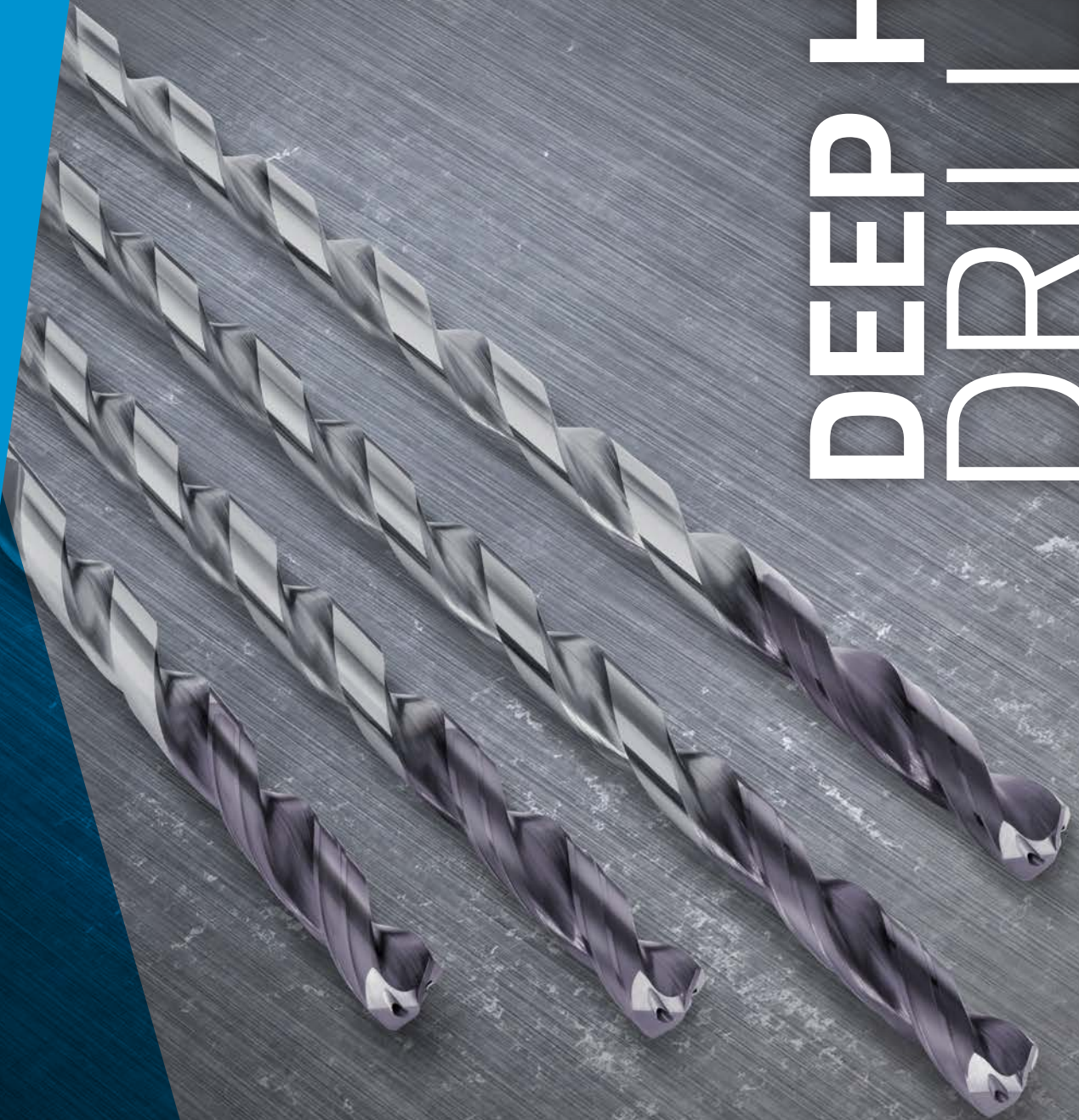


***sutton*tools**
world class cutting tools

DEEP HOLE
DRILLING



**BLACK
MAGIC
XL**

Next generation in
deep hole drilling



Deep hole drilling up to 30xD depth

The Black Magic XL Series Carbide Drills are designed to reduce process times in demanding deep hole metal drilling. Internal coolant allows large material removal rate using high cutting speeds and feeds with specially designed flute ensures fast and short chip evacuations which eliminates jamming.



Applications

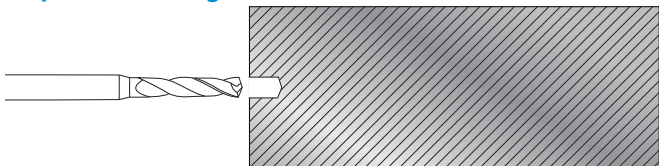
ISO	VDI	Material Group	Sutton	
P	A	Steel	N	INI
M	R	Stainless Steel	VA	
K	F	Cast Iron	GG	

Drilling for increased tool life and reliability

Drilling deep holes is a demanding machining task.

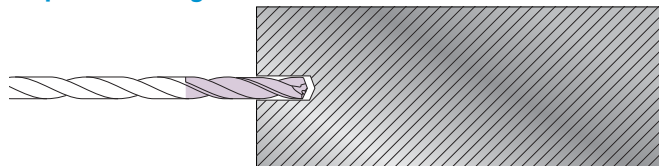
Sutton Tools recommends the following strategy to increase reliability and prevent breakage.

Step 1. Pilot drilling



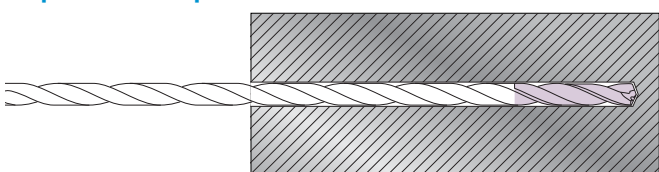
- Choose the same diameter drill in Stub length (D323 or D329 Series).
- Drill pilot to a depth of 2xD, with recommended speed & feeds.

Step 2. Enter long drill



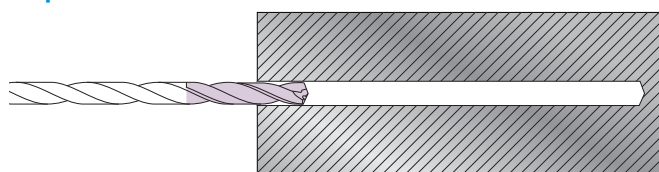
The longer drill should enter the hole with the through spindle coolant turned off & at approx. 500RPM & 50% feed-rate.

Step 3. Drill to depth



Once the longer drill has entered the pilot hole at approx. 1.5xD, the drilling can proceed to 100% speed & feed to the programmed hole depth with coolant turned on.

Step 4. Retract drill



Once the drill reaches the depth, it should be retracted at the maximum feed-rate & approx. 500 RPM, turning off the through spindle coolant before the drill leaves the hole.

Note:

- Always reduce ATC (Auto Tool Changer) to 10%, if left at 100% the fast tool change action will break long IK carbide drills eg 20xD, 30xD, etc.
- Check for clearance in the tool magazine.
- Above recommendations are based on high pressure coolant applications (1000 PSI min).

Characteristics

- Long tool life
- Precise hole quality
- Flute design and through-coolant ducts ensures efficient chip evacuation
- 4 guidance lands to stabilise drill point



2 helical coolant ducts

Pertura coated tip for enhanced reliability in deep hole drilling

Up to depths of 30×Diameter

Micro geometry and surface conditioning for optimal chip control

Pertura

Most advanced coating for deep-hole drilling

Pertura is a coating especially developed for extreme deep-hole carbide drilling applications. It is the result of the refinement process involving our Futura and Helica coatings. Regardless of whether for drilling in steels, stainless steels or cast irons, for new or recoating: With its unique nanolayer structure, Pertura enhances the stability and process reliability of your tools even under difficult machining conditions. This means reduced tool changing and increased machine service life. Moreover, machining times are shortened, which in turn allows for maximum machine capacity utilisation as well as savings in production costs.

Every property is a factor for success

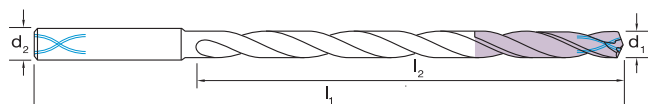
FEATURES	BENEFITS
Nanolayer structure and specific layer composition	Consistent prevention of crack growth Versatile application in high end drilling
Optimal balance between residual stress, hardness and fracture toughness	Applications at moderate and high cutting speeds possible
Enormous abrasion-resistance and high hot hardness	High tool lifetimes
Extremely smooth coating surface	Trouble-free chip transport Reduction of cutting forces
Outstanding oxidation resistance	Very high tool stability, especially of the cutting edges Extremely high service life, even with deep hole and dry drilling

Drills Carbide, Long 12 x d₁

suttontools

BLACK
MAGIC
XL

- Suitable for materials up to 1200N/mm²
- Strong core with internal coolant supply
- Micro geometry and surface conditioning for optimal chip control
- Pertura coated tip for maximum tool life



Catalogue Code
Product Group
Material
Surface Finish
Application
Geometry
Point Type
ISO Materials

12xD



D371

A0210

VHM

Pertura Tip

Up to 1200N/mm²

R30 - IK

135° Form C

P M K

Size Ref.	d ₁ (h7)	L ₁	L ₂	Max. Drill Depth	d ₂ (h6)	Item #
0300	3.0	90	50	46	6	D371 0300
0310	3.1	90	50	45	6	D371 0310
0320	3.2	90	50	45	6	D371 0320
0330	3.3	90	50	45	6	D371 0330
0340	3.4	90	50	45	6	D371 0340
0350	3.5	90	50	45	6	D371 0350
0360	3.6	90	50	45	6	D371 0360
0370	3.7	90	50	44	6	D371 0370
0380	3.8	102	64	58	6	D371 0380
0390	3.9	102	64	58	6	D371 0390
0400	4.0	102	64	58	6	D371 0400
0410	4.1	102	64	58	6	D371 0410
0420	4.2	102	64	58	6	D371 0420
0430	4.3	102	64	58	6	D371 0430
0440	4.4	102	64	57	6	D371 0440
0450	4.5	102	64	57	6	D371 0450
0460	4.6	102	64	57	6	D371 0460
0470	4.7	102	64	57	6	D371 0470
0480	4.8	116	78	71	6	D371 0480
0490	4.9	116	78	71	6	D371 0490
0500	5.0	116	78	71	6	D371 0500
0510	5.1	116	78	70	6	D371 0510
0520	5.2	116	78	70	6	D371 0520
0530	5.3	116	78	70	6	D371 0530
0540	5.4	116	78	70	6	D371 0540
0550	5.5	116	78	70	6	D371 0550
0560	5.6	116	78	70	6	D371 0560
0570	5.7	116	78	69	6	D371 0570
0580	5.8	116	78	69	6	D371 0580
0590	5.9	116	78	69	6	D371 0590
0600	6.0	116	78	69	6	D371 0600
0610	6.1	146	108	99	8	D371 0610
0620	6.2	146	108	99	8	D371 0620
0630	6.3	146	108	99	8	D371 0630
0640	6.4	146	108	98	8	D371 0640
0650	6.5	146	108	98	8	D371 0650
0660	6.6	146	108	98	8	D371 0660
0670	6.7	146	108	98	8	D371 0670
0680	6.8	146	108	98	8	D371 0680
0690	6.9	146	108	98	8	D371 0690
0700	7.0	146	108	98	8	D371 0700
0710	7.1	146	108	97	8	D371 0710
0720	7.2	146	108	97	8	D371 0720
0730	7.3	146	108	97	8	D371 0730
0740	7.4	146	108	97	8	D371 0740
0750	7.5	146	108	97	8	D371 0750

Size Ref.	d ₁ (h7)	L ₁	L ₂	Max. Drill Depth	d ₂ (h6)	Item #
0760	7.6	146	108	97	8	D371 0760
0770	7.7	146	108	96	8	D371 0770
0780	7.8	146	108	96	8	D371 0780
0790	7.9	146	108	96	8	D371 0790
0800	8.0	146	108	96	8	D371 0800
0810	8.1	162	120	108	10	D371 0810
0820	8.2	162	120	108	10	D371 0820
0830	8.3	162	120	108	10	D371 0830
0840	8.4	162	120	107	10	D371 0840
0850	8.5	162	120	107	10	D371 0850
0860	8.6	162	120	107	10	D371 0860
0870	8.7	162	120	107	10	D371 0870
0880	8.8	162	120	107	10	D371 0880
0890	8.9	162	120	107	10	D371 0890
0900	9.0	162	120	107	10	D371 0900
0910	9.1	162	120	106	10	D371 0910
0920	9.2	162	120	106	10	D371 0920
0930	9.3	162	120	106	10	D371 0930
0940	9.4	162	120	106	10	D371 0940
0950	9.5	162	120	106	10	D371 0950
0960	9.6	162	120	106	10	D371 0960
0970	9.7	162	120	105	10	D371 0970
0980	9.8	162	120	105	10	D371 0980
0990	9.9	162	120	105	10	D371 0990
1000	10.0	162	120	105	10	D371 1000
1010	10.1	204	156	141	12	D371 1010
1020	10.2	204	156	141	12	D371 1020
1030	10.3	204	156	141	12	D371 1030
1040	10.4	204	156	140	12	D371 1040
1050	10.5	204	156	140	12	D371 1050
1060	10.6	204	156	140	12	D371 1060
1070	10.7	204	156	140	12	D371 1070
1080	10.8	204	156	140	12	D371 1080
1090	10.9	204	156	140	12	D371 1090
1100	11.0	204	156	139	12	D371 1100
1110	11.1	204	156	139	12	D371 1110
1120	11.2	204	156	139	12	D371 1120
1130	11.3	204	156	139	12	D371 1130
1140	11.4	204	156	139	12	D371 1140
1150	11.5	204	156	139	12	D371 1150
1160	11.6	204	156	139	12	D371 1160
1170	11.7	204	156	138	12	D371 1170
1180	11.8	204	156	138	12	D371 1180
1190	11.9	204	156	138	12	D371 1190
1200	12.0	204	156	138	12	D371 1200

ISO	P													M			K							N										S										H									
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41				
D371	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○				
P	Steel			M	Stainless Steel			K	Cast Iron			N	Non-Ferrous Metals			S	Titanium & Super Alloys			H	Hard Materials										●	Optimal		○	Effective																		

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

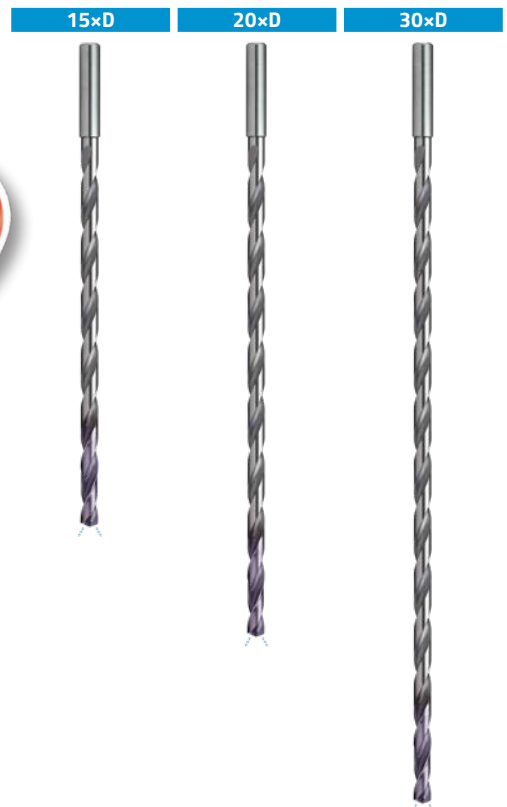
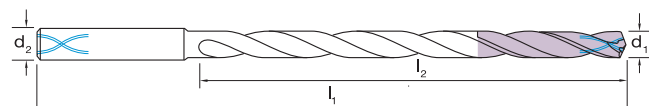
● Optimal ○ Effective

Drills Carbide, Extra Long

suttontools

BLACK
MAGIC
XL

- Suitable for materials up to 1200N/mm²
- Strong core with internal coolant supply
- Micro geometry and surface conditioning for optimal chip control
- Pertura coated tip for maximum tool life



Catalogue Code
Product Group
Material
Surface Finish
Application
Geometry
Point Type
ISO Materials

D372	D373	D375
A0210	A0210	A0210
VHM	VHM	VHM
Pertura Tip	Pertura Tip	Pertura Tip
Up to 1200N/mm ²	Up to 1200N/mm ²	Up to 1200N/mm ²
R30 - IK	R30 - IK	R30 - IK
135° Form C	135° Form C	135° Form C
P M K	P M K	P M K

Size Ref.	d ₁ (h7)	l ₁	l ₂	Max. Drill Depth	d ₂ (h6)	Item #	Item #	Item #
15xD								
0300	3.0	100	55	46	6	D372 0300		
0350	3.5	110	64	53	6	D372 0350		
0400	4.0	118	73	61	6	D372 0400		
0450	4.5	126	82	68	6	D372 0450		
0500	5.0	136	92	77	6	D372 0500		
0550	5.5	145	100	83	6	D372 0550		
0600	6.0	155	110	92	6	D372 0600		
0650	6.5	165	120	100	8	D372 0650		
0700	7.0	173	128	107	8	D372 0700		
0750	7.5	184	138	115	8	D372 0750		
0800	8.0	191	145	121	8	D372 0800		
0850	8.5	205	155	129	10	D372 0850		
0900	9.0	215	164	137	10	D372 0900		
1000	10.0	234	182	152	10	D372 1000		
1200	12.0	275	218	182	12	D372 1200		
20xD								
0300	3	110	70	61	6		D3730300	
0350	3.5	124	82	72	6		D3730350	
0400	4	134	92	80	6		D3730400	
0500	5	158	116	101	6		D3730500	
0600	6	182	138	120	6		D3730600	
0700	7	206	162	141	8		D3730700	
0800	8	230	184	160	8		D3730800	
0850	8.5	250	200	175	10		D3730850	
0900	9	260	210	183	10		D3730900	
1000	10	280	230	200	10		D3731000	
30xD								
0300	3	145	100	91	6			D375 0300
0400	4	175	130	118	6			D375 0400
0500	5	210	165	150	6			D375 0500
0600	6	245	200	182	6			D375 0600
0800	8	310	265	214	8			D375 0800
0900	9	380	330	303	10			D375 0900
1000	10	380	330	300	10			D375 1000

ISO	P												M		K					N										S										H											
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41		
D372	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	●	●	●	●	○	○	○																												
D373	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	●	●	●	●	○	○	○																												
D375	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	●	●	●	●	○	○	○																												

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

● Optimal □ Effective

ISO	VDI	Material Group	Sutton
P	A	Steel	N
M	R	Stainless Steel	VA
K	F	Cast Iron	GG
N	N	Non-Ferrous Metals, Aluminiums & Coppers	Al W
S	S	Titaniums & Super Alloys	Ti Ni
H	H	Hard Materials (≥ 45 HRC)	H

^ VDI 3323 material groups can also be determined by referring to the workpiece material cross reference listing. Refer to our full catalogue.

Feed Table (f) (mm/rev)										
Ø	Feed #									
	1	2	3	4	5	6	7	8	9	10
3.0	0.030	0.035	0.045	0.055	0.070	0.090	0.110	0.135	0.17	0.21
4.0	0.040	0.045	0.060	0.075	0.090	0.115	0.140	0.18	0.22	0.27
5.0	0.045	0.055	0.070	0.090	0.110	0.135	0.17	0.21	0.26	0.32
6.0	0.055	0.065	0.080	0.100	0.125	0.16	0.19	0.24	0.30	0.37
8.0	0.070	0.085	0.105	0.130	0.16	0.20	0.25	0.31	0.38	0.47
10.0	0.085	0.105	0.125	0.16	0.19	0.24	0.30	0.37	0.46	0.56
12.0	0.095	0.120	0.15	0.18	0.23	0.28	0.34	0.42	0.52	0.64

Catalogue Code
Material
Surface Finish
Geometry
Drilling Depth

ISO	VDI [^] 3323	Material	Condition	HB	N/mm ²	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #
P	1	Steel - Non-alloy, cast & free cutting	~ 0.15 %C	A	125	440	80	8	80	8	80	8	80
	2		~ 0.45 %C	A	190	640	80	8	80	8	80	8	80
	3			QT	250	840	70	7	70	7	70	7	70
	4		~ 0.75 %C	A	270	910	70	7	70	7	70	7	70
	5			QT	300	1010	60	6	60	6	60	6	60
	6	Steel - Low alloy & cast < 5% of alloying elements		A	180	610	80	6	80	6	80	6	80
	7			QT	275	930	60	5	60	5	60	5	60
	8			QT	300	1010	60	5	60	5	60	5	60
	9			QT	350	1180	40	5	40	5	40	5	40
	10	Steel - High alloy, cast & tool		A	200	680	50	6	50	6	50	6	50
	11			HT	325	1100	40	5	40	5	40	5	40
	12												
	13	Steel - Corrosion resistant & cast	Ferritic / Martensitic	A	200	680	40	5	40	5	40	5	40
			Martensitic	QT	240	810	30	4	30	4	30	4	30
M	14.1	Stainless Steel	Austenitic	AH	180	610	40	5	40	5	40	5	40
	14.2		Duplex		250	840	30	4	30	4	30	4	30
	14.3		Precipitation Hardening		250	840	40	5	40	5	40	5	40
K	15	Cast Iron - Grey (GG)	Ferritic / Pearlitic		180	610	80	8	80	8	80	8	80
	16		Pearlitic		260	880	70	8	70	8	70	8	70
	17	Cast Iron - Nodular (GGG)	Ferritic		160	570	60	7	60	7	60	7	60
	18		Pearlitic		250	840	60	7	60	7	60	7	60
	19	Cast Iron - Malleable	Ferritic		130	460	60	7	60	7	60	7	60
	20		Pearlitic		230	780	60	7	60	7	60	7	60

Condition: A (Annealed), AH (Age Hardened), C (Cast), HT (Hardened & Tempered), QT (Quenched & Tempered)

Bold = Optimal | Regular = Effective

12xD	15xD	20xD	30xD
			
D371	D372	D373	D375
VHM	VHM	VHM	VHM
Pertura Tip	Pertura Tip	Pertura Tip	Pertura Tip
R30 - IK	R30 - IK	R30 - IK	R30 - IK
≤ 12xØ	≤ 15xØ	≤ 20xØ	≤ 30xØ

suttontools

Regrinding

The relationship with you does not end after the delivery of our products. Sutton Tools supports you by reducing your production costs through our regrinding service of carbide tools available at our state-of-the-art facility.

Using our regrinding service means:

- ✓ Reground with original geometry
- ✓ Quality assured
- ✓ Handled by highly experienced personnel
- ✓ Lower tooling cost

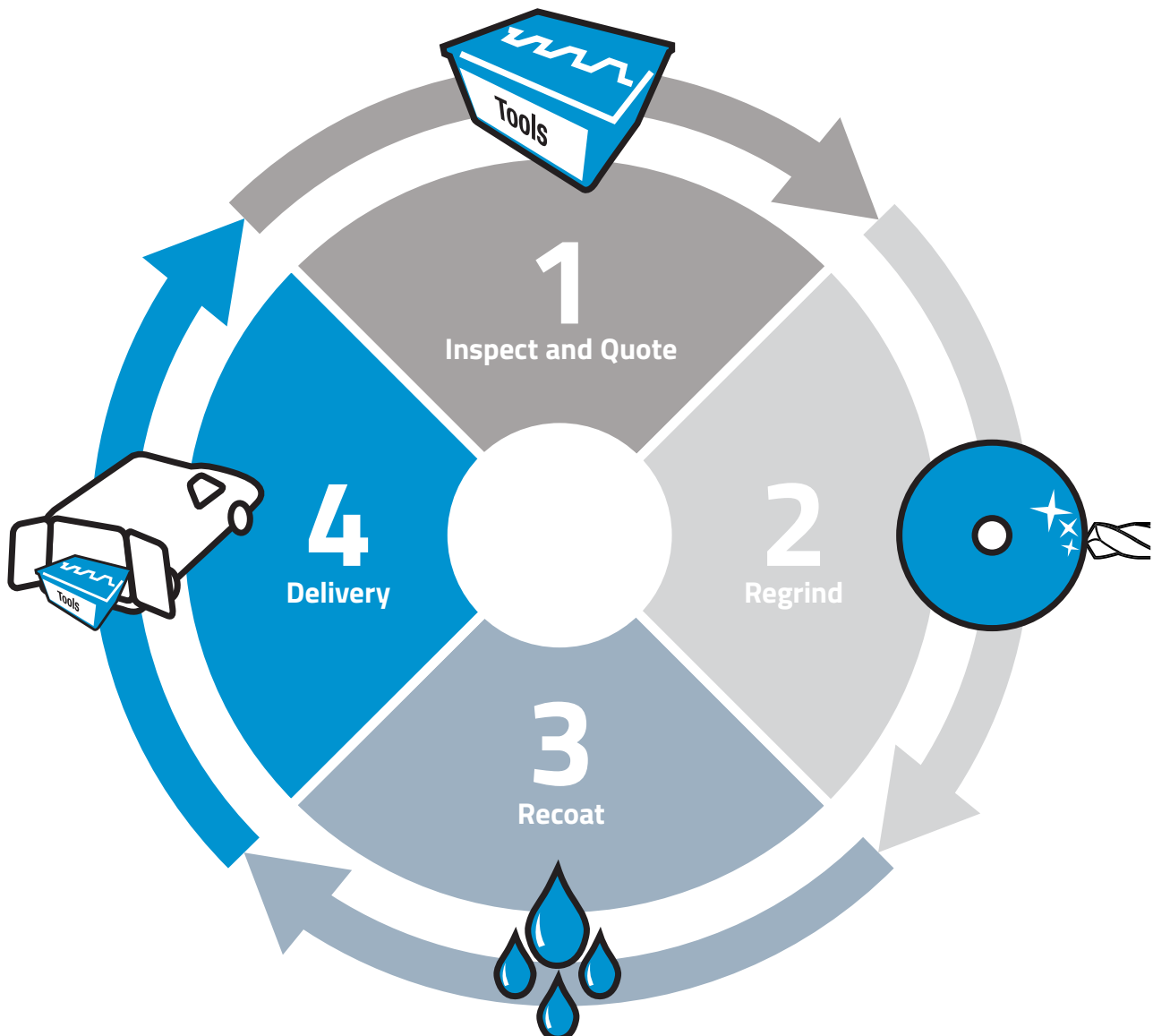
Recoating

As a total solution provider, Sutton Tools uses world leading heat treatment PVD coating (Physical Vapour Deposition) based on Oerlikon Balzers technology on their latest INNOVA coating machine to add life to our products.

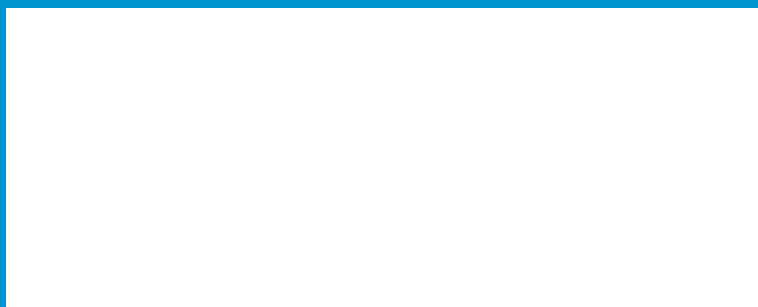
The benefits of PVD coatings include:

- ✓ 300%–1000% increase in tool life
- ✓ Increased productivity
- ✓ Uniform thickness
- ✓ Corrosion resistant
- ✓ Less tool changes due to less wear
- ✓ Better wear condition for regrinds

Tool Regrinding and Recoating Process



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