

# The new Technical guide

This new technical guide book replaces the Metalcutting Technical guide from 2005.

The objective of the guide is to give quick and adequate information for trouble-free and productive machining using Sandvik Coromant products.

This guide should be used in combination with the main ordering catalogue and the latest CoroPak supplement when you need more guidance about:

- How to choose the best machining method
- How to choose the right product
- How to apply, use and maintain the product
- How to optimize productivity and avoid problems
- Trouble shooting
- Technical details of the products
- Formulas
- Workpiece material machinability

An electronic pdf version is available for download via the internet at <http://www.coromant.sandvik.com/> and can also be ordered separately on a DVD.

Another helpful device to have on hand when reading this technical guide is the new Cutting Data Calculator. Contact your Sandvik Coromant representative for more details.



This new Technical Guide replaces the existing Metalcutting Technical Guide



The Technical Guide should be used in combination with the main ordering catalogue and the latest CoroPak supplement.

## Other catalogues/guides

### Heavy machining and Deep hole drilling

Note that information about heavy machining and deep hole drilling are not included in this book nor in the main catalogue; there are dedicated catalogues/application guides available for these areas:

- Heavy machining, order No C-1002:3
- Deep Hole Drilling, order No C-1202:1

### CoroKey – A premium selection!

The CoroKey guide is a condensed catalogue with a premium selection of tools for our main application areas.

### Electronic catalogue

The online catalogue CoroGuide Web, including the Cutting Data Module, is available on Internet free of charge: [www.coromant.sandvik.com](http://www.coromant.sandvik.com)

For calculations related to endmill cutters, CoroMill Plura and CoroMill 316, order the CD: C-2948:063.



Heavy machining catalogue/application guide



Deep hole drilling catalogue/application guide



CoroKey guide

## Application Guides

If you need detailed technical information about certain areas, such as: Heat resistant super alloys, Milling methods, Hole making, etc, there are a number of different guide books and CD's to choose from.

For more information, go to our website at: <http://www.coromant.sandvik.com/>



Application guides for certain areas.

## New Technical training material

A brand new Metal Cutting Technology Training material is now available. Contact your Sandvik Coromant representative for more details about this training material or participation in any of our training courses.



## How to read this book

GENERAL TURNING	A
PARTING AND GROOVING	B
THREADING	C
MILLING	D
DRILLING	E
BORING	F
TOOL HOLDING/MACHINES	G
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## Main index A-I

Our ambition has been to make this book easy to use by applying a logical structure, many illustrative pictures and short but informative texts.

As mentioned earlier, this Technical Guide should be used in combination with the main ordering catalogue and/or the latest CoroPak supplement.

Most of the information provided in the main ordering catalogue is not duplicated in this Technical Guide. For example, cutting data appears only in the Main catalogue.

## Main indices

- The main index follows the main ordering catalogue (A. General turning, B. Parting and grooving, etc.).
- In chapter “H”, basic information appears about both workpiece materials and cutting tool materials.
- Formulas and other useful information (surface finish measurements, hole tolerances, thread charts, etc.) are gathered together in chapter “I”.
- At the end of this book, you will find an index for Frequently Asked Questions (FAQ).

## Sub-indices

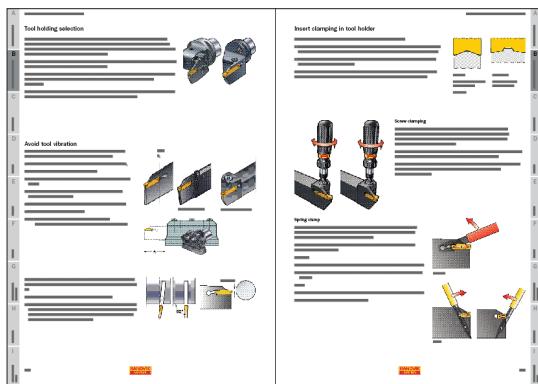
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Sub-indices A-G are divided into “Applications” and “Products” sections.

Under each one of the main indices A-G, sub-indices appear, which are divided into "Applications" and "Products".

- You should read “Applications” when you need guidance about choice of tool and how to apply the tool in the best way.
- When you know what tool should be used, you can read more about that specific product under “Products”. Information on material grades appears at the end of the “Products” section.

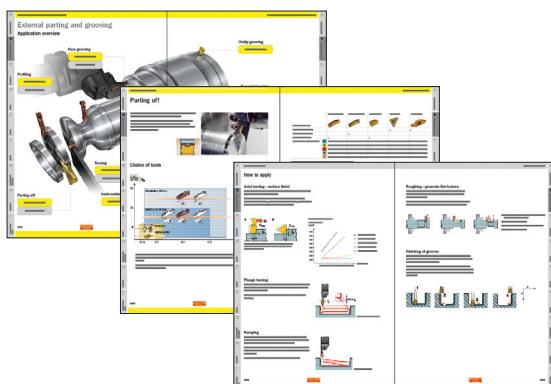
## Applications – example pages from the Parting and grooving chapter



1. General information in the “Getting started” section



2. A two page overview begins each application area

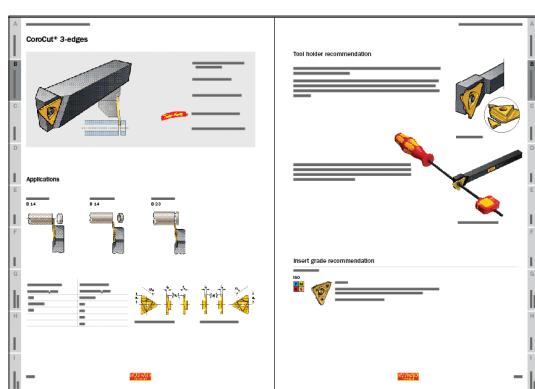


3. Each sub-area is divided into “Choice of tools” and “How to apply”



4. Trouble shooting information appears at the end of the “Applications” section

## Products – example pages from the Parting and grooving chapter



Detailed information about each product



Grade information at the end of the “Products” section

# Manufacturing economics

## What is productivity?

Productivity itself has several definitions, the Sandvik Coromant definition is Output/Input. Doing more with less.

The output can be influenced by a number of factors, such as:

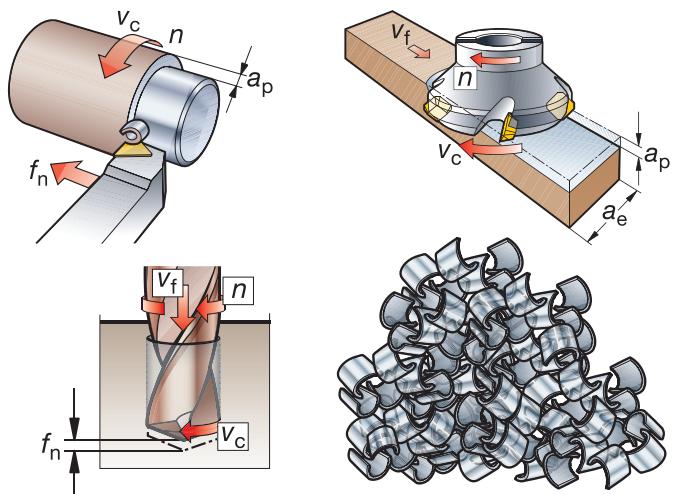
- Selection of machining method and tool path
- Choice of tool, insert geometry and carbide grade
- Cutting data (speed, feed and depth of cut)
- Low number of rejects
- Fewer tool changes - more machining time
- Product availability - less inventory
- Technical training - better understanding

One key factor is the metal removal rate "Q", which can be measured as the amount of material removed in a given time period ( $\text{cm}^3/\text{min}$ ).

**Turning:** Depth of cut x feed/revolution x cutting speed ( $\text{cm}^3/\text{min}$ ).

**Milling:** Depth of cut x width of cut x table feed rate ( $\text{cm}^3/\text{min}$ ).

**Drilling:** Hole area x penetration rate ( $\text{cm}^3/\text{min}$ ).

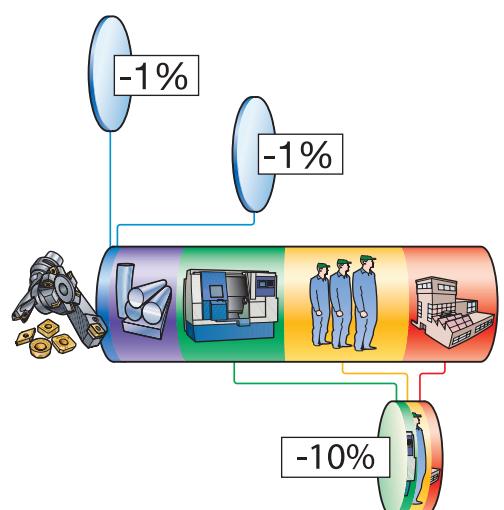


## Increased cutting data reduce costs

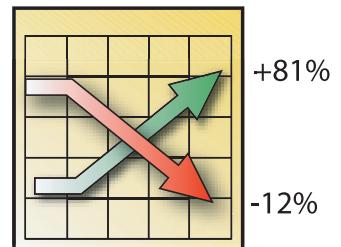
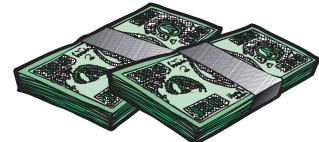
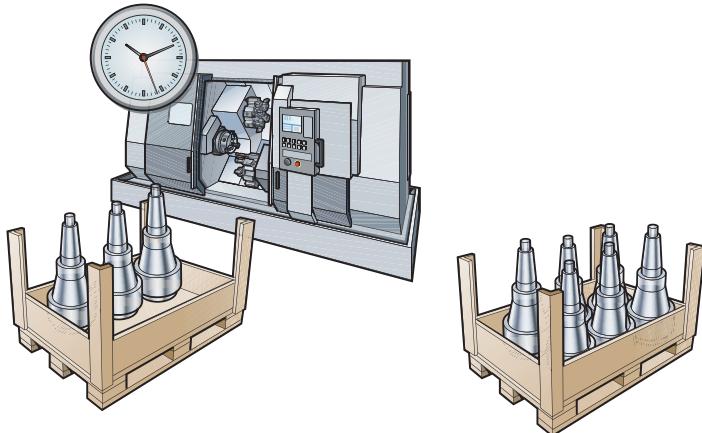
Increased cutting data and process improvements can dramatically reduce the cost per component and thereby increase a company's profitability. In most cases, it is by far more profitable to increase cutting data than to increase tool life. Likewise, it is much more profitable to use cutting tools that can withstand high cutting data than to use low quality tools.

Tool life and tool costs have minor effects on the component cost compared to cutting data. The exact effect on component costs depends on the machining process parameters and the company's cost structure.

- For instance: a 20% increase in cutting data can reduce the cost per component by over 10%, because it affects machine, overhead and operator costs.
- A 50% increase in tool life or a 30% reduction in tool costs will typically only reduce the cost per component by as little as 1% in each case, because the tooling costs only amount to an average of 3-5% of the production costs.



## The effects of cutting data on gross profit – an example

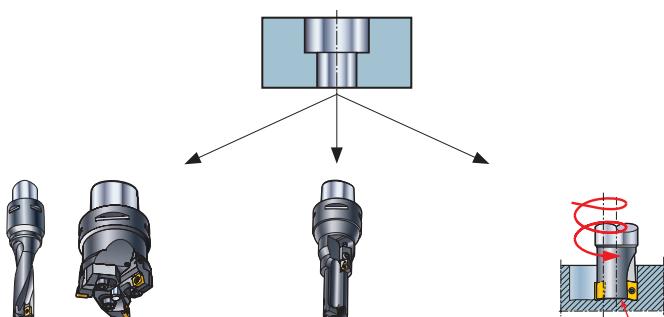


Another method for examining the leverage of cutting data is to look at the effect on a company's gross profit. In a typical example, the total machining time for a certain component was reduced from 8 min and 6 sec to 6 min and 36 sec.

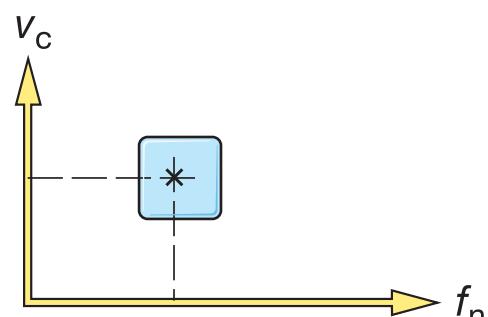
That allowed the company to produce 62 components instead of 51 per shift.

The cost per component in this example was reduced by 12% while the gross profit increased by a staggering 81%.

## Several ways to improve profitability



The first consideration is to choose the most productive method for the actual situation. Often there are several options, depending on batch size, machine, workpiece material, etc.

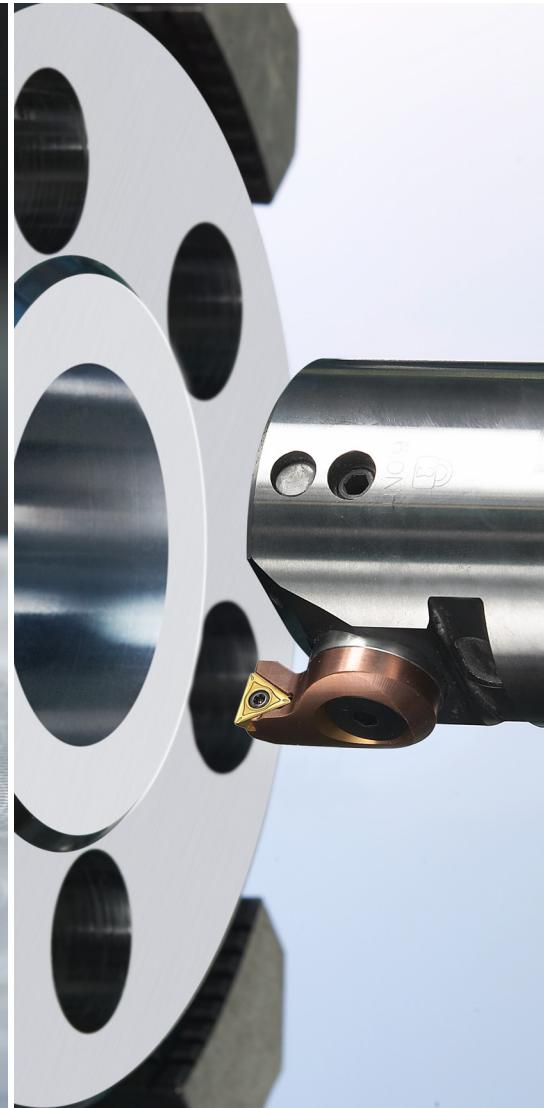
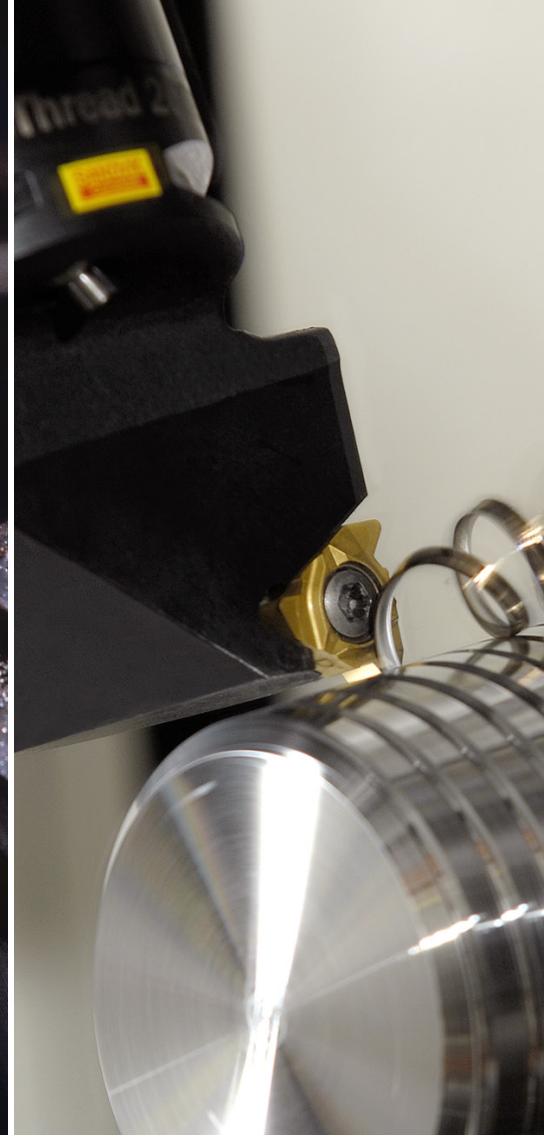
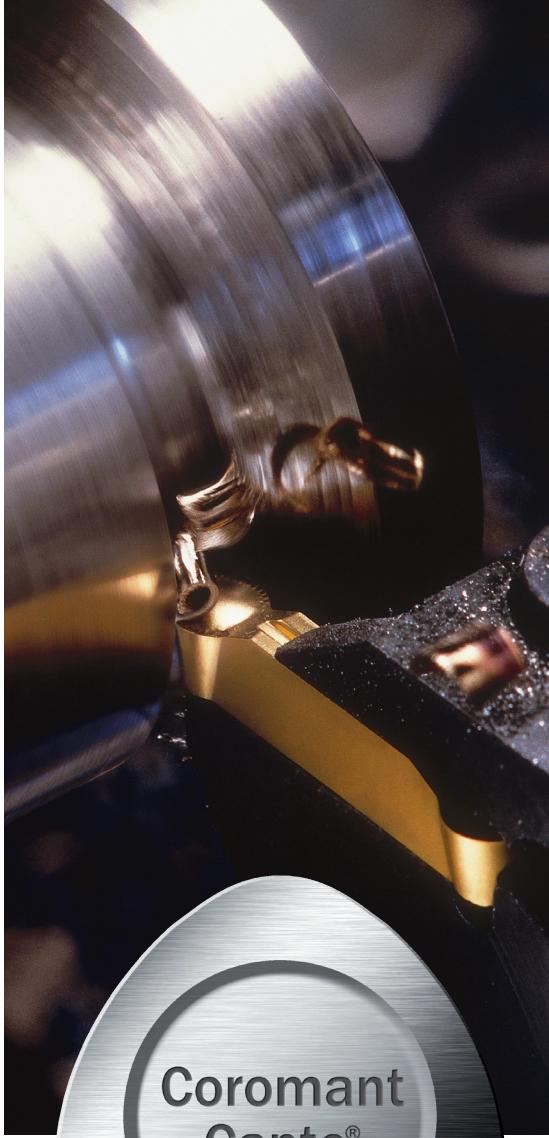
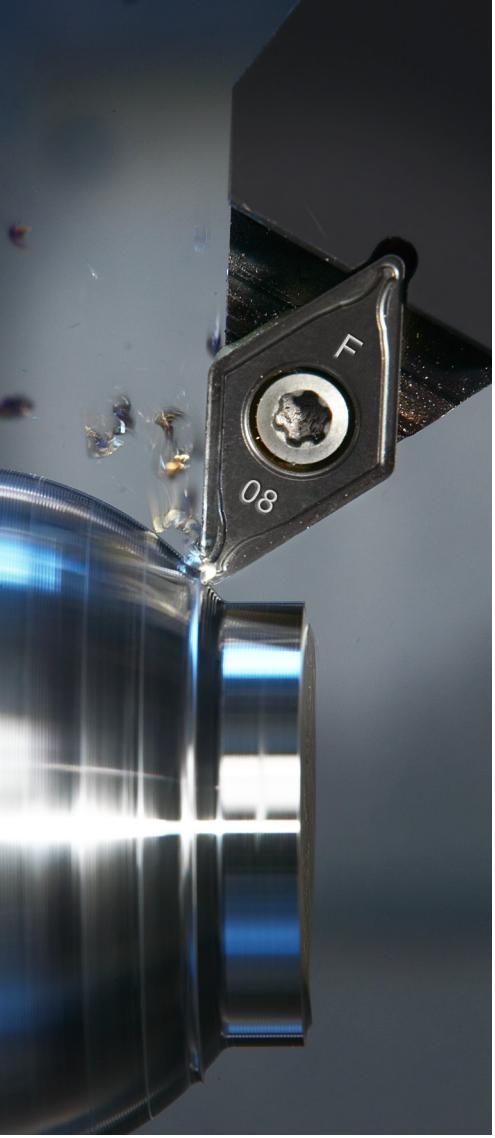


When the best method and tool have been selected, the choice of cutting data is essential for productive, profitable and trouble-free machining.

In order to improve profitability, it is important to study the process in detail. There are many methods for improving processes and each situation is different. In this handbook, you will find an immense number of ways to improve profitability by selecting the best method, the best cutting tools and the best cutting data for the job.

Sandvik Coromant is represented by sales engineers and specialists in 60 countries all over the world, so if you need assistance you will always receive our full support.





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