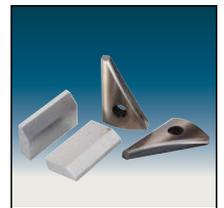
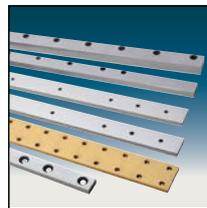




# NEUENKAMP Slitting Technology

for: Steel Stainless Steel Special Alloys Aluminum Non-Ferrous Metal OEM





**NEUENKAMP** Germany

Production Plant 1



Production Plant 2

Dienes Group:



Germany



USA



BELGIUM



POLAND

## Product range

<b>Roll Shear Knives</b>	<b>4</b>
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<b>Spacers</b>	<b>6</b>
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## Roll Shear Knives

for Slitting- and Trimming-Lines



Manufactured from forged alloy tool steels, high speed steels, Neuenkamp special steels and particle metallurgical high performance steels.

Heat treated by employing monitored and process controlled equipment.

Material selection and hardness values according to the knife applications.

Precision and "Ultra Precision"

Tolerances please see table on page 17.

Surface finish: ground, lapped and polished.



### Carbide Knives

Manufactured from Tungsten carbide. All Tungsten carbide grades HIP (Hot Isostatic Pressure) treated.

Carbide grade and grain size according to the knife applications.

Precision and "Ultra Precision"

Tolerances please see table on page 17.

performance ↑	carbide					
	powdermetallurgical steel					
		high speed steel [HSS]				
			Neuenkamp specialty steel			
				high alloy tool steel		
	electrical silicon steel	high tensile steel	stainless steel	cold rolled carbon steel	galvanized pickled	hot rolled, black plate
	material type					

## Stripper Rings



### Bonded Stripper Rings

Steel core made from alloy tool steel or stainless steel for corrosion resistance. Steel core through hardened. Bonded with oil- and abrasion resistant material. Shore hardness and quality to suit the applications. Precision and "Ultra Precision" Tolerances please see table on page 17.



### Loose (Slip-On) Stripper Rings

made from oil- and abrasion resistant material. Shore hardness and quality to suit the applications. Available in "Single Durometer" or "Dual Durometer" design.

#### Selection Recommendations:

● recommended

○ possible

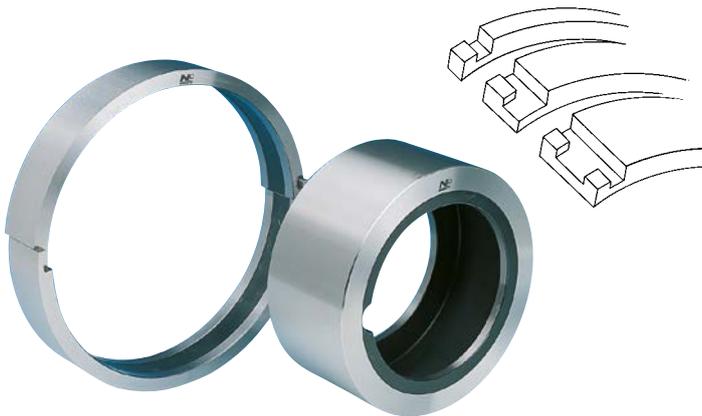
● not recommended

Material Surface Condition	Polyurethane	Perbunan	Buna N
hot / cold rolled	○	●	●
galvanized	○	●	●
pickled / coiled / black plate	○	●	●
stainless steel	●	○	○
aluminum	●	●	●
copper / brass other non ferrous materials	●	●	●
painted surfaces	●	○	○
silicon / electrical sheets	○	●	●
zinc / aluzinc	●	○	○

## Spacers



made from alloy tool steel or stainless steel for corrosion resistance.  
Through hardened quality.  
Special designs for automated setup systems.  
Precision and "Ultra Precision"  
Tolerances please see table on page 17.



**Light Weight Design**  
considerable weight reduction  
due to a maximized recessed inner  
diameter, through hardened, up to 40%  
weight reduction.  
Material selection and tolerances identical  
compared to solid steel spacers.

corrosion resistant  
surface



Special Steel  
light weight design



Quick change Spacer  
(split design)



## Spacers



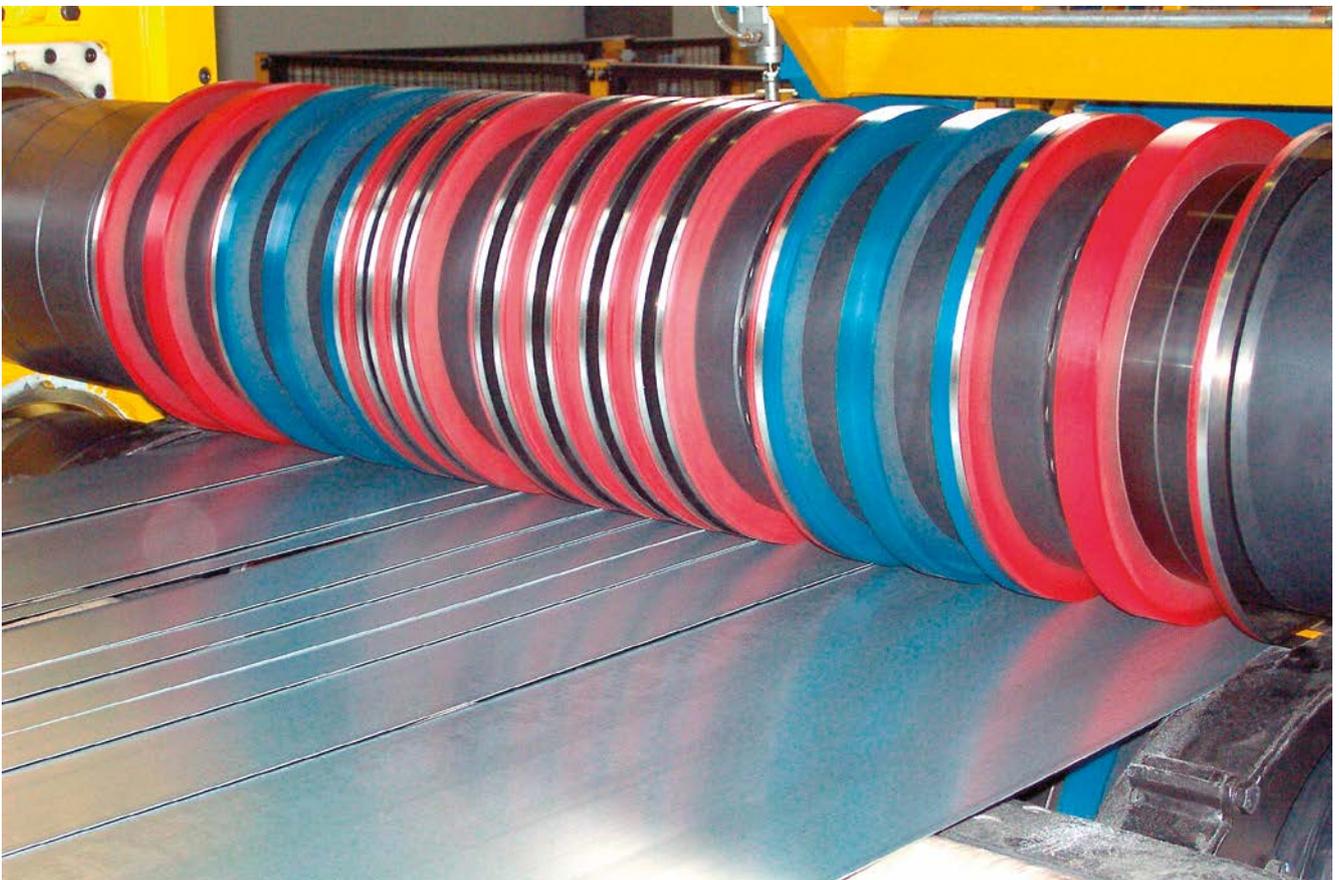
### **Ultra Light Weight Design**

Weight reduction up to 70 %, special ultra light weight design made from Polyamide for an operator friendly, safe and easy handling of large spacers during arbor setups.

Available with a thickness tolerance of  $\pm 0,001$  mm ( $\pm .000040$ " )

Our technical innovation to reduce physical stress on setup personnel.

### **application example**



## Steel Stripper Rings



Made from through hardened and wear-resistant alloy tool steel, side faces ground or lapped, outside diameter ground or polished respectively.

### Special Steel Stripper Ring Design

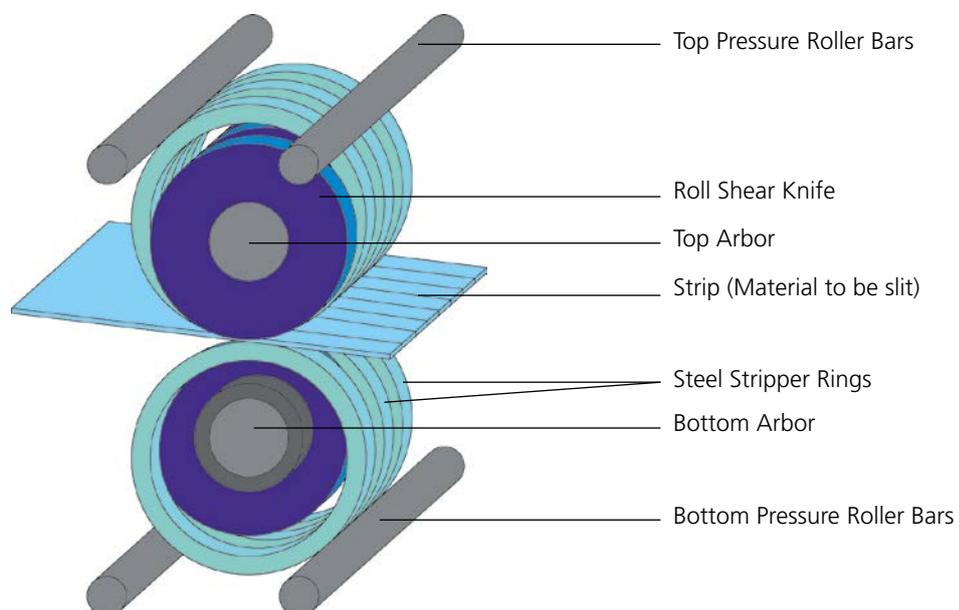
Cast Polyurethane bonded steel stripper rings. Used to process surface sensitive materials.

### The Steel Stripper Ring System

Using steel stripper rings is a method to put pressure onto the strips. Hence, the strip is guided and ejected. This system is commonly used for very thin materials, because bonded stripper rings having a width of less than 2,5 mm do not offer the required stability to effectively guide and eject the slit material. Steel stripper rings do not get placed directly onto the knife arbors. They are running against pressure roller bars and their centreline is offset from the centreline of the knives and spacers. This system allows simple adjustments according to the material thicknesses to be slit by means of adjusting the pressure roller bars.

The setup of steel stripper rings has to be adjusted exactly in accordance to the slitting application.

**Neuenkamp** will gladly offer advise and assistance in helping to achieve the best possible result.



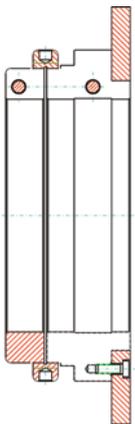
## Assembled Knife Sets



### Quill Sets

Complete Knife Sets for repeat slit widths, increased precision and efficiency. The integrated guide blades guarantee optimal knife spacing and clearance for constant strip width time after time.

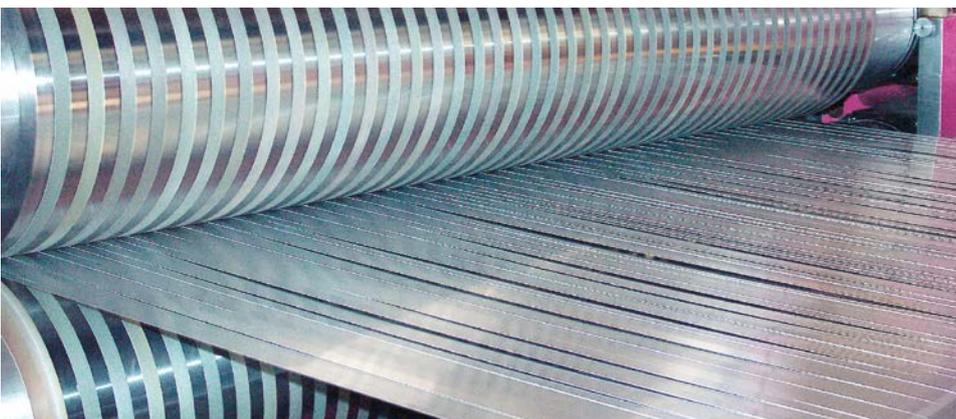
Reduced setup time because of simple installation.



### Knife Collars

Complete top and bottom collars with individual fixing for fast slit width adjustment and clearance setting. Particularly suitable for cutting wide strips and trimming operations.

**Example: Application of an assembled knife set for standard strips.**



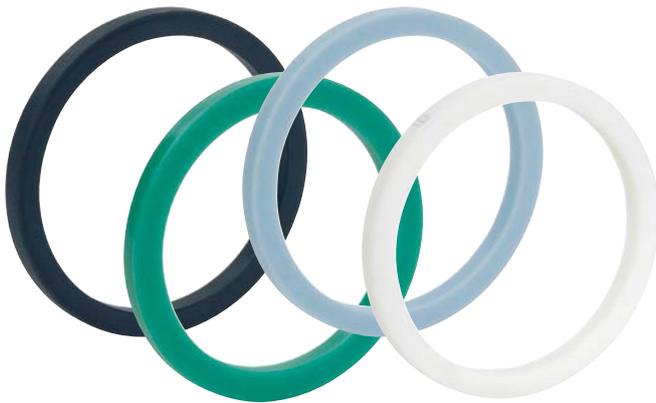
## Separator Tooling



### **Separator Discs**

made from alloy tool steel, through hardened design, with polished or coated surfaces.

For soft and sensitive materials made from Polyamide or fibre glass reinforced material.



### **Separator Spacers**

made from tool steel, soft or heat treated (through hardened).

For easy handling and weight reduction made from Polyamide, in different colours for easier thickness identification.



### **Bonded Plastic Separator Spacers**

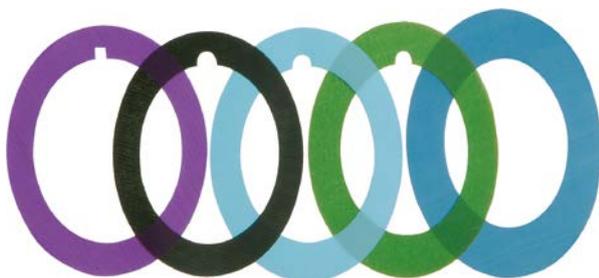
Core made from Aluminium or an extreme hard plastic material, bonded with Cast Polyurethane. To be used for soft and surface sensitive materials.

## Accessories



### Hydraulic Nuts

Applied to obtain a defined and uniform clamping pressure, necessary to lock tooling properly onto the slitter arbors. Reduced setup times, due to an easy and quick locking and unlocking mechanism. Improved tooling placement accuracy during the clamping process, based upon an equal axial pressure distribution, causing a decrease in vibration, a balanced setup and minimizes the hazards usually involved with manual clamping nuts. Hydraulic clamping nuts can be used commonly in all slitting lines.



### Plastic Shims

Made of special hard plastic, oil and grease resistant, moisture and water repellent, good wear resistance and thickness variations when placed under pressure. Handling and identification made easy due to a colour code. Width from 0,012 mm to 1,5 mm.



### Tool Storage Systems

Offers increased flexibility in storing slitter tooling. Protects tooling from possible damage and decreases possible dirt buildup, ease of tooling handling, reducing the setup times resulting in increased productivity. The compact tool storage systems offer sufficient space for the tooling, PC work station and additional storage areas for setup accessories, with minimal floor space requirements in mind. Individually tailored to meet the customer's requirement in terms of the tooling inventory and floor space availability.

# Tool Optimization (Opti-Tool)

**Opti-Tool QUESTIONNAIRE**

**1. Slitter Details:**

- a.) Arbor Length:
- b.) Arbor diameter:
- c.) max. Coil width:
- d.) number of Heads:
- e.) Setup Position:

**2. Material Details:**

- a.) material:
- b.) material thickness: min. max.
- c.) material tensile strength:
- d.) slit width: min. max.
- e.) strip width tolerance:
- f.) max. number of strips per Head:

**3. Recommended Hardware:**

Final QC min. thickness: min. 56 min max. thickness 800 + 933 poles

For calculating the number of tools the following facts were taken into consideration:

- type of assembly: No. 3
- max. coil width: 14"
- arbor height: 15"
- min. strip width: 1.500"
- max. strip width: 14"
- number of cutting heads: 3 Heads
- number of strips: 3 Strips

**Recommendation:** 3 strip width can be replaced with an increment of 0.0025" in order to do so tool clearance every strip width (p. 4) or minus 2x tool clearance can be built with an increment of 0.0025". This results in tool clearance of 0.0025", 0.0000", 0.0000" res. per max. width knives. To calculate the gap for strip width of 1.5" to 14" max. 3 Headed Stripper Rings and 2 Spacers will be used.

Offer no. 0666/06-1-001

Your inquiry dated 15.05.2005, Customer US\$M

Customer: 201966  
 55452220 K. Krenner P. Weber  
 USA, Spencer Mass 01922

Customer No.: 804098

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Neuenkamp offers a computer-assisted service to optimize the amount of tooling required for your individual application.

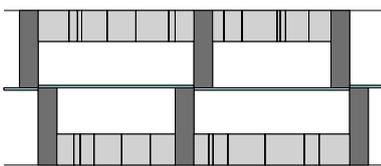
The quantities and thicknesses as well as the total amount of the required tooling is calculated by the system. The basis for the precise calculation for your data is:

- Input of the type of assembly**
- Input of all slitter information and required tooling**
- Input of needed product-measurements**

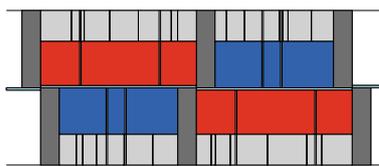
The resulting calculation will guarantee a 100% coverage of all tooling needed for all required slit widths. Because of the mathematical basis of the tooling optimization, considerable cost savings are achieved compared to conventional methods.

The tooling sizes calculated by using this method are dimensioned so that plastic shims are no longer needed. By feeding in different operational data, we can calculate your tool requirements for all current slitting performances. By doing so, we can show you an additional and considerable cost advantage.

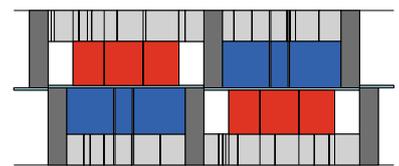
By means of the mathematical statistics in our system, we work out the tooling that your really require.



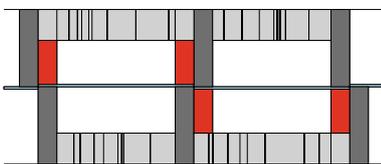
assembly 1



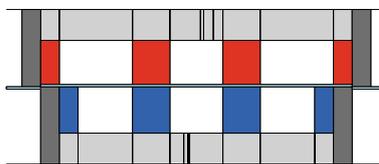
assembly 3



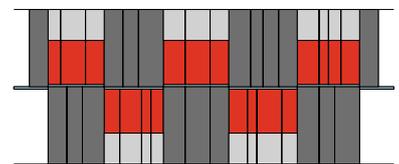
assembly 4



assembly 5



assembly 6a



assembly 8



## Technical Support

Our engineers offer extensive support for your slitting requirements:

- Complete tooling packages for new and existing sitting lines
- Optimizing existing tooling packages, to match the customer's new slitting parameters
- Tooling care and maintenance.



### Slitting Seminars

To be prepared and meeting today's market challenges, it is imperative to acquire new technologies and to apply them properly.

**Neuenkamp** offers the needed support by providing training and technical slitting seminars to be held at the customer's site. In addition to training and teaching nowadays slitting technology by employing a comprehensive technical presentation, our sales engineers will also look at customer specific applications. Each seminar will end with an open discussion of slitting related topics.

Please contact us at your earliest convenience to schedule an in house seminar.



### Regrind Service

Slitter Knives and Bonded Stripper Rings. Regrinding performed by our manufacturing specialists.

Benefit from our knowledge for improved wear and superior surface finish.

Using the proper abrasives and grinding techniques for re-grinding slitter tooling, manufactured according to their specific slitting application, we will provide the correct finish for improved wear and prolonged tool life.

## NEUENKAMP Automatic Slitter Knife Face Polishing Machine



Economically and consistently provides a mirror-like finish on rotary slitting knives, achieving a better quality cut and extended knife life.

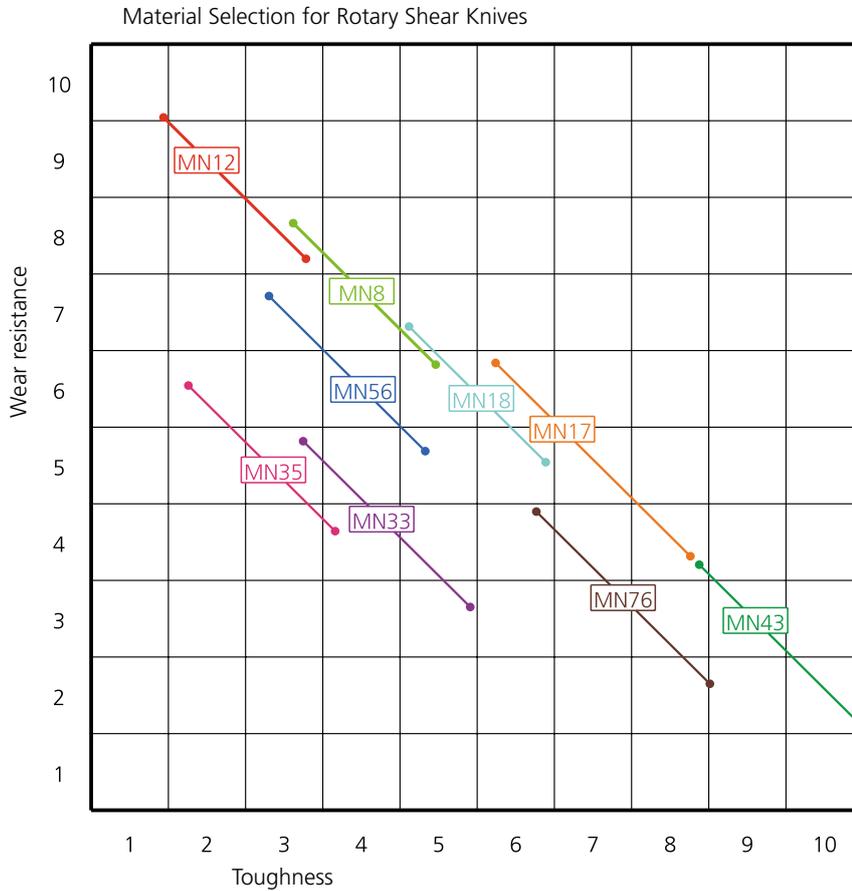
Typically, companies slitting aluminium, brass, copper and other soft metals experience a knife edge build-up which progressively and adversely affects the knife's cutting abilities and its dimensional characteristics. This automatic polisher restores the fine edge with no real change in the thickness of the original blade.



### Polishing Paper

The suitable polishing paper for your application guarantees optimal operating conditions in conjunction with the polishing machine. Improved abrasive paper strength and proper grain size guarantee optimized polishing results.

## Material Selection



### Standard Hardness Values:

Material	Hardness range [HRC]
MN 8	61 - 64
MN 12	62 - 65
MN 17	56 - 61
MN 18	59 - 63
MN 33	56 - 60
MN 35	58 - 62
MN 43	54 - 57
MN 56	60 - 64
MN 76	55 - 59

According to the slitting application, the proper knife metallurgy and hardness is selected. The important criteria are maximum wear and adequate toughness. The graph shows for each knife material an area of use, considering the appropriate hardness value.

Material grade	Material Thickness [mm]				
	< 1,2	1,2 - 2,0	2,0 - 4,0	4,0 - 7,0	> 7,0
none ferrous	MN 35, MN 33	MN 33, MN18	MN 33, MN 17	MN 17, MN 76	MN 17, MN 76
cold rolled carbon	MN 33, MN 18	MN 33, MN18	MN 33, MN 17	MN 17, MN 76, MN 43	MN 17, MN 43
hot rolled			MN 17, MN 76	MN 17, MN 76, MN 43	MN 17, MN 43
stainless	MN 18, MN 56, MN 8	MN 17, MN 18	MN 17, MN 76	MN 17, MN 76, MN 43	MN 17, MN 43
silicon steel	MN 18, MN 56, MN 8	MN 18, MN 56			
heat treated	MN 56, MN 12, MN 8	MN 18, MN 56			

## Quality Management



In 1996 Neuenkamp established a quality control procedure and achieved DIN ISO 9001 certification. Manufacturing processes are all subject to strict procedures, requiring a 100% inspection after each operation.

In addition quality control is performed in a climate controlled environment.

Utilizing state of the art inspection equipment and processes, guarantee meeting all customer specifications and the highest level of product quality. If desired, Neuenkamp customers are invited to inspect and qualify their products in our plant for approval and acceptance.

Inspection certificates will be provided upon request.

### Manufacturing Tolerances for NEUENKAMP Precision and "Ultra" Precision: Rotary Shear Knives, Spacers, Stripper Rings

Outer Ø	Thickness Tolerance	Parallelism	Flatness according to Thickness [mm]				Surface Finish of Tooling Faces Ra (µm)	
			≤ 1	1 - 2	2 - 5	> 5	standard	polished
≤ 250 (10")	± 0,001 mm	0,002 mm	0,02 mm	0,005 mm	0,002 mm	0,002mm	0,2 µm	0,1 µm
	± .000040"	.000080"	.00080"	.00020"	.000080"	.000080"	8 micro inch	4 micro inch
≤ 340 (13.5")	± 0,001 mm	0,002 mm	0,03 mm	0,01 mm	0,005 mm	0,002mm	0,2 µm	0,1 µm
	± .000040"	.000080"	.00120"	.00040"	.00020"	.000080"	8 micro inch	4 micro inch
≤ 420 (16.5")	± 0,001 mm	0,002 mm	0,04 mm	0,02 mm	0,01 mm	0,002mm	0,2 µm	0,1 µm
	± .000040"	.000080"	.00160"	.00080"	.00040"	.000080"	8 micro inch	4 micro inch
≤ 550 (21.5")	± 0,003 mm	0,002 mm			0,02 mm	0,005mm	0,2 µm	
	± .000120"	.000080"			.00080"	.00020"	8 micro inch	
≤ 600 (24")	± 0,005 mm	0,005 mm				0,01mm	0,35 µm	
	± .00020"	.00020"				.00040"	15 micro inch	

### For special applications also available with "Ultra" Precision Tolerances

Outer Ø	Thickness Tolerance	Parallelism	Flatness according to Thickness [mm]				Surface Finish of Tooling Faces Ra (µm)	
			≤ 1	1 - 2	2 - 5	> 5	standard	polished
≤ 300 (12")	± 0,0005 mm	0,001mm	0,01 mm	0,003 mm	0,001 mm	0,001 mm	0,2 µm	0,05 µm
	± .000020"	.000040"	.00040"	.000120"	.000040"	.000040"	8 micro inch	2,5 micro inch

## Straight Knives

### **Straight Knives and Shear Blades from Neuenkamp**

offer various solutions and are primarily used in the Steel industry, Transformer sheet industry and in the Non-ferrous Metal industry.

Our product range includes a wide choice of shear blades, scrap chopper blades, cross cutting knives or customer-specific straight knives with a length of up to 6000 mm.

Our Knives are made of high alloy tool steel, powder metallurgical steel, or Neuenkamp special knife materials and guarantee a perfect cutting process.

Whether for precision applications, in the thin strip area or for heavy gauge slitting up to a material thickness of 20.0 mm in combination with different material strengths, our tools will be tailored for the particular slitting application.

Through many years of experience and knowledgeable technical advice, we help our customers to achieve a continuous and trouble free production process by using our tools.



**Shear Blade in special „roof design“  
with CNC – precision ground surface**



### **Regrinding Service**

Regrinding performed from the manufacturer specialists.

Benefit from our knowledge for improved wear and superior surface finish.

Using the proper abrasives and grinding techniques for re-grinding slitter tooling.

We provide the correct finish according to your specific slitting application for improved wear and long tool life.



### **Straight Knives / Shear Blades**

fine ground surface finish and precision,  
tool tolerances  
fitting to every machine type

individual selection of knife materials  
suitable for every application



### **Scrap - Chopper Blades**

in straight design,  
or with special radius grinding.

special knife material for high  
performance and highest reliability to  
avoid knife cracking during use



### **Profile- und Special Shear Blades**

for Heavy Gauge application up to  
20,0 mm material thickness

execution of knives according drawing  
cutting edges and dedicated geometries  
with CNC – precision ground surfaces

prolonged knife wear by using  
Powder metallurgical steel.



Dienes Germany

Dienes USA

EuroKnife Bt. Hungary

Dienes Belgium

Dienes Polska

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