

"Simply the Best" by testing

Our own production of nearly all components of our standard programme and our own development of special articles enables us to have an excellent knowledge in both manufacturing quality and safety testing.

Creating Innovation, Exceeding Safety Standards, Keeping Top Quality

With this motivation we make complex development and product tests as an essential part of our work.

Material Tests

These are the first steps of our quality management: All deliveries of raw material are tested according to and above specification details. All wires are tested for their tensile strength and for their reverse bending strength by a fatigue measuring process. Beside the quality of the material it is important that its attributes are as suitable as possible for their intended use.

Imbalance Test

An imbalance of machine driven brushes is not pleasant and is dangerous for the health of persons working at the machine. Although it is not necessary under the DIN or the EN Norms, we produce our brushes according to our own standards for minimum imbalance. By doing so our customers take advantage of smooth running fatigue reducing brushes. Our employees in production ensure that these high quality aspects are maintained.

Safety Tests

According to European safety norms all brushes have to withstand 1.5 times of the mentioned maximum RPM. Naturally when developing a brush, we test every brush type for this safety aspect. Only if all tests are satisfactory, can the article be produced. During production many samples are taken of the brushes in order to check the required safety speed. Should a model or a raw material be changed we begin the tests again. For this very reason every customer can rely on a high quality and safe tool.

Lifetime and Power

For the measurement of the lifetime and power of technical brushes there are neither

norms nor standard procedures. After long developing processes and many tests we have found testing methods that simulate testing in real working conditions. On self built machines we are able to test the abrasion and thus the lifetime and power of machine driven brushes. Beside the quality aspect these tests are helpful in optimising materials used, as well as component parts and the construction of brushes. Even if in comparison tests with competitor brushes such testing has shown and proved the high quality of our products:

We keep on testing to guarantee customer satisfaction.



Quality is our feature!

Accredited with DIN EN ISO 9001



Recommendations for Safe Brush Use

LESSMANN Quality is Safe

We guarantee the best quality and long lifetime for our products. Our brushes are manufactured according to the existing standard DIN 68 347 part 1 and 2 and EN 1083. All the relevant machine driven brushes are checked for occupational safety using a centrifugal force test.

Safety Information

All machine driven brushes require as with other rotary tools, that the required safety precautions are kept:

Safety for Your Body

All operators and other personnel in areas where rotary brushes are being used must wear safety goggles or face shields and protective clothing.

For your own safety:
Wear Eye Protection!



Brush Check

The brushes should be checked for damage before using.

A correct mounting is imperative.

Peripheral Speed

The max. RPM indicated in the catalogue are safety figures by which the brushes can be used without danger. Please do not exceed these figures under any circumstances! In most cases a lower RPM is sufficient to gain an optimal result.

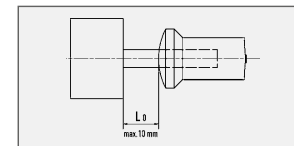
Correct Pressure

The schedule shows the necessary motor drive power for different brush diameters. The brushes need only a light pressure while brushing because only the wire points are effective (please look at the schedule). A higher pressure does not improve the brushing effect. In fact the brush lifetime is reduced and greater power is needed. The indicated curves inform you about the expected power. The power ratings refer to a brush with 30 mm width.

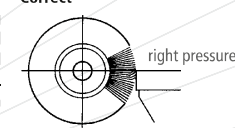
Working with Shank Brushes

When working with shank brushes please note that the shank has to be inserted fully into the tool.

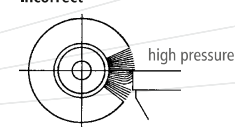
This is especially necessary when working with high RPM, for example on straight grinders and pneumatic tools. Generally it is best if the shank sticks out only 10 mm when the brush is mounted.



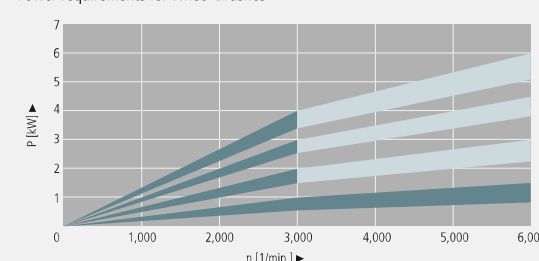
Correct



Incorrect



Power requirements for Wheel Brushes



The performance figures mentioned above are only guidelines.
*Power requirements for a brush width = 30 mm

minimum bore size for wheel brushes according to DIN EN 1083

Diameter of the brush in mm	Minimum diameter of bore in mm
50	4,6
75	6,5
100	10
150	13
200	16
250	20
300	20
350	32

Recommended use of brushes on angle grinders – the right combination

Common idle speed of angle grinders (WS)	Brush diameter	60	65	75	80	90	100	115	125	150	178	200
Ø 115 11,000 RPM = WS 1	Knot Wheel Brush						WS 1	WS 1	WS 2	WS 3	WS 4	WS 5
Ø 125 11,000 RPM = WS 2	Cup Brush, Crimped Wire	WS 2		WS 2	WS 3		WS 3		WS 5	WS 5		
Ø 150 9,000 RPM = WS 3	Knot Cup Brush without Bridle		WS 1	WS 2	WS 2	WS 2	WS 3/4		WS 5			
Ø 180 8,500 RPM = WS 4	Knot Cup Brush with Bridle				WS 3/4							
Ø 230 6,500 RPM = WS 5	Knot Bevel Brush						WS 1					
	Knot Bevel Brush						WS 1	WS 1				

Warning: Before each operation please compare the idle speed of the angle grinder with the max. peripheral speed of the brush!

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:

- 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.

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:

Information for brushing on stainless steel materials you find at www.lessmann.com

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

Recommended Peripheral Speed for Brushing Application

Application	Peripheral Speed in m/s								
	15	20	25	30	35	40	45	50	
Removing Burrs				25 - 35					
Cleaning Welds						35 - 45			
Removing Scale						35 - 45			
Polishing					30 - 40				
Working on Plastic	15 - 20								

Recommended Peripheral Speed for Brushing with Abrasive Filaments

Dry conditions: 16 - 18 m/s
Wet conditions: 25 - 30 m/s

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

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

Brush filling materials and the characteristics



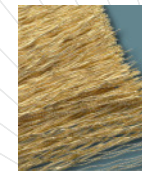
STA Steel Wire straight / crimped

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.



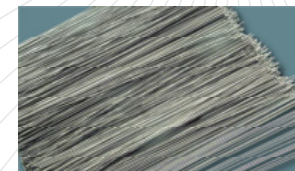
STL Cord Wire

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



ROF / RO4 / ROL / RO8 Stainless Steel Wire

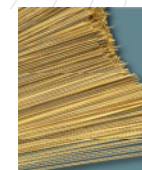
ROF must be used when working on stainless steel. Material number (WNR.) 1.4301 (AISI 304). This wire is resistant against corrosion and certain acids and bleaches.
RO4 Premium-quality stainless steel wire. WNR. 1.4401 (AISI 316)
RO8 High heat resistant stainless steel wire. WNR. 1.4860.
ROL Stainless Steel Wire with cord construction WNR. 1.4310



ROH Stainless Steel Wire High Tensile

This wire is characterized by a high tensile strength and a long lifetime even in extreme applications. WNR. 1.4310 (AISI 301).

Further information on brushing on stainless steel materials you find at www.lessmann.com



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.

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.