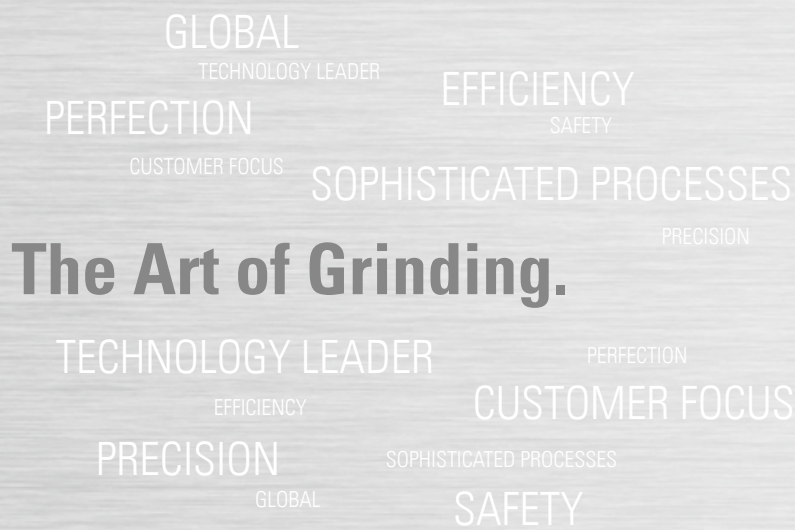




STUDER SOFTWARE

Simple – Reliable – Productive





Fritz Studer AG

The name STUDER stands for more than 100 years of experience in the development and production of precision cylindrical grinding machines. «The Art of Grinding.» is our passion, highest precision is our aim and top Swiss quality is our benchmark.

Our product line includes both standard machines, as well as complex system solutions in high-precision cylindrical grinding for machining small and medium-sized workpieces. In addition we offer software, system integration and a wide range of services. As well as receiving a complete tailor-made solution the customer also benefits from our 100 years of know-how in relation to the grinding process.

Our customers include companies from the machine tool industry, automotive engineering, tool and die makers, the aerospace industry, pneumatics/hydraulics, electronics/electrical engineering, medical technology, the watch industry and job order production. They value maximum precision, safety, productivity and longevity. 24 000 manufactured and delivered systems make us the market leader and are clear evidence of our technological leadership in universal, external, internal and noncircular grinding. Around 800 employees, including 75 apprentices, make it their goal every day to ensure that «The Art of Grinding.» will continue to be closely linked to the name STUDER in the future.

StuderWIN StuderGRIND

If you like software that simply works, STUDER is the right partner for you. Thanks to our software the machine is quick to set up and easy to operate: simply enter the workpiece dimensions and the material and StuderTechnology generates the grinding program automatically, based on 100 years of grinding experience. It uses roughly 300 machine parameters, which you can supplement with your own individual empirical values. The StuderPictogramming visual language facilitates programming and subsequent operation.

StuderWIN

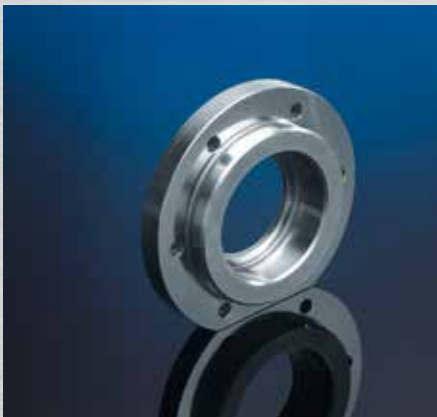




Economical production

Industry requirements on machine tool manufacturers are high and uncompromising. They are primarily geared towards one goal – that of reducing production costs. Each of the approximately 5000 users of Studer grinding machines demand solutions that will fulfil their individual grinding tasks. These solutions must be based on an open software concept which is also simple and intuitive to use. Finally, the user expects the shortest setup, programming and grinding times, combined with the highest machine availability.

The customer's every wish is STUDER'S command: Numerous close customer contacts provide valuable information on our customers' diverse requirements. Engineers and experts in the areas of software, production and research work hand-in-hand to constantly align STUDER'S evolutionary, modular software concept with practical requirements. This constantly results in new functions, which make the handling of Studer grinding machines even simpler and more efficient.

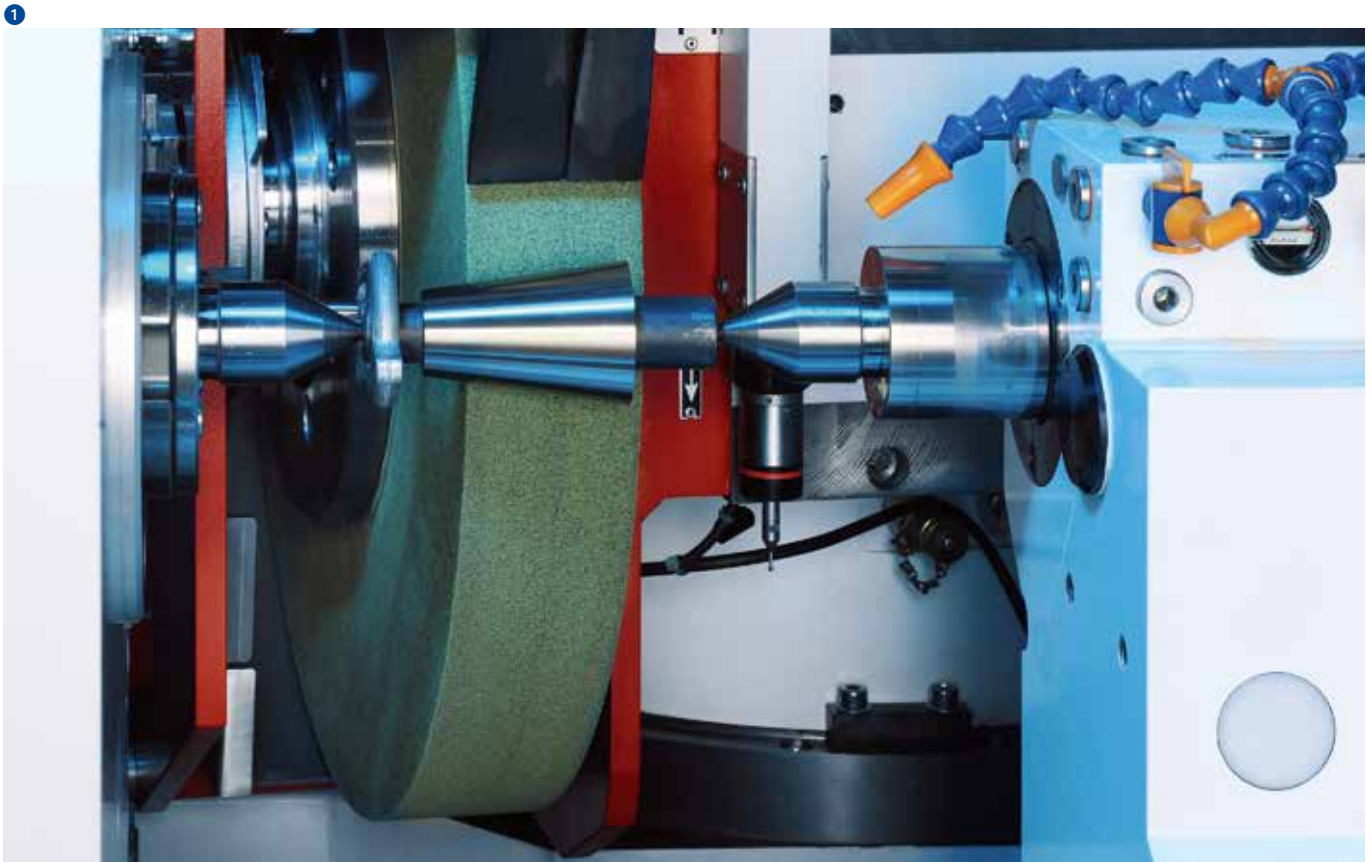


STUDER developed the now almost legendary «pictogramming» language to assist operation. This philosophy has been consistently developed over the years. No other supplier today can offer such a multitude of setup functions, grinding cycles and auxiliary functions, which make even complex grinding processes child's play to program and control. This means that the training periods are equally short for both professionals and beginners.



Whether universal or high production, whether external or internal grinding machines – the user interface and software are always identical. This is reflected in the very high level of robustness, which virtually eliminates downtimes. Another unique feature is the possibility of upgrading previously supplied STUDER machines with the latest functions over the years. This means that STUDER machines are always state-of-the-art and retain their value.

The STUDER operating system – Complex but easy to operate



The software of a cylindrical grinding machine must be able to deal with the most diverse customer profiles, from individual component and small-batch production through to large scale production. It must be equally accessible to all operators – from a novice through to a highly qualified and motivated technician.

STUDER software is therefore designed in such a way that the operator can set up the machine efficiently and achieve cost-effective production without having to go into the menus in depth. The most important information is available at a glance. The software provides an incredible number of simple-to-operate functions for customers with particularly high requirements and finicky grinding tasks. Convenient dialog guidance makes it easy for the operator to get to grips with the architecture.

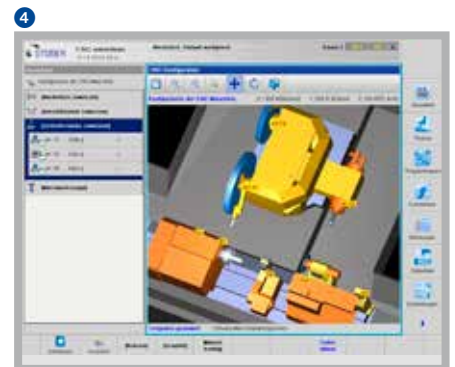
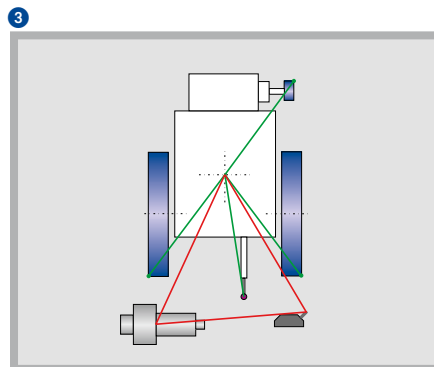
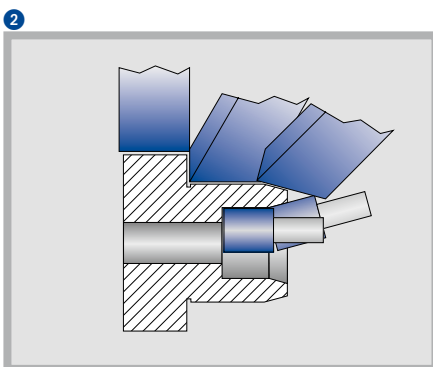
The system transparency enables him to implement his own ideas and requirements. Set-up, tool definition and management, corrections, program creation, process visualization, as well as diagnostics and analysis are the most important areas of this intelligent software. As one would expect of a modern software program, STUDER software can be conveniently operated with or without touch screen.



Economical setup times thanks to quick and reliable set-up



Special attention should be given to set-up, as it is partly responsible for the machine's economic efficiency. Simple and reliable functionality makes a decisive contribution to minimizing setup times. Workpiece and dressers are registered with the grinding wheel using the simplest and clearest method, the teach-in procedure.



Extension package

STUDER Quick-Set (Option)

The «Quick-Set» function allows the machine to be reset in extremely short times with the help of an electronic measuring probe. All relevant points are registered using the teach-in procedure in a guided screen dialog. The operator simply needs to briefly touch the workpiece with the previously calibrated probe,

and all of the up to four grinding wheels are realigned with the new part and are immediately ready for use. The angle used is not relevant here. «Quick-Set» accurately converts all grinding wheel reference points. The repeated, time-consuming setup of all grinding wheels, which also requires considerable

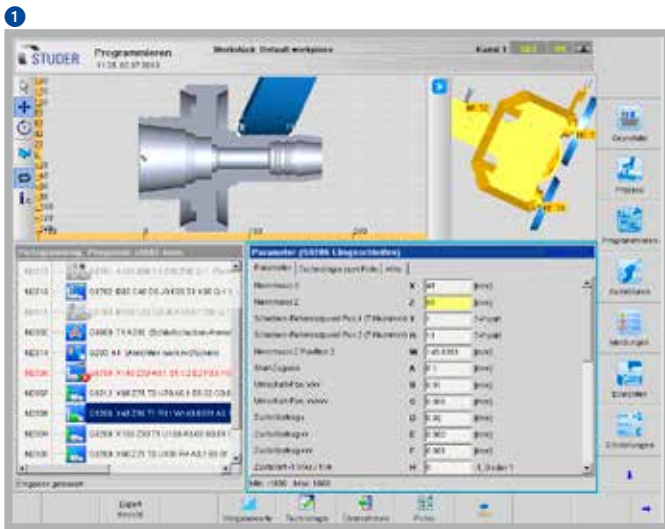
intuition, can be omitted. As a result, setup times and the associated unproductive dwell times can be reduced by up to 90%.

(Only available on machines with swiveling wheelhead and active measuring probe)

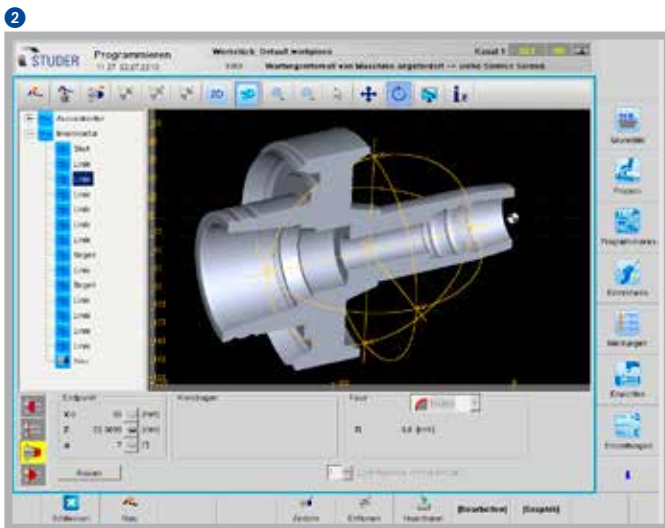
- 1 Setting up with the measuring probe
- 2 Complete machining

- 3 Quick-Set
- 4 Graphic representation of set-up

Move simply and quickly to the workpiece program



The operator must be able to primarily concentrate his skills on process-specific matters and not be burdened with cumbersome programming tasks. «Pictogramming», the visual language developed by STUDER, makes programming easy for the operator: He no longer has to think alphanumerically, but can think in images. The workpiece programs are displayed graphically and clearly, so that the operator can interpret them immediately. The cycles all have their own distinctive symbol, a «Picto», which enables the process parameters to be queried in a simple dialog. They also enable access to STUDER'S workshop-based knowledge of grinding applications, which has been gathered over many years. The input screens can also be provided with the know-how of the respective customer by means of initialization tables.

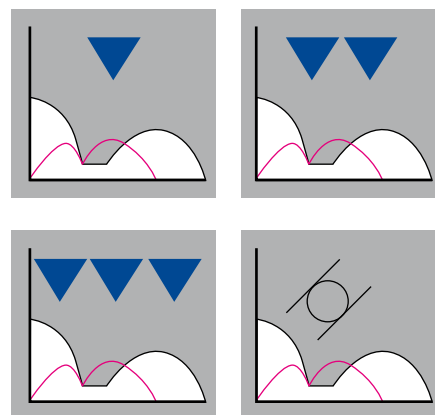


The integrated contour editor enables the operator to draw his workpiece or import it from a DXF drawing. He then clicks on the parts of the workpiece that he wishes to grind and transfers the positions to his program. With the aid of the animated help graphics he can see which grinding wheel will engage with which part of the workpiece. In this way he can check his program.

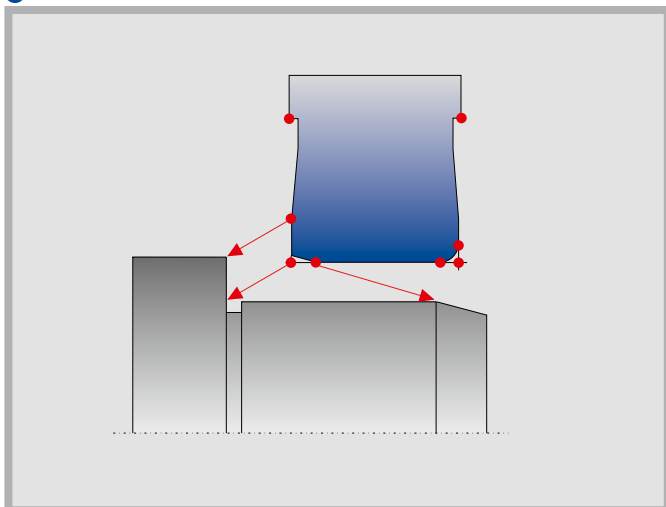
StuderTechnology Integrated

The definition of grinding parameters such as infeed speeds and switch-over points requires considerable experience and ultimately decides the workpiece quality and the productivity of the machine. Experience has shown that only a very few operators take the trouble to calculate grinding parameters based on standard formulas. The result is that empirical values are often used, which are often far from the optimum. With StuderTechnology each user benefits from STUDER'S many years of experience.

Depending on material and hardening process, abrasive and coolant and much more, all necessary values are calculated automatically and inserted into the program. The operator only needs to decide which production goal he wishes to achieve. The result is a significant increase in economic efficiency and quality.



1



The possibility of working with grinding wheel reference points is very advantageous for the user. This means that he can machine cones, for example, by entering the reference point of the chamfer on the grinding wheel and the nominal dimension in the dialog. The height and width of the chamfer are calculated automatically, eliminating unnecessary and incorrect arithmetic calculations.

2



Programs can be conveniently backed up or loaded via USB stick or company network. The data required to machine a workpiece can be grouped into a workpiece project and archived.

Extension package

STUDER micro functions (option)

Convenient programming is an essential factor when it comes to economical grinding processes. This convenience can be considerably enhanced by using CNC microfunctions. When standard grinding cycles are not flexible enough, and pure ISO code programming is too costly and time-consuming, CNC microfunctions are just the solution. These functions can be used to achieve and control even more individual grinding processes without restricting programming convenience. This increases flexibility and optimizes grinding processes.

Extension package

Control measuring cycles with touch probe (option)

Measuring cycles with touch probe for flexible measurement of:

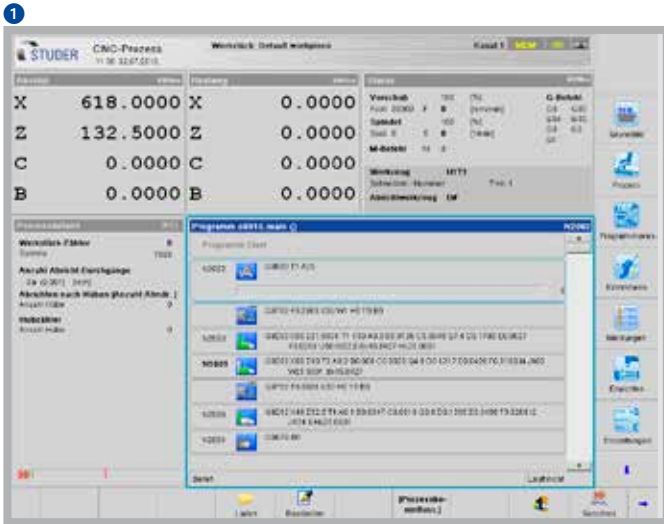
- Automatic calibration of the probe on known diameter (e.g. barrel)
- Measuring cycle for diameter
- Measuring cycle for lengths
- Automatic allocation to the relevant tool

(only with touch probe parallel to the machining plane)

1 Grinding wheel reference points

2 Data transfer

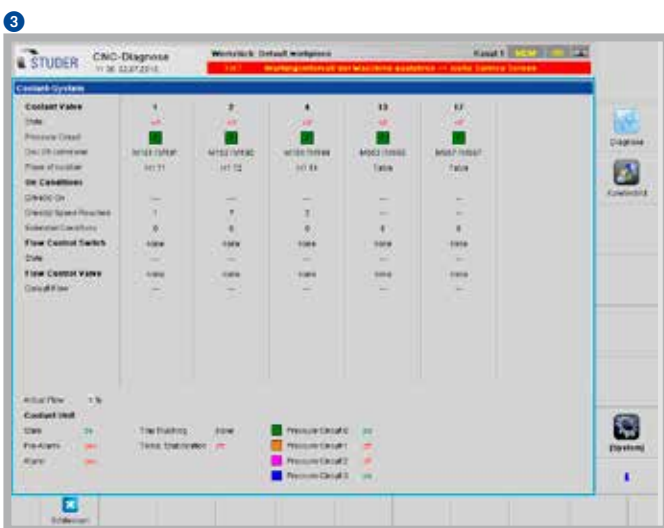
Process control from A to Z



The trend of grinding tasks is towards high complexity, small series and expensive materials. To avoid wasting money through incorrect production, the machine operator must be able to control the grinding process 100 percent and correct it if necessary.

With larger batches and automated systems, the necessary corrections are made completely automatically through in-process gauging or correction values are transferred directly to the machine from external measuring stations. Individual workpieces can be reground at the push of a button without making any modifications to the program.

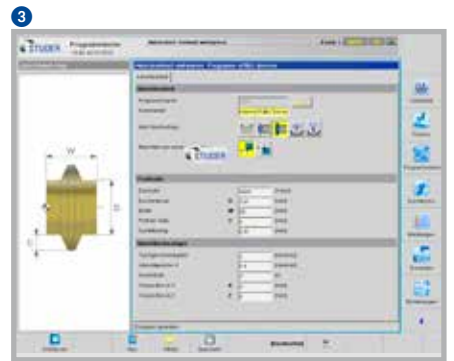
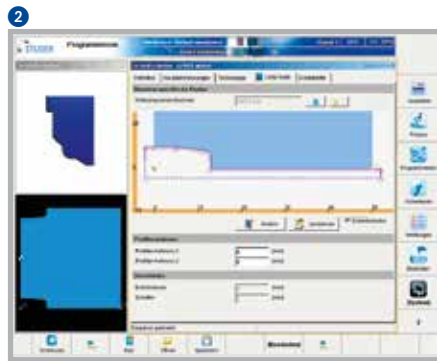
Correct and direct diagnostics



The causes of faults have to be found quickly in order to prevent costly machine downtimes. The diagnostics aid makes on-screen error detection much easier, so that many faults can be quickly recognized and rectified.

In the case of more serious problems, the STUDER specialists in Switzerland can connect directly to the machine via the optional «Studer-Remote» and determine the cause of the fault.

Dressing



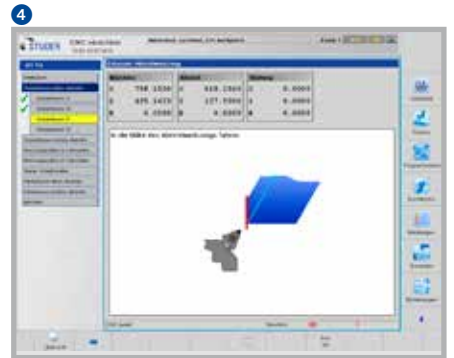
STUDER software provides a large number of macros for dressing grinding wheels.

If no standard grinding wheel shape exists for a grinding task, the dressing can be freely programmed according to DIN 66025.

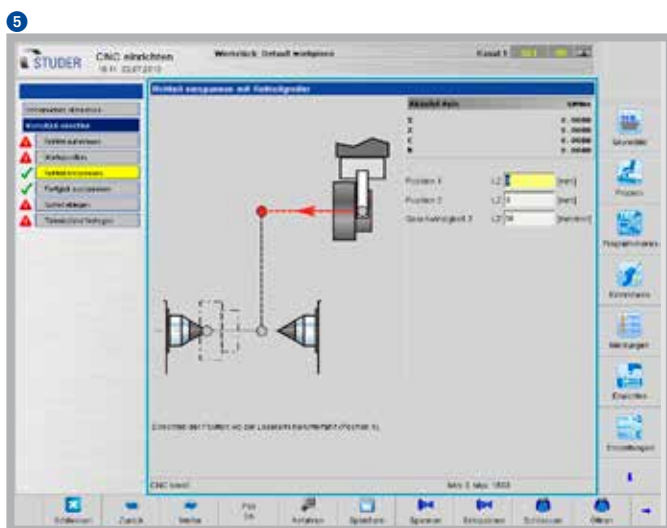
However, the easiest way is to graphically create the shape with the integrated contour editor. From this shape the program - including axis approach and retraction - is then created automatically and graphically represented. This provides the operator with the necessary safety.

However, the quickest and easiest way is to create an impression from the graphically defined workpiece. The grinding wheel can simply be dragged onto the workpiece using «Drag and Cut». Existing draft points facilitate positioning of the wheel on the desired reference points.

A travel-optimized reprofiling program can now be created for the defined dressing program with the StuderDress integrated option (see StuderDress integrated).



Integrated loader functions



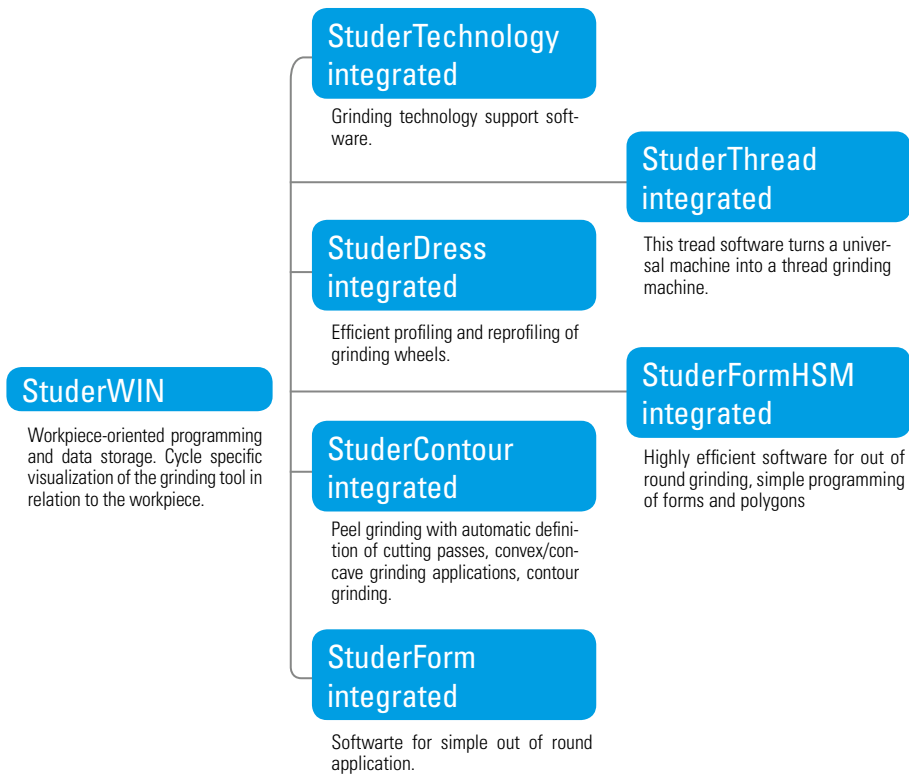
Anyone who thinks that handling systems are complicated and only profitable for large-batch production has not yet experienced STUDER's solution. Incorporated into the normal operation, it is very simply configured. All positions of the portal can be set up using the teach-in procedure.

Taught positions are saved in the workpiece program and are always reactivated when the workpiece is changed. Functions such as the extraction of test pieces and reject parts are integrated, as well as the introduction of a calibration part for in-process gauging.

- 1 Grinding wheel definition
- 2 Contour editor
- 3 Profile role

- 4 Dressing tool registration
- 5 Loader set-up screen

Extensions packages for StuderWIN (options)



Although the machine software has many standard functions, STUDER offers many extension packages that run directly on the control system for even greater convenience and optimized processes.

StuderDress integrated

Reprofiling a grinding wheel is one of the most time-intensive tasks on a grinding machine. The machine is blocked during this process and cannot produce any parts. StuderDress provides a completely new strategy for new and re-profiling of grinding wheels. By using an optimized number of cutting passes the wheel can be preformed in less than half the usual time.

StuderContour integrated

StuderContour specializes in the high-precision machining of longitudinal contours using the rough grinding method. Whether stepped drills, taps, drawing tools or other rotationally symmetric shaft parts - the various diameters can be roughed from solid. The travel paths are optimally divided to maximize the constancy of the grinding wheel's cutting performance with the shortest paths. A central constituent is the sophisticated correction function. This allows deflection, cylindricity and straightness to be ground quickly and accurately on parts with a critical diameter/length ratio in respect of dimension, form and position tolerances. Thanks to the automatic generation of programs and their simulation, StuderContour is extremely user-friendly and reliable to use.

StuderForm integrated

This universal form grinding software enables machining of curves and polygons for standard applications in small production runs.



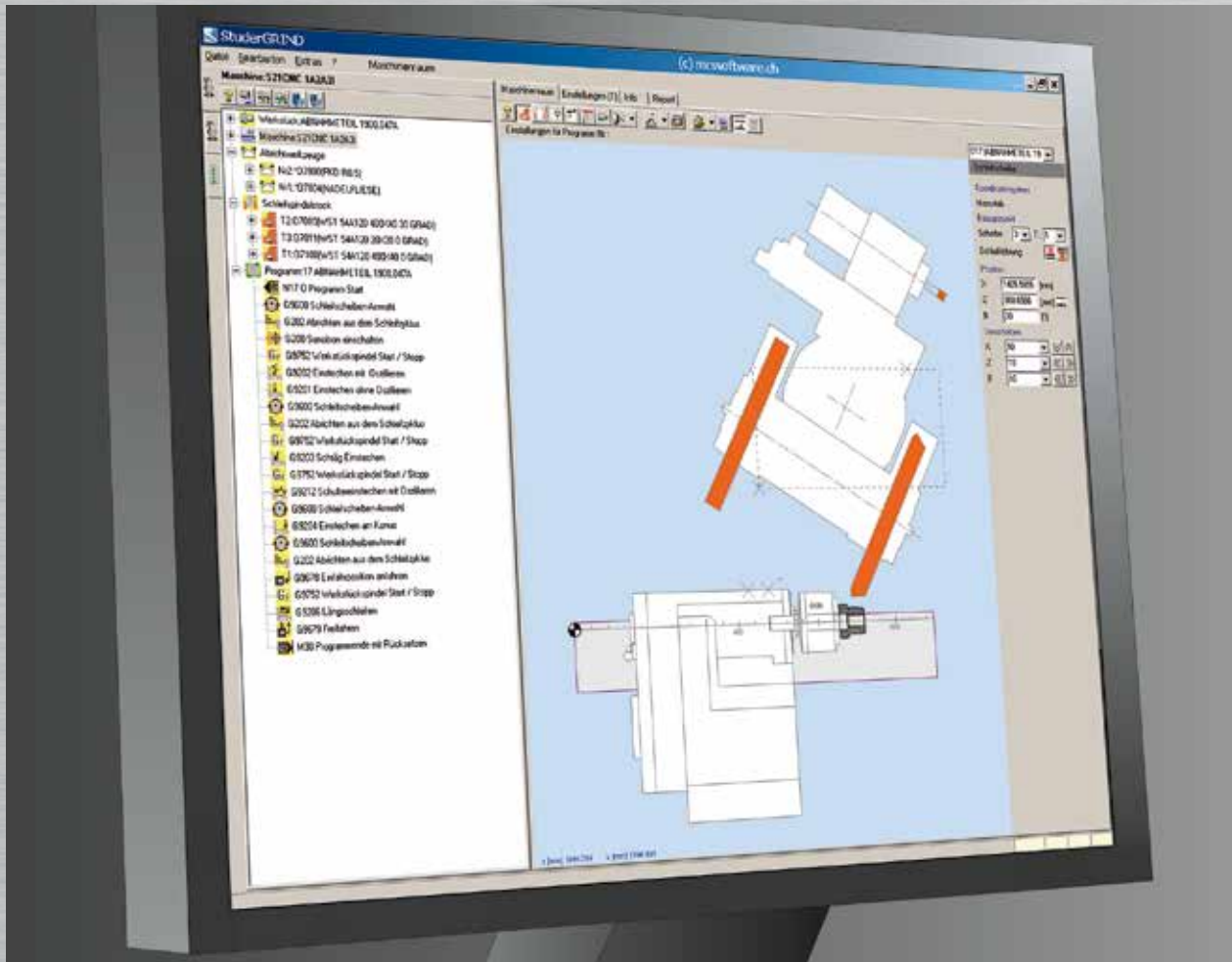
StuderFormHSM integrated

This universal form grinding software enables machining of curves and polygons for standard applications in small production runs. HSM stands for High-Speed Machining. This software makes it possible to control the noncircular grinding process and meets the highest demands. StuderFormHSM controls the axial drives directly at the lowest possible level, and can thus comply with the highly dynamic process specifications. Its simple operation and high path precision in dynamic operations make StuderFormHSM absolutely ideal for individual component and large-batch production.

StuderWIN*training*

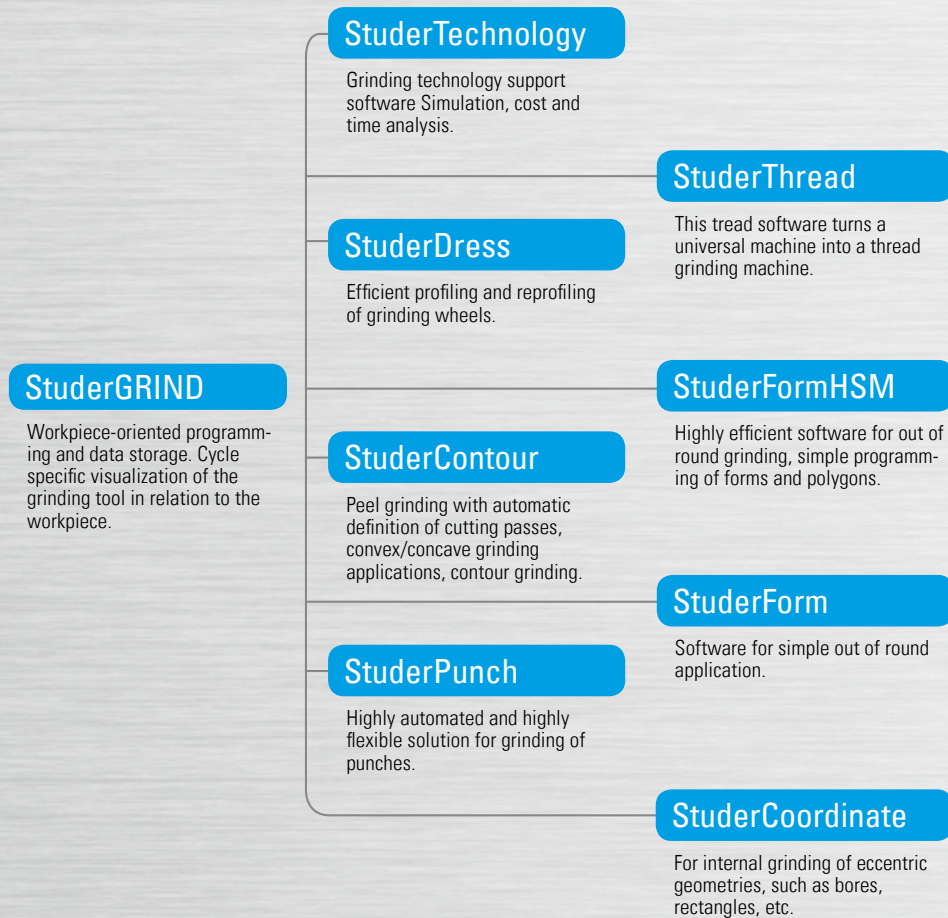
PC software is the ideal platform for learning and developing programming knowledge for STUDER cylindrical grinding machines. StuderWIN*training* essentially consists of a machine organizer, which provides support for the installation and management of the machine software on the PC. The software and configuration of the machine are then used 1:1 for training. This is ideal for the introduction of new employees, results in fewer course costs and the operators can practice without affecting the machine's productivity. StuderWIN*training* can be purchased as an accessory at any time.

StuderGRIND



- StuderPictogramming with graphic programming for the creation of grinding programs
- Programming of nominal positions directly from the workpiece drawing
- Grinding wheel and dressing tool definition
- Workpiece-oriented data management, archiving, documentation, reproduction
- File management with graphic preview and direct program call for additional modules
- Data transmission via RS232, HSSB, Ethernet
- Direct access to the NC memory of the control system
- Numerous additional modules for thread grinding, noncircular grinding, etc.
- Tried, tested and future-proof

CAM programming system



In many businesses the grinding programs are not programmed on the machine, but conveniently in the office. Studer also offers the necessary software packages here.

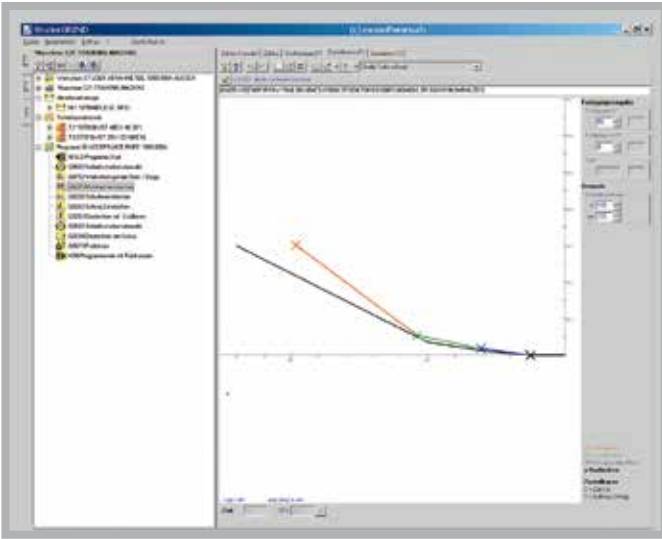
StuderGRIND

StuderGRIND is the perfect software package for the offline programming of grinding machines. The workpiece-oriented data management prevents data chaos, ensuring that all data can be found within the shortest possible time. StuderGRIND with the StuderTechnology option embodies the experience, intelligence and reproducibility of state-of-the-art grinding technology. A powerful tool that keeps grinding times down and optimizes processes as well as conserving existing and new know-how and keeping it available at all times. This software combines precision with economic efficiency, yet is simply to operate. Apart from the host of functions already contained in the basic version of StuderGRIND, a large number of add-on modules are also available.

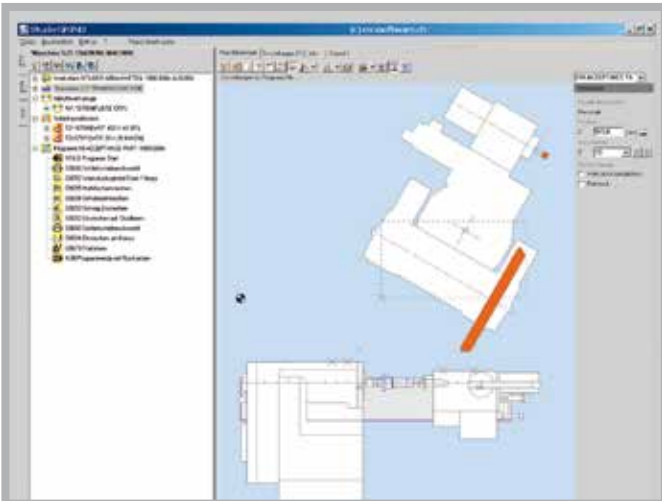
The individual StuderGRIND extension packages can be directly implemented as «Integrated Modules» in all Windows control systems.

StuderTechnology

1



2



StuderTechnology does away with inefficient operations. In many workshops, the same empirical values are still used for switch-over points and feeds – values that are geared towards multiplying safety in respect of dimension, form and position tolerances as well as surface quality. As a result, grinding tools generally remain far below their capabilities, and grinding times are constantly too long. The operator is unable to recalculate the multitude of influencing variables each time. This often results in unsatisfactory compromises. StuderTechnology calculates all relevant process parameters on the basis of the latest

grinding technology knowledge. The module determines the optimal values from the most important process-relevant influencing variables, such as grinding wheel, material and cooling lubricant specification, for each operation step. The result: considerably increased economic efficiency!

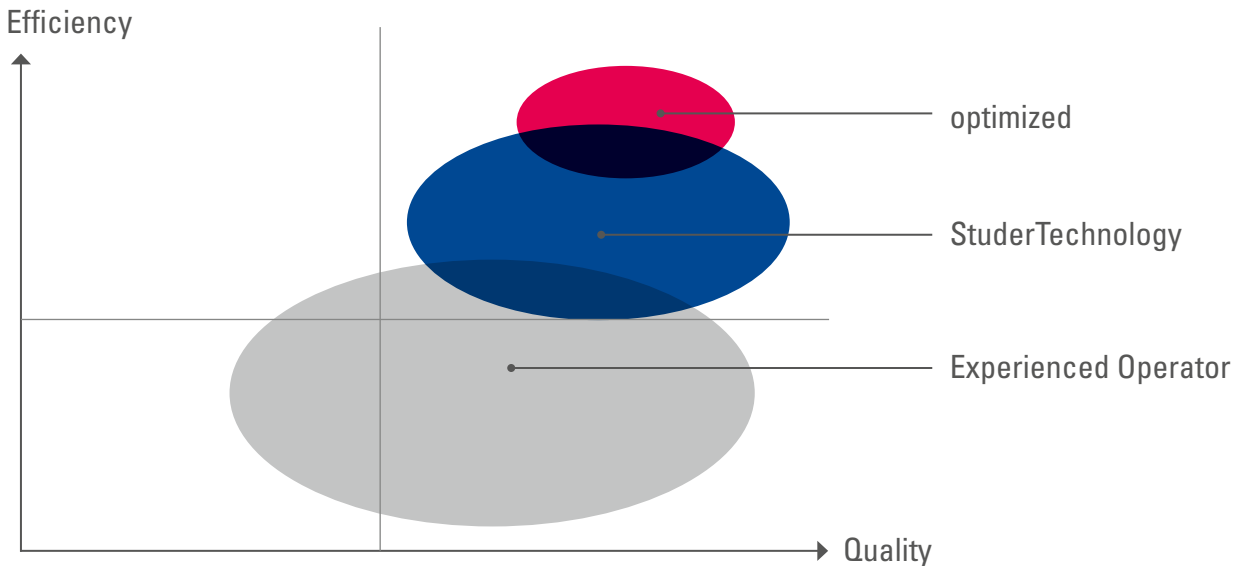
Created programs can be simulated and checked for collisions throughout the machine area. The machining times are precisely calculated, which benefits the user right from the offer phase.

Existing manually created grinding programs can be analyzed, compared with the values suggested by StuderTechnology and overwritten.

1 Infeed diagram

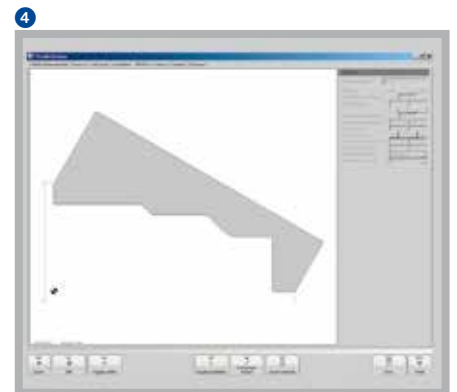
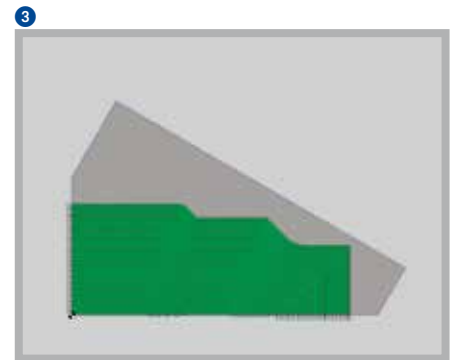
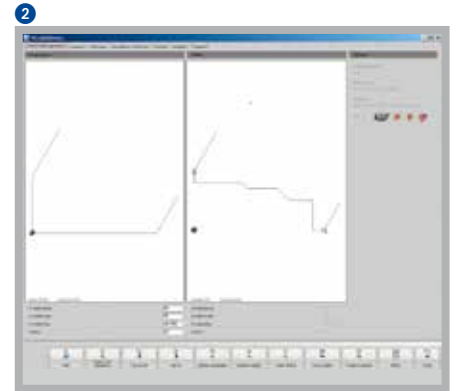
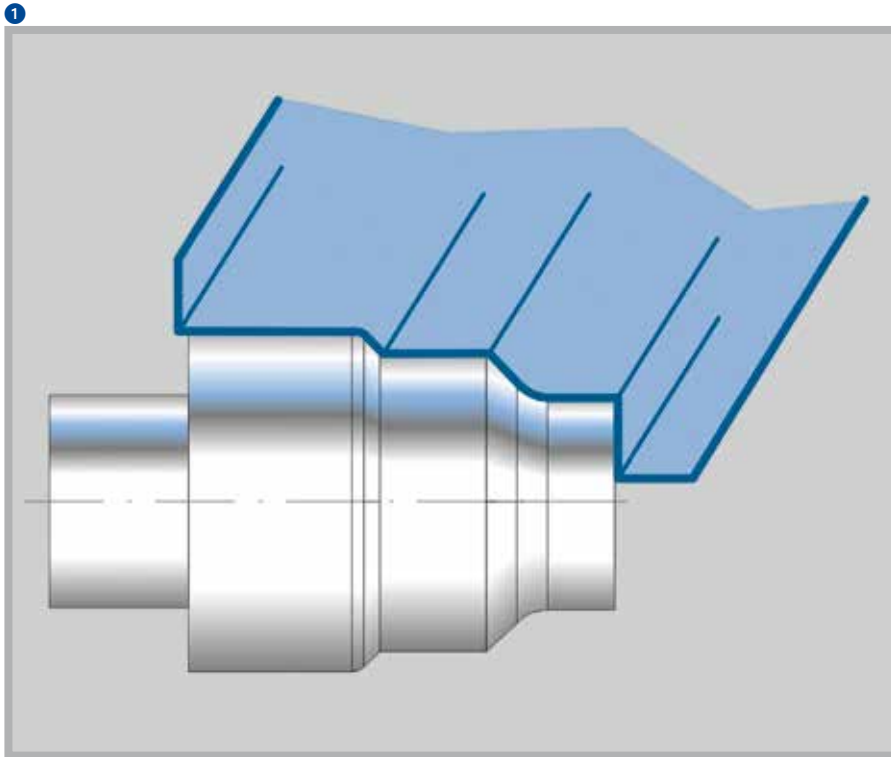
2 Virtual machine room

With StuderTechnology, the grinding process is far more efficient and higher quality than with «empirical values»



- Automatic calculation and design of process parameters
- Direct inclusion of 300 machine parameters and a database
- Integrated grinding know-how, which can be expanded, optimized and reproduced
- Technological analysis, monitoring, graphic infeed curves
- Graphic simulation of grinding programs
- Automatic reporting for the creation of setup plans, tool lists, additional comments and images
- Time and cost calculation, offer creation
- Reduction of setup times
- Reduction of grinding times up to 50 %
- Reduction of optimization times to virtually zero
- Reduction of error costs

Expansion module StuderDress

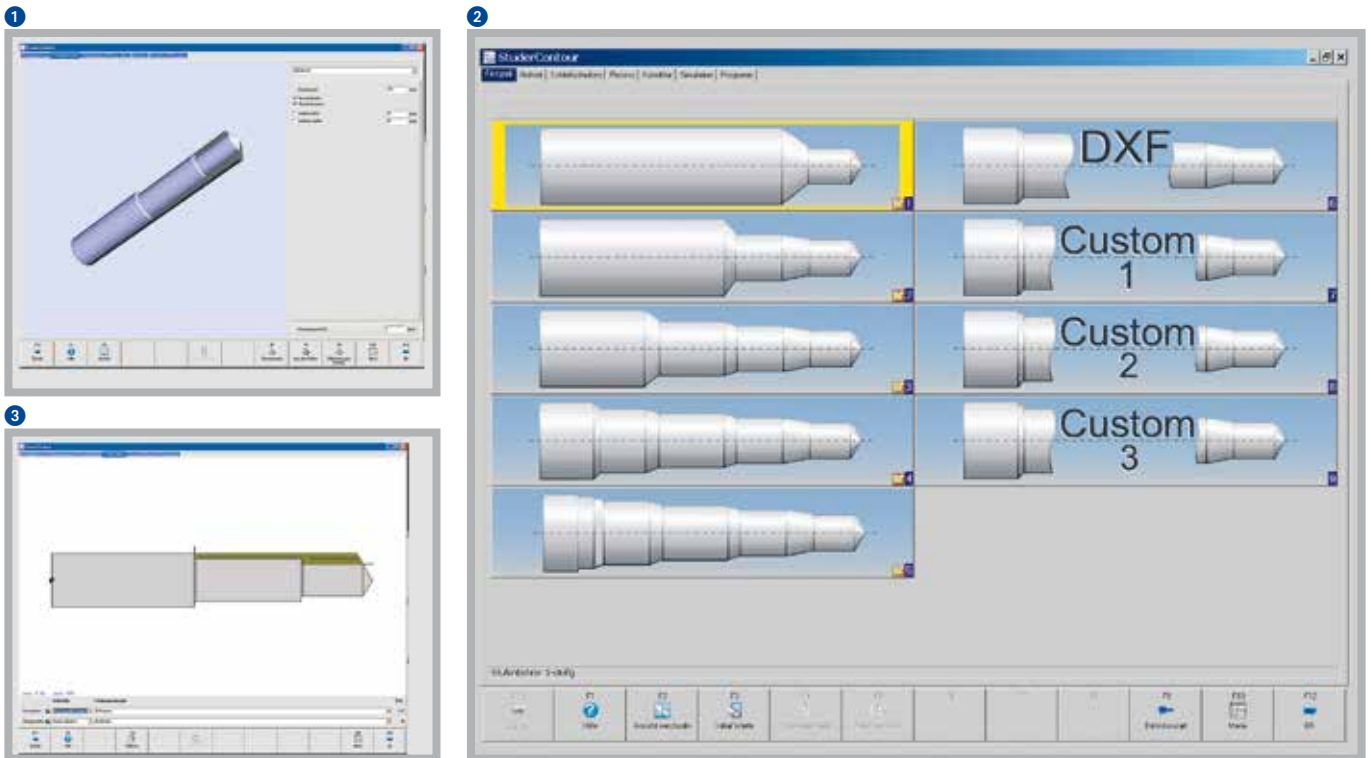


Reprofiling a grinding wheel is one of the most time-intensive tasks on a grinding machine. The machine is blocked during this process and cannot produce any parts.

StuderDress provides a completely new strategy for profiling and re-profiling of grinding wheels. By using an optimized number of cutting passes the wheel can, depending on the wheel profile, be dressed 3 to 10 times faster than with conventional methods.

- Profiling of new and re-profiling of existing grinding wheels.
- Drawing of grinding wheel profiles with the contour editor or free drawing functions.
- Setting of T-points (reference points which allow programming of drawing dimensions) at any locations and in any angular positions of the grinding wheel.
- Time-saving roughing cycles, no unnecessary traversing movements in the air.
- Correction options on the wheel profile for highly accurate grinding results.
- Simulation of the profiling process

Expansion module StuderContour

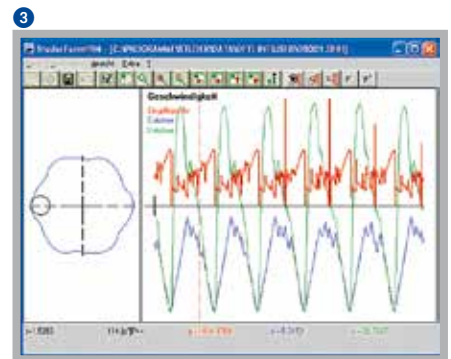
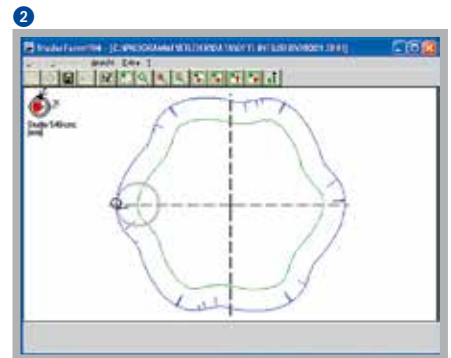


StuderContour specializes in the high-precision machining of longitudinal contours using the rough grinding method. Whether stepped drills, taps, drawing tools or other rotationally symmetric shaft parts - the various diameters can be roughed from solid. The travel paths are optimally divided to maximize the constancy of the grinding wheel's cutting performance with the shortest paths. A central constituent is the sophisticated correction function. This allows deflection, cylindricity and straightness to be ground quickly and accurately on parts with a critical diameter/length ratio in respect of dimension, form and position tolerances. Thanks to the automatic generation of programs and their simulation, StuderContour is extremely user-friendly and reliable to use.

- Predefined stepped tools
- Easy to operate, workshop-compliant Contour editor
- DXF and IGS interface for importing contours
- Regrinding function
- Program simulation
- Integration of company know-how
- Very simple operation

- 1 Definition of rough part geometry
- 2 Macro for standard shapes
- 3 Number of cutting passes and grinding process

Expansion module StuderFormHSM



HSM stands for High-Speed Machining. This software makes it possible to control the noncircular grinding process and meets the highest demands for machining curves and polygons.

StuderFormHSM controls the axial drives directly at the lowest possible level, and can thus comply with the highly dynamic process specifications. Its simple operation and high path precision in dynamic operations make StuderFormHSM absolutely ideal for individual component and large-batch production.



Expansion module StuderForm

The simplified StuderForm module enables the machining of cams and polygons for standard applications in small-batch production.

- Macros for standard forms, free forms using DXF format and support point tables
- First part – good part
- No thermal edge zone damage (burns)
- Many different analysis and correction options
- Combinable. All in a single clamping
- Time calculation

Expansion module StuderPunch



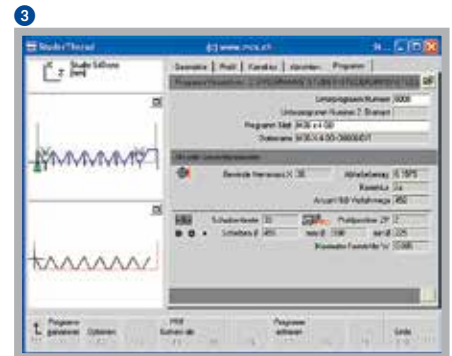
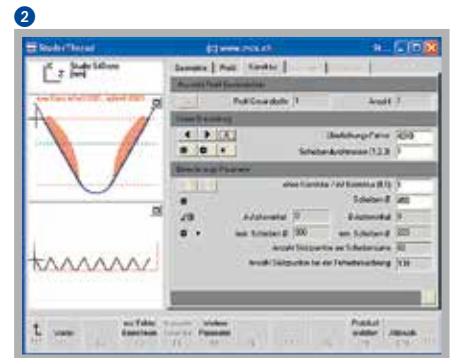
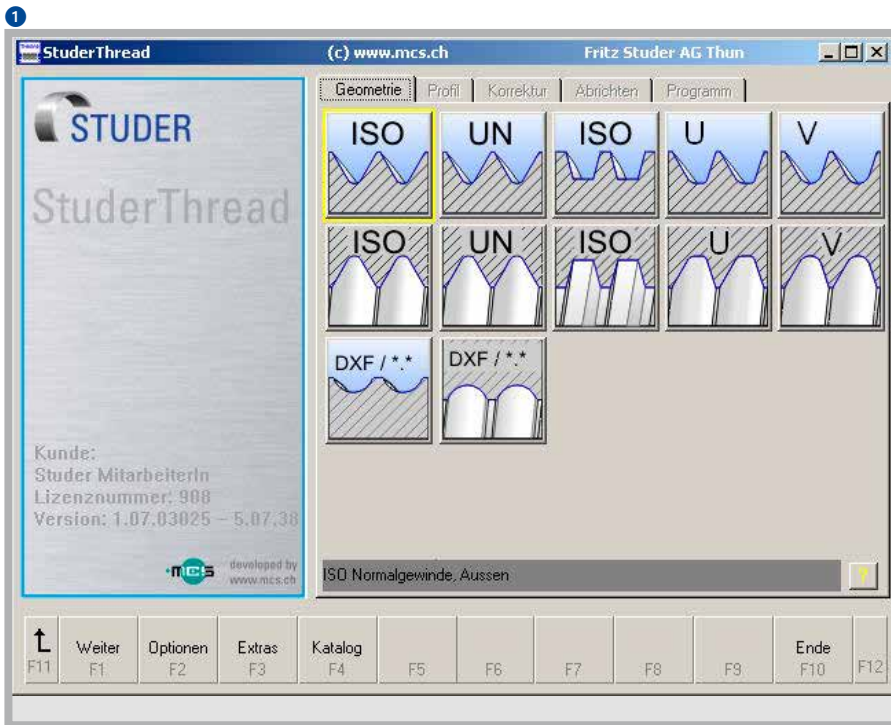
StuderPunch is the perfect software for grinding press and die punches with a high degree of automation. Designed for individual components and small-batch production runs, StuderPunch can be used on universal grinding machines and on production machines specially adapted for this process. The respective company know-how can be deposited in so-called production jobs.

- Numerous predefined, customer-specific die punch cross-sections and any die punch geometries in DXF format
- Fully automated and optimized for die and press punch component families. Very easy operation
- Special software-supported machining strategy for much more efficient material removal
- Lower tool costs thanks to reduced grinding tool wear
- Perfect workpiece surface without damage to the surface-near zone and high shape accuracy

1 Dialogue for cross-section definition
 2 Macros for punch cross-sections
 3 Dialogue for longitudinal section definition

4 Die punch application

Expansion module StuderThread



StuderThread expands a universal cylindrical grinder to give it the functionality of a thread grinding machine. This enables partial operations like thread grinding to be carried out in-house, thus saving time and cost. The most common thread types can be directly accessed. In addition, free-form thread profiles can be produced at any time.

- Preset standard threads or any thread geometries
- Spectrum from fixing threads to gauge accuracy
- Run-in and run-out grinding of threads
- Regrinding of pre-machined threads
- Combinable: Non-circular, circular, threads. All in a single clamping
- Multiple and single profile wheel technology



1 Macros for various thread types

2 Profile distortion calculation

3 Graphic representation of the dressing strategy

4 Application example: plunge-cutting a triple thread



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ISO 9001
VDA6.4
certified

