



Where **high performance**  
is the **standard**<sup>®</sup>



*Including*



## Countersink Section Product Catalog 2020

[www.maford.com](http://www.maford.com)



Where **high performance** is the **standard**®



For 100 years, M.A. FORD® has been at the cutting edge of tooling design and manufacturing and has developed an enviable global reputation for performance and precision in advanced solid carbide tooling, serving over 60 countries worldwide.

Our innovative cutting geometries, materials and coating technologies are providing effective manufacturing solutions to an expanding and increasingly diverse range of industries from agriculture and construction to aerospace, power generation and automotive, to name but a few.

**M.A. FORD® – Where *high performance* is the *standard*.®**



**⚠ WARNING:** This product can expose you to chemicals including nickel, cobalt, and lead, which are known to the State of California to cause cancer, and chemicals including lead which are known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).











## Series Number by Page

Countersinks		
Series No.	Cat. Pg.	Tech Pg.
60	431	442
61	431	442
61B	432	442
61T	433	442
64 Sets	434	442
67	435	442
78	435	442
79	436	442
79B	437	442
79T	438	442
79 Sets	439	442
83	441	442
86	441	442
92	440	442
92 Sets	440	442





### Countersinks Page 429-443

Series	Tool Illustration	Z	Size Range	Material	Included Angle	Material Group	Page
60		1	1/8" - 1"	C	60° 82° 90° 100°		431
61		1	1/8" - 3"	HSS	60° 82° 90° 100° 120°		431
61B		1	1/8" - 1"	HSS	60° 82° 90° 100° 120°		432
61T		1	1/8" - 1"	HSS	60° 82° 90° 100° 120°		433
64 Sets		1	1/4" - 1" 4pc. 3/16" - 1" 7pc.	HSS	60° 82° 90° 100° 120°		434
67		0	3/16" - 1-1/2"	HSS	60° 82° 90°		435
78		6	1/8" - 1-1/2"	C	60° 82° 90° 100° 120°		435
79		6	1/8" - 3"	HSS	60° 82° 90° 100° 120°		436

### Countersinks Page 429-443 *(continued)*

Series	Tool Illustration	Z	Size Range	Material	Included Angle	Material Group	Page
79B		6	1/8" - 1"	HSS	60° 82° 90° 100° 120°		437
79T		6	1/8" - 1"	HSS	60° 82° 90° 100° 120°		438
79 Sets		6	1/4" - 1" 4pc. 1/4" - 1" 7pc.	HSS	60° 82° 90° 100°		439
92		3	1/4" - 2"	HSS	60° 82° 90° 100° 120°		440
92 Sets		3	1/4" - 3/4" 5pc.	HSS	60° 82° 90° 100° 120°		440
Technical Information							442-443

### Micro-Stop Series Page 441

Series	Tool Illustration	Z	Body Size Range	Shank	Material	Included Angle	Material Group	Page
83		2	3/8" - 5/8"	1/4 - 28	HSS	82° 90° 100° 120°		441
86		3	3/8" - 5/8"	1/4 - 28	HSS	82° 90° 100° 120°		441
Technical Information							442-443	

# Countersinks

**Uniflute® Series 60**

**Uniflute® Series 61**

**Uniflute® Series 61B**

**Uniflute® Series 61T**

**Uniflute® Series 64 (61 Sets)**

**Zero Flute Series 67**

**Six Flute Series 78**

**Six Flute Series 79**

**Six Flute Series 79B**

**Six Flute Series 79T**

**Six Flute Series 79 Sets**

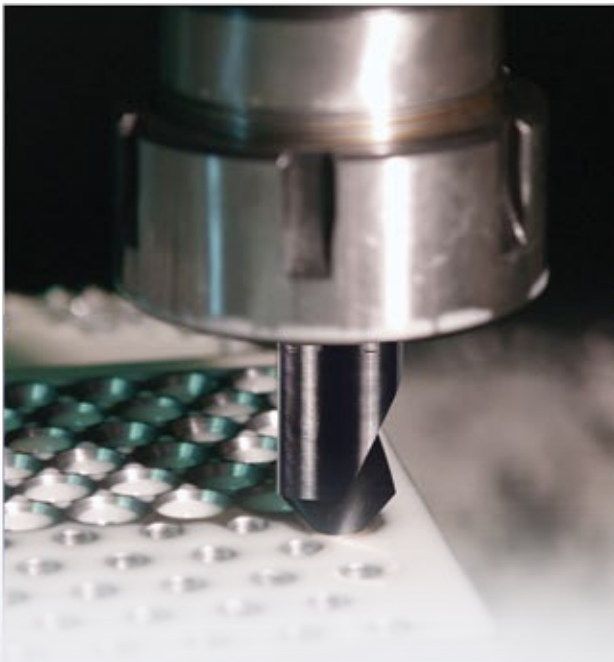


**Three Flute Aircraft Series 92/92 Sets**

**Micro-Stop Series 83**

**Micro-Stop Series 86**

**Application Data**



**Made in USA**



**ISO 9001:2015 Certified**

*Where **high performance** is the **standard**®*

## The Original Countersink from M.A. Ford®

### For Machine or Hand Countersinking

M.A. Ford® provides one of the most complete lines of high-speed steel and carbide countersinks. Tools are available in a variety of flute designs for countersinking virtually any material by machine or by hand.

### Heat Treated Countersinks Deliver Increased Productivity and Tool Life

All M.A. Ford® HSS countersinks are heat treated in an electronically controlled vacuum furnace. This assures precise hardening and eliminates the possibility of decarburization. All heat treating is done in our own facilities for maximum control and assurance of desired hardness and toughness.

Most M.A. Ford® HSS countersinks receive an additional heat treat process known as the Steam Homogeneous Process. This process is like a final tempering, relieving internal grinding stresses. The result is a much tougher cutting edge that stays sharper, longer. Additionally, the Steam Homogeneous Process provides a tough, hard, porous oxide film on the tool that is sufficient enough to retain cutting oil, further reducing frictional heat and extending tool life.



## Coated Countersinks



ALtima® Blaze

See pages 432 & 437.



TiN coating

See pages 433, 434, 438, 439

### Coating Properties

	TiN	ALtima® Blaze
Micro Hardness (HV)	2300	3200
Max. Working Temperature	600° C 1112° F	1100° C 2012° F
Friction Coefficient	0.40	0.35

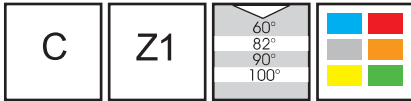
#### ALtima® Blaze

features high temperature hardness and oxidation resistance that provides extreme wear resistance under all machining conditions.

#### TiN

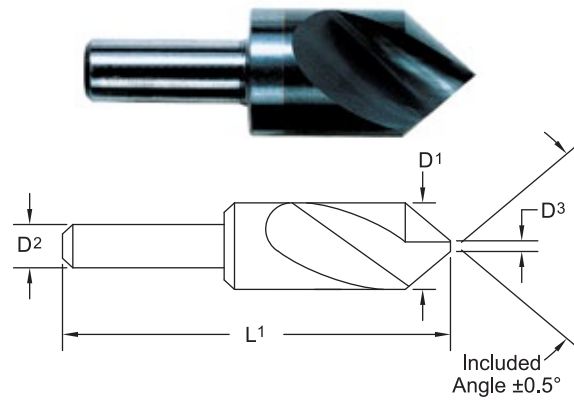
provides a higher surface hardness and increased lubricity over an uncoated tool.

## Uniflute® Series 60



Recommended for use on abrasive, non-metallic and non-ferrous materials.

- Easily resharpened.
- Can be used on hardened steel and work hardening alloys.
- Rigid set-ups and good machinery maintenance are a must.
- Not recommended for use in handheld tools.

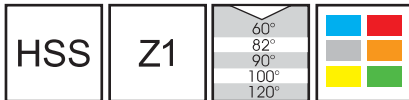


60°		82°		90°		100°		Diameter	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
60012501	60001	60012502	60006	60012503	60011	60012504	60016	1/8	1/8	.030*	1-1/2
60018701	60021	60018702	60026	60018703	60031	60018704	60036	3/16	3/16	.045	1-1/2
60025001	60041	60025002	60046	60025003	60051	60025004	60056	1/4	1/4	.045	2
60037501	60061	60037502	60066	60037503	60071	60037504	60076	3/8	1/4	.060	2
60050001	60081	60050002	60086	60050003	60091	60050004	60096	1/2	1/4	.060	2-3/8
60075001	60101	60075002	60106	60075003	60111	60075004	60116	3/4	1/2	.120	3
60100001	60121	60100002	60126	60100003	60131	60100004	60136	1	1/2	.120	3

\*60° - .015 max.

Standard angles may be modified from 55° to 99°.

## HSS Uniflute® Series 61

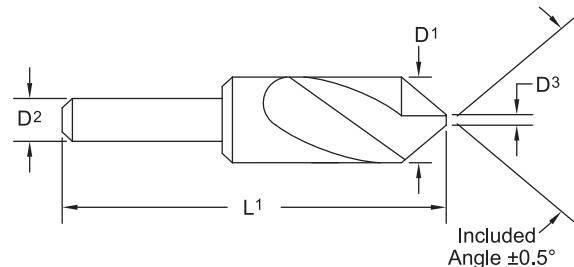


This is the original single flute countersink designed for general purpose countersinking, chamfering or deburring.

- Self piloting and completely chatterless.
- No secondary burrs formed.
- Each size may be used on a wide range of hole diameters.
- Use on machine tool or in handheld tool applications.
- Easily resharpened.
- Steam homogeneous surface treatment (blackening) to prolong tool life and prevent galling.



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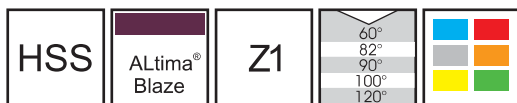
60°		82°		90°		100°		120°		Dia.	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
61012501	61001	61012502	61006	61012503	61011	61012504	61016	61012506	61021	1/8	1/8	.030	1-1/2
61018701	61026	61018702	61031	61018703	61036	61018704	61041	61018706	61046	3/16	3/16	.045	1-1/2
61025001	61051	61025002	61056	61025003	61061	61025004	61066	61025006	61071	1/4	1/4	.045	2
61037501	61076	61037502	61081	61037503	61086	61037504	61091	61037506	61096	3/8	1/4	.060	2
61050001	61101	61050002	61106	61050003	61111	61050004	61116	61050006	61121	1/2	1/4	.060	2
61062501	61126	61062502	61131	61062503	61136	61062504	61141	61062506	61146	5/8	1/4	.060	2-1/4
61075001	61151	61075002	61156	61075003	61161	61075004	61166	61075006	61171	3/4	1/2	.120	2-3/4
61100001	61176	61100002	61181	61100003	61186	61100004	61191	61100006	61196	1	1/2	.120	2-3/4
61125001	61201	61125002	61206	61125003	61211					1-1/4	1/2*	.120	3
61150001	61216	61150002	61221	61150003	61226					1-1/2	3/4*	.250	3-1/2
61200001	61231	61200002	61236	61200003	61241					2	3/4*	.500	3-3/4
61250001	61246	61250002	61251	61250003	61256					2-1/2	3/4*	.750	5
61300001	61261	61300002	61266	61300003	61271					3	3/4*	1.000	5-1/4

\*Straight shank with tang drive.

Standard angles may be modified from 55° to 119° for O.D. 1" and below.  
O.D. greater than 1" may be modified from 55° to 89°.

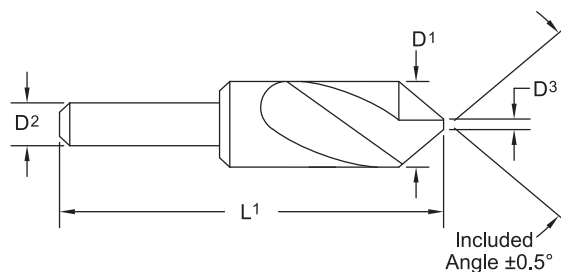


# HSS Uniflute® Series 61B



This is the original single flute countersink designed for general purpose countersinking, chamfering or deburring.

- Self piloting and completely chatterless.
- No secondary burs formed.
- Each size may be used on a wide range of hole diameters.
- Use on machine tool or in handheld tool applications.
- Easily resharpened.
- ALtima® Blaze for extreme wear resistance under all machining conditions.



60°		82°		90°		Diameter	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
61B012501	61003	61B012502	61008	61B012503	61013	1/8	1/8	.030	1-1/2
61B018701	61028	61B018702	61033	61B018703	61038	3/16	3/16	.045	1-1/2
61B025001	61053	61B025002	61058	61B025003	61063	1/4	1/4	.045	2
61B037501	61078	61B037502	61083	61B037503	61088	3/8	1/4	.060	2
61B050001	61103	61B050002	61108	61B050003	61113	1/2	1/4	.060	2
61B062501	61128	61B062502	61133	61B062503	61138	5/8	1/4	.060	2-1/4
61B075001	61153	61B075002	61158	61B075003	61163	3/4	1/2	.120	2-3/4
61B100001	61178	61B100002	61183	61B100003	61188	1	1/2	.120	2-3/4

100°		120°		Diameter	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
61B012504	61018	61B012506	61023	1/8	1/8	.030	1-1/2
61B018704	61043	61B018706	61048	3/16	3/16	.045	1-1/2
61B025004	61068	61B025006	61073	1/4	1/4	.045	2
61B037504	61093	61B037506	61098	3/8	1/4	.060	2
61B050004	61118	61B050006	61123	1/2	1/4	.060	2
61B062504	61143	61B062506	61148	5/8	1/4	.060	2-1/4
61B075004	61168	61B075006	61173	3/4	1/2	.120	2-3/4
61B100004	61193	61B100006	61198	1	1/2	.120	2-3/4

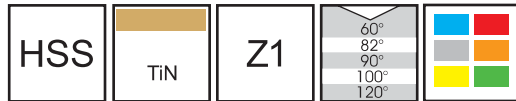


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Angles modified from 55° to 119° available as a special.  
Contact customer service for details.

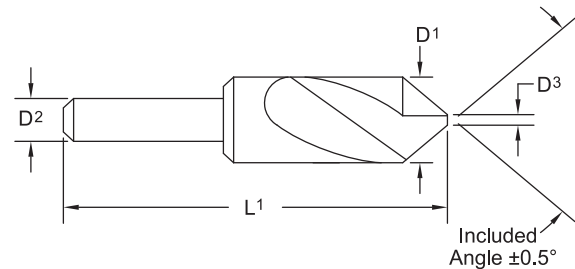
Coating Properties		
	TiN	ALtima® Blaze
Micro Hardness (HV)	2300	3200
Max. Working Temperature	600° C 1112° F	1100° C 2012° F
Friction Coefficient	0.40	0.35

## HSS Uniflute® Series 61T



This is the original single flute countersink designed for general purpose countersinking, chamfering or deburring.

- Self piloting and completely chatterless.
- No secondary burrs formed.
- Each size may be used on a wide range of hole diameters.
- Use on machine tool or in handheld tool applications.
- Easily resharpened.
- TiN coating for higher surface hardness and increased lubricity.



60°		82°		90°		Diameter	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
61T012501	61002	61T012502	61007	61T012503	61012	1/8	1/8	.030	1-1/2
61T018701	61027	61T018702	61032	61T018703	61037	3/16	3/16	.045	1-1/2
61T025001	61052	61T025002	61057	61T025003	61062	1/4	1/4	.045	2
61T037501	61077	61T037502	61082	61T037503	61087	3/8	1/4	.060	2
61T050001	61102	61T050002	61107	61T050003	61112	1/2	1/4	.060	2
61T062501	61127	61T062502	61132	61T062503	61137	5/8	1/4	.060	2-1/4
61T075001	61152	61T075002	61157	61T075003	61162	3/4	1/2	.120	2-3/4
61T100001	61177	61T100002	61182	61T100003	61187	1	1/2	.120	2-3/4

100°		120°		Diameter	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
61T012504	61017	61T012506	61022	1/8	1/8	.030	1-1/2
61T018704	61042	61T018706	61047	3/16	3/16	.045	1-1/2
61T025004	61067	61T025006	61072	1/4	1/4	.045	2
61T037504	61092	61T037506	61097	3/8	1/4	.060	2
61T050004	61117	61T050006	61122	1/2	1/4	.060	2
61T062504	61142	61T062506	61147	5/8	1/4	.060	2-1/4
61T075004	61167	61T075006	61172	3/4	1/2	.120	2-3/4
61T100004	61192	61T100006	61197	1	1/2	.120	2-3/4

Modified angles from 55° to 119° available as a special.  
Contact customer service for details.



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**ISO 9001:2015 Certified**

## Uniflute® Series 64 Sets



Set of four Series 61 Uniflute® countersinks includes 1/4", 1/2", 3/4" and 1" diameter tools. Sets are available with 60°, 82°, 90°, 100° or 120° included angles. TiN coated sets available. Tools are packaged in plastic cases.

Set of seven Series 61 Uniflute® countersinks includes 3/16", 1/4", 3/8", 1/2", 5/8", 3/4" and 1" diameter tools. Sets are available with 60°, 82°, 90°, 100° or 120° included angles. Tools are packaged in plastic cases.

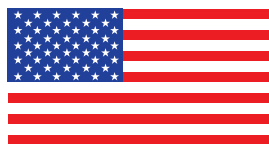
4 Piece Set No.	EDP	Included Angle
64100001	64001	60°
64100002	64006	82°
64100003	64011	90°
64100004	64016	100°
64100006	64021	120°

7 Piece Set No.	EDP	Included Angle
64100071	64003	60°
64100072	64008	82°
64100073	64013	90°
64100074	64018	100°
64100076	64023	120°

TiN 4 Piece Set No.	EDP	Included Angle
64T100001	64025	60°
64T100002	64027	82°
64T100003	64029	90°



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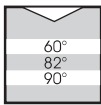
**Made in USA**



## Zero Flute Series 67

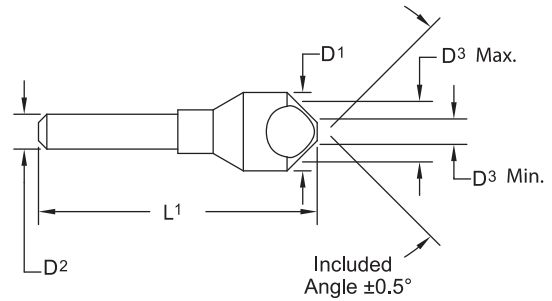
HSS

Z0



Designed for general purpose countersinking, chamfering or deburring.

- Efficient stock removal, chatter-free finish.
- 3/16" and 1/4" tools are double ended.
- Bright finish helps reduce chip build-up on cutting edge.



60°		82°		90°		Diameter		Shank		Non-Cutting OD		OAL
Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Min.**	D3 Max.	L1		
67018701	67001	67018702	67006	67018703	67011	3/16	3/16	.06	.17	1-1/2		
67025001	67016	67025002	67021	67025003	67026	1/4	1/4	.09	.23	2		
67043701	67031	67043702	67036	67043703	67041	7/16	1/4	.15	.40	2		
67056201	67046	67056202	67051	67056203	67056	9/16	1/4	.19	.53	2		
67081201	67061	67081202	67066	67081203	67071	13/16	1/2	.25	.78	2-5/8		
67112501	67076	67112502	67081	67112503	67086	1-1/8	1/2	.44	1.03	2-7/8		
67150001	67091	67150002	67096	67150003	67101	1-1/2	1/2	.50	1.46	3-1/2		

\*\*15% to 30% greater for 60° countersinks only.

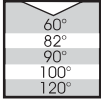


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## Chatterless Six Flute Series 78

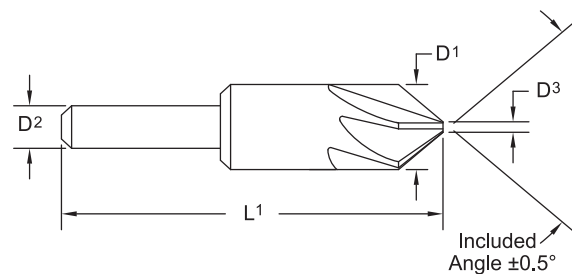
C

Z6



Solid Carbide construction (steel shanks on tools 3/8" diameter and larger) makes this countersink ideal for hardened steel, high temperature alloys and other tough jobs.

- Rigid set-ups and good machine tool maintenance are a must.
- Not recommended for handheld applications.



60°		82°		90°		100°		120°		Dia.	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
78012501	78001	78012502	78006	78012503	78011	78012504	78016	78012506	78021	1/8	1/8	0.03	1-1/2
78018701	78026	78018702	78031	78018703	78036	78018704	78041	78018706	78046	3/16	3/16	0.04	1-1/2
78025001	78051	78025002	78056	78025003	78061	78025004	78066	78025006	78071	1/4	1/4	0.06	2
78037501	78076	78037502	78081	78037503	78086	78037504	78091	78037506	78096	3/8	1/4	0.09	2
78050001	78101	78050002	78106	78050003	78111	78050004	78116	78050006	78121	1/2	3/8	0.15	2-1/4
78062501	78126	78062502	78131	78062503	78136	78062504	78141	78062506	78146	5/8	3/8	0.18	2-3/8
78075001	78151	78075002	78156	78075003	78161	78075004	78166	78075006	78171	3/4	1/2	0.21	2-3/4
78100001	78176	78100002	78181	78100003	78186	78100004	78191	78100006	78196	1	1/2	0.25	2-3/4
78125001	78201	78125002	78206	78125003	78211					1-1/4	1/2*	0.37	3
78150001	78216	78150002	78221	78150003	78226					1-1/2	3/4*	0.43	3-1/2

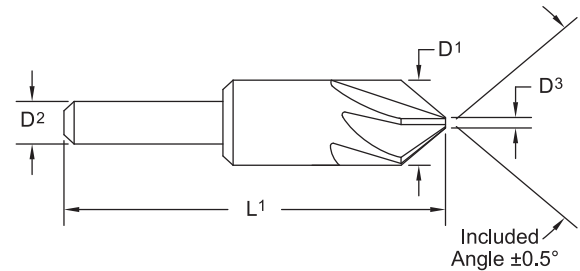
\*Straight shank with tang drive.

# Chatterless Six Flute Series 79

HSS	Z6		
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Standard six flute countersinks are designed for economical, general purpose countersinking, chamfering or deburring. Because of the multiple flute design, chip loads are generally smaller. Even at maximum speeds, chatter-free machining is possible. Steam homogeneous surface treatment (blackening) is used to prolong tool life and prevent galling.



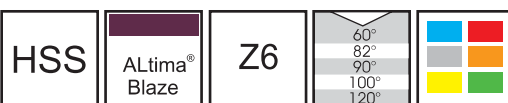
60°		82°		90°		Diameter	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
79012501	79021	79012502	79026	79012503	79031	1/8	1/8	0.03	1-1/2
79018701	79046	79018702	79051	79018703	79056	3/16	3/16	0.04	1-1/2
79025001	79071	79025002	79076	79025003	79081	1/4	1/4	0.06	2
79031201	79096	79031202	79101	79031203	79106	5/16	1/4	0.08	2
79037501	79121	79037502	79126	79037503	79131	3/8	1/4	0.09	2
79050001	79146	79050002	79151	79050003	79156	1/2	3/8	0.15	2
79062501	79171	79062502	79176	79062503	79181	5/8	3/8	0.18	2-1/4
79075001	79196	79075002	79201	79075003	79206	3/4	1/2	0.21	2-3/4
79087501	79221	79087502	79226	79087503	79231	7/8	1/2	0.23	2-3/4
79100001	79246	79100002	79251	79100003	79256	1	1/2	0.25	2-3/4
79125001	79271	79125002	79276	79125003	79281	1-1/4	1/2**	0.37	3
79150001	79296	79150002	79301	79150003	79306	1-1/2	3/4**	0.43	3-1/2
79200001	79321	79200002	79326	79200003	79331	2	3/4**	0.62	3-3/4
79250001	79346	79250002	79351	79250003	79356	2-1/2	3/4**	0.75	5
79300001	79361	79300002	79366	79300003	79371	3	3/4**	1	5-1/4

100°		120°		Diameter	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
79012504	79036	79012506	79041	1/8	1/8	0.03	1-1/2
79018704	79061	79018706	79066	3/16	3/16	0.04	1-1/2
79025004	79086	79025006	79091	1/4	1/4	0.06	2
79031204	79111	79031206	79116	5/16	1/4	0.08	2
79037504	79136	79037506	79141	3/8	1/4	0.09	2
79050004	79161	79050006	79166	1/2	3/8	0.15	2
79062504	79186	79062506	79191	5/8	3/8	0.18	2-1/4
79075004	79211	79075006	79216	3/4	1/2	0.21	2-3/4
79087504	79236	79087506	79241	7/8	1/2	0.23	2-3/4
79100004	79261	79100006	79266	1	1/2	0.25	2-3/4
79125004	79286	79125006	79291	1-1/4	1/2**	0.37	3
79150004	79311	79150006	79316	1-1/2	3/4**	0.43	3-1/2
79200004	79336	79200006	79341	2	3/4**	0.62	3-3/4

\*\*Straight shank with tang drive.

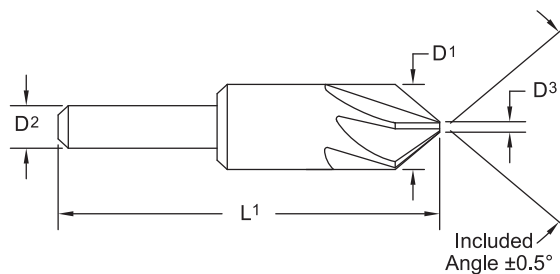


## Chatterless Six Flute Series 79B



Standard six flute countersinks are designed for economical, general purpose countersinking, chamfering or deburring. Because of the multiple flute design, chip loads are generally smaller. Even at maximum speeds, chatter-free machining is possible.

ALtima® Blaze for extreme wear resistance under all machining conditions.



60°		82°		90°		Diameter	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
79B012501	79023	79B012502	79028	79B012503	79033	1/8	1/8	0.03	1-1/2
79B018701	79048	79B018702	79053	79B018703	79058	3/16	3/16	0.04	1-1/2
79B025001	79073	79B025002	79078	79B025003	79083	1/4	1/4	0.06	2
79B037501	79123	79B037502	79128	79B037503	79133	3/8	1/4	0.09	2
79B050001	79148	79B050002	79153	79B050003	79158	1/2	3/8	0.15	2
79B062501	79173	79B062502	79178	79B062503	79183	5/8	3/8	0.18	2-1/4
79B075001	79198	79B075002	79203	79B075003	79208	3/4	1/2	0.21	2-3/4
79B100001	79248	79B100002	79253	79B100003	79258	1	1/2	0.25	2-3/4

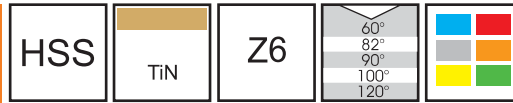
100°		120°		Diameter	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
79B012504	79039	79B012506	79043	1/8	1/8	0.03	1-1/2
79B018704	79064	79B018706	79068	3/16	3/16	0.04	1-1/2
79B025004	79089	79B025006	79093	1/4	1/4	0.06	2
79B037504	79139	79B037506	79143	3/8	1/4	0.09	2
79B050004	79164	79B050006	79168	1/2	3/8	0.15	2
79B062504	79189	79B062506	79193	5/8	3/8	0.18	2-1/4
79B075004	79214	79B075006	79218	3/4	1/2	0.21	2-3/4
79B100004	79264	79B100006	79268	1	1/2	0.25	2-3/4



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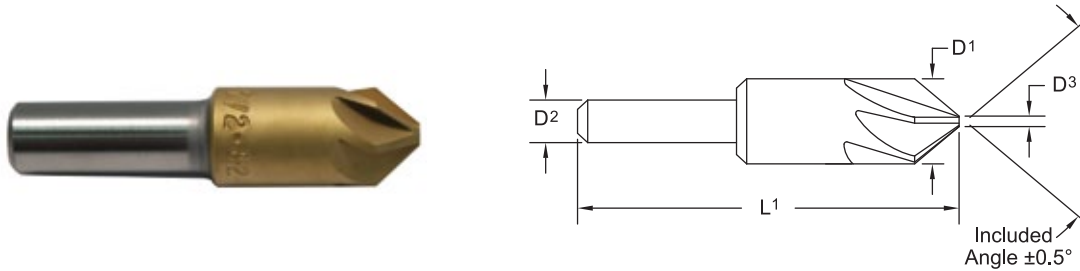
Coating Properties		
	TiN	ALtima® Blaze
Micro Hardness (HV)	2300	3200
Max. Working Temperature	600° C 1112° F	1100° C 2012° F
Friction Coefficient	0.40	0.35

## Chatterless Six Flute Series 79T



Standard six flute countersinks are designed for economical, general purpose countersinking, chamfering or deburring. Because of the multiple flute design, chip loads are generally smaller. Even at maximum speeds, chatter-free machining is possible.

TiN coating for higher surface hardness and increased lubricity.



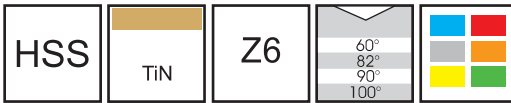
60°		82°		90°		Diameter	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
79T012501	79022	79T012502	79027	79T012503	79032	1/8	1/8	0.03	1-1/2
79T018701	79047	79T018702	79052	79T018703	79057	3/16	3/16	0.04	1-1/2
79T025001	79072	79T025002	79077	79T025003	79082	1/4	1/4	0.06	2
79T037501	79122	79T037502	79127	79T037503	79132	3/8	1/4	0.09	2
79T050001	79147	79T050002	79152	79T050003	79157	1/2	3/8	0.15	2
79T062501	79172	79T062502	79177	79T062503	79182	5/8	3/8	0.18	2-1/4
79T075001	79197	79T075002	79202	79T075003	79207	3/4	1/2	0.21	2-3/4
79T100001	79247	79T100002	79252	79T100003	79257	1	1/2	0.25	2-3/4

100°		120°		Diameter	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
79T012504	79037	79T012506	79042	1/8	1/8	0.03	1-1/2
79T018704	79062	79T018706	79067	3/16	3/16	0.04	1-1/2
79T025004	79087	79T025006	79092	1/4	1/4	0.06	2
79T037504	79137	79T037506	79142	3/8	1/4	0.09	2
79T050004	79162	79T050006	79167	1/2	3/8	0.15	2
79T062504	79187	79T062506	79192	5/8	3/8	0.18	2-1/4
79T075004	79212	79T075006	79217	3/4	1/2	0.21	2-3/4
79T100004	79262	79T100006	79267	1	1/2	0.25	2-3/4



Factory Reconditioning Service Available.  
 Call Customer Service for Details.  
 800-553-8024 / 563-391-6220

## Chatterless Six Flute Series 79 Sets



Set of four Series 79 countersinks includes 1/4", 1/2", 3/4" and 1" diameter tools. Sets are available with 60°, 82°, 90°, or 100° included angles. Tools are packaged in plastic cases. TiN coated sets available.

Set of seven Series 79 countersinks includes 1/4", 5/16", 3/8", 1/2", 5/8", 3/4" and 1" diameter tools. Sets are available with 60°, 82°, 90°, or 100° included angles. Tools are packaged in plastic cases.

4 Piece Set No.	EDP	Included Angle
79000011	79003	60°
79000012	79008	82°
79000013	79013	90°
79000014	79019	100°

7 Piece Set No.	EDP	Included Angle
79000001	79001	60°
79000002	79006	82°
79000003	79011	90°
79000004	79016	100°



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TiN 4 Piece Set No.	EDP	Included Angle
79T000011	79380	60°
79T000012	79382	82°
79T000013	79384	90°



Made in USA



**ISO 9001:2015 Certified**

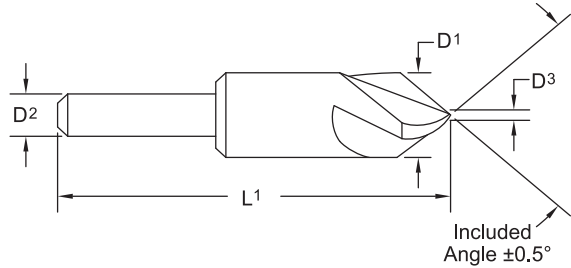


## Aircraft Series 92



Designed for countersinking, chamfering and deburring aluminum, brass and similar materials.

- Bright finish helps reduce chip build-up on the cutting edge.
- Spiral flute geometry for a clean, chatterless finish.
- Each size may be used on a wide range of hole diameters.



60°		82°		90°		Diameter	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
92025001	94101	92025002	94103	92025003	94105	1/4	1/4	0.07	1-1/4
92037501	94113	92037502	94115	92037503	94117	3/8	1/4	0.11	1-5/8
92050001	94125	92050002	94127	92050003	94129	1/2	1/4	0.15	2
92062501	94137	92062502	94139	92062503	94141	5/8	1/4	0.19	2-1/4
92075001	94149	92075002	94151	92075003	94153	3/4	1/2	0.23	3
92087501	94161	92087502	94163	92087503	94165	7/8	1/2	0.26	3
92100001	94173	92100002	94175	92100003	94177	1	1/2	0.30	3-1/4
92112501	94185	92112502	94187	92112503	94189	1-1/8	1/2	0.34	3-1/4
92125001	94197	92125002	94199	92125003	94201	1-1/4	5/8	0.38	3-1/2
92150001	94209	92150002	94211	92150003	94213	1-1/2	3/4	0.45	3-7/8
92200001	94221	92200002	94223	92200003	94225	2	3/4	0.60	4-1/4

100°		120°		Diameter	Shank	Non-Cutting OD	OAL
Tool No.	EDP	Tool No.	EDP	D1	D2	D3 Max.	L1
92025004	94107	92025006	94111	1/4	1/4	0.07	1-1/4
92037504	94119	92037506	94123	3/8	1/4	0.11	1-5/8
92050004	94131	92050006	94135	1/2	1/4	0.15	2
92062504	94143	92062506	94147	5/8	1/4	0.19	2-1/4
92075004	94155	92075006	94159	3/4	1/2	0.23	3
92087504	94167	92087506	94171	7/8	1/2	0.26	3
92100004	94179	92100006	94183	1	1/2	0.30	3-1/4
92112504	94191	92112506	94195	1-1/8	1/2	0.34	3-1/4
92125004	94203	92125006	94207	1-1/4	5/8	0.38	3-1/2
92150004	94215	92150006	94219	1-1/2	3/4	0.45	3-7/8
92200004	94227	92200006	94231	2	3/4	0.60	4-1/4

Standard angles maybe modified from 55° to 119°.



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## Aircraft Series 92 Sets

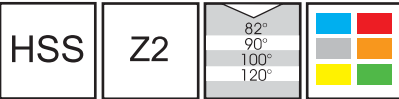


Set of five Series 92 countersinks include 1/4", 3/8", 1/2", 5/8" and 3/4" diameter tools. Sets are available with 60°, 82°, 90°, 100° or 120° included angles. Tools are packaged in plastic cases.

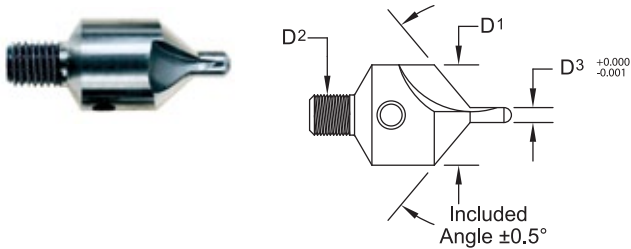
5 Piece Set No.	EDP	Included Angle
92000011	96380	60°
92000012	96381	82°
92000013	96382	90°
92000014	96383	100°
92000016	96385	120°



## Micro-Stop Series 83



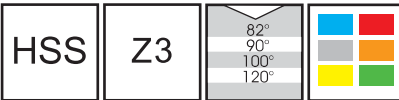
- Integral pilot size must be specified to any diameter within the indicated range.
- May be ordered with a radius blend between the pilot and countersink angle. Specify any radius between .020" and .070". Contact Customer Service for special blend radius pricing.



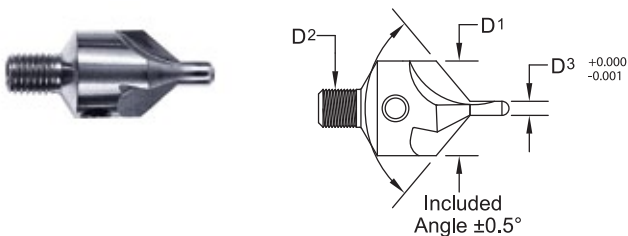
82°	90°	100°	120°	Diameter	Shank	Pilot Size Range
Tool No.	Tool No.	Tool No.	Tool No.	D1	D2	D3
83E00002	83E00003	83E00004	83E00006	3/8	1/4-28	1/16-3/16
83F00002	83F00003	83F00004	83F00006	7/16	1/4-28	3/32-3/16
83G00002	83G00003	83G00004	83G00006	1/2	1/4-28	3/32-1/4
83H00002	83H00003	83H00004	83H00006	5/8	1/4-28	5/32-3/8

Standard angles may be modified from 78° to 119°.

## Micro-Stop Series 86



- Integral pilot size must be specified to any diameter within the indicated range.
- May be ordered with a radius blend between the pilot and countersink angle. Specify any radius between .020" and .070". Contact Customer Service for special blend radius pricing.



82°	90°	100°	120°	Diameter	Shank	Pilot Size Range
Tool No.	Tool No.	Tool No.	Tool No.	D1	D2	D3
86E00002	86E00003	86E00004	86E00006	3/8	1/4-28	1/16-3/16
86F00002	86F00003	86F00004	86F00006	7/16	1/4-28	3/32-3/16
86G00002	86G00003	86G00004	86G00006	1/2	1/4-28	3/32-1/4
86H00002	86H00003	86H00004	86H00006	5/8	1/4-28	5/32-3/8

Standard angles may be modified from 78° to 119°.

## Application Data

### Speeds

To determine optimum speed, start at the lower end of the speed range, and then increase speeds until performance is maximized. When a countersink is operated at excessive RPM (n), chatter may result, and cutting edges can overheat and become prematurely dull.

### Feeds Inch

Series	Countersink Diameter					
	1/8"	3/16"	1/4" - 7/8"	1" - 1-1/2"	2"	2-1/2" - 3"
	f-IPR					
60 / 61	.001-.004	.003-.006	.004-.008	.005-.009	.007-.011	.007-.013
78 / 79	.001-.004	.003-.006	.004-.008	.005-.009	.007-.011	.007-.013
92	—	—	.008-.012	.010-.013	.014-.017	—

Always start the feed at the low end of the range, and then slowly increase until chatter is eliminated.

To prevent the cam relief from rubbing on the workpiece, do not exceed maximum feed when using the 60 / 61 Uniflute® Series Countersinks.

### Speeds Inch

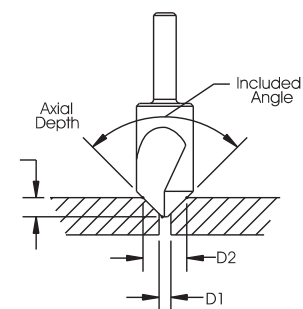
Material	vc - SFM			
	HSS	HSS TIN Coated	HSS ALtima® Blaze Coated	Carbide
Aluminum / Aluminum Alloys	150-250	190-315	240-400	300-500
Brass / Bronze (ordinary)	75-125	90-160	120-200	150-250
Iron - Cast (soft)	75-125	90-160	120-200	125-225
Iron - Cast (medium hard)	50-100	65-125	80-160	100-175
Iron - Hard Chilled	10-20	15-25	20-35	20-35
Iron - Malleable	80-90	100-115	130-145	90-150
Magnesium / Magnesium Alloys	125-250	160-310	200-400	250-400
Monel, High Nickel Steel	30-50	40-65	50-80	50-75
Plastics, Bakelite	100-250	125-315	160-400	250-400
Steel - Mild (.2 - .3 carbon)	80-100	100-125	130-160	120-170
Steel - Mild (.4 - .5 carbon)	70-80	85-100	115-130	80-150
Tool Steels (1.2 carbon)	50-60	65-75	80-100	60-100
Steel - Forgings	40-50	50-65	65-80	50-80
Steel - Alloys (300 - 400 Brinnell)	20-30	25-40	35-50	30-50
Steel - High Tensile (35 - 40 Rc)	30-40	40-50	50-65	40-60
Steel - High Tensile (40 - 45 Rc)	25-35	30-45	40-56	35-55
Steel - High Tensile (45 - 50 Rc)	15-25	20-30	25-40	25-40
Steel - High Tensile (50 - 55 Rc)	7-15	10-20	15-30	15-20
Stainless Steel - Free Machining	30-80	40-100	50-130	80-125
Stainless Steel - Work Hardening	15-50	20-65	30-80	50-75
Ti-75A (commercially pure Titanium)	50-60	65-75	80-100	60-90
Inconel Alloys	15-20	20-25	25-35	25-35

## Minimum Body Diameter For 82° Flat Head Cap Screws

Screw Size	Series 67 Size	All other C'sinks Size
#4	7/16	1/4
#5	9/16	5/16
#6	9/16	5/16
#8	9/16	3/8
#10	9/16	1/2
#12	13/16	1/2
1/4	13/16	5/8
5/16	1-1/8	3/4
3/8	1-1/8	7/8
7/16	1-1/8	7/8
1/2	1-1/2	1
5/8	1-1/2	1-1/4
3/4	1-1/2	1-1/2

## Diameter Gain in Size For Each .001" of Axial Depth in Hole

Included Angle	Axial Depth ap (inch)	Dia. Gain
30°	.0010	.0005
45°	.0010	.0008
60°	.0010	.0010
82°	.0010	.0017
90°	.0010	.0020
100°	.0010	.0028
120°	.0010	.0034



$$\text{DIAMETER GAIN} = D2 - D1$$

**ISO 9001:2015 Certified**

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

## Diameter Gain in Size For Each .025mm of Axial Depth in Hole

Included Angle	Axial Depth ap (mm)	Dia. Gain (mm)
30°	.025	.0127
45°	.025	.0203
60°	.025	.0254
82°	.025	.0432
90°	.025	.0508
100°	.025	.0711
120°	.025	.0864

## Feeds Metric

Series	Countersink Diameter					
	1/8"	3/16"	1/4" - 7/8"	1" - 1-1/2"	2"	2-1/2" - 3"
	f-mm/Rev					
60 / 61	.025-.100	.076-.152	.100-.203	.127-.229	.178-.280	.178-.330
78 / 79	.025-.100	.076-.152	.100-.203	.127-.229	.178-.280	.178-.330
92	—	—	.203-.305	.254-.330	.356-.432	—

Always start the feed at the low end of the range, and then slowly increase until chatter is eliminated. To prevent the cam relief from rubbing on the workpiece, do not exceed maximum feed when using the 60 / 61 Uniflute® Series Countersinks.

## Speeds Metric

Material	vc - m/min.			
	HSS	HSS TIN Coated	HSS ALtima® Blaze Coated	Carbide
Aluminum / Aluminum Alloys	45-75	60-100	75-120	90-155
Brass / Bronze (ordinary)	25-40	30-50	35-60	45-80
Iron - Cast (soft)	25-40	30-50	35-60	40-70
Iron - Cast (medium hard)	15-30	20-40	25-50	30-55
Iron - Hard Chilled	3-10	5-10	5-10	5-10
Iron - Malleable	25-30	30-35	40-45	30-45
Magnesium / Magnesium Alloys	40-75	50-95	60-120	75-125
Monel, High Nickel Steel	10-15	10-20	15-25	15-25
Plastics, Bakelite	30-75	40-100	50-120	80-120
Steel - Mild (.2 - .3 carbon)	25-30	30-40	40-50	40-50
Steel - Mild (.4 - .5 carbon)	20-25	25-30	35-40	25-45
Tool Steels (1.2 carbon)	15-20	20-25	25-30	20-30
Steel - Forgings	10-15	15-20	20-25	15-25
Steel - Alloys (300 - 400 Brinnell)	5-10	10-15	10-15	10-15
Steel - High Tensile (35 - 40 Rc)	10-15	10-15	15-20	15-20
Steel - High Tensile (40 - 45 Rc)	8-15	10-15	10-20	10-20
Steel - High Tensile (45 - 50 Rc)	5-10	5-10	8-10	8-15
Steel - High Tensile (50 - 55 Rc)	2-5	3-5	5-10	5-6
Stainless Steel - Free Machining	10-25	10-30	15-40	25-40
Stainless Steel - Work Hardening	5-10	5-20	10-25	15-25
Ti-75A (commercially pure Titanium)	15-20	20-25	25-30	20-30
Inconel Alloys	5-6	5-10	5-10	8-15

## Minimum Body Diameter For 90° Flat Head Cap Screws (mm)

Screw Size(mm)	C'sink Diameter
3	7
4	10
5	12
6	14
8	19
10	23
12	31



### Conversion Formulas

$$\text{(vc-m/min X 318.057) / Tool Diameter}^* = \text{RPM (n)}$$

$$\text{(vc-SFM X 3.82) / Tool Diameter} = \text{RPM (n)}$$

\*Tool Diameter must be in mm.

**Safety Note**

Always wear the appropriate personal protective equipment such as safety glasses and protective clothing when using solid carbide or HSS cutting tools. Machines should be fully guarded.

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

## Coatings

### ALtima®

Aluminum Titanium Nitride (AlTiN). ALtima® is the original high performance coating. This coating allows tools to be run at higher speeds and feeds in a wide array of materials. Also, it allows the option of running tools dry due to the high oxidation temperature of the coating.

### ALtima® Plus

This Aluminum Titanium Nitride (AlTiN) multi-layer coating has optimized coating structure, with pre and post treatment of the coating for optimized high performance drilling in any ferrous material.

### ALtima® 52

Aluminum Titanium Nitride (AlTiN). ALtima® 52 is specially designed for milling hardened steels 52 Rc and above. It has very high hardness and the oxidation temperature of the coating makes this the absolute best choice for hardened steel milling. ALtima® 52 is designed to allow for dry machining.

### ALtima® Blaze

Aluminum Chromium Nitride (AlCrN). ALtima® Blaze is designed to allow higher material removal rates. This coating has a higher oxidation temperature than a typical TiAlN coating. It has shown very good results in nickel alloys, titanium, and other difficult to machine materials. Tools coated with ALtima® Blaze can be used in dry machining.

### ALtima® Micro

An ultra thin, nano structured, TiAlN coating developed specifically for micro tool applications.

### ALtima® Xtreme

Designed for high speed and dry machining.

### Fordlube

Titanium DiBoride (TiB<sub>2</sub>) is a unique coating with low Aluminum affinity, smooth surface finish and high hardness. It is ideal for Aluminum and Magnesium alloys as it prevents build-up on cutting edge, provides superior chip flow along with extended wear resistance.

### Gem+

Recommended for aluminium and aluminium alloys up to 12% Si, non-ferrous metals and composites. Gem+ provides excellent wear resistance and maintains sharp cutting edges.

### GemX

A CVD diamond coating for composites and aluminum that offers the maximum hardness and wear resistance of any of our coatings.

### TiN

Titanium Nitride (TiN). TiN coating has shown good results in low carbon steels and many iron-based applications. It is a very popular coating used in the industry today.

### TiCN

Titanium Carbonitride (TiCN). TiCN is a multi-layer coating. Because of the multi-layer composition, TiCN is tougher than TiN, even though TiCN is harder. The added toughness of the TiCN coating makes it a good choice for mechanically stressed edges like in end mill applications. The higher hardness makes TiCN a good choice for abrasive applications where higher wear resistance is required.

### CERAedge®

CERAedge® is a unique coating that provides excellent performance in titanium, aluminium, and composites.









### Special Coatings

Upon request, M.A. Ford® can provide any commercially available coating. **Any standard uncoated M.A. Ford® cutting tool can be provided with coating if requested.**

## Coating Properties









M.A. Ford® Coating	M.A. Ford® Tool Number Designation	Microhardness (HV)	Maximum Service Temp.	Friction Coefficient
ALtima®	A	3100	1100° C / 2012° F	0.42
ALtima® Plus	AP	3200	1100° C / 2012° F	0.25
ALtima® 52	A or AH	3600	1200° C / 2192° F	0.40
ALtima® Blaze	B	3200	1100° C / 2012° F	0.35
ALtima® Micro	AM	3300	900° C / 1652° F	0.30-0.35
ALtima® Xtreme	AX	3800	1100° C / 2012° F	0.30-0.50
Fordlube	F	4000	700° C / 1292° F	0.30
Gem+	GP	4710	500° C / 932° F	0.30
GemX	GX	10000	600° C / 1100° F	0.10
TiN	T	2300	600° C / 1112° F	0.40
TiCN	C	3000	400° C / 752° F	0.40
CERAedge®	CE	3400	1100° C / 2012° F	0.25

# Material Conversion Chart

								
	USA	France	Brazil	German W-nr	German DIN	UK	Spain	Japan JIS
FREE MACHINING STEEL	12L13	S250Pb		1.0718	9SMnPb28		F.2112 -	
	1108	10F1		1.0721	10S20	210M15	F.2121 -	
	11L08	10PbF2		1.0722	10SPb20		F.2122 -	
				1.0723	15S20	210A15	F.210F.	
	1215	S300	1215	1.0736	9SMn36	240M07 EN 1B	F.2113-	
12L14	S300Pb		1.0737	9MnPb36		F.2114 -		
LOW CARBON STEEL	1010	AF34C10/XC10	1010	1.0301	C10	045M10		
	1015	AF37C12/XC18	1015	1.0401	C15	080M15;040A15	F.111	
	1020	AF42C20/XC25	1020	1.0402	C22	055M15 EN2C	F.112	
	1025	AF50C30		1.0406	C25	070M26	F.221	
	1212			1.0711	9S20	220M07		
	1213	S250	1213	1.0715	9SMn28	230M07	F.2111 -	
	1010	XC10	1010	1.1121	Ck10	040A10	F.1510 -	
	1022/1518	20M5		1.1133	20Mn5	120M19	F.1515 -	
	1015	XC15 / C15E	1015	1.1141	Ck15	080M15 EN 32C	F.1511 -	
	10201023	XC25 / C22E	1020	1.1151	Ck22	050A20	F.1120 -	
	1025	XC25 / C25E		1.1158	Ck25	070M26	F.1120 -	
	A350-LF5	15N6 / 15Ni6		1.5622	14Ni6		F.2641 -	
	3310/9314	12NC15		1.5752	14NiCr14	655M13/A12 EN 36A		
	MEDIUM CARBON STEEL	1035	AF56C35 /XC38	1035	1.0501	C35	060A35	F.113
1045		AF65C45 /C45	1045	1.0503	C45	080M46	F.114	
1040		AF60C40 /C40	1040	1.0511	C40		F.114.A	
1055		C55	1055	1.0535	C55	070M55		
1060		AF70C55 / C60	1060	1.0601	C60	080A62 EN 43D	F.115	
1140		35MF6	1140	1.0726	35S20	212M36 EN 8M	F.210G.	
1146		45MF4		1.0727	45S20	212M44		
9255		51S7		1.0903	51Si7	250A53 EN 45	F.1450 -	
9255		55S7	9254	1.0904	55Si7		F.1440-	
9260		60S7		1.0909	60Si7	250A58	F.1441 -	
9262		60SC7		1.0961	60SiCr7	250A61	F.1442 -	
1330/1536		35M5 / 30Mn5		1.1165/66	30Mn5/34Mn5	120M36/150M28	F.1203	
1335		40M5 / 36Mn5	1541	1.1167	36Mn5	150M36 EN 15	F.1203 -	
1330		20M5 / 28Mn6	1330	1.117	28Mn6	150M28 EN 14A		
1035		XC32 / C35R	1035	1.118	Cm35	080M36	F.1135 -	
1040		XC42H1 / C40E	1040	1.1186	Ck40	060A40/080A40		S 40 C
1045		XC42H1 / C45/XC45	1045	1.1191	Ck45	080M46/060A47	F.1140 -	S 45 C
1045		XC42H1 /C45R	1045	1.1201	Cm45	080M46	F.1145 -	
1055		XC55H1 / C55E	1055	1.1203	Ck55	060A57/070M55	F.1150 -	S55C
1050		XC48H1 / C50E	1050	1.1206	Ck50	080M50		
1050		XC48H1TS	1050	1.1213	Cf53	060A52		
1060	XC60 / C60E/2C60	1060	1.1221	Ck60	060A62	F.511/F.512	S58C	
1070	XC68	1070	1.1231	Ck67	060A67			
1080/1078/1086	XC75 / C75E/XC90	1074	1.1248/1269	Ck75	060A78	F.513/514/515		
1095	XC100	1095	1.1274	Ck101	060A96			
4135/4142	34CD4 /42CD4		1.233	35CrMo4/47CrMo4	708A37/M40		SCM435TK	
3135/3140	35NC6		1.5711/5711	36NiCr6/40NiCr6	640A35/M40 EN111A			
8620/8720	20NCD2	8620	1.6523/43	21NiCrMo2	805M20/A20 EN 362	F.1522 -	SNCM220(H)	
8740	40NCD2	8640	1.6546	40NiCrMo22	311-Type7	F.1204 -	SNCM240	
	18NCD6		1.6587	17CrNiMo8	820A16	F.1560 -		
5132	32C4 / 34Cr4		1.7033	34Cr4	530A32 EN18B	F.8221 /F.224	SCR430(H)	
5135	38C4 / 37Cr4	5135	1.7034	37Cr4	530A36	F.1201 -		
5140	42C4 / 41Cr4	5140	1.7035	41Cr4	530M40/A40 EN 18	F.1202 -	SCR440(H)	
5140	42C4TS	5140	1.7045	42Cr4	530A40	F.1202 -	SCR440	
5115	16MC5	5115	1.7131	16MnCr5	527M17	F.1515 -		
5155	55C3		1.7176	55Cr3	527A60 EN 48	F.1431 -	SUP9(A)	
4130	25CD4 / 25CrMo4	4130	1.7218	25CrMo4	1717CDS110	F.8330 -	SCM420/430	
4135/4137	35CD4 / 34CrMo4		1.722	34CrMo4	708A37 EN 19B	F.8231 -		
4140/4142	42CD4 / 42CrMo4	4140	1.7225	42CrMo4	708M40 EN 19A	F.8232 -		
4150	50CrMo4	4150	1.7228	50CrMo4	708A47			
6150	50CV4 / 51CrV4	6151	1.8159	50CrV4	735A50 EN 47	F.1430 -		

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# Material Conversion Chart

								
	USA	France	Brazil	German W-nr	German DIN	UK	Spain	Japan JIS
HIGH STRENGTH ALLOY STEEL	A355Cl.D	30CAD6.12		1.8507	34CrAlMo5	905M31	F.1741 -	
	A355Cl.A	40CAD6.12		1.8509	41CrAlMo7	905M39 EN 41B	F.1740 -	
		18NC13		1.5755	31NiCr14	653M31	F.123	
	9840	40NCD3		1.6511	36CrNiMo4	816M40 EN 110	F.1280	
	4340		4340	1.6562	40NiCrMo73	817M40		SNCM 447
		30CND8		1.658	30CrNiMo8	823M30		
	4340	35NCD6	4340	1.6582	34CrNiMo8	817M40 EN 24	F.1272	SNCM 447
		35NCD14		1.6746	32NiCrMo145	830M31	F.1262	
		35NCD16		1.6747	30NiCrMo166	835M30	F.1260	
		30CD12		1.8515	31CrMoV139	722M24 EN 40B	F.1712	
			1.8523	39CrMoV139	897M39 EN 40C			
STRUCTURAL STEEL	A570 (36)	E24-2NE / S235JRG2	A36	1.0038	RS137-2	4360-40C		STKM 12A
	A570 (40)	E28-2 / S275JR		1.0044	SI44-2	4360-43A/B	A 430B	SM 400 A;B;C
	A570 (50)	A50-2 / E295		1.005	SI50-2	4360-50B		SS490
		A60-2 / E335-A70-2/E360		1.006/007	SI60-2/SI70-2	4360-55E		
	A284/A573/A611	E24-3;-4 / S235J2G3		1.0116	SI37-3	4360-40C/D-1449-37C	A360 C;D	
	A366/1012/A619	DC01		1.033/0333	SI12/13	1449 -2/3/4CR	AP 00/02	
	A620	DC04		1.0338	SI14	1449 1CR; 2CR	AP 04	
	A516Gr.65;-55;	A37CP;AP / P235GH		1.0345	H I	1501Gr.161-360/400	A 37 RC I;RA II	
		A42CP;AP / P265GH		1.0425	H II	161-400;	A42 RC I	
	A537	A52CP;AP / P335GH		1.0473	19Mn6		A 47 RB II	
	A516 (70)	A48CP;AP / P295GH		1.0481	17Mn4		A 47 RC I; RA II	
		E36-3/4 / S355J2G3		1.057	SI52-3	4360-50B;50C;50D	A 510 C;D	
	A204 (A)	15D3 / 15Mo3		1.5415	15Mo3	1501-240	F.2601 -	
	4520			1.5423	16Mo5	1503-245-420	F.2602 -	
	A350-LF3	12Ni14 / 12Ni14		1.5637	10Ni14	1501-503-690	F.152	
	3115	10NC6		1.5713	13NiCr6			
	3415	14NC11		1.5732	14NiCr10		F.1540	
	A182-F11;F12	15CD3.05		1.7335	13CrMo44	620Gr.27;31	F.2631	
	A387 (12)	15CD4.5		1.7337	16CrMo44	620Gr.27		
	A182F22	10CrMo9-10		1.738	10CrMo910	622Gr.31;45	TU.H	
A633Gr.E	E420RIFP / S420N		1.8902	SI420	4360-55E	AE 420 KG		
A633Gr.E	E460RIFP / S460N		1.8905	SI460		AE 460 KG		
HIGH TEMPERATURE ALLOYS	330	Z12NCS37.18		1.4864	X12NiCrSi3616	NA17	F.3313	
				1.4865	G-X40NiCrSi3818	330C40		
	B163	Z8NC3221		1.4876	X10NiCrAlTi3320	NA15(H)	F.3545	
	4544/SB127/164	NU30		2.436	NiCu30Fe	3072-76/NA13		
	4676			2.4375	NiCu30Al	3072-76/NA18/3146		
	5388 C	NC 17 DWY		2.4602	NiCr17Mo17FeW			
		NC 20 T		2.463	Ni-Cr20Ti	HR5/203-4/703-B		
		NC 20 TA		2.4631	NiCr20TiAl	HR 401HR601/736B		
		NCKD 20 ATV		2.4634	NiCo20Cr15MoAlTi	HR 3/5007		
	687	NCKD 20 AT		2.4636	NiCo15Cr15MoAlTi			
		NCK 20 D		2.465	NiCr20Co19MoTi	HR 10		
	5660C	Z8 NCDT 42		2.4662	NiCr15MoTi			
	5536E	Nc 22 FeD		2.4665	NiCr22Fe18Mo	HR 6/204		
		NC 19 FeNb		2.4668	NiCr19Fe19NbMo	HR 8		
	5542G	NC 15 Fe TNb		2.4669	NiCr16FeTi	HR 505		
	5391A	NC 13 AD		2.467	G-NiCr13Al6MoNb	HC 203		
		NK 15 CAT		2.4674	NiCo15Cr10MoAlTi	HC 204		
	5540	NC 15 Fe		2.4816	NiCr15Fe	3072-76		
	5581	NC 22 FeDNB		2.4856	NiCr22Mo9Nb			
		NC 21 FeDU		2.4858	NiCr21Mo	3072-76		
	NC 19 KDT		2.4973	NiCr19Co11MoTi				
684	NCK 19 DAT		2.4983	NiCr18Co18MoAlTi				
TITANIUM TITANIUM ALLOYS		T-35		3.7024/25	Ti 99.8	TA.1	Ti-PO1	
		T-U2		3.7124	TiCu2	TA.21-24/52-55/58	Ti-P11	
		T-A6ZD		3.7154	TiAl6Zr5Mo0.5Si0.2	TA.43/44	Ti-P67	
		T-A4DE		3.7184	TiAl4Mo4Sn2Si0.5	TA.45-51/57	Ti-P68	
	4941/42/51/4902	T-40		3.7034/35	Ti 99.7	TA.2/3/4/5	Ti-PO2	
	4901/21	T-60		3.7064/65	Ti99.5	TA.6/7/8/9	Ti-PO4	
	491128/35/54/65/67	T-A6V		3.7164/65	TiAl6V4	TA.10-13/28/56	Ti-P63	
	4900	T-50				DTD 5023/5283		

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For product information, call your local distributor.









# Material Conversion Chart

								
	USA	France	Brazil	German W-nr	German DIN	UK	Spain	Japan JIS
STAINLESS STEELS	410S	Z3014		1.4001	X7Cr14	403S17	F.8401	
	405	Z6CA13 / Z6CrAl13		1.4002	X8CrAl13	405S17	F.3111	
	416	Z12CF13 / Z12CrS13		1.4005	X12CrS13	416S21	F.3411	SUS 416
	410/CA-15	Z12C13 / Z12Cr13	410	1.4006	X10Cr13	410S21 ENEN 56A	F.3401	SUS 410
	430	Z8C17 / Z6Cr17		1.4016	X6Cr17	430S15 EN 60	F.3113	SUS 430
	420	Z20C13 / Z20Cr13	420	1.4021	X20Cr13	420S37	F.3402	SUS 420
		Z40C14 / Z40Cr14		1.4034	X46Cr13	420S45 EN 56D	F.3405	
	431	Z15CN16.02		1.4057	X20CrNi172	431S29 EN 57	F.3427	
	430F	Z10CF17		1.4104	X12CrMoS17		F.3117	
	434	Z8CD17.01		1.4113	X6CrMo17	434S17		
	440C	Z100CD17		1.4125	X105CrMo17			
	304/304H	Z6CN18.09	304	1.4301	X5CrNi1810	304S15 EN 58E	F.3451	SUS304
	308; 305	Z8CN18.12		1.4303	X5CrNi1812	305S19	F.3513	
	303	Z10CNF18.09	303	1.4305	X10CrNiS189	303S21 EN 58M	F.3508	SUS303
	304L	Z2CN18.10/Z3CN19.10M		1.4306	G-X2CrNi189/1911	304S12/S11/C12	F.3503	SCS19
	CF-8	Z6CN18.10M		1.4308	G-X6CrNi189	304C15		
	301	Z12CN17.07	302	1.431	X12CrNi177	301S21	F.3517	
	304LN	Z2CN18.10Az		1.4311	X2CrNiN1810	304S62		
		Z10CN18.9M		1.4312	G-X10CrNi188	302C25		
	CA6-NM	Z4CND13.4M		1.4313	G-X5CrNi134	425C11		
	316/316L	Z6CND17.11	316	1.4401	X5CrNiMo17122	316S16/S31 EN 58J	F.3543	SUS316
	316L	Z2CND 18.13	316L	1.4404	X2CrNiMo17132	316S11/S12	F.3533	SUS316 L
	316LN	Z2CND 17.12Az		1.4406	2CrNiMoN17122	316S61		SUS316LN
	CF-8M			1.4408	G-X6CrNiMo1810	316C16	F.8414	
	316LN	Z2CND17.13Az		1.4429	X2CrNiMo17133	316S62		SUS316LN
	316L	Z2CND17.13		1.4435	X2CrNiMo18143	316S11/S12	F.3533	SUS316LN
	316	Z6CND17.12		1.4436	X5CrNiMo17133	316S16	F.3534	SUS316
	317L	Z2CND19.15		1.4438	X2CrNiMo18164	317S12		SUS317L
	329		329 (DUPLEX)	1.446	X8CrNiMo275		F.3309	SUS329
	XM8/430Ti	Z8CT17		1.451	X6CrTi17		F.3114	
	409	Z6CT12		1.4512	X5CrTi12	409S19		
	321	Z6CNT18.10	321	1.4541	X6CrNiTi1810	321S12/S31 EN 58B	F.3523	SUS321
	630	Z6CNU17.04		1.4542	X5CrNiCuNb1714			SUS630
	347	Z6CNNb18.10		1.455	X6CrNiNb1810	347S17/S31 EN 58F	F.3552	SUS347
	316Ti	Z6CNDT17.12		1.4571	X6CrNiMoTi17122	320S31/S17 EN 58J	F.3552	
	316Ti			1.4573	X10CrNiMoTi1812	320S33		
	316Cb	Z6CNDNb17.12/19.13		1.458	X6CrNiMoNb17122	318S17		
	HNV3	Z45CS9		1.4718	X45CrSi93	401S45 EN52	F.3220	
		Z10C13		1.4724	X10CrAl13	403S17	F.13152	
		Z40CSD10		1.4731	X40CrSiMo102		F.3221	
	430	Z10CAS18		1.4742	X10CrAl18	430S15	F.3153	SUS430
	HNV6	Z80CSN20.02		1.4747	X80CrNiSi20	443S65 EN 59	F.3222	
	446	Z10CAS24		1.4762	X10CrAl24		F.3154	SUH446
	309	Z15CNS20.12		1.4828	X15CrNiSi2012	309S24		
	309S	Z15CN24.13		1.4833	X7CrNi2314	309S24		
314/310	Z15CNS25.20	314	1.4841	X15CrNiSi2520		F.3310		
310S	Z12CN25.20	310	1.4845	X12CrNi2521	310S24	F.331		
HK			1.4848	G-X40CrNiSi2520	310C40	F.8452		
EV8	Z52CMN21.09		1.4871	X53CrMnNiN219	349S54	F.3217		
	Z35CNWS14.14		1.4873	X45CrNiW189	331S40	F.3211		
321	T6CNT18.12(B)		1.4878	X12CrNiTi189	321S20	F.3523	SUS321	
A353	Z8N9		1.5662	X8Ni9	1501-509;510	F.2645		
2515	Z18N5		1.568	12Ni19				

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# Material Conversion Chart

								
	USA	France	Brazil	German W-nr	German DIN	UK	Spain	Japan JIS
<b>TOOL STEELS</b>	A532IBNiCr-LC			0.962	G-X260NiCr42	Grade2A		
	A532IANiCr-HC			0.9625	G-X330NiCr42	Grade2B		
	A532IDNi-HiCr			0.963	G-X300CrNiSi952	Grade2C,D,E		
	A532IID20%CrMo-LC			0.9645	G-X260CrMoNi2021	Grade3C		
	A532IIIA25%Cr			0.965	G-X260Cr27	Grade3D		
	A532IIIA25%Cr			0.9655	G-X300CrMo271	Grade3E		
	W108	Y190;Y180		1.1525	C80W1			
	W110	Y1105		1.1545	C105W1			SK3
	W112	Y2120		1.1663	C125W		F.5123	
	W1			1.175/.1625	C75W/C80W1	BW1A/BW1B	F.1507	
	L3	Y100C6	52100	1.2067	100Cr6	BL3	F.5230	
	D3	Z200C12	420 (1.2083)	1.208	X210Cr12	BD3	F.5212	
	L2			1.221	115CrV3			
	H11	Z38CDV5	H11	1.2343	X38CrMoV51	BH11	F.5317	
	H13	Z40CDV5	H13	1.2344	X40CrMoV51	BH13	F.5318	SKD61
	A2	Z100CDV5	A2	1.2363	X100CrMoV51	BA2	F.5227	SKD12
	H10	32DCV28	H10	1.2365	X32CrMoV33	BH10	F.5313	
	D2	Z160CDV12	D2	1.2379	X155CrVMo121	BD2		
		105WC13		1.2419	105WCr6		F.5233	
			D6 (VC131)	1.2436	X210CrW12		F.5213	
	O1		O1 (VND)	1.251	100MnCrW4	BO1	F.5220	SKS 31
	S1		S1 (VW3)	1.2542	45WCrV7	BS1	F.5241	
		55WC20		1.255	60WCrV7			
	H21	Z30WCV9	H20/H21	1.2581	X30WCrV93	BH21	F.5323	SKD5
				1.2601	X165CrMoV12		F.5211	
	H12	Z35CWDV5	H12	1.2606	X37CrMoW51	BH12		
	L6	55NCDV7	(VMO)	1.2713	55NiCrMoV6		F.528	
	W210	Y1105V		1.2833	100V1	BW2		
	2	90MV8		1.2842	90MnCrV8	BO2		
	T15			1.3202	S12-1-4-5	BT15	F.5563	
		Z130WKCDV10-10-04-03		1.3207	S10-4-3-10		F.553	
		Z85WDKCV06-05-05-04-02	M35	1.3243	S6-5-2-5		F.5613	
	M41	Z110WKCDV07-05-04-04-02		1.3246	S7-4-2-5		F.5613	
	M42	Z110DKCWW09-08-04-02-01	M42	1.3247	S2-10-1-8	BT42	F.5615	
	M33/M34			1.3249	S2-9-2-8	BM34	F.5611	
	T4	Z80WKCV18-05-04-01		1.3255	S18-1-2-5	BT4	F.5530	
	T5			1.3265	S18-1-2-10	BT5	F.5540	
	M3	Z90WDCV06-05-04-03		1.3342	SC6-5-2			
	M2	Z85WDCV06-05-04-02	M2	1.3343	S6-5-2	BM2	F.5603	
	M3Class2	Z130WDCV06-05-04-04	M3:2	1.3344	S6-5-3		F.5605	
H41/M1	Z85DCVW08-04-02-01		1.3346	S2-9-1	BM1			
M7	Z100DCVW09-04-02-02	M7	1.3348	S2-9-2		F.5607		
T1	Z80WCV18-04-01		1.3355	S18-0-1	BT1	F.5520		
A128(A)	Z120M12 / Z120Mn12		1.3401	X120Mn12		F.82551		
52100	100C6	52100	1.3505	100Cr6	534A99	F.1310		
<b>HARDENED STEEL</b>								
<b>CAST ALUMINIUM</b>	319,2	A-S5U		3.2151	G-AISI6Cu4	LM4/LM22	L-2660	
	380,1	A-S9U3		3.2161	G-AISI8Cu3	LM24	L-2630	
		A-S4G		3.2341	G-AISI5Mg	DTD716B		
	A356.2	A-S7G0,3		3.2371	G-AISI7Mg	2L99/LM25		
		A7-S10G		3.2373	G-AISI9Mg			
	A360	A-S10G		3.2381	G-AISI10Mg	LM9	L-2560	
	413,1	A-S12U		3.2583	G-AISI12Cu	LM20	L-2530	
	514.1	A-G6		3.3561	G-AIMg5	LM5		
	A413	A-S13		3.3581	G-AISI12	LM6	L-2520	
	520	A-G10-Y4		3.3591	G-AIMg10	LM10	L-2310	
	390				AISI17Cu4			
	393				AISI18-25CuNiMg	LM28/LM29		

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# Material Conversion Chart

								
	USA	France	Brazil	German W-nr	German DIN	UK	Spain	Japan JIS
<b>WROUGHT ALUMINIUM</b>	1200	A4		3.0205	Al99	1C	L-3001	
	1050A	A5		3.0255	Al99,5	1B	L-3051	
	1350A	A5/L		3.0257	E-Al	1E	L-3052	
	1080A	A8		3.0285	Al99,8	1A	L-3081	
	1199	A99		3.0385	Al99,98R	1		
	3004	A-M1G		3.0526	AlMnMg1	N4	L-3820	
	2014	A-U4SG		3.1255	AlCuSiMn	H15	L-3130	
	2117	A-U2G		3.1305	AlCu2,5Mg0,5	3L86/HR13	L-3180	
	2017A	A-U4G		3.1325	AlCuMg1	H14	L-3120	
	2024	A-U4G1		3.1355	AlCuMg2	2L98	L3140	
	2003	A-U4Pb		3.1645	AlCuMgPb		L-3121	
	2011	A-U5PbBi		3.1655	AlCuBiPb	FC1	L-3182	
	6101B			3.2305	E-AlMgSi	91E	L-3431	
	6463	A85-GS		3.2307	Al99,85MGSi	BTR6		
	6181	A-SGMO,7		3.2315	Al-Si Mg	H30	L-3451	
	6060			3.3206	AlMGSi0,5	H9	L-3441	
	6101C	A-GS/L		3.3207	E-AlMgSi0,5	BTR6		
	5005A	A-G0,6		3.3315	AlMg1	N41	L-3350	
	5050B	A-G1,5		3.3316	AlMg1,5	3L44	L-3380	
	5052	A-G2,5C		3.3523	AlMg2,5	N5Mg3,5	L-3360	
	5251	A-G2M		3.3525	AlMg2Mn0,3	N4		
	5754	A-G3M		3.3535	AlMg3		L-3390	
	5454	A-G2,5MC		3.3537	AlMg2,7Mn	N51		
	5083	5083		3.3547	AlMg4,5Mn	N8	L-3321	
	5056A			3.3555	AlMg5	N6	L-3320	
7020	A-Z5G		3.4335	AlZn4,5Mg1	H17	L-3741		
7075	A-Z5GU		3.4365	AlZnMgCu1,5	2L95	L-3710		
<b>SG / NODULAR CAST IRON</b>	60-40-18	FGS-400-12		0.704	GGG-40	420/12		
		FGS370-17		0.7043	GGG-40.3	370/17		
	65-45-12	FGS500-7		0.705	GGG-50	500/7		FDC500
	80-55-06	FGS 600-3		0.706	GGG-60	600/3		
	100-70-03	FGS 700-2		0.707	GGG-70	700/2		FDC700
	120-90-02	FGS 800-2		0.708	GGG-80	800/2		
		MB 35-7		0.8035	GTW-35-04	W 340/3		
		MB 40-10		0.804	GTW-40-05	W 410/4		
				0.8045	GTW-45-07			
	32 510	MN 35-10		0.8135	GTS-35-10	B 340/12		
		MP 50-5		0.8145	GTS-45-06	P 440/7		
		MP 60-3		0.8155	GTS-55-04	P 540/5		
				0.8165	GTS 65-02			
70 003	MP 70-2		0.817	GTS 70-02	P 690/2			
<b>GREY / WHITE CAST IRON</b>	A48-40B	Ft25D / FGL250		0.6025	GG25	Grade 260	FG 25	
	A48-20B	Ft10D / FGL100		0.601	GG10		FG 10	
	A48-25B	Ft15D / FGL150		0.6015	GG15	Grade 150	FG 15	
	A48-30B	Ft20D / FGL200		0.602	GG20	Grade 220	FG20	
	A48-45B	Ft30D / FGL300		0.603	GG30	Grade 300	FG 30	
	A48-50B	Ft35D / FGL350		0.6035	GG35	Grade 350	FG35	
	A48-60B	Ft40D / FGL400		0.604	GG40	Grade 400		
<b>BRONZE ALUMINIUM-BRONZE TIN BRONZE</b>	C 60 800	CuAl6		2.0918	CuAl5As			
	C 61 000	CuAl8		2.092	CuAl8			
	C 61 400	CuAl7Fe2		2.0932	CuAl8Fe3	CA 106		
	C 62 300	CuAl9Fe3Mn2		2.0936	CuAl10Fe3Mn2	CA 105		
	C 95 200	CuAl9Fe3		2.094	CuAl10Fe	AB 1		
	B 505	CuAl9Fe3		2.094	G-FeAlBzF50	AB 1		
		CuAl9Mn2		2.096	CuAl9Mn2			
	C 63 200	CuAl9Ni5Fe3Mn		2.0966	CuAl10Ni5Fe4	CA 104		
	C 95 800	CuAl9Ni5Fe		2.097	G-NiAlBzF50	AB 2		
		CuAl11Ni5Fe5		2.0978	CuAl11Ni6Fe5			
	C 94100	CuPb20Sn5		2.1188	G-CuPb20Sn	LB5		

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# Material Conversion Chart

								
	USA	France	Brazil	German W-nr	German DIN	UK	Spain	Japan JIS
<b>BRASS</b>	C 21000/34500	CuZn5		2.022/2.032	CuZn5	CZ 125/101		
	C 85700	CuZn40-Y30		2.034	G-CuZn37Pb	PCB 3		
	C 28000/38500	CuZn40/44Pb2		2.036/2.041	CuZn40/44Pb2	CZ 109/CZ130		
	C 68700	CuZn22Al2		2.046	CuZn20Al2	CZ 110		
	C 44300			2.047	CuZn28Sn1	CZ 111		
	C 46400			2.053	CuZn38Sn1	CZ 112		
	C 67400			2.055	CuZn40Al2	CZ 114		
	C 86400			2.0591	G-CuZn38Al	PCB1, DCB 3		
	C 86400	CuZn40-Y30		2.0592	G-CuZn35Al1	HTB 1		
	C 86300			2.0598	G-CuZn25Al5	HTB 3		
	C 90500			2.105	G-CuSn10Zn	G1		
	C 90800	CuSn12		2.1052	G-CuSn12	Pb2		
	C 91700			2.106	G-CuSn12Ni	CT2		
	C 90250			2.1086	G-CuSn10	CT1		
	C 93200	CuSn7Pb6Zn4		2.109	G-CuSn7ZnPb			
	C 92410			2.1093	G-CuSn6ZnNi	LG4		
	C 83600	CuPb5Sn5Zn5		2.1096	G-CuSn5ZnPb/RG5	LG2		
	C 93700	CuPb10Sn10		2.1176	G-CuPb10Sn	LB2		
C 93800			2.1182	G-CuPb15Sn	LB1			
<b>COPPER COPPER/NICKEL ALLOYS</b>	C 96200			2.0815	G-CuNi10			
	C 71300	CiNi25		2.083	CuNi25	CN 105		
	C 96400			2.0835	G-CuNi30	CN 2		
	C 72150	CuNi44		2.0842	CuNi44Mn1			
	C 70600	CuNi10Fe1Mn		2.0872	CuNi10Fe1Mn	CN 102		
	C 71500	CuNi30Mn1Fe		2.0882	CuNi30Mn1Fe	CN 107		
	C 17000	CuBe1,7		2.1245	CuBe1,7	CB 101		
	C 17200	CuBe1,9		2.1247	CuBe2			
	C 17500			2.1285	CuCo2Be	C 112		
	C 71640	CuNi30Fe2Mn2			CuNi30Fe2Mn2	CN 108		
	OF	Cu-c1/C2		2.004	OF-Cu	Cu-OF C 103/110		
	C 11000	Cu-a1/A2		2.006	E-Cu57	Cu-ETP-2 C 101		
	C 11000	Cu-a1		2.0065	E-Cu58	Cu-ETP-2 C 101		
	C 1200	Cu-b2		2.0076	SW-Cu			
	C 12200	Cu-b1		2.009	SF-Cu	Cu-DHP C 106		

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**M.A. Ford<sup>®</sup> Asia-Pacific Limited**

Room 1709, Level 17  
Millennium City 2  
378 Kwun Tong Road  
Kowloon, Hong Kong

Tel: +852-2167-7150  
Fax: +852-2167-8150  
e-mail: [sales@mafordeurope.com](mailto:sales@mafordeurope.com)