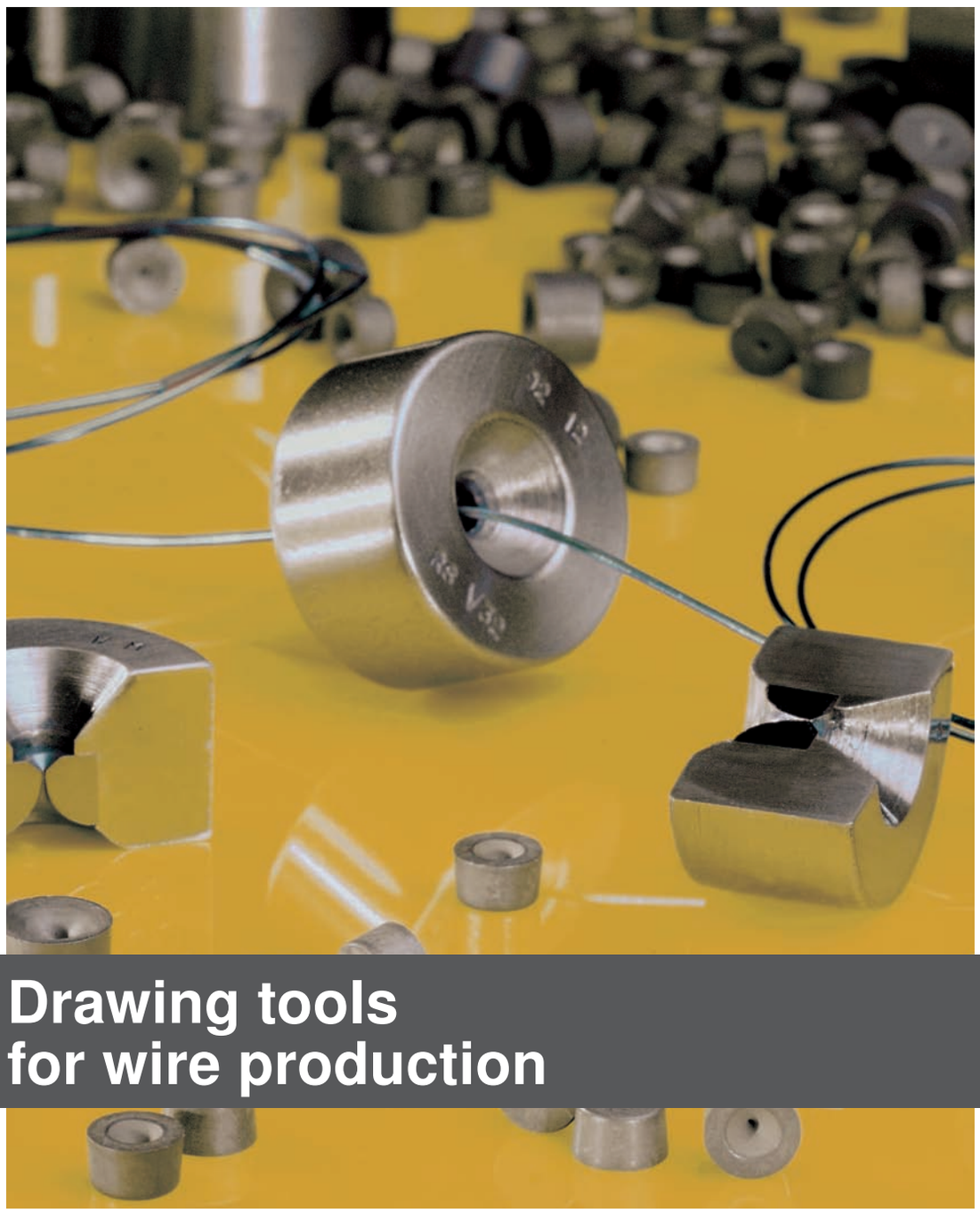
hard material matters

CERATIZIT

hard material matters



Drawing tools for wire production

CERATIZIT – the parent companies

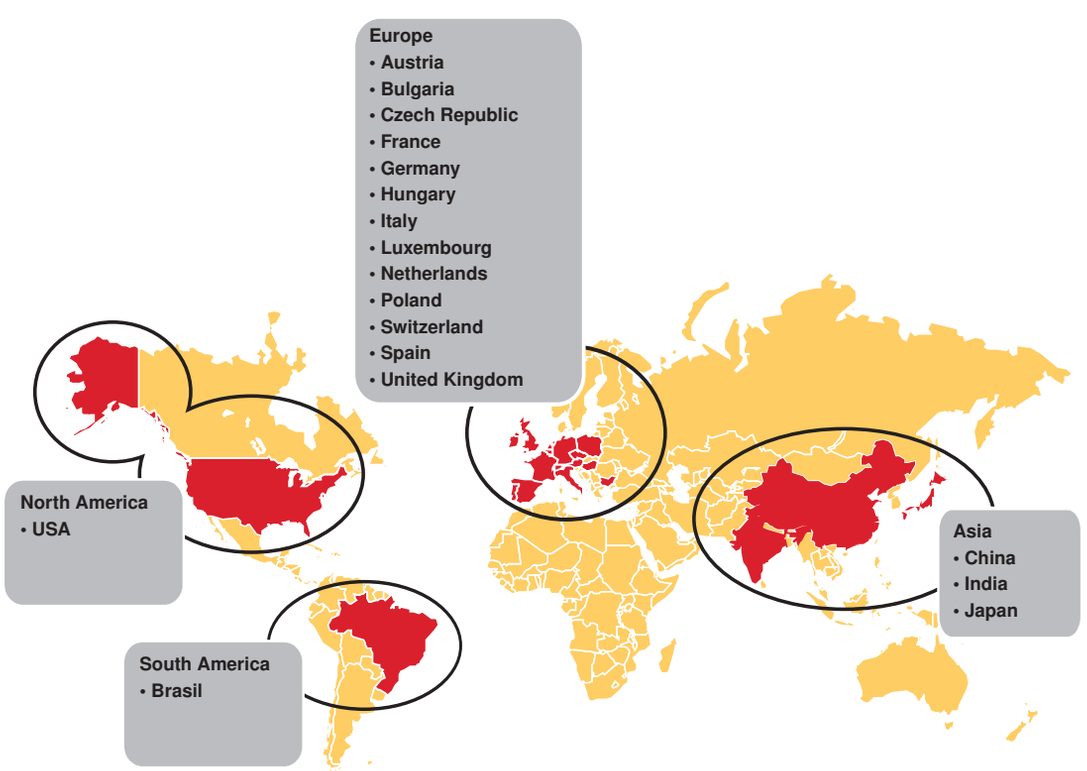
Headquarters and main site
MAMER / Luxembourg

Main site **REUTTE** / Austria

Hard material matters – it is the core of our business. Through in-depth knowledge and highly flexible production facilities we strive to provide our business partners with direct competitive advantages in the field of hard materials for tooling solutions and wear parts. Our dedication to hard material matters creates intelligent solutions for tomorrow and time to come.

Production plants in the three main economic areas and a worldwide sales network of subsidiaries and distribution partners ensure a quick response to customer needs. In-house training courses and seminars guarantee that both business partners and employees share the latest information on our product range.

We promote intensive dialogue with our customers and strive for long-term business relations on a partnership basis.
The CERATIZIT corporate value 'The focus and point of view of our business partners matters' is a guiding principle for all CERATIZIT employees worldwide.



Direct sales and distribution partners

CERATIZIT Alserio

CERATIZIT Alserio specialises in the production of carbide tools for metal forming. In this way we are able to guarantee you application know-how and tool quality of the highest standard.
As carbide and tools are produced by the same source, we are able to guarantee you utmost process security and an optimum combination of carbide, tool design and surface machining.

At CERATIZIT we consider the carbide business to be a matter of confidence. Decades of experience in carbide development and production enable us to offer you this confidence. Our quality management systems meet the highest standards. This is documented by the ISO 9001:2000 quality certificate.

TÜV CERT

CERTIFICATE

The TÜV CERT Certification Body
of TÜV Anlagentechnik GmbH
Unternehmensgruppe TÜV Rheinland/Berlin-Brandenburg

hereby certifies in accordance with
TÜV CERT procedures that

CERATIZIT Luxembourg S.à.r.l.
101, route de Holzem
8232 Mamer
Luxembourg

has established and applies a quality system for

development and production of hardmetal,
ceramic and cermet parts
at the site of Mamer

An audit was performed.
Report No. 3252
Proof has been furnished that the requirements according to

DIN EN ISO 9001:2000

are fulfilled.
The certificate is valid until December 2005
Certificate Registration No. 01 100 3252

TÜV Rheinland/
Berlin-Brandenburg

TÜV

TÜV CERT Certification Body
of TÜV Anlagentechnik GmbH

ÖQS

ÖQS-ZERTIFIKAT

Die ÖQS - Zertifizierungs- und Begutachtungs GmbH stellt folgenden Organisationen ein ÖQS-Zertifikat aus:

Dieses ÖQS-Zertifikat bestätigt die Anwendung und Weiterentwicklung von einem wirksamen

CERATIZIT Austria Gesellschaft m.b.H.
A-6600 Reute/Tirol

QUALITÄTSMANAGEMENT-SYSTEM
entsprechend den Forderungen der
ÖNORM EN ISO 9001:2000

Registrier-Nummer: 3164/0
Erstzustellung: 23. Mai 2001
Gültig bis: 27. April 2007

Die Gültigkeit dieses ÖQS-Zertifikates wird durch jährliche Überwachungsaudits und dreijährige Verlängerungsaudits aufrechterhalten.

Wien, am 21. Juni 2004

ÖQS - Zertifizierungs- und Begutachtungs GmbH

TT Ing. Viktor Saltschek
Präsident

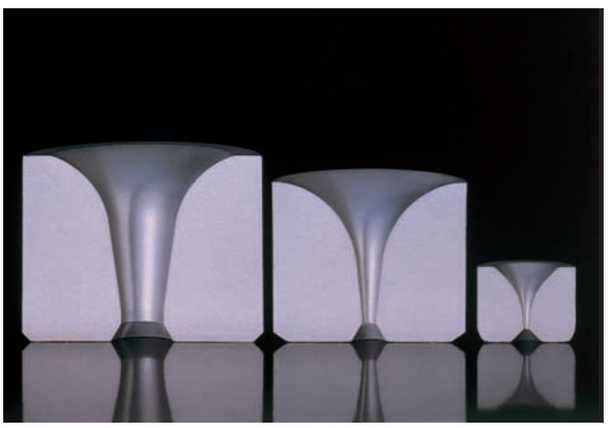
Konrad Scheiber
Geschäftsführer

Drawing tooling

Cost effective solutions for optimum quality

Drawing die blanks

A standard range of as sintered drawing die pellets ex stock, or specials to customer drawings - no problem for CERATIZIT. The geometries of the drawing die pellets we supply are tried and tested. Together with very close tolerances this guarantees minimum finishing.

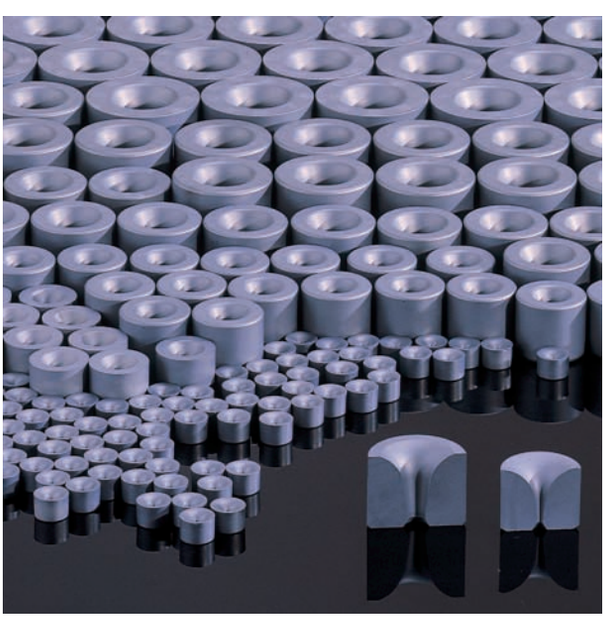


In practice this means:

- High drawing speed
- Good dimensional accuracy
- Very good surface finish on the product
- Long tool life
- Maximum production security

To tune in to the demands of tyre cord drawing we offer specially developed CERATIZIT grades. These are well established in the market and provide excellent results in the production of high tensile wire.

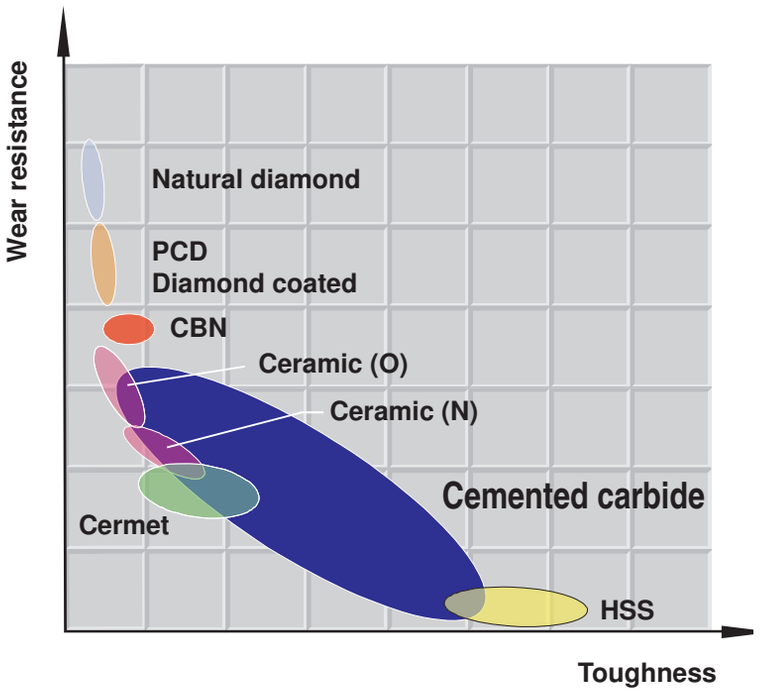
The dimensions of CERATIZIT dies for wire drawing are based on the current ISO recommendations. Each die size is supplied with several appropriately stepped bore sizes and the most frequently used entrance angle 2 α.



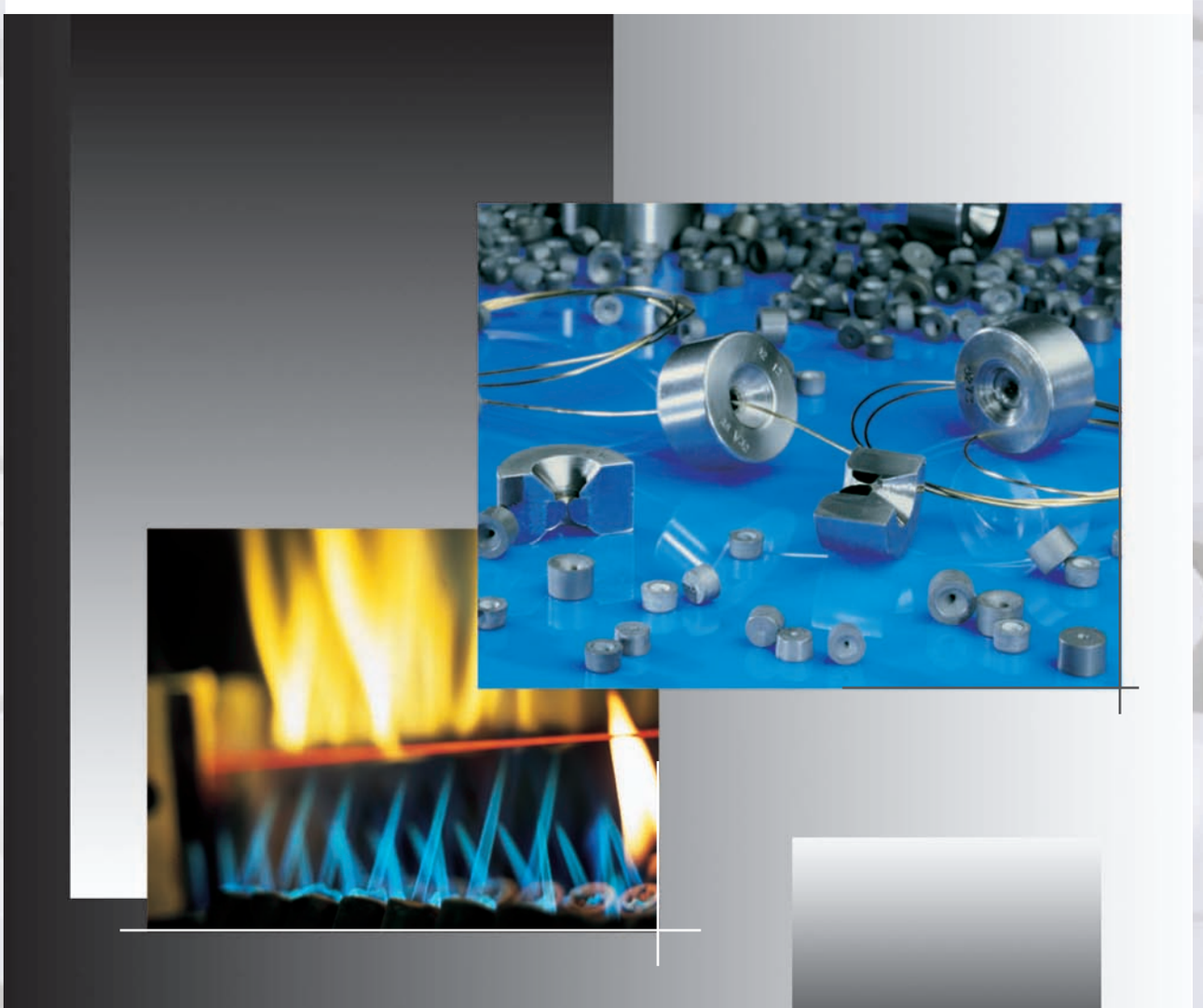
CERATIZIT carbide grades are designed to meet the requirements of the market. Most dies can be supplied with small bore sizes, allowing large dies to be used for smaller exit bores and many times afterwards up to the largest possible diameter.

This brochure provides detailed information about the range of CERATIZIT wire drawing dies.

Hard materials / carbide



Carbide is a brittle, hard material with mechanical properties that can be adjusted within a very wide range, given its composition and microstructure. The hardness and toughness range of the CERATIZIT grades includes everything from wear resistant tool steel to super-hard ceramic materials.



Carbide grades

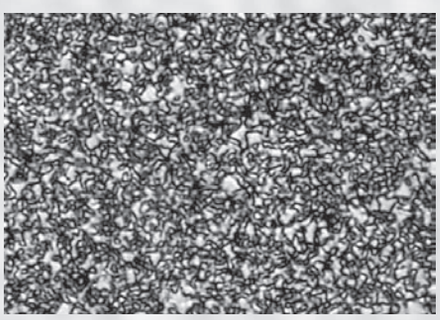
Composition and properties

Grade	CT grade code	Code ISO K	Binder	Hardness			Transverse rupture strength		K_{IC}* SEVNB
			(%)	HV10	HV30	HRA	MPa	P.S.I.	MPa*m$^{1/2}$
SUBMICRON GRAIN GRADES									
TSM05	CTS10F	K05	4,8	1980	1940	93,7	3300	478.500	7,2
FINE GRAIN GRADES									
TD10	CTF11Y	K10	6	1760	1730	92,7	2300	333.500	8,6
TD20	CTF12Y	K20	6	1600	1580	91,7	2300	333.500	9,9
TD30	CTF18Y	K30	9	1470	1450	90,8	3000	435.000	10,9

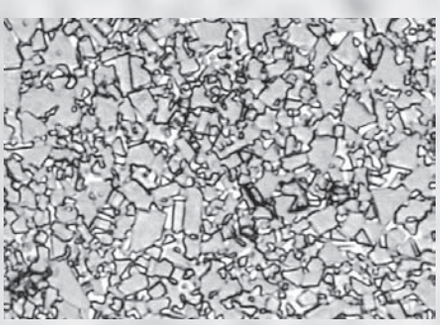
Comments:

1. The data in this table are typical material parameters. We reserve the right to modify the data due to technical progress or due to further development within our company.
2. K_{IC}*: the measured critical tension intensity factors (K_{IC}) depend to a high degree on the sample geometry and sample preparation. A direct comparison with parameters which have been determined by means of a different method is therefore not admissible.

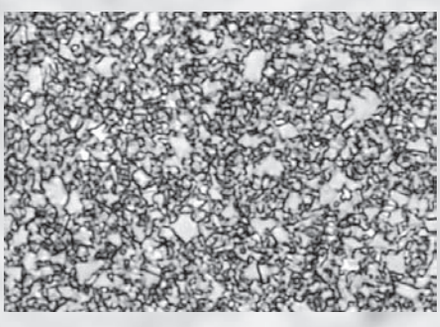
TSM05



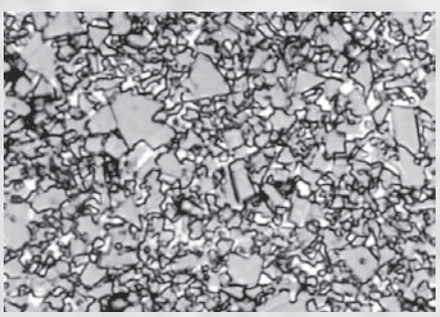
TD20



TD10



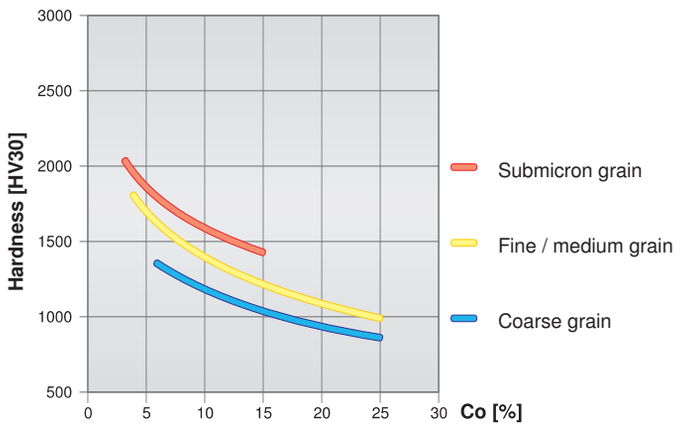
TD30

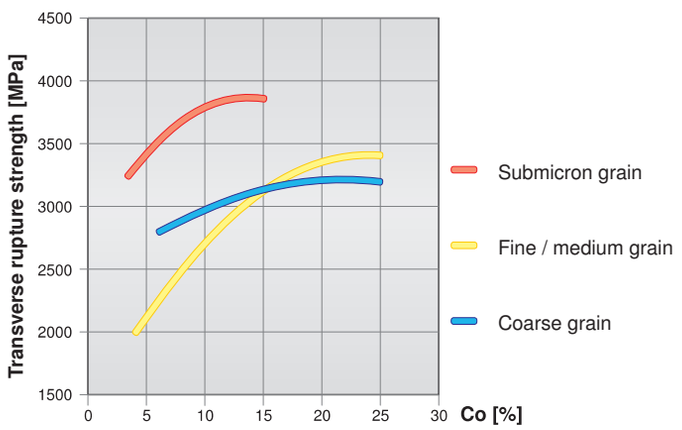


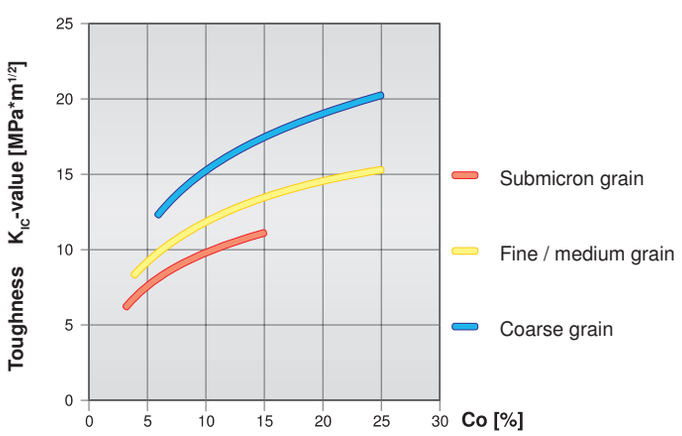
The basis for optimum quality

The graphic illustrations below show that the mechanical properties of the carbide mainly depend on the binder content (Co) and the TC grain size. Hardness, i.e. wear resistance, increases inversely/reciprocally proportional to the fracture toughness. This means that the harder the material the more it reacts to notch tensions and impact stress (the 'impact resistance' parameter, which cannot be precisely defined, correlates to a high degree with the fracture toughness of the material).

On the other hand, the transverse rupture strength does not directly depend on the hardness but rather on the TC grain size and the cobalt content. The adhesive wear (tendency to stick), however, decreases with the grain size and the cobalt content of the carbide used. The list of the mentioned interdependencies, which could be extended at will for other wear and failure mechanisms, show that it is only possible to choose the correct carbide grade following a systematic procedure and/or based on experience with similar forming processes.

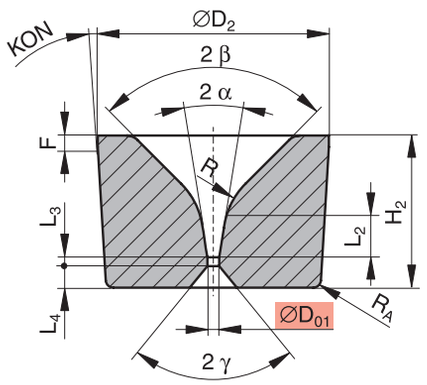




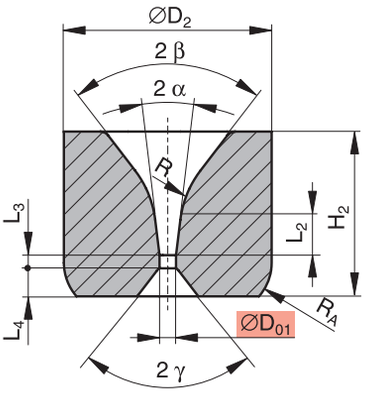


Classification of the WC grain size	
WC grain size [µm]	Classification
< 0,2	nano
0,2 - 0,5	ultrafine
0,5 - 0,8	submicron
0,8 - 1,3	fine
1,3 - 2,5	medium
2,5 - 6,0	coarse
> 6,0	extra-coarse

Description of symbols



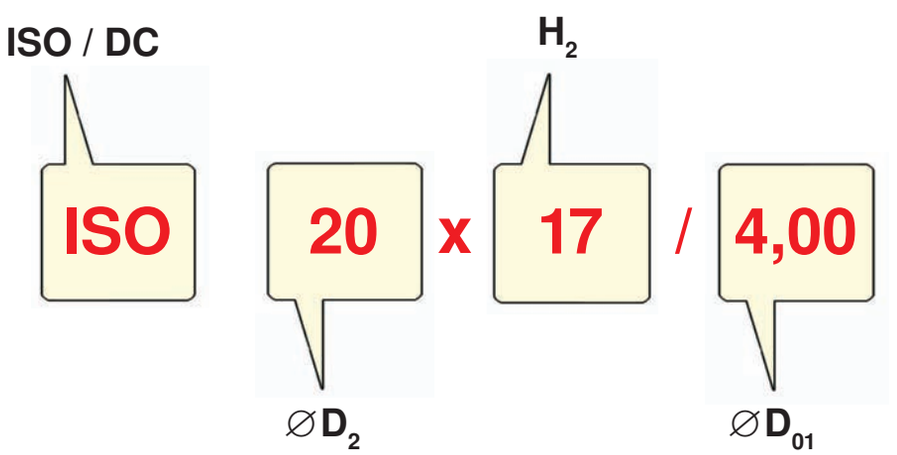
Tyre cord pellets



Wire die pellets

∅D$_{01}$	As sintered diameter (nominal diameter with minus tolerance)
∅D$_2$	Pellet diameter
H$_2$	Pellet height
L$_2$	Drawing height
L$_3$	Bearing length
L$_4$	Exit angle depth
2 α	Drawing angle
2 β	Entrance angle
2 γ	Exit angle
R	Entrance radius
R$_A$	Outer edge radius/chamfer
KON	Cone angle / 2
F	Cylindrical length

Designation system for drawing dies



DC	7 x 4	9 x 6

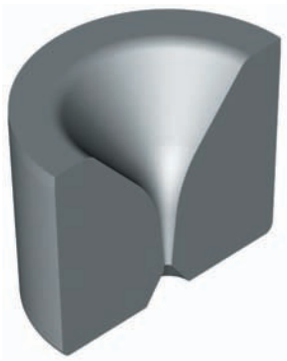
ISO	10 x 8	16 x 13	20 x 17
	25 x 20	30 x 24	35 x 24
	40 x 24	45 x 25	

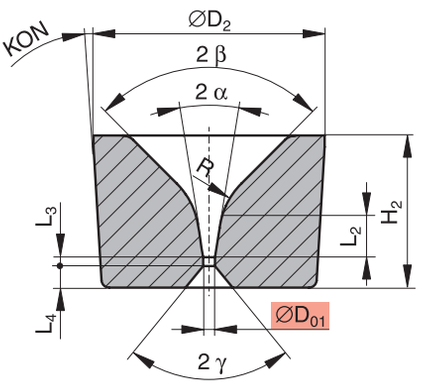
0,1
↑
↓
20,5

possible combinations according to stock programme

DC 7 x 4, DC 9 x 6

Steelcord pellets for the tyre industry



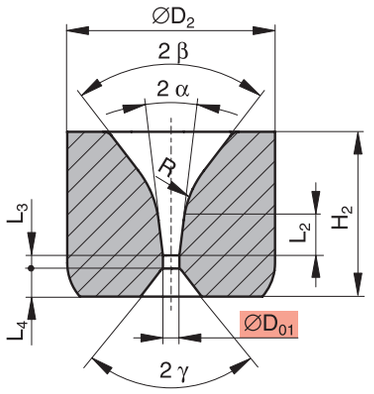


Type, ordering description	Dimensions in mm									
	$\varnothing D_{01}$ $^{+0,01}_{-0,03}$	R	2 β	2 α x L_2	L_3	2 γ x L_4	$\varnothing D_2$	H_2	KON	Grade
DC 7 x 4 / 0,12	0,12	2,0	90°	12° x 0,9	≤ 0,1	90° x 0,7	7 $^{\pm 0,1}$	4,0	4°	TSM05
DC 7 x 4 / 0,16	0,16									
DC 7 x 4 / 0,20	0,20									
DC 7 x 4 / 0,24	0,24									
DC 7 x 4 / 0,28	0,28									
DC 7 x 4 / 0,32	0,32									
DC 9 x 6 / 0,10	0,10	3,0	90°	12° x 1,0	≤ 0,1	90° x 1,1	9 $^{\pm 0,05}$	6,0	1° 30´	TSM05
DC 9 x 6 / 0,12	0,12									
DC 9 x 6 / 0,14	0,14									
DC 9 x 6 / 0,16	0,16									
DC 9 x 6 / 0,18	0,18									
DC 9 x 6 / 0,20	0,20									
DC 9 x 6 / 0,22	0,22									
DC 9 x 6 / 0,24	0,24									
DC 9 x 6 / 0,26	0,26									
DC 9 x 6 / 0,30	0,30	4,0	90°	12° x 1,0	0,15	90° x 1,0	9 $^{\pm 0,05}$	6,0	1° 30´	TSM05
DC 9 x 6 / 0,40	0,40				0,20					
DC 9 x 6 / 0,50	0,50				0,25					
DC 9 x 6 / 0,60	0,60				0,30					
DC 9 x 6 / 0,70	0,70	3,0	90°	14° x 1,0	0,35	90° x 1,0	9 $^{\pm 0,05}$	6,0	1° 30´	TSM05
DC 9 x 6 / 0,80	0,80				0,40					
DC 9 x 6 / 0,90	0,90				0,45					
DC 9 x 6 / 1,00	1,00				0,50					
DC 9 x 6 / 1,10	1,10				0,55					
DC 9 x 6 / 1,20	1,20	3,0	90°	14° x 1,0	0,60	90° x 1,0	9 $^{\pm 0,05}$	6,0	1° 30´	TSM05
DC 9 x 6 / 1,30	1,30				0,65					
DC 9 x 6 / 1,40	1,40				0,70					

Ordering example: 30 pieces DC 9 x 6 / 0,65

ISO 10 x 8, ISO 16 x 13

ISO drawing die blanks



Type, ordering description	Dimensions in mm								
	$\varnothing D_{01}$	R	2 β	2 α x L_2	L_3	2 γ x L_4	$\varnothing D_2$ ±0,2	H_2	Grade
ISO 10 x 8 / 0,20	0,20 -0,05	6,0	90°	12° x 1,60	0,20	90° x 1,4	10,4	8,0	TD10
ISO 10 x 8 / 0,30	0,30 -0,05			12° x 1,60	0,20				
ISO 10 x 8 / 0,40	0,40 -0,08			12° x 1,60	0,20				
ISO 10 x 8 / 0,50	0,50 -0,08			12° x 1,55	0,25				
ISO 10 x 8 / 0,60	0,60 -0,10			12° x 1,50	0,30				
ISO 10 x 8 / 0,70	0,70 -0,10			14° x 1,85	0,35				
ISO 10 x 8 / 0,80	0,80 -0,10			14° x 1,80	0,40				
ISO 10 x 8 / 0,90	0,90 -0,10			14° x 1,75	0,45				
ISO 10 x 8 / 1,00	1,00 -0,10			14° x 1,70	0,50				
ISO 10 x 8 / 1,10	1,10 -0,10			14° x 1,85	0,55				
ISO 10 x 8 / 1,20	1,20 -0,10			14° x 1,80	0,60				
ISO 10 x 8 / 1,30	1,30 -0,10			14° x 1,75	0,65				
ISO 10 x 8 / 1,40	1,40 -0,10			14° x 1,70	0,70				
ISO 10 x 8 / 1,50	1,50 -0,10			14° x 1,75	0,75				
ISO 10 x 8 / 1,60	1,60 -0,10	4,5	90°	14° x 2,35	0,80	90° x 1,4	10,4	8,0	TD10
ISO 10 x 8 / 1,70	1,70 -0,10			14° x 2,30	0,85				
ISO 10 x 8 / 1,80	1,80 -0,10			14° x 2,25	0,90				
ISO 10 x 8 / 1,90	1,90 -0,10			14° x 2,20	0,95				
ISO 10 x 8 / 2,00	2,00 -0,10			14° x 2,35	1,00				
ISO 10 x 8 / 2,10	2,10 -0,10			14° x 2,20	1,05				
ISO 10 x 8 / 2,20	2,20 -0,10			14° x 2,15	1,10				
ISO 10 x 8 / 2,30	2,30 -0,10			14° x 2,20	1,15				
ISO 10 x 8 / 2,40	2,40 -0,10			14° x 2,15	1,20				
ISO 16 x 13 / 0,20	0,20 -0,05	8,0	75°	12° x 2,45	0,20	75° x 2,3	16,4	13	TD10
ISO 16 x 13 / 0,30	0,30 -0,05			12° x 2,40	0,20				
ISO 16 x 13 / 0,40	0,40 -0,08			12° x 2,55	0,20				
ISO 16 x 13 / 0,50	0,50 -0,08			12° x 2,50	0,25				

Ordering example: 50 pieces ISO 16 x 13 / 1,70

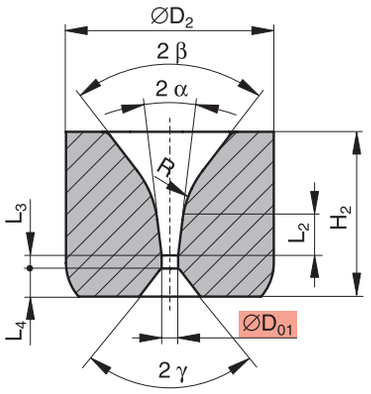
ISO 16 x 13

Type, ordering description	Dimensions in mm								
	$\varnothing D_{01}$	R	2 β	2 α x L_2	L_3	2 γ x L_4	$\varnothing D_2$ ±0,2	H_2	Grade
ISO 16 x 13 / 0,60	0,60 $^{-0,10}$	8,0	75°	12° x 2,45	0,30	75° x 2,3	16,4	13,0	TD10
ISO 16 x 13 / 0,70	0,70 $^{-0,10}$			14° x 2,75	0,35				
ISO 16 x 13 / 0,80	0,80 $^{-0,10}$			14° x 2,80	0,40				
ISO 16 x 13 / 0,90	0,90 $^{-0,10}$			14° x 2,80	0,45				
ISO 16 x 13 / 1,00	1,00 $^{-0,10}$			14° x 3,00	0,50				
ISO 16 x 13 / 1,10	1,10 $^{-0,10}$			14° x 2,85	0,55				
ISO 16 x 13 / 1,20	1,20 $^{-0,10}$			14° x 2,90	0,60				
ISO 16 x 13 / 1,30	1,30 $^{-0,10}$			14° x 2,95	0,65				
ISO 16 x 13 / 1,40	1,40 $^{-0,10}$			14° x 3,05	0,70				
ISO 16 x 13 / 1,50	1,50 $^{-0,10}$			14° x 2,95	0,75				
ISO 16 x 13 / 1,60	1,60 $^{-0,10}$			14° x 2,95	0,80				
ISO 16 x 13 / 1,70	1,70 $^{-0,10}$			14° x 2,85	0,85				
ISO 16 x 13 / 1,80	1,80 $^{-0,10}$			14° x 3,15	0,90				
ISO 16 x 13 / 1,90	1,90 $^{-0,10}$			14° x 2,80	0,95				
ISO 16 x 13 / 2,00	2,00 $^{-0,10}$			14° x 3,05	1,00				
ISO 16 x 13 / 2,10	2,10 $^{-0,10}$			14° x 3,65	1,05				
ISO 16 x 13 / 2,20	2,20 $^{-0,10}$			14° x 4,25	1,10				
ISO 16 x 13 / 2,30	2,30 $^{-0,10}$			14° x 4,20	1,15				
ISO 16 x 13 / 2,40	2,40 $^{-0,10}$			14° x 4,15	1,20				
ISO 16 x 13 / 2,50	2,50 $^{-0,10}$			14° x 4,10	1,25				
ISO 16 x 13 / 2,60	2,60 $^{-0,10}$	6,5	75°	16° x 4,50	1,30	75° x 2,3	16,4	13,0	TD10
ISO 16 x 13 / 2,70	2,70 $^{-0,10}$			16° x 4,45	1,35				
ISO 16 x 13 / 2,80	2,80 $^{-0,10}$			16° x 4,40	1,40				
ISO 16 x 13 / 2,90	2,90 $^{-0,10}$			16° x 4,35	1,45				
ISO 16 x 13 / 3,00	3,00 $^{-0,10}$			16° x 2,90	1,50				
ISO 16 x 13 / 3,20	3,20 $^{-0,15}$	6,5	75°	16° x 2,90	1,50	75° x 2,3	16,4	13,0	TD20
ISO 16 x 13 / 3,40	3,40 $^{-0,15}$			16° x 2,80	1,60				
ISO 16 x 13 / 3,60	3,60 $^{-0,15}$			16° x 2,80	1,60				
ISO 16 x 13 / 3,80	3,80 $^{-0,15}$			16° x 2,80	1,60				
ISO 16 x 13 / 4,00	4,00 $^{-0,15}$			18° x 4,80	1,70				
ISO 16 x 13 / 4,20	4,20 $^{-0,15}$			18° x 4,80	1,70				
ISO 16 x 13 / 4,40	4,40 $^{-0,15}$			18° x 5,30	1,80				
ISO 16 x 13 / 4,60	4,60 $^{-0,15}$			18° x 5,30	1,80				
ISO 16 x 13 / 4,80	4,80 $^{-0,15}$	3,0	–	18° x 6,25	1,90	75° x 2,3	16,4	13,0	TD20
ISO 16 x 13 / 5,00	5,00 $^{-0,15}$			18° x 6,25	1,90				
ISO 16 x 13 / 5,20	5,20 $^{-0,15}$			18° x 6,05	2,10				
ISO 16 x 13 / 5,40	5,40 $^{-0,15}$			18° x 6,05	2,10				
ISO 16 x 13 / 5,60	5,60 $^{-0,15}$			18° x 5,95	2,20				

Ordering example: 30 pieces ISO 16 x 13 / 5,20

ISO 20 x 17

ISO drawing die blanks



Type, ordering description	Dimensions in mm								
	$\varnothing D_{01}$	R	2 β	2 α x L_2	L_3	2 γ x L_4	$\varnothing D_2^{\pm 0,25}$	H_2	Grade
ISO 20 x 17 / 1,40	$1,40^{-0,10}$	10,0	60°	14° x 3,55	0,70	60° x 3,2	20,45	17,0	TD20
ISO 20 x 17 / 1,60	$1,60^{-0,10}$			14° x 3,45	0,80				
ISO 20 x 17 / 1,80	$1,80^{-0,10}$			14° x 4,05	0,90				
ISO 20 x 17 / 2,00	$2,00^{-0,10}$			14° x 3,95	1,00				
ISO 20 x 17 / 2,20	$2,20^{-0,10}$			14° x 3,85	1,10				
ISO 20 x 17 / 2,40	$2,40^{-0,10}$			14° x 3,75	1,20				
ISO 20 x 17 / 2,60	$2,60^{-0,10}$			16° x 4,70	1,30				
ISO 20 x 17 / 2,80	$2,80^{-0,10}$			16° x 4,60	1,40				
ISO 20 x 17 / 3,00	$3,00^{-0,10}$			16° x 5,20	1,50				
ISO 20 x 17 / 3,20	$3,20^{-0,15}$			16° x 5,05	1,60				
ISO 20 x 17 / 3,40	$3,40^{-0,15}$			16° x 4,90	1,70				
ISO 20 x 17 / 3,60	$3,60^{-0,15}$			16° x 4,80	1,80				
ISO 20 x 17 / 3,80	$3,80^{-0,15}$			16° x 4,70	1,90				
ISO 20 x 17 / 4,00	$4,00^{-0,15}$			18° x 6,65	1,60				
ISO 20 x 17 / 4,20	$4,20^{-0,15}$			18° x 6,55	1,70				
ISO 20 x 17 / 4,40	$4,40^{-0,15}$			18° x 6,45	1,80				
ISO 20 x 17 / 4,60	$4,60^{-0,15}$			18° x 6,45	1,80				
ISO 20 x 17 / 4,80	$4,80^{-0,15}$			18° x 6,35	1,90				
ISO 20 x 17 / 5,00	$5,00^{-0,15}$			18° x 6,25	2,00				
ISO 20 x 17 / 5,20	$5,20^{-0,15}$			18° x 6,15	2,10				
ISO 20 x 17 / 5,40	$5,40^{-0,15}$	8,0	60°	18° x 7,25	2,20	60° x 3,2	20,45	17,0	TD20
ISO 20 x 17 / 5,60	$5,60^{-0,15}$			18° x 7,25	2,20				
ISO 20 x 17 / 6,20	$6,20^{-0,20}$	2,5	-	18° x 9,50	2,20	60° x 3,2	20,45	17,0	TD20
ISO 20 x 17 / 6,80	$6,80^{-0,20}$			18° x 9,00	2,70				
ISO 20 x 17 / 7,40	$7,40^{-0,20}$			18° x 8,80	2,90				
ISO 20 x 17 / 8,00	$8,00^{-0,20}$			18° x 8,70	3,00				
ISO 20 x 17 / 8,60	$8,60^{-0,20}$			18° x 8,60	3,10				
ISO 20 x 17 / 9,00	$9,00^{-0,20}$			18° x 8,60	3,10				

Ordering example: 50 pieces ISO 20 x 17 / 3,20

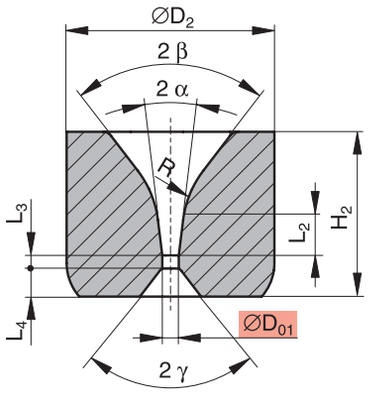
ISO 25 x 20

Type, ordering description	Dimensions in mm								
	∅D_{01}	R	2 β	2 α x L_2	L_3	2 γ x L_4	∅D_2 $^{\pm 0,25}$	H_2	Grade
ISO 25 x 20 / 3,00	3,00 $^{-0,10}$	10,0	60°	16° x 5,10	1,50	60° x 3,5	25,45	20,0	TD30
ISO 25 x 20 / 3,20	3,20 $^{-0,15}$			16° x 5,00	1,60				
ISO 25 x 20 / 3,40	3,40 $^{-0,15}$			16° x 4,90	1,70				
ISO 25 x 20 / 3,60	3,60 $^{-0,15}$			16° x 4,80	1,80				
ISO 25 x 20 / 3,80	3,80 $^{-0,15}$			16° x 4,70	1,90				
ISO 25 x 20 / 4,00	4,00 $^{-0,15}$			18° x 7,20	1,60				
ISO 25 x 20 / 4,20	4,20 $^{-0,15}$			18° x 7,10	1,70				
ISO 25 x 20 / 4,40	4,40 $^{-0,15}$			18° x 7,00	1,80				
ISO 25 x 20 / 4,60	4,60 $^{-0,15}$			18° x 7,00	1,80				
ISO 25 x 20 / 4,80	4,80 $^{-0,15}$			18° x 6,90	1,90				
ISO 25 x 20 / 5,00	5,00 $^{-0,15}$			18° x 6,80	2,00				
ISO 25 x 20 / 5,20	5,20 $^{-0,15}$			18° x 6,70	2,10				
ISO 25 x 20 / 5,40	5,40 $^{-0,15}$			18° x 6,60	2,20				
ISO 25 x 20 / 5,60	5,60 $^{-0,15}$			18° x 6,60	2,20				
ISO 25 x 20 / 5,80	5,80 $^{-0,15}$			18° x 6,50	2,30				
ISO 25 x 20 / 6,00	6,00 $^{-0,15}$	10,0	90°	18° x 7,80	2,40	60° x 3,5	25,45	20,0	TD30
ISO 25 x 20 / 6,20	6,20 $^{-0,20}$			18° x 7,70	2,50				
ISO 25 x 20 / 6,40	6,40 $^{-0,20}$			18° x 7,60	2,60				
ISO 25 x 20 / 6,60	6,60 $^{-0,20}$			18° x 7,60	2,60				
ISO 25 x 20 / 6,80	6,80 $^{-0,20}$			18° x 7,50	2,70				
ISO 25 x 20 / 7,00	7,00 $^{-0,20}$			18° x 7,40	2,80				
ISO 25 x 20 / 7,20	7,20 $^{-0,20}$			18° x 7,30	2,90				
ISO 25 x 20 / 7,40	7,40 $^{-0,20}$	10,0	60°	18° x 6,75	3,00	60° x 3,5	25,45	20,0	TD30
ISO 25 x 20 / 7,60	7,60 $^{-0,20}$			18° x 6,75	3,00				
ISO 25 x 20 / 7,80	7,80 $^{-0,20}$			18° x 6,65	3,10				
ISO 25 x 20 / 8,00	8,00 $^{-0,20}$			18° x 6,95	2,80				
ISO 25 x 20 / 8,20	8,20 $^{-0,20}$			18° x 6,85	2,90				
ISO 25 x 20 / 8,40	8,40 $^{-0,20}$			18° x 6,85	2,90				
ISO 25 x 20 / 8,60	8,60 $^{-0,20}$			18° x 6,75	3,00				
ISO 25 x 20 / 8,80	8,80 $^{-0,20}$			18° x 6,65	3,10				
ISO 25 x 20 / 9,00	9,00 $^{-0,20}$	2,5	-	18° x 8,60	3,10	60° x 3,5	25,45	20,0	TD30
ISO 25 x 20 / 9,20	9,20 $^{-0,30}$			18° x 8,60	3,10				
ISO 25 x 20 / 9,40	9,40 $^{-0,30}$			18° x 8,60	3,10				

Ordering example: 60 pieces ISO 25 x 20 / 6,40

ISO 30 x 24

ISO drawing die blanks



Type, ordering description	Dimensions in mm								
	$\varnothing D_{01}$	R	2 β	2 α x L_2	L_3	2 γ x L_4	$\varnothing D_2$ $^{\pm 0,25}$	H_2	Grade
ISO 30 x 24 / 4,00	4,00 $^{-0,15}$			18° x 6,90	1,60				
ISO 30 x 24 / 4,20	4,20 $^{-0,15}$			18° x 6,80	1,70				
ISO 30 x 24 / 4,40	4,40 $^{-0,15}$			18° x 6,70	1,80				
ISO 30 x 24 / 4,60	4,60 $^{-0,15}$			18° x 6,70	1,80				
ISO 30 x 24 / 4,80	4,80 $^{-0,15}$			18° x 6,60	1,90				
ISO 30 x 24 / 5,00	5,00 $^{-0,15}$			18° x 6,50	2,00				
ISO 30 x 24 / 5,20	5,20 $^{-0,15}$			18° x 6,40	2,10				
ISO 30 x 24 / 5,40	5,40 $^{-0,15}$	10,0	60°	18° x 7,70	2,20	60° x 4,2	30,45	24,0	TD30
ISO 30 x 24 / 5,60	5,60 $^{-0,15}$			18° x 7,70	2,20				
ISO 30 x 24 / 5,80	5,80 $^{-0,15}$			18° x 7,60	2,30				
ISO 30 x 24 / 6,00	6,00 $^{-0,15}$			18° x 7,50	2,40				
ISO 30 x 24 / 6,20	6,20 $^{-0,20}$			18° x 7,40	2,50				
ISO 30 x 24 / 6,40	6,40 $^{-0,20}$			18° x 7,30	2,60				
ISO 30 x 24 / 6,60	6,60 $^{-0,20}$			18° x 7,30	2,60				
ISO 30 x 24 / 6,80	6,80 $^{-0,20}$			18° x 7,20	2,70				

Ordering example: 50 pieces ISO 30 x 24 / 4,20

ISO 30 x 24 - ISO 40 x 24 - ISO 45 x 25

Type, ordering description	Dimensions in mm								
	$\varnothing D_{01}$	R	2 β	2 α x L_2	L_3	2 γ x L_4	$\varnothing D_2$	H_2	Grade
ISO 30 x 24 / 7,00	$7{,}00^{-0{,}20}$	15,0	76°	18° x 9,15	2,80	60° x 4,2	$30{,}45^{\pm 0{,}25}$	24,0	TD30
ISO 30 x 24 / 7,20	$7{,}20^{-0{,}20}$			18° x 9,05	2,90				
ISO 30 x 24 / 7,40	$7{,}40^{-0{,}20}$			18° x 8,95	3,00				
ISO 30 x 24 / 7,60	$7{,}60^{-0{,}20}$			18° x 8,95	3,00				
ISO 30 x 24 / 7,80	$7{,}80^{-0{,}20}$			18° x 8,85	3,10				
ISO 30 x 24 / 8,00	$8{,}00^{-0{,}20}$			18° x 9,15	2,80				
ISO 30 x 24 / 8,20	$8{,}20^{-0{,}20}$			18° x 9,05	2,90				
ISO 30 x 24 / 8,40	$8{,}40^{-0{,}20}$			18° x 9,05	2,90				
ISO 30 x 24 / 8,60	$8{,}60^{-0{,}20}$			18° x 8,95	3,00				
ISO 30 x 24 / 8,80	$8{,}80^{-0{,}20}$			18° x 8,85	3,10				
ISO 30 x 24 / 9,00	$9{,}00^{-0{,}20}$			18° x 8,75	3,20				
ISO 30 x 24 / 9,20	$9{,}20^{-0{,}30}$			18° x 8,75	3,20				
ISO 30 x 24 / 9,40	$9{,}40^{-0{,}30}$			18° x 8,65	3,30				
ISO 30 x 24 / 9,60	$9{,}60^{-0{,}30}$	12,0	68°	18° x 10,45	3,40	60° x 4,2	$30{,}45^{\pm 0{,}25}$	24,0	TD30
ISO 30 x 24 / 9,80	$9{,}80^{-0{,}30}$			18° x 10,45	3,40				
ISO 30 x 24 / 10,0	$10{,}0^{-0{,}30}$			18° x 10,80	3,00				
ISO 30 x 24 / 10,2	$10{,}2^{-0{,}30}$			18° x 10,70	3,10				
ISO 35 x 24 / 10,5	$10{,}5^{-0{,}20}$	8,0	60°	16° x 14,0	2,00	30° x 3,0	$35{,}425^{\pm 0{,}425}$	24,0	TD30
ISO 35 x 24 / 11,5	$11{,}5^{-0{,}20}$								
ISO 35 x 24 / 12,5	$12{,}5^{-0{,}30}$								
ISO 35 x 24 / 13,5	$13{,}5^{-0{,}30}$								
ISO 35 x 24 / 14,5	$14{,}5^{-0{,}30}$								
ISO 40 x 24 / 14,5	$14{,}5^{-0{,}30}$								
ISO 40 x 24 / 15,5	$15{,}5^{-0{,}30}$	8,0	60°	16° x 13,0	3,00	30° x 3,0	$40{,}425^{\pm 0{,}425}$	24,0	TD30
ISO 40 x 24 / 16,5	$16{,}5^{-0{,}30}$								
ISO 45 x 25 / 16,5	$16{,}5^{-0{,}30}$								
ISO 45 x 25 / 17,5	$17{,}5^{-0{,}30}$	6,0	60°	16° x 14,5	3,00	30° x 3,0	$45{,}425^{\pm 0{,}425}$	25,0	TD30
ISO 45 x 25 / 18,5	$18{,}5^{-0{,}30}$								
ISO 45 x 25 / 19,5	$19{,}5^{-0{,}30}$								
ISO 45 x 25 / 20,5	$20{,}5^{-0{,}30}$								

Ordering example: 20 pieces ISO 35 x 24 / 13,5

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