

NorthWest Short Line

WHEELSETS

Welcome to fine modeling choices from NWSL

The following wheelset and component specification information is provided for modelers and designers who need to go beyond knowing what wheelset fits an Athearn or ATLAS boxcar. To aid your modeling or product design efforts, we have endeavored to provide here all necessary interface specification information to aid you in determining what your specifications should be if you plan to use precision quality, economical NWSL components and/or what you should design your product for to provide you with optimum economy in assembly and operation of your finished product.

The information provided will enable you to determine combinations of components that can achieve your desired requirement when a non-stock wheelset is required without incurring custom manufacturing costs. For instance, the WHEELS specifications in addition to providing the wheel diameter in bold type for the scale of such wheel also provides, in small type, the diameter in other nearby scales where it may meet your specific requirement. Thus, for example, if your model is 'S' scale and you desire a 30" wheel, you will find that an HO scale 40"/110 wheel is comparable to 29" in 'S' scale. If this minor size discrepancy were satisfactory, substantial custom (size) manufacture costs and time delays could be avoided by using this regular production wheel.

The three AXLE STYLE charts show the various stock axles used in various NWSL wheelsets. This information aids in determining what will fit your existing models as well as what journal and spacing dimensions to use in building a model.

If your need is for a different combination of components other than our stock wheel/axle combinations, you can order custom assembly service. Costs for custom wheelsets that require components to be modified or custom machined will be quoted on request.

Gauges, Scales and Ratios. When you proceed beyond the toy train that provides satisfaction merely as a toy, you enter the world of scale models.

Even here there are numerous 'shades' and choices that modelers choose to satisfy each particular interest. Some modelers interest is fulfilled when a train runs on the track; another modeler may not be satisfied until the consist of that train is exactly correct; a third modeler could care less what the prototype train looked like, just taking pleasure from what looks good to him, etc. The ability to accommodate these various individual interests makes railroad modeling a great hobby - actually it is a form of artistry that enables modelers to express themselves in a pleasurable and self satisfying manner. In general, gauge and scale are synonymous, but not always. O gauge for instance is not actually the proper scale gauge for 1/4"=1'0". O gauge derives from the toy trains. In recent years, more interest has been emerging to build models in proper exact gauge in addition to more accurate scaling of components in order to provide models with proportions more accurately depicting the prototype. These efforts have generally been termed 'finescale' but as a result of recent efforts to further formalize this movement and to alleviate confusion that had arisen, the term "Proto" has been borrowed from the British efforts in recent years to refine modeling authenticity. In practice, the designation Proto:48 (abbreviated P:48) is applied to 'O' scale modeling using proper track gauge and correctly scaled wheels (previously termed '1/4AAR'). This derives from the ratio (48:1) of O scale. In S scale, a similar movement generally termed NASG appears to be moving to the P:64 designation. In HO, the P:87 (Proto:87) movement has a large number of adherents in the UK, France, the USA and elsewhere. The scale width of the P:87 wheel improve the scale appearance of HO cars and diesels remarkably.

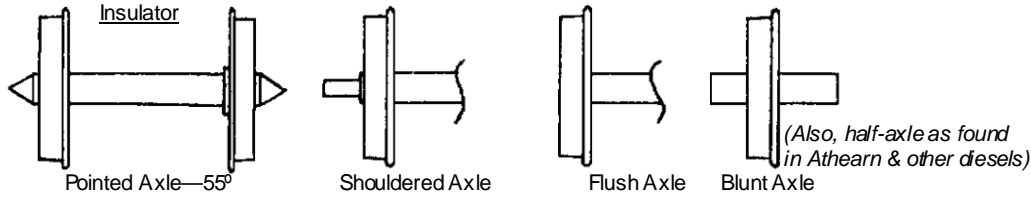
NWSL, in efforts to aid more accurate modeling, has worked with modelers over the years to provide better looking wheel treads that operate well. For example, we did not offer the typical 'O' gauge /172 width wheel because its oversize width detracts from model appearance unnecessarily (the /172 tread was added in late 1992 at the

request of a number of 'O' modelers). Instead, NWSL makes a better looking (NWSL/145) tread that operates well on 'O' gauge track laid to NMRA standards (but operates unsatisfactorily on some older, 'large flangeway' or worn 'O' gauge trackage) yet is much closer to scale width and thus less obtrusive to model appearance without encountering the severe difficulties of going to a completely scale (/115 - P:48) wheel tread. In a larger scale, our /270 tread is much better appearing than the typical LGB (and compatibles) wheel yet operates reliably on LGB (and compatible) track.

Whether your objective is upgrade, repair, or manufacture of fine railroad models, NWSL will be pleased to be of assistance with fine quality, precision manufactured, economical components.

Throw away that modeling 'straight jacket', you've got options that help you achieve a higher level of modeling creativity and pleasure. Best wishes from the people at NWSL who make these products in the USA for your enjoyment.

WHEELSETS



WHEEL DESIGN

Wheel tread and flange design is important to satisfactory train operation. NMRA members have spent much effort refining concepts and designing preferred tread design for railroad modeling purposes which is laid out in NMRA speciation as RP (Recommended Practice)-25 sheet. The specification provides dimensions for a series of tread sizes without indicating applicable scales or gauges. In general, the 110 sizes is used for HO gauge, the /88 for HOn3 and the /172 for O gauge. These treads scale out to somewhat larger than true-to-scale wheel, in some cases almost twice scale width. An over-width wheel is detrimental to the appearance of a model that is built closely to scale and in fact requires substantial compromise in modeling the operating components (trucks, brakes, etc.) related to the wheels. On the other hand, attempting to operate scale tread wheels can cause serious difficulties in track construction, requiring tolerances undesirable or unattainable from some modelers. NWSL manufactures a broad range of wheel treads generally but not exactly following the RP-25 specification to permit each modeler to make their own choice as appropriate to meet their individual modeling objectives. NWSL's preference is for scale model products—it is up to you to make the choice necessary to meet your own modeling desires. The RP-25 fillet radius is considered by some modelers to be detrimental to tractive effort. Therefore the radius has been minimized in the NWSL wheel to provide better tractive effort for power units such as the Stanton Drive, Athearn (and other) replacement wheels, Magic Carpets, etc.

WHEEL TREAD DIMENSIONS								
NMRA Code	NWSL designation	DIMENSIONS (inch-mm)			GENERAL GAUGE Usage	scale width	also used for these scale/gauges	Tread Legend
		D	T	N				
	NWSL/270	.100-2.5	.100-2.5	.270-6.7	1:32, LGB, G, #1	8-5/8"	1/2', F, A,	
	NWSL/236	.062-1.6	.062-1.6	.236-6.0	1:32, #1 semi-finescale	7-1/2"	1/2'n3, F, A,	
	NWSL/210	.110-2.8	.080-2.0	.210-5.3	O tinplate	7-1/2"	1/2'n3, F, A,	
175	NWSL/172	.062-1.6	.054-1.4	.172-4.4	O	8-1/4"	#1 finescale, #1/2'n3	
	NWSL/145	.045-1.1	.035-0.9	.150-3.8	O semi-finescale	7"		
	NWSL/135	.035-0.9	.035-0.9	.135-3.4	O traction	6-1/2"		
	NWSL/115	.027-0.7	.026-0.7	.115-2.9	P:48, On3	5-1/2"	S	
110	NWSL/110	.027-0.7	.027-0.7	.110-2.8	HO	9-5/8"	S, P:64, OO	
88	NWSL/88	.025-0.6	.025-0.6	.088-2.2	HOn3	7-2/3"	Sn3, On2, HO, TT	
87	NWSL/87	.025-0.6	.025-0.6	.087-2.2	P:64	5-1/2"	P:64	
72	NWSL/72	.020-0.5	.020-0.5	.072-1.8	N	11-1/2"	HOn3 (6.3")	
64	NWSL/64	.013-0.3	.013-0.3	.064-1.6	P:87	5-1/2"	N semi-finescale (10.2")	
	NWSL/50	.013-0.3	.013-0.3	.050-1.3	N finescale	8"		
mainline Prototype treadwidth— 5-1/2"						traction 4-1/2", some as narrow as 3-1/2"!!		

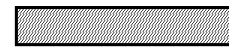
WHEEL SIZES—General applications on the prototypes

Diameter	Commonly found on:	Diameter	Commonly found on:
15—20"	Mine, industrial railroads	33"	Typical freight car, early streetcars, interurbans
20—26"	Narrow gauge, light railroads (18', 2', etc. gauges)	36"	Freight cars of 70 Ton and up capacity, interurbans, passenger cars, some diesel and electric locomotives
22—36"	Streetcars, interurbans	38"	High capacity double stack container cars (125+ ton cap'y)
26"	Modern streetcars, narrow gauge freight cars	40"	most EMD diesels, some circa 1900 passenger cars
28"	Trailer trains, modern interurban, N.G. passenger cars	42"	Baldwin, ALCO, Athearn HO diesels, dash 8-40CM, AC44-9, AC4400
30"	Streetcars (some US, many European)	45"	SD80MAC, SD90MAC
31"	North Shore Electroliner		

Note: It was not uncommon for a prototype wheel size to be changed over the years. Many interurbans were delivered with 37-1/2" wheels that were later allowed to wear to or were replaced by 36" (or even 33") wheels. Most early 3' gauge equipment had 24" wheels that were later replaced with 26" wheels in the early 1900s.

AXLE STYLES

FLUSH The axle end is flush with the hub face. This style is used to represent inside journal (bearing) type wheelsets such as many steam locomotive lead (and some trail) trucks, PCC streetcar wheels, etc. It is commonly used in models where the truck sideframe is 'dummy' with no weight carrying function or journals (in some instances—such as some KMT diesels—not quite flush so that the axle end keeps sideframes from shorting to wheels.



POINT Fits a cone shape bearing. Commonly used in HO, S, O, N, etc. scale model non-powered cars. Usually provides lower friction and easier rolling than other styles. Cone angle is 55 degrees. Not recommended for ballasted or heavy cars due to small bearing area and therefore high bearing loading and wear rate. Axle length is very critical, must be closely matched to journal (cone) spacing—watch for variations from one production batch to the next.



BLUNT The axle end is square and the same diameter as the axle body. This style, and the following one, is very easy to use because of the simplicity of the journal (bearing) required—just drill a hole slightly larger than the axle end diameter.



SHOULDER The axle end is square (except for chamfering, if any - some examples with a pointed end that is non-functional) and smaller than the axle body. The bearing diameter is usually slightly smaller than the given dimension so that a hole drilled to the given dimension can serve as a journal bearing. For better life, use Insert journal bearings such as #354-6, #366-6, etc.





NWSL Premium Nickel Silver Wheelsets

N Scale Wheelsets

HOn2-1/2 (HOn30)

Premium operation on code 55 and code 40

N/72 Sstandard or typical wheel tread width for N gauge, but with a more realistic appearance flange.

N/64 Semi-finescale tread that operates reliably on most 'N' gauge trackage

N/50 Even better looking almost finescale for the adventurous perfectionist!

N Scale Wheelsets Nickel-Silver \$19.95/pkg4

KD-MT, MDC, Atlas, etc.

	<u>Part #</u>
28"/50 Point 1.5mm x .540" axle	57515-4
33"/50 Point 1.5mm x .540" axle	57517-4
36"/50 Point 1.5mm x .540" axle	57518-4
28"/64 Point 1.5mm x .540" axle	37515-4
33"/64 Point 1.5mm x .540" axle	37517-4
36"/64 Point 1.5mm x .540" axle	37518-4
28"/72 Point 1.5mm x .540" axle	37415-4
33"/72 Point 1.5mm x .540" axle	37417-4
36"/72 Point 1.5mm x .540" axle	37418-4

Concor/Bachman

33"/50 Point 1.5mm x .560" axle	57567-4
36"/50 Point 1.5mm x .560" axle	57568-4
33"/64 Point 1.5mm x .560" axle	37567-4
36"/64 Point 1.5mm x .560" axle	37568-4
28"/72 Point 1.5mm x .560" axle	37465-4
33"/72 Point 1.5mm x .560" axle	37467-4
36"/72 Point 1.5mm x .560" axle	37468-4
33"/50 Flush 1.5mm x .445" axle	57527-4
28"/64 Flush 1.5mm x .445" axle	37525-4
33"/64 Flush 1.5mm x .445" axle	37527-4
36"/64 Flush 1.5mm x .445" axle	37528-4
40"/64 Flush 1.5mm x .445" axle	37529-4
28"/72 Flush 1.5mm x .445" axle	37425-4
33"/72 Flush 1.5mm x .445" axle	37426-4
36"/72 Flush 1.5mm x .445" axle	37428-4
40"/72 Flush 1.5mm x .445" axle	37429-4
36"/72 Shldr 1.5mm x .530" axle	37408-4

Some Atlas, Rivarossi. etc.

	<u>Part #</u>
33"/50 Point 1.5mm x .550" axle	57537-4
36"/50 Point 1.5mm x .550" axle	57538-4
33"/64 Point 1.5mm x .550" axle	37537-4
36"/64 Point 1.5mm x .550" axle	37538-4
33"/72 Point 1.5mm x .550" axle	37437-4
36"/72 Point 1.5mm x .550" axle	37438-4

Key Tender Cars

33"/72 Point 1.5mm x .580" axle	37419-4
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Minitrix Diesel

40"/72 Flush 1.5mm x .445" axle w/12T SG	7440-4	\$30.95
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Diesel upgrade wheels/wheelsets

	<u>Part #</u>	<u>Price</u>
40"/72 Bachmann Plus F-7 diesel 12T x .165" geared (4)	2574-6	\$30.95
40"/72 Lifelike diesel <i>wheels</i> (China-built units w/1.5mm plastic axle) (8/pkg)	2575-6	\$16.95
40"/64 Lifelike diesel <i>wheels</i> (China-built units w/1.5mm plastic axle)(8/pkg)	2576-6	\$16.95

Arnold/Walthers S2 Diesel upgrade geared wheelsets

	<u>Part #</u>	<u>Price</u>
40"/72 1.0mm x .445" axle geared wheelsets (4/pkg)	2679-6	\$30.95
40"/64 1.0mm x .445" axle geared wheelsets (4/pkg)	2680-6	\$30.95

HOn30 (HOn2-1/2) Scale Wheelsets \$19.95/pkg4

	<u>Part #</u>
20"/64 Shoulder 1.5mm x .530" axle	37550-4 (Grandt Line 5146)
20"/72 Shoulder 1.5mm x .530" axle	37450-4 (Grandt Line 5257)
28"/64 Pointed 1.5mm x .560" axle	37565-4
20"/64 Pointed 1.5mm x .580" axle	37556-4 (Sango)
20"/72 Pointed 1.5mm x .580" axle	37456-4
20"/64 Pointed 1.5mm x .615" axle	37553-4 (Joe Works)
20"/72 Pointed 1.5mm x .615" axle	37453-4



HO Scale Wheelsets

- HO/110** Traditional HO wheel
- HO/88** Traditional HOn3 tread for better HO appearance
- Proto:HO/64** P:87 tread for HO trackage (*limited operation*)
- P:87/64** Exact scale tread for P:87 trackage (*scale flangeways*)

3 different pointed axle lengths are found in HO:

US Standard— 1.015" as fits (runs freely in) Athearn, MDC, most HO (NMRA std is 1.025" which is too long (too tight to run freely) for many trucks)

European— .970" as fits some Rivarossi, RED CABOOSE, most European models (termed "short point").

P:87— .917" as fits trucks modified to scale width. If you want the P:87 tread but standard length pointed axle - add 50 to the stock # (i.e. #7617-4 has P:87 axle; #7668-4 has US Std (Athearn) length axle.

HO Gauge /110 tread Wheelsets (Pkg/4)

	Assembled	Unassembled
	\$19.95	\$15.95
26"/110 Shldr 2.0 x 1.025" axle (4)	37103-4	97103-4
28"/110 Shldr 2.0 x 1.025" axle (4)	37105-4	97105-4
30"/110 Shldr 2.0 x 1.025" axle (4)	37106-4	97106-4
33"/110 Shldr 2.0 x 1.025" axle (4)	37107-4	97107-4
36"/110 Shldr 2.0 x 1.025" axle (4)	37108-4	97108-4
38"/110 Shldr 2.0 x 1.025" axle (4)	37135-4	97135-4
40"/110 Shldr 2.0 x 1.025" axle (4)	37131-4	97131-4
42"/110 Shldr 2.0 x 1.025" axle (4)	27132-4	97132-4
45"/110 Shldr 2.0 x 1.025" axle (4)	37101-4	97101-4
26"/110 shldr 3/32" x 1.025" axle, bright (4)	7103-4	n/a
28"/110 shldr 3/32" x 1.025" axle, bright (4)	7105-4	n/a
30"/110 shldr 3/32" x 1.025" axle, w eathered (4)	17106-4	n/a
30"/110 shldr 3/32" x 1.025" axle, bright (4)	7106-4	n/a
33"/110 shldr 3/32" x 1.025" w eathered (4)	17107-4	n/a
33"/110 shldr 3/32" x 1.025" axle, bright (4)	7107-4	n/a
40"/110 Blunt 3/32" x 1.015" axle (4)	37109-4	97109-4
42"/110 Blunt 3/32" x 1.015" axle (4)	27110-4	97110-4
33"/110 ATLAS Point 2.0 x .944" axle (4)	37187-4	97187-4
36"/110 ATLAS Point 2.0 x .944" axle (4)	37188-4	97188-4
40"/110 ATLAS Point 2.0 x .944" axle (4)	37185-4	97185-4
42"/110 ATLAS Point 2.0 x .944" axle (4)	27186-4	97186-4
28"/110 Point 2.0 x .970" axle (4)	37165-4	97165-4
33"/110 Point 2.0 x .970" axle (4)	37167-4	97167-4
36"/110 Point 2.0 x .970" axle (4)	37168-4	97168-4
40"/110 Point 2.0 x .970" axle (4)	37169-4	97169-4
45"/110 Point 2.0 x .970" axle (4)	37170-4	97170-4
28"/110 Point 3/32" x .970" axle (4)	7165-4	
33"/110 Point 3/32" x .970" axle (4)	7167-4	
26"/110 Point 2.0 x 1.015" axle (4)	37113-4	97113-4
28"/110 Point 2.0 x 1.015" axle (4)	37115-4	97115-4
30"/110 Point 2.0 x 1.015" axle (4)	37116-4	97116-4
33"/110 Point 2.0 x 1.015" axle (4)	37117-4	97117-4
36"/110 Point 2.0 x 1.015" axle (4)	37118-4	97118-4
38"/110 Point 2.0 x 1.015" axle (4)	37136-4	97136-4
40"/110 Point 2.0 x 1.015" axle (4)	37119-4	97119-4
42"/110 Point 2.0 x 1.015" axle (4)	27120-4	97120-4
45"/110 Point 2.0 x 1.015" axle (4)	37102-4	97102-4

NWSL offers wheelsets **unassembled**
 NWSL realizes many of our customers are able to assemble the wheelsets themselves and we now offer packages of just wheels, axles and insulators.

Each package contains: (4) wheels with bore to fit insulator, (4) wheels for non-insulated side, (4) axles, (1) sprue of insulators, instructions & general tips for assembly.

Assembled: \$19.95/pkg 4
Unassembled: \$15.95/pkg 4

HO Scale Wheelsets, *cont'd*

HO Gauge /110 tread Wheelsets (Pkg/4)

	Assembled \$19.95	Unassembled \$15.95
26"/110 Point 3/32" x 1.015" axle, w eathered (4)	17113-4	n/a
26"/110 Point 3/32" x 1.015" axle, bright (4)	7113-4	n/a
28"/110 Point 3/32" x 1.015" axle, bright (4)	7115-4	n/a
30"/110 Point 3/32" x 1.015" axle, w eathered (4)	17116-4	n/a
30"/110 Point 3/32" x 1.015" axle, bright (4)	7116-4	n/a
33"/110 Point 3/32" x 1.015" axle, bright (4)	7117-4	n/a
33"/110 Point 3/32" x 1.015" axle, w eathered (4)	17167-4	n/a
38"/110 Point 3/32" x 1.015" axle, bright (4)	7136-4	n/a
40"/110 Point 3/32" x 1.015" axle (4)	37121-4	97121-4
26"/110 Flush 2.0 x .797 axle (4)	37123-4	97123-4
26"/110 PCC Flush 2.0 x .797 axle (4)	37124-4	97124-4
28"/110 Flush 2.0 x .797 axle (4)	37125-4	97125-4
30"/110 Flush 2.0 x .797 axle (4)	37126-4	97126-4
33"/110 Flush 2.0 x .797 axle (4)	37127-4	97127-4
36"/110 Flush 2.0 x .797 axle (4)	37128-4	97128-4
40"/110 Flush 2.0 x .797 axle (4)	37133-4	97133-4
45"/110 Flush 2.0 x .797 axle (4)	37104-4	97104-4
26"/110 flush 3/32" x .797" axle (4)	7123-4	n/a
28"/110 flush 3/32" x .797" axle (4)	7125-4	n/a
30"/110 Flush 3/32" x .797 axle (4)	37134-4	97134-4
33"/110 flush 3/32" x .797" axle (4)	7127-4	n/a
40"/110 Flush 3/32" x .797 axle (4)	37129-4	97129-4
42"/110 Flush 3/32" x .797 axle (4)	27130-4	97130-4
45"/110 Flush 3/32" x .797 axle (4)	37122-4	97122-4

HO Gauge /88 tread Wheelsets (Pkg/4)

	Assembled \$19.95	Unassembled \$15.95
26"/88 Shldr 2.0 x 1.025" axle (4)	37203-4	97203-4
28"/88 Shldr 2.0 x 1.025" axle (4)	37205-4	97205-4
30"/88 Shldr 2.0 x 1.025" axle (4)	37206-4	97206-4
33"/88 Shldr 2.0 x 1.025" axle (4)	27207-4	97207-4
36"/88 Shldr 2.0 x 1.025" axle (4)	37208-4	97208-4
38"/88 Shldr 2.0 x 1.025" axle (4)	37235-4	97235-4
40"/88 Shldr 2.0 x 1.025" axle (4)	37231-4	97231-4
42"/88 Shldr 2.0 x 1.025" axle (4)	37232-4	97232-4
26"/88 shldr 3/32" x 1.025" axle, bright (4)	7203-4	n/a
26"/88 shldr 3/32" x 1.025" axle, bright (4)	7213-4	n/a
28"/88 shldr 3/32" x 1.025" axle, w eathered (4)	17205-4	n/a
28"/88 shldr 3/32" x 1.025" axle bright (4)	7205-4	n/a
30"/88 shldr 3/32" x 1.025" axle, bright (4)	7206-4	n/a
36"/88 shldr 3/32" x 1.025" axle, w eathered (4)	17208-4	n/a
40"/88 Blunt 3/32" x 1.015" axle (4)	37209-4	97209-4
42"/88 Blunt 3/32" x 1.015" axle (4)	37210-4	97210-4
28"/88 Point 2.0 x .751" axle (4)	7224-4	n/a

HO Scale Wheelsets, *cont'd*

HO Gauge /88 tread Wheelsets (Pkg/4) , con't

	Assembled \$19.95	Unassembled \$15.95
33"/88 Point 2.0 x .944" axle (4)	37287-4	97287-4
36"/88 Point 2.0 x .944" axle (4)	37288-4	97288-4
28"/88 Point 2.0 x .970" axle (4)	37265-4	97265-4
33"/88 Point 2.0 x .970" axle (4)	37267-4	97267-4
36"/88 Point 2.0 x .970" axle (4)	37268-4	97268-4
38"/88 Point 2.0 x .970" axle (4)	37269-4	97269-4
40"/88 Point 2.0 x .970" axle (4)	37270-4	97270-4
33"/88 Point 3/32" x .970" axle (4)	7267-4	n/a
26"/88 Point 2.0 x 1.015" axle (4)	37213-4	97213-4
28"/88 Point 2.0 x 1.015" axle (4)	37215-4	97215-4
30"/88 Point 2.0 x 1.015" axle (4)	37216-4	97216-4
33"/88 Point 2.0 x 1.015" axle (4)	37217-4	
36"/88 Point 2.0 x 1.015" axle (4)	37218-4	97218-4
38"/88 Point 2.0 x 1.015" axle (4)	37236-4	97236-4
40"/88 Point 2.0 x 1.015" axle (4)	37219-4	97219-4
42"/88 Point 2.0 x 1.015" axle (4)	37220-4	97220-4
26"/88 Point 3/32" x 1.015" axle, weathtered (4)	17213-4	n/a
28"/88 Point 3/32" x 1.015" axle, bright (4)	7215-4	n/a
30"/88 Point 3/32" x 1.015" axle, weathered (4)	17216-4	n/a
36"/88 Point 3/32" x 1.015" axle, weathered (4)	17218-4	n/a
38"/88 Point 3/32" x 1.015" axle, weathered (4)	17236-4	n/a
38"/88 Point 3/32" x 1.015" axle, bright (4)	7236-4	n/a
26"/88 Flush 2.0 x .751" axle (4)	37223-4	97223-4
28"/88 Flush 2.0 x .751" axle (4)	37225-4	97225-4
30"/88 Flush 2.0 x .751" axle (4)	37226-4	97226-4
33"/88 Flush 2.0 x .751" axle (4)	37227-4	97227-4
36"/88 Flush 2.0 x .751" axle (4)	37228-4	97228-4
28"/88 flush 3/32" x .751" axle (4)	7225-4	n/a
30"/88 flush 3/32" x .751" axle (4)	7226-4	n/a
33"/88 flush 3/32" x .751" axle (4)	7227-4	n/a
40"/88 Flush 3/32" x .751" axle (4)	37229-4	97229-4
42"/88 Flush 3/32" x .751" axle (4)	37230-4	97230-4

HO₃ Gauge (Pkg/4)

	Assembled \$19.95		Unassembled \$15.95	
	/88 tread	/64 tread	/88 tread	/64 tread
24" Shldr 2mm x .745" axle (4)	37302-4	37352-4	97302-4	97352-4
26" Shldr 2mm x .745" axle (4)	37303-4	37353-4	97303-4	97353-4
24" shldr 3/32" x .750" axle (4)	17302-4	n/a	n/a	n/a
26" shldr 3/32" x .750" axle (4)	17303-4	n/a	n/a	n/a
24" Point 2mm x .760" axle (4)	37312-4	37362-4	97312-4	97362-4
26" Point 2mm x .760" axle (4)	37313-4	37363-4	97313-4	97363-4
28" Point 2mm x .760" axle (4)	37315-4	37365-4	97315-4	97365-4
30" Point 2mm x .760" axle (4)	37316-4	37366-4	97316-4	97366-4
26" Point 3/32" x .685" axle (4)	37333-4	n/a	97333-4	n/a
28" Point 3/32" x .760" axle (4)	17315-4	n/a	n/a	n/a
30" Point 3/32" x .760" axle (4)	17316-4	n/a	n/a	n/a
24" Flush 2mm x .530" axle (4)	37322-4	37372-4	97322-4	97372-4
26" Flush 2mm x .530" axle (4)	37323-4	37373-4	97323-4	97373-4
Fits: Grandt				
26"/64 Shldr 2mm x .588" axle (4)	n/a	37393-4	n/a	97393-4
26"/72 Shldr 2mm x .588" axle (4)	n/a	37343-4	n/a	97343-4
26"/72 Shldr 2mm x .630" axle (4)	n/a	37345-4	n/a	97345-4

HO Scale Wheelsets, *cont'd*

P:87 Gauge /64 tread Wheelsets (Pkg/4) (Exact scale tread for P:87 track (scale flangeways))

	Assembled 19.95	Unassembled \$15.95
26"/64 Shldr 2.0 x .915" axle (4)	37653-4	97653-4
28"/64 Shldr 2.0 x .915" axle (4)	37655-4	97655-4
33"/64 Shldr 2.0 x .915" axle (4)	37657-4	
36"/64 Shldr 2.0 x .915" axle (4)	37658-4	97658-4
28"/64 Shldr 2.0 x 1.025" axle (4)	37605-4	97605-4
30"/64 Shldr 2.0 x 1.025" axle (4)	37606-4	97606-4
33"/64 Shldr 2.0 x 1.025" axle (4)	37607-4	
36"/64 Shldr 2.0 x 1.025" axle (4)	37608-4	97608-4
40"/64 Shldr 2.0 x 1.025" axle (4)	37609-4	97609-4
28"/64 Flush 2.0 x .751" axle (4)	37625-4	97625-4
33"/64 Flush 2.0 x .751" axle (4)	37626-4	
36"/64 Flush 2.0 x .751" axle (4)	37627-4	97627-4
40"/64 Flush 2.0 x .751" axle (4)	37628-4	97628-4
33"/64 Atlas Point 2.0 x .941" axle (4)	37687-4	
36"/64 Atlas Point 2.0 x .941" axle (4)	37688-4	97688-4
28"/64 Point 2.0 x .970" axle (4)	37665-4	97665-4
33"/64 Point 2.0 x .970" axle (4)	37667-4	97667-4
36"/64 Point 2.0 x .970" axle (4)	37668-4	97668-4
38"/64 Point 2.0 x .970" axle (4)	37669-4	97669-4
40"/64 Point 2.0 x .970" axle (4)	37670-4	97670-4
28"/64 Point 2.0 x .917" axle (4)	37675-4	97675-4
33"/64 Point 2.0 x .917" axle (4)	37677-4	
36"/64 Point 2.0 x .917" axle (4)	37678-4	97678-4
24"/64 Point 2.0 x 1.015" axle (4)	37612-4	97612-4
26"/64 Point 2.0 x 1.015" axle (4)	37613-4	97613-4
28"/64 Point 2.0 x 1.015" axle (4)	37615-4	97615-4
30"/64 Point 2.0 x 1.015" axle (4)	37616-4	97616-4
33"/64 Point 2.0 x 1.015" axle (4)	37617-4	97617-4
36"/64 Point 2.0 x 1.015" axle (4)	37618-4	97618-4

Proto:HO Gauge /64 tread Wheelsets (Pkg/4)

	Assembled \$19.95	Unassembled \$15.95
26"/64 Shldr 2.0 x 1.025" axle (4)	57603-4	97603-4
28"/64 Shldr 2.0 x 1.025" axle (4)	57605-4	97605-4
33"/64 Shldr 2.0 x 1.025" axle (4)	57607-4	97607-4
36"/64 Shldr 2.0 x 1.025" axle (4)	57608-4	97608-4
33"/64 Point 2.0 x .917" axle (4)	57677-4	97677-4
28"/64 Point 2.0 x .970" axle (4)	57665-4	97665-4
33"/64 Point 2.0 x .970" axle (4)	57667-4	97667-4
36"/64 Point 2.0 x .970" axle (4)	57668-4	97668-4
Fits: Athearn, et al		
28"/64 Point 2.0 x 1.015" axle (4)	57615-4	97615-4
33"/64 Point 2.0 x 1.015" axle (4)	57617-4	97617-4
36"/64 Point 2.0 x 1.015" axle (4)	57618-4	97618-4

HO Scale Upgrade GEARED Wheelsets

Walthers TRAINLINE (14T SG)

2536-6	39.95	HO 40"/110, Flush 2mm x .797" axle (4)
2537-6	39.95	HO 40"/88, Flush 2mm x .751" axle (4)
2538-6	39.95	P:HO 40"/64, Flush 2mm x .751" axle (4)
2539-6	39.95	P:87 40"/64, Flush 2mm x .751" axle (4)
2299-6	9.95	Gear: 0.5 x 14T SG x .197" face x 2mm bore (1)

Atlas-Model Power/ROCO (10T SG) (see 2584-6 for 10T RWG)

2540-6	39.95	HO 40"/110, Flush 2mm x .797" axle (4)
2541-6	39.95	HO 40"/88, Flush 2mm x .751" axle (4)
2544-6	45.95	HO 40"/110, Flush 2mm x .797" axle (6)
2545-6	45.95	HO 40"/88, Flush 2mm x .751" axle (6)
2542-6	39.95	P:HO 40"/64, Flush 2mm x .751" axle (4)
2546-6	45.95	P:HO 40"/64, Flush 2mm x .751" axle (6)
2547-6	45.95	P:87 40"/64, Flush 2mm x .751" axle (6)
2543-6	39.95	P:87 40"/64, Flush 2mm x .751" axle (4)
2300-6	9.95	Gear: 0.6 x 10T SG x .240" face x 2mm bore (1)
2301-6	9.95	Gear: 0.6 x 10T SG x .250" face x 2mm bore (1)

Walthers/ROCO/Atlas (17TSG)

2550-6	39.95	HO 40"/110, Flush 2mm x .797" axle (4)
2551-6	39.95	HO 40"/88, Flush 2mm x .751" axle (4)
2552-6	39.95	P:HO 40"/64, Flush 2mm x .751" axle (4)
2553-6	39.95	P:87 40"/64, Flush 2mm x .751" axle (4)
2293-6	9.95	Gear: 0.4 x 17T SG x .138" face x 2mm bore (1)

LIMA/MRC/Rivarossi C420 (10T SG)

2554-6	39.95	HO 40"/110, Flush 3/32" x .797" axle (4)
2555-6	39.95	HO 40"/88, Flush 3/32" x .751" axle (4)
2556-6	39.95	P:HO 40"/64, Flush 3/32" x .751" axle (4)
2557-6	39.95	P:87 40"/64, Flush 3/32" x .751" axle (4)
78610-6	9.95	Gear: 0.5 x 10T SG x .095" face x 2.4mm bore (1)
2470-6	9.95	Gear: 0.5 x 20T SG x 1.65mm face x 1.5mm bore (1)

Concor/ROCO GP38/GP40 (14T SG)

2558-6	39.95	HO 40"/110, Flush 2mm x .797" axle (4)
2559-6	39.95	HO 40"/88, Flush 2mm x .751" axle (4)
2560-6	39.95	P:HO 40"/64, Flush 2mm x .751" axle (4)
2561-6	39.95	P:87 40"/64, Flush 2mm x .751" axle (4)
2302-6	9.95	Gear: 0.4 x 14T SG x .125" face x 2mm bore (1)

HO Lindsay power truck upgrade (variable wheelbase version)

2566-6	39.95	HO 40"/110, Shldr 2mm x 1.025" axle (2)
2567-6	39.95	HO 40"/88, Shldr 2mm x 1.025" axle (2)
2568-6	39.95	P:HO 40"/64, Shldr 2mm x 1.025" axle (2)
2569-6	39.95	P:87 40"/64, Shldr 2mm x .915" axle (2)
2303-6	9.95	Gear: 0.4 x 13T WG x .085" face x 2mm bore (1)

KMT/Tenshodo (13T WG)

2570-6	39.95	HO 40"/110, Flush 2mm x .856" axle (4)
2571-6	39.95	HO 40"/88, Flush 2mm x .856" axle (4)
2572-6	39.95	P:HO 40"/64, Flush 2mm x .856" axle (4)
2573-6	39.95	P:87 40"/64, Flush 2mm x .856" axle (4)
2303-6	9.95	Gear: 0.4 x 13T WG x .085" face x 2mm bore (1)

(Caution - Most common KMT but will not fit rare 15T axle gear version KMT)

Model Power/ROCO Shark (10T RWG)

2580-6	39.95	HO 40"/110, Flush 2mm x .797" axle (4)
2581-6	39.95	HO 40"/88, Flush 2mm x .751" axle (4)
2582-6	39.95	P:HO 40"/64, Flush 2mm x .751" axle (4)
2583-6	39.95	P:87 40"/64, Flush 2mm x .751" axle (4)
2326-6	9.95	Gear: 0.4 x 14T RWGd x 2.5mm face x 2mm bore

(Caution - will not fit later 10T axle gear version Shark)

ATLAS/ROCO GP38-2 (10T RWG) (see 2540-6 for 10T SG version)

2584-6	39.95	HO 40"/110, Flush 2mm x .797" axle (4)
2585-6	39.95	HO 40"/88, Flush 2mm x .751" axle (4)
2586-6	39.95	P:HO 40"/64, Flush 2mm x .751" axle (4)
2587-6	39.95	P:87 40"/64, Flush 2mm x .751" axle (4)
2306-6	9.95	Gear: 0.6 x 10T RWG x .240" face x 2mm bore (1)

BACHMANN Doodlebug and EMC gas-electric (15T RWG)

Full set - 2 geared, 2 trail)

2588-6	39.95	HO 36"/110, Flush 2mm x .797" axle (4)
2589-6	39.95	HO 36"/88, Flush 2mm x .751" axle (4)
2590-6	39.95	P:HO 36"/64, Flush 2mm x .751" axle (4)
2591-6	39.95	P:87 36"/64, Flush 2mm x .751" axle (4)
2307-6	9.95	Gear :0.4 x 15T RWG x .190" face x 2mm bore (1)

KMT/Hallmark F9 (13T WG)

(Caution - rare 3.0mm axle w/bearing version KMT)

2592-6	39.95	HO 40"/110, Flush 2mm x .856" axle (4)
2593-6	39.95	HO 40"/88, Flush 2mm x .856" axle (4)
2594-6	39.95	P:HO 40"/64, Flush 2mm x .856" axle (4)
2595-6	39.95	P:87 40"/64, Flush 2mm x .856" axle (4)
2303-6	9.95	Gear: 0.4 x 13T WG x .085" face x 2mm bore (1)

KMT/Hallmark F-9 Diesels (15T)

(Caution - rare 15 tooth axle gear version KMT)

2614-6	39.95	HO 40"/110, Flush 2mm x .856" axle (4)
2615-6	39.95	HO 40"/88, Flush 2mm x .856" axle (4)
2616-6	39.95	P:HO 40"/64, Flush 2mm x .856" axle (4)
2617-6	39.95	P:87 40"/64, Flush 2mm x .856" axle (4)
2308-6	9.95	Gear: 0.35 (72DP) x 15T WG x 2mm bore (1)

KMT/Hallmark (15T w/bearings), shoulder axle upgrade

2618-6	39.95	HO 40"/110 15T w/brg, geared with shldr axle (4)
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KMT/Hallmark (13T WG)

2630-6	39.95	HO 40"/110, Shldr 2mm x .950" axle (4)
2631-6	39.95	HO 40"/88, Shldr 2mm x .950" axle (4)
2632-6	39.95	HO 40"/64, Shldr 2mm x .950" axle (4)
2633-6	39.95	P:87 40"/64, Shldr 2mm x .950" axle (4)
2303-6	9.95	Gear: 0.4 x 13T WG x .085" face x 2mm bore (1)

Bowser trolley worm upgrade kit

2658-6	14.95	HO Replaces worm worm and idler (top) gear
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ModelPower/ROCO Baldwin 'Shark' #4 (11T SG)

2650-6	39.95	HO 42"/110, Flush 2mm x .797" axle (4)
2651-6	39.95	HO 42"/88, Flush 2mm x .751" axle (4)
2652-6	39.95	P:HO 42"/64, Flush 2mm x .751" axle (4)
2653-6	39.95	P:87 42"/64, Flush 2mm x .751" axle (4)
2312-6	9.95	Gear: 0.6 x 11T SG x 2.4mm face x 2mm bore (1)

AHM/ROCO Alco C424 (11T SG)

2654-6	39.95	HO 40"/110, Flush 2mm x .797" axle (2geared, 2non)
2655-6	39.95	HO 40"/88, Flush 2mm x .751" axle (2geared, 2non)
2656-6	39.95	P:HO 40"/64, Flush 2mm x .751" axle (2geared, 2non)
2657-6	39.95	P:87 40"/64, Flush 2mm x .751" axle (2geared, 2non)
2312-6	9.95	Gear: 0.6 x 11T SGd x 2.4mm face x 2mm bore (1)

LifeLike RDC speed-up gearing (from 45 smph to 72 mph)

2692-6	24.95	HO Double-compound gears 26T/19T to increase speed
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AHM/Rivarossi U25C upgrade WHEELS to fit original geared axles

(6) wheels 2mm bore; (6) wheels .120 bore, insulated, (4) add'l 2.0mm/110 insulators

2693-6	11.95	HO 40"/110 wheel size
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2694-6	11.95	HO 40"/88 wheel size
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Bachmann 2-motor GE 44-tonner

2695-6	39.95	HO 33"/110, Flush 2mm x .797" axle (4)
2696-6	39.95	HO 33"/88, Flush 2mm x .751" axle (4)
2697-6	39.95	P:87 33"/64, Flush 2mm x .751" axle (4)
2320-6	9.95	Gear: 0.4 x 15T SGd x 2.0mm face x 2mm bore (1)

Revell SW7 (13T SG)

2700-6	39.95	HO 40"/110 Revell SW7 13T geared wheelset (4)
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ROCO/ModelPower E7/E8 (10T SG)

2704-6	45.95	HO 36"/110 wheels, Flush 2mm x .797" axle (6)
2705-6	45.95	HO 36"/88 wheels, Flush 2mm x .751" axle (6)
2706-6	45.95	HO 36"/64 wheels, Flush 2mm x .751" axle (6)
2707-6	45.95	P:87 36"/64 wheels, Flush 2mm x .751" axle (6)
2301-6	9.95	Gear: 0.6 x 10T SG x 2.5mm face x 2mm bore (1)

Bachmann SHAY 80-ton 3-truck upgrade gears

2800-6	34.95	HO upgrade bevel gear, steel, (6)
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SS= Stainless Steel

3-rail or non-insulated mean neither wheel is insulated from the axle
2-rail (or no indication) means one (or both, usually indicated 'double insulated') wheels are insulated from the axle.

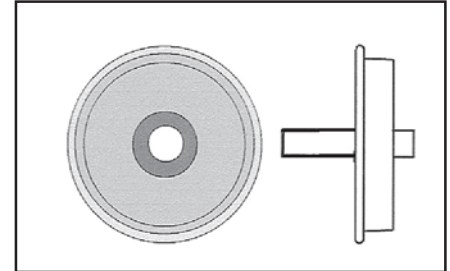
These very special limited production kits are subject to discontinuance at any time without notice. Do NOT order blindly—check gear OD, bore, style data to match your need.

The Athearn Half Axle Jungle

Replacement wheels and gears for Athearn, Life-Like, Proto. Etc. Diesel Locomotives

Irv Athearn had a great idea that revolutionized the way manufacturers made drive systems for their diesel locomotives: Instead of the traditional solid metal axle, with at least one wheel insulator to keep the wheelset from shorting, he developed what we like to call the “tube gear” that does double-duty as both axle gear and wheelset insulator. The tube gear uses two “half-axle” wheels, one inserted on each side of the tube, to form a complete wheelset. However, because the two half-axles do not touch inside the tube, the two wheels remain insulated.

Irv shared the idea with his friend Clarence over at Model Die Casting (Roundhouse/MDC) and the idea proved to be so popular that it wasn’t long until other manufacturers “adopted” the idea and used it on their own products. That said, some of these “borrowed” designs were given some subtle changes (axle diameter the most prominent) which is why our lists below have so many choices, and is why you need to do a little checking and measuring before your order.



Why upgrade to NWSL products? Manufacturers are going to do everything they can to cut cost, and in the case of half-axle diesels that means two things. First, the wheels themselves are almost always made out of nickel-plated brass, and once that nickel plating wears off and the brass is exposed, operation usually becomes more difficult because brass wheels are notorious for picking up dirt and grime. NWSL wheelsets are solid metal—no plating. Second, the factory gears are injection molded, and because of the stress and strain of this ingenious design they are prone to splitting. A split gear usually presents itself by a “thump” every time the break tries to engage with another gear. The factory may or may not have replacements, but if you want to do it once and do it right then choose a NWSL-made replacement: Our upgrade gears are machined from a piece of solid US-made, pre-shrunk acetyl rod and have proven themselves in countless thousands of models over the years.

One final note is that sometimes manufacturers cut yet another corner when making these models. 38", 40" and 42" diameter wheels are common for many diesels, so to cut costs some produced a 39" wheel and a 41" wheel to lessen manufacturing costs. We mention this because some are puzzled by the measurement they get, wondering why we don’t have those sizes in our product line. Before ordering wheels, check your reference books or use an Internet search engine to determine exactly what your model should have, based on the prototype. If anything, you might have to watch for brake shoes that rub against the new wheels after installation or other impediments, and take steps to correct that problem.

- Step one:** Determine if your model uses an inside frame or an outside frame. The (older) outside frame design has metal sideframes, and the more modern inside frame has plastic sideframes.
- Step two:** Determine the diameter of your wheels, again using reference materials for guidance. Use calipers to measure across the face of the wheel, but not including the flange. In HO, a 36" wheel measures approximately 0.414", a 38" wheel 0.437", a 40" wheel 0.460", a 42" wheel 0.482", and a 45" wheel 0.517".
- Step three:** Measure the size of the axle you need. For this step, we’re looking for the diameter of the axle that presses in to the tube gear so remove one half-axle from the tube gear and measure that axle. The most common size is 3/32" (2.4mm) although there are also 2.0mm and 1.5mm versions.
- Step four:** Determine what tread (width) of wheel you want. We offer three treads, /110 (0.110" wide), /88 (0.088" wide), and /64 (0.064" wide) tread. Not sure? Choose /110. This is the same width as the factory wheels and offers the best performance. The /88 tread, also called semi-fine scale, look more realistic than the /110 wheels but are a bit more picky about track, especially switches and the like. The /64 tread, called finescale, is for the advanced modeler with impeccable track work.

ATHEARN Life-Like12T GEAR for Half Axle Wheels

<u>Gear Part #</u>	<u>Qty/pkg</u>	<u>Price</u>
#2193-6	(1)	\$12.95
#2194-6	(4)	\$39.95
#21946-6	(6)	\$49.95



NWSL HALF AXLE WHEELS

ATHEARN Geared Diesels (pkg. 12) \$24.95

	OUTSIDE (older, metal) frame	INSIDE (newer, plastic) frame
3/32" x .440" HALF AXLE		
HO 36"/110 wheels	37138-4	37143-4
HO 40"/110 wheels	37139-4	37141-4
HO 42"/110 wheels	27140-4	27142-4
HO 45"/110 wheels	n/a	27144-4
HO 36"/88 wheels	n/a	37243-4
HO 40"/88 wheels	37239-4	37241-4
HO 42"/88 wheels	37240-4	37242-4
HO 45"/88 wheels	37244-4	n/a
P:87 40"/64 wheels	37639-4	37641-4
P:87 42"/64 wheels	37640-4	37642-4
P:87 45"/64 wheels	n/a	37644-4

ATHEARN 12T GEAR for Half Axle Wheels

<u>Gear Part #</u>	<u>Oty/pkg</u>	<u>Price</u>
#2193-6	(1)	\$12.95
#2194-6	(4)	\$39.95
#21946-6	(6)	\$49.95

FOR BELT DRIVE RDC

	OUTSIDE (older) frame	INSIDE (newer) frame
1.5mm diam. HALF AXLE		
HO 36"/110, on 1.5mm x .475" pointed (8)	37146-4 \$19.95	n/a

Life-Like E7/E8/E9 Diesels (pkg. 12)

	OUTSIDE (older) frame	INSIDE (newer) frame	
3/32" diam. HALF AXLE			
HO 36"/110 on 3/32" x .500" shldr	n/a	37145-4	\$24.95
HO 36"/88 on 3/32" x .500" shldr	n/a	37245-4	\$26.95
P:87 36"/64 on 3/32" x .440" shldr	37645-4	37643-4	\$24.95

Stewart, Kato, LifeLike PA-GP38-2-GP7/9, Athearn Genesis (China) (pkg. 12)

	OUTSIDE (older) frame	INSIDE (newer) frame	
1.5mm x .475" axle			
HO 33"/110 wheels	37137-4	n/a	\$24.95
HO 36"/110 wheels	n/a	37190-4	\$24.95
HO 40"/110 wheels	n/a	37191-4	\$24.95
HO 42"/110 wheels	n/a	27192-4	\$24.95
HO 40"/88 wheels	n/a	37291-4	\$42.95
HO 42"/88 wheels	n/a	37292-4	\$24.95
HO 45"/88 wheels	n/a	37294-4	\$24.95
P:87 33"/64 wheels	n/a	37689-4	\$24.95
P:87 36"/64 wheels	n/a	37690-4	\$24.95
P:87 40"/64 wheels	n/a	37691-4	\$24.95
P:87 42"/64 wheels	n/a	37692-4	\$24.95
P:87 45"/64 wheels	n/a	37694-4	\$24.95

Complete wheelsets for 'Dummy' unpowered diesels (4/pkg) \$19.95

For 3/32" journal trucks, metal sideframe:

40"/110, blunt 3/32" x 1.015" axle	37109-4
42"/110, blunt 3/32" x 1.015" axle	37110-4

For 2.0mm axle journal trucks (c1960-1995):

40"/110, pointed 2.0mm x 1.015" axle	37119-4
42"/110, pointed 2.0mm x 1.015" axle	37120-4

For inside journal trucks (c1990+), plastic sideframe**:

40"/110, flush 3/32" x .797" axle	37129-4
42"/110, flush 3/32" x .797" axle	37130-4

**must trim length of axle carrier to permit free turning of wheels

S Amer/Models Tender (pkg/8)

\$19.95

S	33"/110 half-axle NS wheels	27786-4
S P:64	33"/87 half-axle NS wheels	57786-4

S, P:64, Sn3 Gauge Wheelsets

/110 Traditional 'S' scale wheel tread

/88 P:64 (NASG) Semi-finescale 'S' tread

\$19.95 (pkg/4)

S Gauge

S 33" /110 Shldr 3/32" x 1.265" axle	Part # 27707-4
S 36" /110 Shldr 3/32" x 1.265" axle	37708-4
S 40" /110 Shldr 3/32" x 1.265" axle	37709-4
S 33" /110 Point 3/32" x 1.280" axle	27717-4
S 36" /110 Point 3/32" x 1.280" axle	37718-4
S 33" /110 Flush 3/32" x 1.015" axle	27727-4
S 40" /110 Flush 3/32" x 1.015" axle	37729-4

P:64 Gauge

P:64 33"/110 Shldr 3/32" x 1.265" axle	Part # 27757-4
P:64 36"/110 Shldr 3/32" x 1.265" axle	37758-4
P:64 40"/110 Shldr 3/32" x 1.265" axle	37759-4
P:64 33"/110 Point 3/32" x 1.280" axle	27767-4
P:64 36"/110 Point 3/32" x 1.280" axle	37768-4
P:64 26"/88 Shldr 3/32" x 1.265" axle	57703-4
P:64 28"/88 Shldr 3/32" x 1.265" axle	7773-4
P:64 33"/88 Shldr 3/32" x 1.265" axle	57707-4
P:64 36"/88 Shldr 3/32" x 1.265" axle	57708-4
P:64 40"/88 Shldr 3/32" x 1.265" axle	57709-4
P:64 26"/88 Pointed 3/32" x 1.280" axle	57713-4
P:64 33"/88 Pointed 3/32" x 1.280" axle	57717-4
P:64 36"/88 Pointed 3/32" x 1.280" axle	57718-4
P:64 40"/88 Pointed 3/32" x 1.280" axle	57719-4



Is Tender (\$9.95 Pkg/8)

alf-axle NS wheels	27786-4
lf-axle NS wheels	57786-4

a

	Part #
32" x 1.270" axle	37733-4
S 33" /110 Point 3/32" x 1.270" axle	27737-4
S 36" /110 Point 3/32" x 1.270" axle	37738-4
P:64 26"/88 Point 3/32" x 1.270" axle	57733-4
P:64 33"/88 Point 3/32" x 1.270" axle	57737-4
P:64 36"/88 Point 3/32" x 1.270" axle	57738-4
Sn3 26"/110 Shldr 3/32" x .915" axle	37740-4
Sn3 24"/110 Shldr 3/32" x .915" axle	37741-4

Sn3 Gauge

Grandt Line 4065

Sn3 26"/110 Shldr 3/32" x .860" axle	37742-4
Sn3 24"/110 Shldr 3/32" x .860" axle	37743-4
Sn3 26"/110 Shldr 3/32" x .896" axle	37796-4

Sn3 26"/88 Shldr 3/32" x .860" axle	57742-4
Sn3 24"/88 Shldr 3/32" x .860" axle	57743-4

Grandt Line / OMI

Sn3 26"/110 Point 3/32" x .900" axle	37744-4
Sn3 24"/110 Point 3/32" x .900" axle	37745-4
Sn3 26"/88 Point 3/32" x .900" axle	57744-4
Sn3 24"/88 Point 3/32" x .900" axle	57745-4

Sn3 Gauge (general)

Sn3 26"/88 Shldr 3/32" x .915" axle	57740-4
Sn3 24"/88 Shldr 3/32" x .915" axle	57741-4
Sn3 26"/88 Point 3/32" x .896" axle (PBL trucks)	57746-4
Sn3 26"/88 Point 3/32" x .917" axle (Berlyn trks)	57748-4

Upgrade GEARED Wheelsets

American Models Diesel upgrade geared wheelsets (4)

2534-6	\$32.95	S 40"/88 wheels, Blunt 3/32" x 1.015" axle
2535-6	\$32.95	S 40"/110 wheels, Blunt 3/32" x 1.015" axle
2298-6	\$9.95	Gear: 48DP x 20T WGD 2-lead x .120" face x 3/32" bore (1)

Sn3 Overland Models C&S #9, etc. conversion axle

2598-6	\$9.95	Sn3 Adkins upgrade axle, 3.0mm x .735" x 2.5mm shldr axle
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S-HELPER SW-1 Diesel Switcher geared wheelsets (4)

2644-6	\$32.95	S 40"/110 wheels, Blunt 3/32" x 1.015" axle
2643-6	\$32.95	P:64 40"/88 wheels, Blunt 3/32" x 1.015" axle
2311-6	\$9.95	Gear: 0.5 x 22T WGD 2-lead x .120" face x 3/32" bore (1)

American Models Diesel (Circa 2002+) geared wheelsets

2688-6	\$32.95	S 40"/88 wheels, Blunt 3/32" x 1.015" axle (4)
2689-6	\$32.95	S 40"/110 wheels, Blunt 3/32" x 1.015" axle (4)
2690-6	\$42.95	S 40"/88 wheels, Blunt 3/32" x 1.015" axle (6)
2691-6	\$42.95	S 40"/110 wheels, Blunt 3/32" x 1.015" axle (6)
2316-6	\$9.95	Gear: 48DP x 20T SGd x .120" face x 3/32" bore (1)



O Scale Wheelsets

Steel, weathered, (not rust-proof)

- /210 Tinplate compatible wheel (see #8700-4 series)
- /172 Traditional 'O' gauge wheel (see #88xx-4 series)
- /145 Finer tread for closer to scale appearance on 'O' track (#82xx-4)
- /135 Finer tread used by many traction modelers (See 81xx-4)
- /115 The P:48 exact scale tread (See 83xx-4 series)

NWSL is pleased to support your fine modeling by manufacturing the many custom quality scale choices that make it possible for you to more easily and correctly model and operate your dreams accurately and economically. The /115 tread is an exact 1:48 scale replication of the prototype wheel tread. While it looks great, it cannot be expected to provide reliable operation on regular trackage, but those who model trackwork to P:48 standards will be delighted with the looks and operation of this new series of wheelsets. For common O gauge trackage, the /172 provides fine operating quality as well as looks. The /145 tread looks even better and runs reliably on trackage meeting NMRA standards. /135 tread is typically used in traction modeling. The /115 is used by some 'O' gauge modelers for limited operation of showpiece models on 'O' gauged trackage.

Standard O Gauge(1.25") (pkg/4)

Assembled: \$24.95 Unassembled: \$19.95

/115 Wheelsets	<u>Assembled</u>	<u>Unassembled</u>
26"/115 Pointed 1/8" x 1.800" axle	8260-4	18260-4
33"/115 Pointed 1/8" x 1.800" axle	8261-4	18261-4
36"/115 Pointed 1/8" x 1.800" axle	8262-4	18262-4
40"/115 Pointed 1/8" x 1.800" axle	8263-4	18263-4
26"/115 shldr 1/8" x 1.810" axle	8350-4	18350-4
28"/115 shldr 1/8" x 1.810" axle	8355-4	18355-4
30"/115 shldr 1/8" x 1.810" axle	8354-4	18354-4
33"/115 shldr 1/8" x 1.810" axle	8351-4	18351-4
36"/115 shldr 1/8" x 1.810" axle	8352-4	18352-4
40"/115 shldr 1/8" x 1.810" axle	8353-4	18353-4
26"/115 shldr 1/8" x 1.810" x .088"	8160-4	18160-4
33"/115 shldr 1/8" x 1.810" x .088"	8161-4	18161-4
36"/115 shldr 1/8" x 1.810" x .088"	8162-4	18162-4
40"/115 shldr 1/8" x 1.810" x .088"	8163-4	18163-4
28"/115 Pointed 1/8" x 1.810" axle	8365-4	18365-4
33"/115 Pointed 1/8" x 1.810" axle	8367-4	18367-4
36"/115 Pointed 1/8" x 1.810" axle	8368-4	18368-4

/135 Wheelsets	<u>Assembled</u>	<u>Unassembled</u>
22"/135 shldr 1/8" x 1.810" x .088"	8192-4	18192-4
24"/135 shldr 1/8" x 1.810" x .088"	8193-4	18193-4
26"/135 shldr 1/8" x 1.810" x .088"	8194-4	18194-4
28"/135 shldr 1/8" x 1.810" x .088"	8195-4	18195-4
30"/135 shldr 1/8" x 1.810" x .088"	8196-4	18196-4
33"/135 shldr 1/8" x 1.810" x .088"	8197-4	18197-4
36"/135 shldr 1/8" x 1.810" x .088"	8198-4	18198-4
40"/135 shldr 1/8" x 1.810" x .088"	8199-4	18199-4
26" PCC/135 shldr 1/8" x 1.810" x .088"	8191-4	18191-4
33"/135 point 1/8" x 1.810" x .088"	8187-4	18187-4
36"/135 point 1/8" x 1.810" x .088"	8188-4	18188-4

/145 Wheelsets	<u>Assembled</u>	<u>Unassembled</u>
26"/145 Shldr 1/8" x 1.810" x .088"	8250-4	18250-4
28"/145 Shldr 1/8" x 1.810" x .088"	8255-4	18255-4
30"/145 Shldr 1/8" x 1.810" x .088"	8254-4	18254-4
33"/145 Shldr 1/8" x 1.810" x .088"	8251-4	18251-4
36"/145 Shldr 1/8" x 1.810" x .088"	8252-4	18252-4
38"/145 Shldr 1/8" x 1.810" x .088"	8259-4	18259-4
40"/145 Shldr 1/8" x 1.810" x .088"	8253-4	18253-4
42"/145 Shldr 1/8" x 1.810" x .088"	8258-4	18258-4
26"/145 Pointed 1/8" x 1.800" axle	8284-4	18284-4
28"/145 Pointed 1/8" x 1.800" axle	8285-4	18285-4
30"/145 Pointed 1/8" x 1.800" axle	8286-4	18286-4
33"/145 Pointed 1/8" x 1.800" axle	8287-4	18287-4
36"/145 Pointed 1/8" x 1.800" axle	8288-4	18288-4
40"/145 Pointed 1/8" x 1.800" axle	8289-4	18289-4
26"/145 Flush 1/8" x 1.425" axle	8274-4	18274-4
28"/145 Flush 1/8" x 1.425" axle	8275-4	18275-4
30"/145 Flush 1/8" x 1.425" axle	8276-4	18276-4
33"/145 Flush 1/8" x 1.425" axle	8277-4	18277-4
36"/145 Flush 1/8" x 1.425" axle	8278-4	18278-4
40"/145 Flush 1/8" x 1.425" axle	8279-4	18279-4
42"/145 Flush 1/8" x 1.425" axle	8272-4	18272-4

NWSL now offers wheelsets *unassembled!*

Due to demand and time it takes to assemble wheelsets, NWSL lead time for orders is approximately 3-4 weeks for assembled wheelsets.

NWSL realizes many of our customers are able to assemble the wheelsets themselves and we now offer packages of just wheels, axles and insulators.

Each package contains: (4) wheels with bore to fit insulator, (4) wheels for non-insulated side, (4) axles, (1) sprue of insulators, instructions & general tips for assembly.

/172 Wheelsets	<u>Assembled</u>	<u>Unassembled</u>
28"/172 Flush 1/8" x 1.455" axle	8875-4	18875-4
30"/172 Flush 1/8" x 1.455" axle	8876-4	18876-4
33"/172 Flush 1/8" x 1.455" axle	8877-4	18877-4
36"/172 Flush 1/8" x 1.455" axle	8878-4	18878-4
40"/172 Flush 1/8" x 1.455" axle	8879-4	18879-4
42"/172 Flush 1/8" x 1.455" axle	8872-4	18872-4
28"/172 Shldr 1/8" x 1.810" axle	8855-4	18855-4
30"/172 Shldr 1/8" x 1.810" axle	8854-4	18854-4
33"/172 Shldr 1/8" x 1.810" axle	8851-4	18851-4
36"/172 Shldr 1/8" x 1.810" axle	8852-4	18852-4
40"/172 Shldr 1/8" x 1.810" axle	8853-4	18853-4
42"/172 Shldr 1/8" x 1.810" axle	8858-4 (\$19.95)	18858-4

Athearn, Quality Craft, Weaver (USA), Keystone & other 'O' passenger, freight cars

28"/172 Point 1/8" x 1.80" axle	8885-4	18885-4
33"/172 Point 1/8" x 1.80" axle	8887-4	18887-4
36"/172 Point 1/8" x 1.80" axle	8888-4	18888-4
40"/172 Point 1/8" x 1.80" axle	8889-4	18889-4
42"/172 Point 1/8" x 1.80" axle	8890-4	18890-4

MTH#2	<u>Assembled</u>	<u>Unassembled</u>
33"/145 Shldr 1/8" x 1.730" axle	8248-4	18248-4
36"/145 Shldr 1/8" x 1.730" axle	8249-4	18249-4
33"/172 Shldr 1/8" x 1.730" axle	8848-4	18848-4
36"/172 Shldr 1/8" x 1.730" axle	8849-4	18849-4

MTH#1/ATLAS-Europe

33"/145 Shldr 1/8" x 1.810" x .079" axle	8256-4	18256-4
36"/145 Shldr 1/8" x 1.810" x .079" axle	8257-4	18257-4
33"/172 Shldr 1/8" x 1.810" x .079" axle	8856-4	18856-4
36"/172 Shldr 1/8" x 1.810" x .079" axle	8857-4	18857-4

Lionel 'spinner' China

33"/145 Shldr roller brg 1/8" x 1.91" axle	8292-4	18292-4
36"/145 Shldr roller brg 1/8" x 1.91" axle	8293-4	18293-4
33"/172 Shldr roller brg 1/8" x 1.91" axle	8892-4	18892-4
36"/172 Shldr roller brg 1/8" x 1.91" axle	8893-4	18893-4

Atlas 'spinner' China

33"/145 Shldr roller brg 1/8" x 2.08" axle	8297-4	18297-4
36"/145 Shldr roller brg 1/8" x 2.08" axle	8298-4	18298-4
33"/172 Shldr roller brg 1/8" x 2.08" axle	8897-4	18897-4
36"/172 Shldr roller brg 1/8" x 2.08" axle	8898-4	18898-4

Continued on page 13

O Scale Wheelsets

Steel, weathered, not rust-proof

Continued from page 12

MTH#3	Assembled	Unassembled
33"/145 Point 1/8" x 1.750" x .100" axle	8265-4	18265-4
36"/145 Point 1/8" x 1.750" x .100" axle	8266-4	18266-4
33"/172 Point 1/8" x 1.750" x .100" axle	8865-4	18865-4
36"/172 Point 1/8" x 1.750" x .100" axle	8866-4	18866-4

Red Caboose	Assembled	Unassembled
33"/145 Pointed 1/8" x 1.690" axle	8267-4	18267-4
36"/145 Pointed 1/8" x 1.690" axle	8268-4	18268-4
33"/172 Point 1/8" x 1.750" (RC trucks**) 8867-4	8867-4	18867-4
36"/172 Point 1/8" x 1.750" (RC trucks**) 8868-4	8868-4	18868-4

**Installation in Red Caboose trucks requires trimming back of journal housings to avoid interference (and drag) with wheel.

San Juan/ MTH #4	Assembled	Unassembled
33"/145 Point 1/8" x 1.80" x .100" axle	8269-4	18269-4
36"/145 Point 1/8" x 1.80" x .100" axle	8271-4	18271-4
33"/115 Point 1/8" x 1.80" x .100" axle	8270-4	18270-4
33"/172 Point 1/8" x 1.80" x .100" axle	8869-4	18869-4
36"/172 Point 1/8" x 1.80" x .100" axle	8871-4	18871-4

Atlas China	Assembled	Unassembled
33"/145 Point 1/8" x 1.92" x .100" axle	8281-4	18281-4
36"/145 Point 1/8" x 1.92" x .100" axle	8282-4	18282-4
33"/172 Point 1/8" x 1.92" x .100" axle	8881-4	18881-4
36"/172 Point 1/8" x 1.92" x .100" axle	8882-4	18882-4

Weaver China	Assembled	Unassembled
33"/145 Point 1/8" x 1.815" axle	8294-4	18294-4
36"/145 Point 1/8" x 1.815" axle	8295-4	18295-4
33"/172 Point 1/8" x 1.815" axle	8894-4	18894-4
36"/172 Point 1/8" x 1.815" axle	8895-4	18895-4

PROTO:48 (P:48 gauge) \$24.95 (pkg/4)

/115 (1.17") Wheelsets	Assembled	Unassembled
P:48 26"/115 shldr 1/8" x 1.690" axle	8320-4	18320-4
P:48 28"/115 shldr 1/8" x 1.690" axle	8325-4	18325-4
P:48 30"/115 shldr 1/8" x 1.690" axle	8324-4	18324-4
P:48 33"/115 shldr 1/8" x 1.690" axle	8321-4	18321-4
P:48 36"/115 shldr 1/8" x 1.690" axle	8322-4	18322-4
P:48 40"/115 shldr 1/8" x 1.690" axle	8323-4	18323-4
P:48 40"/115 Pointed 1/8" x 1.690" axle	8389-4	18389-4
P:48 26"/115 Point 1/8" x 1.800" axle	8364-4	18364-4

P:48 26"/115 Flush 1/8" x 1.335" axle	8374-4	18374-4
P:48 28"/115 Flush 1/8" x 1.335" axle	8375-4	18375-4
P:48 33"/115 Flush 1/8" x 1.335" axle	8377-4	18377-4
P:48 36"/115 Flush 1/8" x 1.335" axle	8378-4	18378-4
P:48 40"/115 Flush 1/8" x 1.335" axle	8379-4	18379-4

San Juan/ MTH #4	Assembled	Unassembled
P:48 33"/115 Point 1/8" x 1.800" axle	8369-4	18369-4
P:48 36"/115 Point 1/8" x 1.800" axle	8371-4	18371-4

Atlas / China	Assembled	Unassembled
P:48 33"/115 Point 1/8" x 1.92" axle	8381-4	18381-4
P:48 36"/115 Point 1/8" x 1.92" axle	8382-4	18382-4

3-Rail Wheelsets (non-insulated)

O Gauge (1.25") \$24.95 (pkg/4)

	Assembled	Unassembled
26"/115 shldr 1/8" x 1.810" x .088"	8165-4	18165-4
30"/115 shldr 1/8" x 1.810" x .088"	8169-4	18169-4
33"/115 shldr 1/8" x 1.810" x .088"	8166-4	18166-4
36"/115 shldr 1/8" x 1.810" x .088"	8167-4	18167-4
40"/115 shldr 1/8" x 1.810" x .088"	8168-4	18168-4
22"/135 shldr 1/8" x 1.810" x .088"	8172-4	18172-4
24"/135 shldr 1/8" x 1.810" x .088"	8174-4	18174-4
26"/135 shldr 1/8" x 1.810" x .088"	8176-4	18176-4
28"/135 shldr 1/8" x 1.810" x .088"	8178-4	18178-4
30"/135 shldr 1/8" x 1.810" x .088"	8180-4	18180-4
33"/135 shldr 1/8" x 1.810" x .088"	8183-4	18183-4
36"/135 shldr 1/8" x 1.810" x .088"	8186-4	18186-4
40"/135 shldr 1/8" x 1.810" x .088"	8190-4	18190-4
26" PCC/135 shldr 1/8" x 1.810" x .088"	8177-4	18177-4

Williams 'O' diesel WHEELS \$15.95 (pkg 8)

40"/145 WHEELS & insulators	8207-4
40"/172 WHEELS & insulators	8807-4

On3 - On2 - On30, On42

On30 \$24.95 (pkg/4)

On30	Part #
On30 18"/110 Shldr 3/32" x 1.165" axle	37888-4
On30 20"/110 Shldr 3/32" x 1.165" axle	37889-4

GrandtOn3 trk

On30 24"/110 Shldr 3/32" x 1.165" axle	27890-4
On30 26"/110 Shldr 3/32" x 1.165" axle	27891-4

Bachmann/San Juan

On30 24"/110 Shldr 3/32" x 1.085" axle	27892-4
On30 26"/110 Shldr 3/32" x 1.085" axle	27893-4

Bachmann tender/frt

On30 24"/110 Shldr 3/32" x 1.015" axle	27894-4
On30 26"/110 Shldr 3/32" x 1.015" axle	27895-4

Foothill, Grandt #3113

On30 26"/110 Shldr 3/32" x 1.025" axle	27897-4
On30 24"/110 Shldr 3/32" x 1.025" axle	27898-4

Athearn

On30 30"/110 NS 1/2 axle-inside frame (8)	37896-4	\$14.95
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On3 \$24.95 (pkg/4)

On3	Part #
On3 20"/110 Shldr 3/32" x 1.165" axle	37801-4
On3 24"/110 Shldr 3/32" x 1.165" axle	27802-4
On3 26"/110 Shldr 3/32" x 1.165" axle	27803-4
On3 26"/110 Flush 3/32" x .895" axle	27823-4

San Juan

On3 24"/110 Shldr 3/32" x 1.085" axle	27842-4
On3 26"/110 Shldr 3/32" x 1.085" axle	27843-4

On2 \$24.95 (pkg/4)

On2 18"/110 Shldr 3/32" x .915" axle (Grandt)	37850-4
On2 20"/110 Shldr 3/32" x .915" axle (Grandt)	37851-4

On42 Gauge Wheelsets \$24.95 (pkg/4)

On42 33"/172 Pointed 1/8" x 1.750" axle, double-insulated	8899-4
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O Scale Upgrade GEARED Wheelsets

Weaver RS3, FA, GP38 geared wheelsets (4) \$44.95

2503-6 O 40"/172 wheels, Shldr 1/8" x 1.810" axle
 2504-6 O 40"/145 wheels, Shldr 1/8" x 1.810" axle
 2505-6 O 40"/115 wheels, Shldr 1/8" x 1.810" axle
 2506-6 P:48 40"/115 wheels, Shldr 1/8" x 1.640" axle
 2294-6 Axle Gear only: 48DP x 20T WG (2 lead) (\$9.95)

ROCO/Atlas F9;RedCaboos GP9 geared wheelsets (4) \$44.95

2523-6 O 40"/172 wheels, Shldr 1/8" x 1.455" axle
 2524-6 O 40"/145 wheels, Shldr 1/8" x 1.425" axle
 2525-6 O 40"/115 wheels, Shldr 1/8" x 1.425" axle
 2526-6 P:48 40"/115 wheels Shldr 1/8" x 1.333" axle
 2527-6 9.95 Axle Gear only (1) 36DP x 13T SGd x 4.0mm bore
 2528-6 29.95 Axle Gear only (4) 36DP x 13T SGd x 4.0mm bore
 2295-6 9.95 Axle Gear only (1) 36DP x 13T SGd x 1/8" bore

ATLAS SW7/8 upgrade geared wheelsets, (4) \$44.95

2530-6 O 40"/172 wheels, Shldr 1/8" x 1.455" axle
 2531-6 O 40"/145 wheels, Shldr 1/8" x 1.425" axle
 2532-6 O 40"/115 wheels, Shldr 1/8" x 1.405" axle
 2533-6 P:48 40"/115 wheels, Shldr 1/8" x 1.335" axle
 2297-6 Axle Gear only (1) - 0.5 x 26T SGd x 1/8" bore, (\$9.95)

ATLAS SD35 upgrade geared wheelsets, (6) \$74.95

2626-6 O 40"/172 wheels, Shldr 1/8" x 1.455" axle
 2627-6 O 40"/145 wheels, Shldr 1/8" x 1.425" axle
 2628-6 O 40"/115 wheels, Shldr 1/8" x 1.405" axle
 2629-6 P:48 40"/115 wheels, Shldr 1/8" x 1.335" axle
 2309-6 Center Gear (1) - 48DP x 20T (2-lead) WG x 1/8" bore, (\$9.95)
 2267-6 Side Gear (1) - 40DP x 22T SGd x 1/8" bore, (\$9.95)

K-Line E8 upgrade geared wheelsets (2-rail) (6) \$49.95

2639-6 O 36"/172 wheels, Shldr 1/8" x 1.455" axle, dbl insulated
 2640-6 O 36"/145 wheels, Shldr 1/8" x 1.425" axle, dbl insulated
 2641-6 O 36"/115 wheels, Shldr 1/8" x 1.405" axle, dbl insulated
 2640-6 P:48 36"/115 wheels, Shldr 1/8" x 1.335" axle, dbl insulated
 2310-6 Center Gear (1) - 48DP x 21T (2-lead) WG x 1/8" bore, (\$9.95)
 2267-6 Side Gear (1) - 40DP x 22T SGd x 1/8" bore, (\$9.95)

MTH 'Aerotrain' 2-rail conversion KIT, \$49.95

2663-6 36"/172 wheels (4), 33"/172 wheels (18) and axles
 2664-6 36"/145 wheels (4), 33"/145 wheels (18) and axles
 Special order: Additional cars
 2708-6 9.95 /172 tread wheels, axles
 2709-6 9.95 /145 tread wheels, axles

MTH 'Aerotrain' kit (1-1/2 power truck version)

Requires additional center-knurled axle for the powered wheels plus a replacement for the 'dummy' (or balancing) wheels - 22"/135 on flush 1/8" axle - axle bore must be re-drilled from 2.5mm to 1/8" added special order parts cost - \$10.00.

ATLAS F3, GP9, GP38 upgrade geared wheelsets, (4) \$44.95

2667-6 O 40"/172 wheels, Flush 1/8" x 1.455" axle
 2668-6 O 40"/145 wheels, Flush 1/8" x 1.425" axle
 2669-6 O 40"/115 wheels, Flush 1/8" x 1.405" axle
 2670-6 P:48 40"/115 wheels, Flush 1/8" x 1.335" axle
 2267-6 Side Gear (1) - 40DP x 22T SGd x 1/8" bore, (\$9.95)

ATLAS FM Erie-built WG-SG jackshaft \$19.95

2681-6 Convert dummy (but side-geared) truck to powered truck

MTH New Haven EP3/EP4 conversion to 2-rail wheels/axles, \$44.95

Must obtain 56" Quill drivers from HOUSE of DUDDY
 2682-6 40"/172 wheels, driver axles, lead truck wheelsets (8895-4), O gauge
 2683-6 40"/145 wheels, driver axles, lead truck wheelsets (8295-4), O gauge

K-Line New Haven EP5 convert 3-rail to 2-rail KIT, \$49.95

2684-6 O 40"/172 wheels; contains 2647/20-6 wheelsets, type 'A' axle only, (2) 48DP x 21T WG 2-lead, (6) 40DP x 25T SG
 2685-6 O 40"/145 wheels; contains 2647/21-6 wheelsets, type 'A' axle only, (2) 48DP x 21T WG 2-lead, (6) 40DP x 25T SG
 2686-6 O 40"/115 wheels; contains 2647/23-6 wheelsets, type 'A' axle only, (2) 48DP x 21T WG 2-lead, (6) 40DP x 25T SG
 2687-6 P:48 40"/115 wheels; contains 2647/24-6 wheelsets, type 'A' axle only, (2) 48DP x 21T WG 2-lead, (6) 40DP x 25T SG
 2346-6 Gear only: 48DP x 21T WG 2-lead, x 3/16" bore (1)
 2315-6 Gear only: 40DP x 25T SG x 3/16" bore (1)

Division Point RDC speed-up gearing, \$19.95

2710-6 2x speedup gearing (2 worms, 2 axle gears)

LIONEL Alco S2 upgrade geared wheelsets, 2-rail (4) \$39.95

2712-6 O 40"/172 wheels, Flush 1/8" x 1.455" axle
 2713-6 O 40"/145 wheels, Flush 1/8" x 1.425" axle
 2714-6 O 40"/115 wheels, Flush 1/8" x 1.405" axle
 2715-6 P:48 40"/115 wheels, Flush 1/8" x 1.335" axle
 2323-6 Gear only: 0.5 x 30T SGd x 1/8" bore (\$9.95)

ATLAS SD40 upgrade geared whlsets, 2-rail (6) \$49.95

2716-6 O 40"/172 wheels, Flush 1/8" x 1.455" axle
 2717-6 O 40"/145 wheels, Flush 1/8" x 1.425" axle
 2718-6 O 40"/115 wheels, Flush 1/8" x 1.405" axle
 2719-6 P:48 40"/115 wheels, Flush 1/8" x 1.335" axle
 2322-6 Gear only: 40DP x 20T SGd x 1/8" bore (\$9.95)

MTH/Lionel/Weaver/Atlas/KLine 3-rail to 2-rail wheels/axles KIT

These component kits enable conversion of 3 rail "trapped-axle" design (early diesels from China for various importers/brands—with 3/16" axle) and newer "removable bottom cover" units to be converted to 2-rail and choice of wheels, including P:48. Can be VERY difficult to remove original wheelsets; electrical pickup requirements must be addressed by the installer. PULLER V (#75-4) was designed to remove these difficult to access 'no clearance' wheels, arbor press (such as the SENSIPRESS+) or bigger required to reassemble with new wheels.

Specify wheel dia/tread in addition to kit #

	<u>4-axle units \$44.95</u>	<u>6-axle units \$54.95</u>
42"/172	2646/10-6	2647/10-6
40"/172	2646/20-6	2647/20-6
36"/172	2646/30-6	2647/30-6
33"/172	2646/40-6	2647/40-6
42"/145	2646/11-6	2647/11-6
40"/145	2646/21-6	2647/21-6
36"/145	2646/31-6	n/a
33"/145	2646/41-6	n/a
40"/115	2646/24-6	n/a
36"/115	2646/34-6	n/a
33"/115	2646/44-6	n/a

NOTE: Does not fit Lionel Legacy series

Who uses what axle?

Mfr	Axle		NWSL Part #
	Length	Type	
Aristo	2.72"	shldr	8670-4, etc. (except lighted cars with half-axle insulated wheels)
Accucraft	2.55"	shldr	8681-4, etc.
Bachmann	2.72"	shldr	8670-4, etc.
Delton	2.72"	shldr	8670-4, etc.
Hartford	2.72"	shldr	8670-4, etc.
LGB	2.72"	shldr	8670-4, etc.
Lionel	2.55"	shldr	8616-4, etc.
MDC	2.85"	shldr	8617-4, etc.
MIH	2.55"	shldr	8681-4, etc.
NENarrowGauge	2.72"	shldr	8671-4, 8611-4 etc.
RalphBrown	2.72"	shldr	8670-4, etc.
Ryan	2.72"	shldr	8670-4, etc.
USA Trains	2.72"	shldr	8670-4, etc.

NWSL Upgrade Geared Wheelsets

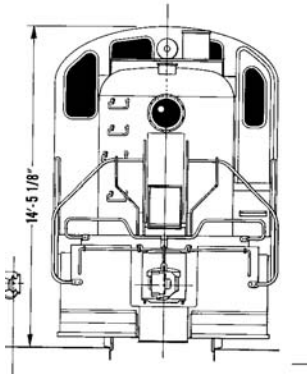
With bearings precision machined to fit your existing C.L.W. truck gearboxes with fine running steel NWSL wheels in your choice of wheel treads and gauge to fit your modeling objectives whether high fidelity or traditional wheels for fine operation and looks. The bronze axle bearing means long life that a plastic gearbox axle bearing can't match. The ready-to-'drop-in' wheelset makes installation easy.

NWSL is pleased to support fine modeling by manufacturing and offering the many quality choices that make it possible for you to more easily model and operate your dreams more accurately and with fine operating models.

/172 Classic O gauge tread

/145 Semi-finescale tread that still operates reliably on most 'O' gauge trackage

/115 Finescale tread in a choice of 'O' or P:48 gauge for correctly scaled wheels



1/8" axle; 20T x .440"/11.2mm OD

Found on the following and possibly others (check your unit for correct number of gear teeth and diameter—different production runs may have different gearing):

Central Loco Works and others using the CLW diesel axle gearbox such as CLW, Weaver, P&D, Car Works E & F units. Will not fit Weaver units made in China with vertical motor—see #2646-6 series upgrade kits for these units.

Replace the broken axle gears (and upgrade wheels) with these precision wheel tread choices:

Weaver RS3, FA, GP38 geared Wheelsets, (4) \$44.95

- 2503-6 O Scale 40"/172 wheels shldr 1/8" x 1.810" axle
- 2504-6 O Scale 40"/145 wheels shldr 1/8" x 1.810" axle
- 2505-6 O Scale 40"/115 wheels shldr 1/8" x 1.810" axle
- 2506-6 P:48 scale 40"/115 wheels shldr 1/8" x 1.640" axle
- 2294-6 Gear: 48DP x 20T WG 2-lead x 1/8" bore (1) \$9.95

Caution: Above #2506-6 has P:48 length axle, requires truck to be narrowed to P:48 width; will NOT run on 'O' gauge trackage - requires specially prepared trackage gauged to P:48 standards for reliable operation!



Did You Know Athearn Made O Gauge Trucks?

And they are found under Quality Craft and many other O gauge cars with steel axle and /172 tread plastic wheels, which tend to 'dirty' up the rails. When you want fine, clean running O gauge (or P:48) wheelsets, NWSL will get you rolling.

These all steel wheelsets are manufactured in 28, 33, and 36 diameter, in four tread width choices to aid you in modeling exactly your preference (3-rail choices are in the '87' series, i.e. #8751-4, etc.)

/172	Traditional O gauge tread width (#88xx-4 series)
/145	Semi-finescale tread width (#82xx-4 series)
/135	Traction tread width (#81xx-4 series)
/115	Exact finescale tread width (#83xx-4 series)
/210	Tinplate tread width (#87xx-4 series)

ROCO SWITCHES - O scale derail problem

NWSL received a report that /145 tread wheelsets for Athearn trucks derailed on ROCO switches. A second modeler reported that he experiences the problem and found that it was due to the depth of the 'point notch' in the stock (outside) rail such that the point wheel running surface was not aligned with the stock rail (enabling the wheel flange to climb the notch and derail). This problem can be resolved by carefully filing the notch so it matches (aligns with) the point.

October 8, 1990: A modeler reported that recent (c1990) ROCO switches have wider frog (flangeways), which permit the /145 wheels to drop into the frog gap. Therefore, test operate a sample /145 wheelset on your trackage before committing to quantity of wheelsets. (No other such reports have been received - possibly a fluke.)



O Scale Tinplate Wheelsets

Precision Machined Steel Wheelsets

Precision machined and assembled, fine operating steel NWSL wheelsets made in the USA by NWSL craftsmen for your Lionel and other tinplate 'O' scale trucks.

The most commonly found size for standard gauge freight cars is 33", and 36" is the most common passenger car size—in the better looking NWSL /210 tread providing reliable operation on 'O' tinplate trackage such as Lionel, MTH, etc. Examine your existing wheelset axle ends to determine which style you require. Pointed fits Athearn, Quality Craft, Keystone Locomotive Works, some Walthers, some MTH, circa 1997 Lionel from China and others. Shouldered fits All Nation, Keil Line, many ATLAS, old Lionel, etc. some MTH, Williams, older Walthers.

/210 tread Tinplate	\$17.95 (pkg/4)	Part #
33"/210 wheels, Shldr 1/8" × 1.810" axle, not insulated		8751-4
36"/210 wheels, Shldr 1/8" × 1.810" axle, not insulated		8752-4
33"/210 wheels, Pointed 1/8" × 1.80" axle, not insulated		8787-4
36"/210 wheels, Pointed 1/8" × 1.80" axle, not insulated		8788-4
33"/210 wheels, Pointed 1/8" × 1.690" axle, insulated		8767-4

Large Scale Wheelsets

For improved appearance, operation and electrical pickup, NWSL #1 gauge wheelsets are all metal manufactured in brass nickel plated for a quality appearance, reliable electrical pickup and better operation. These wheelsets are double insulated with each wheel hub insulated to the steel axle. Journals are 3mm to fit virtually all #1 gauge truck bearings (tight journals can be drilled 1/8" for satisfactory free operation). Some sizes also available in solid nickel-silver or Stainless Steel.



NWSL #1 gauge wheelsets—1 to r: /172, /270, /236 treads on standard shouldered axle

All metal wheels eliminate the track dirtying tendency of plastic wheels. While these wheelsets are dimensioned for 1:32 scale (3/8"=1'-0"), they can be used in any scale utilizing #1 gauge (1.75") track such as 1:20.3, 1:22.5, 1:24, and 1:29 ratio models. Selections to fit virtually any #1 gauge train: NWSL standard #1 gauge axle fits most #1 gauge car trucks (LGB, Ryan, Delton etc.) - see #8671-4, #8672-4. Some #1 gauge trucks require different length/specification axles - Lionel (2.550" length—see #8615-4, #8616-4), MDC (2.847" length—see #8617-4 and #8618-4) and Accucraft (2.550" length, short body 2.100" - see #8681-4, #8682-4).

Large Scale wheels that look like railroad wheels - not toy trains:

1:32 (3/8") Scale

NWSL wheelsets for #1 gauge provide a prototypical contour tread shape eliminating the outsize and improper shaped flange of plastic toy wheels and additionally are offered in two tread sizes - the /270 tread (8.6" wide in 1:32 scale) is a more accurate representation of the prototype wheel tread but is still compatible with LGB (and LGB compatible) trackage and specialwork; it will not run reliably on #1 gauge finescale switchwork (Old Pullman, etc.). The /236 tread (7-1/2" wide in 1:32 scale) even more closely replicates scale wheel treads but may not run reliably through some LGB specialwork (switches, etc.) and should only be used on track built to finescale standards. And if you want to REALLY go finescale in 1:32 scale, we have the /172 tread wheelsets in the #48670-4 series, wheels that are actual 5-1/2" scale width, same as the prototype!

Wheel Dia.		/270 tread		/236	/172
Scale	Actual	Shouldrd	Flush	Shouldrd	Shouldrd
40"	1-1/4"	#8670-4	#8660-4	#28670-4	#48670-4
36"	1-1/8"	#8671-4	#8661-4	#28671-4	#48671-4
33"	1-1/32"	#8672-4	#8662-4	#28672-4	#48672-4
28"	7/8"	#8673-4	#8663-4	#28673-4	#48673-4
<i>Shouldered wheelset journals are 3.0mm to fit LGB trucks or 1/8" journals or use #362-6 journal bearings. Shouldered fit LGB, Aristo, Bachman, Delton, Kalamazoo, REA, Ryan, US Trains - measure wheel diameter to determine size req'd.</i>					
36"	1-1/8"	#8615-4	fit LIONEL large scale		
33"	1.031"	#8616-4	fit LIONEL large scale		
36"	1-1/8"	#8617-4	fit MDC 1:32 cars		
33"	1.031"	#8618-4	fit MDC 1:32 cars		

1:29 (A) Scale

This scale was derived by Aristo for a line of Large Scale models to run on #1 gauge track. Subsequently joined by USA TRAINS, and others. Standard 2.72" shouldered axle wheelsets (#8670-4, etc.) fits most except lighted cars which need 1/2 axle style wheels)

Standard Gauge (approx. 1:26.6) Scale

Obsolete #2 gauge of 2-1/8" used by Lionel, Ives, etc. circa 1900-1930. Custom assembled (c.a.) to order—select wheel diameter, and axle—3.087" and 2.95" length shouldered style.

1:24 (1/2") Scale

Some modelers in this scale using #1 gauge track use the appropriate diameter above listed wheelsets—see cross-reference chart at right.

1:22.5 (G) Scale

Early LGB garden railway models used this scale for modeling meter gauge railway models running on #1 gauge track. Standard (LGB) shouldered axle fits, determine wheel diameter and see #8670-4, etc.

1:20.3 (F) Scale

This bizarre(?) scale derives from the American use of #1 gauge to represent 3'-0" gauge track. To aid those craftsman modelers who are endeavoring to model accurately in this scale, NWSL has manufactured a batch of 26" wheels in both /270 (scale 5-1/2" tread) and /236 tread (scale 4-3/4" wide tread). Prototype tread width was generally 5-1/2" with specialty use such as streetcars generally measuring 4-1/2".

Large Scale Wheels sizes cross reference							
Actual diameter		Scales & diameter					
inch	mm	32	A	Std	1/2"	G	F
.875"	22.2mm	28	25	24	21	20	18
1.031"	26.2mm	33	30	27	25	23	21
1.125"	28.6mm	36	33	30	27	25	23
1.250"	31.8mm	40	36	33	30	28	25
1.281"	32.5mm	41	37	34	31	29	26
1.379"	35.0mm	44	40	37	33	31	28

1:20.3 (F) Scale Wheelsets					
Wheel Dia.		/270 tread		/236 tread	
Scale	Actual	Shouldered	Flush	Shouldered	Flush
26"	1.281"	#8611-4	c.a.	#28611-4	c.a.
<i>Shouldered wheelset journals are 3.0mm to fit LGB trucks or 1/8" journals or use #362-6 journal bearings. Shouldered fit LGB, Bachman, REA, Delton, Kalamazoo. Wheel diameter may not!</i>					

Heavy all metal wheels mean better rolling, cleaner track, more prototypical train rumble, but also means heavier load for your locomotives and therefore possibly shorter trains (or double heading). The "weathered" nickel-silver wheelsets are being made available for those modelers who prefer the more realistic dark gray/black appearance to the bright finish. The weathered wheels are chemically treated (antiqued), which will wear away on wear surfaces such as the tread thus exposing the underlying bright metal just like the prototype (can also be removed with a pencil eraser where desired). See the NWSL catalog pages 7-5 and on for full specifications.

See Master Product Stock Number list (blue pages) for complete product listing and current prices. Above wheels were originally made of aluminum which provided excellent results in our applications and testing. However, some modelers have experienced problems in their particular operation environment. Therefore, recent production wheels are made in nickel-plated brass or the more expensive nickel silver and stainless steel which has provided reliable electrical operation results for all modelers.

Large Scale Wheelsets

Choice of 3 treads:

- /270 Traditional Large Scale wheel tread width, (LGB et al)
- /236 Semi-finescale tread width for better appearance
- /172 P:32 exact scale tread for 1:32 modeling

NICKEL SILVER Wheelsets

\$34.95 (Pkg/4)

1:20.3 scale (Bachmann, Accucraft, etc.)

- 58611-4 26"/270, shldr 3/16" x 2.72" axle
- 58671-4 23"/270, shldr 3/16" x 2.72" axle
- 68611-4 26"/236, shldr 3/16" x 2.72" axle
- 78611-4 26"/172, shldr 3/16" x 2.72" axle

1:22.5 scale (LGB, Bachman etc.)

- 58673-4 20"/270, shldr 3/16" x 2.72" axle
- 68672-4 23"/236, shldr 3/16" x 2.72" axle
- 68673-4 20"/236, shldr 3/16" x 2.72" axle
- 78671-4 25"/172, shldr 3/16" x 2.72" axle
- 78672-4 23"/172, shldr 3/16" x 2.72" axle

1:29 scale (Aristo, Lionel, US Trains, etc.)

- 58615-4 33"/270, shldr 3/16" x 2.55" axle
- 58616-4 36"/270, shldr 3/16" x 2.55" axle

1:29 scale (LGB/Bachmann)

- 58675-4 40"/270, shldr 3/16" x 2.55" axle
- 58668-4 40"/270, shldr 3/16" x 2.72" axle
- 58669-4 36"/270, shldr 3/16" x 2.72" axle
- 68675-4 40"/236, shldr 3/16" x 2.55" axle
- 68616-4 36"/236 shldr 3/16" x 2.55" axle

1:32 scale /172 fine scale

- 78661-4 36"/172, flush 3/8" scale axle
- 48682-4 33"/172, shldr 3/16" x 2.72" shldr axle
- 48671-4 36"/172, shldr 3/16" x 2.72" axle
- 48670-4 40"/172, shldr 3/16" x 2.72" axle

1:32 scale /236 semi-scale

- 68618-4 33"/236, shldr 3/16" x 2.85" axle
- 68670-4 40"/236, shldr 3/16" x 2.72" axle
- 68663-4 28"/236, flush 3/8" scale axle
- 68660-4 40"/236, flush 3/8" scale axle
- 68662-4 33"/236, flush 3/8" scale axle

1:32 scale (American Std Car, MDC, etc.)

- 68617-4 36"/236, shldr 3/16" x 2.85" axle
- 58617-4 36"/270, shldr 3/16" x 2.85" axle
- 58670-4 40"/270, shldr 3/8" scale axle
- 58663-4 28"/270, flush 3/8" scale axle
- 58661-4 36"/270, flush 3/8" scale axle
- 58660-4 40"/270, flush 3/8" scale axle

1:32 scale Lionel

- 58615-4 36"/270, shldr 3/16" x 2.55" axle
- 58616-4 40"/270, shldr 3/16" x 2.55" axle
- 68615-4 36"/236, shldr 3/16" x 2.55" axle
- 68616-4 40"/236, shldr 3/16" x 2.55" axle

1:32 scale LGB/Bachmann)

- 58672-4 33"/270, shldr 3/16" x 2.72" axle
- 68671-4 36"/236, shldr 3/16" x 2.72" axle

1:32 scale Accucraft

- 58682-4 33"/270, shldr 3/16" x 2.10" axle
- 58681-4 36"/270, shldr 3/16" x 2.10" axle
- 68682-4 33"/236, shldr 3/16" x 2.55" axle
- 68681-4 36"/236, shldr 3/16" x 2.55" axle
- 78681-4 36"/172, shldr 3/16" x 2.55" axle

- 78682-4 33"/172, shldr 3/16" x 2.55" axle

NICKEL-PLATED BRASS Wheelsets

(while they last) \$29.95 (Pkg/4)

1:29 scale (Lionel)

- 8615-4 33"/270, shldr 3/16" x 2.55" axle
- 8616-4 36"/270, shldr 3/16" x 2.55" axle
- 28615-4 33"/236, shldr 3/16" x 2.55" axle
- 28616-4 36"/236, shldr 3/16" x 2.55" axle

1:32 scale

(LGB, Bachmann, USA Trains, Delton, Aristo, etc.)

- 8618-4 33"/270, shldr 3/16" x 2.85" axle (MDC)
- 8617-4 36"/270, shldr 3/16" x 2.85" axle (MDC)
- 8660-4 40"/270, flush axle
- 8661-4 36"/270, flush axle
- 8662-4 33"/270, flush axle
- 8670-4 40"/270, shldr 3/16" x 2.72" axle (LGB, Bachmann, USA)
- 8671-4 36"/270, shldr 3/16" x 2.72" axle (Trains, Delton, Aristo)
- 8672-4 33"/270, shldr 3/16" x 2.72" axle (except lighted cars)
- 8681-4 36"/270, shldr 3/16" x 2.10" axle (Accucraft)
- 8682-4 33"/270, shldr 3/16" x 2.10" axle (Accucraft)
- 8863-4 28"/270, flush 3/16" x 2.070" axle (inside frame trks)
- 28617-4 36"/236, shldr 3/16" x 2.85" axle (MDC)
- 28618-4 33"/236, shldr 3/16" x 2.85" axle (MDC)
- 28660-4 40"/236, flush axle
- 28661-4 36"/236, flush axle
- 28662-4 33"/236, flush axle
- 28670-4 40"/236, shldr 3/16" x 2.72" (LGB, Bachmann, USA)
- 28671-4 36"/236, shldr 3/16" x 2.72" (Trains, Delton, Aristo)
- 28672-4 33"/236, shldr 3/16" x 2.72" (except lighted cars)

- 28682-4 33"/236, shldr 3/16" x 2.55" axle (Accucraft)
- 28681-4 36"/236, shldr 3/16" x 2.55" axle (Accucraft)
- 28680-4 40"/236, shldr 3/16" x 2.55" axle (Accucraft)

Large Scale Upgrade WHEELS ONLY

1:29 scale

#1 Aristo diesel

- 2565-6 40"/270 SS ("screw-head") (8)
- 2563-6 40"/236 NS ("screw-head") (8)

#1 Aristo U25 (circa 2001)

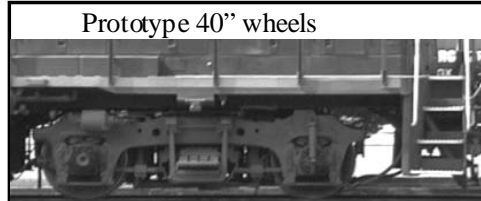
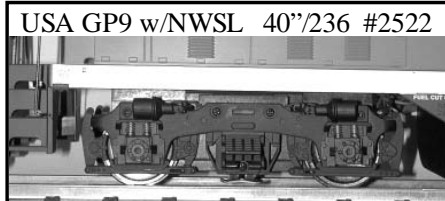
- 2648-6 40"/270 NS ("screw-secured") (8)
- 2638-6 40"/270 SS ("screw-secured") (8)
- 2649-6 40"/236 NS ("screw-secured") (8)

Wheel Measurements

Wheel size	1:32	1:29	1:20.3	1:22.5
20				.875"
23			1.12"	1.03"
25				1.12"
26			1.28"	
28	.875"			
33	1.031"	1.03"		
36	1.125"	1.12"		
40	1.250"	1.379"		
41	1.281"			
44	1.379"			

Large Scale Wheelsets Specially Machined Axles and Wheels

Look better with closer to scale tread and flange plus more correct size (diameter) wheel providing excellent tracking and operation on your rails. NWSL Nickel-Silver (NS) /236 and /270 tread and Stainless Steel (SS) /270 wheels in your choice of size to fit your modeling objectives whether high fidelity or just fine operation that clean running premium solid wheels provide. NWSL supports finescale modelers by manufacturing the /172 tread (exact scale width) selection. NWSL upgrade wheels eliminate the sometimes troublesome 'traction tires'. Installation instructions included – (pull wheels out of axle gear, salvage bearings, install bearings on new wheels, press new wheels into axle gear).



Upgrade your wheels to correct diameter & tread size

- /270 - the gauge #1 gauge 'scale' tread with correct flange shape (all #1 gauge trackage)
- /236 - the semi-finescale tread (operates reliably on most #1 gauge trackage except LGB 1500 series)
- /172 - the finescale tread in 1:32 or 1:29 (exact scale wheel tread -requires custom trackage)

Replacement "plug-in" wheels for **ARISTO** (40" only) and **USA TRAINS** (36" and 40") 1:29 Large Scale diesels. Replace the original USA under-size (32.5" & 34"), oversize flange, and/or worn wheels with better looking, more correct size and profile NWSL wheels.

Note: 40"/270 cannot be fit to USA GP7 due to truck frame interference (but 40"/236 can be fitted). Sideframe brake detail of USA GP7, F3, GP38 must be trimmed for clearance of these larger diameter wheels. Package contains all wheels for one locomotive. Aristo **MUST** use 40" wheels.

1:29 scale: Large Scale Nickel Silver WHEELS ONLY (Pkg/8) \$74.95

2521-6	36"/236	(1.594)	USA	GP7,	44T,	GP38,	F3,	NW2		
2522-6	40"/236	(1.594)	USA	GP7,		GP38,	F,		Aristo	RS3, FA
2662-6	40"/270	(1.594)	USA	GP7,		GP38,	F,		Aristo (early)	RS3, FA
2529-6	36"/270	(1.525)	USA	GP7,		GP38,	F3,	NW2		
2645-6	40"/270	(1.594)					F3		Lionel	

1:29 scale: Large Scale Stainless Steel WHEELS ONLY (Pkg/8) \$74.95

2548-6	36"/270	(1.525)	USA	GP7,		GP38,	F3,	NW2		
2549-6	40"/270	(1.594)	USA			GP38,	F3,	NW2, (not GP7),	Aristo	RS3, FA

NOTE: Gauge #1 is also termed 'LGB', and is used by various LS (Large Scale, 'G' scale) mfr such as Aristo, Bachmann, Lionel, USA Trains, etc.

1:29 Scale: #1 USA Trains SD40

2600-6				40"/270	SS half axle wheels (correct wheel diameter)	(12)
2601-6	74.95			36"/270	SS half axle wheels (original model whl dia.)	(12)
2602-6				40"/236 (1.379")	NS half axle wheels; (8) type 1 axle, (4) type 2 axle	
2603-6	74.95			36"/236 (1.379")	NS half axle wheels (8) type 1 axle, (4) type 2 axle	

1:29 Scale: #1 Aristo SD45 diesel

2604-6				40"/270	NS WHEELS with taper bore bushing (screw-secured")	(12)
2605-6				40"/236	NS WHEELS with taper bore bushing (screw-secured")	(12)
2607-6	49.95			33"/270	NS wheels ("screw-secured") #1 Aristo RDC car	(8)

#1 Aristo SD45, GP40, dash 9

2609-6	44.95			44"/315	NS WHEELS, end-screw type, tapered axle	(8)
2610-6	74.95			44"/315	NS WHEELS, end-screw type, tapered axle	(12)

Axle gears - USA Trains diesel 'G' scale

(#1 gauge) 1/2 axle wheelsets when your original USA TRAINS diesel axle gear fails—cracks or breaks, NWSL precision machined gear — not injection molded. Machined from solid delrin for longer life—confirm teeth & dia.

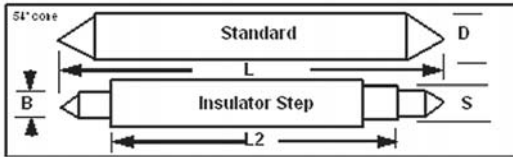
2163-6	34T x 17.8mm dia	(NW2 diesel)
2165-6	33T x 21mm dia	(GP9, F3, GP38 diesels)

01/01/2017

Prices subject to change without notice.



Left front—USA Trains 'toy flange' wheel;
right front— NWSL #2521-6 36"/270
(Gear not included)

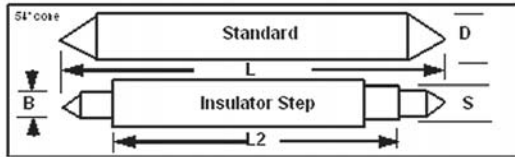


Pointed Axle Specifications

Price \$1.00 ea

		DIMENSIONS (inch - x 25.4 for mm)						
Gauge	Style	D	L	S	B	L2	Where used (some examples) part#	NWSL #
Z	Std	1.5mm	0.410	n/a			Z, Nn3	
N	Std	1.5mm	0.540	n/a			(KD, MDC, Atlas, *)	97000106
N	Std	1.5mm	0.550	n/a			Atlas (some China)	97000050
N	Std	1.5mm	0.560	n/a			37465, 37467, 37468-4 (Concor, Bachman-some)	97000002
N	Std	1.5mm	0.445	n/a				97000201
HOn30	Std	1.5mm	5.800	n/a			(Sango)	97000010
HOn30	Std	1.5mm	0.615	n/a			(Joe Works)	
HOn3	Std	1.5mm	0.590	n/a			Hoffman	97000065
HOn3	Std	1.5mm	0.660	n/a			Hoffman (custom)	
HOn3	Std	1.5mm	0.760	n/a			spoked w heelsets, Rio Grande, etc.	
HOn3	Std	1.5mm	0.790	n/a			Hoffman (custom)	97000018
HOn3	Step	2.0mm	0.760	n/a	0.062	0.56	37312-4, et al	
HOn3	ModStd	3/32"	0.585	n/a	0.05	0.475	(fits Grandt Line)	97000121
HOn3	Step	3/32"	0.665	n/a		0.525	Hoffman-PSC (custom)	
HOn3	Std	3/32"	0.700	n/a			Hoffman-CB&T (custom)	97000016
HO	Std	2.0mm	0.797	n/a				97000007
HO	Std	2.0mm	0.920	n/a				97000056
HO	Std	2.0mm	0.944	n/a			37187-4 etc, Atlas (China circa 2001 & later)	97000059
HO	Std	3/32"	0.960	n/a			Rivarossi/AHM (some) (data)	
HO	Std	2.0mm	0.970	n/a			European standard, 37169-4 et al	97000057
HO	Std	3/32"	0.970	n/a			European standard, 37169-4 et al	97000008
HO	Std	3/32"	1.000	n/a			D&G Short Axle	97000055
HO	Std	3/32"	1.006	n/a			TYCO/AHM/etc (some)	97000006
HO	Std	3/32"	1.015	n/a				97000004
HO	Std	1.5mm	1.015	n/a				97000054
HO	Std	2.0mm	1.015	n/a			37113-4, 371123-4, 37612-4, 57615-4, et al	97000005
HO	Half	3/32"	.415"	n/a			37146-4, etc	97000402
P:87	Std	2.0mm	0.917	n/a			37675-4, et al P:87	97000009
P:87	Std	3/32"	0.917	n/a			Stratton /72 w heel	97000020
S	Std	3/32"	1.264	n/a			S-Helper	97000147
S	Std	3/32"	1.280	n/a			American Models, Pacific Rail trucks	97000021
S	Std	3/32"	1.270	n/a			S Helper (made in China cars)	97000072
Sn3	Step	3/32"	0.896	n/a	0.065	.686t3	37796-4 (PBL Sn3trucks)	97000136
Sn3	Step	3/32"	0.900	n/a	0.065	0.705	Grandt Line (some)trucks	97000022
Sn3	Std	3/32"	0.917	n/a				97000020
Sn3	Std	2.0mm	0.917	n/a				97000009
NOTES:		(t2=+0/--.002)	(t5=+0/--.005)	(t1=+0/--.001)	(1.5mm=.0591"), (2.0mm=.0787"), (3.0mm=.1181")			

continued next page



Pointed Axle Specifications, *cont'd*

Price \$1.00 ea

		DIMENSIONS (inch - x 25.4 for mm)							
Gauge	Style	D	L	S		B	L2	Where used (some examples) part#	NWSL #
OO	Std	3/32"	1.075	n/a				(custom)	97000070
On30	Std	2.0mm	1.102	n/a		0.06		37895-4; 37894-4 (Bachmann On30 tender, frt trucks)	97000005
On3	Step	1/8"	1.340	n/a					97000079
On42	Step	1/8"	1.430	.100t1	.100t1	.100t1			97000078
P:48	Step	1/8"	1.690	.100t1				838x-4 series, 8267/8-4 (RedCaboose)	97000025

Price \$1.50 ea

O	Step	1/8"	1.710						97000032
O	Step	1/8"	1.750	.100t1				8265-4, 8266-4 (MTH point axle pass car)	97000027
O	Step	1/8"	1.800	.100t1				8187/88-4, 828x-4, 836x-4, 888x-4 (Athearn, Q.Craft, etc.)	97000026
O	Step	1/8"	1.800	.100t1		.100t1		8269-4, 8270-4 (San Juan)	97000028
O	Step	1/8"	1.815	.100t1		.100t1		Weaver (China), 8294, 8295, 8894, 8895-4	97000031
O	Step	1/8"	1.875	.100t1					97000038
O	Step	1/8"	1.878	.100t1		0.097		(MTH#4 point axle tender truck)	97000029
O	Step	1/8"	1.925	.100t1		.100t1		Atlas (made in China circa 2001 & later) (some Lionel?)	97000030
		(t2=+0/-0.002)	(t5+0/-0.005)	(t1=+0/-0.001)				(1.5mm=.0591"), (2.0mm=.0787"), (3.0mm=.1181")	

Compatibility/fit notes:

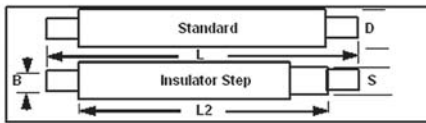
Axle length is particularly critical for the cone style axle end. We list known fits; different production runs of models, particularly imported models, may or may not have consistent axle length. If you encounter a tight or loose fit and unsatisfactory operation and NWSL offers more than one choice in your scale, try the other choice.

N gauge: .540" axle fits most or all Kadee, MicroTrains, Roundhouse, Atlas, AHM, Trix, Aurora. .560" axle fits most Concor, Bachmann; .550" fits Atlas China-bilt

HO gauge: The 1.015" length "Athearn std" fits almost all instances of pointed axle including many Rivarossi. Some Rivarossi, AHM, TYCO (made in HongKong) and many European made cars use the .970" (24.5mm) length point axle.

S gauge: The 1.28" length fits American Models, Pacific Rail, S Helper, S Scale America trucks—S Helper(China bilt) uses 1.27" axle.

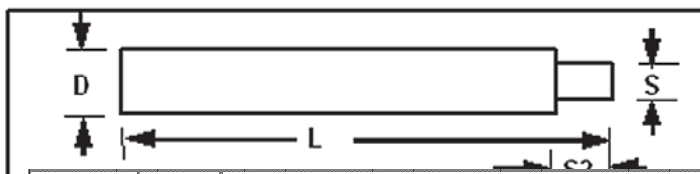
O gauge: The 'Athearn std' pointed 1.800" axle is the most commonly found—fits most or all Athearn, Quality Craft, Intermountain, Keystone, some Williams. The 1.69" 'shortpoint' fits Red Caboose and P:48. MTH uses several different axles. MTH#4 fits K-Line. Recent Atlas (made in China since circa 2001) use the 1.93" length.



Shouldered Axle Specifications

Price \$1.00 ea

Gauge	Style	DIMENSIONS (inch - x 25.4 for mm)					Where used (some examples) part#	NSL #
		D	L	S	B	L2		
HOn30	Std	15mm	0.530		0.031	0.444	Grandt # 5146 (SRRL)(eff. 9910)	97000107
HOn30	Std	15mm	0.540		0.034	0.450	Grandt # 5146 (SRRL)(thru 9909)	97000106
HO	std	2.0mm	0.950		1.5	0.793	2630-6; 2618-6; KMT	97000103
HO	Std	3/32"	1.025		0.062	0.840		97000114
HO	Std	2.0mm	1.025		0.062	0.840	37103-4, et al	97000111
HO	Step	3.0mm	1.075	0.100	0.088	0.850	2060-6, et al	97000110
HO	half	3/32"	0.440				37145-4, 37245-4, 37645-4, et al	97000407
HOn3	Std	15mm	0.588		0.044	0.510	Sn2	97000126
HOn3	Std	2.0mm	0.588		0.044	0.510	37343-4 et al, Grandt Line HOn3 trucks /72 wheels	97000122
HOn3	Std	3/32"	0.588		0.044	0.488	Grandt Line HOn3 trucks (thru 9911)	97000121
HOn3	Std	3/32"	0.588		0.047	0.510	Grandt Line HOn3 trucks (eff. 9912)	
HOn3	Std	3/32"	0.745		0.062	0.560		
HOn3	Std	2.0mm	0.630		0.044	0.510	37345-4 Berlyn HOn3 trucks /72 wheels	97000124
HOn3	Std	2.0mm	0.745					97000125
P:87	Std	2.0mm	0.915		0.062	0.765	37655-4, et al P:87	97000301
Sn3	Std	3/32"	0.860		0.06	0.677	Grandt Line # 4065 Sn3 trucks (eff.9910)	97000131
Sn3	Std	3/32"	0.875		0.062	0.685	Grandt Line # 4065 Sn3 trucks (thru9909)	97000132
Sn3	Std	3/32"	0.915		0.062	0.730	37851-4, 37850-4, 57748-4, 57740-4, 57741-4	97000135
S	Std	3/32"	1.265		0.062	1.080		97000133
S	Step	3mm	1.300	0.100	2mm	1.076	2050-6, Omnicon diesel	97000134
On2	Std	3/32"	0.915		0.062	0.730	7850/7851-4 (also see Sn3 axle)	97000136
On2	Std	1/8"	1.050	0.100	0.084	0.723		97000172
On3	Std	3/32"	1.085		0.062	0.900	San Juan On3 Car trucks #37843-4; Bachmann On30 37893-4	
On3	Std	3/32"	1.165		0.062	0.905	37801/37802/37803-4, 2022-6, Also OO gauge	97000129
On3	Std	3/32"	1.165		0.062	0.980	78017802/7803-4, 2022-6, Also OO gauge (to 2-02)	97000127
On42	step	1/8"	1.300	0.100	0.088	1.072		97000170
OO	Std	3/32"	1.165		0.062	0.980	custom assembly (same as On3 gauge)	
P:48	Step	1/8"	1.640	0.100	0.088	1.400	8320-4, etc.	
P:48	Std	1/8"	1.640		0.088	1.400	Non-insulated, 8310-4, etc.	
O	Step	1/8"	1.667	0.100	0.059	1.475	Overland brass caboose (custom)	
O	Step	1/8"	1.730	0.100	0.09	1.400	Insulated (MTH frt#2)	97000137
O	Step	1/8"	1.730	0.100	0.088	1.475	double insulated	97000139
O	Step	1/8"	1.760		0.088		Insulated one side (O Magic Carpet)	97000150
O	Step	1/8"	1.760		0.088		Non-Insulated (O Magic Carpet, 3-rail)	97000151
O	Std	1/8"	1.770	0.100	0.079	1.490	Dbl insulated	97000164
O	Step	1/8"	1.810	0.100	0.079	1.480	2.0mm journal fit; 8256-4, 8257-4 (Atlas/MTH frt # 1)	97000162
O	Step	1/8"	1.810	0.100	0.088	1.480	8100-4, 8200-4	
O	Std	1/8"	1.810		0.088	1.480	Non-insulated, 8178-4, ec.l	97000117
O	Step	1/8"	1.810	0.100	0.093	1.480	Non-insulated	97000188
O	Step	1/8"	1.810	0.100	0.093	1.480	3/32" Ball-bearing journal fit option	97000163
O	Step	.156t2	1.810	0.145	0.13	1.480	8400-4, etc.	
O	Std2	.1535t2	1.867	0.100	0.088	1.06	SAM diesel F7, GP9, RS3, non-insulated	97000161
O	Step	1/8"	1.909	0.100	0.093	1.48	Lionel 'bearing spinner' style 14mm bearing cap fit	97000165
O	Step	1/8"	2.080	0.100	2.5	1.877	Atlas 'bearing spinner' style 15mm bearing cap fit	97000166
Otp	Std	1/8"	1.867		0.088	1.530	Non-insulated, 8700-4, etc. (tinplate)	97000161
#1	half	6.0mm	1.036		0.113		2563/2565-6	97001218
#1	half	6.0mm	1.300		0.113	1.036	2521-6; 2522-6; 2548/2549-6 etc.	
A/std	half	6.0mm	1.400		0.113	1.136	For 1:29 std gauge of 1948"	
#1Accu	Std	3/16"	2.550		3mm	2.100	(Accucraft #1 gauge brass trucks)	97001124
#1LGB	Std	3/16"	2.722		3mm	2.250	8630-4, 8670-4, et al (LGB, Bachman, REA, etc.)	97001122
#1Lionel	Std	3/16"	2.550		3mm	2.250	8615-4 (Lionel large scale)	97001123
#1MDC	Std	3/16"	2.847		3mm	2.375	8617-4 et al (MDC large scale)	97001125
Std Ga	Std	3/16"	2.950		3mm	2.500	Lionel tender (cars?) w/2.6" between sideframes	97001129
Std Ga	Std	3/16"	3.087		3mm	2.615	2-1/8" gauge (Lionel 500 series cars)	97001128
1/2"	Std	3/16"	2.050		0.124	1.400	1" gauge /270, /236 wheels - 2' gauge	97001133
1/2"	Std	3/16"	2.300		0.124	1.650	1-1/4" gauge /270, /236 wheels - 30" gauge	97001132
1/2"	Std	3/16"	2.550		0.124	1.900	1-1/2" gauge /270, /236 wheels - 3' gauge	97001131
1/2"	Std	3/16"	3.500		0.124	3.040	2-1/2" gauge /270, /236 wheels	97001130
3/8n2	Step	1/8"	1.307	0.100	0.088	0.980		
3/8n3	Step	1/8"	1.683	0.100	0.088	1.355		
		(t2=+0/-0.002)	(t5=+0/-0.005)	(t1=+0/-0.001)		(t5=+0/-0.005)	(1.5mm=.059"), (2.0mm=.0787"), (3.0mm=.118")	



Flush/Blunt Axle

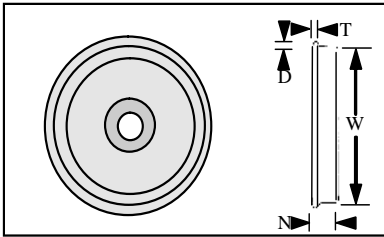
Price \$1.00 ea

ID	DIMENSIONS (inch - x 25.4 for mm)					Where used (some examples) part#	NWSL #
Gauge	Style	D	L	S	S2		
N	flush	1.5mm	0.445				97000201
HOn30	flush	3/32"	0.46				97000261
HOn30	flush	3/32"	0.475				97000260
HOn3	flush	2.0mm	0.580				97000265
HOn3	flush	1.5mm	0.510			/72	97000259
HOn3	flush	2.0mm	0.530			/88, 37322-4, 37323-4	97000258
HOn3	flush	3/32"	0.530			/88, 2019-6, 37322-4, 37323-4	97000208
HO	flush	1.5mm	0.751			/88, 47226-4, et al	97000207
HO	half	1.5mm	0.472			37191, 37192, 37291, 37292, 37691, 37692-4, et al	97000400
HO	flush	2.0mm	0.744				97000215
HO	flush	2.0mm	0.751			/88, 37224-4, et al; P:87. HO/64	97000254
HO	flush	2.0mm	0.797			/110, 37123-4, et al	97000253
HO	flush	2.0mm	0.856			2570/2573-6; KMT diesel	97000299
HO	blunt	2.0mm	1.025			37109-4,37110-4	97000252
HO	flush	3.0mm	0.803			KMT, 102-6	97000300
HO	half	3/32"	0.463			37139-4/37144-4, 37239-4/37244-4, et al	97000401
HO	half	3/32"	.570"			PA Heritage Models	97000405
HO	flush	3/32"	0.744			/64	97000216
HO	flush	3/32"	0.751			/88, 37224-4, et al	97000307
HO	flush	3/32"	0.797			/110, 37123-4, et al	97000206
HO	blunt	3/32"	1.015			37109,37110, 37080, 37081, 37091-4; S Flush	97000302
Sn3/TT	flush	3/32"	0.650				97000146
Sn3	flush	3/32"	0.702				97000145
Sn3	blunt	3/32"	1.2000			Tomalco #50, 7090-4	97000209
S	flush	2mm	1.015"				97000148
S	flush	3/32"	1.015			(use HO Blunt), 37729-4, et al	97000302
S	blunt	1/8"	1.105			S Scale Loco.	97000266
On3	flush	2mm	0.895				97000220
On3	flush	2mm	0.975			/145, double-insulated	97000209
On3	flush	3/32"	0.895			2021-6, 7350-4	97000214
O	flush	2mm	1.355"			/115, /110, double-insulated	97000227
O	flush	2mm	1.405"			/135, double-insulated	97000228
O	flush	2mm	1.425"			/145, double-insulated	97000221
O	flush	2mm	1.455"			/172, double-insulated	97000226
O	flush	1/8"	1.005				97000223
O	flush	1/8"	1.3500			/135, Q Car recess face, not insulated	97000224
O	flush	1/8"	1.3500	0.1	0.19	Q Car recess face, insulated	97000225
O	flush	1/8"	1.355	0.1		/115, 2533-6; Double insulated	97000275
O	flush	1/8"	1.4050			/135, 8177-4 PCC /135 non-insulated	97000211
O	flush	1/8"	1.4050	0.1	0.19	/135, 8191-4 PCC /135 insulated	97000212
O	flush	1/8"	1.4050	0.1	0.19	/135, 2532-6; double insulated	97000222
O	Flush	1/8"	1.4250	0.1		DbI-insulated	97000219
O	flush	1/8"	1.4250	0.1	0.2	/145, 2531-6 dbI insulated	97000213
O	flush	1/8"	1.4250	0.1	0.2	/145, 8274-4, 8275-4, 8276-4	97000219
O	flush	1/8"	1.4550	0.1	0.2	/172 insulated one side	9700272
O	flush	1/8"	1.4550	0.1	0.2	/172, 2532-6 dbI insulated	97000270
#1/Aristo	Half	6.0mm	1.0300			2564-6, etc. Aristo screw head (V.2)	
#1/LGB	flush	3/16"	2.0600				97001216
#1/LGB	flush	3/16"	2.0700			8690-4, 8691-4	97001341
#1/Ryan	blunt	1/8"	2.7350			Ryan trucks	
#1/LGB	blunt	1/8"	2.8250			8610-4 only (fit RYAN, LGB* w heels, trucks)	
		(t2=+0/-0.002)	(t5+0/-0.005)			(15mm=.0591"), (2.0mm=.0787"), (3.0mm=.1181")	

Price \$1.25 ea

10-10-2009

*LGB has nominal 3mm bore, may need to drill 1/8" to fit.



NWSL Wheels

NMRA code	NWSL code	WHEEL TREAD DIM			Where usually found
		D	T	N	
	/270	0.100	0.100	0.270	3/8, LGB, #1, Std
	/236	0.062	0.062	0.236	3/8 finescale
	/210	0.110	0.080	0.210	'O' tinplate
175	/172	0.045	0.048	0.175	'O' gauge (not tinplate)
	/145	0.045	0.035	0.150	'O' semi-finescale
	/135	0.035	0.035	0.135	'O' traction
P:48	/115	0.027	0.026	0.115	'O' finescale, S
110	/110	0.027	0.027	0.110	HO, NASG, Sn3, OO
	/88	0.025	0.025	0.088	HO n3, P:64, Sn3, Sn2, TT
87	/87	0.025	0.025	0.087	P:64
	/72	0.020	0.020	0.072	N, HO semi-finescale
	/64	0.013	0.013	0.064	P:87, N semi-finescale
	/50	0.013	0.013	0.050	N finescale, Nn3, Z

Easy modeling hint

When scaling from a prototype for your model, you can often work faster and more accurately, in these days of cheap high powered calculators, from your prototype dimension by dividing it by the ratio for your scale (ie. For a 6'-0" dimension just multiply by 12 to get an HO model dimension of .828"). This is where metrics can come in handy because decimal inch scales (rulers) are rare—multiply by 25.4 and you have 21.02mm; your mm scale allows you to easily measure 21mm.

Note: 'Std P:' refers to the Proto:(ratio) finescale gauge.

RR model scale designations, ratio & gauge										
Scale Name	Ratio	Scale to the foot	TRACK GAUGE used						Comment	
			std	Std P:	n42	nM	n3	n30		n2
Z	220	.0544"	.256							
N	160	.075"	.353	.353			.250			
TT	120	1/10" - .100"		.471						
HO	87.1	3.5mm	.649	.649		.471	.413	.353	.276	n2-1/2 uses N gauge
OO	76.2	4.0mm	.750							
S	64	3/16"	.875	.883			.563		.413	
#0-O	48	1/4"	1.25	1.177	.875		.750	.649	.500	#0 gauge aka Q scale
O17	45.2	17/64"	1.25							
#1	32	3/8"	1.768	1.766						45mm LGB=#1=Gnm
A	29		1.768							Aristo #1 gauge
#2-std	26.6	7/16" - 29/64"	2.125							Std gauge toy trains
1/2"	24	1/2"	2.5				1.77		1.25	
#3	22.5		2.5			1.772				#3 ('G') std. gauge
F	20.3			2.783			1.772			n3=#1 gauge

N scale wheels Specifications

Price \$2.00 ea

Tread	inch - mm	Z	N	TT	HO	Where used (some)	Bore	Bore	Bore	Bore
		220	160	120	87		10mm	15mm	2.0mm	3/32"
/50	.175 - 4.45	39	28	21	15	57515-4		9600000INS		96000005NS
/50	.206 - 5.23	45	33	25	18	57517-4		96000002NS		96000006NS
/50	.225 - 5.72	50	36	27	20	57518-4, 57567-4		96000003NS		96000004NS
/64	.175 - 4.45	39	28	21	15	37515-4		96000010NS		96000099NS
/64	.206 - 5.23	45	33	25	18	37517-4, 37537-4,		96000010INS		960000102NS
/64	.225 - 5.72	50	36	27	20	37518-4, 37528-4, 37538-4, 37568-4		960000103NS		960000104NS
/64	.250 - 6.35	55	40	30	22	37550-4, 37553-4, 37556-4	960000107NS	960000105NS	960000108NS	960000106NS
/64	.262—6.67		42	32	23	2678-6	960000111NS -OOS	960000109NS		960000110NS
/72	.175 - 4.45	39	28	21	15	37415-4, 37465-4	960000207NS	960000205NS		960000206NS 960000206NP
/72	.206 - 5.23	45	33	25	18	37417-4, 37467-4		960000202NS 960000202NP		96000020INS 96000020INP
/72	.225 - 5.72	50	36	27	20	37418-4, 37450-4, 37468-4		960000203NS 960000203NP		960000204NS 960000204NP
/72	.250 - 6.35	55	40	30	22	2675-6, 37450-4	960000210NS	960000208NS 960000208NP		960000209NS 960000209NP
/72	.262—6.67		42	31	23	2676-6	960000213NS	960000212NS		960000211NS

HO scale wheels

Specifications

Price \$2.00 ea

Tread	inch - mm	N	TT	HO	OO	S	O	Where used (some)	Bore	Bore	Bore	Bore
		160	120	87	76	64	48		15mm	2.0mm	3/32"	.120"
164	.275 - 7.00	44	33	24	21	18		37393-4		93000184NS		93000185NS
164	.299 - 7.59	48	36	26	23	19		37653, 37363-4	93000169NS	93000186NS	93000168NS	93000187NS
164	.322 - 8.18	51	39	28	25	21		37605, 37615, 37655, 37665, 37675, 57605-4	96000100NS	93000189NS		93000188NS
164	.345 - 8.76		41	30	26	22		37606-4		93000190NS		93000191NS
164	.379 - 9.63		45	33	29	24		37607, 37617, 37667, 37677, 37687, 57607-4	93000177NS	93000178NS	93000170NS	93000179NS
164	.414 - 10.52			36	32	26	20	37608, 37618, 37638, 37643, 37645, 37658-4	93000183NS	93000182NS	93000181NS	93000180NS
164	.437 - 11.10			38	33	28	21	37236-4		93000177NS	93000175NS	93000176NS
164	.460 - 11.68			40	35	29	22	37609, 37691, 37639, 37641-4	93000195NS	93000193NS	93000112NS	93000194NS
164	.483 - 12.27			42	37	31	23	37692-4, 37640-4, 37642-4	93000192NS		93000115NS	
164	.516 - 13.11			45	39	33	25	37644-4	93000178NS	93000197NS	93000196NS	
172	.275 - 7.00	44	33	24	21	18			93000198NS	Avail	Avail	93000199NS
172	.299 - 7.59	48	36	26	23	19		37343-4		93000205NS	93000203NS	93000204NS
172	.379 - 9.63		45	33	29	24				93000201NS	93000211NS 93000211NP	93000200NS 93000200NP
172	.414 - 10.52			36	32	26			93000206NS		93000207NS 93000207NP	93000209NS 93000209NP
188	.275 - 7.00	44	33	24	21	18		37302-4, 37312-4, 37322-4		93000400NS 93000400NP	93000401NS	93000402NS 93000402NP
188	.299 - 7.59	48	36	26	23	19		37203-4, 37213-4, 37223-4		93000404NS	93000405NS 93000405NP	93000403SS
188	.322 - 8.18	51	39	28	25	21		37205, 37215, 37225, 37265, 37303, 37313, 37323-4		93000408NS	93000406NS 93000406NP	93000407SS
188	.345 - 8.76	55	41	30	26	22		37216-4	93000412NS	93000409NS	93000411NS 93000411NP	93000410NS 93000410NP
188	.379 - 9.63		45	33	29	24		37207, 37217, 37227, 37267, 37287-4	93000434NS	93000416NS	93000415NS 93000415NP	93000417NS
188	.414 - 10.52			36	32	26	20	37208, 37218, 37228, 37268, 37288-4	93000419NS	93000420NS	93000431NS 93000431NP	93000418NS 93000418NP
188	.437 - 11.10			38	33	28	21	37236-4	93000433NS	93000421NS	93000432NS 93000432NP	93000422NS 93000422NP
188	.460-11.10			40	35	29	22	37229, 37239, 37241, 37291-4	93000423NS	93000425NS	93000426NS 93000426NP	93000424NS 93000424NP
188	.483-12.27			42	37	31	23	37240-4, 37242-4, 37292-4	93000430NS	93000429NS	93000427NS 93000427NP	93000428NS 93000428NP
188	.483-12.27			45	39	33	24		93000499NS		93000498NS	

HO scale wheels

Specifications, cont'd

Price \$2.00 ea

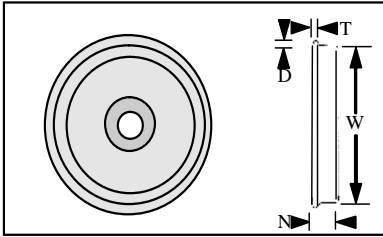
Tread	inch - mm	N	TT	HO	OO	S	O	Where used (some)	Bore	Bore	Bore	Bore
		160	120	87	76	64	48		15mm	2.0mm	3/32"	.120"
/110	.275 - 7.00		33	24	21	18				93000501NS	93000500NS	93000502NS
/110	.299 - 7.59		36	26	23	19		37103, 37113, 37123-4		93000503SS	93000504NS 93000504NP	93000505SS
/110	.299 - 7.59		36	26	23	19		PCC FACE		93000532NS	93000510NS 93000510NP	93000509NS 93000509NP
/110	.322 - 8.18		39	28	25	21		37105, 37115, 37125, 37165-4	93000606NS	93000508NS	93000506NS 93000506NP	93000507NS 93000507NP
/110	.345 - 8.76		41	30	26	22		37106-4		93000513NS	93000512NS 93000512NP	93000511NS 93000511NP
/110	.379 - 9.63		45	33	29	24	18	37107, 37117, 37127, 37167, 37187, 37741, 37743, 37745, 37850-4	93000531SS	93000515SS	93000514SS	93000516SS
/110	.414 - 10.52			36	32	26	20	37108, 37118, 37128, 37168, 37188, 37740, 37742, 37744-4	93000530SS	93000519SS	93000517SS	93000518SS
/110	.437 - 11.10			38	33	28	21	37135-4, 37136-4		93000520NS	93000534NS 93000534NP	93000521NS 93000521NP
/110	.460-11.68			40	35	29	22	37109, 37119, 37129, 37131, 37139, 37141-4	93000529SS	93000524SS	93000523SS	93000522SS
/110	.483-12.27			42	37	31	23	37110, 37120, 37130, 37132, 37140, 37142, 37192-4	93000527SS	93000526SS	93000528SS	93000525SS
/110	.516-13.11			45	39	33	24	37802, 37842, 37892, 37894, 37144, 37707, 37717, 37737-4	93000604NS	93000603NS	93000602NS 93000602NP	93000601NS 93000601NP

S scale wheels

Specifications

Price \$2.00 ea

Tread	inch - mm	HO	OO	S	O	Where used (some)	Bore	Bore	Bore	Bore
		87	76	64	48		15mm	2.0mm	3/32"	.120"
/87	.516 - 13.11	45	39	33	24	57707-4, 57717-4, 37244-4	n/a	96000543NS	96000541NS	96000542NS
/87	.563 - 14.30	49	43	36	26	57708-4, 57718-4		n/a	96000544NS	96000545NS
/87	.625 - 15.88	54	48	40	30	57709-4			96000546NS	96000547NS
/110	.516-13.11	45	39	33	24	37802, 37842, 37892, 37894, 37144, 37707, 37717, 37737-4	93000604NS	93000603NS	96000534NS 96000534NP	96000536NS 96000536NP
/110	.563-14.30	49	43	36	27	37708-4, 37718-4, 37738-4			96000602NS 96000602NP	96000607NS 96000607NP
/110	.625-15.88	54	48	40	30	37709-4, 37729-4, 37896-4			96000603NS-OOS 96000603NP	96000604NS-OOS 96000604NP

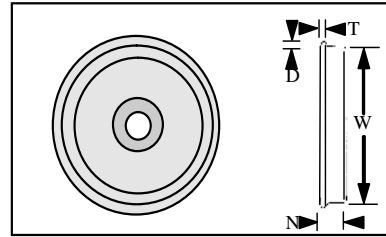


NWSL Wheel O scale Specifications

Tread	inch - mm	Z	N	TT	HO	OO	S	O	Where used (some)	Bore	Bore	Price
		220	160	120	87	76	64	48		1/8"	3.0mm	
/115	542-13.77						35	26	8160, 8165, 8260, 8340, 8330, 8320, 8350-4	96000610		\$2.50
/115	542-13.77						35	26	PCC flat face	96000611		\$2.50
/115	583-14.81						37	28	PCC flat face	96000617		\$2.50
/115	583-14.81						37	28	8341, 8331, 8325, 8355, 8375, 8385, 8365-4	96000616		\$2.50
/115	625-15.88						40	30	8147, 8164, 8169, 8342, 8332, 8324, 8354-4	96000612		\$2.50
/115	688-17.48						44	33	8148, 8161, 8166, 8224, 8220, 8261, 8343-4	96000613		\$2.50
/115	750-19.05						48	36	8149, 8162, 8167, 8225, 8221, 8262, 8344-4	96000614		\$2.50
/115	833-21.16						53	40	8163, 8168, 8226, 8222, 8263, 8345, 8323-4, Atlas F9/ RC GP 9 8305-4, 2611-6, 2613-6	96000615	96000620	\$2.50
/135	458-11.63							22	8192-4, 8172-4	96000700		\$2.50
/135	500-12.7							24	8193-4, 8174-4	96000701		\$2.50
/135	542-13.77							26	PCC flat face 8140-4, 8126-4	96000722		\$2.50
/135	542-13.77							26	PCC recess face (Q Car)	96000672		\$2.50
/135	542-13.77							26	8194-4, 8176-4, 8141-4, 8127-4, 8191-4	96000724		\$2.50
/135	583-14.81							28	8195-4, 8178-4, 8142-4, 8128-4	96000725		\$2.50
/135	625-15.88							30	8196-4, 8180-4, 8143-4, 8130-4	96000726	96000728	\$2.50
/135	651-16.54							31		96000727		\$2.50
/135	688-17.48							33	8197, 8183, 8144, 8133, 8187, 8245, 8233-4	96000721		\$2.50
/135	750-19.05							36	8198, 8186, 8145, 8136, 8188, 8246, 8236-4	96000729		\$2.50
/135	833-21.16							40	8199, 8190, 8146, 8247, 8240-4	96000731		\$2.50
/145	542-13.77							26	PCC flat face			\$2.50
/145	542-13.77							26	8250-4, 8274-4, 8284-4	96000800		\$2.50
/145	583-14.81							28	8255-4, 8275-4, 8285-4	96000802		\$2.50
/145	625-15.88							30	8254-4, 8276-4, 8286-4	96000803		\$2.50
/145	688-17.48							33	8134, 8214, 8248, 8251, 8256, 8265, 8267-4	96000804		\$2.50
/145	750-19.05							36	8135, 8215, 8249, 8252, 8260, 8266, 8268-4	96000806		\$2.50
/145	792-20.11							38		96000807		\$2.50
/145	833-21.16							40	8216-4, 8253-4, 8279-4, 8289-4, Atlas F9/ RC GP 9 8206-4	96000808		\$2.50
/145	875-22.23							42	8272-4	96000809		\$2.50
/145	916-23.28							44		96000811		\$2.50
/172	583-14.81							28	8855-4, 8875-4	96000900		\$2.50
/172	625-15.88							30		96000907		\$2.50
/172	688-17.48							33	8848, 8851, 8856, 8865, 8867, 8869, 8877-4	96000902		\$2.50
/172	750-19.05							36	8849, 8852, 8857, 8866, 8868, 8871, 8878-4	96000903		\$2.50
/172	833-21.16							40	8853-4, 8889-4, Atlas F9/ RC GP 9 8806-6	96000904		\$2.50
/172	875-22.23							42	8858-4	96000901		\$2.50
/172	1005"							48		96000909		\$4.50
/210	651-16.54							31		96000910		\$2.50
/210	688-17.48							33	8751-4, 8787-4	96000912		\$2.50
/210	750-19.05							36	8752-4, 8788-4	96000911		\$2.50
												\$2.50

NWSL Wheel

Large scale Specifications



Tread	inch - mm	3/8	A	Std	1/2	G	F	Where used (some)	Material	Bore	Bore	Price
		1:32	1:29	1:26.6	1:24	1:22.5	1:20.3			5/16"	6mm	
/172	.875"	28	25	23	21	20	18		NP	96001806		\$3.00
/172	1.031"	33	30	27	25	23	21	78662-4, 78672-4, 78682-4	NS	96001807		\$3.00
										OOS		
/172	1.125"	36	33	30	27	25	23	78661-4, 78671-4,	NS	96001808		\$3.00
/172	1.250"	40	36	33	30	28	25	2562-6, 2564-6, 2606-6	NP	96001809		\$3.00
										OOS		
												\$3.00
/236	.875"	28	25	23	21	20	18	28673-4, 68673-4	NP	96001908		\$3.00
/236	.875"	28	25	23	21	20	18		NS	96001901		\$3.00
/236	1.031"	33	30	27	25	23	21	28672-4, 68672-4	NS	96001902		\$3.00
										OOS		
/236	1.125"	36	33	30	27	25	23	68671-4	NS	96001903		\$3.00
										OOS		
/236	1.250"	40	36	33	30	28	25		NP	96001904		\$3.00
/236	1.250"	40	36	33	30	28	25		NP		96001907	\$3.00
/236	1.250"	40	36	33	30	28	25		NS	96001909		\$3.00
/236	1.250"	40	36	33	30	28	25		NS		96001913	\$3.00
/236	1.281"	41	37	34	31	29	26	28611-4, 68611-4	NP	96001905		\$3.00
/236	1.281"	41	37	34	31	29	26		NS	96001910		\$3.00
/236	1.379"	44	40	37	33	31	28		NS		96001906	\$3.00
/236	1.379"	44	40	37	33	31	28		NS	96001911		\$3.00
										OOS		
												\$3.00
/270	.875"	28	25	23	21	20	18	8673-4	NP	96001001		\$3.00
										OOS		
/270	.875"	28	25	23	21	20	18		NS	96001008		\$3.00
/270	1.031"	33	30	27	25	23	21	8618-4, 8672-4, 58618-4, 58672-4	NP	96001002		\$3.00
/270	1.031"	33	30	27	25	23	21		NS	96001009		\$3.00
/270	1.125"	36	33	30	27	25	23	8615-4, 8617-4, 8671-4, 58615- 4, 58617-4, 58671-4, 2607-6	NP	96001003		\$3.00
/270	1.125"	36	33	30	27	25	23		NS	96001010		\$3.00
/270	1.250"	40	36	33	30	28	25		NP	96001004		\$3.00
/270	1.250"	40	36	33	30	28	25		NS	96001011	96001012	\$3.00
/270	1.250"	40	36	33	30	28	25		SS		96001013	\$3.00
/270	1.281"	41	37	34	31	29	26	58611-4	NS	96001005		\$3.00
/270	1.379"	44	40	37	33	31	28		NS	96001006	96001007	\$3.00