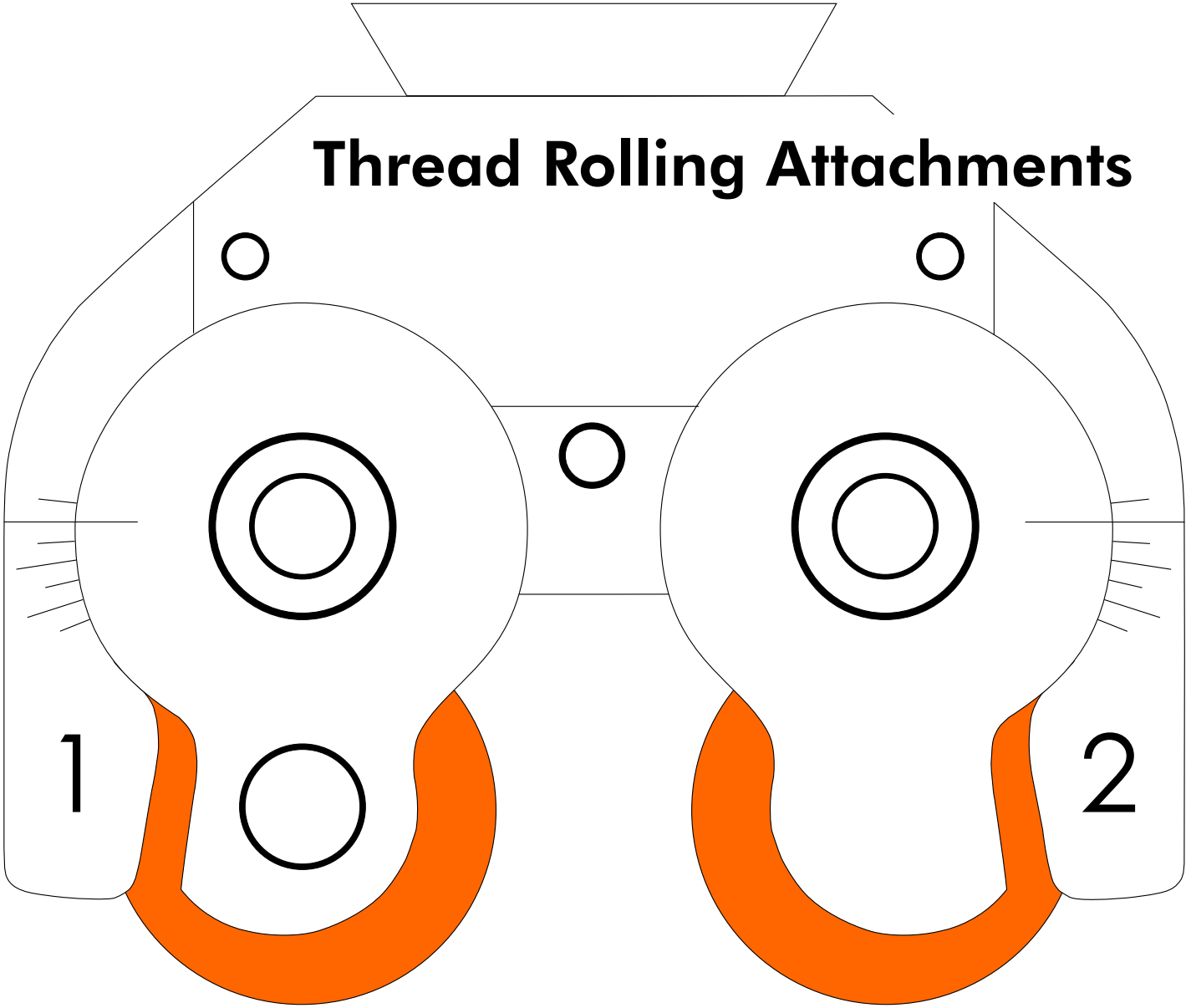


Thread Rolling Attachments



Aiming At Your Success

We claim:

- Only WAGNER® offers you all processes of producing **external threads**:
- Only the best is good enough for us! **Top Quality** has its origin in Pliezhausen:
- With our thread rolling attachments you **save** both time and money:
- Many **types of threads** can be rolled with our thread rolling attachment:
- A wide range of **work pieces** can be rolled with the thread rolling head

We prove:

Rolling – cutting – reducing diameters.

Complying with our consequent quality system, only first class materials are processed to high quality tools.

You only need one thread rolling head. The rolls may be changed quickly.

Right-, left- handed threads, regular type- and fine threads, conical threads and cylindrical threads or threads against the collar as well as special threads.

WAGNER®-thread rolling attachments process all cold-mouldable materials.





Thread Cutting Head



Multi-Cutter Turning Head



Thread Rolling Head

Dear reader,

we are a company specialised on the machining of external thread tools.

With our **thread cutting heads** one does cut threads on different materials, in various sizes and to an enormous good price all over the world for more than 100 years.

The **multi-cutter turning head** was developed for cutting precise diameters, and our **thread rolling head** is used in firms dealing with metal-machining for thread cutting, where besides speed and good value an enormous load bearing capacity of the threads is necessary.

Apart from the axial method, WAGNER® also offers **thread rolling attachments** for the tangential machining of cold- moulded materials.

On the following pages you will find more information about its wide range of application.

Yours sincerely,





Thread Rolling Attachment with adaptor for single and multi spindle lathes with cross slide



WAGNER® thread rolls

The Operation Range

The thread rolling attachment is an ingenious invention.

You are able to roll threads of the highest surface quality with a short manufacturing time. With the use of this tool workpieces are rolled tangentially.

Due to their uninterrupted fibre flow, the rolled threads can bear the heaviest loads. Thread rolling attachments are mainly used on CNC- and cam controlled single- or multi spindle lathes. You can also use them on special purpose machines.

The main **operation ranges** for WAGNER®-thread rolling attachments are the following:

- threads behind a collar
- threads close to a collar
- Very short threads
- threads with an occupied end of the workpiece
- threads with very short run-out
- workpieces which can't be rolled according to the axial method due to lack of space

The thread rolls match the threads to roll in diameter, gradient and shape. Each pair of rolls is built for one thread measurement.

The material is designed for the special tasks of the non-cutting metal forming technique as is the manufacturing of the thread rolls.

The adapter is the connector between the thread rolling attachment and the machine tool. The prismatic clamping facilitates a fast tool change as the exact positioning of the tool. The swinging support of the thread rolling attachment enables an automatic adjustment towards the middle part of the workpiece.

Types of threads:

WAGNER®-tool systems offers a wide range of thread rolls for cylindrical and conical threads, right- and left-handed threads as regular type and fine threads.

Besides we supply you with rolls for special applications such as the rolling of oil grooves, knurling, serrations or smoothing.

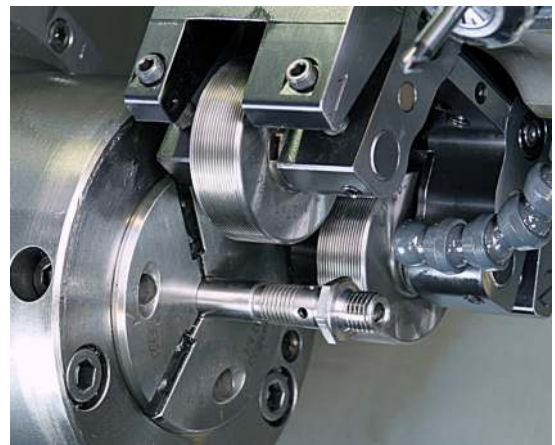
Installation sizes

WAGNER® thread rolling attachments are available in six installation sizes.

They are thus designed to roll a big diameter range.



A rolled thread in front of the collar



A just rolled thread behind the collar

The Process

The thread will be rolled cold-moulded. Calculating with a medium flank diameter, the thread core is pressed in so that the ousted material flows into the cone points.

The thread rolling attachment together with the adapter is installed on the tool girder for instance the side carriage of a machine.

It moves with constant infeed towards the rotating workpiece.

The thread rolls synchronized by a gearbox will be put into motion when contacting the workpiece. With the constant infeed of the tool girder they will roll the thread.

As soon as the thread rolls will be on top of the middle part of the workpiece, the return motion will begin and the workpiece will be released.

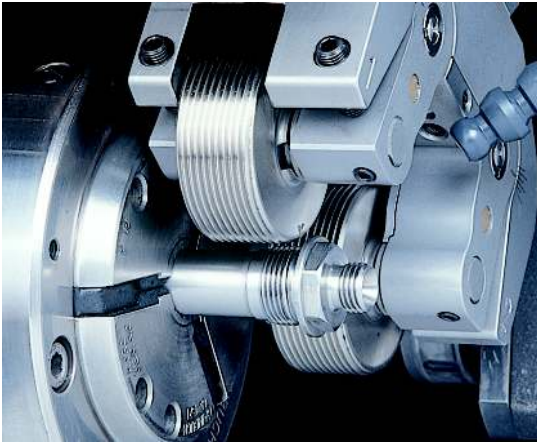
In order to roll one workpiece only a few turnings are needed. The exact number depends on the thread lead, material and the size of the tool.

The fibre flow of the thread profile is uninterrupted therefore a better ruggedness against the notch effect can be achieved.

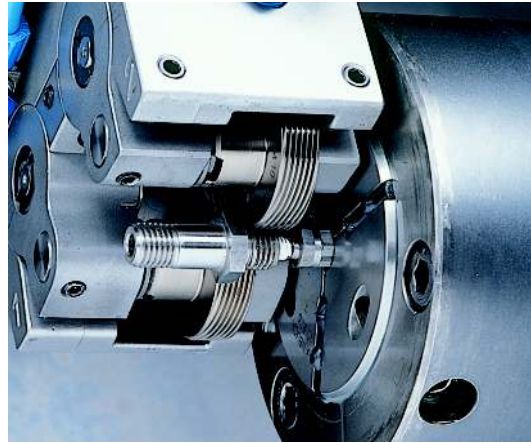
The surface of the thread is hardened and the flanks of the thread are burnished under high pressure. An outstanding feature of threads rolled with the thread rolling attachment is their high endurance limit, abrasion resistance and a high corrosion resistance.

More typical features of the thread rolling attachment are the following:

- Compared to other thread rolling processes the roll times are shorter.
- The infeed of the thread rolling attachment is related to the workpiece RPM therefore the adjusted spindle RPM may be maintained.
- The type of thread and the thread measurement are to be determined by use of the appropriate thread rolls.



Thread rolling close to a collar.



Thread rolling in case axial machining is not possible due to lack of space.

Preparation Of The Rolling Process

Preparation of the workpiece

The pre-machining of the workpiece is dependant on the nature of the flow of the material which takes place when rolling threads by cold- moulding.

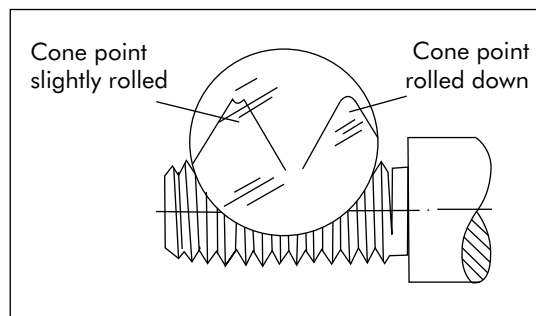
The volume which is displaced from the cone points of the thread profiles by the rolls via the thread core should be the same as the volume which flows into the cone points.

Therefore the pre-machining diameter needed for the rolling process approximately amounts to the flank diameter of the thread.

The flowability of the material is important, too. The exact pre-machining diameter can be only determined by testing. It has to be such that the external diameter of the thread with the appropriate flange diameter won't be rolled over, but just slightly rolled.

If the external diameter is rolled over the thread rolls will be overstressed and will break eventually.

Modifications of the pre-machining diameter affect the external diameter of the rolled thread by the amount 3 to 5.



Chamfering

At the start of the thread and at the tap clearance the pre-machined workpiece needs to be chamfered with a chamfer of 30° (even to the axis of the workpiece).

The chamfer should start 0.1 to 0.4 mm below the minor diameter according to the flank lead. A chamfer of 30° produces a thread run-in or to be precise a run-out of approximately 45°.

The thread service life will be diminished by steeper chamfers! Besides the run-ins of the threads will be damaged should the rolling process be continued.

If the thread is rolled on the free end of the workpiece, chamfers which are too small lead to bends on the plain surface.



WAGNER® Thread Rolling Attachment with an adaptor with VDI-shank for CNC lathes



WAGNER® Thread Rolling Attachment in short build for CNC lathes with star revolver

Working With The Thread Rolling Attachment

Suitable materials

The material has to be cold- moulded.

The breaking elongation of the material is dependant on the amount of the moulding process. For materials up to 800 N/mm² the breaking elongation of fine threads should amount at least to 7%. As far as trapezoid threads are concerned the breaking elongation should amount at least to 12%.

If the breaking elongation is appropriate, fine threads can be rolled up to approximately 1000 N/mm². However, alloyed steels possessing a high strength and a low elongation are not suitable. Free-cutting brass isn't suitable either.

Cooling- Lubrication

Ample supply of the cooling- lubricant is needed. Emulsions from 8 to 10 % and low viscosity oils used for chip-removing work have proven to be worth. The filtering of the coolant lubricant is essential so that no chips will be rolled into the thread or stick into the roll bearing.

Thread Rolls- Service Life

The tool life quantity of the rolls is dependant on a lot of factors.

Usually, it will last from some thousand up to a hundred thousand threads per set of rolls.

Please take note of the following factors which impact the tool life quantity of the rolls:

- Strength- and elongation of the material δ_5
- Hardness of the material when using cold-forming technology
- Rolling degree of the thread
- Approved performance of the run-in and run-out phase
- Proper setting and appropriate mounting onto the machine
- Roll speed and infeed of the tool
- Quality and supply of the coolant lubricant
- »Chip-free« workpieces which implies that the workpieces must be cleaned from chips and the thread rolls before starting the rolling process.

Setting of the thread rolling attachment

By use of the micron setting gauge the thread rolling attachment can be adjusted quickly and exactly on the machine on the middle part of the workpiece.



WAGNER® Thread Rolling Attachment B 8-W



WAGNER® Thread Rolling Attachment B 10-W

Features Of Construction

Evening out of the infeed

One roll rotates opposite towards the infeed direction of the thread rolling attachment. The forces resulting thereof will be evened out and guarantee a synchronous running of the thread rolls. This is also the case should both of the rolls don't touch the workpiece at the same time.

Swinging support in the adapter

By this feature of construction an even distribution of the moulding forces onto the thread rolls will be achieved. This results in a reduced tool abrasion.

An automatic alignment towards the middle part of the workpiece is guaranteed through the swinging of the thread rolling attachment.

Roll bearing at the side

The side forces working on the thread rolls are taken up by axial groove bearings. This has got a positive effect when rolling conical threads.

The fast tool changing setting

The dove tail guiding as connection between the thread rolling attachment and adapter allows a fast detachment of the thread rolling attachment for changing the thread rolls.

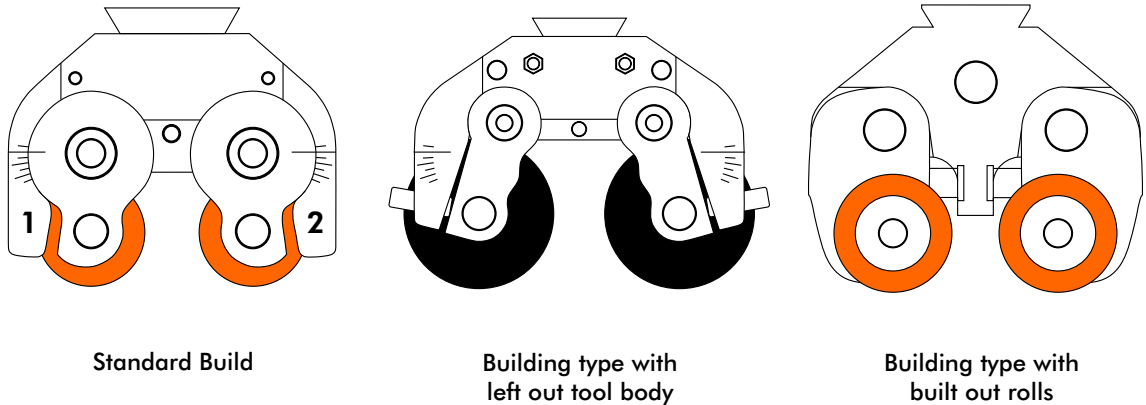
By an adjustable stop the thread rolling attachment will be put back in the same position to the workpiece and will be clamped.

Service unit

WAGNER® thread rolling attachments are designed service-friendly.

Additionally, we supply you with an oil mist lubrication.

A flawless lubrication can be achieved as well as the entering of dirt and chips into the thread rolling attachment can be avoided.



Assembly And Bringing Into Service

The assembly of the adapter onto the carriage of the machine is done quickly and easily. Afterwards the thread rolling attachment is set in five steps before bringing it into service.

1. Mounting of the thread rolls

The thread rolls are built into the thread rolling attachment by taking off the roll bolts. Then you insert the thread rolls and secure the roll bolts with two screws.

Thread rolls for cylindrical and conical threads may be changed without any additional devices.

2. Setting of the roll distance to the core diameter of the workpiece

By means of the delivery screws you can adjust the arms until both thread rolls touch the workpiece or the setting gauge. The upper and lower arms can be set evenly by a scale.

3. Setting of the thread rolls

By turning the adjusting screw, you can position the thread rolls neatly.

As a result the markings on the thread rolls should be vertical.

You can set the thread rolls directly on the built in thread rolling attachment that is on the machine.

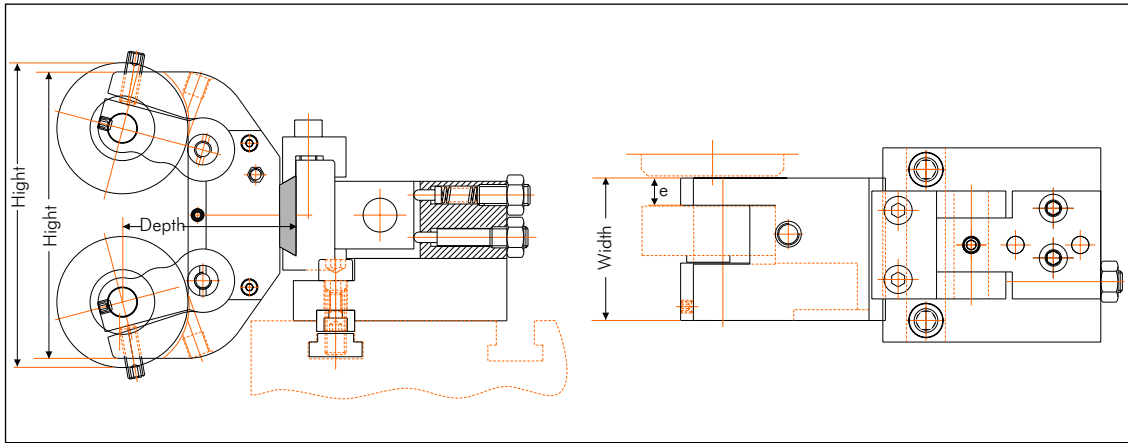
4. Setting on the machine

You can set the thread rolling attachment to the middle part of the workpiece quickly and easily on the machine with our provided micron setting gauge.

A setting gauge usable for the whole working range is available for each type.

5. Mounting onto the adapter

The dove tail guiding functions as a connection between thread rolling attachment and adapter. You can mount and dismount the thread rolling attachment without changing the position to the workpiece.



A Thread Rolling Attachment on a cross slide

Technical Data

- WAGNER® thread rolling attachments enable a long service life of the rolls. The rolls are of big size which means a long thread profile line is available for abrasion.
- WAGNER® thread rolling attachments roll highly precise thread profiles as both of the rolls are synchronised by very robust gear-box wheels. By means of an adjusting screw the thread rolls can be adjusted precisely. WAGNER® provides you with a state of the art thread rolling equipment.
- WAGNER® thread rolling attachments possess a large cut-out which allows the building-in of state of the art thread rolls as far as size and diameter is concerned.
- You won't have a lot of expenses for spare parts since the WAGNER® thread rolling attachment is very sturdily build and will last for a very long time. Each tool meets highly standards for stability and rigidity.
- The tool body of the WAGNER® thread rolling attachment is solid and rigid. Thus the moulding forces will be taken up directly in the tool body during thread rolling without stressing the rolls.

Type	Metric Norm Thread Desired-Ø	Metric Fine Thread Desired-Ø	Thread length max.	Weight kg		Max. Feed force N	Dimensions			Dimension »e«
				Tool with rolls	Adaptor		Width	Height	Depth	
B 8-W	1.6 - 12	2 - 13	14	1.0	appr. 1.5	1600	36.6	76.2	47.5	6.5
B 10-W	2 - 16	3 - 16	19	2.1	appr. 1.7	2490	50	92	65	10
B 13-W	3 - 22	3 - 30	25.5	3.8	appr. 2.0	4890	66	114	79.5	13
B 15-W	6 - 22	6 - 45	25.5	4.5	appr. 2.0	5700	66.2	135 to 147	83.4	13
B 18-W	6 - 27	6 - 42	32	7.0	appr. 3.0	6230	79	156	95.5	16
B 36	8 - 33	8 - 56	32	11.5	appr. 4.5	9790	90	200	115	21

Measures in mm



Plug body



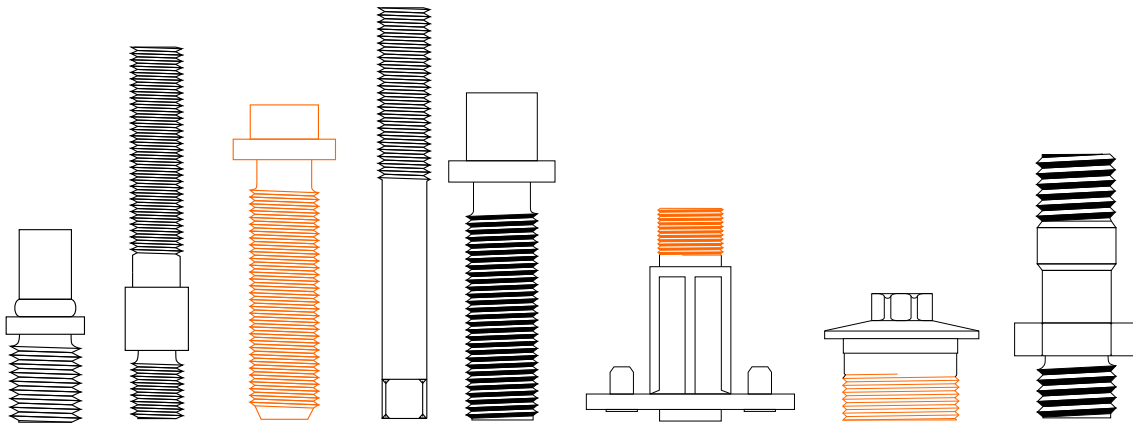
Threaded joint



Injector Body

Examples Of Production And Performance

Workpiece:	Plug body	Threaded joint for cable supply	Injector body
Thread:	NPT 1/8 - 27	M 14 x 1.25	M 15 x 0.5
Material:	Machining steel	C 35	C 45
Tool size:	B 15-W	B 13-W	B 15-W
Shape of the rolls:	K 2	C 1	C 2
Rolling speed:	50 m/ min	60 m/ min	78 m/ min
Necessary turnings of the workpiece:	19	18	27
Tool life quantity per pair of rolls:	150.000 Stück	40.000 Stück	80.000 Stück
Cooling lubricant:	Oil	Emulsion	Öl
Type of machine:	Multi spindle turning lathe	Single spindle turning lathe	Multi spindle turning lathe
Manufacturer:	Index	Gildemeister	Schütte
Type:	MS 42	CTX 200 E	AFH 130
Location of the spindle/ carriage:	Position 5.1	Revolver	Position 6
Type of infeed:	CNC-controlled 0.26 mm/ revolution	CNC-controlled 0.25 mm/ revolution	Cam-controlled 0.12 mm/ revolution
Remark:	Compared to chasing thread is rolled to save time.	Thread is rolled owing to screw-in abrasion (surface density).	For stability reasons a rolled thread is needed.



Tool Standards

- Long service life of the rolls: will be achieved by large rolls. Owing to their big size a long thread profile line for abrasion is available.
- Very precise thread profiles: The rolls are synchronised by very solid gear-box wheels. By means of an adjusting screw, thread rolls can be synchronised precisely. Thus a state of the art thread rolling process will be achieved.
- Large cut out in the tool body: is needed for building in of the matching thread rolls as far as size and diameter is concerned.
- Low expenses of spare parts: A thread rolling attachment should last long and should be solidly built. Each tool should meet the highest standards of stability and rigidity.
- Rigid, solid tool body: Thus the moulding forces are taken up directly in the tool body during thread rolling without stressing the rolls.

Comparison

Thread Cutting

= chip-removing

Strength:

lower, as the fibre motion of the work piece will be interrupted.

Notch effect in the groove of the thread.

Manufacturing time:

Cutting time: 3 - 40 m/min.

Deep thread profiles have to be cut in several steps.

Higher primary processing times, but shorter set-up time because of tool default.

Preparation of the moulding blank:

The initial diameter can be of the same size as the external diameter of the thread.

It may also be bigger since an excessive amount can be removed.

The moulding blank need not be chamfered.

Subsequent machining:

A cut thread can be finished off at anytime.

Finishing quality of the thread flank:

dependant on the work piece and the cutting conditions. The rougher the surface the more likely is it to corrode.

Tool costs:

very low as the chasers can be reground.

Material:

Non cold-moulded work pieces such as cast iron, annealed cast iron and gun-metal can be cut.

Thread Rolling

= non-cutting

Strength:

higher, because of strain hardening of the work piece. Fibre motion of the work piece won't be destroyed resulting thereof is a higher static and dynamic tensile strength.

Manufacturing time:

Rolling time: 30 - 100 m/min.

The thread will be rolled in just one step.

Very short primary processing times, higher set-up times when setting the tools.

Preparation of the moulding blank:

The initial diameter has to be prepared in tight measurements. The processing diameter approximately complies with the effective diameter.

The exact diameter can be obtained through testing. You will need a chamfer with a chamfer angle of 12-30°.

Subsequent machining:

Subsequent machining is hardly possible owing to the work piece's hardening of rolled threads.

Finishing quality of the thread flank:

very high since it is burnished.

Very low falling gradient.

Tool costs:

high cost-effectiveness with large-volume because of the very high tool service life.

Material:

All cold-moulded work pieces owing to the non-cutting moulding can be rolled. Easy to process for long-chipping work pieces.



Thread Cutting Head



Large Head



Multi-Cutter Turning Head
MSD



Thread Rolling Head

WAGNER® thread rolling technology for efficient rolling of threads of small and serial parts

WAGNER® Thread Cutting Heads cut external threads quickly and with clearance. There is a multitude of installation sizes including graded cutting ranges. High chipping performance and short cutting times guarantee full use of the power of modern machines. Large Heads cut external threads in a wide diameter range. They are individually built for performing heaviest chipping tasks.

The patented WAGNER® Multi-Cutter Turning Head allows fast thread cutting with high precision. Four reversing plates, a wide diameter range, central fitting as well as lifting of the cutting edges when reversing are just some of the excellent features of the MSD.

Our axial Thread Rolling Heads roll external threads at a high speed showing all the advantages of cold- moulding. Not only are their diameters adjustable but also do they fit for various types of threads and machines.



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