

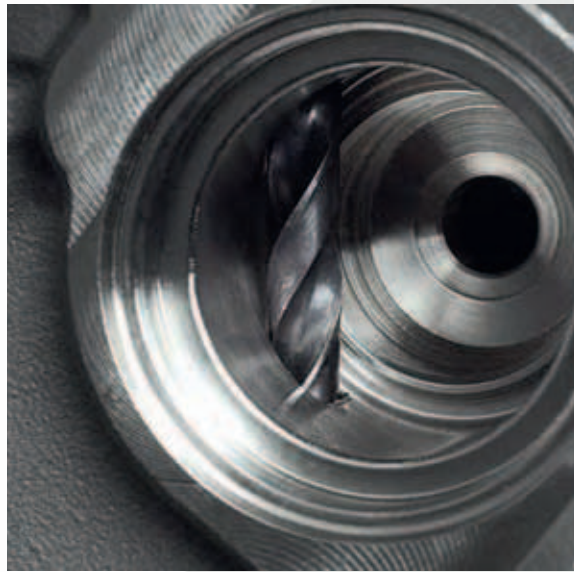


# HARTNER

Precision Cutting Tools

## TS-DRILLS

PUNTE AD ALTO RENDIMENTO IN METALLO DURO INTEGRALE



+ la soluzione giusta per ogni materiale

# Codice ISO

<b>P</b>	acciaio, acciaio legato in alta percentuale
<b>M</b>	acciaio inossidabile
<b>K</b>	ghisa grigia, ghisa sferoidale e ghisa malleabile
<b>N</b>	alluminio ed altri metalli non ferrosi
<b>S</b>	leghe speciali, superleghe e leghe di titanio
<b>H</b>	acciaio temprato e ghisa temprata

## Pittogrammi

Materiale da taglio

**VHM**

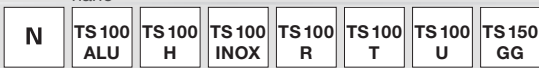
Metallo duro integrale

Trattam. di superficie



AITIN AITIN nano lucido FIRE TiAlN TiAlSiN

Tipo



Profondità di foro



Norma



secondo DIN secondo standard Hartner

Angolo di affilatura



Tolleranza del Ø



Direzione di taglio



destra

Forma del gambo



secondo DIN 6535 cilindrico

Assott. del nocc.



Refrigerazione interna



con RI



senza RI





### TS 100 U

- ▼ ACCIAIO E ACCIAIO ALTAMENTE LEGATO, IMPIEGO UNIVERSALE

P	•
M	○
K	•
N	○
S	○
H	○

TS 100 U



### TS 100 INOX

- ▼ ACCIAI INOSSIDABILI, RESISTENTI AGLI ACIDI E AL CALORE, TITANIO E LEGHE DI TITANIO, LEGHE SPECIALI

P	○
M	•
K	•
N	○
S	○
H	○

TS 100 INOX



### TS 100 R | TS 150 GG

- ▼ GHISA GRIGIA, MALLEABILE E SFEROIDALE, GGV/ADI/CDI

P	○
M	○
K	•
N	○
S	○
H	○

TS 100 R | TS 150 GG



### TS 100 ALU | TS 150 GG

- ▼ LEGHE DI ALLUMINIO, RAME, OTTONE E BRONZO, PLASTICHE

P	○
M	○
K	○
N	•
S	○
H	○

TS 100 ALU | TS 150 GG

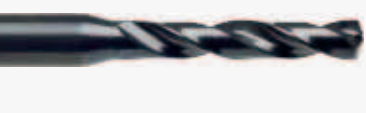


### TS 100 H

- ▼ ACCIAI LEGATI E NON LEGATI AD ALTA RESISTENZA, ACCIAI TEMPRATI, LEGHE SPECIALI E LEGHE DI TITANIO

P	•
M	○
K	•
N	○
S	•
H	○

TS 100 H



### MICROPUNTE IN METALLO DURO

- ▼ LAVORAZIONE GENERICA DI ACCIAI FINO A  $\sim 1200 \text{ N/mm}^2$ , IMPIEGO UNIVERSALE

P	•
M	•
K	•
N	○
S	○
H	○

Micropunte in MDI



### TS 100 T

- ▼ LAVORAZIONE GENERICA DI ACCIAI FINO A  $\sim 1200 \text{ N/mm}^2$ , IMPIEGO UNIVERSALE

P	•
M	•
K	•
N	○
S	○
H	○

TS 100 T



## APPLICAZIONI RACCOMANDATE

P	M	K	N	S	H	Norma	Refrigerazione interna	Materiale da taglio	Superficie	Direzione di taglio	Forma del gambo	Profondità di foro	d1/mm	Articolo n.	Pagina
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## TS 100 U

	●	○	●	○	○	DIN 6537K	senza RI	MDI	F	destra	HA	3xD	3,000 - 20,000	89413	10
	●	○	●	○	○	DIN 6537K	senza RI	MDI	F	destra	HE	3xD	3,000 - 20,000	89402	10
	●	○	●	○	○	DIN 6537L	senza RI	MDI	F	destra	HA	5xD	3,000 - 20,000	89414	12
	●	○	●	○	○	DIN 6537L	senza RI	MDI	F	destra	HE	5xD	3,000 - 20,000	89417	12
	●	○	●	○	○	DIN 6537K	con RI	MDI	F	destra	HA	3xD	3,000 - 20,000	89410	14
	●	○	●	○	○	DIN 6537K	con RI	MDI	F	destra	HE	3xD	3,000 - 20,000	89415	14
	●	○	●	○	○	DIN 6537L	con RI	MDI	F	destra	HA	5xD	3,000 - 20,000	89411	16
	●	○	●	○	○	DIN 6537L	con RI	MDI	F	destra	HE	5xD	3,000 - 20,000	89408	16
	●	○	●	○	○	Norma di fab.	con RI	MDI	F	destra	HA	7xD	3,000 - 20,000	89412	18
	●	○	●	○	○	Norma di fab.	con RI	MDI	F	destra	HE	7xD	3,000 - 20,000	89416	18
	●	○	●	○	○	Norma di fab.	con RI	MDI	F	destra	HA	12xD	3,000 - 20,000	89418	20

## TS 100 INOX

	○	●	○	○	○	DIN 6537K	con RI	MDI	a	destra	HA	3xD	3,000 - 20,000	89450	24
	○	●	○	○	○	DIN 6537K	con RI	MDI	a	destra	HE	3xD	3,000 - 20,000	89550	24

P	M	K	N	S	H	Norma	Refrigerazione interna	Materiale da taglio	Superficie	Direzione di taglio	Forma del gambo	Profondità di foro	d1/mm	Articolo n.	Pagina
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## TS 100 INOX



○	●			○		DIN 6537L	con RI	MDI	ⓐ	destra	HA	5xD	3,000 - 20,000	89451	26
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○	●			○		DIN 6537L	con RI	MDI	ⓐ	destra	HE	5xD	3,000 - 20,000	89551	26
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## TS 100 R | TS 150 GG



	●					DIN 6537L	con RI	MDI	ⓑ	destra	HA	5xD	3,000 - 20,000	89420	32
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	●					Norma di fab.	con RI	MDI	ⓑ	destra	HA	7xD	4,000 - 20,000	89421	34
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	●	○				Norma di fab.	con RI	MDI	○	destra	HA	4xD	3,000 - 20,000	89292	36
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	●	○				Norma di fab.	con RI	MDI	○	destra	HA	7xD	3,000 - 20,000	89294	37
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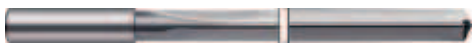


	●	○				Norma di fab.	con RI	MDI	○	destra	HA	10xD	3,000 - 20,000	89293	38
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## TS 100 ALU | TS 150 GG



		●				DIN 6537L	con RI	MDI	○	destra	HA	5xD	3,000 - 20,000	89560	44
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	○	●				Norma di fab.	con RI	MDI	○	destra	HA	10xD	3,000 - 19,500	89295	46
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## TS 100 H







●				○		DIN 6537K	senza RI	MDI	Ⓨ	destra	HA	3xD	3,000 - 20,000	89422	50
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●				○		DIN 6537K	con RI	MDI	Ⓨ	destra	HA	3xD	3,000 - 20,000	89423	52
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P	M	K	N	S	H	Norma	Refrigerazione interna	Materiale da taglio	Superficie	Direzione di taglio	Forma del gambo	Profondità di foro	d1/mm	Articolo n.	Pagina
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## TS 100 H

	•	•	•	•	○	DIN 6537K	con RI	MDI	Y	destra	HE	3xD	3,000 - 20,000	89424	52
	•	•	•	•	○	DIN 6537L	con RI	MDI	Y	destra	HA	5xD	3,000 - 20,000	89425	54
	•	•	•	•	○	DIN 6537L	con RI	MDI	Y	destra	HE	5xD	3,000 - 20,000	89426	54
	•	•	•	•	○	Norma di fab.	con RI	MDI	Y	destra	HA	7xD	3,000 - 16,000	89427	56

## Micropunte

	•	•	•	○	○	Norma di fab.	senza RI	MDI	A	destra	cil.	4xD	0,500 - 3,000	86400	60
	•	•	•	○	○	Norma di fab.	senza RI	MDI	A	destra	cil.	7xD	0,500 - 3,000	86401	61
	•	•	•	○	○	Norma di fab.	con RI	MDI	A	destra	cil.	5xD	1,400 - 3,000	86405	62
	•	•	•	○	○	Norma di fab.	con RI	MDI	A	destra	cil.	8xD	1,400 - 3,000	86408	63
	•	•	•	○	○	Norma di fab.	con RI	MDI	A	destra	cil.	15xD	1,400 - 3,000	86412	64

## TS 100 T

	•	•	•	○	○	Norma di fab.	con RI	MDI	A	destra	HA	15xD	3,000 - 16,000	86509	68
	•	•	•	○	○	Norma di fab.	con RI	MDI	A	destra	HA	20xD	3,000 - 16,000	86511	69
	•	•	•	○	○	Norma di fab.	con RI	MDI	A	destra	HA	25xD	3,000 - 16,000	86512	70



P	M	K	N	S	H	Norma	Refrigerazione interna	Materiale da taglio	Superficie	Direzione di taglio	Forma del gambo	Profondità di foro	d1/mm	Articolo n.	Pagina
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## TS 100 T



•	•	•	○	○		Norma di fab.	con RI	<b>MDI</b>	<b>A</b>	destra	HA	30xD	3,000 - 14,000	<b>86513</b>	71
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•	•	•	○	○		Norma di fab.	con RI	<b>MDI</b>	<b>A</b>	destra	HA	40xD	3,000 - 10,000	<b>86514</b>	72
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## TS 100 U

### ▼ VANTAGGI E PROPRIETÀ

- ▼ Valori di taglio massimo ed eccellenti **risultati di lavorazione** in acciaio a truciolo lungo e corto con resistenze fino a ca.  $1200\text{ N/mm}^2$ , acciai al carbonio, bronzo, ghisa e leghe AISi altamente legate
- ▼ Fori di precisione con **rigide tolleranze di diametro** e superfici di qualità
- ▼ Centraggio di precisione e trucioli corti, grazie alla geometria di taglio **ottimizzata con affilatura a due piani e affilatura speciale**





# ACCIAIO E ACCIAIO ALTAMENTE LEGATO

## ▼ IMPIEGO UNIVERSALE

Geometria speciale **per impiego universale** in quasi tutti i materiali

Smusso di protezione bordi per durate elevate anche in **condizioni di impiego difficili**

Affilatura speciale **per un centraggio preciso**

Per fori di profondità 7xD e 12xD, due smussi di guida aggiuntivi **assicurano la linearità e concentricità del foro**

Il profilo aperto del canale guida-trucioli garantisce trucioli corti e **una evacuazione sicura**

**Rivestimento nanoFIRE** multistrato per lunga durata con valori di taglio elevati



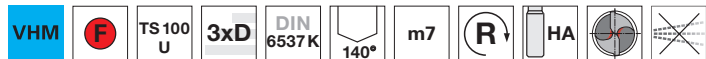


TS-Drills senza refrigerazione interna

Articolo n. 89413



P	M	K	N	S	H
●	○	●	○	○	○

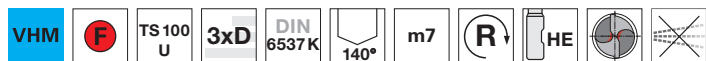


Assott. del nocc.  $\geq \varnothing 3,000$  • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm<sup>2</sup> • ghise  
 • bronzo, ottone • leghe di alluminio con elevato contenuto di silicio

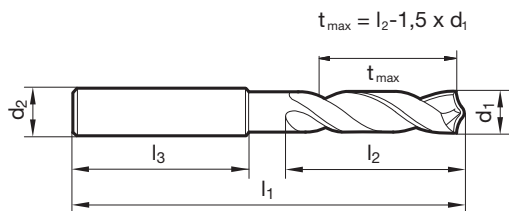
Articolo n. 89402



P	M	K	N	S	H
●	○	●	○	○	○



Assott. del nocc.  $\geq \varnothing 3,000$  • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm<sup>2</sup> • ghise  
 • bronzo, ottone • leghe di alluminio con elevato contenuto di silicio



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	5,200		6,000	66,000	28,000	36,000
3,100		6,000	62,000	20,000	36,000	5,300		6,000	66,000	28,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	5,400		6,000	66,000	28,000	36,000
3,200		6,000	62,000	20,000	36,000	5,500		6,000	66,000	28,000	36,000
3,250		6,000	62,000	20,000	36,000	5,550		6,000	66,000	28,000	36,000
3,300		6,000	62,000	20,000	36,000	5,560	7/32	6,000	66,000	28,000	36,000
3,400		6,000	62,000	20,000	36,000	5,600		6,000	66,000	28,000	36,000
3,500		6,000	62,000	20,000	36,000	5,700		6,000	66,000	28,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	5,800		6,000	66,000	28,000	36,000
3,600		6,000	62,000	20,000	36,000	5,900		6,000	66,000	28,000	36,000
3,700		6,000	62,000	20,000	36,000	5,950	15/64	6,000	66,000	28,000	36,000
3,800		6,000	66,000	24,000	36,000	6,000		6,000	66,000	28,000	36,000
3,900		6,000	66,000	24,000	36,000	6,100		8,000	79,000	34,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	6,200		8,000	79,000	34,000	36,000
4,000		6,000	66,000	24,000	36,000	6,300		8,000	79,000	34,000	36,000
4,100		6,000	66,000	24,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
4,200		6,000	66,000	24,000	36,000	6,400		8,000	79,000	34,000	36,000
4,300		6,000	66,000	24,000	36,000	6,500		8,000	79,000	34,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	6,600		8,000	79,000	34,000	36,000
4,400		6,000	66,000	24,000	36,000	6,700		8,000	79,000	34,000	36,000
4,500		6,000	66,000	24,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
4,600		6,000	66,000	24,000	36,000	6,800		8,000	79,000	34,000	36,000
4,650		6,000	66,000	24,000	36,000	6,900		8,000	79,000	34,000	36,000
4,700		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	7,100		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,900		6,000	66,000	28,000	36,000	7,200		8,000	79,000	41,000	36,000
5,000		6,000	66,000	28,000	36,000	7,300		8,000	79,000	41,000	36,000
5,100		6,000	66,000	28,000	36,000	7,400		8,000	79,000	41,000	36,000
5,160	13/64	6,000	66,000	28,000	36,000	7,500		8,000	79,000	41,000	36,000



## TS-Drills senza refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	79,000	41,000	36,000	11,400		12,000	102,000	55,000	45,000
7,600		8,000	79,000	41,000	36,000	11,500		12,000	102,000	55,000	45,000
7,700		8,000	79,000	41,000	36,000	11,600		12,000	102,000	55,000	45,000
7,800		8,000	79,000	41,000	36,000	11,700		12,000	102,000	55,000	45,000
7,900		8,000	79,000	41,000	36,000	11,800		12,000	102,000	55,000	45,000
7,940	5/16	8,000	79,000	41,000	36,000	11,900		12,000	102,000	55,000	45,000
8,000		8,000	79,000	41,000	36,000	11,910	15/32	12,000	102,000	55,000	45,000
8,100		10,000	89,000	47,000	40,000	12,000		12,000	102,000	55,000	45,000
8,200		10,000	89,000	47,000	40,000	12,100		14,000	107,000	60,000	45,000
8,300		10,000	89,000	47,000	40,000	12,200		14,000	107,000	60,000	45,000
8,330	21/64	10,000	89,000	47,000	40,000	12,300	31/64	14,000	107,000	60,000	45,000
8,400		10,000	89,000	47,000	40,000	12,400		14,000	107,000	60,000	45,000
8,500		10,000	89,000	47,000	40,000	12,500		14,000	107,000	60,000	45,000
8,600		10,000	89,000	47,000	40,000	12,600		14,000	107,000	60,000	45,000
8,700		10,000	89,000	47,000	40,000	12,700	1/2	14,000	107,000	60,000	45,000
8,730	11/32	10,000	89,000	47,000	40,000	12,800		14,000	107,000	60,000	45,000
8,800		10,000	89,000	47,000	40,000	13,000		14,000	107,000	60,000	45,000
8,900		10,000	89,000	47,000	40,000	13,100	33/64	14,000	107,000	60,000	45,000
9,000		10,000	89,000	47,000	40,000	13,200		14,000	107,000	60,000	45,000
9,100		10,000	89,000	47,000	40,000	13,300		14,000	107,000	60,000	45,000
9,130	23/64	10,000	89,000	47,000	40,000	13,500		14,000	107,000	60,000	45,000
9,200		10,000	89,000	47,000	40,000	13,700		14,000	107,000	60,000	45,000
9,250		10,000	89,000	47,000	40,000	13,800		14,000	107,000	60,000	45,000
9,300		10,000	89,000	47,000	40,000	14,000		14,000	107,000	60,000	45,000
9,400		10,000	89,000	47,000	40,000	14,100		16,000	115,000	65,000	48,000
9,500		10,000	89,000	47,000	40,000	14,200		16,000	115,000	65,000	48,000
9,520	3/8	10,000	89,000	47,000	40,000	14,290	9/16	16,000	115,000	65,000	48,000
9,600		10,000	89,000	47,000	40,000	14,500		16,000	115,000	65,000	48,000
9,700		10,000	89,000	47,000	40,000	14,700		16,000	115,000	65,000	48,000
9,800		10,000	89,000	47,000	40,000	15,000		16,000	115,000	65,000	48,000
9,900		10,000	89,000	47,000	40,000	15,100		16,000	115,000	65,000	48,000
9,920	25/64	10,000	89,000	47,000	40,000	15,200		16,000	115,000	65,000	48,000
10,000		10,000	89,000	47,000	40,000	15,500		16,000	115,000	65,000	48,000
10,100		12,000	102,000	55,000	45,000	15,700		16,000	115,000	65,000	48,000
10,200		12,000	102,000	55,000	45,000	15,800		16,000	115,000	65,000	48,000
10,300		12,000	102,000	55,000	45,000	16,000		16,000	115,000	65,000	48,000
10,320	13/32	12,000	102,000	55,000	45,000	16,200		18,000	123,000	73,000	48,000
10,400		12,000	102,000	55,000	45,000	16,500		18,000	123,000	73,000	48,000
10,500		12,000	102,000	55,000	45,000	17,000		18,000	123,000	73,000	48,000
10,600		12,000	102,000	55,000	45,000	17,500		18,000	123,000	73,000	48,000
10,700		12,000	102,000	55,000	45,000	18,000		18,000	123,000	73,000	48,000
10,800		12,000	102,000	55,000	45,000	18,500		20,000	131,000	79,000	50,000
10,900		12,000	102,000	55,000	45,000	19,000		20,000	131,000	79,000	50,000
11,000		12,000	102,000	55,000	45,000	19,500		20,000	131,000	79,000	50,000
11,100		12,000	102,000	55,000	45,000	20,000		20,000	131,000	79,000	50,000
11,110	7/16	12,000	102,000	55,000	45,000						
11,200		12,000	102,000	55,000	45,000						
11,300		12,000	102,000	55,000	45,000						

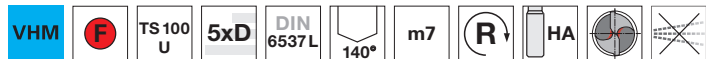


TS-Drills senza refrigerazione interna

Articolo n. 89414



P	M	K	N	S	H
●	○	●	○	○	○

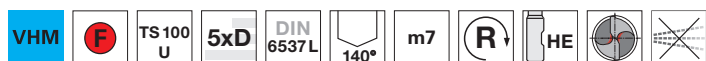


Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm<sup>2</sup> • ghise  
 • bronzo, ottone • leghe di alluminio con elevato contenuto di silicio

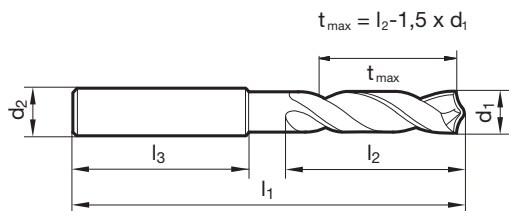
Articolo n. 89417



P	M	K	N	S	H
●	○	●	○	○	○



Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm<sup>2</sup> • ghise  
 • bronzo, ottone • leghe di alluminio con elevato contenuto di silicio



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	5,200		6,000	82,000	44,000	36,000
3,100		6,000	66,000	28,000	36,000	5,300		6,000	82,000	44,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	5,400		6,000	82,000	44,000	36,000
3,200		6,000	66,000	28,000	36,000	5,500		6,000	82,000	44,000	36,000
3,250		6,000	66,000	28,000	36,000	5,550		6,000	82,000	44,000	36,000
3,300		6,000	66,000	28,000	36,000	5,560	7/32	6,000	82,000	44,000	36,000
3,400		6,000	66,000	28,000	36,000	5,600		6,000	82,000	44,000	36,000
3,500		6,000	66,000	28,000	36,000	5,700		6,000	82,000	44,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	5,800		6,000	82,000	44,000	36,000
3,600		6,000	66,000	28,000	36,000	5,900		6,000	82,000	44,000	36,000
3,700		6,000	66,000	28,000	36,000	5,950	15/64	6,000	82,000	44,000	36,000
3,800		6,000	74,000	36,000	36,000	6,000		6,000	82,000	44,000	36,000
3,900		6,000	74,000	36,000	36,000	6,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	6,200		8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	6,300		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	6,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	6,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	6,600		8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	6,700		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	6,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	6,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	7,100		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,900		6,000	82,000	44,000	36,000	7,200		8,000	91,000	53,000	36,000
5,000		6,000	82,000	44,000	36,000	7,300		8,000	91,000	53,000	36,000
5,100		6,000	82,000	44,000	36,000	7,400		8,000	91,000	53,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000	7,500		8,000	91,000	53,000	36,000



## TS-Drills senza refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	91,000	53,000	36,000	11,400		12,000	118,000	71,000	45,000
7,600		8,000	91,000	53,000	36,000	11,500		12,000	118,000	71,000	45,000
7,700		8,000	91,000	53,000	36,000	11,600		12,000	118,000	71,000	45,000
7,800		8,000	91,000	53,000	36,000	11,700		12,000	118,000	71,000	45,000
7,900		8,000	91,000	53,000	36,000	11,800		12,000	118,000	71,000	45,000
7,940	5/16	8,000	91,000	53,000	36,000	11,900		12,000	118,000	71,000	45,000
8,000		8,000	91,000	53,000	36,000	11,910	15/32	12,000	118,000	71,000	45,000
8,100		10,000	103,000	61,000	40,000	12,000		12,000	118,000	71,000	45,000
8,200		10,000	103,000	61,000	40,000	12,100		14,000	124,000	77,000	45,000
8,300		10,000	103,000	61,000	40,000	12,200		14,000	124,000	77,000	45,000
8,330	21/64	10,000	103,000	61,000	40,000	12,500		14,000	124,000	77,000	45,000
8,400		10,000	103,000	61,000	40,000	12,700	1/2	14,000	124,000	77,000	45,000
8,500		10,000	103,000	61,000	40,000	13,000		14,000	124,000	77,000	45,000
8,600		10,000	103,000	61,000	40,000	13,100	33/64	14,000	124,000	77,000	45,000
8,700		10,000	103,000	61,000	40,000	13,500		14,000	124,000	77,000	45,000
8,730	11/32	10,000	103,000	61,000	40,000	13,700		14,000	124,000	77,000	45,000
8,800		10,000	103,000	61,000	40,000	13,800		14,000	124,000	77,000	45,000
8,900		10,000	103,000	61,000	40,000	14,000		14,000	124,000	77,000	45,000
9,000		10,000	103,000	61,000	40,000	14,100		16,000	133,000	83,000	48,000
9,100		10,000	103,000	61,000	40,000	14,200		16,000	133,000	83,000	48,000
9,130	23/64	10,000	103,000	61,000	40,000	14,290	9/16	16,000	133,000	83,000	48,000
9,200		10,000	103,000	61,000	40,000	14,500		16,000	133,000	83,000	48,000
9,250		10,000	103,000	61,000	40,000	14,700		16,000	133,000	83,000	48,000
9,300		10,000	103,000	61,000	40,000	15,000		16,000	133,000	83,000	48,000
9,400		10,000	103,000	61,000	40,000	15,100		16,000	133,000	83,000	48,000
9,500		10,000	103,000	61,000	40,000	15,200		16,000	133,000	83,000	48,000
9,520	3/8	10,000	103,000	61,000	40,000	15,500		16,000	133,000	83,000	48,000
9,600		10,000	103,000	61,000	40,000	15,700		16,000	133,000	83,000	48,000
9,700		10,000	103,000	61,000	40,000	16,000		16,000	133,000	83,000	48,000
9,800		10,000	103,000	61,000	40,000	16,500		18,000	143,000	93,000	48,000
9,900		10,000	103,000	61,000	40,000	17,000		18,000	143,000	93,000	48,000
9,920	25/64	10,000	103,000	61,000	40,000	17,500		18,000	143,000	93,000	48,000
10,000		10,000	103,000	61,000	40,000	18,000		18,000	143,000	93,000	48,000
10,100		12,000	118,000	71,000	45,000	18,500		20,000	153,000	101,000	50,000
10,200		12,000	118,000	71,000	45,000	19,000		20,000	153,000	101,000	50,000
10,300		12,000	118,000	71,000	45,000	19,500		20,000	153,000	101,000	50,000
10,320	13/32	12,000	118,000	71,000	45,000	20,000		20,000	153,000	101,000	50,000
10,400		12,000	118,000	71,000	45,000						
10,500		12,000	118,000	71,000	45,000						
10,600		12,000	118,000	71,000	45,000						
10,700		12,000	118,000	71,000	45,000						
10,800		12,000	118,000	71,000	45,000						
10,900		12,000	118,000	71,000	45,000						
11,000		12,000	118,000	71,000	45,000						
11,100		12,000	118,000	71,000	45,000						
11,110	7/16	12,000	118,000	71,000	45,000						
11,200		12,000	118,000	71,000	45,000						
11,300		12,000	118,000	71,000	45,000						

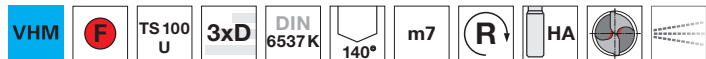


TS-Drills con refrigerazione interna

Articolo n. 89410



P	M	K	N	S	H
●	○	●	○	○	○

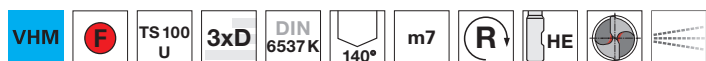


Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm<sup>2</sup> • ghise  
 • bronzo, ottone • leghe di alluminio con elevato contenuto di silicio

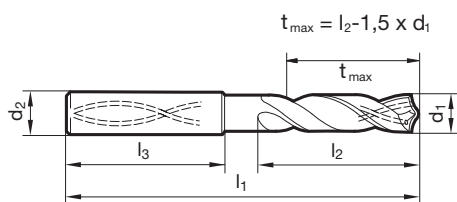
Articolo n. 89415



P	M	K	N	S	H
●	○	●	○	○	○



Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm<sup>2</sup> • ghise  
 • bronzo, ottone • leghe di alluminio con elevato contenuto di silicio



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
	33/64		107,000	60,000	45,000	5,000		6,000	66,000	28,000	36,000
			115,000	65,000	48,000	5,100		6,000	66,000	28,000	36,000
			123,000	73,000	48,000	5,160	13/64	6,000	66,000	28,000	36,000
3,000		6,000	62,000	20,000	36,000	5,200		6,000	66,000	28,000	36,000
3,100		6,000	62,000	20,000	36,000	5,300		6,000	66,000	28,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	5,400		6,000	66,000	28,000	36,000
3,200		6,000	62,000	20,000	36,000	5,500		6,000	66,000	28,000	36,000
3,250		6,000	62,000	20,000	36,000	5,550		6,000	66,000	28,000	36,000
3,300		6,000	62,000	20,000	36,000	5,560	7/32	6,000	66,000	28,000	36,000
3,400		6,000	62,000	20,000	36,000	5,600		6,000	66,000	28,000	36,000
3,500		6,000	62,000	20,000	36,000	5,700		6,000	66,000	28,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	5,800		6,000	66,000	28,000	36,000
3,600		6,000	62,000	20,000	36,000	5,900		6,000	66,000	28,000	36,000
3,700		6,000	62,000	20,000	36,000	5,950	15/64	6,000	66,000	28,000	36,000
3,800		6,000	66,000	24,000	36,000	6,000		6,000	66,000	28,000	36,000
3,900		6,000	66,000	24,000	36,000	6,100		8,000	79,000	34,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	6,200		8,000	79,000	34,000	36,000
4,000		6,000	66,000	24,000	36,000	6,300		8,000	79,000	34,000	36,000
4,100		6,000	66,000	24,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
4,200		6,000	66,000	24,000	36,000	6,400		8,000	79,000	34,000	36,000
4,300		6,000	66,000	24,000	36,000	6,500		8,000	79,000	34,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	6,600		8,000	79,000	34,000	36,000
4,400		6,000	66,000	24,000	36,000	6,700		8,000	79,000	34,000	36,000
4,500		6,000	66,000	24,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
4,600		6,000	66,000	24,000	36,000	6,800		8,000	79,000	34,000	36,000
4,650		6,000	66,000	24,000	36,000	6,900		8,000	79,000	34,000	36,000
4,700		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	7,100		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,900		6,000	66,000	28,000	36,000	7,200		8,000	79,000	41,000	36,000





## TS-Drills con refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,300		8,000	79,000	41,000	36,000	11,110	7/16	12,000	102,000	55,000	45,000
7,400		8,000	79,000	41,000	36,000	11,200		12,000	102,000	55,000	45,000
7,500		8,000	79,000	41,000	36,000	11,300		12,000	102,000	55,000	45,000
7,540	19/64	8,000	79,000	41,000	36,000	11,400		12,000	102,000	55,000	45,000
7,600		8,000	79,000	41,000	36,000	11,500		12,000	102,000	55,000	45,000
7,700		8,000	79,000	41,000	36,000	11,600		12,000	102,000	55,000	45,000
7,800		8,000	79,000	41,000	36,000	11,700		12,000	102,000	55,000	45,000
7,900		8,000	79,000	41,000	36,000	11,800		12,000	102,000	55,000	45,000
7,940	5/16	8,000	79,000	41,000	36,000	11,900		12,000	102,000	55,000	45,000
8,000		8,000	79,000	41,000	36,000	11,910	15/32	12,000	102,000	55,000	45,000
8,100		10,000	89,000	47,000	40,000	12,000		12,000	102,000	55,000	45,000
8,200		10,000	89,000	47,000	40,000	12,100		14,000	107,000	60,000	45,000
8,300		10,000	89,000	47,000	40,000	12,200		14,000	107,000	60,000	45,000
8,330	21/64	10,000	89,000	47,000	40,000	12,300	31/64	14,000	107,000	60,000	45,000
8,400		10,000	89,000	47,000	40,000	12,500		14,000	107,000	60,000	45,000
8,500		10,000	89,000	47,000	40,000	12,700	1/2	14,000	107,000	60,000	45,000
8,600		10,000	89,000	47,000	40,000	13,000		14,000	107,000	60,000	45,000
8,700		10,000	89,000	47,000	40,000	13,200		14,000	107,000	60,000	45,000
8,730	11/32	10,000	89,000	47,000	40,000	13,300		14,000	107,000	60,000	45,000
8,800		10,000	89,000	47,000	40,000	13,500		14,000	107,000	60,000	45,000
8,900		10,000	89,000	47,000	40,000	13,700		14,000	107,000	60,000	45,000
9,000		10,000	89,000	47,000	40,000	14,000		14,000	107,000	60,000	45,000
9,100		10,000	89,000	47,000	40,000	14,200		16,000	115,000	65,000	48,000
9,130	23/64	10,000	89,000	47,000	40,000	14,290	9/16	16,000	115,000	65,000	48,000
9,200		10,000	89,000	47,000	40,000	14,400		16,000	115,000	65,000	48,000
9,250		10,000	89,000	47,000	40,000	14,500		16,000	115,000	65,000	48,000
9,300		10,000	89,000	47,000	40,000	14,600		16,000	115,000	65,000	48,000
9,400		10,000	89,000	47,000	40,000	14,700		16,000	115,000	65,000	48,000
9,500		10,000	89,000	47,000	40,000	15,000		16,000	115,000	65,000	48,000
9,520	3/8	10,000	89,000	47,000	40,000	15,200		16,000	115,000	65,000	48,000
9,600		10,000	89,000	47,000	40,000	15,500		16,000	115,000	65,000	48,000
9,700		10,000	89,000	47,000	40,000	15,700		16,000	115,000	65,000	48,000
9,800		10,000	89,000	47,000	40,000	16,000		16,000	115,000	65,000	48,000
9,900		10,000	89,000	47,000	40,000	16,100		18,000	123,000	73,000	48,000
9,920	25/64	10,000	89,000	47,000	40,000	16,500		18,000	123,000	73,000	48,000
10,000		10,000	89,000	47,000	40,000	16,900		18,000	123,000	73,000	48,000
10,100		12,000	102,000	55,000	45,000	17,000		18,000	123,000	73,000	48,000
10,200		12,000	102,000	55,000	45,000	17,300		18,000	123,000	73,000	48,000
10,300		12,000	102,000	55,000	45,000	17,500		18,000	123,000	73,000	48,000
10,320	13/32	12,000	102,000	55,000	45,000	18,000		18,000	123,000	73,000	48,000
10,400		12,000	102,000	55,000	45,000	18,500		20,000	131,000	79,000	50,000
10,500		12,000	102,000	55,000	45,000	18,900		20,000	131,000	79,000	50,000
10,600		12,000	102,000	55,000	45,000	19,000		20,000	131,000	79,000	50,000
10,700		12,000	102,000	55,000	45,000	19,500		20,000	131,000	79,000	50,000
10,800		12,000	102,000	55,000	45,000	20,000		20,000	131,000	79,000	50,000
10,900		12,000	102,000	55,000	45,000						
11,000		12,000	102,000	55,000	45,000						
11,100		12,000	102,000	55,000	45,000						

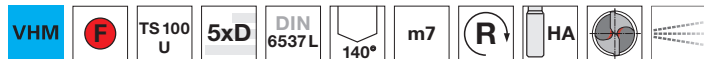


## TS-Drills con refrigerazione interna

## Articolo n. 89411



P	M	K	N	S	H
●	○	●	○	○	○



Assott. del nocc.  $\geq \varnothing 3,000$  • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm<sup>2</sup> • ghise  
 • bronzo, ottone • leghe di alluminio con elevato contenuto di silicio

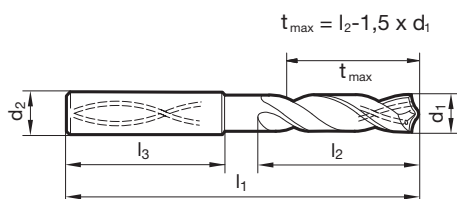
## Articolo n. 89408



P	M	K	N	S	H
●	○	●	○	○	○



Assott. del nocc.  $\geq \varnothing 3,000$  • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm<sup>2</sup> • ghise  
 • bronzo, ottone • leghe di alluminio con elevato contenuto di silicio



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
			133,000	83,000	48,000	5,160	13/64	6,000	82,000	44,000	36,000
3,000		6,000	66,000	28,000	36,000	5,200		6,000	82,000	44,000	36,000
3,100		6,000	66,000	28,000	36,000	5,300		6,000	82,000	44,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	5,400		6,000	82,000	44,000	36,000
3,200		6,000	66,000	28,000	36,000	5,500		6,000	82,000	44,000	36,000
3,250		6,000	66,000	28,000	36,000	5,550		6,000	82,000	44,000	36,000
3,300		6,000	66,000	28,000	36,000	5,560	7/32	6,000	82,000	44,000	36,000
3,400		6,000	66,000	28,000	36,000	5,600		6,000	82,000	44,000	36,000
3,500		6,000	66,000	28,000	36,000	5,700		6,000	82,000	44,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	5,800		6,000	82,000	44,000	36,000
3,600		6,000	66,000	28,000	36,000	5,900		6,000	82,000	44,000	36,000
3,700		6,000	66,000	28,000	36,000	5,950	15/64	6,000	82,000	44,000	36,000
3,800		6,000	74,000	36,000	36,000	6,000		6,000	82,000	44,000	36,000
3,900		6,000	74,000	36,000	36,000	6,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	6,200		8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	6,300		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	6,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	6,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	6,600		8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	6,700		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	6,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	6,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	7,100		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,900		6,000	82,000	44,000	36,000	7,200		8,000	91,000	53,000	36,000
5,000		6,000	82,000	44,000	36,000	7,300		8,000	91,000	53,000	36,000
5,100		6,000	82,000	44,000	36,000	7,400		8,000	91,000	53,000	36,000



## TS-Drills con refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,500		8,000	91,000	53,000	36,000	11,900		12,000	118,000	71,000	45,000
7,540	19/64	8,000	91,000	53,000	36,000	11,910	15/32	12,000	118,000	71,000	45,000
7,600		8,000	91,000	53,000	36,000	12,000		12,000	118,000	71,000	45,000
7,700		8,000	91,000	53,000	36,000	12,100		14,000	124,000	77,000	45,000
7,800		8,000	91,000	53,000	36,000	12,200		14,000	124,000	77,000	45,000
7,900		8,000	91,000	53,000	36,000	12,300	31/64	14,000	124,000	77,000	45,000
7,940	5/16	8,000	91,000	53,000	36,000	12,400		14,000	124,000	77,000	45,000
8,000		8,000	91,000	53,000	36,000	12,500		14,000	124,000	77,000	45,000
8,100		10,000	103,000	61,000	40,000	12,600		14,000	124,000	77,000	45,000
8,200		10,000	103,000	61,000	40,000	12,700	1/2	14,000	124,000	77,000	45,000
8,300		10,000	103,000	61,000	40,000	12,800		14,000	124,000	77,000	45,000
8,330	21/64	10,000	103,000	61,000	40,000	13,000		14,000	124,000	77,000	45,000
8,400		10,000	103,000	61,000	40,000	13,100	33/64	14,000	124,000	77,000	45,000
8,500		10,000	103,000	61,000	40,000	13,300		14,000	124,000	77,000	45,000
8,600		10,000	103,000	61,000	40,000	13,500		14,000	124,000	77,000	45,000
8,700		10,000	103,000	61,000	40,000	13,700		14,000	124,000	77,000	45,000
8,730	11/32	10,000	103,000	61,000	40,000	13,800		14,000	124,000	77,000	45,000
8,800		10,000	103,000	61,000	40,000	14,000		14,000	124,000	77,000	45,000
8,900		10,000	103,000	61,000	40,000	14,100		16,000	133,000	83,000	48,000
9,000		10,000	103,000	61,000	40,000	14,200		16,000	133,000	83,000	48,000
9,100		10,000	103,000	61,000	40,000	14,290	9/16	16,000	133,000	83,000	48,000
9,130	23/64	10,000	103,000	61,000	40,000	14,500		16,000	133,000	83,000	48,000
9,200		10,000	103,000	61,000	40,000	14,700		16,000	133,000	83,000	48,000
9,250		10,000	103,000	61,000	40,000	14,800		16,000	133,000	83,000	48,000
9,300		10,000	103,000	61,000	40,000	15,000		16,000	133,000	83,000	48,000
9,400		10,000	103,000	61,000	40,000	15,100		16,000	133,000	83,000	48,000
9,500		10,000	103,000	61,000	40,000	15,200		16,000	133,000	83,000	48,000
9,520	3/8	10,000	103,000	61,000	40,000	15,300		16,000	133,000	83,000	48,000
9,600		10,000	103,000	61,000	40,000	15,500		16,000	133,000	83,000	48,000
9,700		10,000	103,000	61,000	40,000	15,700		16,000	133,000	83,000	48,000
9,800		10,000	103,000	61,000	40,000	15,800		16,000	133,000	83,000	48,000
9,900		10,000	103,000	61,000	40,000	16,000		16,000	133,000	83,000	48,000
9,920	25/64	10,000	103,000	61,000	40,000	16,500		18,000	143,000	93,000	48,000
10,000		10,000	103,000	61,000	40,000	16,900		18,000	143,000	93,000	48,000
10,100		12,000	118,000	71,000	45,000	17,000		18,000	143,000	93,000	48,000
10,200		12,000	118,000	71,000	45,000	17,500		18,000	143,000	93,000	48,000
10,300		12,000	118,000	71,000	45,000	18,000		18,000	143,000	93,000	48,000
10,320	13/32	12,000	118,000	71,000	45,000	18,500		20,000	153,000	101,000	50,000
10,400		12,000	118,000	71,000	45,000	18,900		20,000	153,000	101,000	50,000
10,500		12,000	118,000	71,000	45,000	19,000		20,000	153,000	101,000	50,000
10,600		12,000	118,000	71,000	45,000	19,050	3/4	20,000	153,000	101,000	50,000
10,700		12,000	118,000	71,000	45,000	19,500		20,000	153,000	101,000	50,000
10,800		12,000	118,000	71,000	45,000	20,000		20,000	153,000	101,000	50,000
10,900		12,000	118,000	71,000	45,000						
11,000		12,000	118,000	71,000	45,000						
11,100	7/16	12,000	118,000	71,000	45,000						
11,110		12,000	118,000	71,000	45,000						
11,200		12,000	118,000	71,000	45,000						
11,300		12,000	118,000	71,000	45,000						
11,400		12,000	118,000	71,000	45,000						
11,500		12,000	118,000	71,000	45,000						
11,600		12,000	118,000	71,000	45,000						
11,700		12,000	118,000	71,000	45,000						
11,800		12,000	118,000	71,000	45,000						



## TS-Drills con refrigerazione interna

## Articolo n. 89412



P	M	K	N	S	H
●	○	●	○	○	○



Assott. del noc.  $\geq \varnothing 3,000$  • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm<sup>2</sup> • ghise  
 • bronzo, ottone • leghe di alluminio con elevato contenuto di silicio

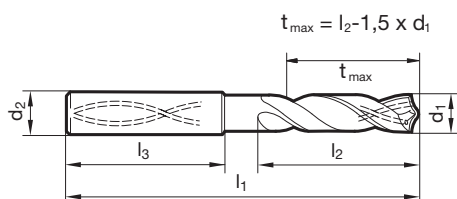
## Articolo n. 89416



P	M	K	N	S	H
●	○	●	○	○	○



Assott. del noc.  $\geq \varnothing 3,000$  • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm<sup>2</sup> • ghise  
 • bronzo, ottone • leghe di alluminio con elevato contenuto di silicio



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	70,000	30,000	36,000	5,200		6,000	90,000	50,000	36,000
3,100		6,000	70,000	30,000	36,000	5,300		6,000	90,000	50,000	36,000
3,170	1/8	6,000	70,000	30,000	36,000	5,400		6,000	97,000	57,000	36,000
3,200		6,000	70,000	30,000	36,000	5,500		6,000	97,000	57,000	36,000
3,250		6,000	70,000	30,000	36,000	5,700		6,000	97,000	57,000	36,000
3,300		6,000	70,000	30,000	36,000	5,800		6,000	97,000	57,000	36,000
3,400		6,000	75,000	35,500	36,000	5,900		6,000	97,000	57,000	36,000
3,500		6,000	75,000	35,500	36,000	5,950	15/64	6,000	97,000	57,000	36,000
3,570	9/64	6,000	75,000	35,500	36,000	6,000		6,000	97,000	57,000	36,000
3,600		6,000	75,000	35,500	36,000	6,200		8,000	106,000	66,000	36,000
3,700		6,000	75,000	35,500	36,000	6,300		8,000	106,000	66,000	36,000
3,800		6,000	75,000	37,500	36,000	6,350	1/4	8,000	106,000	66,000	36,000
3,900		6,000	75,000	37,500	36,000	6,500		8,000	106,000	66,000	36,000
3,970	5/32	6,000	75,000	37,500	36,000	6,600		8,000	106,000	66,000	36,000
4,000		6,000	75,000	37,500	36,000	6,700		8,000	106,000	66,000	36,000
4,100		6,000	75,000	37,500	36,000	6,800		8,000	106,000	66,000	36,000
4,200		6,000	75,000	37,500	36,000	6,900		8,000	116,000	76,000	36,000
4,300		6,000	85,000	45,000	36,000	7,000		8,000	116,000	76,000	36,000
4,370	11/64	6,000	85,000	45,000	36,000	7,100		8,000	116,000	76,000	36,000
4,400		6,000	85,000	45,000	36,000	7,200		8,000	116,000	76,000	36,000
4,500		6,000	85,000	45,000	36,000	7,500		8,000	116,000	76,000	36,000
4,600		6,000	85,000	45,000	36,000	7,600		8,000	116,000	76,000	36,000
4,650		6,000	85,000	45,000	36,000	7,700		8,000	116,000	76,000	36,000
4,700		6,000	85,000	45,000	36,000	7,800		8,000	116,000	76,000	36,000
4,760	3/16	6,000	90,000	50,000	36,000	8,000		8,000	116,000	76,000	36,000
4,800		6,000	90,000	50,000	36,000	8,100		10,000	131,000	87,000	40,000
4,900		6,000	90,000	50,000	36,000	8,200		10,000	131,000	87,000	40,000
5,000		6,000	90,000	50,000	36,000	8,400		10,000	131,000	87,000	40,000
5,100		6,000	90,000	50,000	36,000	8,500		10,000	131,000	87,000	40,000
5,160	13/64	6,000	90,000	50,000	36,000	8,600		10,000	131,000	87,000	40,000



## TS-Drills con refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8,700		10,000	131,000	87,000	40,000	14,000		14,000	182,000	133,000	45,000
8,800		10,000	131,000	87,000	40,000	14,100		16,000	204,000	152,000	48,000
9,000		10,000	131,000	87,000	40,000	14,200		16,000	204,000	152,000	48,000
9,100		10,000	139,000	95,000	40,000	14,500		16,000	204,000	152,000	48,000
9,200		10,000	139,000	95,000	40,000	15,000		16,000	204,000	152,000	48,000
9,250		10,000	139,000	95,000	40,000	15,100		16,000	204,000	152,000	48,000
9,300		10,000	139,000	95,000	40,000	15,500		16,000	204,000	152,000	48,000
9,400		10,000	139,000	95,000	40,000	16,000		16,000	204,000	152,000	48,000
9,500		10,000	139,000	95,000	40,000	16,500		18,000	223,000	171,000	48,000
9,520	3/8	10,000	139,000	95,000	40,000	16,900		18,000	223,000	171,000	48,000
9,700		10,000	139,000	95,000	40,000	17,000		18,000	223,000	171,000	48,000
9,800		10,000	139,000	95,000	40,000	17,500		18,000	223,000	171,000	48,000
9,900		10,000	139,000	95,000	40,000	18,000		18,000	223,000	171,000	48,000
10,000		10,000	139,000	95,000	40,000	18,500		20,000	244,000	190,000	50,000
10,200		12,000	155,000	106,000	45,000	18,900		20,000	244,000	190,000	50,000
10,300		12,000	155,000	106,000	45,000	19,000		20,000	244,000	190,000	50,000
10,500		12,000	155,000	106,000	45,000	19,050	3/4	20,000	244,000	190,000	50,000
10,800		12,000	155,000	106,000	45,000	19,500		20,000	244,000	190,000	50,000
11,000		12,000	155,000	106,000	45,000	20,000		20,000	244,000	190,000	50,000
11,200		12,000	163,000	114,000	45,000						
11,500		12,000	163,000	114,000	45,000						
11,800		12,000	163,000	114,000	45,000						
12,000		12,000	163,000	114,000	45,000						
12,100		14,000	182,000	133,000	45,000						
12,200		14,000	182,000	133,000	45,000						
12,500		14,000	182,000	133,000	45,000						
12,700	1/2	14,000	182,000	133,000	45,000						
13,000		14,000	182,000	133,000	45,000						
13,100	33/64	14,000	182,000	133,000	45,000						
13,500		14,000	182,000	133,000	45,000						

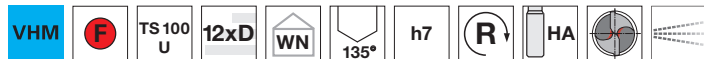


## TS-Drills con refrigerazione interna

Articolo n. 89418

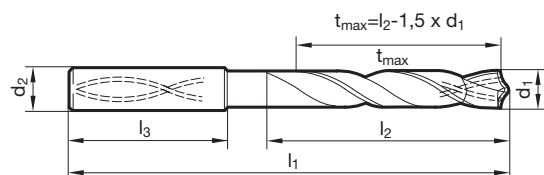


P	M	K	N	S	H
●	○	●	○	○	○



Assott. del nocc.  $\geq \varnothing 3,000$  • affilatura su piani • rivestimento testa • forma del tagliente principale diritta • geometria dei taglienti ottimizzata

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm<sup>2</sup> • ghise • bronzo, ottone • leghe di alluminio con elevato contenuto di silicio



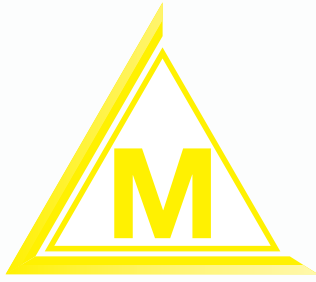
d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	90,000	50,000	36,000	7,000		8,000	146,000	108,000	36,000
3,100		6,000	90,000	50,000	36,000	7,100		8,000	146,000	108,000	36,000
3,170	1/8	6,000	90,000	50,000	36,000	7,200		8,000	146,000	108,000	36,000
3,200		6,000	90,000	50,000	36,000	7,300		8,000	146,000	108,000	36,000
3,300		6,000	90,000	50,000	36,000	7,400		8,000	146,000	108,000	36,000
3,400		6,000	90,000	50,000	36,000	7,500		8,000	146,000	108,000	36,000
3,500		6,000	90,000	50,000	36,000	7,600		8,000	146,000	108,000	36,000
3,600		6,000	90,000	50,000	36,000	7,700		8,000	146,000	108,000	36,000
3,700		6,000	90,000	50,000	36,000	7,800		8,000	146,000	108,000	36,000
3,800		6,000	102,000	64,000	36,000	7,900		8,000	146,000	108,000	36,000
3,900		6,000	102,000	64,000	36,000	8,000		8,000	146,000	108,000	36,000
4,000		6,000	102,000	64,000	36,000	8,100		10,000	162,000	120,000	40,000
4,100		6,000	102,000	64,000	36,000	8,200		10,000	162,000	120,000	40,000
4,200		6,000	102,000	64,000	36,000	8,300		10,000	162,000	120,000	40,000
4,300		6,000	102,000	64,000	36,000	8,400		10,000	162,000	120,000	40,000
4,400		6,000	102,000	64,000	36,000	8,500		10,000	162,000	120,000	40,000
4,500		6,000	102,000	64,000	36,000	8,600		10,000	162,000	120,000	40,000
4,600		6,000	102,000	64,000	36,000	8,700		10,000	162,000	120,000	40,000
4,700		6,000	102,000	64,000	36,000	8,800		10,000	162,000	120,000	40,000
4,800		6,000	116,000	78,000	36,000	8,900		10,000	162,000	120,000	40,000
4,900		6,000	116,000	78,000	36,000	9,000		10,000	162,000	120,000	40,000
5,000		6,000	116,000	78,000	36,000	9,100		10,000	162,000	120,000	40,000
5,100		6,000	116,000	78,000	36,000	9,200		10,000	162,000	120,000	40,000
5,200		6,000	116,000	78,000	36,000	9,300		10,000	162,000	120,000	40,000
5,300		6,000	116,000	78,000	36,000	9,400		10,000	162,000	120,000	40,000
5,400		6,000	116,000	78,000	36,000	9,500		10,000	162,000	120,000	40,000
5,500		6,000	116,000	78,000	36,000	9,520	3/8	10,000	162,000	120,000	40,000
5,600		6,000	116,000	78,000	36,000	9,600		10,000	162,000	120,000	40,000
5,700		6,000	116,000	78,000	36,000	9,700		10,000	162,000	120,000	40,000
5,800		6,000	116,000	78,000	36,000	9,800		10,000	162,000	120,000	40,000
5,900		6,000	116,000	78,000	36,000	9,900		10,000	162,000	120,000	40,000
6,000		6,000	116,000	78,000	36,000	10,000		10,000	162,000	120,000	40,000
6,100		8,000	146,000	108,000	36,000	10,200		12,000	204,000	156,000	45,000
6,200		8,000	146,000	108,000	36,000	10,500		12,000	204,000	156,000	45,000
6,300		8,000	146,000	108,000	36,000	11,000		12,000	204,000	156,000	45,000
6,350	1/4	8,000	146,000	108,000	36,000	11,500		12,000	204,000	156,000	45,000
6,400		8,000	146,000	108,000	36,000	12,000		12,000	204,000	156,000	45,000
6,500		8,000	146,000	108,000	36,000	12,500		14,000	230,000	182,000	45,000
6,600		8,000	146,000	108,000	36,000	12,700	1/2	14,000	230,000	182,000	45,000
6,700		8,000	146,000	108,000	36,000	13,000		14,000	230,000	182,000	45,000
6,800		8,000	146,000	108,000	36,000	13,500		14,000	230,000	182,000	45,000
6,900		8,000	146,000	108,000	36,000	14,000		14,000	230,000	182,000	45,000





## TS-Drills con refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
14,500		16,000	260,000	208,000	48,000	20,000		20,000	310,000	258,000	50,000
15,000		16,000	260,000	208,000	48,000						
15,500		16,000	260,000	208,000	48,000						
16,000		16,000	260,000	208,000	48,000						
16,500		18,000	285,000	234,000	48,000						
17,000		18,000	285,000	234,000	48,000						
17,500		18,000	285,000	234,000	48,000						
18,000		18,000	285,000	234,000	48,000						
18,500		20,000	310,000	258,000	50,000						
19,000		20,000	310,000	258,000	50,000						
19,050	3/4	20,000	310,000	258,000	50,000						
19,500		20,000	310,000	258,000	50,000						



## TS 100 INOX

### ▼ VANTAGGI E PROPRIETÀ

- ▼ **Specialista** per fori precisi e lunga durata in acciai inossidabili, acciai resistenti agli acidi e al calore, Inconel, Hastelloy, Nimonic, titanio e leghe di titanio
- ▼ Il **TS 100 INOX** consente velocità di avanzamento elevate: i trucioli vengono asportati rapidamente e si evita la formazione di taglienti di riporto
- ▼ **Canali di refrigerazione** con sezione massima agevolano la dissipazione del calore e l'evacuazione dei trucioli e impediscono la formazione di rialzi sul bordo di taglio, garantendo la massima sicurezza di processo durante la foratura



# ACCIAI INOSSIDABILI, RESISTENTI AGLI ACIDI E AL CALORE, TITANIO E LEGHE DI TITANIO, LEGHE SPECIALI

TS 100 INOX

**Affilatura speciale** per un centraggio preciso

**Geometria netta**, adattata specificamente alla lavorazione di materiali alto-legati e alla preparazione dei bordi di taglio

**Lubrorefrigerazione perfetta**, grazie alla massima sezione del canale di refrigerazione

Nano rivestimento **AlTiN molto liscio**, resistente a usura, per i migliori risultati in acciai inossidabili e resistenti agli acidi

**Profilo della scanalatura aperto**, per un'evacuazione perfetta dei trucioli anche in materiali a truciolo lungo



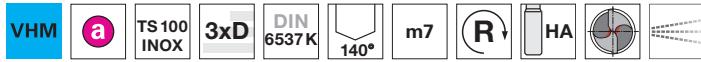


## TS-Drills con refrigerazione interna

### Articolo n. 89450

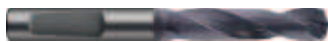


P	M	K	N	S	H
○	●			○	



Assott. del noc.  $\geq \varnothing 3,000$  • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
acciai inossidabili e resistenti al calore • Titanio e leghe di titanio • Inconel, Hastelloy, Monel

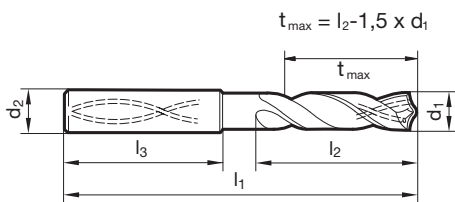
### Articolo n. 89550



P	M	K	N	S	H
○	●			○	



Assott. del noc.  $\geq \varnothing 3,000$  • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
acciai inossidabili e resistenti al calore • Titanio e leghe di titanio • Inconel, Hastelloy, Monel



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	5,200		6,000	66,000	28,000	36,000
3,100		6,000	62,000	20,000	36,000	5,300		6,000	66,000	28,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	5,400		6,000	66,000	28,000	36,000
3,200		6,000	62,000	20,000	36,000	5,500		6,000	66,000	28,000	36,000
3,250		6,000	62,000	20,000	36,000	5,550		6,000	66,000	28,000	36,000
3,300		6,000	62,000	20,000	36,000	5,560	7/32	6,000	66,000	28,000	36,000
3,400		6,000	62,000	20,000	36,000	5,600		6,000	66,000	28,000	36,000
3,500		6,000	62,000	20,000	36,000	5,700		6,000	66,000	28,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	5,800		6,000	66,000	28,000	36,000
3,600		6,000	62,000	20,000	36,000	5,900		6,000	66,000	28,000	36,000
3,700		6,000	62,000	20,000	36,000	5,950	15/64	6,000	66,000	28,000	36,000
3,800		6,000	66,000	24,000	36,000	6,000		6,000	66,000	28,000	36,000
3,900		6,000	66,000	24,000	36,000	6,100		8,000	79,000	34,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	6,200		8,000	79,000	34,000	36,000
4,000		6,000	66,000	24,000	36,000	6,300		8,000	79,000	34,000	36,000
4,100		6,000	66,000	24,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
4,200		6,000	66,000	24,000	36,000	6,400		8,000	79,000	34,000	36,000
4,300		6,000	66,000	24,000	36,000	6,500		8,000	79,000	34,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	6,600		8,000	79,000	34,000	36,000
4,400		6,000	66,000	24,000	36,000	6,700		8,000	79,000	34,000	36,000
4,500		6,000	66,000	24,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
4,600		6,000	66,000	24,000	36,000	6,800		8,000	79,000	34,000	36,000
4,650		6,000	66,000	24,000	36,000	6,900		8,000	79,000	34,000	36,000
4,700		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	7,100		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,900		6,000	66,000	28,000	36,000	7,200		8,000	79,000	41,000	36,000
5,000		6,000	66,000	28,000	36,000	7,300		8,000	79,000	41,000	36,000
5,100		6,000	66,000	28,000	36,000	7,400		8,000	79,000	41,000	36,000
5,160	13/64	6,000	66,000	28,000	36,000	7,500		8,000	79,000	41,000	36,000



## TS-Drills con refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	79,000	41,000	36,000	10,900		12,000	102,000	55,000	45,000
7,600		8,000	79,000	41,000	36,000	11,000		12,000	102,000	55,000	45,000
7,700		8,000	79,000	41,000	36,000	11,100		12,000	102,000	55,000	45,000
7,800		8,000	79,000	41,000	36,000	11,110	7/16	12,000	102,000	55,000	45,000
7,900		8,000	79,000	41,000	36,000	11,200		12,000	102,000	55,000	45,000
7,940	5/16	8,000	79,000	41,000	36,000	11,300		12,000	102,000	55,000	45,000
8,000		8,000	79,000	41,000	36,000	11,400		12,000	102,000	55,000	45,000
8,100		10,000	89,000	47,000	40,000	11,500		12,000	102,000	55,000	45,000
8,200		10,000	89,000	47,000	40,000	11,600		12,000	102,000	55,000	45,000
8,300		10,000	89,000	47,000	40,000	11,700		12,000	102,000	55,000	45,000
8,330	21/64	10,000	89,000	47,000	40,000	11,800		12,000	102,000	55,000	45,000
8,400		10,000	89,000	47,000	40,000	11,900		12,000	102,000	55,000	45,000
8,500		10,000	89,000	47,000	40,000	11,910	15/32	12,000	102,000	55,000	45,000
8,600		10,000	89,000	47,000	40,000	12,000		12,000	102,000	55,000	45,000
8,700		10,000	89,000	47,000	40,000	12,200		14,000	107,000	60,000	45,000
8,730	11/32	10,000	89,000	47,000	40,000	12,500		14,000	107,000	60,000	45,000
8,800		10,000	89,000	47,000	40,000	12,700	1/2	14,000	107,000	60,000	45,000
8,900		10,000	89,000	47,000	40,000	13,000		14,000	107,000	60,000	45,000
9,000		10,000	89,000	47,000	40,000	13,500		14,000	107,000	60,000	45,000
9,100		10,000	89,000	47,000	40,000	13,700		14,000	107,000	60,000	45,000
9,130	23/64	10,000	89,000	47,000	40,000	14,000		14,000	107,000	60,000	45,000
9,200		10,000	89,000	47,000	40,000	14,200		16,000	115,000	65,000	48,000
9,250		10,000	89,000	47,000	40,000	14,290	9/16	16,000	115,000	65,000	48,000
9,300		10,000	89,000	47,000	40,000	14,500		16,000	115,000	65,000	48,000
9,400		10,000	89,000	47,000	40,000	14,700		16,000	115,000	65,000	48,000
9,500		10,000	89,000	47,000	40,000	15,000		16,000	115,000	65,000	48,000
9,520	3/8	10,000	89,000	47,000	40,000	15,200		16,000	115,000	65,000	48,000
9,600		10,000	89,000	47,000	40,000	15,500		16,000	115,000	65,000	48,000
9,700		10,000	89,000	47,000	40,000	15,700		16,000	115,000	65,000	48,000
9,800		10,000	89,000	47,000	40,000	16,000		16,000	115,000	65,000	48,000
9,900		10,000	89,000	47,000	40,000	16,500		18,000	123,000	73,000	48,000
9,920	25/64	10,000	89,000	47,000	40,000	17,000		18,000	123,000	73,000	48,000
10,000		10,000	89,000	47,000	40,000	17,500		18,000	123,000	73,000	48,000
10,100		12,000	102,000	55,000	45,000	18,000		18,000	123,000	73,000	48,000
10,200		12,000	102,000	55,000	45,000	18,500		20,000	131,000	79,000	50,000
10,300		12,000	102,000	55,000	45,000	19,000		20,000	131,000	79,000	50,000
10,320	13/32	12,000	102,000	55,000	45,000	19,500		20,000	131,000	79,000	50,000
10,400		12,000	102,000	55,000	45,000	20,000		20,000	131,000	79,000	50,000
10,500		12,000	102,000	55,000	45,000						
10,600		12,000	102,000	55,000	45,000						
10,700		12,000	102,000	55,000	45,000						
10,800		12,000	102,000	55,000	45,000						

TS 100 INOX



## TS-Drills con refrigerazione interna

### Articolo n. 89451



P	M	K	N	S	H
○	●			○	



Assott. del noc.  $\geq \varnothing 3,000$  • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
acciai inossidabili e resistenti al calore • Titanio e leghe di titanio • Inconel, Hastelloy, Monel

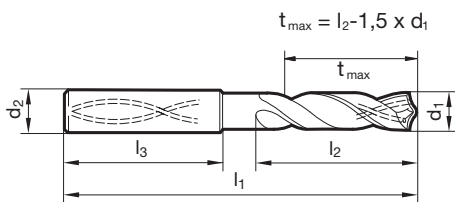
### Articolo n. 89551



P	M	K	N	S	H
○	●			○	



Assott. del noc.  $\geq \varnothing 3,000$  • affilatura su piani • forma del tagliente principale diritta • geometria dei taglienti ottimizzata  
acciai inossidabili e resistenti al calore • Titanio e leghe di titanio • Inconel, Hastelloy, Monel



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	5,200		6,000	82,000	44,000	36,000
3,100		6,000	66,000	28,000	36,000	5,300		6,000	82,000	44,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	5,400		6,000	82,000	44,000	36,000
3,200		6,000	66,000	28,000	36,000	5,500		6,000	82,000	44,000	36,000
3,250		6,000	66,000	28,000	36,000	5,550		6,000	82,000	44,000	36,000
3,300		6,000	66,000	28,000	36,000	5,560	7/32	6,000	82,000	44,000	36,000
3,400		6,000	66,000	28,000	36,000	5,600		6,000	82,000	44,000	36,000
3,500		6,000	66,000	28,000	36,000	5,700		6,000	82,000	44,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	5,800		6,000	82,000	44,000	36,000
3,600		6,000	66,000	28,000	36,000	5,900		6,000	82,000	44,000	36,000
3,700		6,000	66,000	28,000	36,000	5,950	15/64	6,000	82,000	44,000	36,000
3,800		6,000	74,000	36,000	36,000	6,000		6,000	82,000	44,000	36,000
3,900		6,000	74,000	36,000	36,000	6,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	6,200		8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	6,300		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	6,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	6,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	6,600		8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	6,700		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	6,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	6,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	7,100		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,900		6,000	82,000	44,000	36,000	7,200		8,000	91,000	53,000	36,000
5,000		6,000	82,000	44,000	36,000	7,300		8,000	91,000	53,000	36,000
5,100		6,000	82,000	44,000	36,000	7,400		8,000	91,000	53,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000	7,500		8,000	91,000	53,000	36,000





## TS-Drills con refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	91,000	53,000	36,000	10,900		12,000	118,000	71,000	45,000
7,600		8,000	91,000	53,000	36,000	11,000		12,000	118,000	71,000	45,000
7,700		8,000	91,000	53,000	36,000	11,100		12,000	118,000	71,000	45,000
7,800		8,000	91,000	53,000	36,000	11,110	7/16	12,000	118,000	71,000	45,000
7,900		8,000	91,000	53,000	36,000	11,200		12,000	118,000	71,000	45,000
7,940	5/16	8,000	91,000	53,000	36,000	11,300		12,000	118,000	71,000	45,000
8,000		8,000	91,000	53,000	36,000	11,400		12,000	118,000	71,000	45,000
8,100		10,000	103,000	61,000	40,000	11,500		12,000	118,000	71,000	45,000
8,200		10,000	103,000	61,000	40,000	11,600		12,000	118,000	71,000	45,000
8,300		10,000	103,000	61,000	40,000	11,700		12,000	118,000	71,000	45,000
8,330	21/64	10,000	103,000	61,000	40,000	11,800		12,000	118,000	71,000	45,000
8,400		10,000	103,000	61,000	40,000	11,900		12,000	118,000	71,000	45,000
8,500		10,000	103,000	61,000	40,000	11,910	15/32	12,000	118,000	71,000	45,000
8,600		10,000	103,000	61,000	40,000	12,000		12,000	118,000	71,000	45,000
8,700		10,000	103,000	61,000	40,000	12,200		14,000	124,000	77,000	45,000
8,730	11/32	10,000	103,000	61,000	40,000	12,500		14,000	124,000	77,000	45,000
8,800		10,000	103,000	61,000	40,000	12,700	1/2	14,000	124,000	77,000	45,000
8,900		10,000	103,000	61,000	40,000	13,000		14,000	124,000	77,000	45,000
9,000		10,000	103,000	61,000	40,000	13,500		14,000	124,000	77,000	45,000
9,100		10,000	103,000	61,000	40,000	13,700		14,000	124,000	77,000	45,000
9,130	23/64	10,000	103,000	61,000	40,000	14,000		14,000	124,000	77,000	45,000
9,200		10,000	103,000	61,000	40,000	14,200		16,000	133,000	83,000	48,000
9,250		10,000	103,000	61,000	40,000	14,290	9/16	16,000	133,000	83,000	48,000
9,300		10,000	103,000	61,000	40,000	14,500		16,000	133,000	83,000	48,000
9,400		10,000	103,000	61,000	40,000	14,700		16,000	133,000	83,000	48,000
9,500		10,000	103,000	61,000	40,000	15,000		16,000	133,000	83,000	48,000
9,520	3/8	10,000	103,000	61,000	40,000	15,200		16,000	133,000	83,000	48,000
9,600		10,000	103,000	61,000	40,000	15,500		16,000	133,000	83,000	48,000
9,700		10,000	103,000	61,000	40,000	15,700		16,000	133,000	83,000	48,000
9,800		10,000	103,000	61,000	40,000	16,000		16,000	133,000	83,000	48,000
9,900		10,000	103,000	61,000	40,000	16,500		18,000	143,000	93,000	48,000
9,920	25/64	10,000	103,000	61,000	40,000	17,000		18,000	143,000	93,000	48,000
10,000		10,000	103,000	61,000	40,000	17,500		18,000	143,000	93,000	48,000
10,100		12,000	118,000	71,000	45,000	18,000		18,000	143,000	93,000	48,000
10,200		12,000	118,000	71,000	45,000	18,500		20,000	153,000	101,000	50,000
10,300		12,000	118,000	71,000	45,000	19,000		20,000	153,000	101,000	50,000
10,320	13/32	12,000	118,000	71,000	45,000	19,500		20,000	153,000	101,000	50,000
10,400		12,000	118,000	71,000	45,000	20,000		20,000	153,000	101,000	50,000
10,500		12,000	118,000	71,000	45,000						
10,600		12,000	118,000	71,000	45,000						
10,700		12,000	118,000	71,000	45,000						
10,800		12,000	118,000	71,000	45,000						

TS 100 INOX



## TS 100 R

### ▼ VANTAGGI E PROPRIETÀ

- ▼ **Geometria speciale** con rettifica brevettata del raggio, che assicura **massima resa** e redditività nella lavorazione di GGV (ghisa a grafite vermicolare) e ADI (ghisa austemperata), nonché di tutte le ghise più comuni
- ▼ Eccellente adattamento di contorno frontale e profilo della scanalatura, che permette alla TS 100 R di lavorare con **estrema stabilità**, affidabilità e **precisione dimensionale**
- ▼ Idonea per fori di **profondità  $\leq 7xD$**

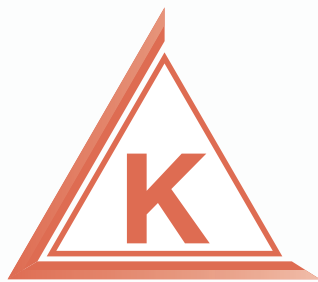


# GHISA GRIGIA, GHISA MALLEABILE E GHISA A GRAFITE SFEROIDALE, GGV/ADI/CDI

Notevole riduzione dell'usura, grazie alla **rettifica brevettata del raggio**

**Rettifica stabile delle punte** con affilatura speciale, garantisce il centraggio accurato e la precisione dimensionale

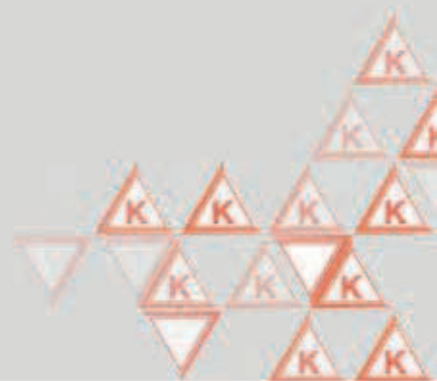
**Rivestimento nanoFIRE** per massima resistenza a usura in ghise abrasive



## TS 150 GG

### ▼ VANTAGGI E PROPRIETÀ

- ▼ **Potente punta in carburo di silicio** con canali di refrigerazione per la lavorazione di **materiali a truciolo corto**, come ghisa, ghisa grigia, ghisa duttile e malleabile
- ▼ per produrre **fori con precisione di allineamento molto alta**
- ▼ su richiesta **disponibile anche in versione rivestita**



# GHISA GRIGIA, GHISA MALLEABILE E GHISA A GRAFITE SFEROIDALE

**Geometria di taglio speciale,** adattata alla lavorazione redditizia in quasi tutte le ghise

**Versione lucida** per un'ottimale evacuazione dei trucioli

**Affilatura speciale** per un centraggio preciso e ridotta deviazione di linearità

**Quattro smussi di guida** assicurano la linearità e concentricità del foro

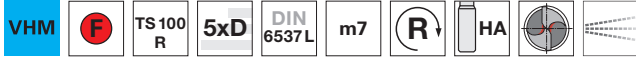


## TS-Drills con refrigerazione interna

Articolo n. 89420

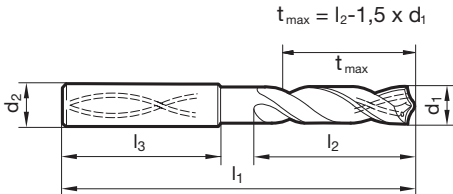


P	M	K	N	S	H
		•			



Assott. del noc.  $\geq \varnothing 3,000$  • affilatura raggiata brevettata • tagliente dritto (con la correzione del labbro)  
ghisa verimicolare GGv e ADI, CDI • ghisa grigia, ghisa malleabile, ghisa sferoidale

TS 100 R | TS 150 GG



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,250		6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,600		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,700		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000





## TS-Drills con refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9,400		10,000	103,000	61,000	40,000	13,000		14,000	124,000	77,000	45,000
9,500		10,000	103,000	61,000	40,000	13,100	33/64	14,000	124,000	77,000	45,000
9,520	3/8	10,000	103,000	61,000	40,000	13,300		14,000	124,000	77,000	45,000
9,600		10,000	103,000	61,000	40,000	13,400		14,000	124,000	77,000	45,000
9,700		10,000	103,000	61,000	40,000	13,500		14,000	124,000	77,000	45,000
9,800		10,000	103,000	61,000	40,000	13,700		14,000	124,000	77,000	45,000
9,900		10,000	103,000	61,000	40,000	13,800		14,000	124,000	77,000	45,000
9,920	25/64	10,000	103,000	61,000	40,000	13,900		14,000	124,000	77,000	45,000
10,000		10,000	103,000	61,000	40,000	14,000		14,000	124,000	77,000	45,000
10,100		12,000	118,000	71,000	45,000	14,100		16,000	133,000	83,000	48,000
10,200		12,000	118,000	71,000	45,000	14,200		16,000	133,000	83,000	48,000
10,300		12,000	118,000	71,000	45,000	14,290	9/16	16,000	133,000	83,000	48,000
10,320	13/32	12,000	118,000	71,000	45,000	14,300		16,000	133,000	83,000	48,000
10,400		12,000	118,000	71,000	45,000	14,400		16,000	133,000	83,000	48,000
10,500		12,000	118,000	71,000	45,000	14,500		16,000	133,000	83,000	48,000
10,600		12,000	118,000	71,000	45,000	14,600		16,000	133,000	83,000	48,000
10,700		12,000	118,000	71,000	45,000	14,700		16,000	133,000	83,000	48,000
10,720	27/64	12,000	118,000	71,000	45,000	14,900		16,000	133,000	83,000	48,000
10,800		12,000	118,000	71,000	45,000	15,000		16,000	133,000	83,000	48,000
10,900		12,000	118,000	71,000	45,000	15,100		16,000	133,000	83,000	48,000
11,000		12,000	118,000	71,000	45,000	15,200		16,000	133,000	83,000	48,000
11,100		12,000	118,000	71,000	45,000	15,300		16,000	133,000	83,000	48,000
11,110	7/16	12,000	118,000	71,000	45,000	15,400		16,000	133,000	83,000	48,000
11,200		12,000	118,000	71,000	45,000	15,500		16,000	133,000	83,000	48,000
11,300		12,000	118,000	71,000	45,000	15,600		16,000	133,000	83,000	48,000
11,400		12,000	118,000	71,000	45,000	15,700		16,000	133,000	83,000	48,000
11,500		12,000	118,000	71,000	45,000	15,800		16,000	133,000	83,000	48,000
11,600		12,000	118,000	71,000	45,000	15,870	5/8	16,000	133,000	83,000	48,000
11,700		12,000	118,000	71,000	45,000	15,900		16,000	133,000	83,000	48,000
11,800		12,000	118,000	71,000	45,000	16,000		16,000	133,000	83,000	48,000
11,900		12,000	118,000	71,000	45,000	16,500		18,000	143,000	93,000	48,000
11,910	15/32	12,000	118,000	71,000	45,000	16,670	21/32	18,000	143,000	93,000	48,000
12,000		12,000	118,000	71,000	45,000	17,000		18,000	143,000	93,000	48,000
12,100		14,000	124,000	77,000	45,000	17,500		18,000	143,000	93,000	48,000
12,200		14,000	124,000	77,000	45,000	18,000		18,000	143,000	93,000	48,000
12,300	31/64	14,000	124,000	77,000	45,000	18,500		20,000	153,000	101,000	50,000
12,400		14,000	124,000	77,000	45,000	19,000		20,000	153,000	101,000	50,000
12,500		14,000	124,000	77,000	45,000	19,500		20,000	153,000	101,000	50,000
12,600		14,000	124,000	77,000	45,000	20,000		20,000	153,000	101,000	50,000
12,700	1/2	14,000	124,000	77,000	45,000						
12,800		14,000	124,000	77,000	45,000						
12,900		14,000	124,000	77,000	45,000						

TS 100 R | TS 150 GG



## TS-Drills con refrigerazione interna

Articolo n. 89421

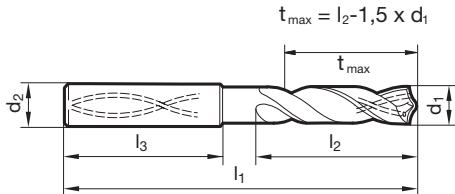


P	M	K	N	S	H
		•			



Assott. del noc.  $\geq \varnothing 4,000$  • affilatura raggiata brevettata • tagliente dritto (con la correzione del labbro)  
ghisa verimicolare GGv e ADI, CDI • ghisa grigia, ghisa malleabile, ghisa sferoidale

TS 100 R | TS 150 GG



d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
4,000		6,000	75,000	37,500	36,000	7,200		8,000	116,000	76,000	36,000
4,100		6,000	75,000	37,500	36,000	7,300		8,000	116,000	76,000	36,000
4,200		6,000	75,000	37,500	36,000	7,400		8,000	116,000	76,000	36,000
4,300		6,000	85,000	45,000	36,000	7,500		8,000	116,000	76,000	36,000
4,370	11/64	6,000	85,000	45,000	36,000	7,540	19/64	8,000	116,000	76,000	36,000
4,400		6,000	85,000	45,000	36,000	7,600		8,000	116,000	76,000	36,000
4,500		6,000	85,000	45,000	36,000	7,700		8,000	116,000	76,000	36,000
4,600		6,000	85,000	45,000	36,000	7,800		8,000	116,000	76,000	36,000
4,650		6,000	85,000	45,000	36,000	7,900		8,000	116,000	76,000	36,000
4,700		6,000	85,000	45,000	36,000	7,940	5/16	8,000	116,000	76,000	36,000
4,760	3/16	6,000	90,000	50,000	36,000	8,000		8,000	116,000	76,000	36,000
4,800		6,000	90,000	50,000	36,000	8,100		10,000	131,000	87,000	40,000
4,900		6,000	90,000	50,000	36,000	8,200		10,000	131,000	87,000	40,000
5,000		6,000	90,000	50,000	36,000	8,300		10,000	131,000	87,000	40,000
5,100		6,000	90,000	50,000	36,000	8,330	21/64	10,000	131,000	87,000	40,000
5,160	13/64	6,000	90,000	50,000	36,000	8,400		10,000	131,000	87,000	40,000
5,200		6,000	90,000	50,000	36,000	8,500		10,000	131,000	87,000	40,000
5,300		6,000	90,000	50,000	36,000	8,600		10,000	131,000	87,000	40,000
5,400		6,000	97,000	57,000	36,000	8,700		10,000	131,000	87,000	40,000
5,500		6,000	97,000	57,000	36,000	8,730	11/32	10,000	131,000	87,000	40,000
5,550		6,000	97,000	57,000	36,000	8,800		10,000	131,000	87,000	40,000
5,560	7/32	6,000	97,000	57,000	36,000	8,900		10,000	131,000	87,000	40,000
5,600		6,000	97,000	57,000	36,000	9,000		10,000	131,000	87,000	40,000
5,700		6,000	97,000	57,000	36,000	9,100		10,000	139,000	95,000	40,000
5,800		6,000	97,000	57,000	36,000	9,130	23/64	10,000	139,000	95,000	40,000
5,900		6,000	97,000	57,000	36,000	9,200		10,000	139,000	95,000	40,000
5,950	15/64	6,000	97,000	57,000	36,000	9,250		10,000	139,000	95,000	40,000
6,000		6,000	97,000	57,000	36,000	9,300		10,000	139,000	95,000	40,000
6,100		8,000	106,000	66,000	36,000	9,400		10,000	139,000	95,000	40,000
6,200		8,000	106,000	66,000	36,000	9,500		10,000	139,000	95,000	40,000
6,300		8,000	106,000	66,000	36,000	9,520	3/8	10,000	139,000	95,000	40,000
6,350	1/4	8,000	106,000	66,000	36,000	9,600		10,000	139,000	95,000	40,000
6,400		8,000	106,000	66,000	36,000	9,700		10,000	139,000	95,000	40,000
6,500		8,000	106,000	66,000	36,000	9,800		10,000	139,000	95,000	40,000
6,600		8,000	106,000	66,000	36,000	9,900		10,000	139,000	95,000	40,000
6,700		8,000	106,000	66,000	36,000	9,920	25/64	10,000	139,000	95,000	40,000
6,750	17/64	8,000	106,000	66,000	36,000	10,000		10,000	139,000	95,000	40,000
6,800		8,000	106,000	66,000	36,000	10,100		12,000	155,000	106,000	45,000
6,900		8,000	116,000	76,000	36,000	10,200		12,000	155,000	106,000	45,000
7,000		8,000	116,000	76,000	36,000	10,300		12,000	155,000	106,000	45,000
7,100		8,000	116,000	76,000	36,000	10,320	13/32	12,000	155,000	106,000	45,000
7,140	9/32	8,000	116,000	76,000	36,000	10,400		12,000	155,000	106,000	45,000



## TS-Drills con refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
10,500		12,000	155,000	106,000	45,000	14,000		14,000	182,000	133,000	45,000
10,600		12,000	155,000	106,000	45,000	14,100		16,000	204,000	152,000	48,000
10,700		12,000	155,000	106,000	45,000	14,200		16,000	204,000	152,000	48,000
10,720	27/64	12,000	155,000	106,000	45,000	14,290	9/16	16,000	204,000	152,000	48,000
10,800		12,000	155,000	106,000	45,000	14,300		16,000	204,000	152,000	48,000
10,900		12,000	155,000	106,000	45,000	14,400		16,000	204,000	152,000	48,000
11,000		12,000	155,000	106,000	45,000	14,500		16,000	204,000	152,000	48,000
11,100		12,000	163,000	114,000	45,000	14,600		16,000	204,000	152,000	48,000
11,110	7/16	12,000	163,000	114,000	45,000	14,700		16,000	204,000	152,000	48,000
11,200		12,000	163,000	114,000	45,000	14,900		16,000	204,000	152,000	48,000
11,300		12,000	163,000	114,000	45,000	15,000		16,000	204,000	152,000	48,000
11,400		12,000	163,000	114,000	45,000	15,100		16,000	204,000	152,000	48,000
11,500		12,000	163,000	114,000	45,000	15,200		16,000	204,000	152,000	48,000
11,600		12,000	163,000	114,000	45,000	15,300		16,000	204,000	152,000	48,000
11,700		12,000	163,000	114,000	45,000	15,400		16,000	204,000	152,000	48,000
11,800		12,000	163,000	114,000	45,000	15,500		16,000	204,000	152,000	48,000
11,900		12,000	163,000	114,000	45,000	15,600		16,000	204,000	152,000	48,000
11,910	15/32	12,000	163,000	114,000	45,000	15,700		16,000	204,000	152,000	48,000
12,000		12,000	163,000	114,000	45,000	15,800		16,000	204,000	152,000	48,000
12,100		14,000	182,000	133,000	45,000	15,870	5/8	16,000	204,000	152,000	48,000
12,200		14,000	182,000	133,000	45,000	15,900		16,000	204,000	152,000	48,000
12,300	31/64	14,000	182,000	133,000	45,000	16,000		16,000	204,000	152,000	48,000
12,400		14,000	182,000	133,000	45,000	16,500		18,000	223,000	171,000	48,000
12,500		14,000	182,000	133,000	45,000	16,670	21/32	18,000	223,000	171,000	48,000
12,600		14,000	182,000	133,000	45,000	17,000		18,000	223,000	171,000	48,000
12,700	1/2	14,000	182,000	133,000	45,000	17,500		18,000	223,000	171,000	48,000
12,800		14,000	182,000	133,000	45,000	18,000		18,000	223,000	171,000	48,000
12,900		14,000	182,000	133,000	45,000	18,500		20,000	244,000	190,000	50,000
13,000		14,000	182,000	133,000	45,000	19,000		20,000	244,000	190,000	50,000
13,100	33/64	14,000	182,000	133,000	45,000	19,500		20,000	244,000	190,000	50,000
13,300		14,000	182,000	133,000	45,000	20,000		20,000	244,000	190,000	50,000
13,400		14,000	182,000	133,000	45,000						
13,500		14,000	182,000	133,000	45,000						
13,700		14,000	182,000	133,000	45,000						
13,800		14,000	182,000	133,000	45,000						
13,900		14,000	182,000	133,000	45,000						

TS 100 R | TS 150 GG

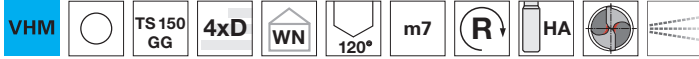


## TS-Drills con refrigerazione interna

Articolo n. 89292



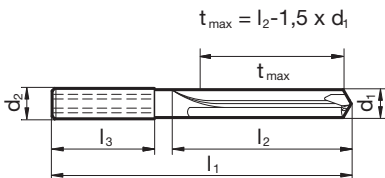
P	M	K	N	S	H
		•	○		



Assott. del nocc.  $\geq \varnothing 3,000$  • affilatura su piani • strette tolleranze sul diametro • ottima finitura di superf. del foro • attenzione alla press. del refriger.

ghisa grigia, ghisa malleabile, ghisa sferoidale

TS 100 R | TS 150 GG



d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	24,000	36,000	8,300		10,000	103,000	61,000	40,000
3,100		6,000	66,000	24,000	36,000	8,400		10,000	103,000	61,000	40,000
3,200		6,000	66,000	24,000	36,000	8,500		10,000	103,000	61,000	40,000
3,300		6,000	66,000	24,000	36,000	8,700		10,000	103,000	61,000	40,000
3,400		6,000	66,000	24,000	36,000	9,000		10,000	103,000	61,000	40,000
3,500		6,000	66,000	24,000	36,000	9,400		10,000	103,000	61,000	40,000
3,600		6,000	66,000	24,000	36,000	10,000		10,000	103,000	61,000	40,000
3,700		6,000	66,000	24,000	36,000	10,200		12,000	118,000	71,000	45,000
3,800		6,000	74,000	30,000	36,000	10,500		12,000	118,000	71,000	45,000
3,900		6,000	74,000	30,000	36,000	11,000		12,000	118,000	71,000	45,000
4,000		6,000	74,000	30,000	36,000	11,500		12,000	118,000	71,000	45,000
4,200		6,000	74,000	30,000	36,000	12,000		12,000	118,000	71,000	45,000
5,000		6,000	74,000	36,000	36,000	12,300	31/64	14,000	124,000	74,000	45,000
5,100		6,000	74,000	36,000	36,000	12,500		14,000	124,000	74,000	45,000
5,300		6,000	74,000	36,000	36,000	12,700	1/2	14,000	124,000	74,000	45,000
5,400		6,000	74,000	36,000	36,000	13,000		14,000	124,000	74,000	45,000
5,900		6,000	74,000	36,000	36,000	14,000		14,000	124,000	74,000	45,000
6,000		6,000	74,000	36,000	36,000	15,000		16,000	133,000	83,000	48,000
6,200		8,000	91,000	53,000	36,000	16,000		16,000	133,000	83,000	48,000
6,300		8,000	91,000	53,000	36,000	16,500		18,000	143,000	93,000	48,000
6,400		8,000	91,000	53,000	36,000	17,000		18,000	143,000	93,000	48,000
6,600		8,000	91,000	53,000	36,000	17,500		18,000	143,000	93,000	48,000
6,700		8,000	91,000	53,000	36,000	18,000		18,000	143,000	93,000	48,000
6,800		8,000	91,000	53,000	36,000	19,000		20,000	153,000	101,000	50,000
7,000		8,000	91,000	53,000	36,000	20,000		20,000	153,000	101,000	50,000
7,400		8,000	91,000	53,000	36,000						
7,500		8,000	91,000	53,000	36,000						
8,000		8,000	91,000	53,000	36,000						
8,100		10,000	103,000	61,000	40,000						
8,200		10,000	103,000	61,000	40,000						

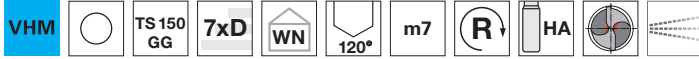


## TS-Drills con refrigerazione interna

Articolo n. 89294

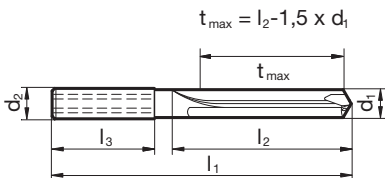


P	M	K	N	S	H
		•	○		



Assott. del nocch.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • strette tolleranze sul diametro • ottima finitura di superf. del foro • attenzione alla press. ottimale del refrig.

ghisa grigia, ghisa malleabile, ghisa sferoidale



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	74,000	32,000	36,000	9,500		10,000	139,000	95,000	40,000
3,100		6,000	74,000	32,000	36,000	10,000		10,000	139,000	95,000	40,000
3,200		6,000	74,000	32,000	36,000	10,200		12,000	163,000	114,000	45,000
3,300		6,000	74,000	32,000	36,000	10,500		12,000	163,000	114,000	45,000
3,400		6,000	74,000	34,000	36,000	11,000		12,000	163,000	114,000	45,000
3,500		6,000	74,000	34,000	36,000	11,500		12,000	163,000	114,000	45,000
3,600		6,000	74,000	34,000	36,000	12,000		12,000	163,000	114,000	45,000
3,700		6,000	74,000	34,000	36,000	12,300	31/64	14,000	182,000	133,000	45,000
3,800		6,000	97,000	45,000	36,000	12,500		14,000	182,000	133,000	45,000
3,900		6,000	97,000	45,000	36,000	12,700	1/2	14,000	182,000	133,000	45,000
4,000		6,000	97,000	45,000	36,000	13,000		14,000	182,000	133,000	45,000
4,100		6,000	97,000	45,000	36,000	13,500		14,000	182,000	133,000	45,000
4,200		6,000	97,000	45,000	36,000	14,000		14,000	182,000	133,000	45,000
4,300		6,000	97,000	45,000	36,000	14,500		16,000	204,000	152,000	48,000
4,400		6,000	97,000	45,000	36,000	15,000		16,000	204,000	152,000	48,000
4,500		6,000	97,000	45,000	36,000	15,500		16,000	204,000	152,000	48,000
4,700		6,000	97,000	45,000	36,000	16,000		16,000	204,000	152,000	48,000
4,800		6,000	97,000	57,000	36,000	16,500		18,000	223,000	171,000	48,000
4,900		6,000	97,000	57,000	36,000	17,000		18,000	223,000	171,000	48,000
5,000		6,000	97,000	57,000	36,000	17,500		18,000	223,000	171,000	48,000
5,500		6,000	97,000	57,000	36,000	18,000		18,000	223,000	171,000	48,000
6,000		6,000	97,000	57,000	36,000	18,500		20,000	244,000	190,000	50,000
6,500		8,000	116,000	76,000	36,000	19,000		20,000	244,000	190,000	50,000
6,800		8,000	116,000	76,000	36,000	19,500		20,000	244,000	190,000	50,000
7,000		8,000	116,000	76,000	36,000	20,000		20,000	244,000	190,000	50,000
7,500		8,000	116,000	76,000	36,000						
7,800		8,000	116,000	76,000	36,000						
8,000		8,000	116,000	76,000	36,000						
8,500		10,000	139,000	95,000	40,000						
9,000		10,000	139,000	95,000	40,000						

TS 100 R | TS 150 GG

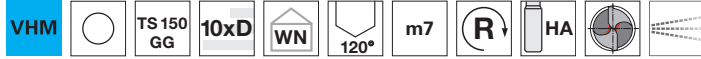


## TS-Drills con refrigerazione interna

Articolo n. 89293



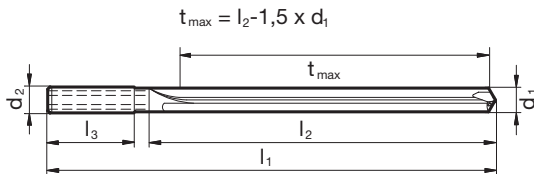
P	M	K	N	S	H
		•	○		



Assott. del nocc.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • strette tolleranze sul diametro • ottima finitura di superf. del foro • attenzione alla press. ottimale del refrig.

ghisa grigia, ghisa malleabile, ghisa sferoidale

TS 100 R | TS 150 GG



d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	91,000	42,000	36,000	9,000		10,000	175,000	130,000	40,000
3,100		6,000	91,000	42,000	36,000	9,500		10,000	175,000	130,000	40,000
3,170	1/8	6,000	91,000	42,000	36,000	9,520	3/8	10,000	175,000	130,000	40,000
3,200		6,000	91,000	42,000	36,000	10,000		10,000	175,000	130,000	40,000
3,250		6,000	91,000	42,000	36,000	10,200		12,000	209,000	159,000	45,000
3,300		6,000	91,000	42,000	36,000	10,500		12,000	209,000	159,000	45,000
3,500		6,000	91,000	48,000	36,000	10,720	27/64	12,000	209,000	159,000	45,000
3,570	9/64	6,000	91,000	48,000	36,000	11,000		12,000	209,000	159,000	45,000
3,600		6,000	91,000	48,000	36,000	11,500		12,000	209,000	159,000	45,000
3,700		6,000	91,000	48,000	36,000	12,000		12,000	209,000	159,000	45,000
3,800		6,000	121,000	77,000	36,000	12,500		14,000	233,000	183,000	45,000
3,900		6,000	121,000	77,000	36,000	12,700	1/2	14,000	233,000	183,000	45,000
3,970	5/32	6,000	121,000	77,000	36,000	13,000		14,000	233,000	183,000	45,000
4,000		6,000	121,000	77,000	36,000	13,500		14,000	233,000	183,000	45,000
4,200		6,000	121,000	77,000	36,000	14,000		14,000	233,000	183,000	45,000
4,400		6,000	121,000	77,000	36,000	14,500		16,000	260,000	207,000	48,000
4,500		6,000	121,000	77,000	36,000	15,000		16,000	260,000	207,000	48,000
5,000		6,000	121,000	82,000	36,000	15,500		16,000	260,000	207,000	48,000
5,500		6,000	121,000	82,000	36,000	16,000		16,000	260,000	207,000	48,000
6,000		6,000	121,000	82,000	36,000	17,500		18,000	284,000	231,000	48,000
6,350	1/4	8,000	146,000	106,000	36,000	18,000		18,000	284,000	231,000	48,000
6,500		8,000	146,000	106,000	36,000	20,000		20,000	308,000	255,000	50,000
6,800		8,000	146,000	106,000	36,000						
7,000		8,000	146,000	106,000	36,000						
7,140	9/32	8,000	146,000	106,000	36,000						
7,500		8,000	146,000	106,000	36,000						
7,800		8,000	146,000	106,000	36,000						
8,000		8,000	146,000	106,000	36,000						
8,500		10,000	175,000	130,000	40,000						
8,730	11/32	10,000	175,000	130,000	40,000						



## ESEMPIO DI APPLICAZIONE ALLOGGIAMENTO

Tipo utensile	TS 100 R
Articolo n.	89420
Diametro	17 mm
Profondità foratura	50 mm
Materiale	EN-GJS-400-15
Raffreddamento	RI 20 bar
Lubrificante	Emulsione
Macchina	Centro di lavorazione
$v_c$	160 m/min
f	0,6 mm/U
Durata utile	305 m

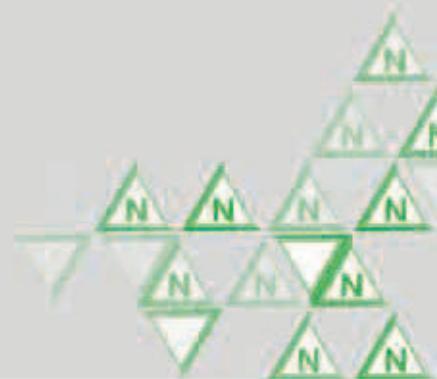




## TS 100 ALU

### ▼ VANTAGGI E PROPRIETÀ

- ▼ **Evacuazione affidabile dei trucioli e resa di taglio perfetta**, soprattutto in leghe di alluminio, rame, ottone e bronzo e in plastiche
- ▼ **Gestione del truciolo ottimale** sull'intera gamma di materiali, da leghe non ferrose tenere e tenaci fino a leghe di alluminio pressofuso o di ottone malleabile
- ▼ **Ridotte temperature di processo**, che impediscono la formazione di taglianti di riporto durante la lavorazione di metalli non ferrosi



# ALLUMINIO, RAME, OTTONE E LEGHE DI BRONZO, MATERIE PLASTICHE

Bordi di taglio affilati, sottoposti a microtrattamento, per una resa perfetta anche in leghe AISi termotrattate

Geometria di affilatura aperta e forma concava del bordo di taglio, per un'eccellente gestione del truciolo

Con elevate qualità di finitura superficiale in corrispondenza del nocciolo, affilatura frontale e taglienti

Versione lucida per la migliore evacuazione dei trucioli

Tipo speciale di metallo duro per la lavorazione di metalli non ferrosi

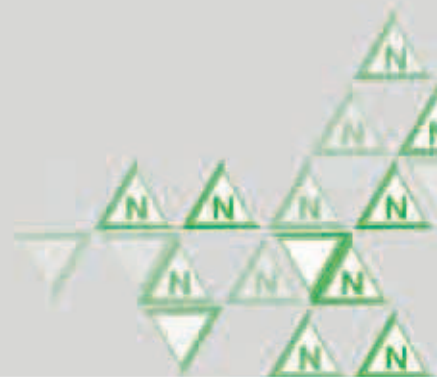




## TS 150 GG

### ▼ VANTAGGI E PROPRIETÀ

- ▼ **Potente punta in carburo di silicio** con canali di refrigerazione per la lavorazione **di materiali a truciolo corto**, come leghe di alluminio con elevato tenore di silicio
- ▼ Per produrre **fori con precisione di allineamento molto alta**
- ▼ Forare con **alti volumi di evacuazione del truciolo**
- ▼ Su richiesta **disponibile anche in versione rivestita**



# ALLUMINIO, RAME, OTTONE E LEGHE DI BRONZO

**Geometria di taglio speciale,** adattata alla lavorazione redditizia di quasi tutte le leghe di alluminio e alluminio pressofuso

**Affilatura speciale** per un centraggio preciso e una ridotta deviazione di linearità

**Versione lucida** per un'ottimale evacuazione dei trucioli

**Quattro smussi di guida** assicurano la linearità e concentricità del foro

TS 100 ALU | TS 150 GG

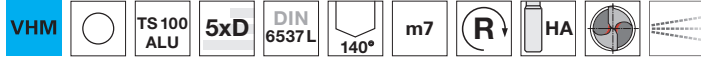


## TS-Drills con refrigerazione interna

Articolo n. 89560

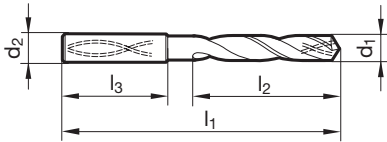


P	M	K	N	S	H
			•		



Assott. del nocch.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • tagliente principale forma concava • geometria dei taglienti ottimizzata  
alluminio e leghe di alluminio • rame, ottone e leghe di bronzo • plastica

TS 100 ALU | TS 150 GG



d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,250		6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,600		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,700		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000



## TS-Drills con refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9,340		10,000	103,000	61,000	40,000	13,300		14,000	124,000	77,000	45,000
9,400		10,000	103,000	61,000	40,000	13,400		14,000	124,000	77,000	45,000
9,500		10,000	103,000	61,000	40,000	13,500		14,000	124,000	77,000	45,000
9,520	3/8	10,000	103,000	61,000	40,000	13,700		14,000	124,000	77,000	45,000
9,600		10,000	103,000	61,000	40,000	13,800		14,000	124,000	77,000	45,000
9,700		10,000	103,000	61,000	40,000	14,000		14,000	124,000	77,000	45,000
9,800		10,000	103,000	61,000	40,000	14,100		16,000	133,000	83,000	48,000
9,900		10,000	103,000	61,000	40,000	14,200		16,000	133,000	83,000	48,000
9,920	25/64	10,000	103,000	61,000	40,000	14,290	9/16	16,000	133,000	83,000	48,000
10,000		10,000	103,000	61,000	40,000	14,300		16,000	133,000	83,000	48,000
10,100		12,000	118,000	71,000	45,000	14,400		16,000	133,000	83,000	48,000
10,200		12,000	118,000	71,000	45,000	14,500		16,000	133,000	83,000	48,000
10,300		12,000	118,000	71,000	45,000	14,700		16,000	133,000	83,000	48,000
10,320	13/32	12,000	118,000	71,000	45,000	14,800		16,000	133,000	83,000	48,000
10,400		12,000	118,000	71,000	45,000	15,000		16,000	133,000	83,000	48,000
10,500		12,000	118,000	71,000	45,000	15,100		16,000	133,000	83,000	48,000
10,600		12,000	118,000	71,000	45,000	15,200		16,000	133,000	83,000	48,000
10,700		12,000	118,000	71,000	45,000	15,300		16,000	133,000	83,000	48,000
10,800		12,000	118,000	71,000	45,000	15,500		16,000	133,000	83,000	48,000
10,900		12,000	118,000	71,000	45,000	15,700		16,000	133,000	83,000	48,000
11,000		12,000	118,000	71,000	45,000	15,800		16,000	133,000	83,000	48,000
11,100		12,000	118,000	71,000	45,000	16,000		16,000	133,000	83,000	48,000
11,110	7/16	12,000	118,000	71,000	45,000	16,500		18,000	143,000	93,000	48,000
11,200		12,000	118,000	71,000	45,000	16,700		18,000	143,000	93,000	48,000
11,300		12,000	118,000	71,000	45,000	16,900		18,000	143,000	93,000	48,000
11,400		12,000	118,000	71,000	45,000	17,000		18,000	143,000	93,000	48,000
11,500		12,000	118,000	71,000	45,000	17,500		18,000	143,000	93,000	48,000
11,600		12,000	118,000	71,000	45,000	17,700		18,000	143,000	93,000	48,000
11,700		12,000	118,000	71,000	45,000	18,000		18,000	143,000	93,000	48,000
11,800		12,000	118,000	71,000	45,000	18,500		20,000	153,000	101,000	50,000
11,900		12,000	118,000	71,000	45,000	18,900		20,000	153,000	101,000	50,000
11,910	15/32	12,000	118,000	71,000	45,000	19,000		20,000	153,000	101,000	50,000
12,000		12,000	118,000	71,000	45,000	19,050	3/4	20,000	153,000	101,000	50,000
12,100		14,000	124,000	77,000	45,000	19,300		20,000	153,000	101,000	50,000
12,200		14,000	124,000	77,000	45,000	19,500		20,000	153,000	101,000	50,000
12,500		14,000	124,000	77,000	45,000	20,000		20,000	153,000	101,000	50,000
12,600		14,000	124,000	77,000	45,000						
12,700	1/2	14,000	124,000	77,000	45,000						
12,800		14,000	124,000	77,000	45,000						
12,900		14,000	124,000	77,000	45,000						
13,000		14,000	124,000	77,000	45,000						
13,100	33/64	14,000	124,000	77,000	45,000						

TS 100 ALU | TS 150 GG

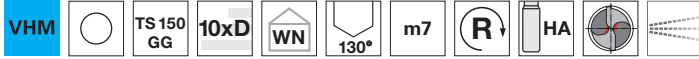


## TS-Drills con refrigerazione interna

Articolo n. 89295

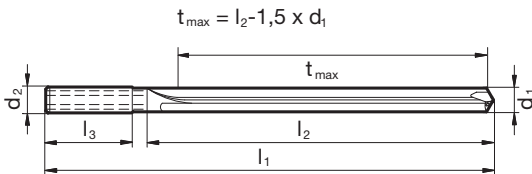


P	M	K	N	S	H
		○	●		



Assott. del nocc.  $\geq \varnothing 3,000$  • affilatura su piani • strette tolleranze sul diametro • ottima finitura di superf. del foro • attenzione alla press. ottimale del refriger.

ghisa grigia, ghisa malleabile, ghisa sferoidale



d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	91,000	42,000	36,000	8,500		10,000	175,000	130,000	40,000
3,100		6,000	91,000	42,000	36,000	8,730	11/32	10,000	175,000	130,000	40,000
3,300		6,000	91,000	42,000	36,000	9,000		10,000	175,000	130,000	40,000
3,500		6,000	91,000	48,000	36,000	9,130	23/64	10,000	175,000	130,000	40,000
3,600		6,000	91,000	48,000	36,000	9,500		10,000	175,000	130,000	40,000
3,800		6,000	121,000	77,000	36,000	9,520	3/8	10,000	175,000	130,000	40,000
4,000		6,000	121,000	77,000	36,000	10,000		10,000	175,000	130,000	40,000
4,400		6,000	121,000	77,000	36,000	10,320	13/32	12,000	209,000	159,000	45,000
4,700		6,000	121,000	77,000	36,000	10,500		12,000	209,000	159,000	45,000
4,800		6,000	121,000	82,000	36,000	11,000		12,000	209,000	159,000	45,000
4,900		6,000	121,000	82,000	36,000	11,110	7/16	12,000	209,000	159,000	45,000
5,000		6,000	121,000	82,000	36,000	11,510	29/64	12,000	209,000	159,000	45,000
5,500		6,000	121,000	82,000	36,000	12,000		12,000	209,000	159,000	45,000
6,000		6,000	121,000	82,000	36,000	12,300	31/64	14,000	233,000	183,000	45,000
6,350	1/4	8,000	146,000	106,000	36,000	12,700	1/2	14,000	233,000	183,000	45,000
6,500		8,000	146,000	106,000	36,000	13,000		14,000	233,000	183,000	45,000
6,800		8,000	146,000	106,000	36,000	14,000		14,000	233,000	183,000	45,000
7,000		8,000	146,000	106,000	36,000	15,000		16,000	260,000	207,000	48,000
7,140	9/32	8,000	146,000	106,000	36,000	15,500		16,000	260,000	207,000	48,000
7,500		8,000	146,000	106,000	36,000	16,000		16,000	260,000	207,000	48,000
7,800		8,000	146,000	106,000	36,000	17,500		18,000	284,000	231,000	48,000
7,940	5/16	8,000	146,000	106,000	36,000	18,000		18,000	284,000	231,000	48,000
8,000		8,000	146,000	106,000	36,000	18,500		20,000	308,000	255,000	50,000
8,330	21/64	10,000	175,000	130,000	40,000	19,500		20,000	308,000	255,000	50,000

TS 100 ALU | TS 150 GG





## ESEMPIO DI APPLICAZIONE ALLOGGIAMENTO

Tipo utensile	TS 100 ALU
Articolo n.	89560
Diametro	10 mm
Profondità foratura	50 mm
Materiale	G-AISI9Mg
Raffreddamento	RI 60 bar
Lubrificante	Emulsione
Macchina	Centro di lavorazione
$v_c$	310 m/min
f	0,5 mm/U
Durata utile	80 m





## TS 100 H

### ▼ VANTAGGI E PROPRIETÀ

- ▼ Grazie innovativa geometria di taglio e al **rivestimento TiAlSiN** estremamente duro, è possibile lavorare con **precisione ed efficienza** materiali ad alta resistenza e leghe speciali
- ▼ **Soluzione ideale** per applicazione anche **nell'industria automobilistica, nella tecnica aeronautica e aerospaziale**, nella **costruzione di impianti** per la **produzione di energia** e nell'**industria chimica**



# ACCIAI LEGATI E NON LEGATI AD ALTA RESISTENZA, ACCIAI TEMPRATI, ACCIAI TEMPRATI, LEGHE SPECIALI E LEGHE DI TITANIO

Lo **smusso negativo** protegge i bordi di taglio e assicura un'eccellente qualità della superficie del componente

**Quattro smussi di guida** assicurano la massima qualità del foro e riducono al minimo l'usura dei bordi di taglio

**Profilo della scanalatura speciale**, per un'evacuazione perfetta dei trucioli anche in materiali a truciolo lungo

Il nuovo **rivestimento in TiAlSiN** sviluppato da noi è uno dei rivestimenti nitridici più duri esistenti sul mercato. Grazie alla sua struttura nanocomposita con strati in TiAlN e SiN, arriva a una **durezza estrema di 5500 HV**

**Taglienti robusti** e gestione ottimale del truciolo, grazie alla rettifica **della superficie conica**, con **taglienti concavi** e **geometria di affilatura speciale**

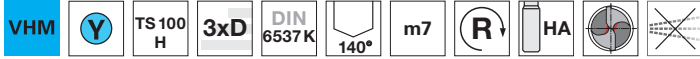


## TS-Drills senza refrigerazione interna

Articolo n. 89422

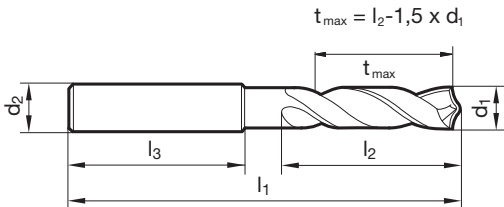


P	M	K	N	S	H
•				•	○



Assott. del nocc.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • il tagliente principale è leggermente concavo • geometria dei taglienti ottimizzata

per acciai legati e altamente legati fino a 1400 N/mm<sup>2</sup> • Inconel, Hastelloy, Monel • Titanio e leghe di titanio



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000

TS 100 H



## TS-Drills senza refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9,400		10,000	89,000	47,000	40,000	13,000		14,000	107,000	60,000	45,000
9,500		10,000	89,000	47,000	40,000	13,300		14,000	107,000	60,000	45,000
9,520	3/8	10,000	89,000	47,000	40,000	13,500		14,000	107,000	60,000	45,000
9,600		10,000	89,000	47,000	40,000	13,700		14,000	107,000	60,000	45,000
9,700		10,000	89,000	47,000	40,000	14,000		14,000	107,000	60,000	45,000
9,800		10,000	89,000	47,000	40,000	14,200		16,000	115,000	65,000	48,000
9,900		10,000	89,000	47,000	40,000	14,290	9/16	16,000	115,000	65,000	48,000
9,920	25/64	10,000	89,000	47,000	40,000	14,300		16,000	115,000	65,000	48,000
10,000		10,000	89,000	47,000	40,000	14,500		16,000	115,000	65,000	48,000
10,100		12,000	102,000	55,000	45,000	14,700		16,000	115,000	65,000	48,000
10,200		12,000	102,000	55,000	45,000	15,000		16,000	115,000	65,000	48,000
10,300		12,000	102,000	55,000	45,000	15,200		16,000	115,000	65,000	48,000
10,320	13/32	12,000	102,000	55,000	45,000	15,300		16,000	115,000	65,000	48,000
10,400		12,000	102,000	55,000	45,000	15,500		16,000	115,000	65,000	48,000
10,500		12,000	102,000	55,000	45,000	15,700		16,000	115,000	65,000	48,000
10,600		12,000	102,000	55,000	45,000	16,000		16,000	115,000	65,000	48,000
10,700		12,000	102,000	55,000	45,000	16,300		18,000	123,000	73,000	48,000
10,800		12,000	102,000	55,000	45,000	16,500		18,000	123,000	73,000	48,000
10,900		12,000	102,000	55,000	45,000	16,900		18,000	123,000	73,000	48,000
11,000		12,000	102,000	55,000	45,000	17,000		18,000	123,000	73,000	48,000
11,100		12,000	102,000	55,000	45,000	17,300		18,000	123,000	73,000	48,000
11,110	7/16	12,000	102,000	55,000	45,000	17,500		18,000	123,000	73,000	48,000
11,200		12,000	102,000	55,000	45,000	18,000		18,000	123,000	73,000	48,000
11,300		12,000	102,000	55,000	45,000	18,500		20,000	131,000	79,000	50,000
11,400		12,000	102,000	55,000	45,000	18,900		20,000	131,000	79,000	50,000
11,500		12,000	102,000	55,000	45,000	19,000		20,000	131,000	79,000	50,000
11,600		12,000	102,000	55,000	45,000	19,050	3/4	20,000	131,000	79,000	50,000
11,700		12,000	102,000	55,000	45,000	19,300		20,000	131,000	79,000	50,000
11,800		12,000	102,000	55,000	45,000	19,500		20,000	131,000	79,000	50,000
11,900		12,000	102,000	55,000	45,000	20,000		20,000	131,000	79,000	50,000
11,910	15/32	12,000	102,000	55,000	45,000						
12,000		12,000	102,000	55,000	45,000						
12,200		14,000	107,000	60,000	45,000						
12,500		14,000	107,000	60,000	45,000						
12,700	1/2	14,000	107,000	60,000	45,000						
12,800		14,000	107,000	60,000	45,000						

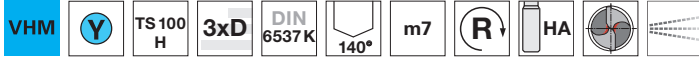


## TS-Drills con refrigerazione interna

### Articolo n. 89423



P	M	K	N	S	H
•				•	○



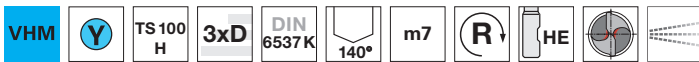
Assott. del nocc.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • il tagliente principale è leggermente concavo • geometria dei taglienti ottimizzata

per acciai legati e altamente legati fino a 1400 N/mm<sup>2</sup> • Inconel, Hastelloy, Monel • Titanio e leghe di titanio

### Articolo n. 89424

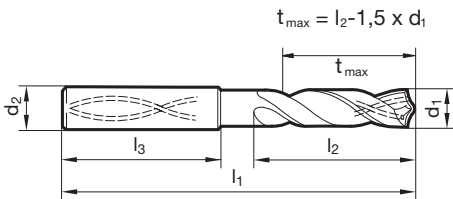


P	M	K	N	S	H
•				•	○



Assott. del nocc.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • il tagliente principale è leggermente concavo • geometria dei taglienti ottimizzata

per acciai legati e altamente legati fino a 1400 N/mm<sup>2</sup> • Inconel, Hastelloy, Monel • Titanio e leghe di titanio



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	5,200		6,000	66,000	28,000	36,000
3,100		6,000	62,000	20,000	36,000	5,300		6,000	66,000	28,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	5,400		6,000	66,000	28,000	36,000
3,200		6,000	62,000	20,000	36,000	5,500		6,000	66,000	28,000	36,000
3,250		6,000	62,000	20,000	36,000	5,550		6,000	66,000	28,000	36,000
3,300		6,000	62,000	20,000	36,000	5,560	7/32	6,000	66,000	28,000	36,000
3,400		6,000	62,000	20,000	36,000	5,600		6,000	66,000	28,000	36,000
3,500		6,000	62,000	20,000	36,000	5,700		6,000	66,000	28,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	5,800		6,000	66,000	28,000	36,000
3,600		6,000	62,000	20,000	36,000	5,900		6,000	66,000	28,000	36,000
3,700		6,000	62,000	20,000	36,000	5,950	15/64	6,000	66,000	28,000	36,000
3,800		6,000	66,000	24,000	36,000	6,000		6,000	66,000	28,000	36,000
3,900		6,000	66,000	24,000	36,000	6,100		8,000	79,000	34,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	6,200		8,000	79,000	34,000	36,000
4,000		6,000	66,000	24,000	36,000	6,300		8,000	79,000	34,000	36,000
4,100		6,000	66,000	24,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
4,200		6,000	66,000	24,000	36,000	6,400		8,000	79,000	34,000	36,000
4,300		6,000	66,000	24,000	36,000	6,500		8,000	79,000	34,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	6,600		8,000	79,000	34,000	36,000
4,400		6,000	66,000	24,000	36,000	6,700		8,000	79,000	34,000	36,000
4,500		6,000	66,000	24,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
4,600		6,000	66,000	24,000	36,000	6,800		8,000	79,000	34,000	36,000
4,650		6,000	66,000	24,000	36,000	6,900		8,000	79,000	34,000	36,000
4,700		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	7,100		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,900		6,000	66,000	28,000	36,000	7,200		8,000	79,000	41,000	36,000
5,000		6,000	66,000	28,000	36,000	7,300		8,000	79,000	41,000	36,000
5,100		6,000	66,000	28,000	36,000	7,400		8,000	79,000	41,000	36,000
5,160	13/64	6,000	66,000	28,000	36,000	7,500		8,000	79,000	41,000	36,000



## TS-Drills con refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	79,000	41,000	36,000	11,400		12,000	102,000	55,000	45,000
7,600		8,000	79,000	41,000	36,000	11,500		12,000	102,000	55,000	45,000
7,700		8,000	79,000	41,000	36,000	11,600		12,000	102,000	55,000	45,000
7,800		8,000	79,000	41,000	36,000	11,700		12,000	102,000	55,000	45,000
7,900		8,000	79,000	41,000	36,000	11,800		12,000	102,000	55,000	45,000
7,940	5/16	8,000	79,000	41,000	36,000	11,900		12,000	102,000	55,000	45,000
8,000		8,000	79,000	41,000	36,000	11,910	15/32	12,000	102,000	55,000	45,000
8,100		10,000	89,000	47,000	40,000	12,000		12,000	102,000	55,000	45,000
8,200		10,000	89,000	47,000	40,000	12,200		14,000	107,000	60,000	45,000
8,300		10,000	89,000	47,000	40,000	12,500		14,000	107,000	60,000	45,000
8,330	21/64	10,000	89,000	47,000	40,000	12,700	1/2	14,000	107,000	60,000	45,000
8,400		10,000	89,000	47,000	40,000	12,800		14,000	107,000	60,000	45,000
8,500		10,000	89,000	47,000	40,000	13,000		14,000	107,000	60,000	45,000
8,600		10,000	89,000	47,000	40,000	13,300		14,000	107,000	60,000	45,000
8,700		10,000	89,000	47,000	40,000	13,500		14,000	107,000	60,000	45,000
8,730	11/32	10,000	89,000	47,000	40,000	13,700		14,000	107,000	60,000	45,000
8,800		10,000	89,000	47,000	40,000	14,000		14,000	107,000	60,000	45,000
8,900		10,000	89,000	47,000	40,000	14,200		16,000	115,000	65,000	48,000
9,000		10,000	89,000	47,000	40,000	14,290	9/16	16,000	115,000	65,000	48,000
9,100		10,000	89,000	47,000	40,000	14,300		16,000	115,000	65,000	48,000
9,130	23/64	10,000	89,000	47,000	40,000	14,500		16,000	115,000	65,000	48,000
9,200		10,000	89,000	47,000	40,000	14,700		16,000	115,000	65,000	48,000
9,250		10,000	89,000	47,000	40,000	15,000		16,000	115,000	65,000	48,000
9,300		10,000	89,000	47,000	40,000	15,200		16,000	115,000	65,000	48,000
9,400		10,000	89,000	47,000	40,000	15,300		16,000	115,000	65,000	48,000
9,500		10,000	89,000	47,000	40,000	15,500		16,000	115,000	65,000	48,000
9,520	3/8	10,000	89,000	47,000	40,000	15,700		16,000	115,000	65,000	48,000
9,600		10,000	89,000	47,000	40,000	16,000		16,000	115,000	65,000	48,000
9,700		10,000	89,000	47,000	40,000	16,300		18,000	123,000	73,000	48,000
9,800		10,000	89,000	47,000	40,000	16,500		18,000	123,000	73,000	48,000
9,900		10,000	89,000	47,000	40,000	16,900		18,000	123,000	73,000	48,000
9,920	25/64	10,000	89,000	47,000	40,000	17,000		18,000	123,000	73,000	48,000
10,000		10,000	89,000	47,000	40,000	17,300		18,000	123,000	73,000	48,000
10,100		12,000	102,000	55,000	45,000	17,500		18,000	123,000	73,000	48,000
10,200		12,000	102,000	55,000	45,000	18,000		18,000	123,000	73,000	48,000
10,300		12,000	102,000	55,000	45,000	18,500		20,000	131,000	79,000	50,000
10,320	13/32	12,000	102,000	55,000	45,000	18,900		20,000	131,000	79,000	50,000
10,400		12,000	102,000	55,000	45,000	19,000		20,000	131,000	79,000	50,000
10,500		12,000	102,000	55,000	45,000	19,050	3/4	20,000	131,000	79,000	50,000
10,600		12,000	102,000	55,000	45,000	19,300		20,000	131,000	79,000	50,000
10,700		12,000	102,000	55,000	45,000	19,500		20,000	131,000	79,000	50,000
10,800		12,000	102,000	55,000	45,000	20,000		20,000	131,000	79,000	50,000
10,900		12,000	102,000	55,000	45,000						
11,000		12,000	102,000	55,000	45,000						
11,100		12,000	102,000	55,000	45,000						
11,110	7/16	12,000	102,000	55,000	45,000						
11,200		12,000	102,000	55,000	45,000						
11,300		12,000	102,000	55,000	45,000						

TS 100 H

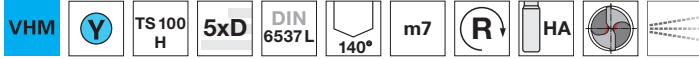


## TS-Drills con refrigerazione interna

### Articolo n. 89425



P	M	K	N	S	H
•				•	○



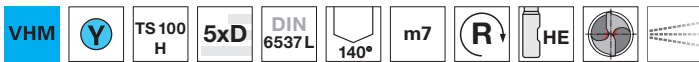
Assott. del nocc.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • il tagliente principale è leggermente concavo • geometria dei taglienti ottimizzata

per acciai legati e altamente legati fino a 1400 N/mm<sup>2</sup> • Inconel, Hastelloy, Monel • Titanio e leghe di titanio

### Articolo n. 89426

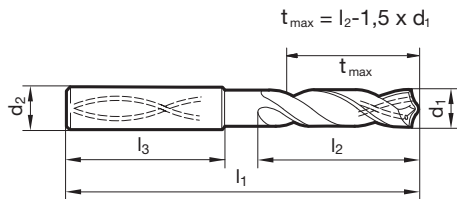


P	M	K	N	S	H
•				•	○



Assott. del nocc.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • il tagliente principale è leggermente concavo • geometria dei taglienti ottimizzata

per acciai legati e altamente legati fino a 1400 N/mm<sup>2</sup> • Inconel, Hastelloy, Monel • Titanio e leghe di titanio



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	5,200		6,000	82,000	44,000	36,000
3,100		6,000	66,000	28,000	36,000	5,300		6,000	82,000	44,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	5,400		6,000	82,000	44,000	36,000
3,200		6,000	66,000	28,000	36,000	5,500		6,000	82,000	44,000	36,000
3,250		6,000	66,000	28,000	36,000	5,550		6,000	82,000	44,000	36,000
3,300		6,000	66,000	28,000	36,000	5,560	7/32	6,000	82,000	44,000	36,000
3,400		6,000	66,000	28,000	36,000	5,600		6,000	82,000	44,000	36,000
3,500		6,000	66,000	28,000	36,000	5,700		6,000	82,000	44,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	5,800		6,000	82,000	44,000	36,000
3,600		6,000	66,000	28,000	36,000	5,900		6,000	82,000	44,000	36,000
3,700		6,000	66,000	28,000	36,000	5,950	15/64	6,000	82,000	44,000	36,000
3,800		6,000	74,000	36,000	36,000	6,000		6,000	82,000	44,000	36,000
3,900		6,000	74,000	36,000	36,000	6,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	6,200		8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	6,300		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	6,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	6,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	6,600		8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	6,700		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	6,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	6,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	7,100		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,900		6,000	82,000	44,000	36,000	7,200		8,000	91,000	53,000	36,000
5,000		6,000	82,000	44,000	36,000	7,300		8,000	91,000	53,000	36,000
5,100		6,000	82,000	44,000	36,000	7,400		8,000	91,000	53,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000	7,500		8,000	91,000	53,000	36,000

TS 100 H



## TS-Drills con refrigerazione interna

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	91,000	53,000	36,000	11,400		12,000	118,000	71,000	45,000
7,600		8,000	91,000	53,000	36,000	11,500		12,000	118,000	71,000	45,000
7,700		8,000	91,000	53,000	36,000	11,600		12,000	118,000	71,000	45,000
7,800		8,000	91,000	53,000	36,000	11,700		12,000	118,000	71,000	45,000
7,900		8,000	91,000	53,000	36,000	11,800		12,000	118,000	71,000	45,000
7,940	5/16	8,000	91,000	53,000	36,000	11,900		12,000	118,000	71,000	45,000
8,000		8,000	91,000	53,000	36,000	11,910	15/32	12,000	118,000	71,000	45,000
8,100		10,000	103,000	61,000	40,000	12,000		12,000	118,000	71,000	45,000
8,200		10,000	103,000	61,000	40,000	12,200		14,000	124,000	77,000	45,000
8,300		10,000	103,000	61,000	40,000	12,500		14,000	124,000	77,000	45,000
8,330	21/64	10,000	103,000	61,000	40,000	12,700	1/2	14,000	124,000	77,000	45,000
8,400		10,000	103,000	61,000	40,000	12,800		14,000	124,000	77,000	45,000
8,500		10,000	103,000	61,000	40,000	13,000		14,000	124,000	77,000	45,000
8,600		10,000	103,000	61,000	40,000	13,300		14,000	124,000	77,000	45,000
8,700		10,000	103,000	61,000	40,000	13,500		14,000	124,000	77,000	45,000
8,730	11/32	10,000	103,000	61,000	40,000	13,700		14,000	124,000	77,000	45,000
8,800		10,000	103,000	61,000	40,000	14,000		14,000	124,000	77,000	45,000
8,900		10,000	103,000	61,000	40,000	14,200		16,000	133,000	83,000	48,000
9,000		10,000	103,000	61,000	40,000	14,290	9/16	16,000	133,000	83,000	48,000
9,100		10,000	103,000	61,000	40,000	14,300		16,000	133,000	83,000	48,000
9,130	23/64	10,000	103,000	61,000	40,000	14,500		16,000	133,000	83,000	48,000
9,200		10,000	103,000	61,000	40,000	14,700		16,000	133,000	83,000	48,000
9,250		10,000	103,000	61,000	40,000	15,000		16,000	133,000	83,000	48,000
9,300		10,000	103,000	61,000	40,000	15,200		16,000	133,000	83,000	48,000
9,400		10,000	103,000	61,000	40,000	15,300		16,000	133,000	83,000	48,000
9,500		10,000	103,000	61,000	40,000	15,500		16,000	133,000	83,000	48,000
9,520	3/8	10,000	103,000	61,000	40,000	15,700		16,000	133,000	83,000	48,000
9,600		10,000	103,000	61,000	40,000	16,000		16,000	133,000	83,000	48,000
9,700		10,000	103,000	61,000	40,000	16,300		18,000	143,000	93,000	48,000
9,800		10,000	103,000	61,000	40,000	16,500		18,000	143,000	93,000	48,000
9,900		10,000	103,000	61,000	40,000	16,900		18,000	143,000	93,000	48,000
9,920	25/64	10,000	103,000	61,000	40,000	17,000		18,000	143,000	93,000	48,000
10,000		10,000	103,000	61,000	40,000	17,300		18,000	143,000	93,000	48,000
10,100		12,000	118,000	71,000	45,000	17,500		18,000	143,000	93,000	48,000
10,200		12,000	118,000	71,000	45,000	18,000		18,000	143,000	93,000	48,000
10,300		12,000	118,000	71,000	45,000	18,500		20,000	153,000	101,000	50,000
10,320	13/32	12,000	118,000	71,000	45,000	18,900		20,000	153,000	101,000	50,000
10,400		12,000	118,000	71,000	45,000	19,000		20,000	153,000	101,000	50,000
10,500		12,000	118,000	71,000	45,000	19,050	3/4	20,000	153,000	101,000	50,000
10,600		12,000	118,000	71,000	45,000	19,300		20,000	153,000	101,000	50,000
10,700		12,000	118,000	71,000	45,000	19,500		20,000	153,000	101,000	50,000
10,800		12,000	118,000	71,000	45,000	20,000		20,000	153,000	101,000	50,000
10,900		12,000	118,000	71,000	45,000						
11,000		12,000	118,000	71,000	45,000						
11,100		12,000	118,000	71,000	45,000						
11,110	7/16	12,000	118,000	71,000	45,000						
11,200		12,000	118,000	71,000	45,000						
11,300		12,000	118,000	71,000	45,000						

TS 100 H



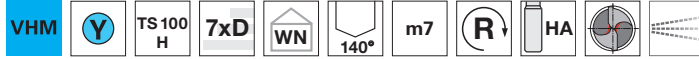


## TS-Drills con refrigerazione interna

Articolo n. 89427

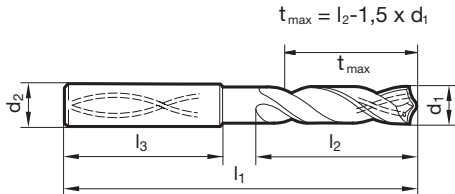


P	M	K	N	S	H
•				•	○



Assott. del nocc.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • il tagliente principale è leggermente concavo • geometria dei taglienti ottimizzata

per acciai legati e altamente legati fino a 1400 N/mm<sup>2</sup> • Inconel, Hastelloy, Monel • Titanio e leghe di titanio



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	70,000	30,000	36,000	9,250		10,000	139,000	95,000	40,000
3,250		6,000	70,000	30,000	36,000	9,400		10,000	139,000	95,000	40,000
3,300		6,000	70,000	30,000	36,000	9,500		10,000	139,000	95,000	40,000
3,400		6,000	75,000	35,500	36,000	10,000		10,000	139,000	95,000	40,000
3,500		6,000	75,000	35,500	36,000	10,200		12,000	155,000	106,000	45,000
3,700		6,000	75,000	35,500	36,000	10,400		12,000	155,000	106,000	45,000
4,000		6,000	75,000	37,500	36,000	10,500		12,000	155,000	106,000	45,000
4,200		6,000	75,000	37,500	36,000	10,800		12,000	155,000	106,000	45,000
4,300		6,000	85,000	45,000	36,000	11,000		12,000	155,000	106,000	45,000
4,500		6,000	85,000	45,000	36,000	11,300		12,000	163,000	114,000	45,000
4,650		6,000	85,000	45,000	36,000	11,400		12,000	163,000	114,000	45,000
5,000		6,000	90,000	50,000	36,000	11,500		12,000	163,000	114,000	45,000
5,100		6,000	90,000	50,000	36,000	12,000		12,000	163,000	114,000	45,000
5,200		6,000	90,000	50,000	36,000	12,500		14,000	182,000	133,000	45,000
5,500		6,000	97,000	57,000	36,000	13,000		14,000	182,000	133,000	45,000
5,550		6,000	97,000	57,000	36,000	13,100	33/64	14,000	182,000	133,000	45,000
6,000		6,000	97,000	57,000	36,000	13,500		14,000	182,000	133,000	45,000
6,500		8,000	106,000	66,000	36,000	14,000		14,000	182,000	133,000	45,000
6,750	17/64	8,000	106,000	66,000	36,000	14,500		16,000	204,000	152,000	48,000
6,800		8,000	106,000	66,000	36,000	15,000		16,000	204,000	152,000	48,000
6,900		8,000	116,000	76,000	36,000	15,100		16,000	204,000	152,000	48,000
7,000		8,000	116,000	76,000	36,000	15,500		16,000	204,000	152,000	48,000
7,400		8,000	116,000	76,000	36,000	16,000		16,000	204,000	152,000	48,000
7,500		8,000	116,000	76,000	36,000						
7,800		8,000	116,000	76,000	36,000						
8,000		8,000	116,000	76,000	36,000						
8,500		10,000	131,000	87,000	40,000						
8,600		10,000	131,000	87,000	40,000						
8,800		10,000	131,000	87,000	40,000						
9,000		10,000	131,000	87,000	40,000						

TS 100 H



## ESEMPIO DI APPLICAZIONE ALBERO A GOMITI

Tipo utensile	TS 100 H
Articolo n.	89425
Diametro	14 mm
Profondità foratura	65 mm
Materiale	42CrMoS4
Raffreddamento	RI 40 bar
Lubrificante	Emulsione
Macchina	Centro di lavorazione
$v_c$	105 m/min
f	0,35 mm/U
Durata utile	55 m

## MICROPUNTE IN MDI

### ▼ VANTAGGI E PROPRIETÀ

- ▼ Per fori di profondità fino a 4xD e 7xD si possono scegliere micropunte in carburo di silicio senza refrigerazione interna nella gamma di **diametri da 0,5 a 3,0 mm**
- ▼ Per fori **fino a 8xD e 15xD** si utilizzano micropunte in carburo di silicio **con refrigerazione interna** nella gamma di **diametri da 1,4 a 3,0 mm**
- ▼ Grazie alla **geometria ottimizzata dell'utensile**, con le micropunte in carburo di silicio di Hartner per fori di profondità fino a 15xD **non è necessario rimuovere i trucioli**



# LAVORAZIONE GENERALE DELL'ACCIAIO FINO A $\sim 1200 \text{ N/MM}^2$

▼ APPLICAZIONE UNIVERSALE

## Bordi di taglio concavi affilati

assicurano un'elevata sicurezza di processo, anche in applicazioni critiche

**Affilatura speciale** per un centraggio accurato e una alta precisione dimensionale

## Profilo della scanalatura

**ottimizzato** per elevata stabilità e buona evacuazione dei trucioli

La struttura monostrato **dello strato in TiAlN** è particolarmente idonea per il rivestimento di micro utensili e assicura elevata resistenza a usura e buona evacuazione dei trucioli

## La geometria degli

**utensili** è progettata per l'impiego universale in quasi tutti i materiali



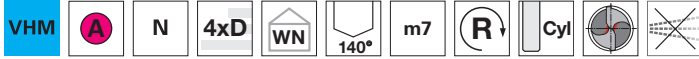


## Micropunte senza canali di refrigerazione

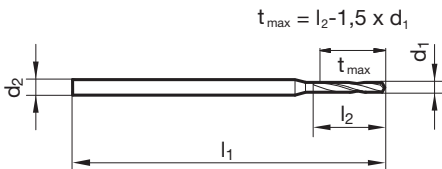
Articolo n. 86400



P	M	K	N	S	H
•	•	•	○	○	



Assott. del noc.  $\geq \varnothing 0,500$  • affilatura su piani • forma del tagliente principale diritta • fresatura dei taglienti ridotti  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm<sup>2</sup>  
 • acciai inossidabili • ghise



d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
0,500	3,000	47,000	3,000	1,950	3,000	52,000	11,700
0,550	3,000	47,000	3,300	1,980	4,000	59,000	12,000
0,600	3,000	47,000	3,600	2,000	4,000	59,000	12,000
0,650	3,000	47,000	3,900	2,050	4,000	59,000	12,300
0,700	3,000	47,000	4,200	2,100	4,000	59,000	12,600
0,750	3,000	47,000	4,500	2,150	4,000	59,000	12,900
0,800	3,000	47,000	4,800	2,200	4,000	59,000	13,200
0,850	3,000	47,000	5,100	2,250	4,000	59,000	13,500
0,900	3,000	47,000	5,400	2,300	4,000	59,000	13,800
0,950	3,000	47,000	5,700	2,350	4,000	59,000	14,100
1,000	3,000	47,000	6,000	2,380	4,000	59,000	14,400
1,050	3,000	47,000	6,300	2,400	4,000	59,000	14,400
1,100	3,000	47,000	6,600	2,450	4,000	59,000	14,700
1,150	3,000	47,000	6,900	2,500	4,000	59,000	15,000
1,200	3,000	47,000	7,200	2,550	4,000	59,000	15,300
1,250	3,000	47,000	7,500	2,600	4,000	59,000	15,600
1,300	3,000	47,000	7,800	2,650	4,000	59,000	15,900
1,350	3,000	47,000	8,100	2,700	4,000	59,000	16,200
1,400	3,000	47,000	8,400	2,750	4,000	59,000	16,500
1,450	3,000	47,000	8,700	2,780	4,000	59,000	16,800
1,500	3,000	47,000	9,000	2,800	4,000	59,000	16,800
1,550	3,000	47,000	9,300	2,850	4,000	59,000	17,100
1,590	3,000	47,000	9,600	2,900	4,000	59,000	17,400
1,600	3,000	47,000	9,600	2,950	4,000	59,000	17,700
1,650	3,000	47,000	9,900	3,000	4,000	59,000	18,000
1,700	3,000	47,000	10,200				
1,750	3,000	47,000	10,500				
1,800	3,000	52,000	10,800				
1,850	3,000	52,000	11,100				
1,900	3,000	52,000	11,400				

Micropunte in MDI

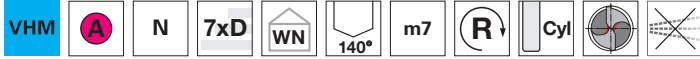


## Micropunte senza canali di refrigerazione

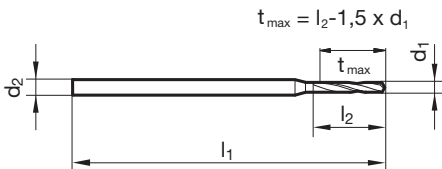
Articolo n. 86401



P	M	K	N	S	H
•	•	•	○	○	



Assott. del noc.  $\geq \varnothing 0,500$  • affilatura su piani • forma del tagliente principale diritta • fresatura dei taglienti ridotti  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm<sup>2</sup>  
 • acciai inossidabili • ghise



d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
0,500	3,000	47,000	4,000	1,950	3,000	52,000	17,600
0,550	3,000	47,000	4,400	1,980	4,000	63,000	18,000
0,600	3,000	47,000	4,800	2,000	4,000	63,000	18,000
0,650	3,000	47,000	5,200	2,050	4,000	63,000	18,500
0,700	3,000	47,000	5,600	2,100	4,000	63,000	18,900
0,750	3,000	47,000	6,000	2,150	4,000	63,000	19,400
0,800	3,000	47,000	6,400	2,200	4,000	63,000	19,800
0,850	3,000	47,000	6,800	2,250	4,000	63,000	20,300
0,900	3,000	47,000	7,200	2,300	4,000	63,000	20,700
0,950	3,000	47,000	7,600	2,350	4,000	63,000	21,200
1,000	3,000	47,000	8,000	2,380	4,000	63,000	21,600
1,050	3,000	47,000	8,400	2,400	4,000	63,000	21,600
1,100	3,000	47,000	8,800	2,450	4,000	63,000	22,100
1,150	3,000	47,000	9,200	2,500	4,000	63,000	22,500
1,200	3,000	52,000	10,800	2,550	4,000	63,000	23,000
1,250	3,000	52,000	11,300	2,600	4,000	67,000	23,400
1,300	3,000	52,000	11,700	2,650	4,000	67,000	23,900
1,350	3,000	52,000	12,200	2,700	4,000	67,000	24,300
1,400	3,000	52,000	12,600	2,750	4,000	67,000	24,800
1,450	3,000	52,000	13,100	2,780	4,000	67,000	25,200
1,500	3,000	52,000	13,500	2,800	4,000	67,000	25,200
1,550	3,000	52,000	14,000	2,850	4,000	67,000	25,700
1,590	3,000	52,000	14,400	2,900	4,000	67,000	26,100
1,600	3,000	52,000	14,400	2,950	4,000	67,000	26,600
1,650	3,000	52,000	14,900	3,000	4,000	67,000	27,000
1,700	3,000	52,000	15,300				
1,750	3,000	52,000	15,800				
1,800	3,000	52,000	16,200				
1,850	3,000	52,000	16,700				
1,900	3,000	52,000	17,100				

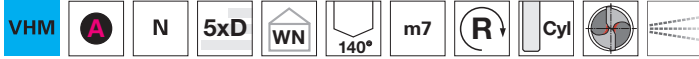


## Micropunte con canali di refrigerazione

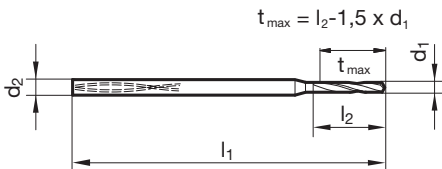
Articolo n. 86405



P	M	K	N	S	H
•	•	•	○	○	



Assott. del nocc.  $\geq \varnothing 1,400$  • affilatura su piani • forma del tagliente principale diritta • fresatura dei taglienti ridotti  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm<sup>2</sup>  
 • acciai inossidabili • ghise



d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
1,400	4,000	52,000	11,000	2,450	4,000	62,000	20,000
1,450	4,000	52,000	12,000	2,500	4,000	62,000	20,000
1,500	4,000	52,000	12,000	2,550	4,000	62,000	20,000
1,550	4,000	52,000	12,000	2,600	4,000	66,000	21,000
1,590	4,000	52,000	13,000	2,650	4,000	66,000	21,000
1,600	4,000	52,000	13,000	2,700	4,000	66,000	22,000
1,650	4,000	52,000	13,000	2,750	4,000	66,000	22,000
1,700	4,000	56,000	14,000	2,780	4,000	66,000	22,000
1,750	4,000	56,000	14,000	2,800	4,000	66,000	22,000
1,800	4,000	56,000	14,000	2,850	4,000	66,000	23,000
1,850	4,000	56,000	15,000	2,900	4,000	66,000	23,000
1,900	4,000	56,000	15,000	2,950	4,000	66,000	24,000
1,950	4,000	56,000	16,000	3,000	4,000	66,000	24,000
1,980	4,000	56,000	16,000				
2,000	4,000	56,000	16,000				
2,050	4,000	56,000	16,000				
2,100	4,000	62,000	17,000				
2,150	4,000	62,000	17,000				
2,200	4,000	62,000	18,000				
2,250	4,000	62,000	18,000				
2,300	4,000	62,000	18,000				
2,350	4,000	62,000	19,000				
2,380	4,000	62,000	19,000				
2,400	4,000	62,000	19,000				

Micropunte in MDI

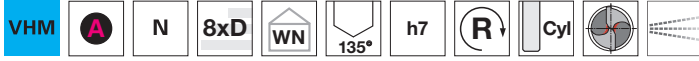




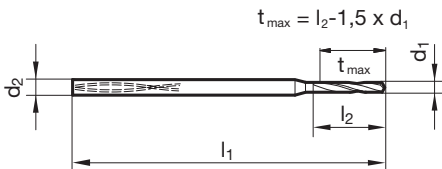
## Micropunte con canali di refrigerazione

Articolo n. 86408

P	M	K	N	S	H
•	•	•	○	○	



Assott. del noc..  $\geq \varnothing 1,400$  • affilatura su piani • forma del tagliente principale diritta • fresatura dei taglienti ridotti  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm<sup>2</sup>  
 • acciai inossidabili • ghise



d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
1,400	4,000	52,000	15,000	2,600	4,000	66,000	29,000
1,500	4,000	52,000	17,000	2,700	4,000	66,000	30,000
1,600	4,000	52,000	18,000	2,800	4,000	66,000	31,000
1,700	4,000	56,000	19,000	2,900	4,000	66,000	32,000
1,800	4,000	56,000	20,000	3,000	4,000	66,000	33,000
1,900	4,000	56,000	21,000				
2,000	4,000	56,000	22,000				
2,100	4,000	62,000	23,000				
2,200	4,000	62,000	24,000				
2,300	4,000	62,000	25,000				
2,400	4,000	62,000	26,000				
2,500	4,000	62,000	28,000				

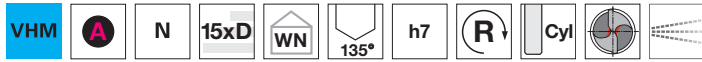


## Micropunte con canali di refrigerazione

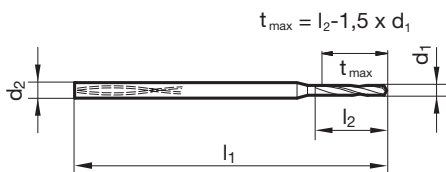
Articolo n. 86412



P	M	K	N	S	H
•	•	•	○	○	



Assott. del noc.  $\geq \varnothing 1,400$  • affilatura su piani • forma del tagliente principale diritta • fresatura dei taglienti ridotti  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm<sup>2</sup>  
 • acciai inossidabili • ghise



d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
1,400	4,000	62,000	25,000	2,600	4,000	87,000	47,000
1,500	4,000	62,000	27,000	2,700	4,000	87,000	48,000
1,600	4,000	62,000	29,000	2,800	4,000	87,000	50,000
1,700	4,000	70,000	31,000	2,900	4,000	87,000	52,000
1,800	4,000	70,000	32,000	3,000	4,000	87,000	54,000
1,900	4,000	70,000	34,000				
2,000	4,000	70,000	36,000				
2,100	4,000	78,000	38,000				
2,200	4,000	78,000	40,000				
2,300	4,000	78,000	42,000				
2,400	4,000	78,000	44,000				
2,500	4,000	78,000	45,000				

Micropunte in MIDI




## ESEMPIO DI APPLICAZIONE POMPA

Tipo utensile	Micropunte
Articolo n.	86412
Diametro	2,8 mm
Profondità foratura	38 mm
Materiale	X6CrNiTi18-10
Raffreddamento	RI 80 bar
Lubrificante	Emulsione
Macchina	Centro di lavorazione
$v_c$	60 m/min
f	0,03 mm/U
Durata utile	60 m

## TS 100 T

### ▼ VANTAGGI E PROPRIETÀ

- ▼ **Punta a spirale** per fori profondi fino a **40xD** in acciai legati e non legati, in particolare anche in acciaio per alberi a gomiti
- ▼ Sezione ottimizzata della scanalatura, sezione massima del canale di refrigerazione e scanalature lucidate, particolarmente lisce **assicurano un'ottimale evacuazione dei trucioli da fori profondi**
- ▼ **Velocità di avanzamento e taglio altissime** assicurano una notevole riduzione **dei tempi di lavorazione**
- ▼ Oltre al programma di magazzino, si possono realizzare **misure intermedie** per una profondità di foratura massima fino a **40xD** o una **lunghezza complessiva massima fino a 500 mm**
- ▼ **Versione speciale** disponibile su richiesta per la lavorazione di alluminio 



# LAVORAZIONE GENERALE DELL'ACCIAIO FINO A $\sim 1200 \text{ N/MM}^2$

## ▼ APPLICAZIONE UNIVERSALE

La **geometria degli utensili** è progettata per l'impiego universale in quasi tutti i materiali

**Affilatura speciale** per un centraggio preciso e una ridotta deviazione di linearità

La **massima sezione del canale di refrigerazione** assicura un'alimentazione efficace del lubrificante ai taglienti e un'eccellente evacuazione dei trucioli

**Quattro smussi di guida** per un supporto ottimale nella foratura

La **sezione ottimale della scanalatura** assicura una gestione ottimale del truciolo nella zona anteriore dell'utensile e una buona evacuazione nella zona posteriore

**Scanalature lucidate** per un'evacuazione perfetta dei trucioli, anche a profondità estreme





## TS-Drills con refrigerazione interna

Articolo n. 86509

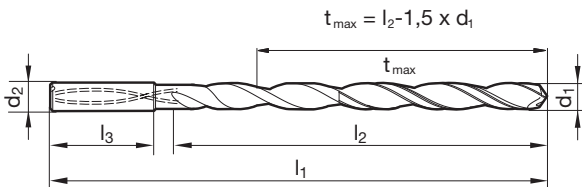


P	M	K	N	S	H
●	●	●	○	○	○



Assott. del nocc.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • rivestimento testa • tagliente principale forma concava • forma della scanalatura ottimizzata • max. taglio trasversale foro • attenzione alla press. del refrig.

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm<sup>2</sup> • acciai inossidabili • ghise



d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	95,000	55,000	36,000	7,540	19/64	8,000	183,000	143,000	36,000
3,100		6,000	106,000	66,000	36,000	7,800		8,000	183,000	143,000	36,000
3,170	1/8	6,000	106,000	66,000	36,000	7,940	5/16	8,000	183,000	143,000	36,000
3,200		6,000	106,000	66,000	36,000	8,000		8,000	183,000	143,000	36,000
3,300		6,000	106,000	66,000	36,000	8,330	21/64	10,000	204,000	160,000	40,000
3,500		6,000	116,000	76,000	36,000	8,500		10,000	204,000	160,000	40,000
3,570	9/64	6,000	116,000	76,000	36,000	8,730	11/32	10,000	204,000	160,000	40,000
3,700		6,000	116,000	76,000	36,000	8,800		10,000	204,000	160,000	40,000
3,800		6,000	116,000	76,000	36,000	9,000		10,000	204,000	160,000	40,000
3,970	5/32	6,000	116,000	76,000	36,000	9,130	23/64	10,000	221,000	177,000	40,000
4,000		6,000	116,000	76,000	36,000	9,500		10,000	221,000	177,000	40,000
4,200		6,000	133,000	93,000	36,000	9,520	3/8	10,000	221,000	177,000	40,000
4,300		6,000	133,000	93,000	36,000	9,800		10,000	221,000	177,000	40,000
4,370	11/64	6,000	133,000	93,000	36,000	9,920	25/64	10,000	221,000	177,000	40,000
4,500		6,000	133,000	93,000	36,000	10,000		10,000	221,000	177,000	40,000
4,600		6,000	133,000	93,000	36,000	10,320	13/32	12,000	247,000	198,000	45,000
4,760	3/16	6,000	133,000	93,000	36,000	10,500		12,000	247,000	198,000	45,000
4,800		6,000	133,000	93,000	36,000	10,720	27/64	12,000	247,000	198,000	45,000
5,000		6,000	133,000	93,000	36,000	11,000		12,000	247,000	198,000	45,000
5,100		6,000	150,000	110,000	36,000	11,110	7/16	12,000	263,000	214,000	45,000
5,160	13/64	6,000	150,000	110,000	36,000	11,510	29/64	12,000	263,000	214,000	45,000
5,410		6,000	150,000	110,000	36,000	11,800		12,000	263,000	214,000	45,000
5,500		6,000	150,000	110,000	36,000	11,910	15/32	12,000	263,000	214,000	45,000
5,560	7/32	6,000	150,000	110,000	36,000	12,000		12,000	263,000	214,000	45,000
5,600		6,000	150,000	110,000	36,000	12,300	31/64	14,000	297,000	248,000	45,000
5,800		6,000	150,000	110,000	36,000	12,500		14,000	297,000	248,000	45,000
5,950	15/64	6,000	150,000	110,000	36,000	12,700	1/2	14,000	297,000	248,000	45,000
6,000		6,000	150,000	110,000	36,000	13,000		14,000	297,000	248,000	45,000
6,300		8,000	167,000	127,000	36,000	13,100	33/64	14,000	297,000	248,000	45,000
6,350	1/4	8,000	167,000	127,000	36,000	13,490	17/32	14,000	297,000	248,000	45,000
6,500		8,000	167,000	127,000	36,000	13,890	35/64	14,000	297,000	248,000	45,000
6,750	17/64	8,000	167,000	127,000	36,000	14,000		14,000	297,000	248,000	45,000
6,800		8,000	167,000	127,000	36,000	14,290	9/16	16,000	333,000	281,000	48,000
7,000		8,000	167,000	127,000	36,000	15,000		16,000	333,000	281,000	48,000
7,140	9/32	8,000	183,000	143,000	36,000	15,870	5/8	16,000	333,000	281,000	48,000
7,500		8,000	183,000	143,000	36,000	16,000		16,000	333,000	281,000	48,000

TS 100 T



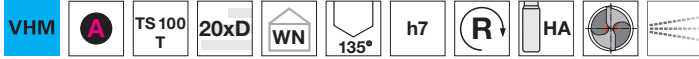


## TS-Drills con refrigerazione interna

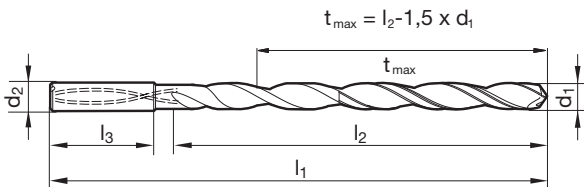
Articolo n. 86511



P	M	K	N	S	H
•	•	•	○	○	○



Assott. del nocc.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • rivestimento testa • tagliente principale forma concava • forma della scanalatura ottimizzata • max. taglio trasversale foro • attenzione alla press. del refrig.  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm<sup>2</sup>  
 • acciai inossidabili • ghise



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	110,000	70,000	36,000	7,940	5/16	8,000	223,000	183,000	36,000
3,100		6,000	123,000	83,000	36,000	8,000		8,000	223,000	183,000	36,000
3,170	1/8	6,000	123,000	83,000	36,000	8,330	21/64	10,000	249,000	205,000	40,000
3,200		6,000	123,000	83,000	36,000	8,500		10,000	249,000	205,000	40,000
3,300		6,000	123,000	83,000	36,000	8,730	11/32	10,000	249,000	205,000	40,000
3,500		6,000	136,000	96,000	36,000	8,800		10,000	249,000	205,000	40,000
3,570	9/64	6,000	136,000	96,000	36,000	9,000		10,000	249,000	205,000	40,000
3,700		6,000	136,000	96,000	36,000	9,130	23/64	10,000	271,000	227,000	40,000
3,800		6,000	136,000	96,000	36,000	9,520	3/8	10,000	271,000	227,000	40,000
3,970	5/32	6,000	136,000	96,000	36,000	9,920	25/64	10,000	271,000	227,000	40,000
4,000		6,000	136,000	96,000	36,000	10,000		10,000	271,000	227,000	40,000
4,200		6,000	158,000	118,000	36,000	10,200		12,000	302,000	253,000	45,000
4,300		6,000	158,000	118,000	36,000	10,320	13/32	12,000	302,000	253,000	45,000
4,370	11/64	6,000	158,000	118,000	36,000	10,500		12,000	302,000	253,000	45,000
4,500		6,000	158,000	118,000	36,000	10,720	27/64	12,000	302,000	253,000	45,000
4,600		6,000	158,000	118,000	36,000	11,000		12,000	302,000	253,000	45,000
4,760	3/16	6,000	158,000	118,000	36,000	11,110	7/16	12,000	323,000	274,000	45,000
4,800		6,000	158,000	118,000	36,000	11,510	29/64	12,000	323,000	274,000	45,000
5,000		6,000	158,000	118,000	36,000	11,800		12,000	323,000	274,000	45,000
5,100		6,000	180,000	140,000	36,000	11,910	15/32	12,000	323,000	274,000	45,000
5,160	13/64	6,000	180,000	140,000	36,000	12,000		12,000	323,000	274,000	45,000
5,410		6,000	180,000	140,000	36,000	12,300	31/64	14,000	367,000	318,000	45,000
5,500		6,000	180,000	140,000	36,000	12,500		14,000	367,000	318,000	45,000
5,560	7/32	6,000	180,000	140,000	36,000	12,700	1/2	14,000	367,000	318,000	45,000
5,800		6,000	180,000	140,000	36,000	13,000		14,000	367,000	318,000	45,000
5,950	15/64	6,000	180,000	140,000	36,000	13,100	33/64	14,000	367,000	318,000	45,000
6,000		6,000	180,000	140,000	36,000	13,490	17/32	14,000	367,000	318,000	45,000
6,350	1/4	8,000	202,000	162,000	36,000	13,890	35/64	14,000	367,000	318,000	45,000
6,500		8,000	202,000	162,000	36,000	14,000		14,000	367,000	318,000	45,000
6,750	17/64	8,000	202,000	162,000	36,000	14,290	9/16	16,000	413,000	361,000	48,000
6,800		8,000	202,000	162,000	36,000	15,000		16,000	413,000	361,000	48,000
7,000		8,000	202,000	162,000	36,000	15,870	5/8	16,000	413,000	361,000	48,000
7,140	9/32	8,000	223,000	183,000	36,000	16,000		16,000	413,000	361,000	48,000
7,500		8,000	223,000	183,000	36,000						
7,540	19/64	8,000	223,000	183,000	36,000						
7,800		8,000	223,000	183,000	36,000						

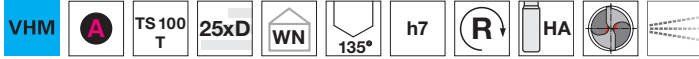


## TS-Drills con refrigerazione interna

Articolo n. 86512

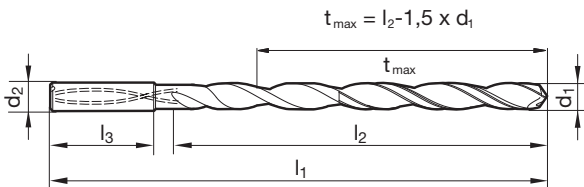


P	M	K	N	S	H
•	•	•	○	○	○



Assott. del nocc.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • rivestimento testa • tagliente principale forma concava • forma della scanalatura ottimizzata • max. taglio trasversale foro • attenzione alla press. del refrig.

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm<sup>2</sup> • acciai inossidabili • ghise



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	125,000	85,000	36,000	7,940	5/16	8,000	263,000	223,000	36,000
3,100		6,000	141,000	101,000	36,000	8,000		8,000	263,000	223,000	36,000
3,170	1/8	6,000	141,000	101,000	36,000	8,330	21/64	10,000	294,000	250,000	40,000
3,200		6,000	141,000	101,000	36,000	8,500		10,000	294,000	250,000	40,000
3,300		6,000	141,000	101,000	36,000	8,730	11/32	10,000	294,000	250,000	40,000
3,500		6,000	156,000	116,000	36,000	8,800		10,000	294,000	250,000	40,000
3,570	9/64	6,000	156,000	116,000	36,000	9,000		10,000	294,000	250,000	40,000
3,700		6,000	156,000	116,000	36,000	9,130	23/64	10,000	321,000	277,000	40,000
3,800		6,000	156,000	116,000	36,000	9,520	3/8	10,000	321,000	277,000	40,000
3,970	5/32	6,000	156,000	116,000	36,000	9,920	25/64	10,000	321,000	277,000	40,000
4,000		6,000	156,000	116,000	36,000	10,000		10,000	321,000	277,000	40,000
4,200		6,000	183,000	143,000	36,000	10,320	13/32	12,000	359,000	310,000	45,000
4,300		6,000	183,000	143,000	36,000	10,720	27/64	12,000	359,000	310,000	45,000
4,370	11/64	6,000	183,000	143,000	36,000	11,000		12,000	359,000	310,000	45,000
4,500		6,000	183,000	143,000	36,000	11,110	7/16	12,000	386,000	337,000	45,000
4,600		6,000	183,000	143,000	36,000	11,510	29/64	12,000	386,000	337,000	45,000
4,760	3/16	6,000	183,000	143,000	36,000	11,910	15/32	12,000	386,000	337,000	45,000
4,800		6,000	183,000	143,000	36,000	12,000		12,000	386,000	337,000	45,000
5,000		6,000	183,000	143,000	36,000	12,300	31/64	14,000	437,000	388,000	45,000
5,100		6,000	210,000	170,000	36,000	12,700	1/2	14,000	437,000	388,000	45,000
5,160	13/64	6,000	210,000	170,000	36,000	13,000		14,000	437,000	388,000	45,000
5,410		6,000	210,000	170,000	36,000	13,100	33/64	14,000	437,000	388,000	45,000
5,500		6,000	210,000	170,000	36,000	13,490	17/32	14,000	437,000	388,000	45,000
5,560	7/32	6,000	210,000	170,000	36,000	13,890	35/64	14,000	437,000	388,000	45,000
5,800		6,000	210,000	170,000	36,000	14,000		14,000	437,000	388,000	45,000
5,950	15/64	6,000	210,000	170,000	36,000	14,290	9/16	16,000	493,000	441,000	48,000
6,000		6,000	210,000	170,000	36,000	15,000		16,000	493,000	441,000	48,000
6,300		8,000	237,000	197,000	36,000	15,870	5/8	16,000	493,000	441,000	48,000
6,350	1/4	8,000	237,000	197,000	36,000	16,000		16,000	493,000	441,000	48,000
6,500		8,000	237,000	197,000	36,000						
6,750	17/64	8,000	237,000	197,000	36,000						
6,800		8,000	237,000	197,000	36,000						
7,000		8,000	237,000	197,000	36,000						
7,140	9/32	8,000	263,000	223,000	36,000						
7,500		8,000	263,000	223,000	36,000						
7,540	19/64	8,000	263,000	223,000	36,000						

TS 100 T





## TS-Drills con refrigerazione interna

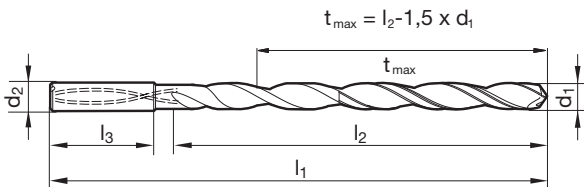
Articolo n. 86513



P	M	K	N	S	H
•	•	•	○	○	○



Assott. del nocc.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • rivestimento testa • tagliente principale forma concava • forma della scanalatura ottimizzata • max. taglio trasversale foro • attenzione alla press. del refrig.  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm<sup>2</sup>  
 • acciai inossidabili • ghise



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	140,000	100,000	36,000	7,500		8,000	303,000	263,000	36,000
3,100		6,000	158,000	118,000	36,000	7,540	19/64	8,000	303,000	263,000	36,000
3,170	1/8	6,000	158,000	118,000	36,000	7,940	5/16	8,000	303,000	263,000	36,000
3,200		6,000	158,000	118,000	36,000	8,000		8,000	303,000	263,000	36,000
3,300		6,000	158,000	118,000	36,000	8,330	21/64	10,000	339,000	295,000	40,000
3,500		6,000	176,000	136,000	36,000	8,500		10,000	339,000	295,000	40,000
3,570	9/64	6,000	176,000	136,000	36,000	8,730	11/32	10,000	339,000	295,000	40,000
3,700		6,000	176,000	136,000	36,000	8,800		10,000	339,000	295,000	40,000
3,800		6,000	176,000	136,000	36,000	9,000		10,000	339,000	295,000	40,000
3,970	5/32	6,000	176,000	136,000	36,000	9,130	23/64	10,000	371,000	327,000	40,000
4,000		6,000	176,000	136,000	36,000	9,520	3/8	10,000	371,000	327,000	40,000
4,200		6,000	208,000	168,000	36,000	9,920	25/64	10,000	371,000	327,000	40,000
4,370	11/64	6,000	208,000	168,000	36,000	10,000		10,000	371,000	327,000	40,000
4,500		6,000	208,000	168,000	36,000	10,320	13/32	12,000	412,000	363,000	45,000
4,760	3/16	6,000	208,000	168,000	36,000	10,720	27/64	12,000	412,000	363,000	45,000
5,000		6,000	208,000	168,000	36,000	11,000		12,000	412,000	363,000	45,000
5,100		6,000	240,000	200,000	36,000	11,110	7/16	12,000	443,000	394,000	45,000
5,160	13/64	6,000	240,000	200,000	36,000	11,510	29/64	12,000	443,000	394,000	45,000
5,410		6,000	240,000	200,000	36,000	11,910	15/32	12,000	443,000	394,000	45,000
5,500		6,000	240,000	200,000	36,000	12,000		12,000	443,000	394,000	45,000
5,560	7/32	6,000	240,000	200,000	36,000	12,300	31/64	14,000	507,000	458,000	45,000
5,950	15/64	6,000	240,000	200,000	36,000	12,700	1/2	14,000	507,000	458,000	45,000
6,000		6,000	240,000	200,000	36,000	13,000		14,000	507,000	458,000	45,000
6,300		8,000	272,000	232,000	36,000	13,100	33/64	14,000	507,000	458,000	45,000
6,350	1/4	8,000	272,000	232,000	36,000	13,490	17/32	14,000	507,000	458,000	45,000
6,500		8,000	272,000	232,000	36,000	13,890	35/64	14,000	507,000	458,000	45,000
6,750	17/64	8,000	272,000	232,000	36,000	14,000		14,000	507,000	458,000	45,000
6,800		8,000	272,000	232,000	36,000						
7,000		8,000	272,000	232,000	36,000						
7,140	9/32	8,000	303,000	263,000	36,000						



## TS-Drills con refrigerazione interna

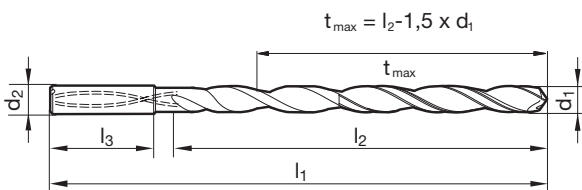
Articolo n. 86514



P	M	K	N	S	H
•	•	•	○	○	○



Assott. del nocc.  $\geq \varnothing 3,000$  • spoglia sul cono tagliente • rivestimento testa • tagliente principale forma concava • forma della scanalatura ottimizzata • max. taglio trasversale foro • attenzione alla press. del refrig.  
 acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm<sup>2</sup>  
 • acciai inossidabili • ghise



d1	inch	d2 h6	l1	l2	l3	d1	inch	d2 h6	l1	l2	l3
mm		mm	mm	mm	mm	mm		mm	mm	mm	mm
3,000		6,000	170,000	130,000	36,000	5,500		6,000	280,000	240,000	36,000
3,100		6,000	193,000	153,000	36,000	5,560	7/32	6,000	300,000	260,000	36,000
3,170	1/8	6,000	193,000	153,000	36,000	5,950	15/64	6,000	300,000	260,000	36,000
3,200		6,000	193,000	153,000	36,000	6,000		6,000	300,000	260,000	36,000
3,300		6,000	193,000	153,000	36,000	6,300		8,000	322,000	282,000	36,000
3,500		6,000	193,000	153,000	36,000	6,350	1/4	8,000	322,000	282,000	36,000
3,570	9/64	6,000	216,000	176,000	36,000	6,500		8,000	322,000	282,000	36,000
3,800		6,000	216,000	176,000	36,000	6,750	17/64	8,000	342,000	302,000	36,000
3,970	5/32	6,000	216,000	176,000	36,000	6,800		8,000	342,000	302,000	36,000
4,000		6,000	216,000	176,000	36,000	7,000		8,000	342,000	302,000	36,000
4,200		6,000	238,000	198,000	36,000	7,140	9/32	8,000	363,000	323,000	36,000
4,370	11/64	6,000	238,000	198,000	36,000	7,500		8,000	363,000	323,000	36,000
4,500		6,000	238,000	198,000	36,000	7,540	19/64	8,000	383,000	343,000	36,000
4,760	3/16	6,000	258,000	218,000	36,000	7,940	5/16	8,000	383,000	343,000	36,000
5,000		6,000	258,000	218,000	36,000	8,000		8,000	383,000	343,000	36,000
5,100		6,000	280,000	240,000	36,000	8,500		10,000	409,000	365,000	40,000
5,160	13/64	6,000	280,000	240,000	36,000	9,000		10,000	429,000	386,000	40,000
5,410		6,000	280,000	240,000	36,000	10,000		10,000	471,000	427,000	40,000

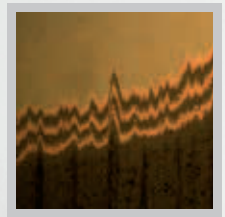
# APPLICAZIONI RACCOMANDATE

# I RIVESTIMENTI



## **F** Rivestimento FIRE/nanoFIRE

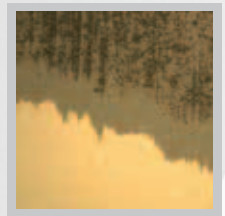
- ▼ Caratteristica visiva: colore viola scuro
- ▼ Rivestimento TiAlN multilayer con struttura a gradiente. Rivestimento generale con resa min. 2 volte superiore rispetto a TiN. Unisce i vantaggi di TiN, TiAlN e TiCN. Isolamento termico eccellente, per così dire „resistente al fuoco“ Elevata tenacità. FIRE plus MolyGlide: la combinazione ideale e il miglior presupposto per la lavorazione a secco e HSC.



## **A** Rivestimento AlTiN (nitruro di titanio e alluminio)

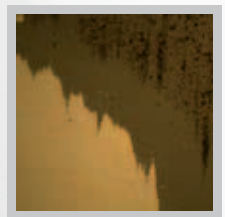
### **a** Rivestimento AlTiN nano (nitruro di titanio e alluminio)

- ▼ Caratteristica visiva: colore viola scuro
- ▼ Il nostro consolidato rivestimento a base di TiAlN è stato oggetto di un continuo e ulteriore sviluppo. Le proprietà strutturali, chimiche e meccaniche ottimizzate del rivestimento in AlTiN permettono di ottenere tramite trattamento termico una fortissima durezza, un'ottima resistenza all'ossidazione e un'eccellente aderenza del rivestimento. Questo rivestimento, combinato con metallo duro, è idoneo per la lavorazione di materiali difficili da lavorare, come ad esempio l'Inconel e acciai temprati, di materiali duri (> 52 HRC) e per la lavorazione IHSC. Ottimo per la lavorazione di acciai inossidabili.



## **A** Rivestimento TiAlN (nitruro di alluminio e titanio)

- ▼ Caratteristica visiva: colore viola scuro
- ▼ Rivestimento speciale per lavorazioni con evacuazione di truciolo in materiali abrasivi (ghisa, AISi) e/o per alti carichi termici, quindi per impieghi senza raffreddamento o con limitata possibilità di raffreddamento, come in fori profondi o diametri ridotti. In questo caso, in particolare, il rivestimento permette di ottenere prestazioni notevolmente superiori già con dati di taglio migliori.



## **Y** Rivestimento in TiAlSiN

- ▼ Caratteristica visiva: colore rosso bronzo
- ▼ Elevata durezza, multistrato di rivestimento termoresistente, speciale per la lavorazione di acciai ad alta resistenza e temprati e di ghise. Grazie alla sua struttura nanocomposita con strati in TiAlN e SiN, arriva a una durezza estrema di 5500 HV.



# RACCOMANDAZIONI PER L'UTILIZZO

## TS-Drills

### Note generali:

Per motivi di sicurezza, è di fondamentale importanza che nessuna punta possa ruotare liberamente senza supporto a una velocità maggiore di 6.000 giri/min. Altrimenti le forze centrifughe potrebbero rompere gli utensili lunghi ancora prima di raggiungere la superficie del pezzo!

### Note per l'impiego delle punte 7xD, 10xD e 12xD:

Per fori profondi  $\geq 7xD$  si devono preparare fori pilota.

1. Il foro pilota può essere prodotto con una punta corta e rigida, il cui diametro sia maggiore di 0,01-0,02 mm rispetto al diametro della TS-Drill. Profondità del foro pilota 1xD.
2. In alternativa, la TS-Drill stessa può produrre il foro pilota. Per questo occorre ridurre la velocità di taglio e l'avanzamento del 30-40%.

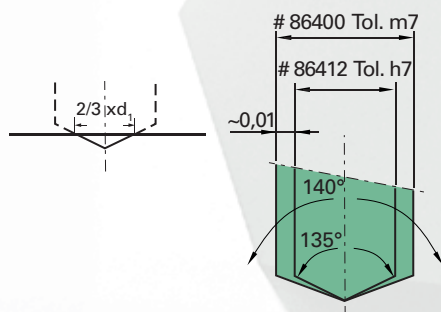
## Micropunte in metallo duro integrale

### Foro pilota

Per l'impiego della micropunta in carburo di silicio 15xD consigliamo di produrre un foro pilota con profondità da 1xD a 2xD. La micropunta in carburo di silicio 4xD è ideale per questo foro pilota. L'angolazione della sua punta e la tolleranza del suo diametro sono perfezionati a tale scopo.

### Centraggio

Per ottenere la massima resa con le micropunte in MDI a partire da una profondità 8xD, consigliamo il centraggio. A tale scopo si può utilizzare la micropunta in carburo di silicio fino a 4xD, codice articolo 86400. Il diametro di centraggio dovrebbe essere circa  $2/3xD$ .



### Qualità filtro

A causa del diametro molto piccolo del canale di refrigerazione, per l'utilizzo delle micropunte in carburo di silicio con refrigerazione interna, consigliamo di monitorare costantemente la qualità del filtro del lubrorefrigerante.





## Applicazioni raccomandate per TS-Drills

Articolo n. HA   
Articolo n. HE

Norma/DIN

Materiale da taglio

Tratt. di superficie

Tipo

Refrigerazione

Prezzi/misure pag.

### Note generali per punte in MDI:

Macchine potenti, mandrini senza gioco, attacchi utensile allineati con precisione, errore di concentricità degli utensili serrati max. 0,02 mm, alte pressioni del refrigerante. Consigliamo l'impiego di mandrini ad espansione idraulica o a calettamento.

### Note sulla refrigerazione delle punte in MDI:

consigliamo la lubrorefrigerazione mediante emulsione o olio. In alternativa, in presenza di determinati presupposti, si può lavorare anche con raffreddamento ad aria. Invece del raffreddamento ad aria, si dovrebbe comunque sempre preferire l'impiego in condizioni di lubrificazione minimale, per il quale gli utensili sono particolarmente adatti. Per l'impiego con lubrificazione minimale consigliamo l'utilizzo di codoli conici e inserti Hartner per lubrificazione minimale. Il nostro servizio di assistenza è a vostra disposizione per qualsiasi consulenza.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
<b>2,50</b>	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
<b>3,15</b>	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
<b>4,00</b>	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
<b>5,00</b>	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
<b>6,30</b>	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
<b>8,00</b>	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
<b>10,00</b>	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
<b>12,50</b>	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
<b>16,00</b>	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
<b>20,00</b>	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
<b>25,00</b>	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800

Refrigerante:

- Emulsione
- Olio
- Aria

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm <sup>2</sup>	Durezza	Refrigerazione
Acciai da costruzione	<b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2) <b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500)	≤500 ≤1000		● ●
Acciai automatici	<b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36) <b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)	≤850 ≤1000		● ●
Acciai da bonifica non legati	<b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30) <b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45) <b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)	≤700 ≤850 ≤1000		● ● ●
Acciai da bonifica legati	<b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4 <b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4	≤1000 ≤1400		● ●
Acciai da cementazione non legati	<b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)	≤850		●
Acciai da cementazione legati	<b>1.7276</b> 10CrMo11, <b>1.5125</b> 11MnSi6 <b>1.5752</b> 15NiCr13, <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5	≤1000 ≤1400		● ●
Acciai nitruati	<b>1.8504</b> 34CrAl6 <b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7	≤1000 ≤1400		● ●
Acciai utensili	<b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9 <b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4	≤850 ≤1400		● ●
Acciai super rapidi	<b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3	≤1400		●
Acciai per molle	<b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	-		≤48 HRC ≤66 HRC	● ●
Acciai inossidabili, allo zolfo austenitici martensitici	<b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9 <b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A) <b>1.4057</b> X20CrNi172 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2	≤900 ≤1100 ≤1500		● ● ●
Ghise	<b>0.6010</b> EN-GJL-100 (GG10), <b>0.6020</b> EN-GJL-200 (GG20) <b>0.6025</b> EN-GJL-250 (GG25), <b>0.6035</b> EN-GJL-350 (GG35)		≤240 HB ≤350 HB	● ●
Ghise sferoidali, ghise temperate	<b>0.7050</b> EN-GJS-500-7 (GGG50), <b>0.8035</b> EN-GJMW-350-4 (GTW35) <b>0.7070</b> EN-GJS-700-2 (GGG70), <b>0.8170</b> EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	● ●
Ghisa in conchiglia	-		≤350 HB	●
Nuove ghise GGV	<b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35) <b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo 6		≤220 HB ≤300 HB	● ●
Nuove ghise ADI	<b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000) <b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)	≤1000 ≤1400		● ●
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	<b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2 <b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		● ●
Alluminio e leghe di alu	<b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1	≤400		●
Leghe di alu per lav. plastiche	<b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	<b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9 <b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		● ●
Leghe di magnesio	<b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1	≤400		●
Rame legato in bassa %	<b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb	≤600		●
Ottone, a truciolo corto a truciolo lungo	<b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2 <b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5	≤600 ≤600		● ●
Bronzi a truciolo corto	<b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn <b>2.0790</b> CuNi18Zn19Pb	≤600 ≤850		● ●
Bronzi a truciolo lungo	<b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10 <b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2	≤850 ≤1000		● ●
Mat. plastiche termoidurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		●
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		●
Mat. plast. a fibre aramidiche	Kevlar	≤1000		●
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		●



# HARTNER

## ≤3xD

89413
89402
6537K
VHM
FIRE
TS 100 U
senza RI
10

89410
89415
6537K
VHM
FIRE
TS 100 U
con RI
14

89450
89550
6537K
VHM
AITiN nano
TS 100 INOX
con RI
24

89422
6537K
VHM
TiAlSiN
TS 100 H
senza RI
50

89423
89424
6537K
VHM
TiAlSiN
TS 100 H
con RI
52

## ≤4xD

89292
WN
VHM
lucido
TS 150 GG
con RI
36

## ≤5xD

89414
89417
6537L
VHM
FIRE
TS 100 U
senza RI
12

89411
89408
6537L
VHM
FIRE
TS 100 U
con RI
16



$v_c$ m/min	Num. col. avanzam.	$v_c$ m/min	Num. col. avanzam.	$v_c$ m/min	Num. col. avanzam.	$v_c$ m/min	Num. col. avanzam.	$v_c$ m/min	Num. col. avanzam.	$v_c$ m/min	Num. col. avanzam.	$v_c$ m/min	Num. col. avanzam.	$v_c$ m/min	Num. col. avanzam.
130	7	145	7			130	7	145	7			130	7	145	7
110	6	120	6			110	6	120	6			110	6	120	6
145	8	170	8			145	8	170	8			145	8	170	8
110	7	145	8			110	7	145	8			110	7	145	8
120	7	130	8			120	7	130	8			120	7	130	8
110	7	125	7			110	7	125	7			110	7	125	7
105	7	120	7			105	7	120	7			105	7	120	7
105	7	120	7			105	7	120	7			105	7	120	7
100	6	105	7			100	6	105	7			100	6	105	7
130	8	145	8			130	8	145	8			130	8	145	8
120	7	120	7			120	7	120	7			120	7	120	7
85	5	85	5			85	5	85	5			85	5	85	5
100	6	110	7			100	6	110	7			100	6	110	7
90	5	105	5			90	5	105	5			90	5	105	5
65	6	80	6			65	6	80	6			65	6	80	6
55	5	65	5			55	5	65	5			55	5	65	5
		60	4			55	4	60	4					60	5
45	3	60	3			45	3	60	3			45	3	60	3
40	1	55	3			40	1	55	3			40	1	55	2
20	1	35	2			20	1	35	2			20	1	35	2
40	2	60	5	80	5	40	2					40	2	60	5
15	1	55	2	60	2-3	15	1					15	1	55	5
35	2	45	5	80	5	35	2					35	2	45	5
210	8	210	9							120	7	210	8	210	9
155	8	160	9							100	7	155	8	160	9
155	7	140	9							90	7	155	7	140	9
125	7	130	8							80	7	125	7	130	8
35	3	40	3							40	2	35	3	40	3
25	4	35	4	30	4	25	4	35	4			25	4	35	4
15	1	45	4	45	4	15	1	45	4			15	1	45	4
15	1	40	3	40	3	15	1	40	3			15	1	40	3
260	9	310	9							410	9	260	9	310	9
260	9	310	9							410	9	260	9	310	9
220	8	260	9							380	9	220	9	260	9
180	8	220	9							330	9	180	8	220	9
260	8	280	8									260	8	280	8
105	7	125	7									105	7	125	7
270	8	325	8							280	9	270	8	325	8
180	7	220	7									180	7	220	7
105	6	125	7							110	6	105	6	125	7
85	6	105	6							80	5	85	6	105	6
80	5	90	6									80	5	90	6
60	5	80	6									60	5	80	6







# HARTNER

## ≤5xD

89451
89551
6537L
VHM
AlTiN nano
TS 100 INOX
con RI
26

89425
89426
6537L
VHM
TiAlSiN
TS 100 H
con RI
54

89420
6537L
VHM
FIRE
TS 100 R
con RI
32

89560
6537L
VHM
lucido
TS 100 ALU
con RI
44

## ≤7xD

89412
89416
WN
VHM
FIRE
TS 100 U
con RI
18

89427
WN
VHM
TiAlSiN
TS 100 H
con RI
56

89294
WN
VHM
lucido
TS 150 GG
con RI
37

89421
WN
VHM
FIRE
TS 100 R
con RI
34



$v_c$ m/min	Num. col. avanzam.	$v_c$ m/min	Num. col. avanzam.	$v_c$ m/min	Num. col. avanzam.	$v_c$ m/min	Num. col. avanzam.	$v_c$ m/min	Num. col. avanzam.	$v_c$ m/min	Num. col. avanzam.	$v_c$ m/min	Num. col. avanzam.
145	7	145	6	145	6	145	6	145	6	145	6	145	6
120	6	120	5	120	5	120	5	120	5	120	5	120	5
170	8	170	7	170	7	170	7	170	7	170	7	170	7
145	8	145	7	145	7	145	7	145	7	145	7	145	7
130	8	130	7	130	7	130	7	130	7	130	7	130	7
125	7	125	6	125	6	125	6	125	6	125	6	125	6
120	7	120	6	120	6	120	6	120	6	120	6	120	6
120	7	120	6	120	6	120	6	120	6	120	6	120	6
105	7	105	6	105	6	105	6	105	6	105	6	105	6
145	8	145	7	145	7	145	7	145	7	145	7	145	7
120	7	120	6	120	6	120	6	120	6	120	6	120	6
85	5	85	4	85	4	85	4	85	4	85	4	85	4
110	7	110	6	110	6	110	6	110	6	110	6	110	6
105	5	105	4	105	4	105	4	105	4	105	4	105	4
80	6	80	5	80	5	80	5	80	5	80	5	80	5
65	5	65	4	65	4	65	4	65	4	65	4	65	4
60	4	60	3	60	3	60	3	60	3	60	3	60	3
60	3	60	2	60	2	60	2	60	2	60	2	60	2
55	3	55	2	55	2	55	2	55	2	55	2	55	2
35	2	35	1	35	1	35	1	35	1	35	1	35	1
80	5	80	4	80	4	80	4	80	4	80	4	80	4
60	2-3	60	2	60	2	60	2	60	2	60	2	60	2
80	5	80	4	80	4	80	4	80	4	80	4	80	4
210	9	210	8	210	8	210	8	210	8	210	8	210	8
160	9	160	8	160	8	160	8	160	8	160	8	160	8
160	9	160	8	160	8	160	8	160	8	160	8	160	8
130	8	130	7	130	7	130	7	130	7	130	7	130	7
130	8	130	7	130	7	130	7	130	7	130	7	130	7
100	8	100	7	100	7	100	7	100	7	100	7	100	7
80	8	80	7	80	7	80	7	80	7	80	7	80	7
60	8	60	7	60	7	60	7	60	7	60	7	60	7
35	4	35	3	35	3	35	3	35	3	35	3	35	3
45	4	45	3	45	3	45	3	45	3	45	3	45	3
40	3	40	2	40	2	40	2	40	2	40	2	40	2
350	9	350	8	350	8	350	8	350	8	350	8	350	8
320	8	320	7	320	7	320	7	320	7	320	7	320	7
280	7	280	6	280	6	280	6	280	6	280	6	280	6
320	7	320	6	320	6	320	6	320	6	320	6	320	6
190	7	190	6	190	6	190	6	190	6	190	6	190	6
160	6	160	5	160	5	160	5	160	5	160	5	160	5
160	6	160	5	160	5	160	5	160	5	160	5	160	5
150	6	150	5	150	5	150	5	150	5	150	5	150	5
150	6	150	5	150	5	150	5	150	5	150	5	150	5
100	3	100	2	100	2	100	2	100	2	100	2	100	2
100	3	100	2	100	2	100	2	100	2	100	2	100	2
100	2	100	1	100	1	100	1	100	1	100	1	100	1
410	8	410	7	410	7	410	7	410	7	410	7	410	7
380	8	380	7	380	7	380	7	380	7	380	7	380	7
330	8	330	7	330	7	330	7	330	7	330	7	330	7
280	7	280	6	280	6	280	6	280	6	280	6	280	6
110	6	110	5	110	5	110	5	110	5	110	5	110	5
80	5	80	4	80	4	80	4	80	4	80	4	80	4



## Applicazioni raccomandate per TS-Drills

Articolo n. HA   
Articolo n. HE

Norma/DIN

Materiale da taglio

Tratt. di superficie

Tipo

Refrigerazione

Prezzi/misure pag.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800

Refrigerante:

● Emulsione

● Olio

○ Aria

Ø utensile mm	Codice serie avanzamento per codice articolo 86400/86405/86401/86408/86412												
	56	57	58	59	60	61	62	63	64	65	66	67	68
	f (mm/U)												
0,50	0,006	0,012	0,018	0,022	0,030	0,035	0,040	0,045	0,050	0,050	0,055	0,060	0,060
0,80	0,008	0,016	0,024	0,032	0,040	0,050	0,060	0,070	0,080	0,080	0,080	0,090	0,090
1,00	0,012	0,022	0,032	0,042	0,060	0,070	0,080	0,090	0,100	0,100	0,110	0,110	0,120
1,50	0,021	0,036	0,051	0,066	0,090	0,100	0,120	0,130	0,150	0,150	0,160	0,170	0,180
2,00	0,032	0,052	0,072	0,092	0,120	0,140	0,160	0,180	0,200	0,210	0,220	0,230	0,240
2,50	0,045	0,070	0,095	0,120	0,150	0,170	0,200	0,220	0,250	0,260	0,270	0,280	0,300
3,00	0,060	0,090	0,120	0,150	0,180	0,210	0,240	0,270	0,300	0,310	0,330	0,340	0,360

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm <sup>2</sup>	Durezza	Refrigerazione
Acciai da costruzione	<b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2) <b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500)	≤500 ≤1000		●
Acciai automatici	<b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36) <b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)	≤850 ≤1000		●
Acciai da bonifica non legati	<b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30) <b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45) <b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)	≤700 ≤850 ≤1000		●
Acciai da bonifica legati	<b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4 <b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7255</b> 42CrMo4	≤1000 ≤1400		●
Acciai da cementazione non legati	<b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)	≤850		●
Acciai da cementazione legati	<b>1.7276</b> 10CrMo11, <b>1.5125</b> 11MnSi6 <b>1.5752</b> 15NiCr13, <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5	≤1000 ≤1400		●
Acciai nitruati	<b>1.8504</b> 34CrAl6 <b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7	≤1000 ≤1400		●
Acciai utensili	<b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9 <b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4	≤850 ≤1400		●
Acciai super rapidi	<b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3	≤1400		●
Acciai per molle	<b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	-		≤48 HRC ≤66 HRC	●
Acciai inossidabili, allo zolfo austenitici martensitici	<b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9 <b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A) <b>1.4057</b> X20CrNi172 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Ghise	<b>0.6010</b> EN-GJL-100 (GG10), <b>0.6020</b> EN-GJL-200 (GG20) <b>0.6025</b> EN-GJL-250 (GG25), <b>0.6035</b> EN-GJL-350 (GG35)		≤240 HB ≤350 HB	●
Ghise sferoidali, ghise temperate	<b>0.7050</b> EN-GJS-500-7 (GGG50), <b>0.8035</b> EN-GJMW-350-4 (GTW35) <b>0.7070</b> EN-GJS-700-2 (GGG70), <b>0.8170</b> EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	●
Ghisa in conchiglia	-		≤350 HB	●
Nuove ghise GGV	<b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35) <b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo 6		≤220 HB ≤300 HB	●
Nuove ghise ADI	<b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000) <b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)	≤1000 ≤1400		●
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	<b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2 <b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alluminio e leghe di alu	<b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1	≤400		●
Leghe di alu per lav. plastiche	<b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	<b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9 <b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		●
Leghe di magnesio	<b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1	≤400		●
Rame legato in bassa %	<b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb	≤600		●
Ottone, a truciolo corto a truciolo lungo	<b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2 <b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5	≤600 ≤600		●
Bronzi a truciolo corto	<b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn <b>2.0790</b> CuNi18Zn19Pb	≤600 ≤850		●
Bronzi a truciolo lungo	<b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10 <b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2	≤850 ≤1000		●
Mat. plastiche termoidurenti	Epoxidharz, Resopal, Pertinax, Moltopren	≤150		●
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		●
Mat. plast. a fibre aramidiche	Kevlar	≤1000		●
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		●





## Applicazioni raccomandate per TS-Drills

Articolo n. HA   
Articolo n. HE

Norma/DIN

Materiale da taglio

Tratt. di superficie

Tipo

Refrigerazione

Prezzi/misure pag.

### Procedura:

- Fresatura di una superficie perpendicolarmente all'angolo di entrata della foratura (necessaria solo per superfici oblique).
- Produzione di un foro pilota cilindrico (tolleranza F9) con profondità minima del foro 1xD.
- Eseguire il foro pilota inizialmente a circa 300 giri/min per  $f = 500 \text{ mm/min}$ .
- Regolazione della pressione del lubrificante e del numero di giri.
- Foratura continua sull'intera profondità senza ciclo di evacuazione trucioli.
- Per fori passanti con uscita obliqua, ridurre la velocità di avanzamento  $v_f$  al 40% ca. 1 mm prima dello sfondamento.
- Raggiunta la profondità di foratura, disattivare numero di giri e lubrificante, uscire a velocità alta.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
<b>2,50</b>	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
<b>3,15</b>	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
<b>4,00</b>	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
<b>5,00</b>	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
<b>6,30</b>	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
<b>8,00</b>	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
<b>10,00</b>	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
<b>12,50</b>	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
<b>16,00</b>	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630

Refrigerante:

- Emulsione
- Olio
- Aria

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm <sup>2</sup>	Durezza	Refrigerazione
Acciai da costruzione	<b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2) <b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500)	≤500 ≤1000		● ●
Acciai automatici	<b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36) <b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)	≤850 ≤1000		● ●
Acciai da bonifica non legati	<b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30) <b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45) <b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)	≤700 ≤850 ≤1000		● ● ●
Acciai da bonifica legati	<b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4 <b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4	≤1000 ≤1400		● ●
Acciai da cementazione non legati	<b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)	≤850		●
Acciai da cementazione legati	<b>1.7276</b> 10CrMo11, <b>1.5125</b> 11MnSi6 <b>1.5752</b> 15NiCr13, <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5	≤1000 ≤1400		● ●
Acciai nitruati	<b>1.8504</b> 34CrAl6 <b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7	≤1000 ≤1400		● ●
Acciai utensili	<b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9 <b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4	≤850 ≤1400		● ●
Acciai super rapidi	<b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3	≤1400		●
Acciai per molle	<b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	-		≤48 HRC ≤66 HRC	● ●
Acciai inossidabili, allo zolfo austenitici martensitici	<b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9 <b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A) <b>1.4057</b> X20CrNi172 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2	≤900 ≤1100 ≤1500		● ● ●
Ghise	<b>0.6010</b> EN-GJL-100 (GG10), <b>0.6020</b> EN-GJL-200 (GG20) <b>0.6025</b> EN-GJL-250 (GG25), <b>0.6035</b> EN-GJL-350 (GG35)		≤240 HB ≤350 HB	● ●
Ghise sferoidali, ghise temperate	<b>0.7050</b> EN-GJS-500-7 (GGG50), <b>0.8035</b> EN-GJMw-350-4 (GTW35) <b>0.7070</b> EN-GJS-700-2 (GGG70), <b>0.8170</b> EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	● ●
Ghisa in conchiglia	-		≤350 HB	●
Nuove ghise GGV	<b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35) <b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo 6		≤220 HB ≤300 HB	● ●
Nuove ghise ADI	<b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000) <b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)	≤1000 ≤1400		● ●
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	<b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2 <b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		● ●
Alluminio e leghe di alu	<b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1	≤400		●
Leghe di alu per lav. plastiche	<b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	<b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9 <b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		● ●
Leghe di magnesio	<b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1	≤400		●
Rame legato in bassa %	<b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb	≤600		●
Ottone, a truciolo corto a truciolo lungo	<b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2 <b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5	≤600 ≤600		● ●
Bronzi a truciolo corto	<b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn <b>2.0790</b> CuNi18Zn19Pb	≤600 ≤850		● ●
Bronzi a truciolo lungo	<b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10 <b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2	≤850 ≤1000		● ●
Mat. plastiche termoidurenti	Epoxidharz, Resopal, Pertinax, Moltopren	≤150		●
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		●
Mat. plast. a fibre aramidiche	Kevlar	≤1000		●
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		●



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