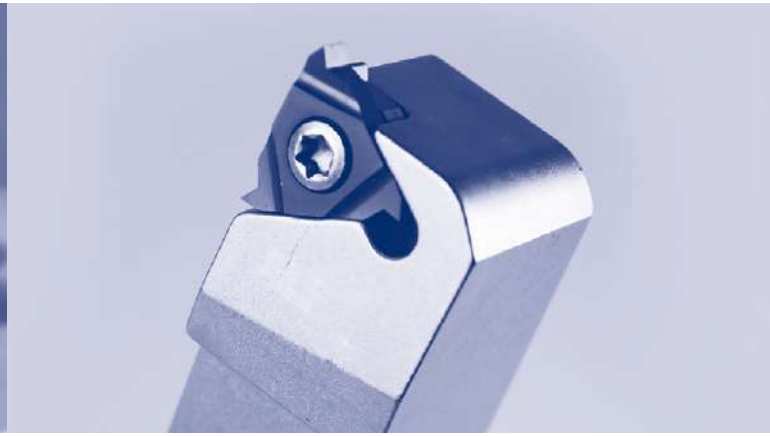
LAMINA TECHNOLOGIES



CUSTOMER INFORMATION 2021

TURNING · MILLING · DRILLING

'Unbeatable Swiss quality'

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A company from the Triton Group, Lamina Technologies is a Swiss manufacturer of carbide tools and specialises in submicron-grade indexable inserts with PVD coatings for use in milling and turning applications. All production processes associated with our carbide products are performed in house and deliver consistent, unbeatable quality (as befits a Swiss company).

Our factory is equipped with state-of-the-art production machinery, which is only ever operated by specialist personnel. This ensures our products offer excellent quality – without exception.

SWISS PRECISION AND AUTOMATED PRODUCTION

Overview of production process

Packaging and labelling
- Visual inspection (100%)

Powder
- Quality control
- Chemical analysis

Pressing
- Checking of indexable insert thickness after pressing
- Visual inspection

Sintering
- Laboratory supervision
- Checking to guarantee tolerances

Rounding of cutting edges
- Checking of cutting edge radii

Coating
- Controlled adhesion
- Controlled coating thickness

MARKET SITUATION

Why switch to Lamina products?

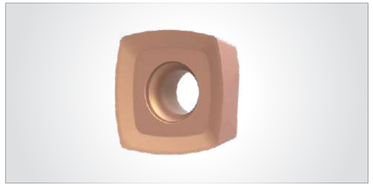
With Lamina products, you avoid:

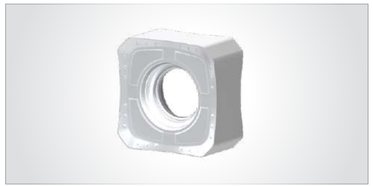
- Needing a specific tool for each application
- Building up large inventories
- Not being able to choose short order cycles
- Undue complexity in terms of inventories and production
- Complex stock management arrangements
- Generating high storage costs
- Being left with obsolete inventories
- High error rates, i.e. due to the use of incorrect tools
- High reject rates
- Additional training requirements for employees

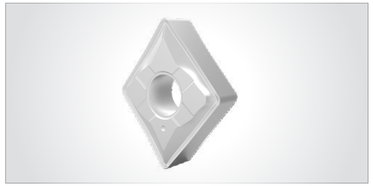
THE LAMINA SOLUTION

The biggest possible reduction in production costs is achieved by reducing non-productive time!

With Lamina products, you get the quality you expect at a fair price







'Unbeatable Swiss quality'

THE MULTI-MAT™ CONCEPT

THE MULTI-MAT CONCEPT™

The Multi-Mat™ concept has been developed by Lamina in close collaboration with our customers from the machining industry.™ By using the same indexable insert for a range of materials, you benefit as follows from a production perspective:

- Increased efficiency for your production
- Reduced production costs
- Increased flexibility
- Drastically reduced inventories in terms of indexable inserts

Steel
Example: 42CrMo4

Stainless steel
Example: V2A, V4A

Cast iron
Example: EN-GJS-400-15

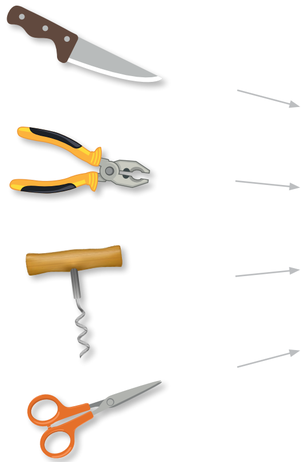
Superalloys
Example: Inconel 718

Hardened materials
Example: 440C

Aluminium and non-ferrous alloys
Example: AlMgSi

THE MULTI-MAT™ CONCEPT | THE OPTIMISED SOLUTION™

Lamina Technologies has developed a convincing alternative in the world of cutting tools



24 HOURS
7 DAYS A WEEK
365 DAYS A YEAR

A handy comparison: Lamina cutting tools are a bit like a Swiss Army knife – versatile, innovative and universal!

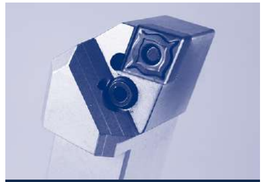
What makes our product so effective?

AVAILABILITY.

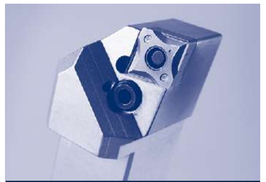
We have developed and are the pioneers of the Multi-Mat™ concept.

Development of unique carbide quality to deliver excellent performance parameters for the majority of materials.

OUR OFFER



Turning



Aluminium turning

Punching

Threading

Milling

Aluminium milling

Drilling

Thread milling

Solid carbide milling

Lamina is up for the tough challenges presented by mechanical production and the ever-increasing requirements associated with metal machining.
The Lamina range offers our customers a manageable number of innovative machining tools that allow them to take care of practically all their production tasks in a satisfactory manner.
The focus is on giving customers value for money, backed up by first-class service and unbeatable availability.

OUR OFFER

Dual product range approach

Lamina Technologies strives to provide our customers with the best products for their machining tasks.
We combine the best substrates, coatings and geometries for your application.

Following the tremendous success of our Magia Pro LT 3130 type, Lamina is expanding its product range.

MAGIA PRO

- Magia Pro is our product range for unbeatable machining performance
- Special types and selected geometries have been chosen for their impressive qualities and long service life
- Significant R&D investments in the development of cutting tools for specific materials and applications

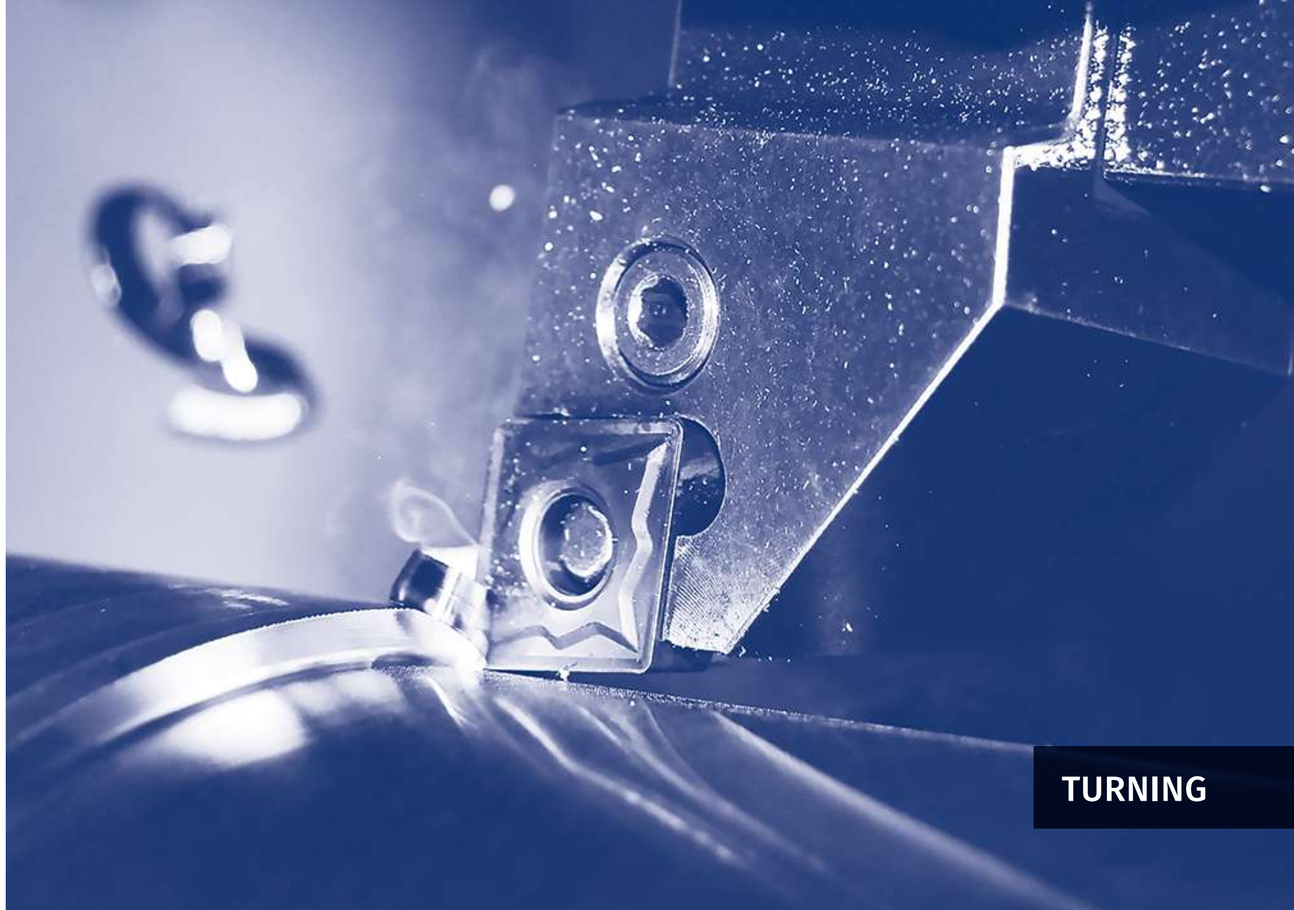
MAGIA

- For customers who need unbeatable performance and flexibility, particularly in the case of stoppages with short production runs
- Multi-Mat™ types that outperform our competitors in the market for most applications
- High-performance Multi-Mat™ types for unbeatable machining performance and great versatility

ALPHA

- Lamina's groundbreaking universal type
- Outstanding performance at an attractive price
- Best choice for machining facilities with short product runs

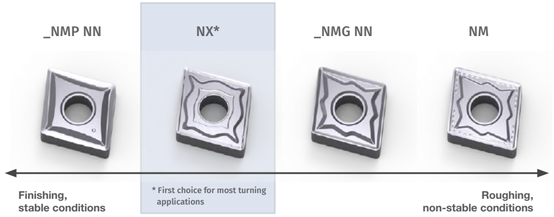
	TURNING	MILLING
PREMIUM	MAGIA PRO LT 1125P	MAGIA PRO LT 3130 P M
PREMIUM	MAGIA LT 1000 MULTI-MAT™	MAGIA LT 3000 MULTI-MAT™
STANDARD	ALPHA LT 10 MULTI-MAT™	ALPHA LT 30 MULTI-MAT™

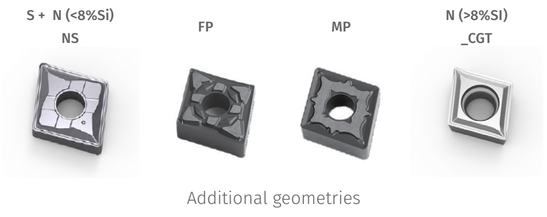


TURNING | CHIP BREAKER

For negative turning inserts

Multi-Mat™ chip breaker

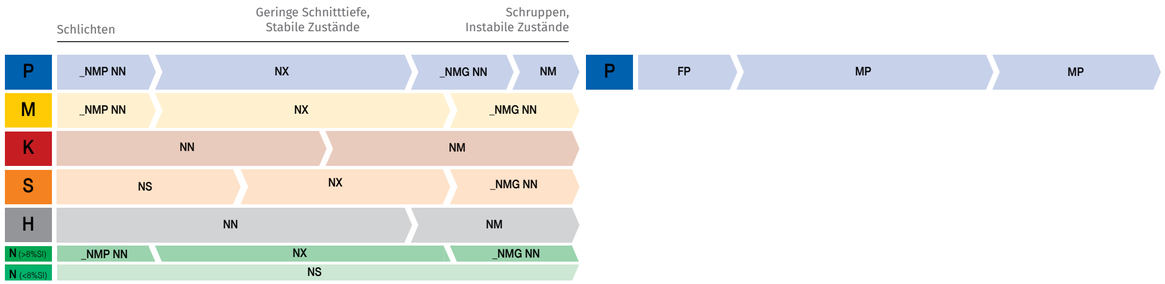


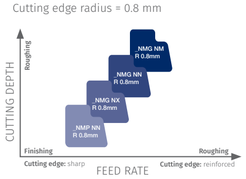


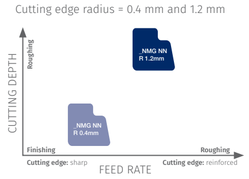
Additional geometries

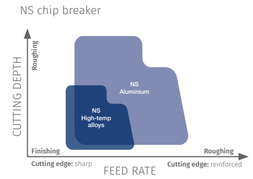
TURNING | CHIP BREAKER

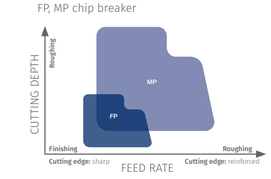
For negative turning inserts











TURNING | CARBIDE TYPES

First choice for universal machining

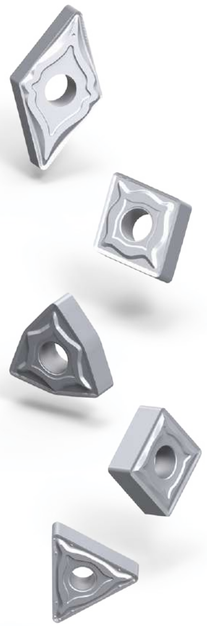
LT1000 | PVD coating

LT 1000 is the most versatile type.
It can be used for a range of materials.
It is suitable for customers with small batches, different
machining applications and various workpiece materials.
Whether you need to machine low-carbon steel, alloyed steel, stainless steel,
cast iron or even unusual materials such as Inconel or titanium alloys.
LT 1000 is the only type you need.

- Outstanding combination of hardness and resilience
- A few indexable inserts cover all your machining requirements
- Swiss made for unbeatable quality
- Attractive price

MAGIA

MULTI-MAT™



TURNING | CARBIDE TYPES

A breakthrough in the machining of superalloys

LT1125P | MT-CVD TiCN/Al203 coating

Lamina's new Magia Pro LT1125P can significantly extend insert tool life.
This is achieved with a combination of advanced substrate surface and coating technologies. The substrate includes both a hard heat resistant core to provide resistance to thermo mechanical load and a cobalt enriched surface zone to provide toughness.

The grade is coated with an advanced MT-CVD TiCN/Al2O3 coating that offers high resistance to abrasivewear. It also acts as a thermal barrier and has low chemical affinity to the workpiece material.

LT1125P is optimized to resist plastic deformation and has a good combination of wear resistance and

toughness. These features make the grade the first option for roughing and finishing of ISO P materials.

LT1125P can operate in a wide range of parameters including high cutting speed and high metal removal rates.

A chip breaker innovation

MAGIA PRO

NEW NS CHIP BREAKER

- Sharp edges to cope with even the trickiest titanium alloys
- Specially designed deflectors facilitate chip flow and prevent retention of heat in the working area
- Very positive geometry for better results

NX CHIP BREAKER

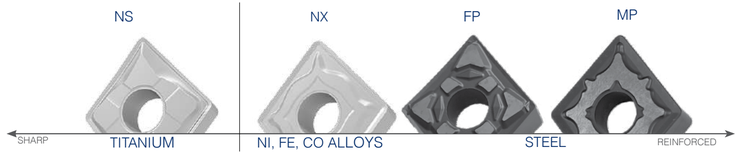
- Completely positive rake angle
- Precisely positioned deflectors
- Tolerance of unevenness to avoid crater wear

FP CHIP BREAKER

- Positive chipbreaker developed for negative inserts under 0.4 corner radius
- Positive cutting edge brings small cutting pressure leading a good chip control
- Under applications for soft steels with very low carbon content it keeps the best surface roughness

MP CHIP BREAKER

- Chip breaker developed for negative inserts for a big range of application related to the depth of cut and feed
- It is the first choice for steel applications combined with LT 1125P grade
- Applying the MP chipbreaker will eliminate the use of different insert types for each application and therefore reduces the stocked items



TURNING | CARBIDE TYPES

First choice for machining stainless steel

LT 1115M/LT1125M | CVD MT-AI203 coating

LT115M — Dedicated grade for general stainless steel turning.

1st choice for medium to high cutting speeds under stable conditions. With the new CVD MT-Al2O3 coating and adhesion resistance due to the Post-coating treatment, it realizes stable, long tool life and high resistance to Notch wear.

LT125M — Dedicated grade for interrupted cuts on stainless steel.

1st choice for low to medium cutting speeds under unstable conditions. A new substrate combined with the latest CVD MT Al2O3 coating greatly improves consistency of tool life, avoiding premature peeling of the coating and chipping of the cutting edge.

RM CHIP BREAKER

- Reinforced cutting edge for heavy continuous and interrupted cut
- Even when using low cutting speeds, the positive rake angle avoids the built up edge
- First choice combined with the grade LT 1125M for unstable conditions

MM CHIP BREAKER

- Positive cutting edge and very precisely positioned deflectors enhance chip control and reduce the notch wear
- First choice combined with the grade LT 1115M for semi-finishing operations under stable conditions using moderate to high cutting speeds.

FM CHIP BREAKER

- Highly positive cutting edge, specifically for small depths of cut (0.4mm)
- The positive rake angle gives a smooth cut and improves surface finish
- It is the first choice for finishing operations using high cutting speeds

MAGIA PRO

TURNING | ALUMINIUM

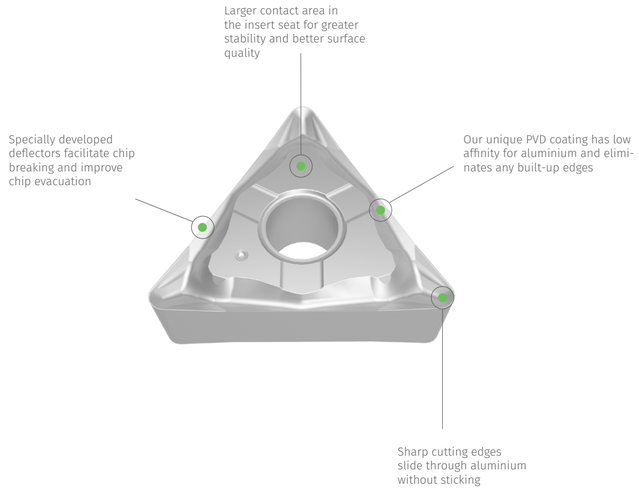
LT 05 | Our aluminium turning is now more effective

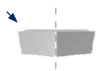
MAY WE INTRODUCE: THE NEW NS CHIP BREAKER LT 05

Our successful aluminium turning range has been improved by combining our unique PVD coating and our ultra-fine-grain substrate with the newly developed NS chip breaker for impeccable aluminium turning.

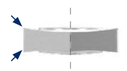
The new NS chip breaker has a larger contact area in the insert seat, which ensures greater stability and therefore better surface quality.

Lamina's _CGT turning geometries are one-sided positive indexable inserts, whereas our _NGG geometries are double-sided and fit all standard ISO tool holders.



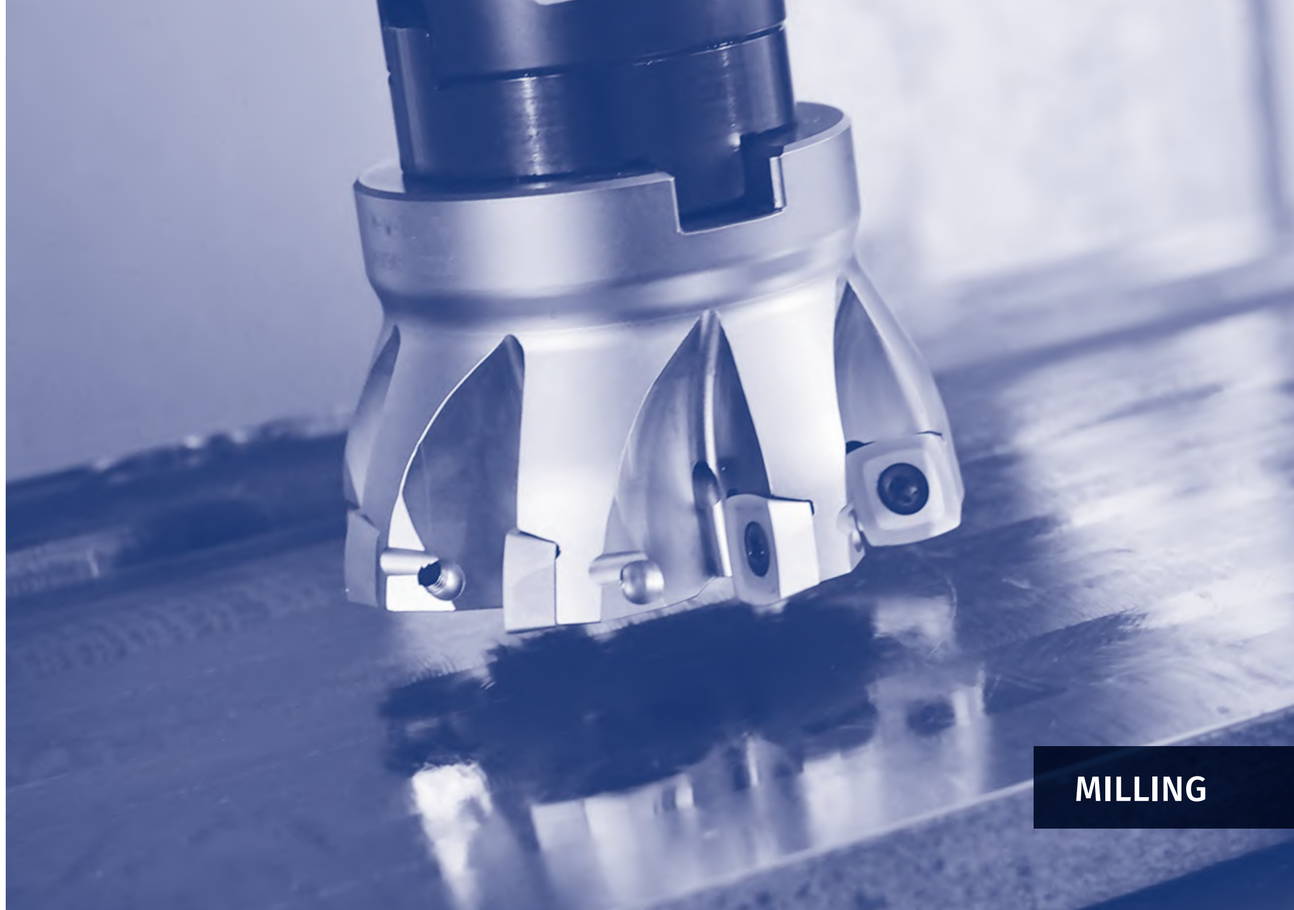


STANDARD ONE-SIDED POSITIVE INDEXABLE INSERT _CGT



LAMINA DOUBLE-SIDED NEGATIVE INDEXABLE INSERT _NGG

'Unbeatable Swiss quality'



MILLING

MILLING | UNIVERSAL CARBIDE TYPES

MULTI-MAT™ the universal type for general machining

LT30, ultra-fine grains, PVD-coated

ALPHA

- Traditional Multi-Mat™ type
- Highly versatile
- Wide range of applications

Lamina's standard milling type with a proven track record

LT3000, premium ultra-fine grains, PVD-coated

MAGIA

- Denser microstructured coating
- Smoother coating
- Low wear
- Gradual and predictable wear
- Greater flexibility
- Broader range of applications

MILLING | CARBIDE TYPES

First choice for machining steel and stainless steel

LT 3130, premium submicron, PVD-coated for steel and stainless steel

Lamina Technologies is proud to present its new Magia Pro range for improved high-performance machining

Groundbreaking types and selected geometries chosen for their impressive range of possible applications and greatly extended tool service lives

Significant R&D investments in the development of cutting tools for specific materials and applications

Our Magia Pro LT 3130 type has been specifically developed to deliver great performance when working with conventional and stainless steels

The low coefficient of friction reduces the amount of heat generated and offers outstanding thermal stability during milling at high speeds

The greater hardness offered by our LT 3130 indexable insert greatly improves service life and ensures exceptional wear resistance to reduce interruptions during production.

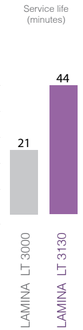
MAGIA PRO

TEST REPORT

APKT 1003 PDTR

M AISI 304

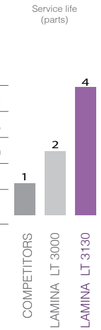
PARAMETER	
Vc (m/min)	220
fz (mm/z)	0.12
Ap/doc (mm)	2.0
Ae/woc (mm)	10.0
Coolant	no
Cutter diameter	25



SDKX 0904-HF

P Low-alloy steel 4340

PARAMETER	
Vc (m/min)	228
fz (mm/z)	1.11
Ap/doc (mm)	0.25
Ae/woc (mm)	20.0
Coolant	no
Cutter diameter	50



MILLING | SURFACE MILLING

EFFICIENT SOLUTIONS

Surface milling is a good option for fast machining and when machining large objects or surface areas.

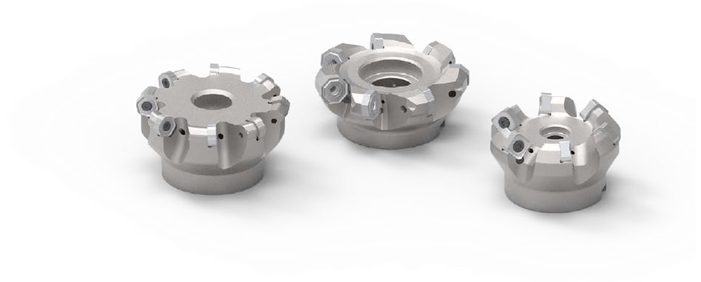
- Wide variety of geometries
- Economical geometries with up to 16 cutting edges
- Makes it possible to use smaller diameters with a view to machining large workpieces

SELECTED GEOMETRIES

SNKX-45
- Right-angled positive indexable insert with 8 cutting edges
- Full Multi-Mat™ flexibility in a thick and strong indexable insert
- Positive cutting edges ensure soft and stable cutting

ONKX
- Double-sided octagonal indexable insert for use in surface milling
- Economical solution with 16 cutting edges!
- Roughing and pre-finishing
- Recommended for use with steel and cast iron – with a cutting depth of up to 4.5 mm

HNKX
- Double-sided hexagonal indexable insert for use in surface milling
- Multi-Mat™ indexable insert with 12 cutting edges
- Magia LT 3000 Multi-Mat™ and Magia Pro LT 3130 for conventional steel and stainless steel



MILLING | SIDE MILLING

SOLUTIONS FOR HIGH METAL REMOVAL RATES

90° indexable inserts are suitable for a large number of applications.

These include
- Shoulder milling
- Plunge milling
- Pocket milling
- Surface milling
- Ramp milling
- Circular milling

Pictured here:

APKT
- Multi-Mat™ geometry for maximum versatility
- Precise 90° shoulders
- Excellent ramp milling performance

MILLING | HIGH-FEED MILLING

SOLUTIONS FOR HIGH METAL REMOVAL RATES

INCREASE PRODUCTIVITY AND REDUCE COSTS

Using a shallow cutting depth with a narrow angle of approach ensures the axial cutting forces are directed towards the machine's spindle. This leads to greater tool stability and therefore more stable cutting, as well as significantly reducing vibrations.

- Excellent machining performance
- Potential for a 10-fold increase in feed rates compared with normal rates

As a leading provider of milling solutions, Lamina is constantly expanding its HF milling range. Our product range covers diameters from 3 mm to 80 mm, so we have the solutions
to increase your productivity across a wide range of milling applications and workpiece materials.

For details of HF solid carbide cutters, please see
the section on solid carbide cutters (page 31 onwards).

MILLING | COPY MILLING

SOLUTIONS FOR COPY MILLING

BENEFITS OF ROUND INDEXABLE INSERTS

Versatile, so can be used for copy, surface, ramp, plunge and pocket milling and also helical interpolation

Strongest indexable insert shape
- Reliable performance, even for challenging applications
- Strongest indexable insert shape, no corners that can break

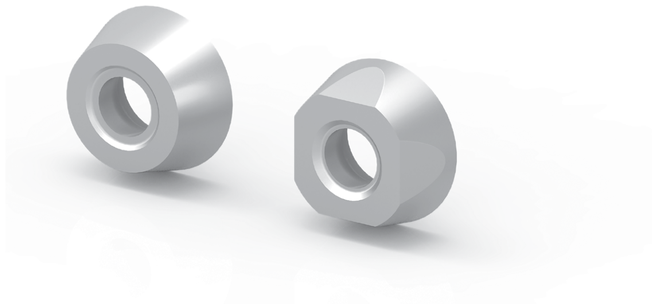
Economical solution
- Numerous cutting edges on each indexable insert
- 4-8 actual rotations, depending on the cutting depth

Even and stable cutting
- Even with long overhangs
- Good distribution of cutting forces

NEW PRODUCTS – RX.. INDEXABLE INSERTS WITH FACETS

Lamina Technologies is introducing 3 new round indexable insert geometries with facets: RXMT, RXMW and RXMX.

- Facets ensure indexable inserts are more stable following insertion
- Greater stability (after insertion) makes it easier to machine challenging materials under difficult conditions
- Achieve higher feed rates and cutting speeds
- Available in Magia LT 3000 and our new Magia Pro LT 3130 for steel and stainless steel

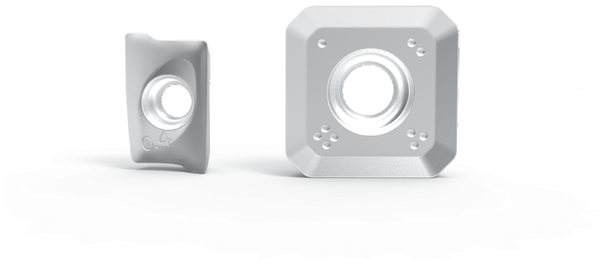


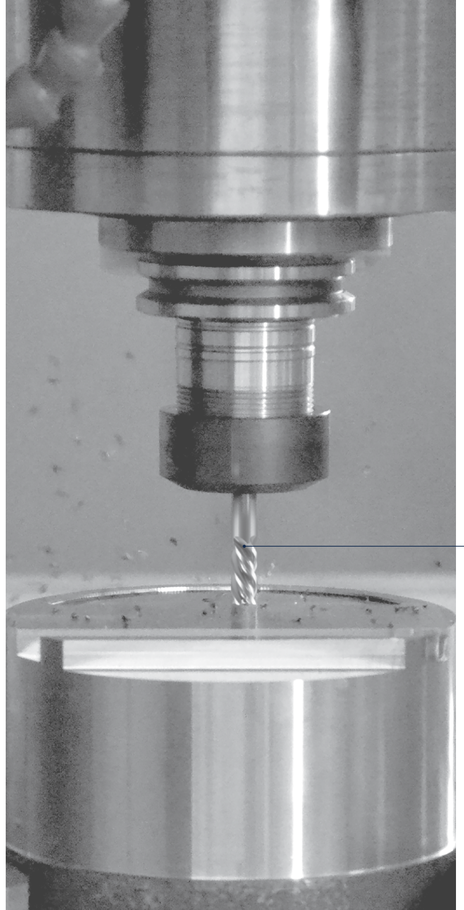
MILLING | ALUMINIUM MILLING

LT 05 ALUMINIUM TYPE

- Specifically designed for aluminium and other non-ferrous metals
- Also suitable for titanium
- Low friction
- Good resistance to built-up edges
- Extremely long service life

Very positive indexable inserts with a unique coating Ideal for 90° shoulder milling and 45° surface milling of aluminium.





MILLING | SOLID CARBIDE MILLING

LT 4000 PREMIUM MULTI-MAT™ TYPE FOR SOLID CARBIDE CUTTERS

With the Magia LT 4000 type, we have managed to combine state-of-the-art PVD technology with high-density plasma to create nano-structured PVD coatings with excellent properties.

Thanks to this new PVD technology combined with our exclusive substrate and edge preparation methods, Magia solid carbide cutters provide greater resilience for the most extreme applications as well as better reliability at lower cutting speeds with emulsion. This opens up a broader range of potential applications for the user.
We have increased tool service life by reducing friction between the coating and the chips and using a harder composite material for the coating, which is more resistant to abrasion.

Summary:

- The next generation of Multi-Mat™ solid carbide cutters
- Greater resilience for a broader range of applications
- Longer service life due to the use of a new, unique coating
- New and exclusive ultra-fine-grain coating
- Exclusive edge preparation method and surface treatment prior to coating
- Unique substrate

MAGIA

'Unbeatable Swiss quality'

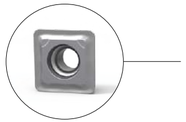
DRILLING

DRILLING | SOLID DRILLING TOOLS

Multi-Mat™ indexable inserts offer drilling solutions for a range of materials.

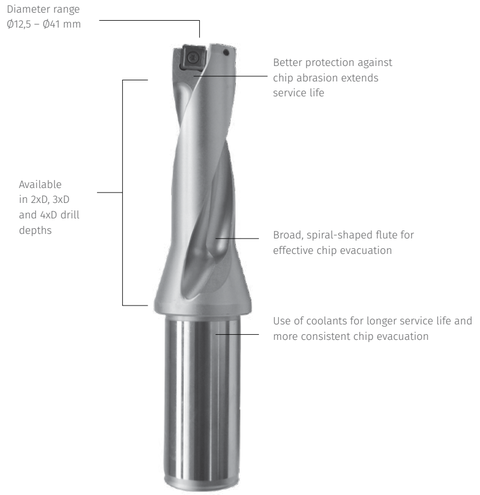
SPMG-Multi-Mat™ indexable inserts for drilling are designed to offer optimised quality and geometry for very high performance levels when working with steel, stainless, steel, cast iron and hardened metals.

SPMG-MULTI-MAT™ INDEXABLE INSERTS



- Same indexable insert, inner and outer pocket
- Multi-Mat™ quality and geometries offer greater versatility and help reduce inventories of unused indexable inserts
- 4 cutting edges

COMPLETE RANGE OF 2X, 3X AND 4XD DRILLING TEMPLATES



LAMINA TECHNOLOGIES

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