5″	12.5″	16″
HO Scale	5″	7″	9″	11″	14″
TT Scale	3.5″	5″	6.5″	8″	10″
N Scale	2.75″	3.75″	4.875″	5.875″	7.5″
Model Radius (millimeters)					
O Scale	229	318	406	495	635
S Scale	178	241	305	368	483
OO Scale	140	203	267	318	406
HO Scale	127	178	229	279	356
TT Scale	89	127	165	203	254
N Scale	70	95	124	149	191

Note 1. Street cars and interurban vehicles should be constructed to negotiate a curve of prototype radius 4′ sharper than indicated in class A and B respectively to assure ease of operation.

3 Locomotive Hauled or MU Trains

3.1 CLASSIFICATION OF EQUIPMENT

<table>
<tr><th rowspan="3">Classification Key</th><th rowspan="3">Layout Type</th><th rowspan="3">Degrees of Curvature</th><th colspan="4">Motive Power</th><th colspan="3">Passenger Equipment</th><th colspan="3">Freight Equipment</th></tr>
<tr><th colspan="2">Rigid Frame</th><th colspan="2">Swivel Trucks Total Length</th><th rowspan="2">Maximum Length</th><th rowspan="2">Trucks</th><th rowspan="2">Diaphragms</th><th rowspan="2">Body Mounted Couplers</th><th rowspan="2">Truck Mounted Couplers</th><th rowspan="2">Cushion Underframe</th></tr>
<tr><th>Wheels and Max. Driver</th><th>Wheelbase</th><th>4 Wheel Trucks</th><th>6 Wheel Trucks</th></tr>
<tr><td>E</td><td>Old Time Pikes, Small</td><td>60</td><td>4-51”</td><td>9’</td><td colspan="2">Not Applicable</td><td>40’</td><td rowspan="5">4 wheel</td><td rowspan="5">None</td><td>36’</td><td>40’</td><td rowspan="5">None</td></tr>
<tr><td>F</td><td rowspan="4">Branch Lines and Feeder Lines</td><td>50</td><td>6-60”</td><td>11’</td><td>40’</td><td rowspan="5">Not Applicable</td><td>50’</td><td>40’</td><td>45’</td></tr>
<tr><td>G</td><td>45</td><td>8-45”*, 6-68”</td><td>12’6”</td><td>45’</td><td>55’</td><td>45’</td><td>50’</td></tr>
<tr><td>H</td><td>40</td><td>8-51”, 6-76”</td><td>14’</td><td>50’</td><td>60’</td><td>50’</td><td>60’</td></tr>
<tr><td>I</td><td>36.5</td><td>10-41”*, 8-54”, 6-82”</td><td>15’</td><td>55’</td><td>65’</td><td>60’</td><td rowspan="11">All</td></tr>
<tr><td>J</td><td rowspan="10">Standard Trunk Lines</td><td>35</td><td>10-43”*, 8-58”, 6-NR</td><td>16’</td><td>60’</td><td>60’</td><td rowspan="10">4 or 6 wheel</td><td rowspan="5">Conventional</td><td rowspan="10">All</td><td>50’</td></tr>
<tr><td>K</td><td>33</td><td>10-46”, 8-62”</td><td>17’</td><td rowspan="9">All</td><td>65’</td><td>55’</td></tr>
<tr><td>L</td><td>30</td><td>10-51”, 8-67”</td><td>18’6”</td><td>60’</td><td>70’</td><td>62’</td></tr>
<tr><td>M</td><td>27</td><td>10-56”, 8-74”</td><td>20’6”</td><td>65’</td><td>75’</td><td>70’</td></tr>
<tr><td>N</td><td>25</td><td>10-60”, 8-80”</td><td>22’</td><td>70’</td><td>80’</td><td>85’</td></tr>
<tr><td>O</td><td>22</td><td>10-68”, 8-NR</td><td>25’</td><td rowspan="3">All</td><td>85’</td><td rowspan="4">Full width or Conventional</td><td rowspan="3">All</td></tr>
<tr><td>P</td><td>20</td><td>10-74”</td><td>27’</td><td rowspan="2">All</td></tr>
<tr><td>Q</td><td>18</td><td>12-67”</td><td>30’8”</td></tr>
</table>

NR denotes No Restriction on this or larger classes.

Note 2. Articulated locomotives should be increased four classes over the class determined by the longer set of drivers. For example, a Pacific with 69″ drivers would be class H, while a Challenger with 69″ drivers would be class L. Duplex locomotives such as the PRR T-1, having a rigid frame, shall be classified based on their actual rigid wheelbase (25′ 3″).

Note 3. On rod type steam locomotives drivers smaller than 50″, marked *, are generally limited to narrow gauge (3′ 6″ or less), plantation or industrial locomotives.

Note 4. Articulated passenger cars should be treated as not less than Class N regardless of length, unless the manufacturer provides a different value.

Note 5. North American 10 coupled and 12 coupled locomotives did not use drivers larger than 74″ and 67″, respectively.

Note 6. If a tender has rigidly mounted wheels (″centipede″) the longer of the locomotive or tender wheelbases shall determine classification.

Note 7. Locomotives with ″blind″ (flangeless) center wheels in a rigid wheel base of 15 feet (Class I) or greater may be reduced one class. Development of ″freak″ equipment for operation on sharper curves is not recommended.

Note 8. Freight cars 50 feet or longer using two trucks at each end, with coupler mounted on the span bolster, may be reduced one class. The longest possible coupler shank is recommended.

3.2 TRACK DIMENSIONS

Classification Key	E	F	G	H	I	J	K	L	M	N	O	P	Q
Degrees of Curvature	60	50	45	40	36.5	35	33	30	27	25	22	20	18
Prototype Radius	100′	118′	131′	146′	158′	166′	176′	193′	214′	231′	262′	288′	320′
Minimum Turnout Frog	4	4.5	5	5	5	6	6	6	6	6	6	7	8
Model Radius (inches)													
O Scale	25″	30″	32.5″	36.5″	40″	41.5″	44″	48″	53.5″	58″	65.5″	72″	80″
S Scale	19″	22.5″	24.5″	27.5″	30″	31″	33″	36″	40″	43.5″	49″	54″	60″
OO Scale	16″	18.5″	20.5″	23″	25″	26″	27.5″	30.5″	33.75″	36.5″	41.5″	45.5″	50.5″
HO Scale	14″	16.5″	18″	20″	22″	23″	24.5″	26.5″	29.5″	32″	36″	40″	44″
TT Scale	10″	12″	13″	14.5″	16″	16.5″	17.5″	19.5″	21.5″	23″	26″	29″	32″
N Scale	7.5″	8.875″	10″	11″	12″	12.5″	13.25″	14.5″	16.125″	17.375″	19.625″	21.5″	24″
Model Radius (millimeters)													
O Scale	635	762	826	927	1016	1054	1118	1219	1359	1473	1664	1829	2032
S Scale	483	572	622	699	762	787	838	914	1016	1105	1245	1372	1524
OO Scale	406	470	521	584	635	660	699	775	851	927	1054	1156	1283
HO Scale	356	419	457	508	559	584	622	673	749	813	914	1016	1118
TT Scale	254	305	330	368	406	419	445	495	546	584	660	737	813
N Scale	191	225	248	279	305	318	337	368	410	441	498	546	610

Note 9. The minimum turnout frog for diverging routes, including crossovers, to be negotiated at high speed should be No. 8 for classes N and greater.

Note 10. The recommended maximum turnout frog for systems using center third rail for power supply is No. 6 is, to avoid an excessive gap in the third rail.

Note 11. Equilateral (wye) turnouts may be one frog number less than the values shown.

Note 12. Curved turnouts should be increased one frog number if the inner curve is at minimum radius for the equipment to be operated.

Note 13. The application of turnouts specified by radius rather than frog number should be consistent with the radius values specified for the equipment to be operated.

Note 14. See NMRA RECOMMENDED PRACTICES RP-7 and RP-7.2 for Clearances and for Multiple Track Centers for various radii.

4 Document History

Date	Description
January 1990	Complied by Hill, Hazen, Bradley
July 2017	Revised by Alex Schneider
March 2018	Revised by Rod Tonkin and Alex Schneider
February 2026	Revised by Yaron Bandell Migrated to new template, minor corrections made

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