



Evolution in grinding.

Cylindrical grinding

... using
THELEICO
grinding
wheels

_ External cylindrical grinding
_ Internal grinding

Efficient cylindrical grinding using THELEICO gri

As part of industrial manufacturing processes cylindrical grinding is one of the most important grinding methods. It is of utmost importance, since many turned components and products need either to be finished or reduced to size in their outer diameter. As requirements are high, THELEICO grinding wheels are particularly suitable in this respect. During the manufacturing process of technical components cylindrical grinding operations offer universal possibilities to many manufacturers. The variety of applications includes most different trades and industrial sectors such as automotive and supplying industry, car construction, mechanical engineering, foundries and rolling mills, paper and printing industry, metal working industry, glass industry, plastics and rubber industry.

All cylindrical grinding operations can be divided into three subtypes:

- External cylindrical grinding between centers
- External cylindrical grinding (centerless)
- Internal grinding

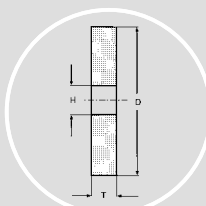


Grinding methods and applications

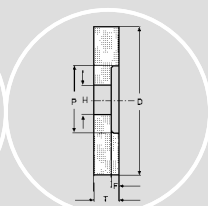
Cylindrical grinding has two important objectives:

- to generate macro geometry (shape and position tolerances)
- to achieve micro geometry (surface finish)

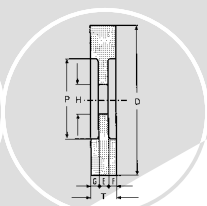
Shape 1



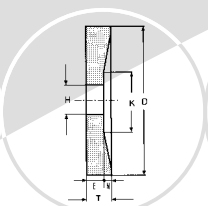
Shape 5



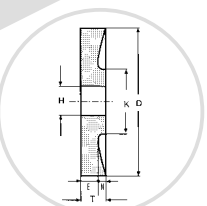
Shape 7



Shape 20



Shape 120



External cylindrical grinding machine



External cylindrical grinding between centers DIN shape no. 1, 5, 7, 20, 120

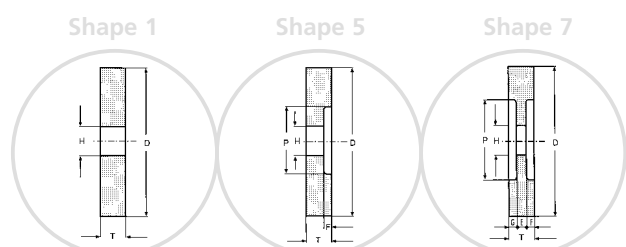
Application			Grinding wheel specification		
Material	Alloy	Hardness	Rough and finish grinding		Fine grinding
			ø < 500 mm	ø > 500 mm	
Steel	unalloyed and low-alloyed	unhardened	33A 60-3 J 6 V	33A 54-3 K 6 V	
		hardened	40A 60-3 I 7 V	40A 60-3 J 6 V	40A 150-1 I 7 V
	high-alloyed Cr > 6% HSS, HSS-E	unhardened	46A 80-9 I 10 V	46A 80-0 I 10 V	40A 150-1 I 7 V
		hardened	85C 80-0 H11 V 27A 80-0 G10 VM		85C 150-1 H10 V 85C 180-2 L 4 B
Hard chromium			42A 60-3 I 7 V		40A 120-0 F11 V
Carbide metal			85C 100-0 F11 V	85C 80-0 F11 V	
Grey cast iron (GG), spheroidal cast iron (GGG), chilled cast iron			85C 60-3 I 10 V	85C 54-1 I 10 V	
Wear-resistant coatings (eg flame-coated)			85C 60-3 H11 V		
Light and non-ferrous metals (eg aluminium, copper, bronze)			89C 54-3 H12 V		
Rubber coatings			47A 60-0 H13 V		
Polyurethane coatings (heat-sensitiv)			89C 60-9 E13 V		89C 120-2 F13 V

Applications



Among these subtypes differences are made between longitudinal and plunge-cut grinding. The grinding method depends on workpieces geometry. The grinding machines needed for these grinding processes show a more or less pronounced degree of automation depending on the overall process. Typical examples of machine types and applications are as follows:

- universal cylindrical grinding machines for individual and small series manufacture
- production cylindrical grinders for series and mass production
- simultaneous cylindrical grinders/external cylindrical grinders
- cam grinders
- crankshaft grinders
- polygonal and out-of-round grinders
- roll grinders
- roller bearing grinders
- special purpose grinders



Variations and quality criteria of THELEICO grinding wheels

THELEICO grinding wheels cover the whole spectrum of applications such as standard qualities regarding geometry and composition, which can be used depending on material and task, and individually tailored grinding wheels for individual grinding operations.

The grinding wheel compositions include all aluminium oxide and silicon carbide abrasives from THELEICO's broad range which serve as raw materials:

- regular aluminium oxide, semi-pure aluminium oxide, high purity aluminium oxide (white/pink/ruby), monocrystal aluminium oxide, zirconia alumina
- sintered aluminium oxide
- silicon carbide (dark/green)

Centerless external cylindrical grinding machine



External cylindrical grinding (centerless) DIN shape no. 1, 5, 7

Application			Grinding wheel specification					
Material	Alloy	Hardness	ø < 500 mm				ø > 500 mm	
Steel	unalloyed and low-alloyed	unhardened	10A	60-3	M 6	V	33A	46-9 P 4 B
		hardened	33A	60-3	L 6	V	33A	54-3 N 5 V
	high-alloyed Cr > 6% HSS, HSS-E	unhardened	42A	54-3	M 5	V	45A	60-3 M 5 V
		hardened	40A	60-3	K 7	V	45A	60-3 K 5 V
	stainless and acid-resistant (VA)		85C	80-9	L 5	V	85C	60-3 L 5 V
Hard chromium			45A	60-3	L 5	V	45A	60-3 M 5 V
Grey cast iron (GG)			85C	60-3	L 5	V	85C	46-1 K 5 V
Spheroidal cast iron (GGG)			40A	60-3	L 5	V	40A	54-3 L 5 V
Light and non-ferrous metals (eg aluminium, copper, bronze)			85A	80-2	I 11	V	85C	54-2 J 11 V
Rubber coatings			47A	60-2	I 12	V		
Polyurethane coatings (heat-sensitiv)			89C	80-9	G12	V		
Regulating wheels			10A	100-9	Q 2	B		



THELEICO quality product range

THELEICO supplies all process-related ISO shapes of bonded abrasives with peripheral speeds up to 100 m/s and a maximum outer diameter of 1100 mm. As vitrified bonded wheels show better profile stability and as the surface to be achieved is defined, these wheels are preferentially used during cylindrical grinding operations. However, for superfinishing, resin bonded wheels are employed.

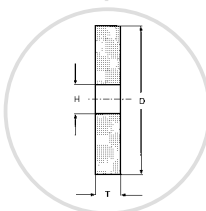
The grinding wheel composition is mainly dependent on the material to be ground. With steel materials the alloy components, the degree of tempering and material hardness are of decisive importance. The more these

parameters increase, the more the share of high purity aluminium oxide, monocrystal aluminium oxide and sintered aluminium oxide has to be augmented against the regular aluminium oxide amount.

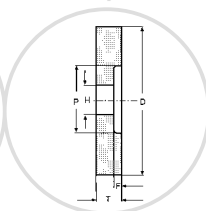
As a result of wide and long experience by THELEICO's application technology staff, the required qualities are fixed while positive grinding results form the basis of further quality optimization.

Special attention is paid to optimizing the grinding process because, under economical aspects, production grinding has to be an economical and efficient procedure.

Shape 1



Shape 5



Internal grinding machine



Internal grinding DIN shape no. 1, 5

Application			Grinding wheel specification
Material	Alloy	Hardness	Rough and finish grinding
Steel	general use		40A 54-3 I 8 V
	unalloyed and low-alloyed	unhardened	40A 54-3 J 7 V
		hardened	40A 54-3 I 8 V 24A 54-0 I 7 VM
	high-alloyed Cr > 6% HSS, HSS-E	unhardened	46A 60-9 I 10 V 26A 60-9 I 10 VM
		hardened	85C 54-1 H10 V 26A 46-9 I 10 VM
	stainless and acid-resistant (VA)		85C 54-1 H10 V
Hard chromium			42A 60-1 I 7 V
Grey cast iron (GG)			85C 54-1 H10 V
Spheroidal cast iron (GGG)			46A 60-9 I 10 V
Light and non-ferrous metals (eg aluminium, copper, bronze)			85C 60-0 H11 V

**Please
contact us!**

Further information and
product recommendations
at www.leisse.org



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