

Producing Quality – brushing the correct way

Optimise Brush Results

The brush diameter and filling length are most important for the perfect brushing result. It is therefore very easy to eliminate almost all bad brushing results:

Brushing effect too weak:

- Increase the peripheral speed by increasing the brush diameter or the operating speed, but never exceed the maximum RPM rating.
- Use a brush with shorter trim length.
- Use a brush with larger wire diameter.

Brushing effect too powerful:

- Reduce the peripheral speed by reducing the brush diameter or the operating speed.
- Use a brush with longer trim length.
- Use a brush with smaller wire diameter.

Brush transfers burr:

- Use a brush with shorter trim length.
- Examine brush and work piece position.
- Use a brush with wider face.
- Use a brush with thicker wire diameter.

Note: you are welcome to contact our technical contact persons.



Information for brushing on stainless steel materials at www.lessmann.com/downloads



Our processed stainless steel wires are not completely magnet-free. They may contain oil residues due to the manufacturing process. If this is not permitted in the application, please order the brushes in an oil-free/degreased version.

Recommended Peripheral Speed for Brushing Application

Application	Peripheral Speed in m/s							
	15	20	25	30	35	40	45	50
With Filaments								
Removing Burrs			25–35					
Cleaning Welds					35–45			
Removing Scale					35–45			
Polishing				30–40				
Working on Plastic	15–20							
With Abrasive Filaments								
Dry conditions	16–18							
Wet conditions			25–30					

Conversion mm in Inches and I.S.W.G.

Brush diameter	
Millimeter	Inches
25	1"
50	2"
75	3"
100	4"
125	5"
150	6"
180	7"
200	8"
250	10"
300	12"
350	14"

Wire diameter		
Millimeter	Inches	I.S.W.G
0.08	0.0031	44
0.10	0.0039	42
0.12	0.0047	40
0.15	0.0059	38
0.20	0.0079	36
0.25	0.0098	33
0.30	0.0118	31
0.35	0.0138	29
0.40	0.0157	27
0.50	0.0197	25
0.80	0.0315	21

Peripheral Speed v in m/sec. (please follow the max. rotary speed of the brush!)

n [1/min.] (RPM)	Brush diameter d in mm/inches							
	50 2"	80 3"	100 4"	125 5"	150 6"	200 8"	250 10"	300 12"
1,000		4.2	5.2	6.5	7.9	10.5	13.1	15.7
1,500	3.9	6.3	7.9	9.8	11.8	15.7	19.6	23.6
2,000	5.2	8.4	10.5	13.1	15.7	20.9	26.2	31.4
2,500	6.5	10.5	13.1	16.4	19.6	26.2	32.7	39.3
3,000	7.9	12.6	15.7	19.6	23.6	31.4	39.3	47.1
3,500	9.2	14.7	18.3	22.9	27.5	36.7	45.8	55.0
4,000	10.5	16.8	20.9	26.2	31.4	41.9	52.4	62.8
5,000	13.1	20.9	26.2	32.7	39.3	52.4	65.4	78.5
6,000	15.7	25.1	31.4	39.3	47.1	62.8	78.5	
8,000	20.9	33.5	41.9	52.4	62.8	83.8		
10,000	26.2	41.9	52.4	65.4	78.5			
12,500	32.7	52.4	65.4	81.8				
15,000	39.3	62.8	78.5					
20,000	52.4	83.8						
25,000	65.4							

Peripheral Speed $v = \frac{\text{Brush diameter (d)} \times \pi \times \text{Peripheral Speed (n)}}{1,000 \times 60}$

For working in wet condition we recommend PA 6.12 as base. Please state on your order! Since the upcoming heat on wet applications is conducted, the peripheral speed can be set much higher than on dry applications.

Brush filling materials and their characteristics



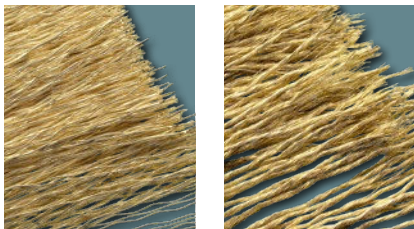
STA Steel Wire straight / crimped

is developed in co-operation with wire producers, so that it meets our special requirements. This wire is alloyed with manganese in order to increase its toughness. Result is higher tensile strength and longer lifetime of LESSMANN-Brushes.



STH Steel Wire High Tensile straight / crimped

is most often used in Knotted Brushes, Deburring Brushes and Pipeline Brushes. Furthermore we offer this high tensile wire in our complete assortment. Above all it features through its tensile strength and high fatigue rates, what results in lifetime even for extreme brushing applications.



STM Brass Coated Steel Wire

For long lifetime plus high tensile strength and cutting performance. Best results in brushing and deburring applications.

STL Cord Wire

Brass coated steel wire corded. Longest lifetime for heavy duty brush applications, e.g. deburring.



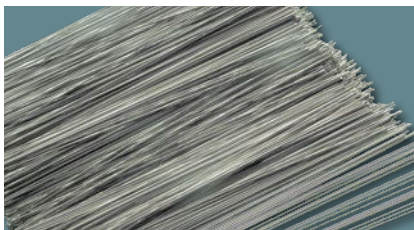
ROF / RO4 / ROL / RO8 Stainless Steel Wire

ROF must be used when working on stainless steel. Material number (WNR.) **1.4301 (AISI 304)**. This wire is resistant against corrosion and certain acids and bleaches.

RO4 Premium-quality stainless steel wire. WNR. **1.4401 (AISI 316)**

RO8 High heat resistant stainless steel wire. WNR. **1.4860.**

ROL Stainless Steel Wire with cord construction WNR. **1.4301/1.4310**



ROH Stainless Steel Wire High Tensile

This wire is characterized by a high tensile strength (2100–2500N/mm) and a long lifetime even in extreme applications. WNR. **1.4310 (AISI 301)**



MES Brass Wire (CuZn)

is softer than steel wire. Among other applications brass wire is suitable for working with mild bleaches. It's mainly used for processing of nonferrous metals.



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Straight / Crimped / Knotted:

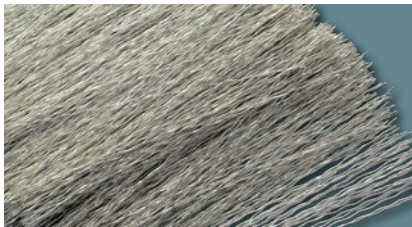
Metal wires for brushes can be processed in brushes straight, crimped or knotted. Wire knots are always made with straight wires. Compared to a straight wire with the same diameter the wire knots are much stronger than the single wire. Crimped wires brace each other and therefore achieve a better stability in the brushes.

Brush filling materials and the characteristics



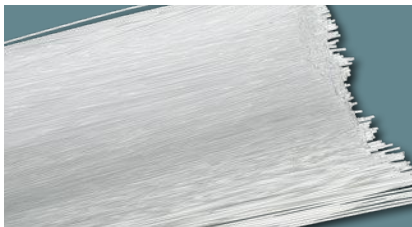
BRO Bronze Wire (CuSn)

is used for surface processing of wood and metal. It's also used when low-sparking brushes are needed.



NSI Nickel Silver (CuNiZn)

is used for polishing work pieces e.g. parts of nickel silver or brass, as it is softer than steel wire.



PP, PA, PE, PBT Synthetic Filaments

are resistant to abrasion and flexible. Despite minor resistance against heat these filaments are perfect for cleaning, grinding or surface processing of metal, plastic or wood.

Available are:

- Polypropylen (PP, white by default)
- Polyamid (PA, transparent by default) – PA 6, PA 6.6, PA 6.12
- Polyethylen (PE)
- Polyester (PBT); only for cleaning
- Polyvinylchloride (PVC)



FIB Fibre

consists of heat resistant plant fibre, is slightly abrasive and therefore can be used for smooth grinding, above all for working on wooden surfaces. Moreover fibre is used for general cleaning and polishing work.



ROS Horse Hair

is an animal hair, which above all is deployed in terms of light cleaning and dusting work. Horse hair is resistant against diluted acids and bleaches. It's not chargeable for static electricity.



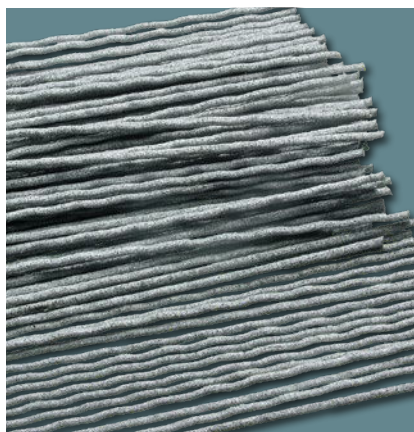
Encapsulated Brushes

Encapsulated brushes are ideal for an aggressive work on working pieces and for a very exact working in edges and angles.

By embedding steel wire, stainless steel wire, brass coated wire or brass wire in tough plastic, the filling width always remains the same and early break of the wires can be prevented. It's the perfect tool for long lasting and safe working. The advantages when working with encapsulated brushes are longer lifetime and harder brush effect.

Furthermore the risk of injury declines when using encapsulated brushes.

However, it might be possible that the brush will leave marks on the work piece.



Abrasive Filaments

consist of polyamide bristles containing abrasive grits. This modern material is ideal for deburring work, fine surface finishing of plastic and metal parts as well as grinding, cleaning, polishing, and structuring of surfaces. With their flexible surface, brushes with abrasive filament align to the different shape of working pieces. Abrasive bristles also have grinding effects on the side, which makes them even more flexible to application possibilities. You can choose between grit (from K60 to K1000) composed of aluminium oxide (AO) and silicon carbide (SIC). Also diamond filament is available.

Normally 2 polyamide-types are used:

Polyamide PA 6:

- good bend recovery
- good abrasion resistance
- absorption of water to max. 10%

Polyamide PA 6.12 (ideal when working in wet surrounding):

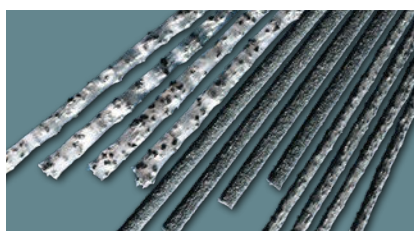
- flexible and excellent bend recovery
- high abrasion resistance
- absorption of water to max. 3%

You can differ the bristles between round or flat bristles. Usually round bristles are used, because they are more flexible than flat bristles and very good for processing work pieces with strong shapes. Round bristles with a smaller diameter, less than 150 mm, are very efficient if you are not able to use flat material. However, flat bristles possess a high abrasive grit, represent a long durability and a high removal rate by a larger contact surface.



For **working in wet condition** we recommend **PA 6.12** as base. Please state on your order!

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3 grits in silicon carbid

Grits to choose from:

Abrasive filaments SIC (filament K60 to K1000):

- intensive results when deburring
- for surficial improvement/-processing
- mainly for process stainless steel and aluminium limited
- microhardness: 25.000 N/mm²

Common measurements: K 80/1,1, K 80/1,2, K 80/1,4, K 120/0,6, K 120/1,1, K 180/0,9, K 180/1,0, K 320/0,60, K 500/0,5

Abrasive filaments AO (filament K60 to K1000):

- less sharp-edged compared to SIC
- to the finish of soft metal
- to polishing and smoothing
- to process aluminium when smoothing or polishing
- microhardness: 21.000 N/mm²

Common measurements: K 80/1,2, K 120/1,1, K 180/0,9, K 180/1,0, K 240/0,75, K 240/0,90, K 320/0,60, K 500/0,25, K 500/0,50, K 600/0,3 – others on request.

Diamonds filaments(filament K60 to K1000):

- for aggressive applications
- used for materials with high material strength
- self-renewing through independent sharpening
- microhardness: 42.000 N/mm²

Ceramic grit:

- very good grinding and polishing properties
- maximum lifetime and aggressiveness
- working with hard metal tools
- microhardness: 42.000 N/mm²



All information on **chemical properties** can be found at www.lessmann.com/downloads in the area of Brush Know-How.

Physical Characteristics								
	STA	STH	ROF	ROH	RO4	RO8	STM / STL	MES
WNr.			1.4301	1.4310	1.4401	1.4860		CuZn36 / CuZn37
AISI			304	301	316			
Tensile Strength in N/mm ² *	1,800–2,100	2,300–2,500	1,800–2,100	2,100–2,500	1,600–1,800	1,600–1,800	2,300–2,600	900–1,200
Specific Gravity in g/cm ³	7.85	7.85	7.85	7.85	7.85	7.90	7.85	8.50
Temperature Consistency in °C	+ 300 °C	+ 300 °C	+ 450 °C	+ 450 °C	+ 500 °C	+ 600 °C	+ 300 °C	+ 180 °C

*The specified Tensile Strength is applicable for a wire strength 0.3–0.4 mm