Recommendation · **Measurements in mm** · **1990 Edition**
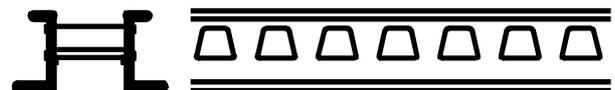
1. Purpose

This standard specifies the dimensions necessary to ensure proper function of cog traction. ISO standards for involute teeth are hereby taken into account for the purpose of using typically available tools.

2. Prototype Systems

2.1 Riggenbach System

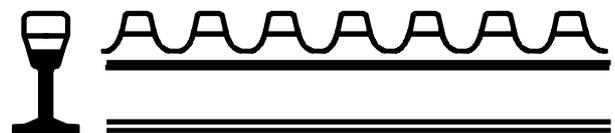Ladder-shaped rack with teeth welded or riveted in between.

Pitch = 100 mm

2.2 Strub System

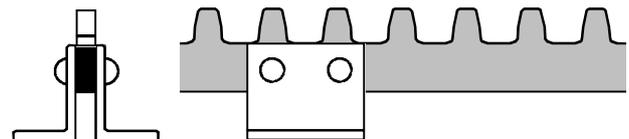Machined rack with wedge-shaped teeth.

Pitch = 100 mm.

2.3 Von Roll System
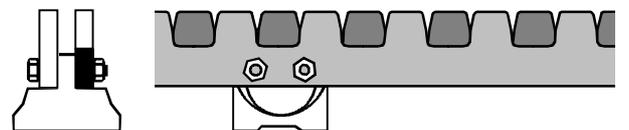
Single blade gear rack up to 120 mm thick.

Pitch = 100 mm.

2.4 Abt System

Double blade gear rack with blades up to 35 mm thick.

Pitch = 120 mm. Each blade is staggered approx. 60 mm from the other.

2.5 Other Systems

The **Klose** design does not differ significantly from the Riggenbach system.

The **Marsch** (ladder-shaped rack with round gear bars) and **Locher** systems (horizontally oriented double-blade gear rack with 85 mm pitch) are outside the purview of this standard.

3. Height of the Gear Racks

In mixed adhesion/cog traction, in order to navigate points the outer diameter of the cog wheel (the tip of the gear teeth) must lie above the top of the rail (TOR). The height may vary, even among prototype railroads using the same system, so that compatibility of traction equipment in many cases is not possible.

In pure cog railroad systems, it is possible to reduce the height of the gear rack, although this requires a more complicated points design.

Apart from the potential difference in height of the gear rack, the Riggenbach, Strub, and von Roll systems are otherwise basically compatible.

4.   Terms

Pitch Circle	tk	Theoretical rolling radius between two cog wheels or between a cog wheel and a gear rack.
Pitch	t	Distance between two adjacent gear spaces on the at their respective pitch circles or at the pitch line

Module $m = t/\pi$ $(\pi = 3.1416)$

Crown Height $h_k = m$

Foot Height $h_f = 1.166 \cdot m$

Tooth Height $h = h_{f} + h_{k} = 2.166 \cdot m$

Number of Teeth z

Reference Diameter $d_0 = z \cdot m$

Outside Diameter $d_k = (z + 2) \cdot m$

Distance of Pitch Line over TOR a

Width of Teeth on the Cogwheel b
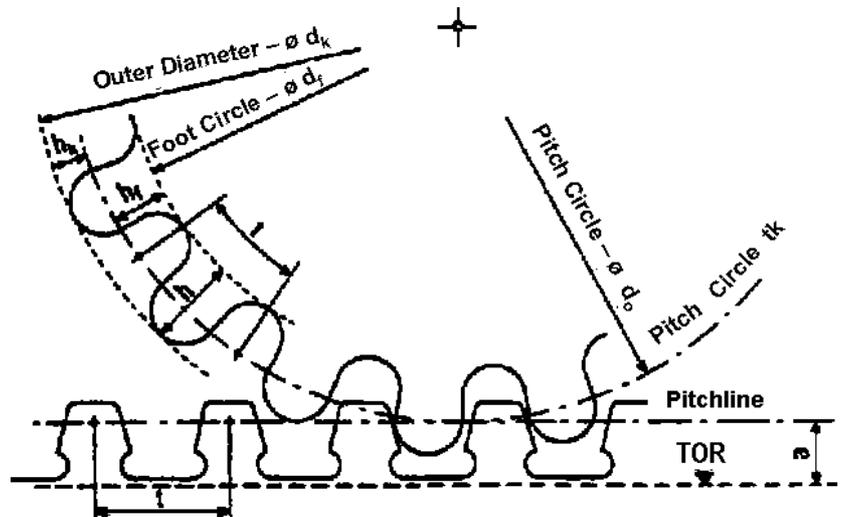
5.   Reproduction in Miniature

The gear racks are referred to by the prototype system, along with the pitch measurement:

- t 100   Riggenbach / Strub / von Roll
- t 120   Abt

In contrast with the prototype, for the sake of interchangeability the distance between the pitch line and the TOR is fixed.

Table of Measurements

Gauge	m		a	b
	t 100	t 120		max.
H0	0,4	0,4	0,6	0,9
S	0,5	0,6	0,75	1,2
0	0,7	0,8	1,1	1,7
I	1	1,25	1,5	2,5
II	1,5	1,75	2,15	3,5
III	2	2,5	3	5
IV	3	3,5	4,35	7,25
V	4	5	6	10
VI	6	7	8,75	14,5

Note for N and TT Scale

For reliable operation of a cog railroad, module ≥ 0.4 is necessary; a more or less true scale cog rack is not achievable. If necessary, the values for HO scale may be used.