

STAINLESS STEELS



Threading up to $3 \times D_1$
Works with Emulsion
h6 Tap shank

Z70

EN-ID-1016



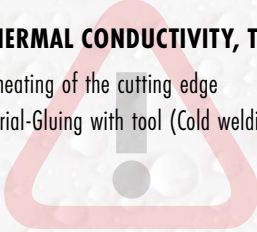
THREADING SOLUTIONS

THE CHALLENGE

WORKING WITH STAINLESS STEELS

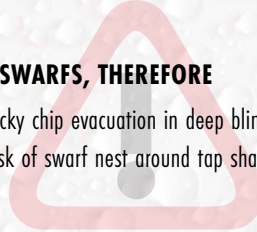
POOR THERMAL CONDUCTIVITY, THEREFORE

- Overheating of the cutting edge
- Material-Gluing with tool (Cold welding)



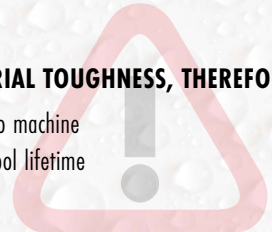
LONG SWARFS, THEREFORE

- Tricky chip evacuation in deep blind holes
- Risk of swarf nest around tap shank

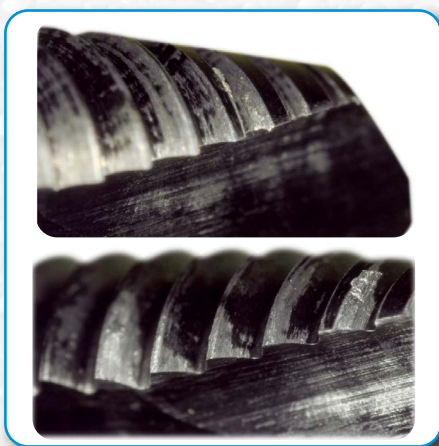


HIGH MATERIAL TOUGHNESS, THEREFORE

- Difficult to machine
- Limited tool lifetime



THE CONSEQUENCES



COLD WELDINGS



SWARF NESTS



DISSATISFIED CUSTOMER

THE SOLUTION

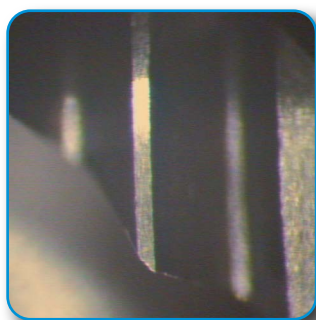
DC SWISS Z-INOX THREAD CUTTING

Z | I N O X



PROPERTIES

The tap is made from HSSE-PM and is available with or without internal lubrication. The flutes are helical R 45, for tapping blind holes up to $3 \times D_1$, in Stainless and alloy steels with high elongation and tensile strength up to $1'150 \text{ N/mm}^2$.



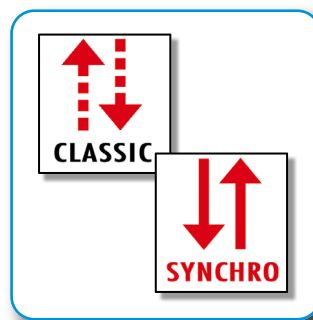
SUITABLE FOR SOLUBLE WATER

The VS surface coating provides protection against wear and cold welding. A high slip coefficient facilitates chip removal and reduces torque.



PROCESS SAFETY UP TO $3 \times D_1$

The cutting geometry and shape of the R45 flutes generate compact, regular chips, ensuring process safety.



IT'S YOUR CHOICE

The cutting geometry is suitable for classical tapping with a compensating spindle as well as for rigid tapping (h6 shank for shrinking).

APPLICATION CHART

Use

-  Optimal with cutting oil
-  Suitable with cutting oil
-  Optimal with emulsion
-  Suitable with emulsion



Material classification

Material groups		Material designation	Hardness (HB)	Tensile strength Rm (N/mm²)	Elongation A (%)	Z. 70VS	Z. 73VS	Z. 20VS	Vc (m/min)
									
10	Steels	11 Free-cutting steels	< 200	< 700	< 10				
		12 Structural / cementation steels	< 200	< 700	< 30				
		13 Carbon steels	< 300	< 1000	< 20				
		14 Alloy steels < 850 N/mm²	< 250	< 850	< 30				
		15 Alloy steels hard. / temp. > 850 - < 1150 N/mm²	> 250	> 850	< 30				6 - 12
		16 High tensile alloy steels	> 250	> 850	< 12				
20	Stainless Steels	21 Free machining stainless steels	< 250	< 850	< 25				20 - 30
		22 Austenitic stainless steels	< 250	< 850	> 20				6 - 12
		23 Ferritic and martensitic < 850 N/mm²	< 250	< 850	> 20				6 - 12
		24 Ferritic and martens. > 850 - < 1150 N/mm²	> 250	> 850	> 15				4 - 8
30	Cast iron	31 Cast iron	< 250	< 850	< 10				
		32 Spheroidal graphite + malleable cast iron	< 250	< 850	> 10				
40	Titan	41 Pure titanium	< 250	< 850	> 20				
		42 Titanium alloys	> 250	> 850	< 20				
50	Nickel	51 Nickel alloys 1 < 850 N/mm²	< 250	< 850	> 25				6 - 12
		52 Nickel alloys 2 > 850 - < 1150 N/mm²	> 250	> 850	< 25				4 - 8
		53 Nickel alloys 3 > 1150 - ≤ 1600 N/mm²	> 340	> 1150	< 20				
60	Copper	61 Pure copper (electrolytic copper)	< 120	< 400	> 12				12 - 16
		62 Short chip brass, phosphor bronze, gun metal	< 200	< 700	< 12				
		63 Long chip brass	< 200	< 700	> 12				
70	Aluminium Magnesium	71 Al unalloyed	< 100	< 350	> 15				
		72 Al alloyed Si < 1.5 %	< 150	< 500	> 15				
		73 Al alloyed Si > 1.5 % - < 10 %	< 120	< 400	< 15				
		74 Al alloyed Si > 10 %, Mg-Alloys	< 120	< 400	< 10				

Pictographs

PM HSSE-PM

 R45 45° right hand spiral flutes

VS  wear-protective coating

C  2.5 x P 2 - 3 chamfered threads, form C

Reference: DIN

15 Alloy steels hard./temp. > 850 - < 1150 N/mm ² 1.3553 X82WMoCrV6-5-4 1.6580 30CrNiMo8 1.7220 34CrMo4 1.7225 42CrMo4 1.8507 34CrAlMo5	21 Free machining stainless steels 1.4005 X12CrS13 1.4104 X14CrMoS17 1.4305 X10CrNiS18-9	22 Austenitic stainless steels 1.4301 X5CrNi18-10 1.4406 X2CrNiMoN17-12-2 1.4435 X2CrNiMo18-14-3 1.4541 X6CrNiTi18-10 1.4571 X6CrNiMoTi17-12-2	23 Ferritic and martensitic < 850 N/mm ² 1.4112 X90CrMoV18 1.4540 X4CrNiCuNb16-4 1.4582 X4CrNiMoNb25-7 1.4762 X10CrAl24 1.4922 X20CrMo11-1
24 Ferritic and martensitic > 850 - < 1150 N/mm ² 1.4057 X17CrNi17-2 1.4125 X105CrMo17 1.4542 X5CrNiCuNb16-4 1.4548 X5CrNiCuNb17-4-4 1.4748 X85CrMoV18-2	51 Nickel alloys 1 < 850 N/mm ² 1.3912 Ni36 (Invar) 2.4360 NiCu30Fe (Monel 400) 2.4816 NiCr15Fe (Inconel 600) 1.4876 X10NiCrAlTi32-20	52 Nickel alloys 2 > 850 - < 1150 N/mm ² 2.4375 NiCu30Al (Monel K500) 2.4631 NiCr20TiAl (Nimonic 80) 2.4668 NiCr19NbMo (Inconel 718)	61 Pure copper (electrolytic copper) 2.0060 E-Cu57 (E-Cu)

Reference: AISI/ASTM

15 Alloy steels hard./temp. > 850 - < 1150 N/mm ² 1.3553 - 1.6580 4340 1.7220 4135 1.7225 4140 1.8507 A355CLD (K23510)	21 Free machining stainless steels 1.4005 416 1.4104 430F 1.4305 303	22 Austenitic stainless steels 1.4301 304 1.4406 316LN 1.4435 316L 1.4541 321 1.4571 316Ti	23 Ferritic and martensitic < 850 N/mm ² 1.4112 440B 1.4540 XM12 (15-5PH) 1.4582 - 1.4762 446 1.4821 4922
24 Ferritic and martensitic > 850 - < 1150 N/mm ² 1.4057 431 1.4125 440C 1.4542 630 (17-4PH) 1.4748 -	51 Nickel alloys 1 < 850 N/mm ² 1.3912 K93600 2.4360 N04400 1.4816 N08800	52 Nickel alloys 2 > 850 - < 1150 N/mm ² 2.4375 N05500 (B865) 2.4631 N07080 (B637) 2.4668 N07718 (B637)	61 Pure copper (electrolytic copper) 2.0060 C11000

6HX

Tolerance class 6HX



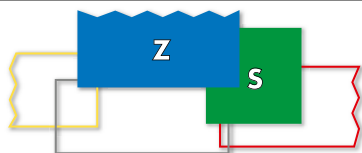
Blind hole < 3 x D_r, long chipping materials



For Classic Tapping



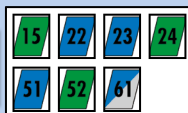
For Rigid Tapping



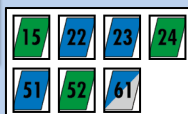
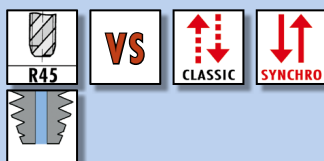
Z362VS-3



Z370VS-3



Z373VS-3



Z362VS-3

Z370VS-3

Z370VS-3

Z373VS-3



PM

PM

PM

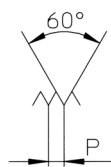
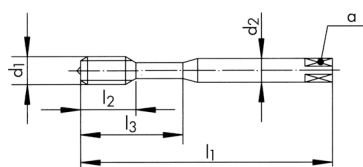


6HX

6HX

4HX

6HX



Ø d ₁ M	P mm	l ₁ mm	l ₂ mm	l ₃ mm	d ₂ mm	a mm		
* 3	0.50	56	5.5	18	3.5	2.7	3	2.50
4	0.70	63	7.5	21	4.5	3.4	3	3.30
5	0.80	70	9.0	25	6.0	4.9	3	4.20
6	1.00	80	11.0	30	6.0	4.9	3	5.00
8	1.25	90	12.5	35	8.0	6.2	3	6.80
10	1.50	100	14.0	39	10.0	8.0	3	8.50

* Z360VS-3

ID

111504

111505

111506

111507

111508

111509

Ø d ₁ M	P mm	l ₁ mm	l ₂ mm	l ₃ mm	d ₂ h ₆ mm	a mm		
3	0.50	56	5.5	18	3.5 (h ₉)	2.7	3	2.50
4	0.70	63	7.5	21	4.5 (h ₉)	3.4	3	3.30
5	0.80	70	9.0	25	6.0	4.9	3	4.20
6	1.00	80	11.0	30	6.0	4.9	3	5.00
8	1.25	90	12.5	35	8.0	6.2	3	Δ 6.80
10	1.50	100	14.0	39	10.0	8.0	3	8.50

ID

ID

ID

162776

165324

165236

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162780

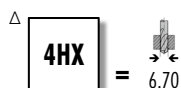
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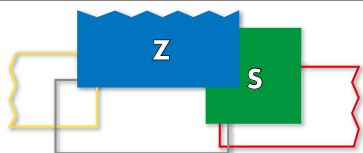
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162781

165438

165241





Z462VS-3

Z470VS-3

Z473VS-3



Z462VS-3



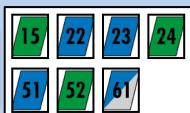
VS



Z470VS-3



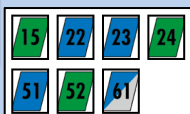
VS



Z473VS-3



VS



PM

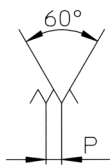
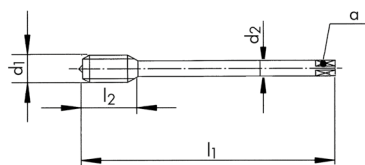
PM



6HX

6HX

6HX



Ø d ₁ M	P mm	l ₁ mm	l ₂ mm	d ₂ mm	a mm		
12	1.75	110	14.0	9.0	7.0	4	10.20
16	2.00	110	18.0	12.0	9.0	4	14.00
20	2.50	140	24.0	16.0	12.0	4	17.50

ID

111510

111511

111512

Ø d ₁ M	P mm	l ₁ mm	l ₂ mm	d ₂ h6 mm	a mm		
12	1.75	110	14.0	* 10.0	* 8.0	4	10.20
14	2.00	110	14.0	* 12.0	* 9.0	4	12.00
16	2.00	110	18.0	12.0	9.0	4	14.00
18	2.50	125	21.0	14.0	11.0	4	15.50
20	2.50	140	24.0	16.0	12.0	4	17.50
22	2.50	140	24.0	16.0	12.0	4	19.50
24	3.00	160	27.0	16.0	12.0	4	21.00

* Norm DC

ID

162782

162783

162784

170643

162785

175190

162786

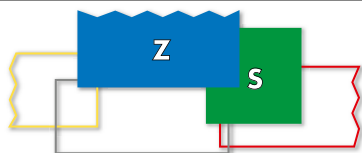
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165234

165235



Z320VS-4



VS



Z420VS-4



VS



Z320VS-4

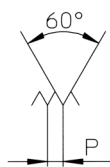
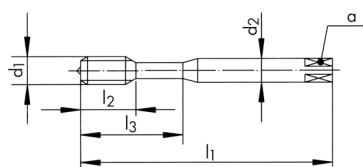
Z420VS-4



PM



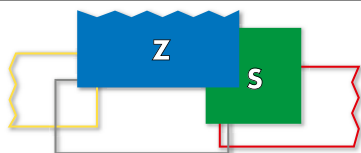
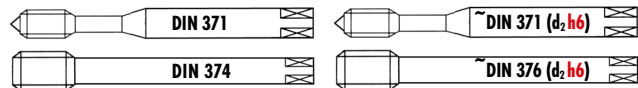
PM



ISO 2
6H

ISO 2
6H

Ø d ₁ M	P mm	l ₁ mm	l ₂ mm	l ₃ mm	d ₂ mm	a mm			ID	ID
2.5	0.45	50	10.0		2.8	2.1	3	2.05	143683	
3	0.50	56	12.0	18	3.5	2.7	3	2.50	104830	
4	0.70	63	14.0	21	4.5	3.4	3	3.30	104831	
5	0.80	70	15.0	25	6.0	4.9	3	4.20	104832	
6	1.00	80	17.0	30	6.0	4.9	3	5.00	104833	
8	1.25	90	20.0	35	8.0	6.2	3	6.80	104834	
10	1.50	100	22.0	39	10.0	8.0	3	8.50	104835	
12	1.75	110	24.0		9.0	7.0	3	10.20		104836
14	2.00	110	28.0		11.0	9.0	3	12.00		143684
16	2.00	110	30.0		12.0	9.0	3	14.00		111569
20	2.50	140	36.0		16.0	12.0	4	17.50		111570



Z320VS-4

Z420VS-4

Z370VS-3

Z470VS-3



Z320VS-4



VS



Z420VS-4



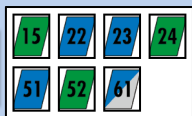
VS



Z370VS-3



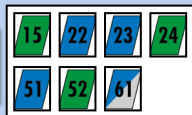
VS



Z470VS-3



VS



PM

PM

PM

PM

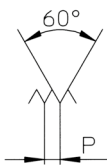
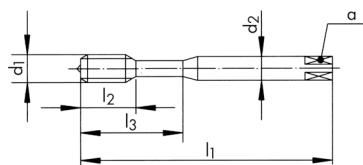


ISO 2
6H

ISO 2
6H

6HX

6HX



Ø d ₁ MF	P mm	l ₁ mm	l ₂ mm	l ₃ mm	d ₂ mm	a mm		
8	1.00	90	20.0	35	8.0	6.2	3	7.00
10	1.00	100	22.0	39	10.0	8.0	3	9.00
12	1.50	100	24.0		9.0	7.0	3	10.50
14	1.50	100	24.0		11.0	9.0	3	12.50
16	1.50	100	26.0		12.0	9.0	3	14.50

ID

ID

124289

120060

120421

120688

120878

Ø d ₁ MF	P mm	l ₁ mm	l ₂ mm	l ₃ mm	d ₂ h ₆ mm	a mm		
6	0.75	80	11.0	30	6.0	4.9	3	5.25
8	1.00	90	12.5	35	8.0	6.2	3	7.00
10	1.00	100	14.0	39	10.0	8.0	3	9.00
12	1.50	110	14.0		* 10.0	* 8.0	4	10.50
14	1.50	110	14.0		* 12.0	* 9.0	4	12.50
16	1.50	110	18.0		12.0	9.0	4	14.50

* Norm DC

ID

ID

166117

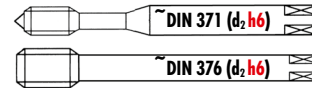
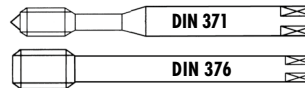
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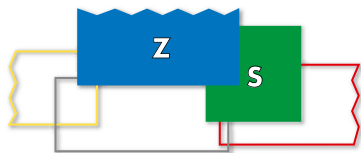
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166121

166122



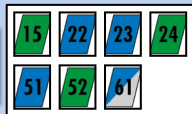
										Z320VS-4	Z420VS-4	Z370VS-3	Z470VS-3
Z320VS-4 VS Z420VS-4 VS Z370VS-3 R45 VS CLASSIC SYNCHRO Z470VS-3 R45 VS CLASSIC SYNCHRO													
										 PM	 PM	 PM	 PM
										 B 4 x P	 B 4 x P	 C 2.5 x P	 C 2.5 x P
										2B	2B	2BX	2BX
Ø" d ₁ UNC	P TPI	d ₁ mm	l ₁ mm	l ₂ mm	l ₃ mm	d ₂ mm	a mm			ID	ID		
6	32	3.50	56	13.0	20	4.0	3.0	3	2.75	111560			
8	32	4.16	63	14.0	21	4.5	3.4	3	3.40	111561			
10	24	4.82	70	15.0	25	6.0	4.9	3	3.80	111562			
1/4	20	6.35	80	17.0	30	7.0	5.5	3	5.10	111563			
5/16	18	7.93	90	20.0	35	8.0	6.2	3	6.50	111564			
3/8	16	9.52	100	22.0	39	10.0	8.0	3	8.00	111565			
1/2	13	12.70	110	24.0		9.0	7.0	3	10.80		111566		
5/8	11	15.87	110	30.0		12.0	9.0	3	13.60		111567		
3/4	10	19.05	125	33.0		14.0	11.0	4	16.60		111568		
Ø" d ₁ UNC	P TPI	d ₁ mm	l ₁ mm	l ₂ mm	l ₃ mm	d ₂ h6 mm	a mm				ID	ID	
6	32	3.50	56	6.5	20	4.0(h9)	3.0	3	2.75		166123		
8	32	4.16	63	7.5	21	4.5(h9)	3.4	3	3.40		166124		
10	24	4.82	70	9.0	25	6.0	4.9	3	3.80		166125		
1/4	20	6.35	80	11.0	30	* 6.0	* 4.9	3	5.10		166126		
5/16	18	7.93	90	12.5	35	8.0	6.2	3	6.50		166127		
3/8	16	9.52	100	14.0	39	10.0	8.0	3	8.00		166128		
7/16	14	11.11	100	14.0		8.0	6.2	3	9.30			166129	
1/2	13	12.70	110	14.0		* 10.0	* 8.0	4	10.80			166130	
5/8	11	15.87	110	18.0		12.0	9.0	4	13.60			166131	
3/4	10	19.05	125	21.0		14.0	11.0	4	16.60			166132	
1	8	25.40	160	27.0		16.0	12.0	4	22.30			175703	
* Norm DC													
3B UNC(J) See DC Main Catalogue													



Z370VS-3



VS



Z470VS-3

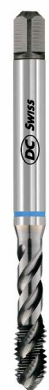


VS



Z370VS-3

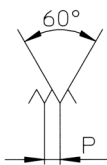
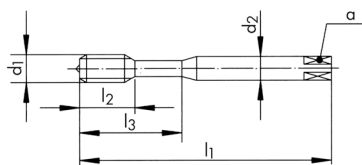
Z470VS-3



PM



PM



2BX



2BX

Ø" d ₁ UNF	P TPI	d ₁ mm	l ₁ mm	l ₂ mm	l ₃ mm	d ₂ h6 mm	α mm		
10	32	4.82	70	9.0	25	6.0	4.9	3	4.05
1/4	28	6.35	80	11.0	30	* 6.0	* 4.9	3	5.50
5/16	24	7.93	90	12.5	35	8.0	6.2	3	6.90
3/8	24	9.52	100	14.0	39	10.0	8.0	3	8.50
7/16	20	11.11	100	14.0		8.0	6.2	3	9.80
1/2	20	12.70	110	14.0		* 10.0	* 8.0	4	11.40

* Norm DC

ID

ID

166136

166135

166134

166133

166138

166137

3B

UNF(J)

Ø" d ₁ UNF	P TPI	d ₁ mm	l ₁ mm	l ₂ mm	l ₃ mm	d ₂ h6 mm	α mm		
10	32	4.82	70	9.0	25	6.0	4.9	3	4.15
1/4	28	6.35	80	11.0	30	* 6.0	* 4.9	3	5.55
5/16	24	7.93	90	12.5	35	8.0	6.2	3	7.00
3/8	24	9.52	100	14.0	39	10.0	8.0	3	8.60

* Norm DC

ID

165121

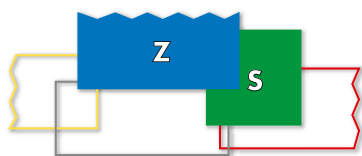
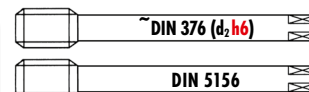
165122

165123

165124

G DIN ISO 228 (BSP)

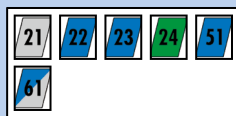
PM



Z420VS-4



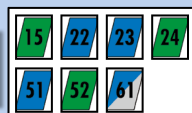
VS



Z470VS-3

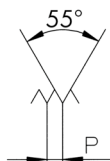
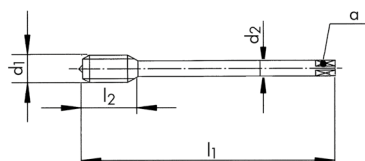


VS



Z420VS-4

Z470VS-3



$\varnothing'' d_1$ G	P TPI	d_1 mm	l_1 mm	l_2 mm	d_2 mm	α mm		
1/8	28	9.72	90	22.0	7.0	5.5	3	8.75
1/4	19	13.15	100	20.0	11.0	9.0	3	11.60
3/8	19	16.66	100	20.0	12.0	9.0	3	15.20
1/2	14	20.95	125	22.0	16.0	12.0	4	18.90

ID

142800

119303

142802

142803

$\varnothing'' d_1$ G	P TPI	d_1 mm	l_1 mm	l_2 mm	d_2 h6 mm	α mm		
1/8	28	9.72	100	14.0	* 8.0	* 6.2	3	8.75
1/4	19	13.15	110	14.0	* 12.0	* 9.0	4	11.60
3/8	19	16.66	110	18.0	12.0	9.0	4	15.20
1/2	14	20.95	125	20.0	16.0	12.0	4	18.90

ID

165198

165199

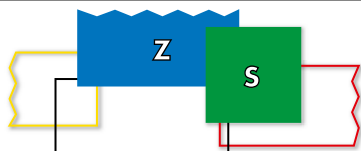
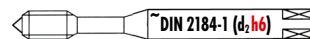
165200

165201

* Norm DC

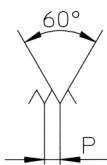
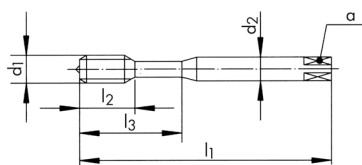
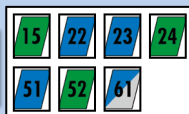
EG UNC/UNF

NASM33537



Z370VS-3

Z370VS-3



Ø" d ₁	P	d ₁	l ₁	l ₂	l ₃	d ₂ h ₆	a		
EG UNC	TPI	mm	mm	mm	mm	mm	mm		
4	40	3.67	56	6.5	20	4.0 (h9)	3.0	3	3.05
6	32	4.53	70	9.0	25	6.0	4.9	3	3.75
8	32	5.19	70	9.0	25	6.0	4.9	3	4.45

ID

165126

165127

165128

Ø" d ₁	P	d ₁	l ₁	l ₂	l ₃	d ₂ h ₆	a		
EG UNF	TPI	mm	mm	mm	mm	mm	mm		
10	32	5.85	80	11.0	30	6.0	4.9	3	5.10
1/4	28	7.52	90	12.5	35	8.0	6.2	3	6.65
5/16	24	9.31	90	12.5	35	* 8.0	* 6.2	3	8.20

ID

165129

165130

165131

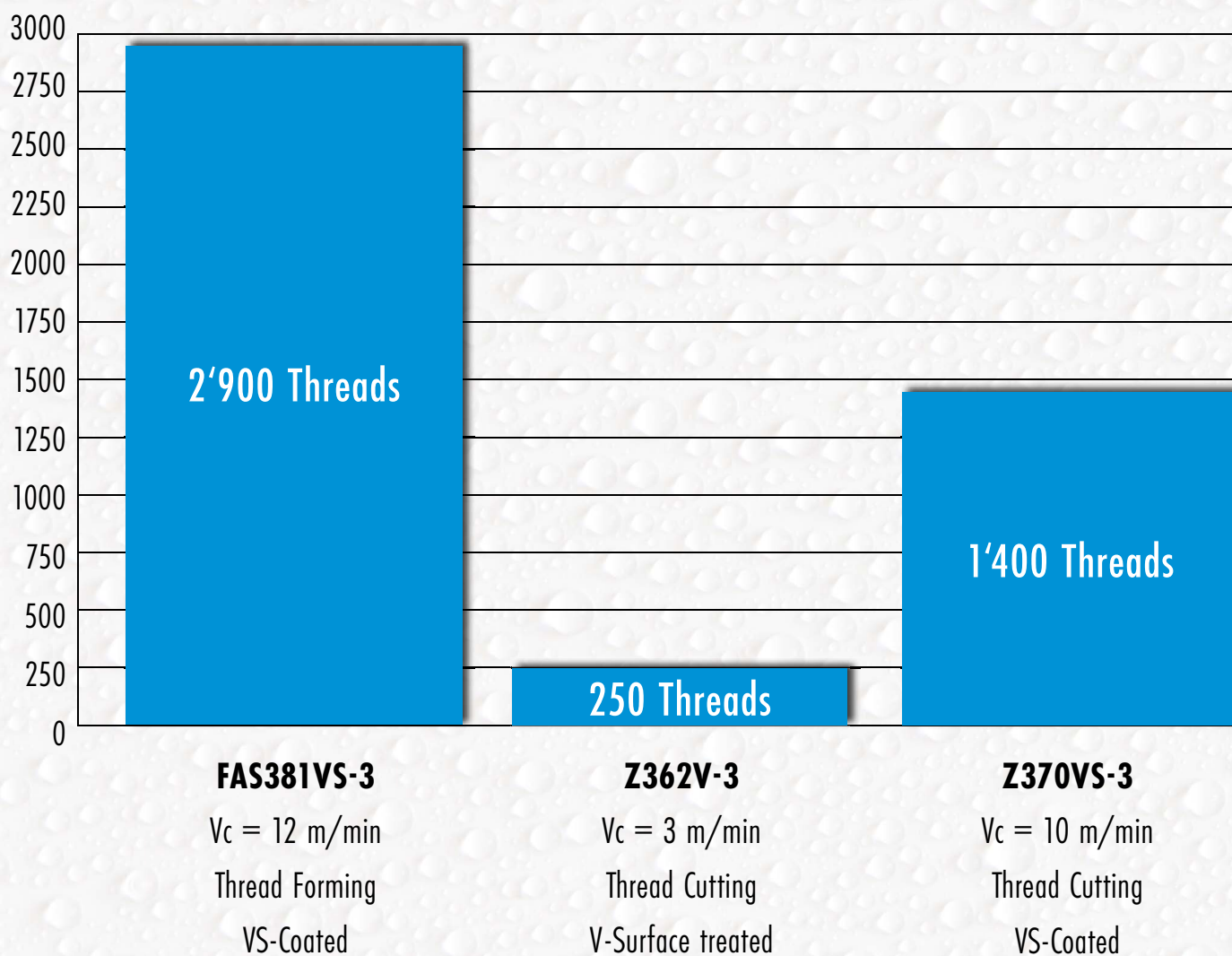
* Norm DC

APPLICATION 1

Material: Austenitic stainless steel
DIN: 1.4301/ AISI 304
Tensile strength: 500 - 700 N/mm²
Blind hole: M10 6H
Threading depth: 20 mm

Working method: Rigid Tapping
Lubricant: Cutting oil

**WITH
CUTTING OIL**



APPLICATION 2

Material: Austenitic stainless steel

DIN: 1.4301/AISI 304

Tensile strength: 500 - 700 N/mm²

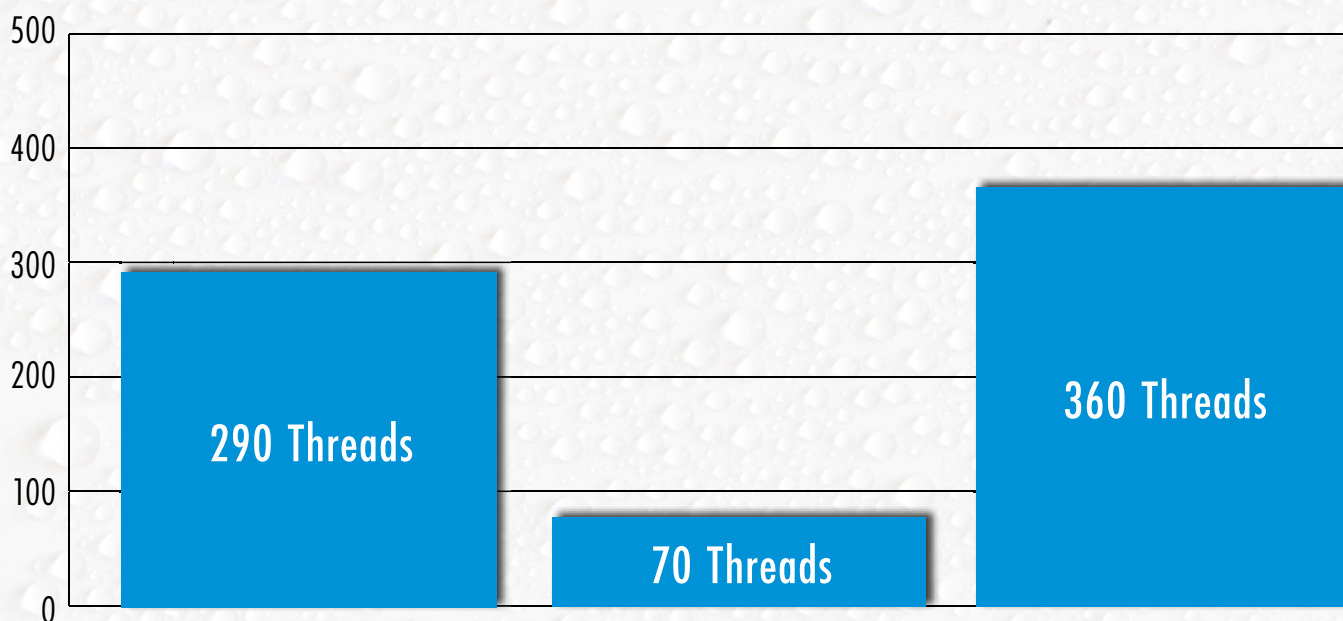
Blind hole: M10 6H

Threading depth: 20 mm

Working method: Rigid Tapping

Lubricant: Emulsion 8 - 10%

**WITH
EMULSION**



FAS381VS-3

Vc = 12 m/min

Thread Forming

VS-Coated

Z362V-3

Vc = 3 m/min

Thread Cutting

V-Surface treated

Z370VS-3

Vc = 8 m/min

Thread Cutting

VS-Coated





« THREAD CUTTING IS OFTEN THE LAST OPERATION ON THE WORKPIECE. PROCESS SECURITY IS THEREFORE MANDATORY. DC SWISS CAN OFFER US THE REQUIRED RELIABILITY, EVEN IN TOUGH MATERIALS. »



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