

Recommendation

Dimensions in mm

Edition 2012 (20231201)  
(First English 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. Original Systems

### 2.1 Riggerbach System

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

Pitch = 100 mm



### 2.2 Strub System

Wedge headed rail gear rack.

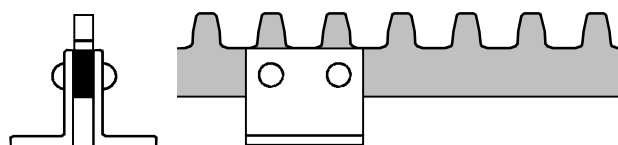
Pitch = 100 mm.



### 2.3 Von Roll System

Single blade gear rack with blades up to 120 mm thick.

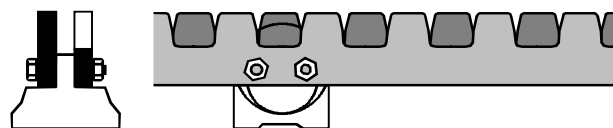
Pitch = 100 mm.



### 2.4 Abt System

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

Pitch = 120 mm. The two blades are set against each other by 60 mm.



### 2.5 Other Systems

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

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

## 3. Height of the gear racks

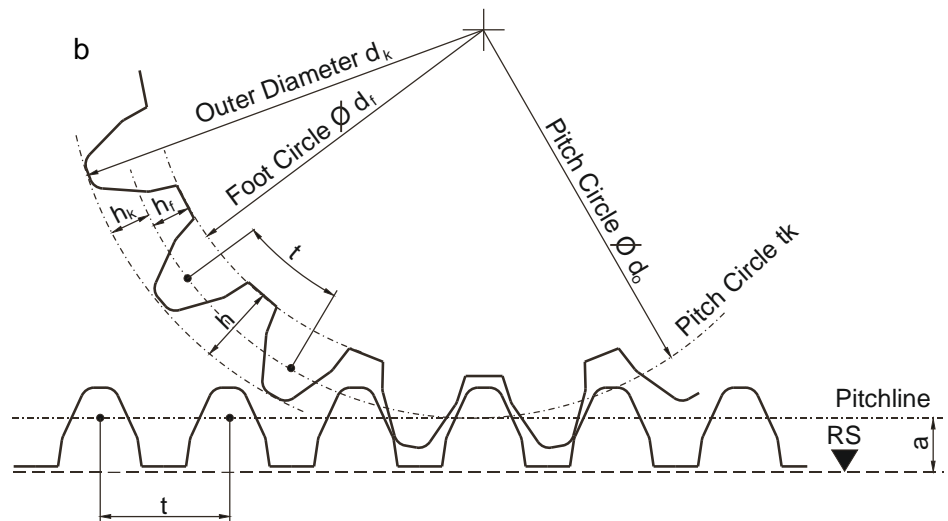
In mixed adhesion/cog traction, in order to pass switches (turnouts), the outer diameter of the cog wheel must lie above the rail surface (RS). The height may vary, even among original railroads using the same system, so that compatibility of traction equipment in many cases is not given.

In pure cog railroad systems, it is possible to reduce the height of the gear rack, although this requires a more complicated construction of switches (turnouts).

Apart from the potential difference in height of the gear rack, the Riggerbach, 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 pitch circle and on the pitch line resp.
Module	m	= $t / \pi$ ( $\pi = 3.14159$ )
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 TOP of Rail (TOR)	a	
Width of Teeth on the Cogwheel	b	



## 5. Model reproduction

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

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

In contrast with the original, for the sake of interchangeability, the distance between the pitch line and the Top of Rail (TOR) is fixed.

### Table of Measurements:

Gauge	m		a	b max.
	t 100	t 120		
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
V	3	3.5	4.35	7.25
VII	4	5	6	10
X	6	7	8.75	14.5

### Note for N and TT Scale:

For reliable operation of a cog railroad, module  $\geq 0.4$  is necessary; a more or less true scale cog rack is not achievable. If necessary, the values for H0 scale must be used.