



  
Springs

  
Gear and motor  
construction

  
Rollers

  
Rails

  
Foundries

  
Turbines

  
Machinery and  
tool construction

  
Skiing

**EXCELLENCE** 

IN GRINDING

**TURBINES**



## YOUR CHALLENGE

### EFFICIENT PROCESSES. CONSTANT PARAMETERS. CONSISTANT QUALITY.

Processing the fir-tree profiles for turbine blades poses complex challenges for the grinding process and especially for the grinding tools. The standards for quality are high and the influencing factors are numerous. The structural conditions of the turbine blades are particularly important. If the structure is damaged due to temperatures that are too high during the grinding process, then this item can no longer be used. There are, however, further indicators that are crucial to the efficiency of the process and they are listed here:

#### **Staying cool** (grinding temperature)

High grinding performance without damage to the structure – that is the objective when grinding the fir-tree profiles of turbine blades. Despite the addition of grinding emulsion, high temperatures on contact surfaces result when the material, machine parameters and grinding wheel are not selected and adapted by a professional.

#### **Saving and ensuring quality**

(reproducibility)

The grinding behaviour of the grinding tool should be reproducible over its entire service life and the quality should remain constant even between different batches. This will save you from constantly having to adjust the grinding parameters and will consequently reduce the risk of structural damage.

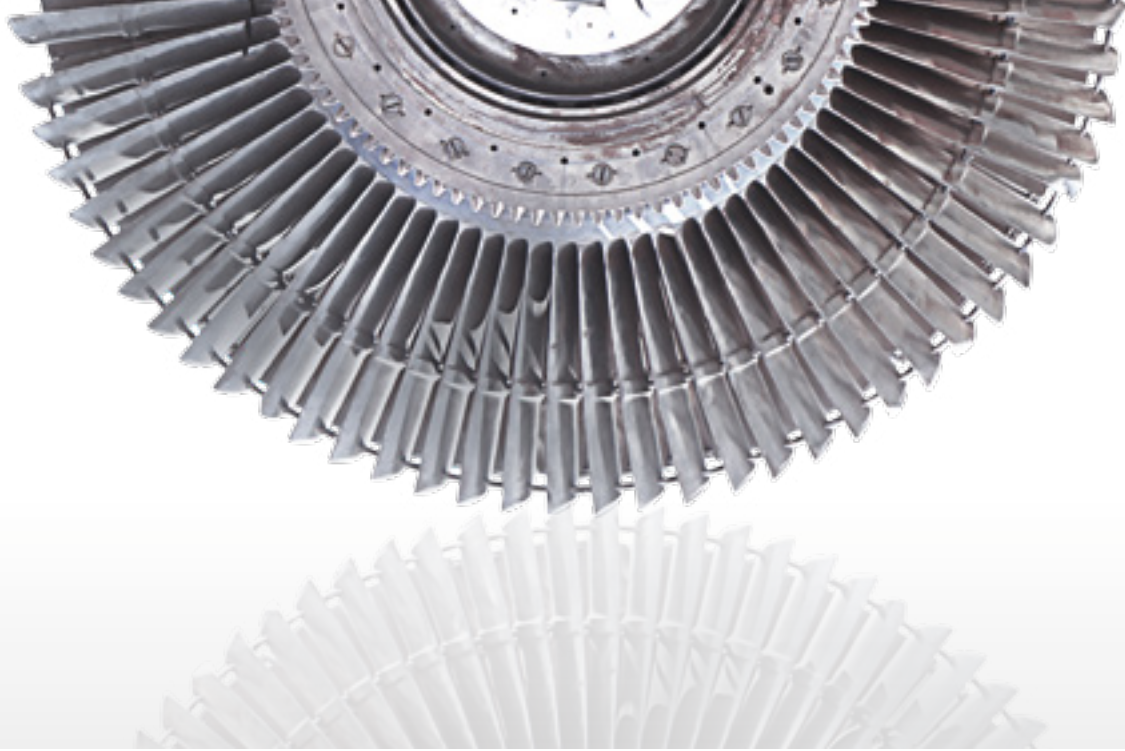
#### **A sense of proportion** (precision)

A adherence to size tolerances is extremely important. Incorrect machine parameters and the use of unsuitable grinding wheels can lead to severe dimensional and contouring inaccuracies.

#### **Optimising surfaces**

(without striae and scratches)

There are crucial requirements for finished turbine blades as regards the geometric shape and the surface roughness. Only machine parameters adapted to the process in combination with grinding wheels adjusted to the material guarantee perfect results.



### **Grinding more quickly**

(material removal per period)

Would you like to grind more efficiently? For an efficient grinding process, it is necessary to remove as much material as possible in the shortest time. An efficient grinding process is only possible if grinding tools are optimally adapted to the machine, the workpiece and the material in terms of hardness, bonding and abrasive grain.

### **Dressing less**

(dressing intervals)

In order for the aggressiveness and geometry of the grinding wheel to be preserved, grinding wheels must be dressed from time to time. This dressing process is what actually leads to the grinding wheel becoming worn down. The objective is to reduce dressing of the dressing tool in order to minimise grinding wheel consumption without a loss of aggressiveness or shape for the grinding wheel.





## OUR SOLUTIONS

THELEICO is among Europe's leading manufacturers of grinding wheels. Thanks to our know-how regarding application technology, we have developed into renowned specialists on the global market. As a specialist, we provide you with our know-how so that you can complete your job in the field of precision-oriented profile grinding not only well but also efficiently.

### **Targeted advice – we take a good, close look**

In order to guarantee the selection or development of an optimal product for your specific application, the precise evaluation of all relevant parameters in the grinding process is essential. Just as much emphasis is placed on technical top performance here as on cost-effectiveness and process reliability.

We collect your process data and help you to select the correct grinding wheel for your application. Trust in our specialists and in our over 90 years of experience in manufacturing grinding wheels.

### **Custom-made abrasive wheels for your special requirements**

Ceramic-bonded fine corundum version with or without additives as well as defined porosity for profile grinding. Or a grinding wheel formula which can absorb the heat that develops from the grinding process – our extensive product portfolio also includes the solution for your applications.

### **Large standard range or short-notice custom production**

In the extensive THELEICO portfolio, you will find a standard range with all traditional dimensions and quality grades. In addition, we have all the means for versatile and short-notice production of custom-made special products at our disposal. We guarantee the best possible selection!

For this we use raw materials from renowned suppliers with which we have already been cooperating and collaborating in product development for years or even decades.

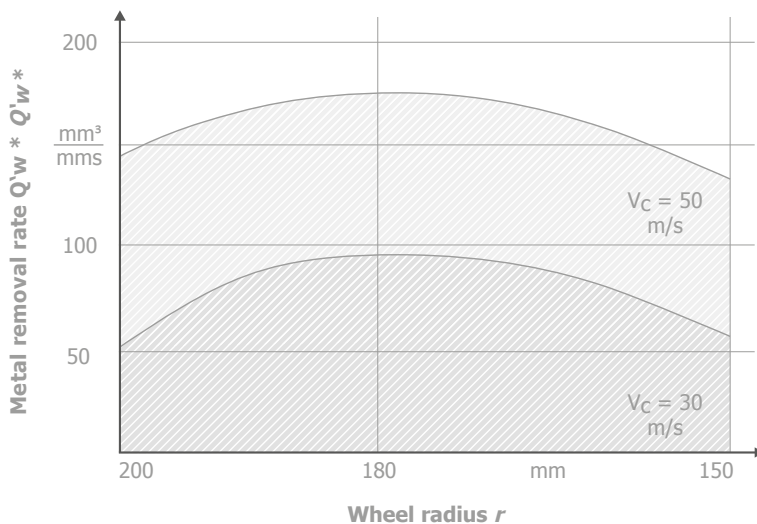
### **Quality throughout – from the raw material to the finished product to the on-site service**

THELEICO stands for reliability and precision. This not only applies to our tools, but to all of our processes as well. High-quality raw materials, qualified and motivated employees and state-of-the-art production and inspection processes guarantee reliable reproducibility in the application. We will deliver your products to you flexibly and reliably!

# WHY PROCESS OPTIMISATION IS SO IMPORTANT

When grinding turbine blades cast from alloys based on nickel or titanium which are resistant to high temperatures, one of the final processing steps is grinding the fir-tree profile. While performing this step, in addition to making sure of dimensional accuracy, it is especially important to ensure that the application of heat does not lead to tension cracks or structural changes. The grinding process, however, should still be carried out with the highest possible degree of efficiency in order to optimise grinding time, for example. It is important to improve value added potential by using a grinding wheel that is optimised for the application and the corresponding process parameters. This means that overall costs can be reduced significantly:

## Examples of application for THELEICO turbine blades



tool:  
THELEICO 47A 46-1 G 14 VM3210

\*Values dependent on the specific application parameters for each case.

Increasing the cutting speed from 30 m/s to 50 m/s with corresponding adjustment of the other process parameters results in double the metal removal rate. However, the pre-requisite for this is that the temperature in the grinding process does not exceed the critical value, which would lead to structural changes in the superalloy being processed. Here, the composition and the structure of the grinding wheel as well as the optimum adaptation of all process parameters are crucial. **This will enable you to reduce your process costs.**

# A RANGE FOR SUCCESS

## ABRASIVE QUALITIES, AREAS OF APPLICATION AND MODELS.

Abrasive Wheel Model/Type*					Product Example
	Grain type	Hardness	Structure	Bonding	Wheel Name
Profile	High-grade corundum	H-K F-J	12-15	ceramic	47A 46-1 G 14 VM3210
	High-grade corundum	F-J	13-15	ceramic	48A 46-1 G 14 VM3210
	High-grade corundum	F-J	13-15	ceramic	40A 60-9 F 15 V9210
	Special corundum	F-J	13-15	ceramic	23A 60-9 F 14 VM4220
	Special corundum	F-J	13-15	ceramic	123A 60-9 F 14 VM4220
Surface	High-grade corundum	D-G	11-15	ceramic	47A 60-0 D 14 VM3210
	High-grade corundum	D-G	11-15	ceramic	48A 60-0 D 14 VM3210
	High-grade corundum	D-G	11-15	ceramic	40A 60-9 E 15 V9200
	Sintered corundum	D-G	11-15	ceramic	23A 54-9 E 14 VM4220
	Special corundum	D-G	11-15	ceramic	123A 54-9 E 14 VM4220

\*Explanations on the various models of grinding wheels can be found at [www.theleico.de/en](http://www.theleico.de/en)



# THELEICO EXCELLENCE

As a specialist for grinding technology, THELEICO stands for safety, expertise and reliability. Our daily actions and our services are shaped by our promise to customers: "EXCELLENCE IN GRINDING".

## EXCELLENT SAFETY

## EXCELLENT COMPETENCE

## EXCELLENT PROCESS

### **Excellent safety – for greater safety while fulfilling the highest requirements**

To meet the highest requirements in your grinding processes, we guarantee you product safety and consistent quality in the use of our products and services.

### **Excellent competence – for custom-made solutions to fulfil your grinding requirements**

Every day we make use of our great experience in grinding technology to develop innovative solutions for today, with the latest technology, and to develop and manufacture adapted products for your application.

### **Excellent process – for the greatest reliability, to ensure reproducible product quality**

We guarantee detailed acceptance of your grinding process data to develop a custom-made grinding tool, in order to thus optimise your processing with our individual solutions and to reduce your process costs.

### **Benefit from our excellence!**





THELEICO Schleiftechnik GmbH & Co. KG

Lagerstraße 3–5  
59872 Meschede  
Germany

Postfach 1554  
59855 Meschede  
Germany

☎ +49 (0) 291/99 01-0  
📠 +49 (0) 291/99 01-28

info@theleico.de  
www.theleico.de