

Technical Details



Application Grade

Grade	Features		Available insert type
HU30T	Universal grade	<ul style="list-style-type: none"> • For chip breaker type only • Stable machining on a wide application due to fine-grained carbide substrate with balanced heat resistance and toughness • Excellent wear resistance and oxidation resistance due to AlTiN coating film Outstanding performance on high speed machining	CFA/CFB (Insert with Chip breaker)
HU35T	Specialized grade for threading inserts	<ul style="list-style-type: none"> • A tough sub-micron substrate with TiAlN coating provides good fracture toughness and excellent wear resistance • Outstanding performance on STS and hard to cut materials 	ER/IR (Ground insert)

Application Range










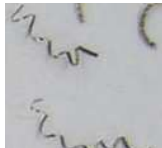


Workpiece		
P	Carbon steel, Alloy steel, Cast Steel	<div style="background-color: #00AEEF; padding: 5px; display: inline-block; margin-right: 20px;">HU30T</div> <div style="background-color: #00AEEF; padding: 5px; display: inline-block;">HU35T</div>
M	Stainless steel, Heat resistant steel, Titanium alloy steel	<div style="background-color: #FFD700; padding: 5px; display: inline-block; margin-right: 20px;">HU30T</div> <div style="background-color: #FFD700; padding: 5px; display: inline-block;">HU35T</div>
K	Carbon Iron, Aluminum, Cast Steel, Copper	<div style="background-color: #FF0000; padding: 5px; display: inline-block; margin-right: 20px;">HU30T</div> <div style="background-color: #FF0000; padding: 5px; display: inline-block;">HU35T</div>



Technical Details



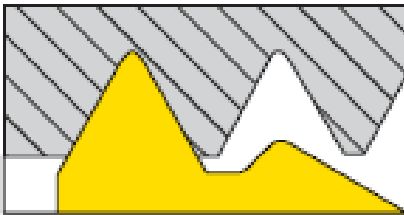
Threading Insert with Chip Breaker

Type	Ground insert without chip breaker		Insert with a chip breaker			
C/B Code	None		CFB		CFA	
Designation Example	ER16-A60		ER-16-AG60-CFB		ER16-AG60-CFA	
Machining	External	Internal	External	Internal	External	Internal
Insert shape						
Chip shape						
Class	P, M, K, N, S		P, M, K		P, M, K	
Features	<ul style="list-style-type: none"> • Groove-shaped chip breaker with superior chip evacuation lowers cutting load • Enables high precision machining • Applicable for machining of various shapes of threads • Applicable for machining of various workpieces 		<ul style="list-style-type: none"> • Unique 3 dimensional chip breaker improves machinability with good chip control • Excellent cutting edge treatment technology ensures high precision sharp cutting edge 		<ul style="list-style-type: none"> • Groove-shaped chip breaker with superior chip evacuation lowers cutting load • Reduces machining pass by 10~30% • Excellent cutting edge treatment achieves high precision sharp cutting edge 	



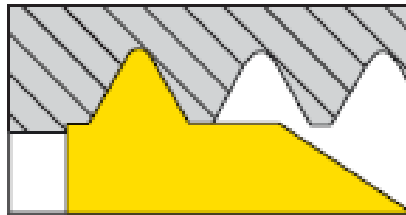
Insert profile style

Partial profile



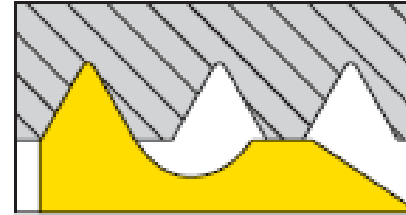
The V partial profile insert cuts without topping the outer diameter of the thread. The same insert can be used for a range of different thread pitches which have a common thread angle

Full profile



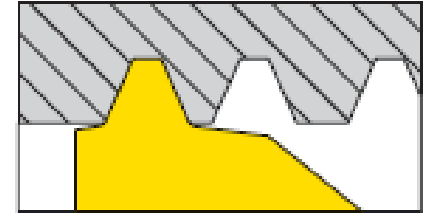
The full profile insert will form a complete thread profile including the crest. For every thread pitch and standard, a separate insert is required

Full Profile for fine pitches



The full profile for Fine Pitches will form a complete thread. The topping of the outer diameter is generated by second tooth

Semi full


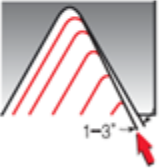



The Semi profile insert will form a complete thread including crest radius but without topping the outer diameter. Mainly used for trapezoidal profiles

Technical Details



Thread infeed method

Infeed	Application
 <p>Radial infeed</p>	<ul style="list-style-type: none"> • When the pitch is smaller than 16 tpi • For material with short chips • For work with hardened material <p>➔ Radial infeed is the simplest and quickest method. The feed is perpendicular to the turning axis, and both flanks of the insert perform the cutting operation. Radial infeed is recommended in 3 cases.</p>
 <p>Flank infeed (modified)</p>	<ul style="list-style-type: none"> • When the thread pitch is greater than 16 tpi. Using the radial method, the effective cutting edge length is too large, resulting in chatter. For TRAPEZ and ACME. The radial method results in three cutting edges, making chip flow very difficult. <p>➔ Flank infeed is recommended in the following cases.</p>
 <p>Alternate flank infeed</p>	<ul style="list-style-type: none"> • This method divides the load equally on both flanks, resulting in equal wear along the cutting edges. Alternate flank infeed requires more complicated programming, and is not available on all lathes. <p>➔ Use of the alternate flank method is recommended especially in large pitches and for materials with long chips.</p>

* Four options for G76 Multiple Thread Cutting are available:

1. P1: Single edge cutting, cutting amount constant
2. P2: Double edge cutting, cutting amount constant
3. P3: Single edge cutting, cutting depth constant
4. P4: Double edge cutting, cutting depth constant

P1 and P3 both allow for single edge threading, but the difference is that with P3 a constant depth cut is done with every pass. Similarly, P2 and P4 options allow for double edge cutting with P4 giving constant depth cut with every pass. Based on industry experience, double edge cutting option P2 may give superior threading results.

*See Haas lathe manual G-Code section for complete programming information on G76

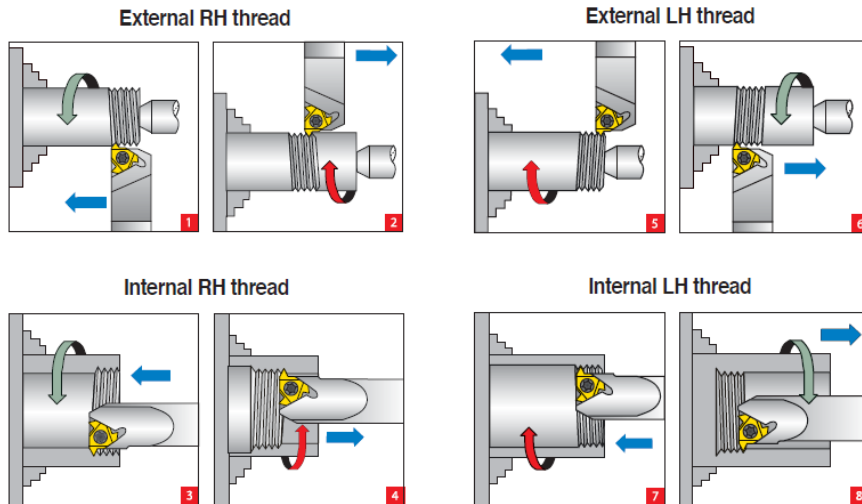


Technical Details



Thread turning method

Thread	Inserts & Tool holder	Rotation	Feed direction	Helix method	Drawing no.
Right Hand External	EX RH	Counter clockwise	Towards chuck	Regular	1
	EX LH	Clockwise	From chuck	Reversed	2
Right Hand Internal	IN RH	Counter clockwise	Towards chuck	Regular	3
	IN LH	Clockwise	From chuck	Reversed	4
Left Hand External	EX LH	Clockwise	Towards chuck	Regular	5
	EX RH	Counter clockwise	From chuck	Reversed	6
Left Hand Internal	IN LH	Clockwise	Towards chuck	Regular	7
	IN RH	Counter clockwise	From chuck	Reversed	8



Number of passes

Pitch	mm	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	8.00
	tpi	48	32	24	20	16	14	12	10	8	7	6	5.5	5	4.5	4	3
No. of passes		4~6	4~7	4~8	5~9	6~10	7~12	7~12	8~14	9~16	10~18	11~18	11~19	12~20	12~20	12~20	15~24








※ One cutting depth is calculated by total cutting depth divided into machining times
 ex) ER16-1.5ISO, hmin 0.92: If 10 times machining, one cutting depth is 0.092 (0.92/10)



Technical Details



Trouble shooting

Problem	Possible cause	Solution
 <p>Increased flank wear</p>	<ul style="list-style-type: none"> Cutting speed too high → Depth of cut too low/too many passes → Unsuitable carbide grade → Insufficient cooling → 	<ul style="list-style-type: none"> Reduce cutting speed/ use coated insert Increase the depth of cut per pass Use a coated carbide grade Increase coolant flow rate
 <p>Uneven cutting edge wear</p>	<ul style="list-style-type: none"> Incorrect helix angle → Wrong infeed method → 	<ul style="list-style-type: none"> Choose the correct shim Use the Alternating Flank Infeed method
 <p>Extreme plastic deformation</p>	<ul style="list-style-type: none"> Depth of cut too large → Insufficient cooling → Cutting speed too high → Unsuitable carbide grade → Nose radius too small → 	<ul style="list-style-type: none"> Decrease depth of cut/ increase number of passes Increase coolant flow rate Reduce cutting speed Use a tougher carbide Use an insert with a larger radius, if possible
 <p>Cutting edge breakage</p>	<ul style="list-style-type: none"> Depth of cut too large → Extreme plastic deformation → Insufficient cooling → Unsuitable carbide grade → Instability → 	<ul style="list-style-type: none"> Decrease depth of cut/ increase number of passes. Use a tougher carbide Increase flow rate and/ or correct flow direction Use a tougher carbide Check stability of the system
 <p>Built-up edge</p>	<ul style="list-style-type: none"> Incorrect cutting speed → Unsuitable carbide grade → 	<ul style="list-style-type: none"> Change the cutting speed Use a coated carbide
 <p>Thread profile is too shallow</p>	<ul style="list-style-type: none"> The tool is not at the workpiece axis height → Insert is not machining the thread crest → Worn insert → 	<ul style="list-style-type: none"> Change tool height Measure the workpiece diameter Change the cutting edge sooner
 <p>Poor surface quality</p>	<ul style="list-style-type: none"> Too low cutting speed → Wrong shim → Flank infeed method is not appropriate → 	<ul style="list-style-type: none"> Increase cutting speed Choose correct shim Use the alternate flank or radial infeed method