

STAINLESS STEELS



Threading up to $3 \times D_1$

Works with Emulsion

h6 Tap shank

Z70

EN-ID-1016



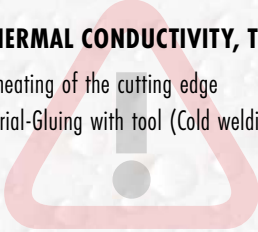
THREADING SOLUTIONS

THE CHALLENGE

WORKING WITH STAINLESS STEELS

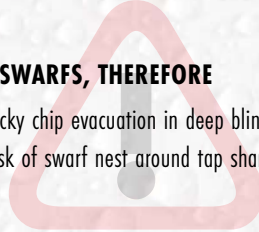
POOR THERMAL CONDUCTIVITY, THEREFORE

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



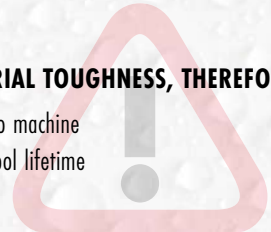
LONG SWARFS, THEREFORE

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

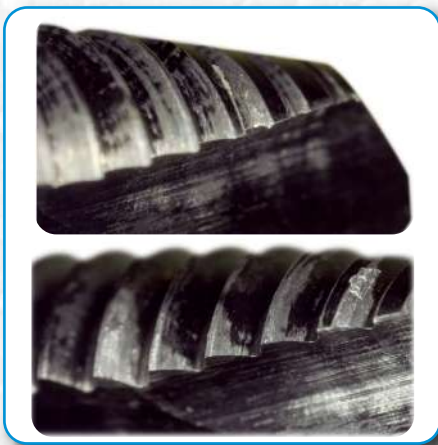


HIGH MATERIAL TOUGHNESS, THEREFORE

- Difficult to machine
- Limited tool lifetime



THE CONSEQUENCES



COLD WELDINGS



SWARF NESTS

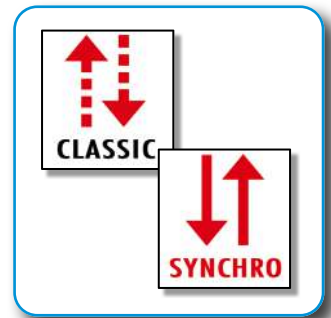
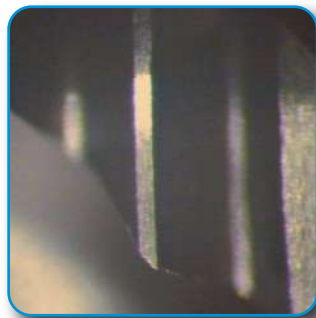


DISSATISFIED CUSTOMER

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/mm ²)	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/mm ²	< 250	< 850	< 30				
	15 Alloy steels hard. / temp. >850 - <1150 N/mm ²	> 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/mm ²	< 250	< 850	> 20				6 - 12
	24 Ferritic and martens. >850 - <1150 N/mm ²	> 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/mm ²	< 250	< 850	> 25				6 - 12
	52 Nickel alloys 2 >850 - <1150 N/mm ²	> 250	> 850	< 25				4 - 8
	53 Nickel alloys 3 >1150 - ≤1600 N/mm ²	> 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

 HSSE-PM

  wear-protective coating

 45° right hand spiral flutes

 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 (MonelK500) 2.4631 NiCr20TiAl (Nimonic 80) 2.4668 NiCr19NbMo (Inconel718)	61 Pure copper (electrolytic copper) 2.0060 E-Cu57 (E-Cu)

Reference: AISI/ASTM

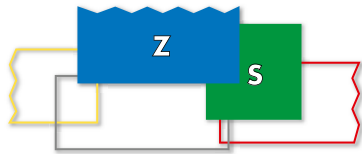
15 Alloy steels hard./temp. > 850 - < 1150 N/mm ² 1.3553 - 1.6580 4340 1.7220 4135 1.7225 4140 1.8507 A355CLD (K23510)	21 Free machining stainless steels 1.4005 416 1.4104 430F 1.4305 303	22 Austenitic stainless steels 1.4301 304 1.4406 316LN 1.4435 316L 1.4541 321 1.4571 316Ti	23 Ferritic and martensitic < 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

R40 VS [22] [23] [24] [51] [61]

Z370VS-3

R45 VS CLASSIC SYNCHRO [15] [22] [23] [24] [51] [52] [61]

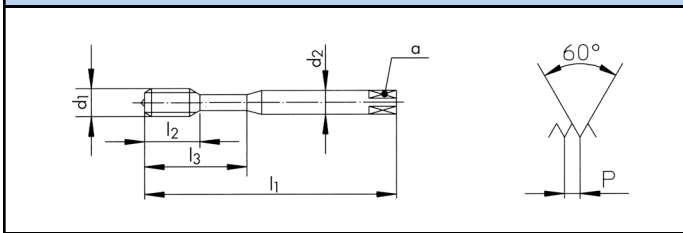
Z373VS-3

R45 VS CLASSIC SYNCHRO [15] [22] [23] [24] [51] [52] [61]



< 2.5 x D < 3 x D < 3 x D < 3 x D

PM PM PM PM



C 2.5 x P C 2.5 x P C 2.5 x P C 2.5 x P

6HX 6HX 4HX 6HX

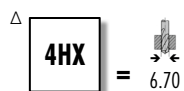
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* 3	0.50	56	5.5	18	3.5	2.7	3	2.50
4	0.70	63	7.5	21	4.5	3.4	3	3.30
5	0.80	70	9.0	25	6.0	4.9	3	4.20
6	1.00	80	11.0	30	6.0	4.9	3	5.00
8	1.25	90	12.5	35	8.0	6.2	3	6.80
10	1.50	100	14.0	39	10.0	8.0	3	8.50

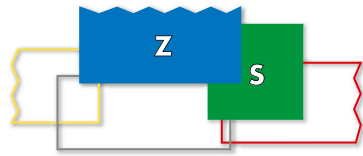
* Z360VS-3

ID	ID	ID
111504		
111505		
111506		
111507		
111508		
111509		

$\varnothing d_1$ M	P mm	l_1 mm	l_2 mm	l_3 mm	d_2 h6 mm	a mm		
3	0.50	56	5.5	18	3.5 (h9)	2.7	3	2.50
4	0.70	63	7.5	21	4.5 (h9)	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
162777	165325	165237
162778	165326	165238
162779	165327	165239
162780	165328	165240
162781	165438	165241





Z462VS-3

Z470VS-3

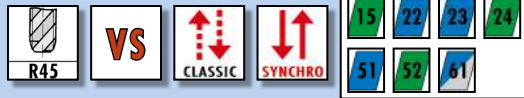
Z473VS-3



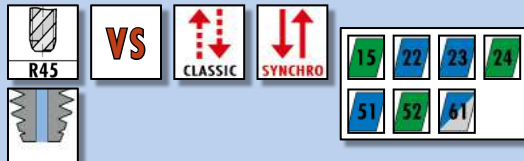
Z462VS-3



Z470VS-3

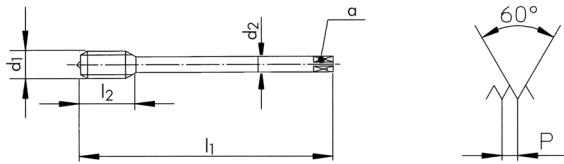


Z473VS-3



PM



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


6HX

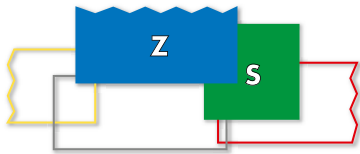
6HX

6HX

$\varnothing d_1$ M	P mm	l_1 mm	l_2 mm	d_2 mm	a mm			ID
12	1.75	110	14.0	9.0	7.0	4	10.20	111510
16	2.00	110	18.0	12.0	9.0	4	14.00	111511
20	2.50	140	24.0	16.0	12.0	4	17.50	111512

$\varnothing d_1$ M	P mm	l_1 mm	l_2 mm	d_2 h6 mm	a mm			ID	ID
12	1.75	110	14.0	*10.0	*8.0	4	10.20	162782	165242
14	2.00	110	14.0	*12.0	*9.0	4	12.00	162783	
16	2.00	110	18.0	12.0	9.0	4	14.00	162784	165244
18	2.50	125	21.0	14.0	11.0	4	15.50	170643	
20	2.50	140	24.0	16.0	12.0	4	17.50	162785	165234
22	2.50	140	24.0	16.0	12.0	4	19.50	175190	
24	3.00	160	27.0	16.0	12.0	4	21.00	162786	165235

* Norm DC



Z320VS-4

Z420VS-4

Z320VS-4



VS



Z420VS-4



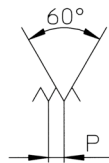
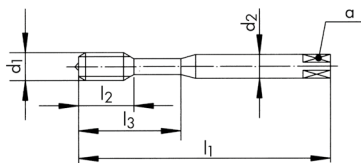
VS



PM



PM



**ISO 2
6H**



**ISO 2
6H**

$\varnothing d_1$ M	P mm	l_1 mm	l_2 mm	l_3 mm	d_2 mm	a mm		
2.5	0.45	50	10.0		2.8	2.1	3	2.05
3	0.50	56	12.0	18	3.5	2.7	3	2.50
4	0.70	63	14.0	21	4.5	3.4	3	3.30
5	0.80	70	15.0	25	6.0	4.9	3	4.20
6	1.00	80	17.0	30	6.0	4.9	3	5.00
8	1.25	90	20.0	35	8.0	6.2	3	6.80
10	1.50	100	22.0	39	10.0	8.0	3	8.50
12	1.75	110	24.0		9.0	7.0	3	10.20
14	2.00	110	28.0		11.0	9.0	3	12.00
16	2.00	110	30.0		12.0	9.0	3	14.00
20	2.50	140	36.0		16.0	12.0	4	17.50

ID

ID

143683

104830

104831

104832

104833

104834

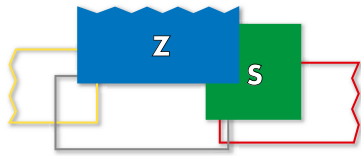
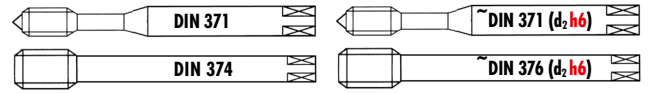
104835

104836

143684

111569

111570



Z320VS-4

Z420VS-4

Z370VS-3

Z470VS-3



Z320VS-4



Z420VS-4



Z370VS-3



Z470VS-3



PM



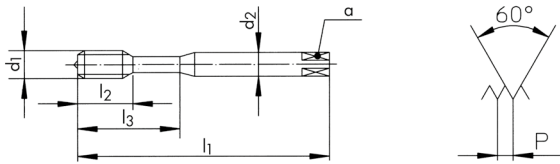
PM



PM



PM



ISO 2
6H



ISO 2
6H



6HX



6HX

∅ 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

∅ 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

ID

ID

166117

166118

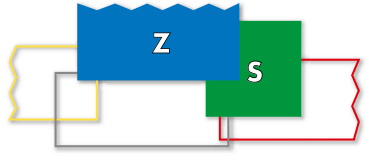
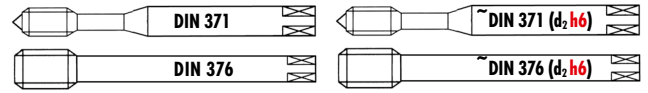
166119

166120

166121

166122

* Norm DC



Z320VS-4 Z420VS-4 Z370VS-3 Z470VS-3



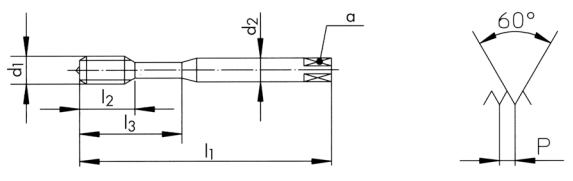
Z320VS-4 VS [21, 22, 23, 24, 51, 61]

Z420VS-4 VS [21, 22, 23, 24, 51, 61]

Z370VS-3 VS [R45, CLASSIC, SYNCHRO, 15, 22, 23, 24, 51, 52, 61]

Z470VS-3 VS [R45, CLASSIC, SYNCHRO, 15, 22, 23, 24, 51, 52, 61]

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	α mm		
6	32	3.50	56	13.0	20	4.0	3.0	3	2.75
8	32	4.16	63	14.0	21	4.5	3.4	3	3.40
10	24	4.82	70	15.0	25	6.0	4.9	3	3.80
1/4	20	6.35	80	17.0	30	7.0	5.5	3	5.10
5/16	18	7.93	90	20.0	35	8.0	6.2	3	6.50
3/8	16	9.52	100	22.0	39	10.0	8.0	3	8.00
1/2	13	12.70	110	24.0		9.0	7.0	3	10.80
5/8	11	15.87	110	30.0		12.0	9.0	3	13.60
3/4	10	19.05	125	33.0		14.0	11.0	4	16.60

ID	ID
111560	
111561	
111562	
111563	
111564	
111565	
	111566
	111567
	111568

Ø" d ₁ UNC	P TPI	d ₁ mm	l ₁ mm	l ₂ mm	l ₃ mm	d ₂ h6 mm	α mm		
6	32	3.50	56	6.5	20	4.0(h9)	3.0	3	2.75
8	32	4.16	63	7.5	21	4.5(h9)	3.4	3	3.40
10	24	4.82	70	9.0	25	6.0	4.9	3	3.80
1/4	20	6.35	80	11.0	30	*6.0	*4.9	3	5.10
5/16	18	7.93	90	12.5	35	8.0	6.2	3	6.50
3/8	16	9.52	100	14.0	39	10.0	8.0	3	8.00
7/16	14	11.11	100	14.0		8.0	6.2	3	9.30
1/2	13	12.70	110	14.0		*10.0	*8.0	4	10.80
5/8	11	15.87	110	18.0		12.0	9.0	4	13.60
3/4	10	19.05	125	21.0		14.0	11.0	4	16.60
1	8	25.40	160	27.0		16.0	12.0	4	22.30

ID	ID
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	166129
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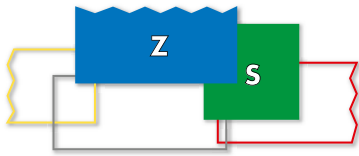
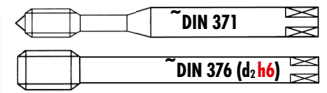
* Norm DC

3B
UNC(J) See DC Main Catalogue

UNF

ANSI B1.1

PM

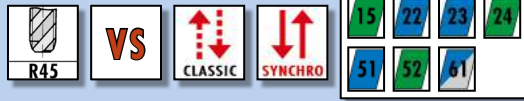


Z370VS-3

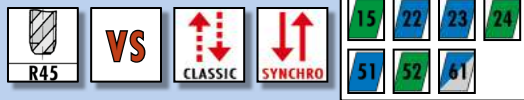
Z470VS-3



Z370VS-3

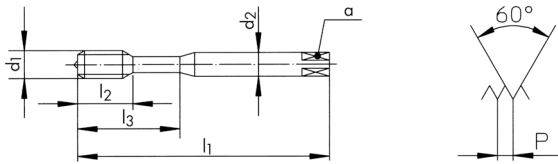


Z470VS-3



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	a 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	a 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

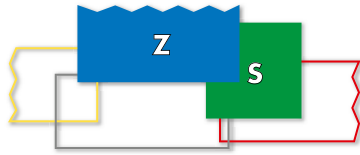
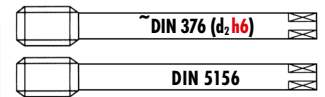
165122

165123

165124

G DIN ISO 228 (BSP)

PM



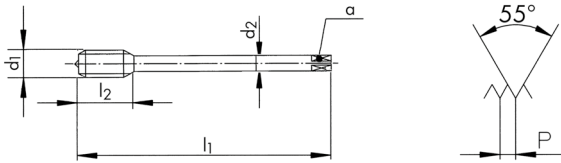
Z420VS-4

Z470VS-3

Z420VS-4



Z470VS-3



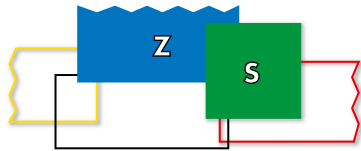
\varnothing " d ₁ G	P TPI	d ₁ mm	l ₁ mm	l ₂ mm	d ₂ mm	α mm			ID
1/8	28	9.72	90	22.0	7.0	5.5	3	8.75	142800
1/4	19	13.15	100	20.0	11.0	9.0	3	11.60	119303
3/8	19	16.66	100	20.0	12.0	9.0	3	15.20	142802
1/2	14	20.95	125	22.0	16.0	12.0	4	18.90	142803

\varnothing " d ₁ G	P TPI	d ₁ mm	l ₁ mm	l ₂ mm	d ₂ h ₆ mm	α mm			ID
1/8	28	9.72	100	14.0	* 8.0	* 6.2	3	8.75	165198
1/4	19	13.15	110	14.0	* 12.0	* 9.0	4	11.60	165199
3/8	19	16.66	110	18.0	12.0	9.0	4	15.20	165200
1/2	14	20.95	125	20.0	16.0	12.0	4	18.90	165201

* Norm DC

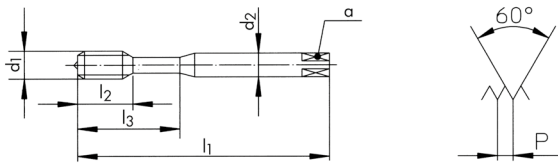
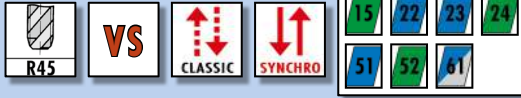
EG UNC/UNF

NASM33537



Z370VS-3

Z370VS-3



$\varnothing'' d_1$ EG UNC	P TPI	d_1 mm	l_1 mm	l_2 mm	l_3 mm	$d_2 h6$ mm	a 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

$\varnothing'' d_1$ EG UNF	P TPI	d_1 mm	l_1 mm	l_2 mm	l_3 mm	$d_2 h6$ mm	a 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

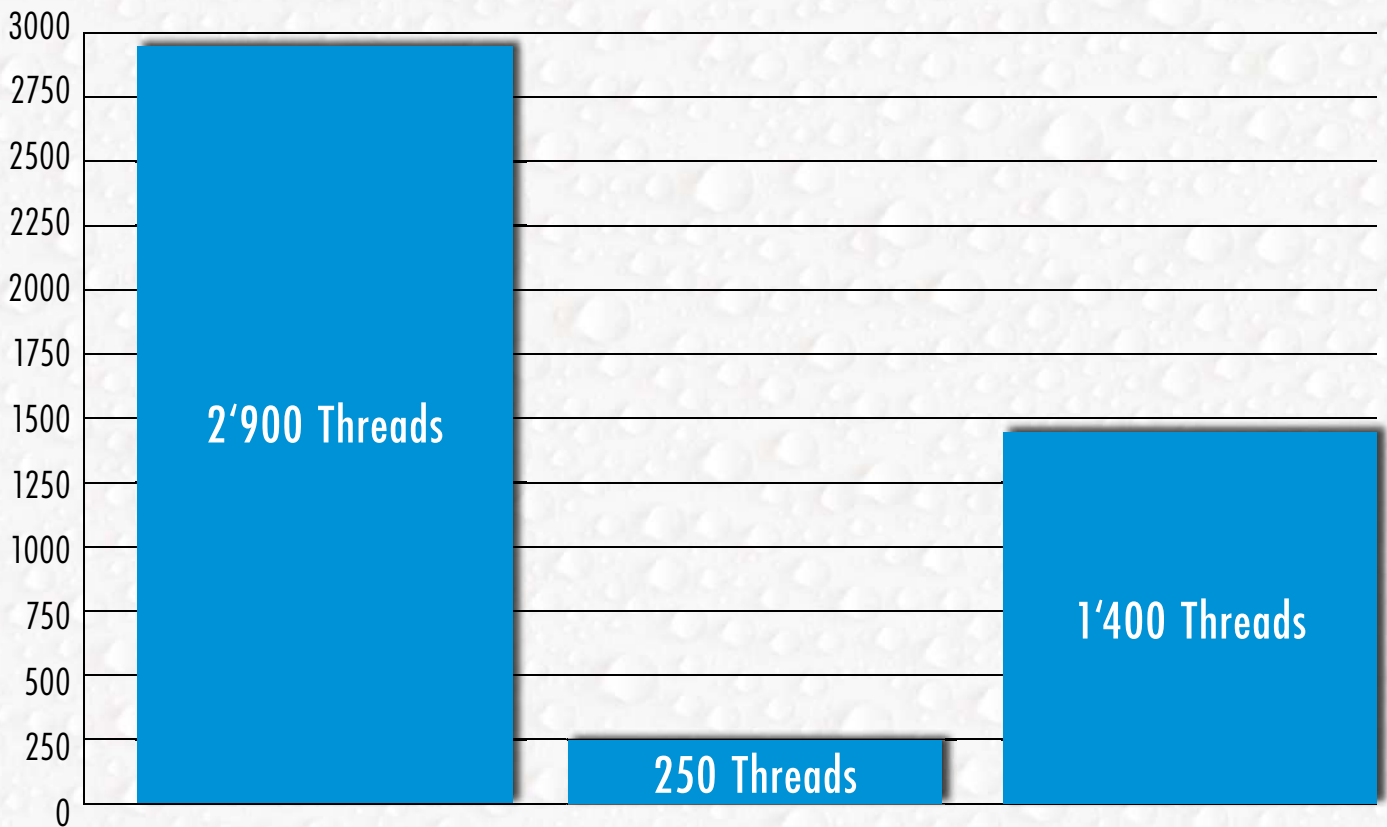
* Norm DC

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



FAS381VS-3

Vc = 12 m/min

Thread Forming

VS-Coated

Z362V-3

Vc = 3 m/min

Thread Cutting

V-Surface treated

Z370VS-3

Vc = 10 m/min

Thread Cutting

VS-Coated



APPLICATION 2

Material: Austenitic stainless steel

DIN: 1.4301/AISI 304

Tensile strength: 500 - 700 N/mm²

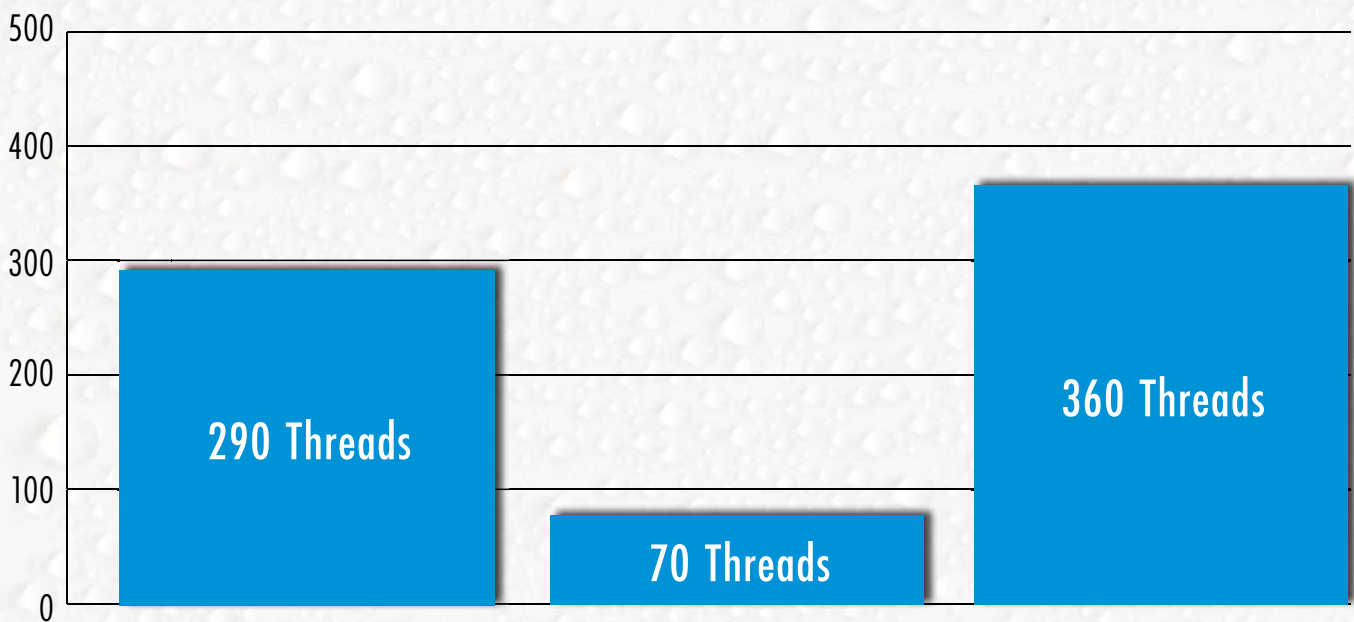
Blind hole: M10 6H

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. »



THREADING SOLUTIONS

DC SWISS SA
Grand-Rue 19
CH-2735 Malleray
Tel. + 41 32 491 63 63
info@dcswiss.ch

DC Swiss GmbH
Graseggerstrasse 125
DE-50737 Köln
Tel. + 49 221 995 532 0
info@dcswiss.de

DC Nano Tools SA
Grand-Rue 19
CH-2735 Malleray
Tel. + 41 32 491 63 63
info@dcswiss.ch

DC Swiss s.r.l
Via Canova 10
IT-20017 Rho
Tel. + 39 02 669 40 41
info@dcswiss.it



DC Swiss UK Ltd
9 Orgreave Road
GB-Sheffield S13 9LQ
Tel. + 44 114 293 90 13
info@dcswiss.co.uk