








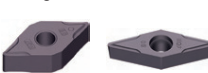

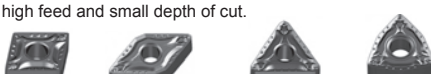






## Introduction of chip-breakers

















Negative inserts with a hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Feature/Shape of insert
For finishing	<b>SF</b> 	<b>M</b>	$a_p=0.002\sim0.039(\text{inch})$ $f_n=0.002\sim0.014(\text{inch/r})$	<b>Recommended chipbreaker for fine-finishing P-kind soft steel</b> Double-side chipbreaker with M-class tolerance has outstanding performance on machining P kind soft steel and medium-carbon steel to ensure high surface quality. 
	<b>DF</b> 	<b>M</b>	$a_p=0.012\sim0.079(\text{inch})$ $f_n=0.002\sim0.014(\text{inch/r})$	<b>Recommended chipbreaker for finishing P-kind materials</b> Double-side chipbreaker with M-class tolerance for finish machining carbon and alloy steels. 
	<b>EF</b> 	<b>M</b>	$a_p=0.002\sim0.039(\text{inch})$ $f_n=0.002\sim0.012(\text{inch/r})$	<b>Recommended chipbreaker for finishing M-kind materials</b> Double-side chipbreaker with M-class tolerance with sharp edge for machining stainless steel to reduce built-up edge and work-hardening, while improving surface finish. 
	<b>NF</b> 	<b>E</b>	$a_p=0.004\sim0.039(\text{inch})$ $f_n=0.002\sim0.012(\text{inch/r})$	<b>Recommended chipbreaker for finishing S-kind materials</b> Double-side chipbreaker with E-class tolerance, for holding close tolerance when indexing. Wear resistance and work hardening resistance combine to achieve high machining precision. 
	<b>NG F</b> 	<b>E</b>	$a_p=0.004\sim0.039(\text{inch})$ $f_n=0.002\sim0.012(\text{inch/r})$	<b>Recommended chipbreaker for general finishing of S- materials</b> E-class double side chip breaker with excellent sharp edge. High positioning accuracy, light cutting force. -NGF is recommended chip breaker for S series material general finishing. 
Wiper	<b>WG F</b> 	<b>M</b>	$a_p=0.012\sim0.079(\text{inch})$ $f_n=0.004\sim0.016(\text{inch/r})$	<b>Wiper chipbreaker for finishing</b> Double-sided chipbreaker with M-level tolerance, finishing chipbreaker with wiper designed can achieve high surface quality. With excellent chip breaking ability, It is suitable for machining at high feed and small depth of cut. 
For semi-finishing	<b>DM</b> 	<b>M</b>	$a_p=0.059\sim0.197(\text{inch})$ $f_n=0.006\sim0.020(\text{inch/r})$	<b>Recommended chipbreaker for semi-finishing P-kind materials</b> Double-side chipbreaker with M-class tolerance reduces cutting force and workpiece adhesion, with a broad chipbreaking range for machining alloy steel. 
	<b>PM</b> 	<b>M</b>	$a_p=0.059\sim0.197(\text{inch})$ $f_n=0.006\sim0.020(\text{inch/r})$	<b>Recommended chipbreaker for semi-finishing P-kind materials</b> Double-side chipbreaker with M-class tolerance has higher toughness on cutting edge than DM chipbreaker. It's suitable for semi-finishing under unfavorable conditions. Also good for machining cast iron with low cutting force. 

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## Introduction of chip-breakers

Negative inserts with a hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Feature/Shape of insert
For semi-finishing	<b>NM</b> 	<b>M</b>	$a_p=0.004\sim0.059(\text{inch})$ $f_n=0.002\sim0.012(\text{inch/r})$	<b>Recommended chipbreaker for semi-finishing S-kind materials</b> Double-side chipbreaker with M-class tolerance with good capability to prevent wear and work-hardening when machining low-machinability rated metals. Possesses higher feed and depth of cut capability than NF chipbreaker. 
	<b>WGM</b> 	<b>M</b>	$a_p=0.012\sim0.079(\text{inch})$ $f_n=0.004\sim0.016(\text{inch/r})$	<b>Wiper chipbreaker for semi-finishing</b> Double-sided chipbreaker with M-level tolerance, semi-finishing chipbreaker with wiper designed, perfect combination of good wiper result and sturdy cutting edge structure, which perfectly meet the requirement of high efficiency and good surface quality. 
	<b>EM</b> 	<b>M</b>	$a_p=0.020\sim0.059(\text{inch})$ $f_n=0.004\sim0.012(\text{inch/r})$	<b>Recommended chipbreaker for semi-finishing M-kind materials</b> Double-side chipbreaker with M-class tolerance serves to reduce cutting force and workpiece adhesion when machining stainless steel. Possesses higher feed and depth of cut capability than EF chipbreaker. 
	<b>Conventional Chipbreaker</b> 	<b>M</b>	$a_p=0.059\sim0.197(\text{inch})$ $f_n=0.008\sim0.020(\text{inch/r})$	<b>For machining P-kind, M-kind, K-kind materials from semifinishing to roughing</b> Double-side chipbreaker with M-class tolerance has good cutting edge toughness with wide application area. Unfavorable chip control compared to dedicated chipbreakers. 
Light-load roughing	<b>DR</b> Double-side 	<b>M</b>	$a_p=0.118\sim0.472(\text{inch})$ $f_n=0.012\sim0.031(\text{inch/r})$	<b>Recommended chipbreaker for light-load roughing of P-kind and K-kind materials</b> Double-side chipbreaker with M-class tolerance for light roughing, higher metal removal rate, and greater cutting edge security. 
	<b>DR</b> Single-side 	<b>M</b>	$a_p=0.118\sim0.591(\text{inch})$ $f_n=0.012\sim0.031(\text{inch/r})$	<b>Recommended chipbreaker for roughing P-kind materials</b> Single-side chipbreaker with M-class tolerance has high security on cutting edge for higher removal rates and low cutting force at large cutting depth and high feed rates. 
For roughing	<b>ER</b> Single/Double side 	<b>M</b>	Double sided $a_p=0.098\sim0.315(\text{inch})$ $f_n=0.008\sim0.024(\text{inch/r})$ Single sided $a_p=0.098\sim0.787(\text{inch})$ $f_n=0.008\sim0.047(\text{inch/r})$	<b>Recommended chipbreaker for roughing M-kind materials</b> Single/Double side chipbreaker with M-class tolerance has good impact-resistance. The chipbreaker's cutting edge is designed to balance security and sharpness. High performance is achieved by reducing edge build-up and reducing heat when roughing stainless steel. 
	<b>SNR</b> 	<b>M</b>	$a_p=0.020\sim0.118(\text{inch})$ $f_n=0.002\sim0.012(\text{inch/r})$	<b>Recommended chipbreaker for S-material high efficiency roughing</b> M-level double-sided chipbreaker perfectly combines sharpness and strength of the cutting edge, with small cutting resistance and high edge strength can effectively reduce groove wear. SNR is recommended chipbreaker for high depth roughing of S- materials. 

## Introduction of chip-breakers


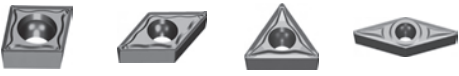










Negative inserts with a hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Feature/Shape of insert
Heavy-load machining			$a_p=0.197\sim0.591(\text{inch})$ $f_n=0.012\sim0.039(\text{inch/r})$	<b>Recommended chipbreaker for heavy-load machining P-kind materials</b> Single-side chipbreaker with M-class tolerance has high strength and security on cutting edge, with strong capability to prevent plastic-deformation under high metal removing rate. 
Cast iron machining			$a_p=0.012\sim0.472(\text{inch})$ $f_n=0.002\sim0.024(\text{inch/r})$	<b>For machining cast iron</b> Double-side with M-class tolerance has high cutting edge strength to effectively machine through workpiece imperfections, such as sand pockets in cast iron. 
Super hard inserts			$a_p=0.002\sim0.020(\text{inch})$ $f_n=0.002\sim0.012(\text{inch/r})$	<b>For machining non-ferrous metal and high-hardness material</b> G-class tolerance is the best choice for machining nonferrous metals with high-hardness materials by soldering PCBN and PCD onto cemented carbide substrate. 

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## Introduction of chip-breakers

Positive inserts with a hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Feature/Shape of insert
For extra finishing	<b>SF</b> 	<b>G</b>	$a_p=0.002\sim0.039(\text{inch})$ $f_n=0.002\sim0.012(\text{inch/r})$	<b>First choice for finish machining</b> G-class tolerance is recommended for precision finishing. 
	<b>HF</b> 	<b>M</b>	$a_p=0.004\sim0.079(\text{inch})$ $f_n=0.002\sim0.012(\text{inch/r})$	<b>Chipbreaker for finishing with wide application</b> With M-class tolerance suitable for internal and external finishing machining for various materials such as steel and cast iron etc. 
For finishing	<b>EF</b> 	<b>M</b>	$a_p=0.004\sim0.079(\text{inch})$ $f_n=0.002\sim0.012(\text{inch/r})$	<b>Recommended chipbreaker for finishing M-kind materials</b> M-class tolerance; sharp cutting edge suitable for finishing materials as stainless steel and soft steel, etc. where edge build-up is problem. 
	<b>NGF</b> 	<b>E</b> <b>G</b>	$a_p=0.004\sim0.039(\text{inch})$ $f_n=0.002\sim0.012(\text{inch/r})$	<b>Recommended chipbreaker for S-material general finishing</b> E, G grade accuracy, for inner hole finishing of S materials. 
For semi-finishing	<b>HM</b> 	<b>M</b>	$a_p=0.039\sim0.157(\text{inch})$ $f_n=0.008\sim0.020(\text{inch/r})$	<b>Chipbreaker for semi-finishing with wide application</b> M-class tolerance; suitable for boring and o.d. semi-finishing materials, like steel and cast iron etc. 
	<b>EM</b> 	<b>M</b>	$a_p=0.039\sim0.157(\text{inch})$ $f_n=0.008\sim0.020(\text{inch/r})$	<b>Recommended chipbreaker for semi-finishing M-kind materials</b> M-class tolerance; higher toughness on cutting edge than EF chipbreaker for higher feed and depth of cut. 

## Introduction of chip-breakers

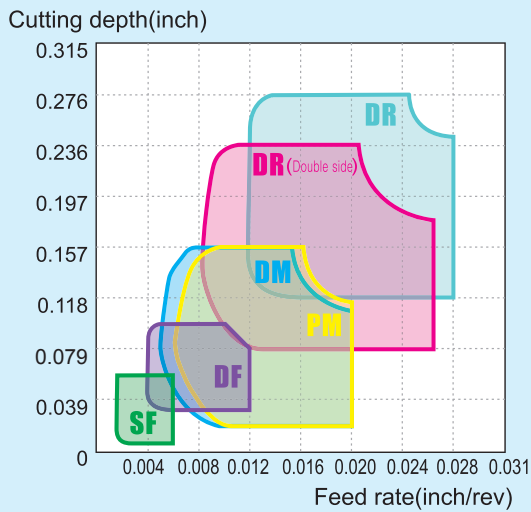
Positive inserts with a hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Feature/Shape of insert
For roughing		 $a_p=0.118\sim0.276(\text{inch})$ $f_n=0.012\sim0.028(\text{inch/r})$	<b>General chipbreaker for roughing</b> M-class tolerance; suitable for both boring and o.d. roughing materials as steel, stainless steel and cast iron etc.	
		 $a_p=0.02\sim0.118(\text{inch})$ $f_n=0.002\sim0.012(\text{inch/r})$	<b>Recommended chipbreaker for S-material high-efficiency roughing</b> M-level accuracy, for inner hole roughing of S materials.	
For Al machining		 $a_p=0.02\sim0.189(\text{inch})$ $f_n=0.002\sim0.020(\text{inch/r})$	<b>Chipbreaker for machining Al</b> G-class tolerance, large rake angle and large clearance angle combine for positive cutting action, with good chip control.	
		 $a_p=0.004\sim0.315(\text{inch})$ $f_n=0.002\sim0.016(\text{inch/r})$	<b>Unique chipbreaker for machining AL alloy</b> G-class tolerance, big rake angle and surface polishing, prevents built-up edge, allowing for high surface workpiece quality and long tool life.	
Super hard inserts		 $a_p=0.002\sim0.020(\text{inch})$ $f_n=0.002\sim0.012(\text{inch/r})$	<b>For nonferrous metals and materials with high hardness</b> G-class tolerance; for machining nonferrous metals and materials with high hardness by soldering PCBN and PCD material to cemented carbide substrate.	

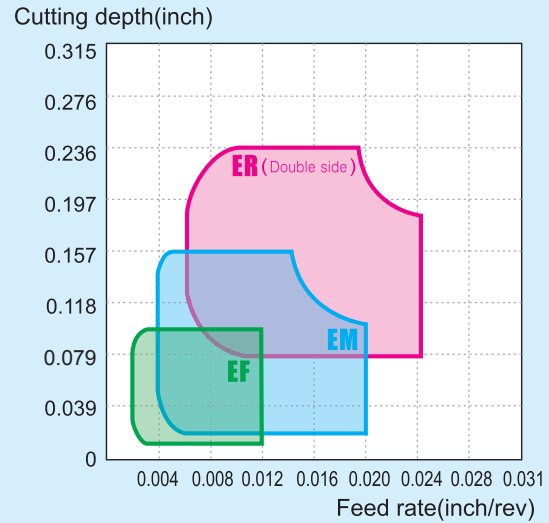
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## Main chip breaking range reference for general turning inserts

### Negative inserts

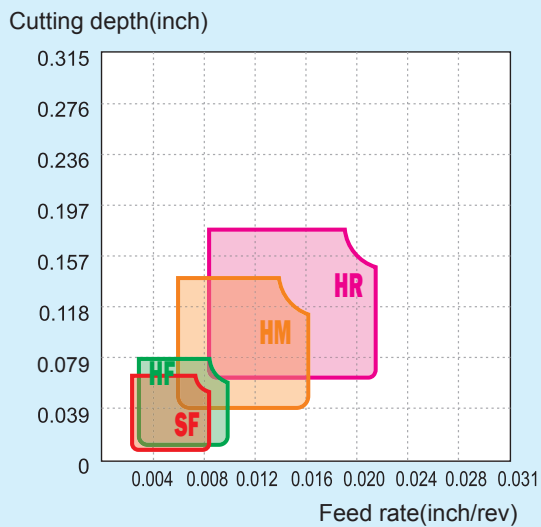


► Workpiece material: 45# steel

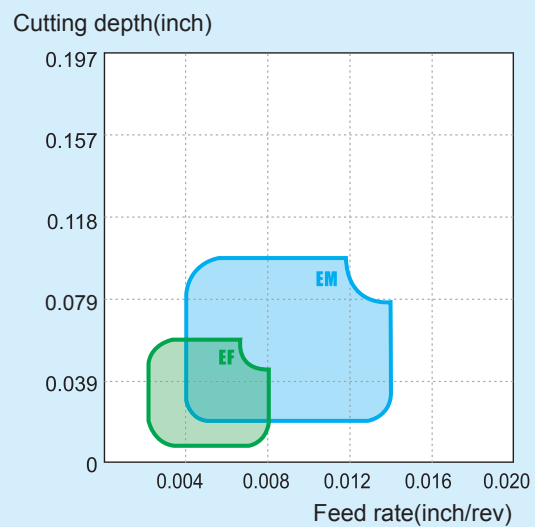


► Workpiece material: stainless steel (Austenitic 321)

### Positive inserts



► Workpiece material: 45# steel



► Workpiece material: stainless steel (Austenitic 321)



# -EF -EM -ER

Specially designed for machining intensively adhesive and high-plasticity materials such as stainless steel, etc

## -EF

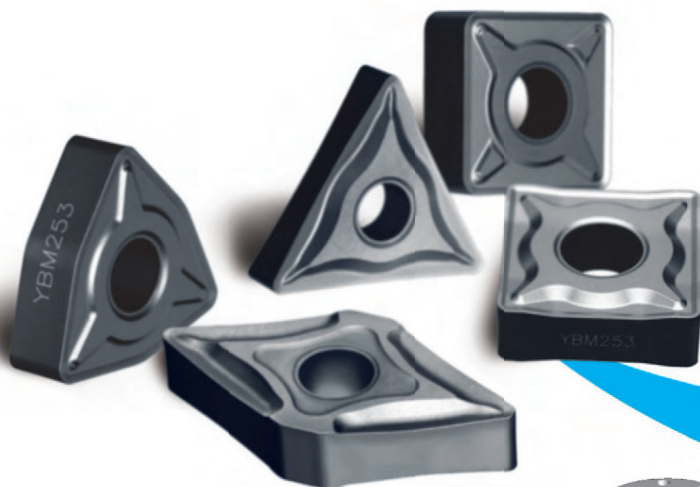
Rake angle and inclined angle are specially designed for intensively adhesive stainless steel and high-plasticity materials which are hard to be machined. Sharp cutting edge enables it to cut lightly and easily and achieve good surface quality by well controlling chip breaking. It is especially suitable for finishing these kinds of materials.

## -EM

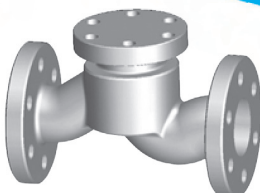
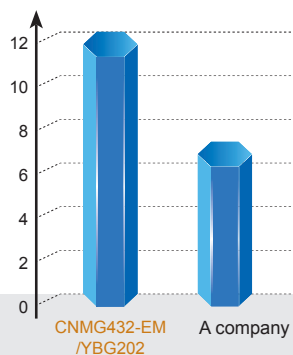
Inserts meet the requirements of machining intensively adhesive materials. Impact resistance of cutting edge is improved in addition to sharpness, which makes it suitable for semi-finishing and intermittent machining of adhesive materials such as austenitic stainless steel, etc.

## -ER

Specially designed double rake angle with wide land achieves balance between edge security and sharpness, and effectively reduces cutting resistance and wear on groove.



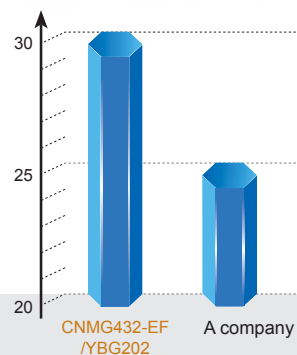
Number of machined parts / Cutting edge



Machining external of valve

Machining end surface of valve (intermittent machining)  
Workpiece diameter: 5.3in  
Rotating speed: 350 rpm  
Feed rate: 0.01in/r  
Cutting depth: 0.059in

Number of machined parts / Cutting edge



Machining external of valve  
Workpiece diameter: 3.5in  
Rotating speed: 635rpm  
Feed rate: 0.006in/r  
Cutting depth: 0.039in