MOROP	Normen Europäischer Modellbahnen **Ratio, Scale, and Gauge**	**NEM** **010** 1 Page

Standard **(Measurements in mm)** **Published 1987**

1. This standard establishes the allocation and designation of the ratios and gauges of model railways .

2. The relative size of railway models is expressed by the term "scale." Each scale ratio is given a "name" which consists of one or more letters or a Roman numeral (table 1). The distance between the rails of a railway (model or prototype) is indicated by the term "gauge." In the model world, the various prototype track gauges are grouped in four subsets. The scale without auxiliary letter denotes all "standard" track gauges 1250mm and larger. Models of narrow-gauge railways having prototype gauges less than 1250mm are designated by one of three auxiliary letters **m**, **e**, or **i** appended to the scale. For this combined scale and gauge designation the term "gauge" is used.

Examples : Modeling a standard guage railway at 1 : 87 ratio: H0 Scale, H0 (Standard) Gauge (Track Guage 16.5mm)

Modeling a meter-gauge railway at 1 : 45 ratio: 0 Scale, 0m (Meter) Gauge (Track Guage 22.5mm)

Table 1

Ratio[1) 2)]	Scale Meter in mm	Scale	Corresponding model gauge for given prototype gauge			
			1250 to1700	850 to< 1250	650 to< 850	400 to< 650
1 : 220	4,5	Z	6,5	-	-	-
1 : 160	6,3	N	9	6,5	-	-
1 : 120	8,3	TT	12	9	6,5	-
1 : 87	11,5	H0	16,5	12	9	6,5
1 : 64	15,6	S	22,5	16,5	12	9
1 : 45 [3)]	22,2	0	32	22,5	16,5	12
1 : 32	31,3	I	45	32	22,5	16,5
1 : 22,5	44,4	II	64	45	32	22,5
1 : 16	62,5	III	89	64	45	32
1 : 11	90,9	IV	127	89	64	45
1 : 8	125,0	V	184	127	89	64
1 : 5,5	181,8	VI	260	184	127	89
Auxiliary letter to be appended to the scale:			-	m	e	i

Notes:
[1)] Individual functional components can deviate from established standards which, in turn, may be outside of tolerance values specified in applicable datasheets.
[2)] For broad-gauge (prototype track gauge greater than 1435mm), scale can be computed starting with the track gauge (prototype compared to model). This can be particularly useful for scales greater than scale I.
[3)] In some countries the ratio 1 : 43,5 is used. In such case, a scale meter equals 23,0 mm.

3. Previously, the track gauges specified in table 1 corresponded to the following:

mm	32	45	64	89	127	184	260
Gauge (in inches)	1 ¼	1 ¾	2 ½	3 ½	5	7 ¼	10 ¼

4. Besides the track gauges listed in Table 1, large scale exhibition models of standard gauge railway vehicles are often built to the gauges 72mm and 144mm (being respectively 1:20 and 1:10 ratio).

5. The model ratios specified in table 1 differ somewhat from those used in earlier years. Also, it was sometimes the practice to measure track gauge as the distance between the center (electrical pick-up) rail and the outer (running) rail.
Prior to 1950, H0 scale and 00 scale were indistinguishable. Today, 00 scale is largely confined to Great Britain and indicates 1:76 ratio models running on 16.5mm gauge track.

Previously, Gauge II indicated 1:27 ratio models and 51mm gauge track; this ratio and gauge is no longer common.

6. In Anglo-Saxon countries, the ratio is often expressed in terms of "mm per foot." For example, the ratio indicated by the terminology 3,5mm scale is 1:87, 4mm scale is 1:76, and 7mm scale is 1:43,5.

7. To convert measurements from one scale into another determine the multiplicative factor by dividing the design ratio by the desired scale ratio. The example below shows the conversion factor from 0 to H0 scale.

Example: Drawing M 1 : 45 Multiplicative factor $= \frac{45}{87} = 0.517$ (or 51.7%)
Model M 1 : 87

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