

# GOLD TWIST

DRILL LINE



## New Tip Geometry for Flat Bottom Hole-Making



### Diameters:

Metric: 8.00mm to 25.5mm  
(.5mm increments)

Inch: .312" - 1.012"

### Geometry:

Steel & General Purpose  
TPF Designation

### Grade:

IN2505

### Focus:

Die Spring Industry

SHCS

Bolt Holes

Blind Holes

Bottom Tapping Applications

Ingersoll has extended the application range of the successful **GOLD TWIST** drilling line by introducing a flat-face geometry tip for flat bottom machining, in a diameter range of 8.00mm to 25.5mm (.312" - 1.012").

The new line reduces the number of tools required to generate a flat bottom hole from 2 or 3 tools to a single tool, greatly reducing cycle time. The new geometry is compatible with the **GOLD TWIST**'s current line of bodies in the same size. Further benefits are excellent chip breaking and high precision flat surfaces.

### FEATURES:

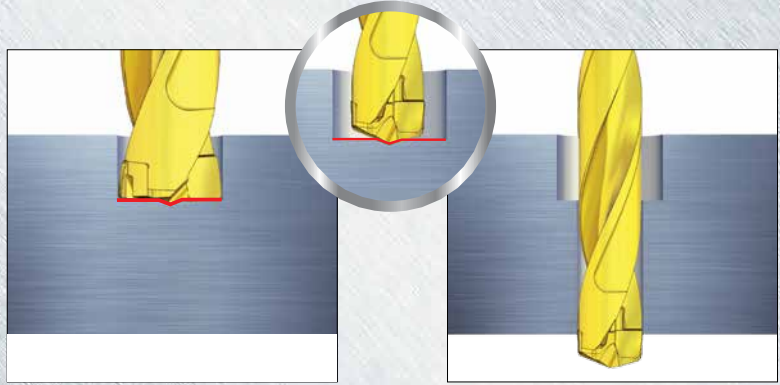
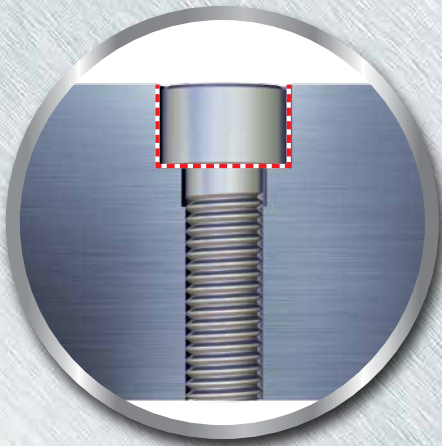
- Suitable for high precision machining of flat surfaces and excellent chip breaking capability
- Improved economy and reduced cycle time by producing flat bottom holes with a single tool
- New geometry is compatible with current **GOLD TWIST** bodies in the same size
- Recommended cutting parameters for flat bottom tips are the same as standard 140° **GOLD TWIST** tips
- IN2505 grade PVD multi-layered coating provides high wear resistance, chipping resistance and prolonged tool life





## MACHINING EXAMPLES

### 1. Counter bored holes for socket head cap screws



• Flat bottom hole for socket head

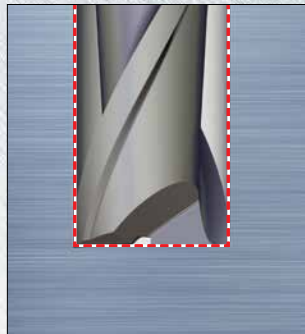
### 2. Flat bottom hole machining

Cycle time minimized by producing flat bottom hole with a single tool

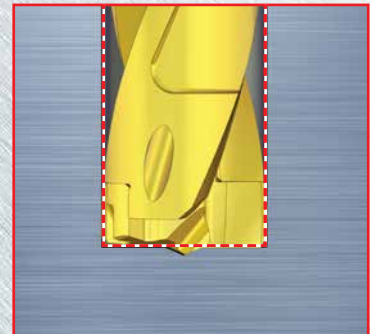
1 Drilling



2 End milling



TPF Style Tip



Conventional cutting method

New **GOLD TWIST** method

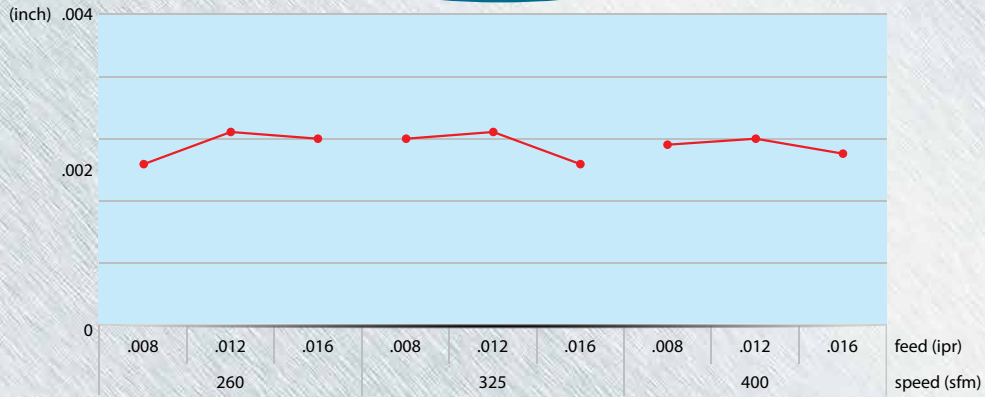


## CASE STUDY

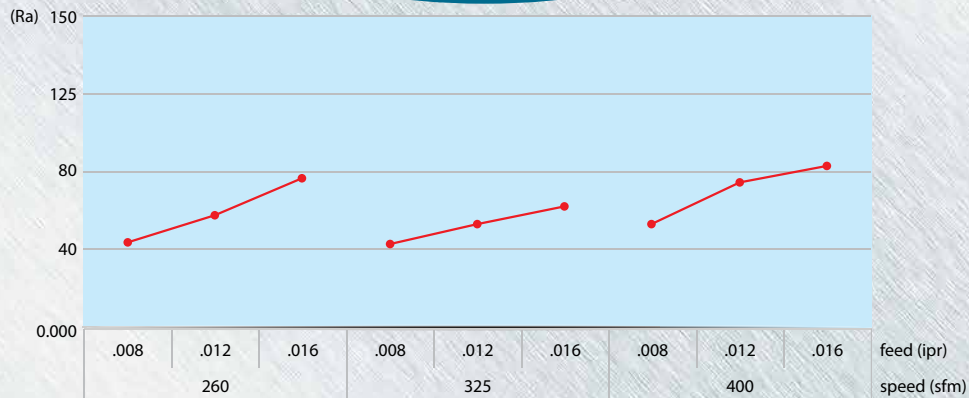
Machine	Vertical machining center (Spindle: BT50)
Cutting conditions	Speed(V) 260 / 325 / 400 (sfm)
	Feed(f) .008 / .012 / .016 (ipr)
Coolant	Internal (145psi)

Material	Alloy steel (AISI 4140)
Body	TD1300065C0R01
Head	TPF1300R01 IN2505 (.512")

### Hole Enlargement



### Surface Roughness



## HOLE IMAGES

Top view



Side view



## CHIP SHAPE

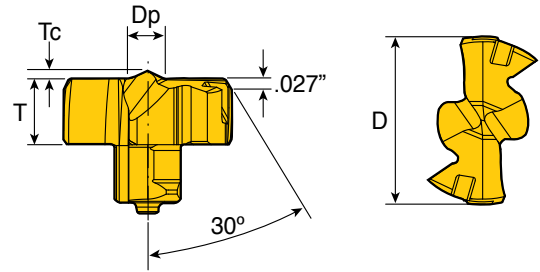




## FLAT BOTTOM TIPS



Grade : IN2505



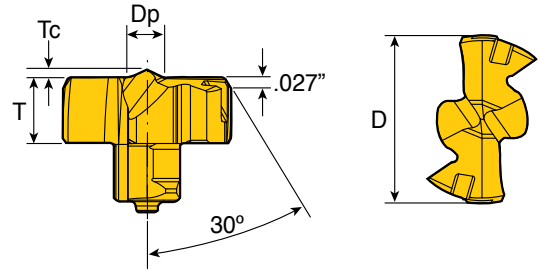
Description	D Diameter (mm)	D Diameter (inch)	T	Tc	Dp Point Diameter
TPF0794R01 IN2505	7.94	0.3125	0.157	0.015	0.091
TPF0800R01 IN2505	8.00	0.3150	0.157	0.015	0.091
TPF0850R01 IN2505	8.50	0.3346	0.157	0.015	0.091
TPF0900R01 IN2505	9.00	0.3543	0.165	0.016	0.090
TPF0950R01 IN2505	9.50	0.3740	0.165	0.016	0.090
TPF1000R01 IN2505	10.00	0.3937	0.173	0.018	0.096
TPF1050R01 IN2505	10.50	0.4134	0.173	0.018	0.096
TPF1100R01 IN2505	11.00	0.4331	0.177	0.021	0.122
TPF1110R01 IN2505	11.10	0.4370	0.177	0.021	0.122
TPF1150R01 IN2505	11.50	0.4528	0.177	0.021	0.122
TPF1200R01 IN2505	12.00	0.4724	0.189	0.022	0.116
TPF1250R01 IN2505	12.50	0.4921	0.189	0.022	0.116
TPF1270R01 IN2505	12.70	0.5000	0.189	0.022	0.116
TPF1300R01 IN2505	13.00	0.5118	0.201	0.023	0.120
TPF1350R01 IN2505	13.50	0.5315	0.201	0.023	0.120
TPF1400R01 IN2505	14.00	0.5512	0.217	0.024	0.130
TPF1429R01 IN2505	14.29	0.5620	0.217	0.024	0.130
TPF1450R01 IN2505	14.50	0.5709	0.217	0.024	0.130
TPF1500R01 IN2505	15.00	0.5906	0.233	0.026	0.139
TPF1550R01 IN2505	15.50	0.6102	0.233	0.026	0.139
TPF1588R01 IN2505	15.90	0.6250	0.233	0.026	0.139
TPF1600R01 IN2505	16.00	0.6299	0.248	0.027	0.147
TPF1650R01 IN2505	16.50	0.6496	0.248	0.027	0.147
TPF1700R01 IN2505	17.00	0.6693	0.260	0.028	0.148
TPF1750R01 IN2505	17.50	0.6890	0.260	0.028	0.148
TPF1800R01 IN2505	18.00	0.7087	0.271	0.028	0.151
TPF1830R01 IN2505	18.30	0.7205	0.271	0.028	0.151
TPF1850R01 IN2505	18.50	0.7283	0.271	0.028	0.151
TPF1900R01 IN2505	19.00	0.7480	0.283	0.029	0.152
TPF1905R01 IN2505	19.05	0.7500	0.283	0.029	0.152
TPF1930R01 IN2505	19.30	0.7598	0.283	0.029	0.152
TPF1950R01 IN2505	19.50	0.7677	0.283	0.029	0.152
TPF2000R01 IN2505	20.00	0.7874	0.323	0.042	0.266
TPF2050R01 IN2505	20.50	0.8071	0.323	0.042	0.266
TPF2060R01 IN2505	20.60	0.8110	0.323	0.042	0.266



## FLAT BOTTOM TIPS



Grade : IN2505



Description	D Diameter (mm)	D Diameter (inch)	T	Tc	Dp Point Diameter
TPF2100R01 IN2505	21.00	0.8268	0.339	0.043	0.276
TPF2150R01 IN2505	21.50	0.8465	0.339	0.043	0.276
TPF2200R01 IN2505	22.00	0.8661	0.350	0.044	0.292
TPF2222R01 IN2505	22.22	0.8750	0.350	0.044	0.292
TPF2250R01 IN2505	22.50	0.8858	0.350	0.044	0.292
TPF2300R01 IN2505	23.00	0.9055	0.366	0.045	0.299
TPF2350R01 IN2505	23.50	0.8252	0.366	0.045	0.299
TPF2381R01 IN2505	23.81	0.9375	0.366	0.045	0.299
TFP2400R01 IN2505	24.00	0.9449	0.382	0.046	0.320
TPF2450R01 IN2505	24.50	0.9646	0.382	0.046	0.320
TPF2500R01 IN2505	25.00	0.9843	0.398	0.047	0.321
TPF2540R01 IN2505	25.40	1.0000	0.398	0.047	0.321
TPF2550R01 IN2505	25.50	1.0039	0.398	0.047	0.321
TPF2570R01 IN2505	25.70	1.0118	0.398	0.047	0.321



## OPERATING GUIDELINES

ISO	Material	Condition	Tensile Strength Rm (N/mm <sup>2</sup> )	Hardness (HB)	Matl No.	Cutting Speed Vc (SFM)	Feed vs Drill Diameter					
							D= 7-9.9mm (.275-.390")	D= 10-11.9mm (.394-.469")	D= 12-13.9mm (.472-.547")	D= 14-15.9mm (.551-.626")	D= 16-19.9mm (.630-.783")	D= 20-25.9mm (.787-1.019")
							IPR (inches/rev)					
<b>P</b>	Non-alloy steel <0.25% C & cast steel, >= 0.25% C free cutting <0.55% C steel >= 0.55% C	Annealed	420	125	1	260-360-460	.005 .007 .009	.006 .008 .011	.007 .009 .012	.008 .011 .014	.010 .014 .018	.010 .014 .018
		Annealed	650	190	2	260-345-430						
		Quenched & Tempered	850	250	3	260-330-400						
		Annealed	750	220	4	230-295-360						
		Quenched & Tempered	1000	300	5	165-230-300						
	Low alloy steel & cast steel (less than 5% alloying elements)	Annealed	600	200	6	230-315-400	.005 .007 .010	.006 .008 .011	.006 .009 .013	.007 .010 .014	.009 .012 .016	.010 .014 .018
		Quenched & Tempered	930	275	7	230-295-360						
			1000	300	8	165-230-300						
	High alloy steel, cast steel, & tool steel	Annealed	680	200	10	165-230-300	.005 .006 .008	.005 .006 .007	.006 .008 .010	.007 .009 .011	.008 .010 .012	.009 .011 .013
		Quenched & Tempered	1100	325	11	130-200-265						
<b>M</b>	Stainless steel & cast stainless steel	Ferritic/martensitic	680	200	12	130-180-230	.004 .005 .006	.005 .006 .007	.006 .007 .008	.006 .008 .009	.006 .008 .010	.007 .009 .012
		Martensitic	820	240	13	130-180-230						
		Austenitic	600	180	14	100-165-230						
<b>K</b>	GreyCast Iron (GG)	Ferritic		160	15	300-410-525	.006 .009 .012	.008 .011 .014	.010 .013 .016	.012 .015 .018	.014 .018 .022	.014 .018 .024
		Pearlitic		250	16	265-360-460						
	Cast Iron Nodular (GGG)	Ferritic		180	17	300-450-600						
		Pearlitic		260	18	265-360-460						
	Malleable Cast Iron	Ferritic		130	19	300-410-525						
Pearlitic		230	20	265-360-460								
<b>N</b>	Aluminum - wrought alloy	Not cureable		60	21	300-510-725	.008 .011 .014	.010 .013 .016	.012 .015 .018	.014 .017 .020	.016 .020 .024	.018 .022 .028
		Cured		100	22	300-510-725						
	Aluminum - cast, alloyed	Not cureable		75	23	300-510-725						
		Cured		90	24	300-510-725						
		High temperature		130	25	265-400-525						
	Copper alloys	Free cutting		110	26	300-510-725						
		Brass		90	27	300-510-725						
		Electrolitic copper		100	28	300-510-725						
	Non-metallic	Duro & fiber plastics			29	-						
		Hard rubber			30	-						
<b>S</b>	High temp alloys	Fe based	Annealed	200	31	100-150-200	.002 .003 .004	.003 .004 .005	.004 .005 .006	.005 .006 .007	.005 .006 .008	.006 .007 .009
			Cured		280	32						
		Ni or Co based	Annealed	250	33	70-115-165						
			Cured	350	34	70-115-165						
			Cast	320	35	70-115-165						
	Titanium, Ti alloys		Rm 400		36	70-115-165						
		Alpha+beta alloys cured	Rm 1050		37	70-115-165						
<b>H</b>	Hardened steel	Hardened		55 HRC	38	70-115-165						
		Hardened		60 HRC	39	70-115-165						
	Chilled cast iron	Cast		400	40	-						
	Cast iron nodular	Hardened		55 HRC	41	-						

\* Feed Rates are based on Two Effective - DO NOT DOUBLE.