

# Unknown involute gear



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Global Application Knowledge Management

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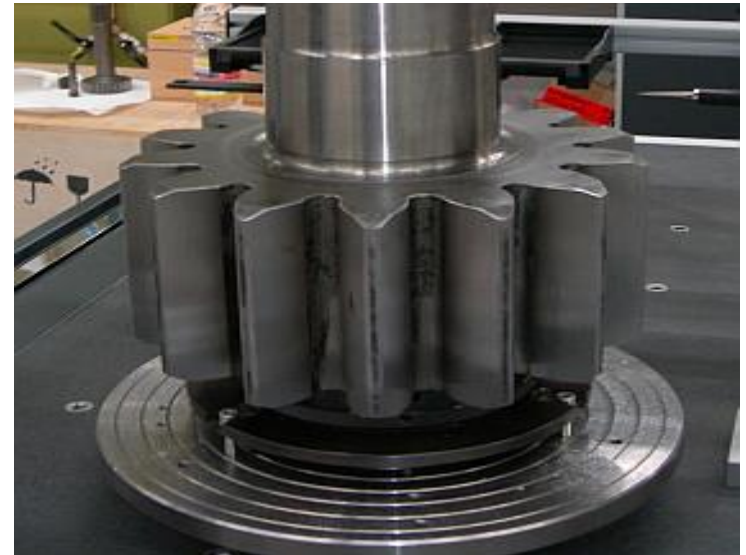
# Work piece and Measurement Task

Who is the customer?

Any customer with unknown gear

What are the requirements of the customer?

Reverse engineering or old gears without data



# Inspection Specials

Preparations:

**Count and measure**

1. Number of teeth  $z$
2. Tip and root diameter  $d_f$   $d_a$
3. Helix angle

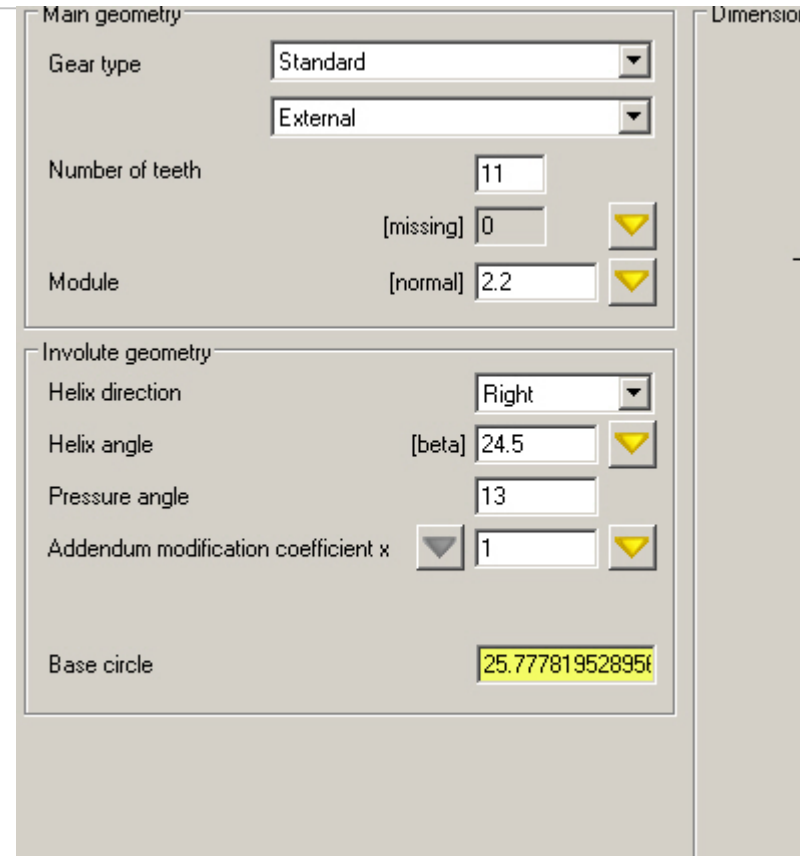
**Calculate module by**

$$(d_a + d_f) / z = d$$

$$d / z = m$$

**Or measure pitch and  $m = p/Pi$**

**The changes of module, helix angle and pressure angle are valid for the geometry ( base circle diameter)**



**Main geometry**

Gear type: Standard

External

Number of teeth: 11

[missing]: 0

Module: [normal] 2.2

**Involute geometry**

Helix direction: Right

Helix angle: [beta] 24.5

Pressure angle: 13

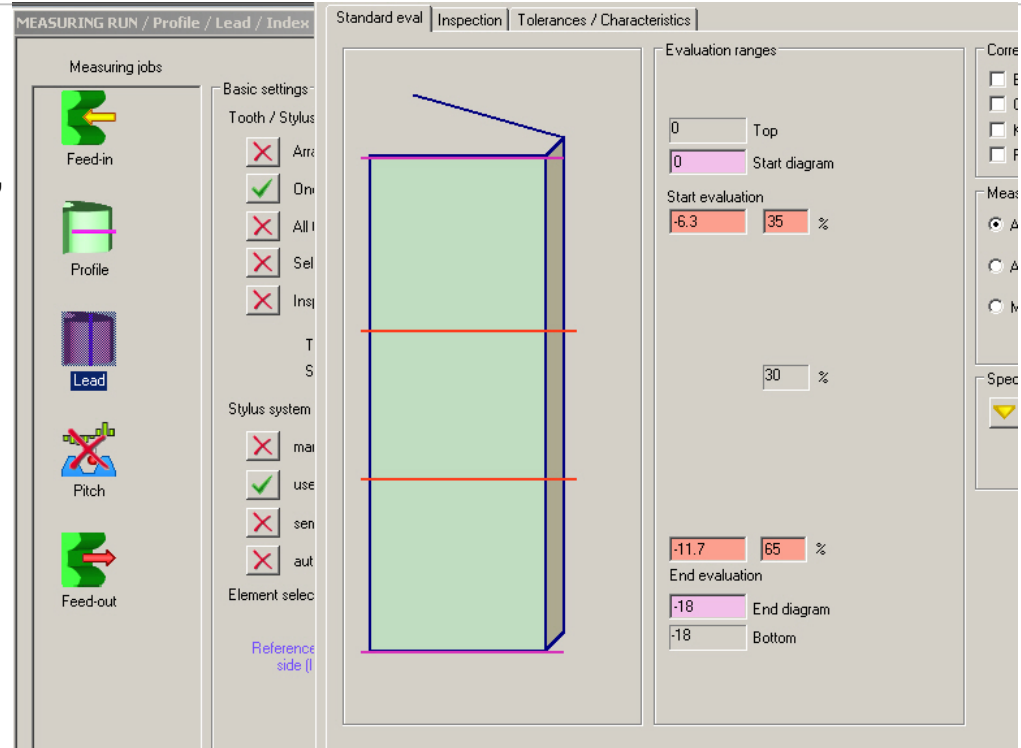
Addendum modification coefficient x: 1

Base circle: 25.777819528956

# Inspection Specials

## Defining the measuring job:

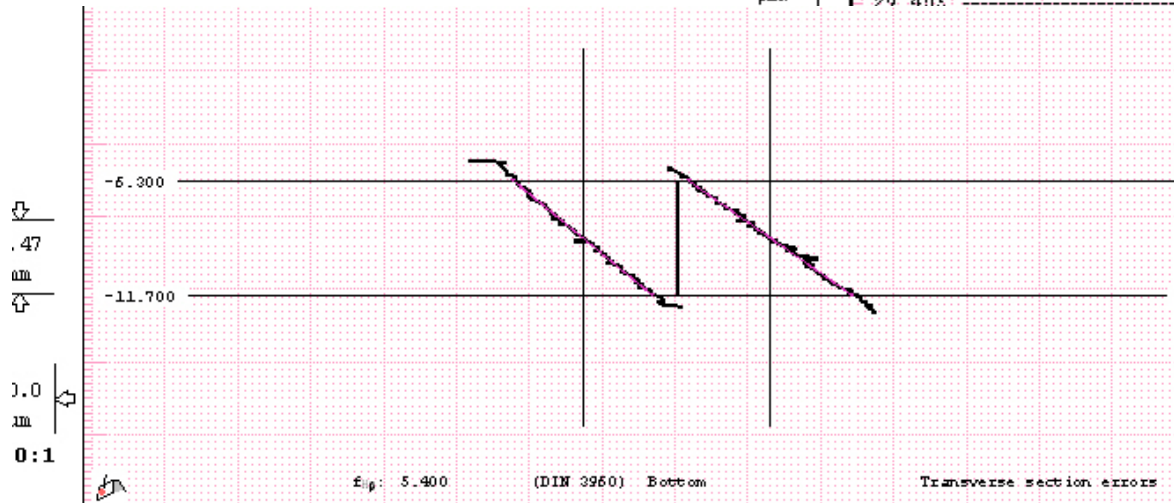
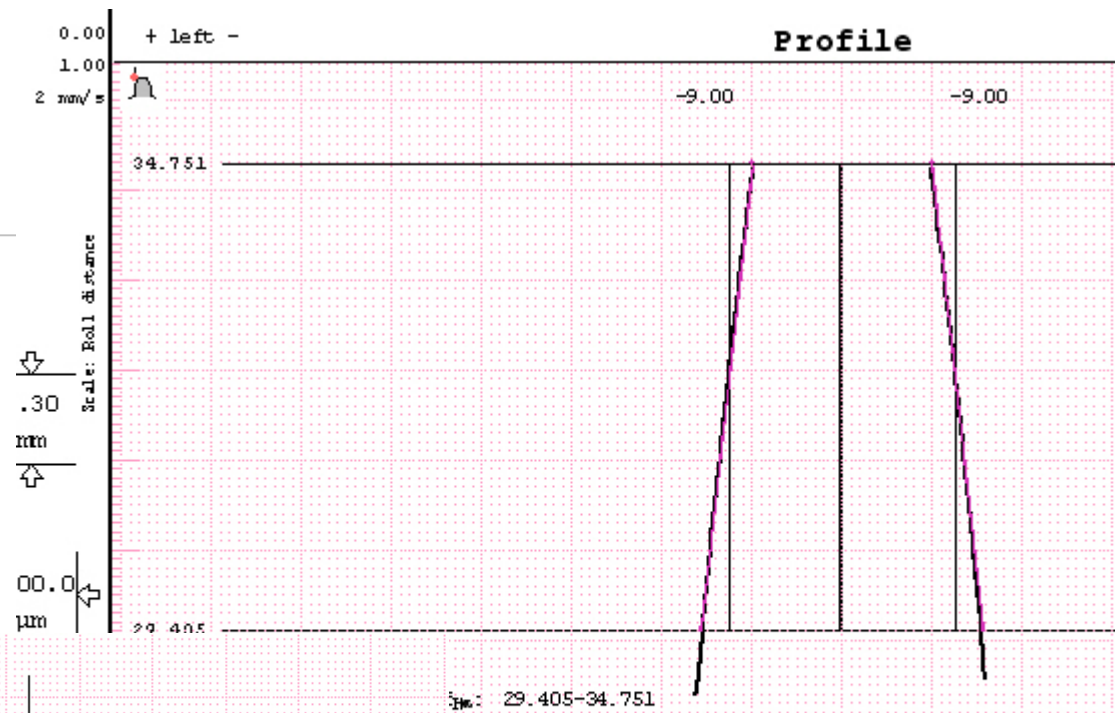
1. Feed in with tooth thickness correction, profile 1 tooth, lead 1 tooth and reduced lead measurement, no pitch measurement



# Inspection Specials

First attempt :

Profile error  $-570 \mu$  on a diameter distance of 5.35 mm



	1	Q <sub>a</sub>	Q <sub>a</sub>	1
	560	>12	>12	554
	23	10	10	27
	-570	>12	>12	-567

	Q <sub>n</sub>	[...]	1	Q <sub>a</sub>	Q <sub>a</sub>	1	Q <sub>n</sub>	[...]
μm	6	9	75	12	12	90	6	
μm	6	6	9	9	10	15	6	
μm	6	±8	76	12	12	89	6	

# Inspection Specials

For more information about helix angle and base circle you have to change to listform.frm

With later evaluation you can modify the gear data and see the result

		Base cylinder						°		mm	µm
Right flank:		$D_{b\ min}$ =	25.91	$D_{b\ max}$ =	25.91	$D_{b\ min}$ =	25.91	$R_{fb}$ =	0.00		
		$e_b$ =	0.00	$\psi$ =	4.71	$f_{fp}$ =	567	$f_{\alpha}$ =	-257		
Left flank:		$D_{b\ min}$ =	25.89	$D_{b\ max}$ =	25.89	$D_{b\ min}$ =	25.89	$R_{fb}$ =	0.00		
		$e_b$ =	0.00	$\psi$ =	4.71	$f_{fp}$ =	570	$f_{\alpha}$ =	-259		
		Helix angle						°		mm	µm
Right flank:		$\beta_m$ =	27.039	$\beta_{max}$ =	27.039	$\beta_{min}$ =	27.039	$R_{\beta}$ =	0.000		
		$\Omega$ =	0.000	$\psi$ =	270.00	$f_{fp}$ =	1138				
Left flank:		$\beta_m$ =	26.924	$\beta_{max}$ =	26.924	$\beta_{min}$ =	26.924	$R_{\beta}$ =	0.000		
		$\Omega$ =	0.000	$\psi$ =	270.00	$f_{fp}$ =	1126				

# Inspection Specials



This is the output of the optimized unknown gear data

Main geometry		Dimension
Gear type	Standard	
	External	
Number of teeth	11	
	[missing] 0	
Module	[normal] 2.2	
Involute geometry		
Helix direction	Right	
Helix angle	[beta] 24.5	
Pressure angle	13	
Addendum modification coefficient x	1	
Base circle	25.777819528956	





# Inspection Specials



This is the output according the nominal gear data from drawing

You can see:  
The data are not the same

External

Number of teeth: 11

[missing]: 0

Module: [normal] 2.25

Involute geometry

Helix direction: Right

Helix angle [beta]: 25

Pressure angle: 17.5

Addendum modification coefficient x: 0.733

Base circle: 25.79234719499

Root circle: 25

Tip circle: 35

Clearance diam: 45

GEAR PRO involute

Operator: unknown z=11

Customer: not OK

Module number	11	da	17.500"	Customer number
ra	2.250 mm	b	25.000"	Drawing number
ra	18.000 mm	q	0.733	da/da
External/Tooth	25.792 mm	ba/da	+16.200"	25.000 mm
		ba/da	+1.800 mm	

Profile

Lead

# Example Description

## Further Remarks

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Anything else to remark?



We make it visible.