GOLD•RHINO

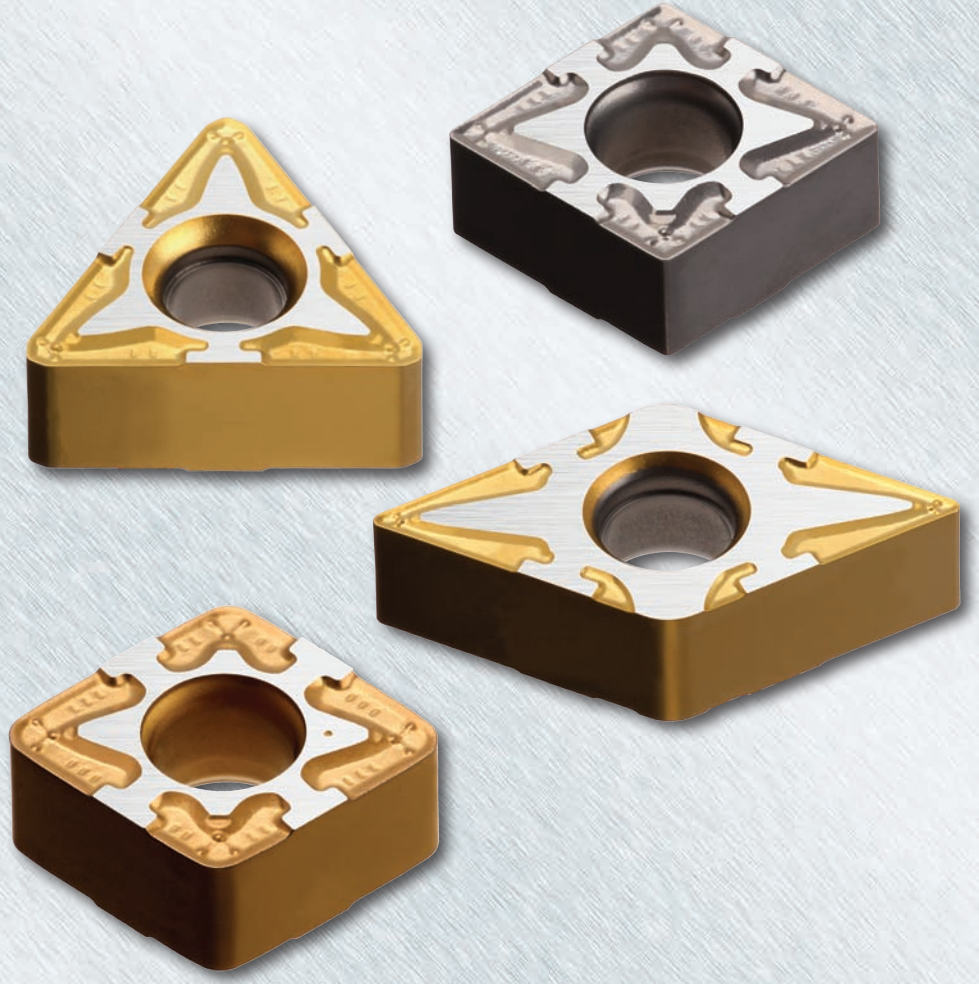
Shapes:
CNMG
DNMG
TNMG
WNMX

Corner Radius:
0.016" (0.4mm)
0.031" (0.8mm)
0.047" (1.2mm)

Grades:
Coated Carbide
- TT7005
- TT7015
- TT8105
- TT8115
- TT8125
- TT5100

Cermet
- CT3000 (uncoated)
- PV3010 (PVD-TiN coated)

NEW PRODUCT ANNOUNCEMENT 2017



A New Wiper Insert Line Now Available for Gold•Rhino

Ingersoll is pleased to announce the introduction of wiper inserts to the Gold Rhino product line. The smaller-sized Gold Rhino inserts are a perfect complement to the wiper geometry, particularly when using the inserts in finishing applications where lighter cutting depths are generally applied.

Available in CNMG, DNMG, TNMG and WNMX shapes, and with three radius and eight grade options, these Gold Rhino wiper inserts cover a wide range of machining applications where higher feed rates and/or improved surface finish is desired.

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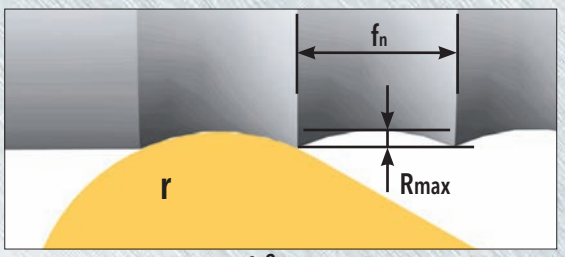
Ingersoll Cutting Tools

WIPER INSERT FEATURES

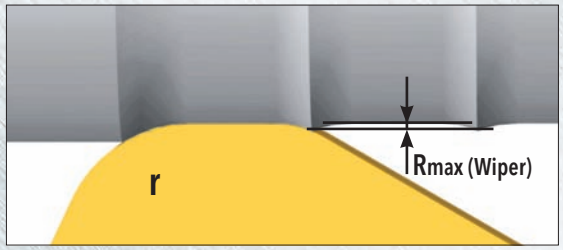
- Compared to general inserts, the new wiper inserts achieve equivalent roughness even in double feed rate conditions.
- At equivalent feed rates, the new Gold•Rhino wiper inserts achieve 2-3 times better surface roughness.
- Predictable surface roughness in a wide feed range.
- Higher feed increases productivity.

Conventional insert

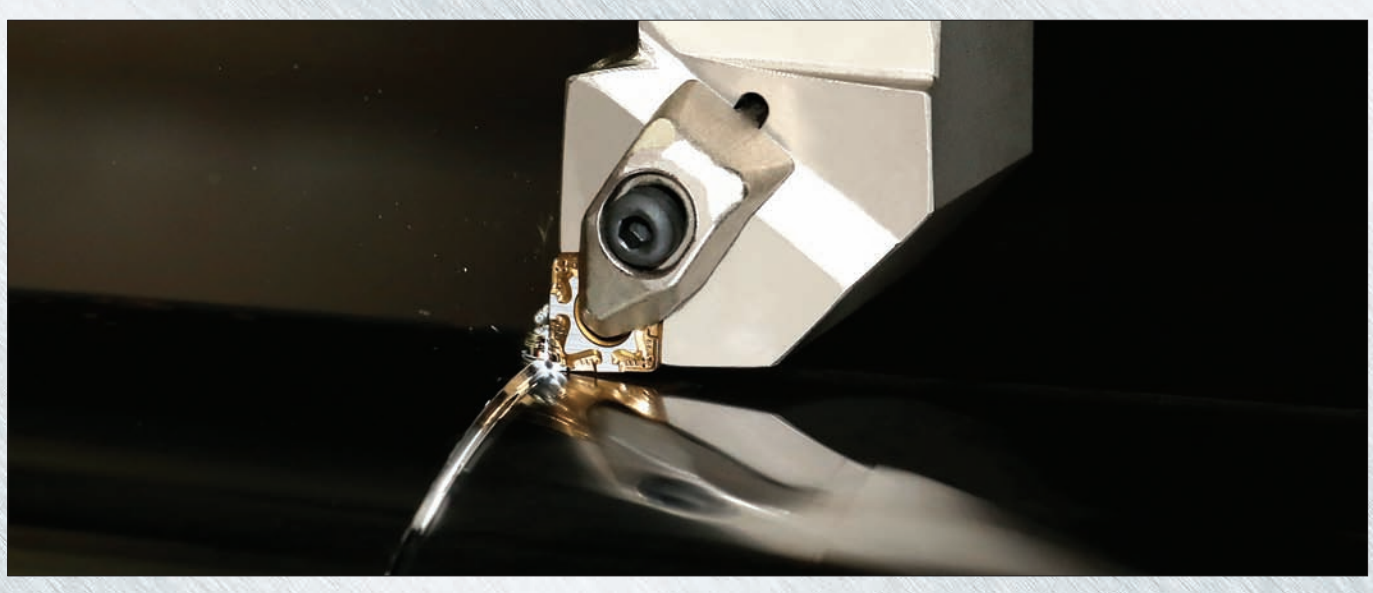


$R_{max} = f_n^2 \times 1000 / 8r$

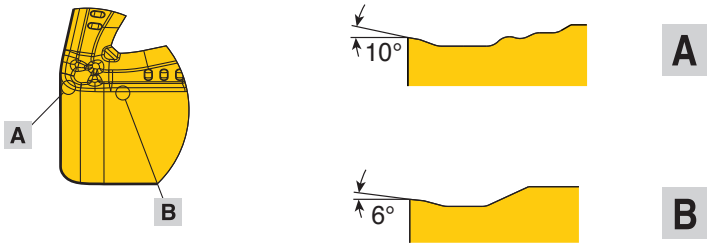
Wiper insert



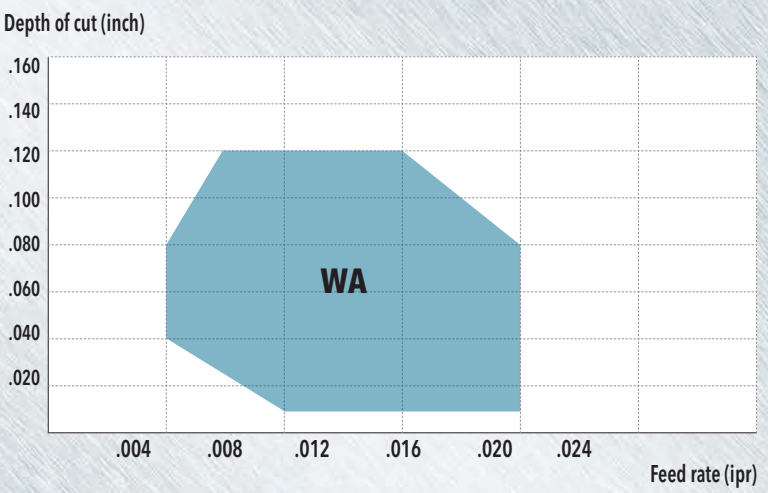
$R_{max}\,(Wiper) = R_{max} / 2$



WIPER INSERT EDGE GEOMETRY

Chip breaker	Edge geometry
 WA	

WIPER INSERT RANGE



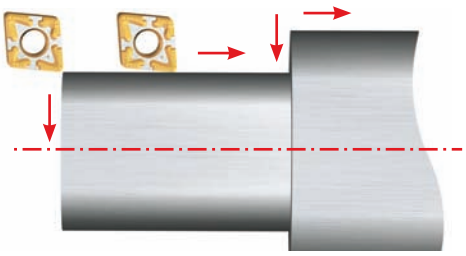
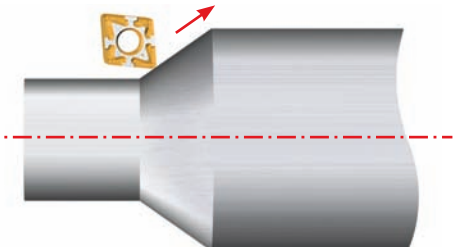
- Insert : CNMG 332 (090408) WA
- Cutting speed (V) : 650 sfm
- Material : 0.45% Carbon Steel (HB200~230)

NOTE: PRIOR TO USING WIPER INSERTS

• In order to obtain the full effect of the insert's wiper capability, please combine both the holder and the insert as suggested below:

Tool holder	Insert
Approach angle at 95°	CNMG-WA (80° corner), WNMX-WA
Approach angle at 75°	CNMG-WA (100° corner)
Approach angle at 93°	DNMG-WA
Approach angle at 91°	TNMG-WA

Without using the above holder insert combinations, it is not possible to achieve the wiper effect during machining.

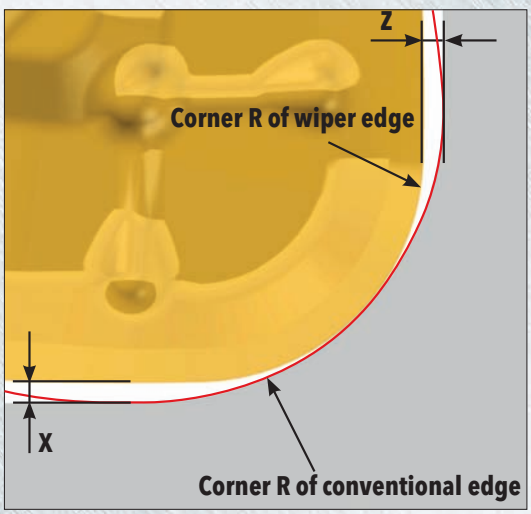
• Effective application - Straight cutting in parallel or perpendicular to the work-piece's center line	• Ineffective application - Tapered or curved face cutting
	

* Ingersoll does not recommend using wiper inserts for internal machining in long overhang conditions due to excessive radial tool pressure that can create vibration.

NOTE: PRIOR TO USING WIPER INSERTS

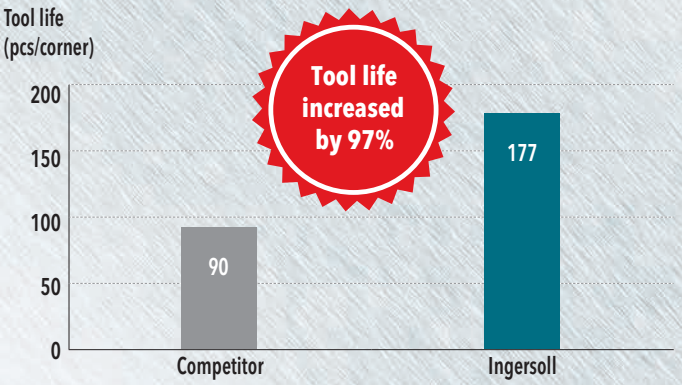
- **To set the wiper insert cutting edge height on the non wiper insert equivalent, the following adjustments should be applied.**

Index position difference				
Insert type	Corner R	Designation	X (inch)	Z (inch)
CNMG & WNMX (80°)	.016	CNMG331(090404) WA	.0012	.0012
		WNMX331(060404) WA		
	.031	CNMG332(090408) WA	.0012	.0012
		WNMX332(060408) WA		
	.047	CNMG333(090412) WA	.0020	.0020
		WNMX333(060412) WA		
CNMG (100°)	.016	CNMG331(090404) WA	.0012	0
	.031	CNMG332(090408) WA	.0012	0
	.047	CNMG333(090412) WA	.0024	0
DNMG (55°)	.016	DNMG3.53.51(130504) WA	.0008	0
	.031	DNMG3.53.52(130508) WA	.0020	.0004
	.047	DNMG3.53.53(130512) WA	.0028	.0008
TNMG (60°)	.016	TNMG2.531(130404) WA	.0008	0
	.031	TNMG2.532(130408) WA	.0020	.0004
	.047	TNMG2.533(130412) WA	.0031	.0004



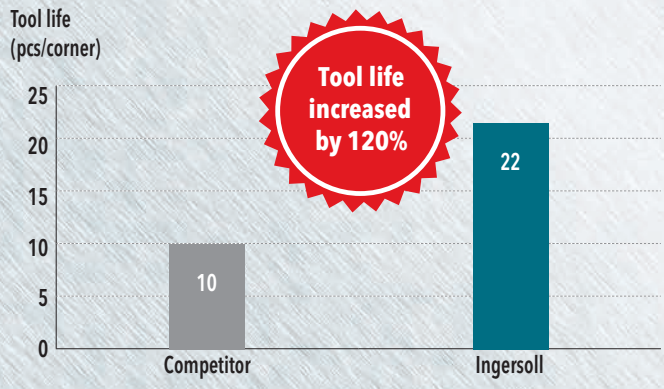
CASE STUDY 1

		Competitor	Ingersoll
Workpiece material		Automotive structural steel (SAPH 440-P)	
Operation		Internal turning	
Insert		CNMG432(120408) cermet PVD coated	CNMG331(090404) WA TT8115
Cutting speed	V (sfm)	1180	
Feed rate	F (ipr)	.005	
Depth of cut	ap (inch)	.020	
Coolant		Yes	
Tool life (pcs/corner)		90	177
Surface finish (Ra)		10.2 - 21.2 µ in	



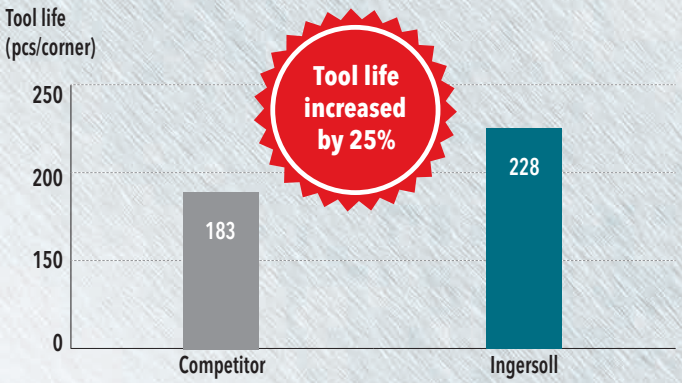
CASE STUDY 2

		Competitor	Ingersoll
Workpiece material		SAE 8620 (SNCM220(H))	
Operation		External turning	
Insert		DNMG432(150408) carbide CVD coated	DNMG3.53.52(130508) WA TT8115
Cutting speed	V (sfm)	700	
Feed rate	F (ipr)	.020	
Depth of cut	ap (inch)	.008	
Coolant		Yes	
Tool life (pcs/corner)		10	22
Surface finish (Ra)		47.2 - 123 µ in	



CASE STUDY 3

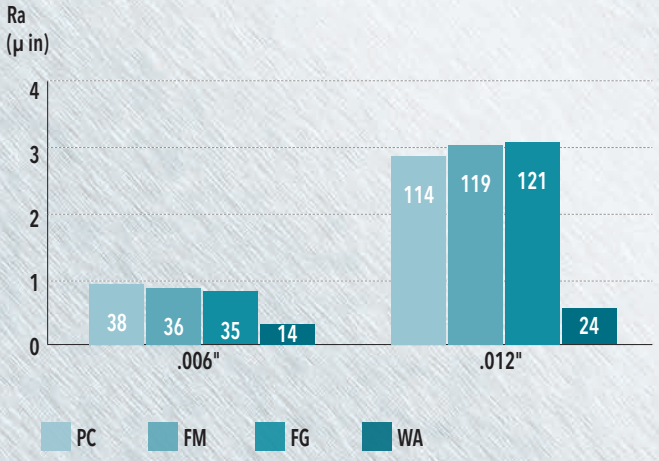
		Competitor	Ingersoll
Workpiece material		SAE 8620 (SNCM220(H))	
Operation		External turning	
Insert		TNMG332(160408) carbide CVD coated	TNMG2.532(130408) WA TT8115
Cutting speed	V (sfm)	980	
Feed rate	F (ipr)	.016	
Depth of cut	ap (inch)	.020	
Coolant		Yes	
Tool life (pcs/corner)		183	228
Surface finish (Ra)		75 µ in	



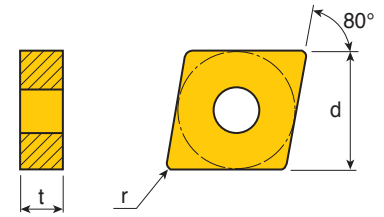
CASE STUDY 4

Surface roughness comparison among several chip breakers

		Ingersoll
Workpiece material		S45C (AISI 1045)
Operation		External continuous turning
Insert		CNMG332(090408) PC TT8115 / CNMG332(090408) FM TT8115 / CNMG332(090408) FG TT8115 / CNMG332(090408) WA TT8115
Cutting speed	V (sfm)	650
Feed rate	F (ipr)	.006, .012
Depth of cut	ap (inch)	.060
Coolant		Wet



CNMG Negative 80° rhombic inserts

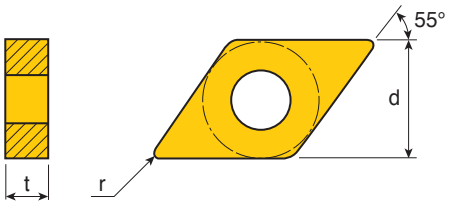


Size	Dimension (inch)		
	d	t	r
331	.375	.187	.016
332	.375	.187	.031
333	.375	.187	.047

Insert	Designation		Feed (ipr)	ap (inch)	Cermet		CVD coated					
					PV3010	CT3000	TT7005	TT7015	TT8105	TT8115	TT8125	TT5100
	CNMG	331(090404) WA	.003 - .010	.010 - .100	●	●	●	●	●	●	●	●
		332(090408) WA	.004 - .016	.010 - .120	●	●	●	●	●	●	●	●
		333(090412) WA	.008 - .020	.010 - .120	●	●	●	●	●	●	●	●

● : Standard items

DNMG Negative 55° rhombic inserts

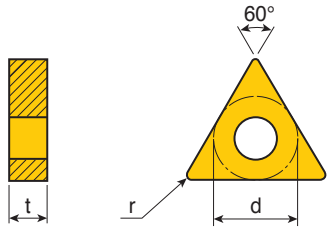


Size	Dimension (inch)		
	d	t	r
3.53.51	.437	.219	.016
3.53.52	.437	.219	.031
3.53.53	.437	.219	.047

Insert	Designation		Feed (ipr)	ap (inch)	Cermet		CVD coated					
					PV3010	CT3000	TT7005	TT7015	TT8105	TT8115	TT8125	TT5100
	DNMG	3.53.51(130504) WA	.003 - .010	.010 - .100	●	●	●	●	●	●	●	●
		3.53.52(130508) WA	.004 - .014	.010 - .120	●	●	●	●	●	●	●	●
		3.53.53(130512) WA	.006 - .018	.016 - .138	●	●	●	●	●	●	●	●

● : Standard items

TNMG Negative triangular inserts

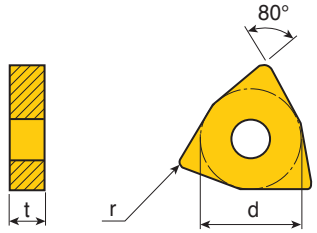


Size	Dimension (inch)		
	d	t	r
2.531	.312	.187	.016
2.532	.312	.187	.031
2.533	.312	.187	.047

Insert	Designation		Feed (ipr)	ap (inch)	Cermet		CVD coated					
					PV3010	CT3000	TT7005	TT7015	TT8105	TT8115	TT8125	TT5100
	TNMG	2.531(130404) WA	.003 - .010	.010 - .100	●	●	●	●	●	●	●	●
		2.532(130408) WA	.004 - .014	.010 - .120	●	●	●	●	●	●	●	●
		2.533(130412) WA	.006 - .018	.016 - .138	●	●	●	●	●	●	●	●

● : Standard items

WNMX Negative 80° trigon inserts



Size	Dimension (inch)		
	d	t	r
331	.375	.187	.016
332	.375	.187	.031
333	.375	.187	.047

Insert	Designation		Feed (ipr)	ap (inch)	Cermet		CVD coated					
					PV3010	CT3000	TT7005	TT7015	TT8105	TT8115	TT8125	TT5100
	WNMX	331(060404) WA	.003 - .010	.010 - .100	●	●	●	●	●	●	●	●
		332(060408) WA	.004 - .016	.010 - .120	●	●	●	●	●	●	●	●
		333(060412) WA	.008 - .020	.016 - .120	●	●	●	●	●	●	●	●

● : Standard items

RECOMMENDED CUTTING SPEEDS (SFM)

ISO	Material		Condition	Tensile strength (N/mm²)	Hardness HB	Cermet		Coated					
						PV3010	CT3000	TT7005	TT7015	TT8105	TT8115	TT8125	TT5100
P	Non-alloy steel, cast steel, free cutting steel	< 0.25%C	Annealed	420	125	1150-2130	980-1870			1020-1900	920-1740	750-1570	660-1480
		>= 0.25%C	Annealed	650	190	890-1710	790-1640			890-1740	790-1570	660-1380	560-1280
		< 0.55%C	Quenched and tempered	850	250	790-1570	720-1510			750-1610	660-1440	520-1250	430-1150
		>= 0.55%C	Annealed	750	220	850-1640	790-1540			820-1640	720-1480	620-1310	520-1210
			Quenched and tempered	1000	300	790-1510	720-1440			690-1540	590-1380	490-1150	390-1050
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	790-1770	720-1710			750-1800	660-1640	560-1310	460-1210
			Quenched and tempered	930	275	620-1080	560-980			590-1080	490-920	460-820	360-720
				1000	300	560-980	490-890			520-980	430-820	390-750	300-660
				1200	350	460-890	430-820			490-920	390-750	360-660	260-560
	High alloy steel, cast steel and tool steel		Annealed	680	200	850-1330	820-1300			690-1380	620-1250	460-920	360-820
			Quenched and tempered	1100	325	460-670	430-640			330-660	300-590	230-430	130-330
M	Stainless steel and cast steel		Ferritic / martensitic	680	200	660-980	590-890						
			Martensitic	820	240	660-890	560-820						
			Austenitic	600	180	560-850	490-790						
K	Gray cast iron (GG)		Ferritic		160	750-1080	720-1050	520-1310	490-1150				
			Pearlitic		250	710-950	670-920	460-1150	430-980				
	Cast iron nodular (GGG)		Ferritic		180	560-870	520-840	980-1800	950-1480				
			Pearlitic		260	590-790	560-750	980-1410	820-1180				
	Malleable cast iron		Ferritic		130	480-720	440-660	660-1510	820-1280				
			Pearlitic		230	340-490	310-460	590-1150	660-1050				
N	Aluminum - wrought alloy		Not cureable		60								
			Cured		100								
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75								
			Cured		90								
		>12% Si	High temp.		130								
	Copper alloys	>1% Pb	Free cutting		110								
			Brass		90								
			Electrolitic copper		100								
	Non-metallic		Duroplastics, fiber plastics										
			Hard rubber										
S	High temp. alloys	Fe based	Annealed		200								
			Cured		280								
		Ni or Co based	Annealed		250								
			Cured		350								
			Cast		320								
	Titanium, Ti alloys			Rm 400									
			Alpha+beta alloys cured	Rm 1050									
H	Hardened steel		Hardened		55HRC								
			Hardened		60HRC								
	Chilled cast iron		Cast		400								
	Cast iron nodular		Hardened		55HRC								

Steel Stainless steel Cast iron Nonferrous High temp. alloys Hardened steel