

When the Protofour 4mm/1ft scale standard track and wheel dimensions were finalised by the Model Railway Study Group in March 1966, many modellers in other scales expressed a desire to adopt the Protofour concept of authentic modelling. Investigation by the Group resulted in Proto-standards, and associated data, being computed for sixteen of the scales in common use throughout the world. With the exception of the basic Protofour 4mm/1ft, these scales fall into six groups, each centred upon a nominal track gauge and having variations of scale within each group according to country of origin. Since there were, even then, clear indications that the appeal of the Protofour concept was becoming an international one, a rationalisation of the basic scales was obviously necessary to avoid confusion.

Broadly speaking the situation was as follows. British scales are traditionally based on metric equivalents of imperial feet, with track gauges adopted from other countries. As a consequence these track gauges are generally out of scale. Whereas the American scales use inch fractions or decimal equivalents of feet with near scale track gauges, the European scales are expressed as round figure ratios, or proportions, of the prototype and have virtually correct-scale track gauges. Furthermore the European series of scales is more evenly spaced, and achieves a near consistent (approximately two-fold) area ratio for adjacent steps in the scale series.

In attempting to resolve the problem of rationalisation many factors were borne in mind; firstly, the obvious need to retain the Protofour 4mm/1ft scale as the British basis of the Protofour concept. Britain, Australia and New Zealand are joining 90% of the world's population by adopting a metric system, while the United States and Canada are considering similar changes. In a generation or so imperial-based scales will not only be obsolete, but they will leave an illogical series of decimalised ratios peculiar to this country.

It seemed logical, therefore, to suggest the adoption of the European series of round figure ratios, as this also has the advantage of offering internationally accepted track gauge dimensions which are themselves virtually dead scale; the worst case of such rounding up error is only 0.35% in Proto-160, amounting to less than 0.032mm over-gauge.

Six scales other than the basic Protofour 4mm/1ft scale have been selected for adoption as basic scales and these are termed the "Preferred Proto-ratios". The accompanying table is headed with the basic Protofour standards, followed by the track and wheel dimensions, with tolerances as necessary, for the six preferred Proto-ratios. For consistency these dimensions and tolerances are directly proportional to the Protofour dimensions. It is important to emphasise that although the preferred ratios give decimalised metric/imperial feet scales, the provision of conversion tables, charts and prototype information compiled by the Study Group completely eliminates the often quoted "problem" of metrication. One very important aspect of the preferred ratios is that it will be possible for modellers in other than 4mm/1ft scale to continue using their traditional track gauges, but with turnouts and wheels correctly scaled to the appropriate Proto-standard for improved appearance and performance.

Research and the development of products to the preferred ratios is continuing within the Study Group and the Protofour Society. Comments and enquiries on any aspect of the standards and their use will be welcomed, and should be addressed to the M.R.S.G., c/o The Editor of "Precision", the Journal of the Protofour Society.

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STANDARD DIMENSIONS FOR PROTOFOUR

				mm	in
1	Track Gauge	TG	min.	18.83	0.741
2	Gauge Widening	GW	max.	0.22	0.009
3	Check Gauge	CG	min.	18.15	0.715
4	Crossing Flangeway	CF	max.	0.68	0.027
5			min.	0.65	0.026
6	Between Checks	BC	max.	17.47	0.688
7	Effective Flange	EF	max.	0.40	0.016
8			min.	0.35	0.014
9	Wheel Back to Back	BB	max.	17.75	0.699
10			min.	17.67	0.696
11	Tyre Width	TW	max.	2.00	0.079
12			min.	1.85	0.073

STANDARD DIMENSIONS FOR PREFERRED PROTO-RATIOS

PROTO-160 (N - gauge)

			mm	in
1	TG	min.	9.00	0.354
2	GW		0.11	0.004
3	CG	min.	8.68	0.342
4	CF	max.	0.32	0.013
5		min.	0.31	0.012
6	BC	max.	8.35	0.319
7	EF	max.	0.19	0.008
8		min.	0.17	0.007
9	BB	max.	8.48	0.334
10		min.	8.45	0.333
11	TW	max.	0.95	0.038
12		min.	0.88	0.035

Scale 1.905mm to 1ft

PROTO-64 (S - gauge)

			mm	in
1	TG	min.	22.50	0.886
2	GW		0.26	0.010
3	CG	min.	21.69	0.854
4	CF	max.	0.81	0.032
5		min.	0.77	0.031
6	BC	max.	20.88	0.822
7	EF	max.	0.48	0.019
8		min.	0.42	0.016
9	BB	max.	21.21	0.835
10		min.	21.12	0.831
11	TW	max.	2.38	0.094
12		min.	2.20	0.087

Scale 4.76mm (3/16") to 1ft

PROTO-120 (TT - gauge)

			mm	in
1	TG	min.	12.00	0.472
2	GW		0.14	0.006
3	CG	min.	11.57	0.456
4	CF	max.	0.43	0.017
5		min.	0.41	0.016
6	BC	max.	11.13	0.438
7	EF	max.	0.25	0.010
8		min.	0.22	0.009
9	BB	max.	11.31	0.445
10		min.	11.26	0.443
11	TW	max.	1.27	0.050
12		min.	1.18	0.046

Scale 2.54mm (1/10") to 1ft

PROTO-45 (O - gauge)

			mm	in
1	TG	min.	32.00	1.260
2	GW		0.37	0.015
3	CG	min.	30.84	1.214
4	CF	max.	1.15	0.045
5		min.	1.10	0.043
6	BC	max.	29.69	1.169
7	EF	max.	0.68	0.027
8		min.	0.59	0.023
9	BB	max.	30.17	1.188
10		min.	30.03	1.182
11	TW	max.	3.39	0.133
12		min.	3.13	0.123

Scale 6.77mm to 1ft

PROTO-87 (HO - gauge)

			mm	in
1	TG	min.	16.50	0.650
2	GW		0.19	0.008
3	CG	min.	15.90	0.626
4	CF	max.	0.60	0.023
5		min.	0.57	0.022
6	BC	max.	15.31	0.603
7	EF	max.	0.35	0.014
8		min.	0.31	0.012
9	BB	max.	15.55	0.612
10		min.	15.48	0.610
11	TW	max.	1.75	0.069
12		min.	1.62	0.064

Scale 3.503mm to 1ft

PROTO-32 (1 - gauge)

			mm	in
1	TG	min.	45.00	1.772
2	GW		0.52	0.021
3	CG	min.	43.37	1.708
4	CF	max.	1.62	0.064
5		min.	1.55	0.061
6	BC	max.	41.75	1.644
7	EF	max.	0.95	0.038
8		min.	0.83	0.033
9	BB	max.	42.42	1.670
10		min.	42.23	1.663
11	TW	max.	4.76	0.188
12		min.	4.41	0.173

Scale 9.525mm (3/8") to 1ft