INDUSTREALIZE
TRANSFORMINDUSTRY

HEAVY

ISCAR'S MACHINING SOLUTIONS FOR

HEAVY MACHINING

Member IMC Group

ISCAR

www.iscar.com

ISCAR, A World Leader in the Heavy Machining Industry

The demand for heavy machining solutions grows exponentially as the use of large size parts rises in the oil and gas, power generation, and railway wheels industries.
The major challenge is to withstand changing cutting depths and high feed rates, generally under dry machining. Choosing the right solution has a dramatic effect on the function and durability of the insert.

ISCAR offers unique solutions for new generation industries. As a leader in providing productive and cost effective machining solutions,
ISCAR strives to be up to date with all the new trends and technologies which are a part of a brighter, greener future.

HEAT EXCHANGERS

OFF ROAD

RAILWAY

POWER GENERATION

DIE AND MOLD

HEAVY

IRON AND STEEL

OIL AND GAS

POWER GENERATION

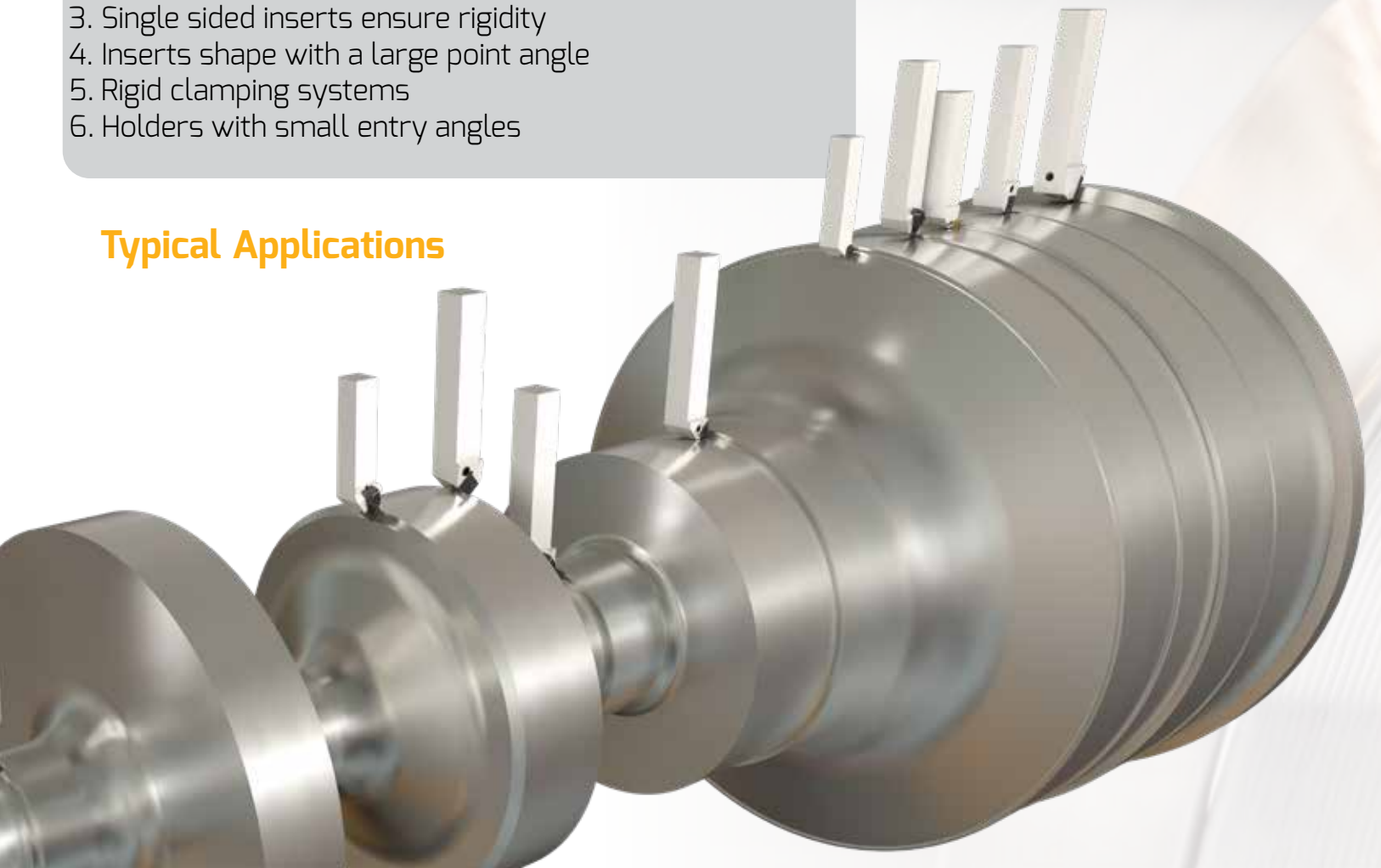
Turning

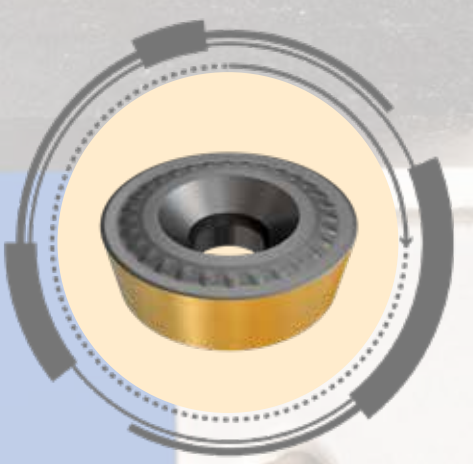
ISO standard tools perform most of the metalworking industries machining with a high applications range. ISCAR ISO turning line provides a complete solution for all types of applications and materials, with innovative insert geometries combined with the world's leading Carbide grades designed to meet high customer demands for increased tool life and productivity.

Key Factors:

1. Inserts size, 19mm and above
2. Strong cutting edge with dedicated land geometry
3. Single sided inserts ensure rigidity
4. Inserts shape with a large point angle
5. Rigid clamping systems
6. Holders with small entry angles

Typical Applications



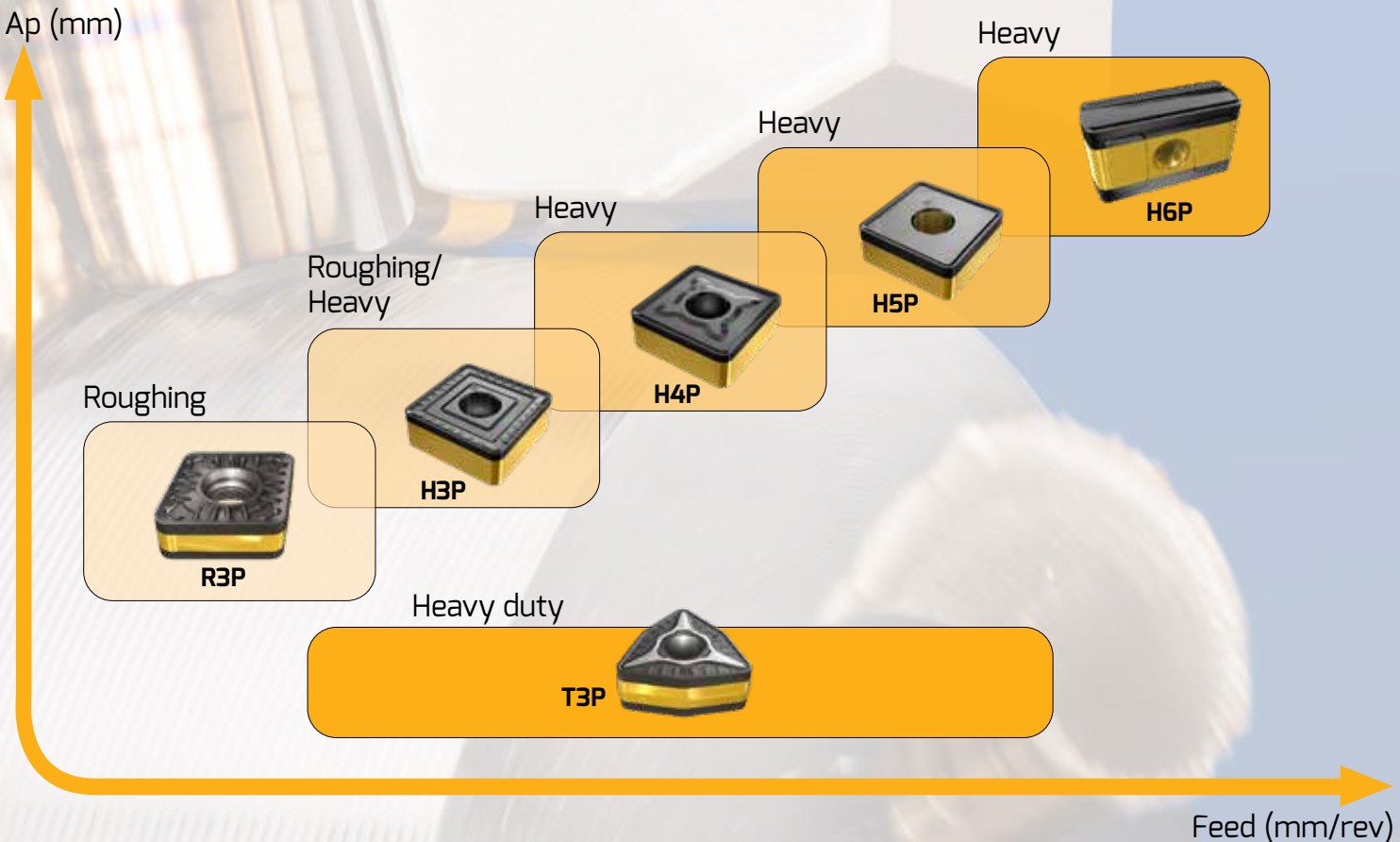


RCMM
Typical Round Inserts

SNMM
Typical Square Inserts

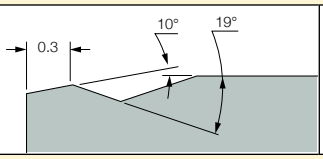
LNMX
Typical Tangetial Inserts

Roughing/Heavy Turning Chip Formers



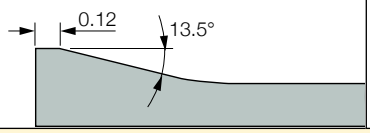
Roughing/Heavy Turning Chip Formers

T3P Chipformer



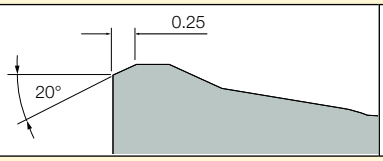
Double-sided 6° negative flank trigone insert for high feed turning on steel.

R3P Chipformer



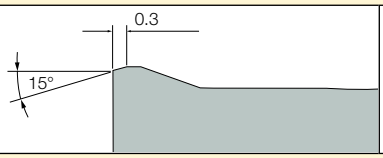
Chipbreaker for rough machining on steel with a positive rake angle and reinforced cutting edge for better performance and longer tool life.

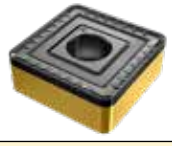
H3P Chipformer



- For heavy roughing applications.
- Low cutting force for low horse power machines.
- Excellent chip control due to changeable land and a flexible chip breaker.

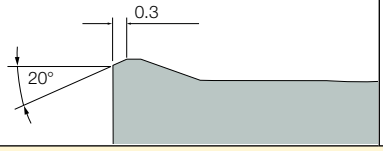
H4P Chipformer

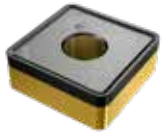




- For heavy roughing applications.
- For large depth of cut and high feed.
- Strong cutting edge credit to a wide land and large land angle.

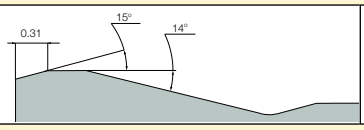
H5P Chipformer





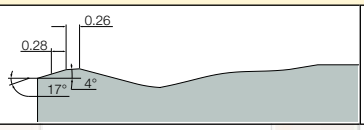
- For heavy roughing applications.
- For large depth of cut and high feed.
- Extremely strong cutting edge credit to a wide land and large land angle.
- Suitable for high cutting conditions.

H6P Chipformer



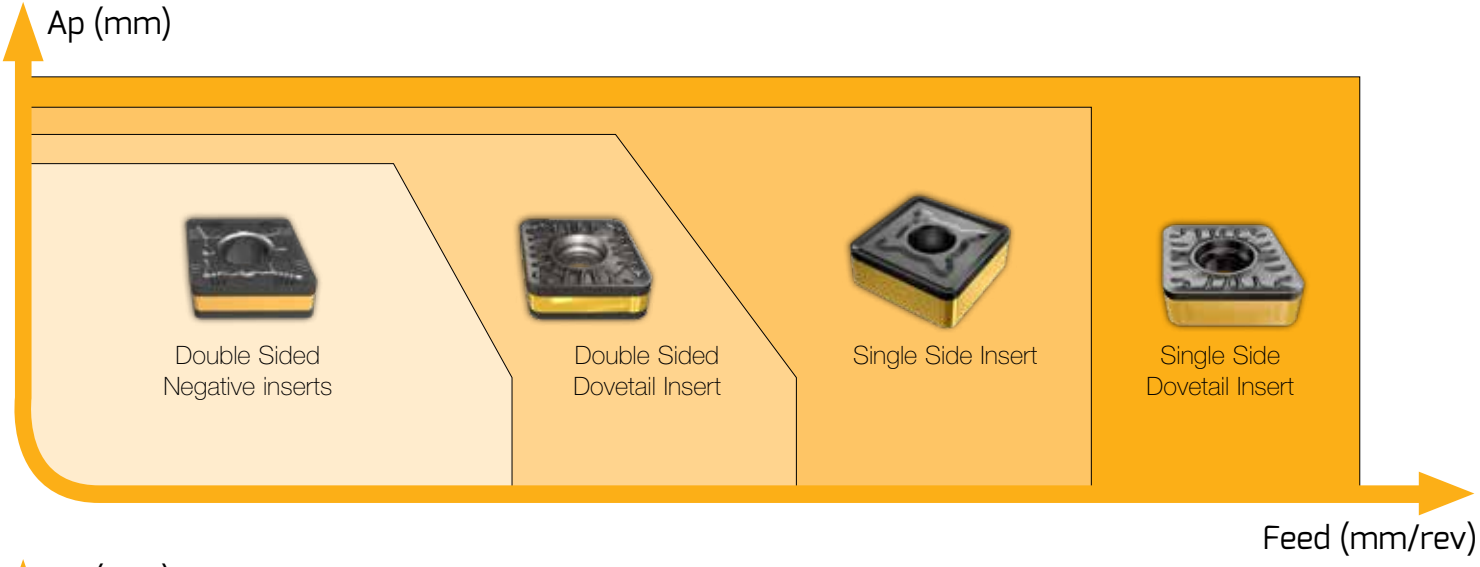
Tangential insert with 4 cutting edges for high metal removal on steel up to 35 mm DOC.

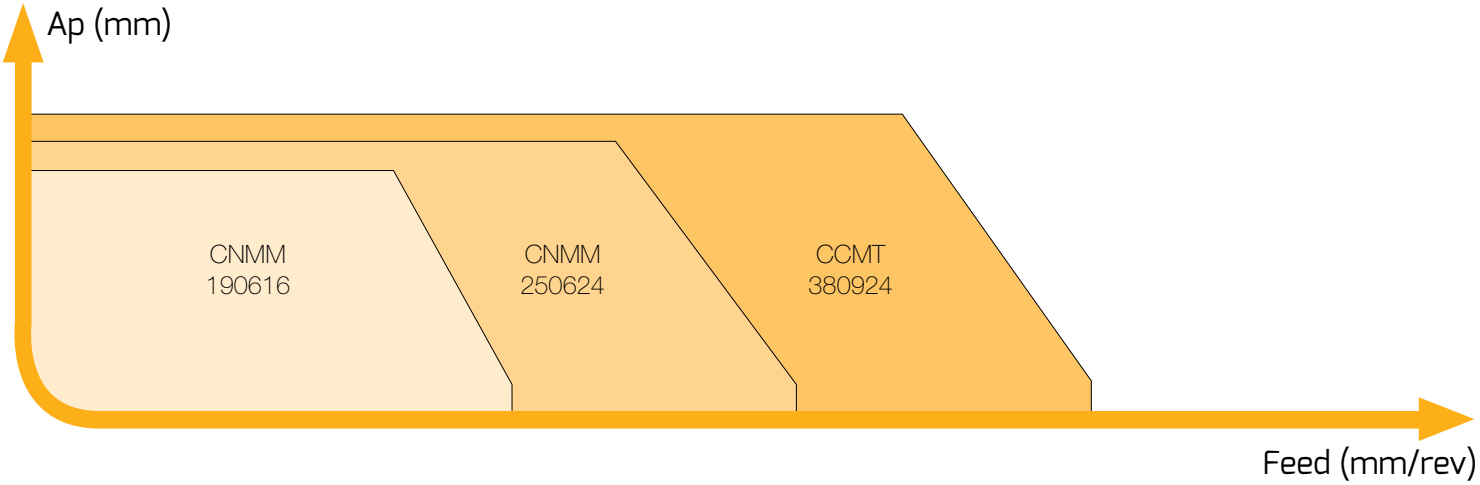
NR Chipformer



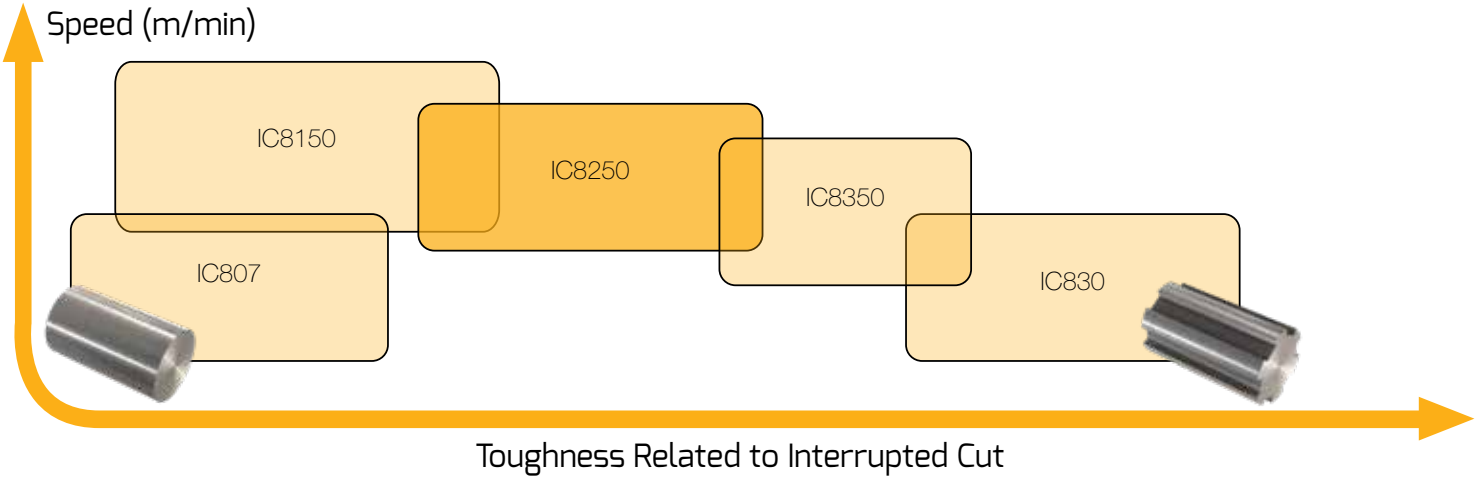
Round 7° inserts with a positive flank and strong cutting edge for rough turning.

Turning Geometries





Grades Position



Key Codes

The chipformer code key consists of three characters such as: LOMX - 402224 - H6P

1. Application			
		Feed (mm/rev)	ap (mm)
R	**R**oughing	0.35-0.70	3.00-7.00
H	**H**eavy Roughing	0.60-1.50	6.00-20.0

2. Chip Load	
2	for special cases
3	general recommendation for all applications
4	for special cases

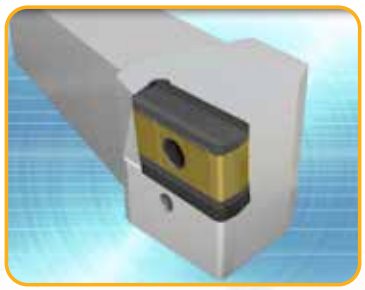
ISO Standard Designation					1	2	3
LOMX	40	22	24	-	H	6	P

3. Workpiece Material Group	
P	**Steel**
M	**Stainless Steel**
K	**Cast Iron**

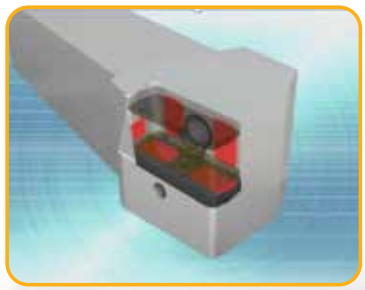
A Tangential LOMX 402224-H6P Insert for Very Heavy Turning Aapplications

Double-sided with 4 cutting edges

The tangentially clamped insert with 4 cutting edges is made from the tough grade IC8250. It can machine at up to 35 mm depth of cut and up to 2 mm/rev feed. The insert is clamped on a very rigid lever lock pocket equipped with a protective seat.

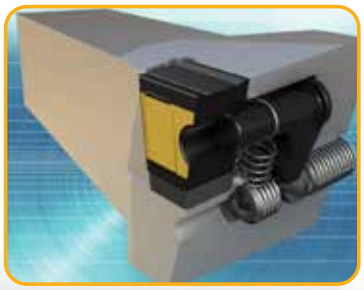


Tangentially Clamped Insert

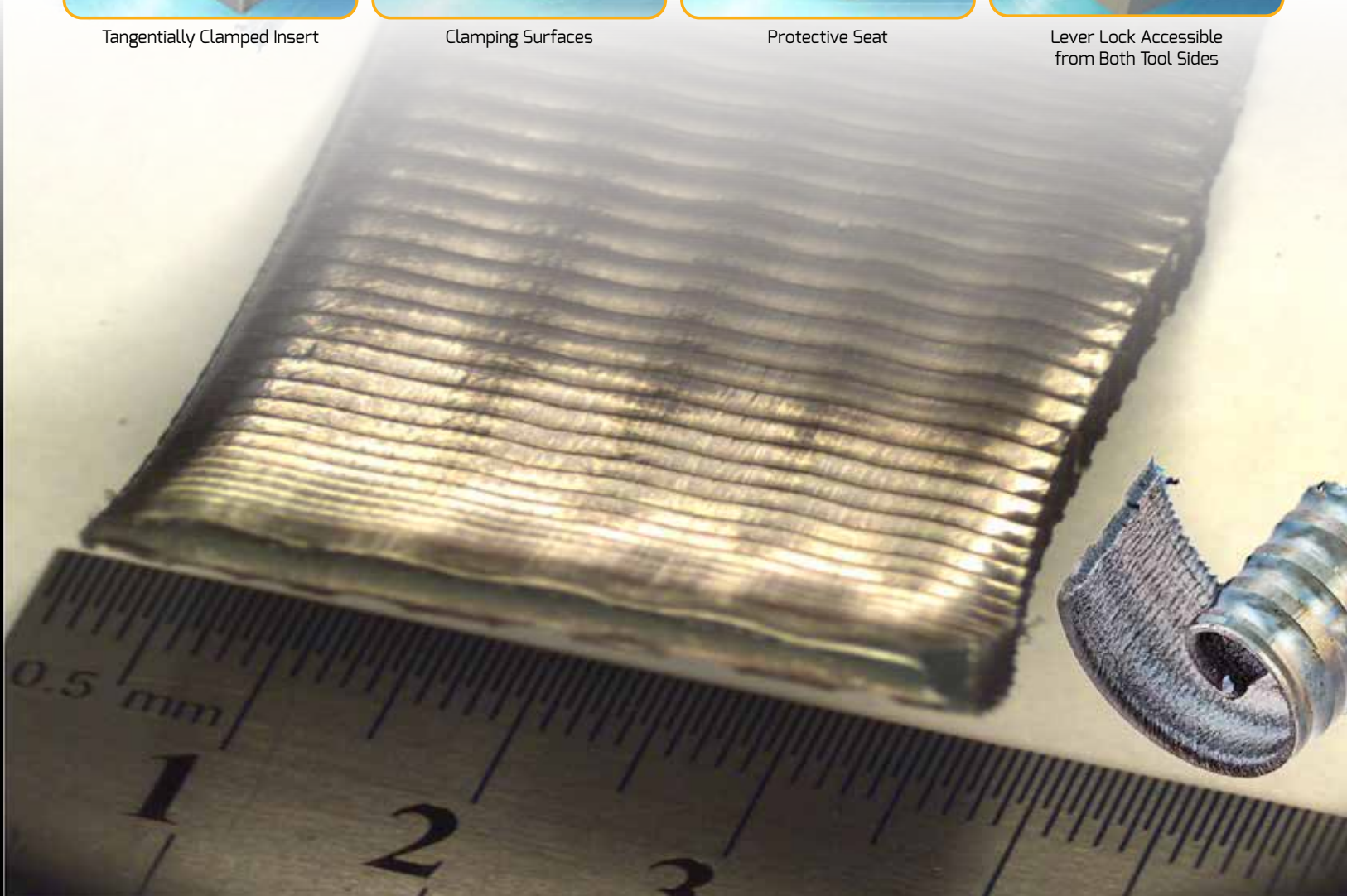


Clamping Surfaces

Protective Seat

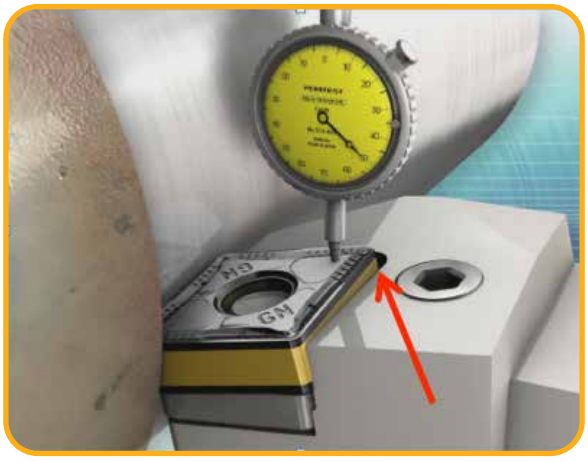


Lever Lock Accessible from Both Tool Sides



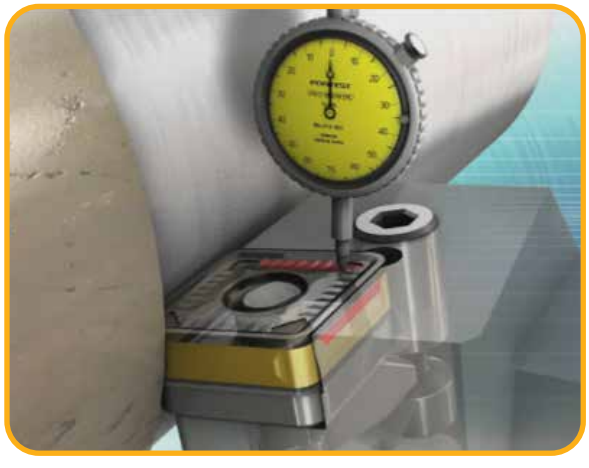
Heavy Machining

The **DOVE-IQ-TURN** clamping mechanism can firmly mount double-sided inserts that feature double negative prism flanks. The dovetail pocket and insert prismatic flanks prevent the insert from being lifted by the cutting forces.

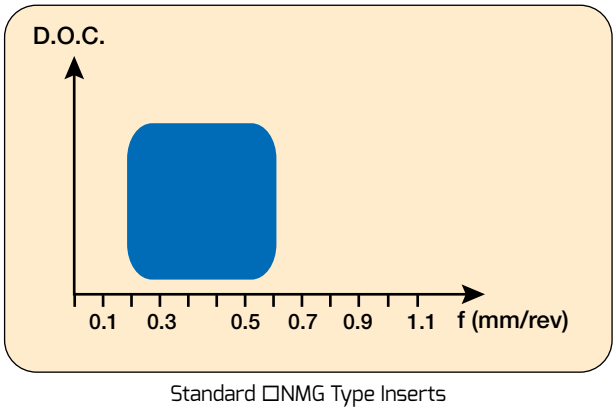


The Cutting Forces Tend to Cause the Standard Insert to Tilt in Standard Lever Clamp Tools

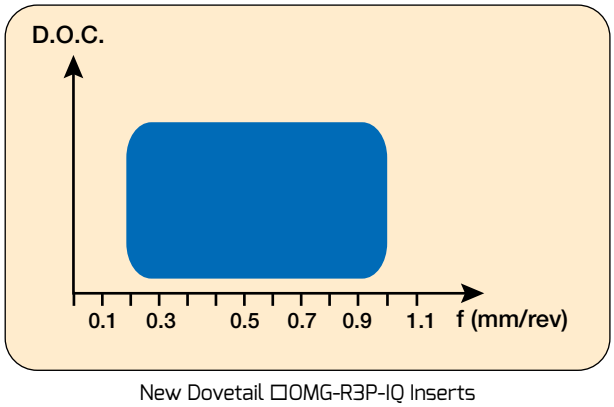
The **DOVE-IQ-TURN** double-sided inserts can be used under heavy chip load conditions. There are three insert geometries with prismatic flanks: **WOMG-R3P-IQ, COMG-R3P-IQ** and **SOMG-R3P-IQ** designed with a new **R3P** chipformer for rough turning of steel. The new system enables 50% higher metal removal rates, compared to □NMG double-sided insert.



Double-Sided Dovetailed Prismatic Flank Inserts are Firmly Held in Place

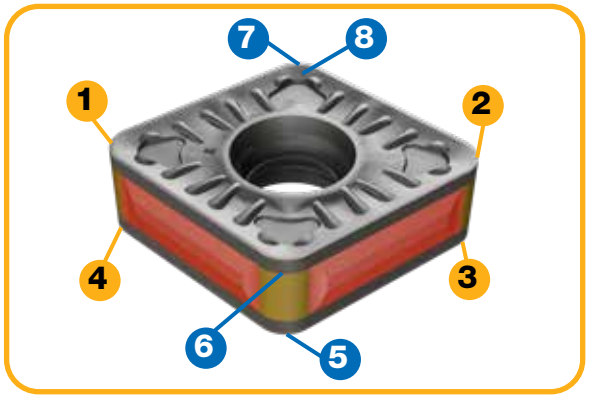


Standard □NMG Type Inserts



New Dovetail □OMG-R3P-IQ Inserts

ISCAR has developed an innovative dovetail pocket combined with a lever clamping mechanism. The new system provides very firm and rigid insert clamping that eliminates the need for the top clamp, which interferes with chip flow.

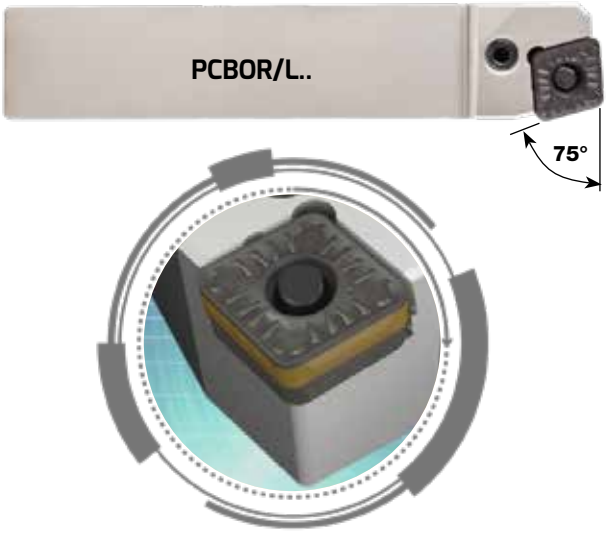


4 Cutting Edges for 80° and
4 Cutting Edges for 100°

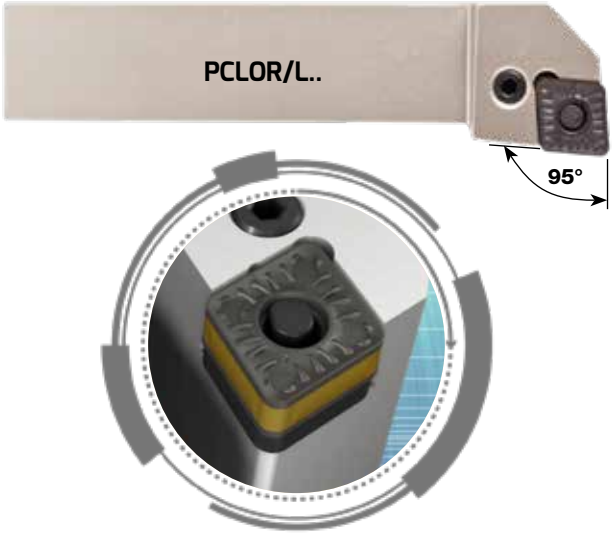
Dovetail Clamping

A Single Insert for Two Applications Either 80° or 100° Insert Corners

Tool for 100° Insert Corner



Tool for 80° Insert Corner



FEEDTURN Insert for 18.5° Lead Angle Tools

PWXOL 3232P-10-TF-IQ lever lock toolholders with a 18.5° lead angle, for fast feed.

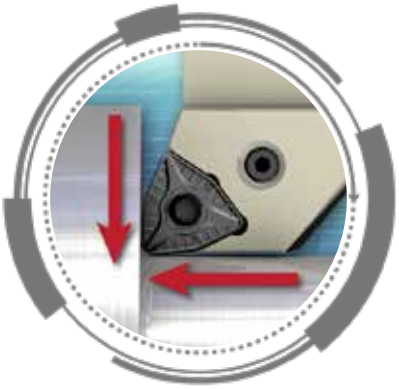
The new tools carry a new insert **WOMG 100716-T3P-IQ** with a new T3P chipformer, double-sided 6° negative flank trigon, for high feed turning of steel, up to 3 mm/rev and up to 2.8 mm D.O.C. longitudinal turning.

Enables high feed, new tools reduce machining time and costs.

Up to 3 mm/rev feed

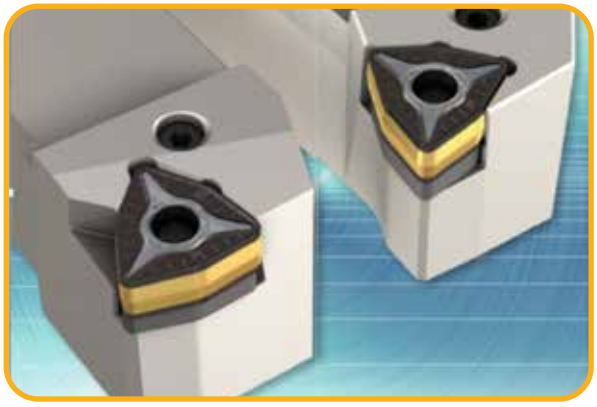
ISCAR Offers Tools for the Same Insert, that Feature a Standard 95° Entry Angle for WOMG 100716-T3P-IQ Inserts

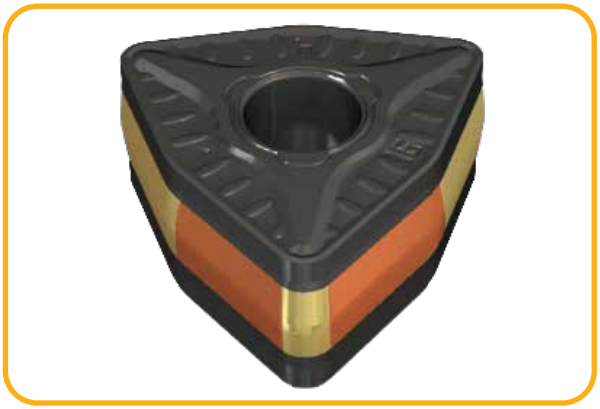
Traditional trigon insert for lateral turning, shouldering and facing



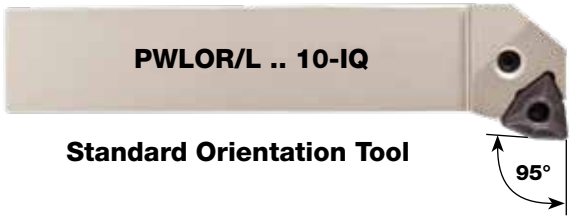
Up to 0.65 mm/rev feed

WOMG 100716-T3P-IQ Double-Sided Dovetail Insert for Two Main Heavy Duty Turning Applications

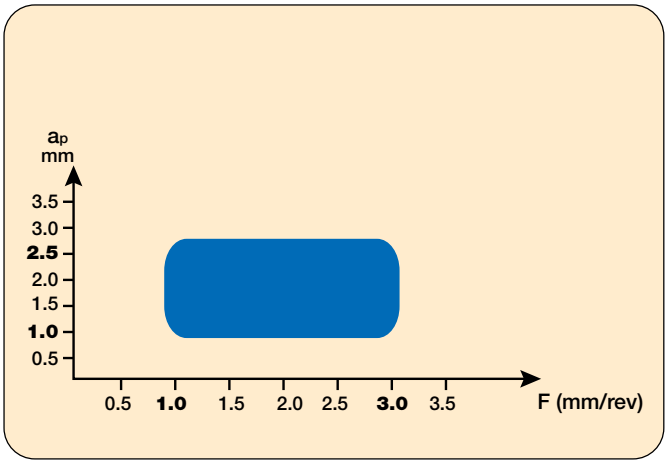


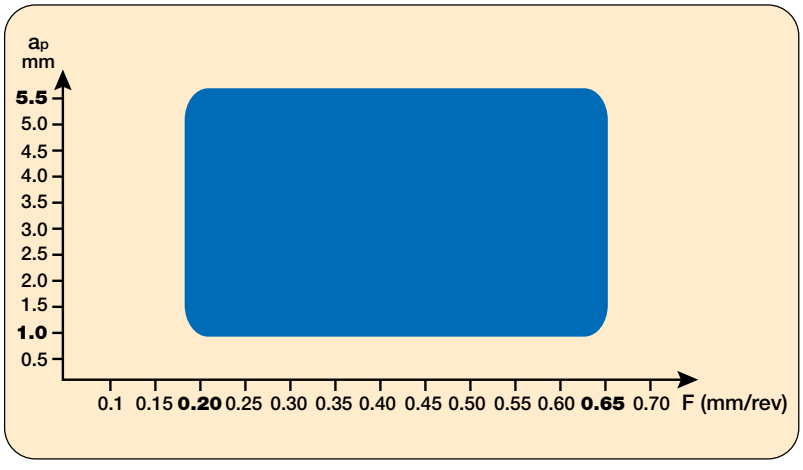


FEEDTURN Tool

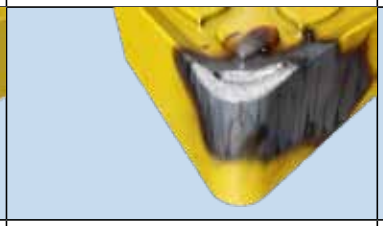
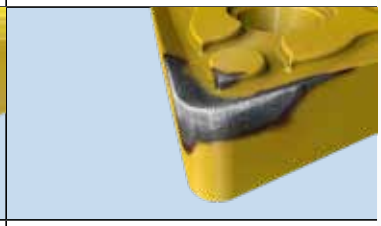


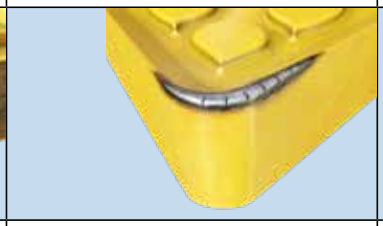
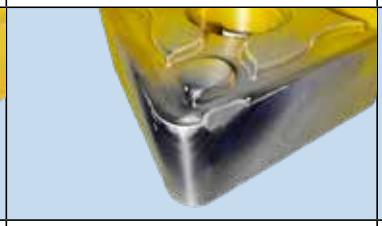
Standard Orientation Tool





Type Of Wear And Remedy

Flank Wear	Crater Wear	Notch Wear	Chipping
			
possible causes: • cutting speed too high • heat development too high • Carbide grade too low-wear	**possible causes:** • cutting speed too high • heat development too high • feed too low	**possible causes:** • cutting speed too high • Carbide grade too low-wear	**possible causes:** • Carbide grade too wear-resistant • cutting edge too positive • formation of edge
possible remedy: • reduce cutting speed • harder Carbide grade • smaller lead angle	**possible remedy:** • reduce cutting speed • harder Carbide grade • increase feed	**possible remedy:** • reduce cutting speed • harder Carbide grade • vary cutting depth	**possible remedy:** • tougher Carbide grade • higher cutting speed • choice of more stable cutting edge

Fracture	Comb Cracks	Built-up Edge	Plastic Deformation
			
possible causes: • cutting edge too positive • Carbide grade too rigid • vibrations	**possible causes:** • heat alternating voltage • strongly interrupted cut • thermal shock through coolant	**possible causes:** • low cutting speed • feed too low • cutting edge too negative	**possible causes:** • feed too high • cutting speed too high • Carbide grade too tough
possible remedy: • reduce cutting depth • lower feed • more stable cutting wedge	**possible remedy:** • choice of tougher Carbide grade • improved coolant supply • dry machining for interrupted cuts	**possible remedy:** • high cutting speed • increase feed • smooth, positive cutting edge	**possible remedy:** • reduce cutting speed • reduce feed • choice of harder Carbide grade

Axle Pin (Gearless)

A conical cast steel axle connects the rotor hub and the annular generator directly as a fixed unit without gears made of alloy steel.

SUMOTURN
HEAVY DUTY LINE

Rough External Turning

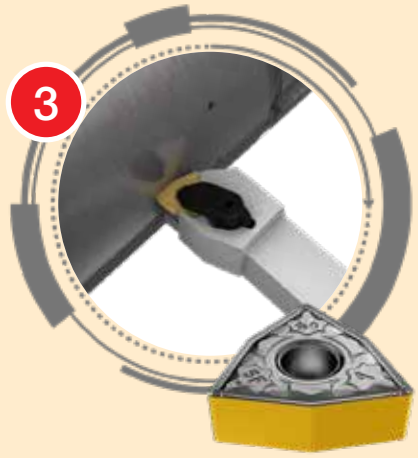
A line of external and internal tools, as well as large-sized inserts for heavy duty applications.

SUMOTURN
HEAVY DUTY LINE

Rough External Turning

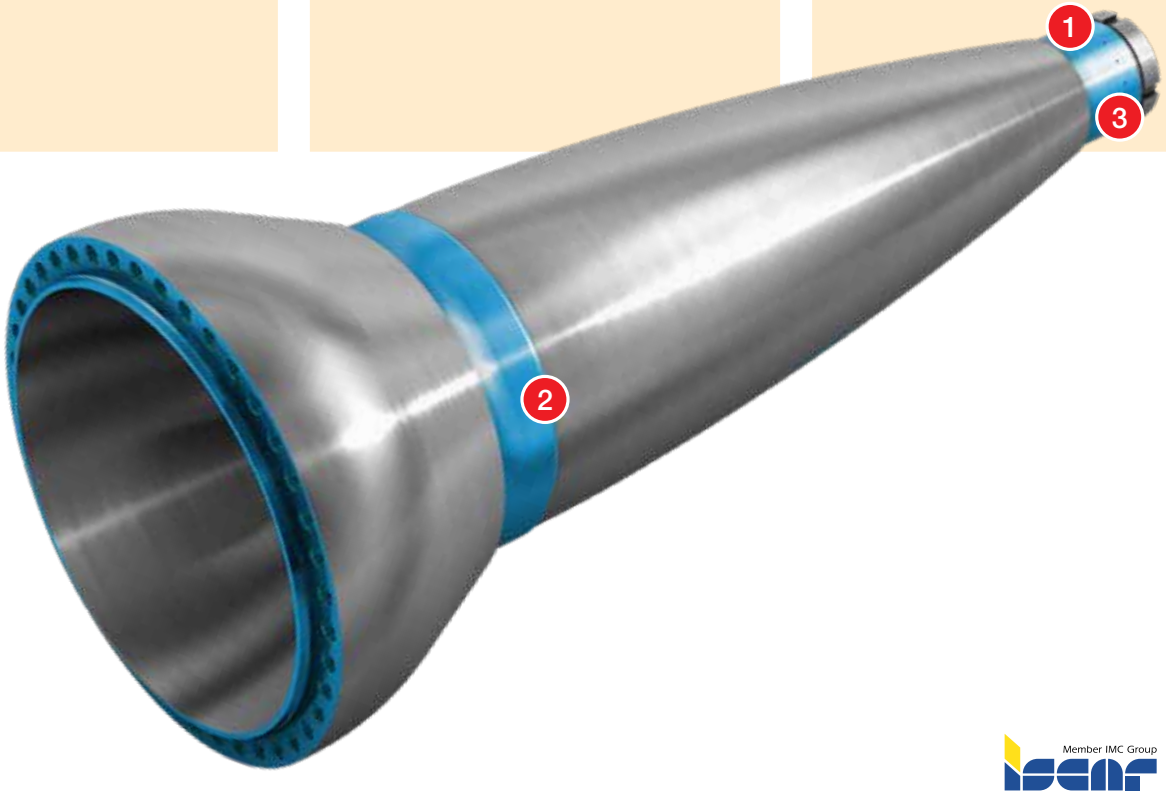
Tangentially clamped insert with a unique helical shaped cutting edge. Provides an exceptional solution for turning and enables very large depths of cut at high feeds.

ISOTURN



External Turning (Finishing)

A line of external and internal tools, as well as large-sized inserts for heavy duty applications.



Heavy Machining

SUMOTURN HEAVY DUTY LINE

External Rough Turning

Tangential inserts with 4 cutting edges for high metal removal of up to 35mm D.O.C. on steel.

SUMOTURN HEAVY DUTY LINE

O.D. Rough Turning

A line of external and internal tools, as well as large-sized inserts for heavy duty applications.

HELITURN TG

External Turning (Finishing)

Tangentially clamped insert with unique helical shaped cutting edges. Provides an exceptional solution for turning, enabling very large depths of cut and high feeds.

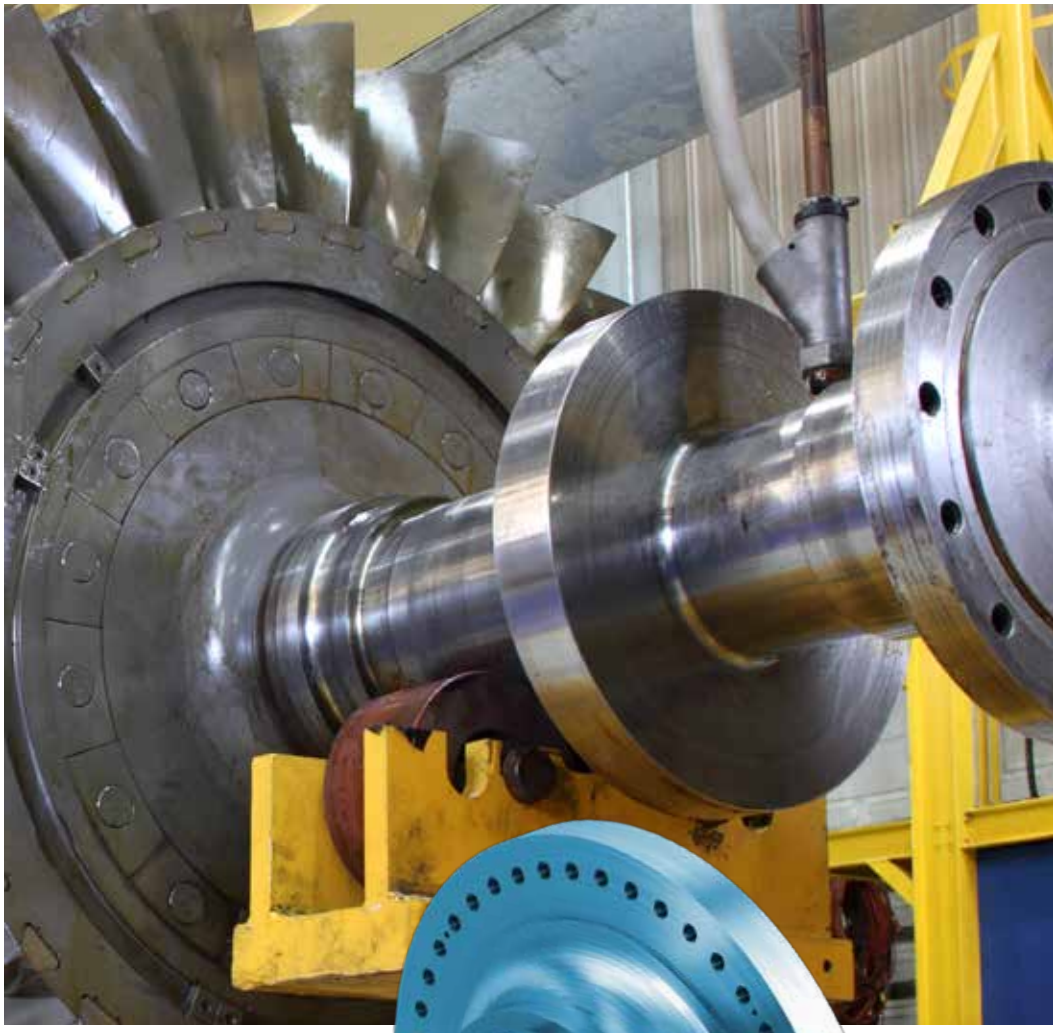
Main Shaft

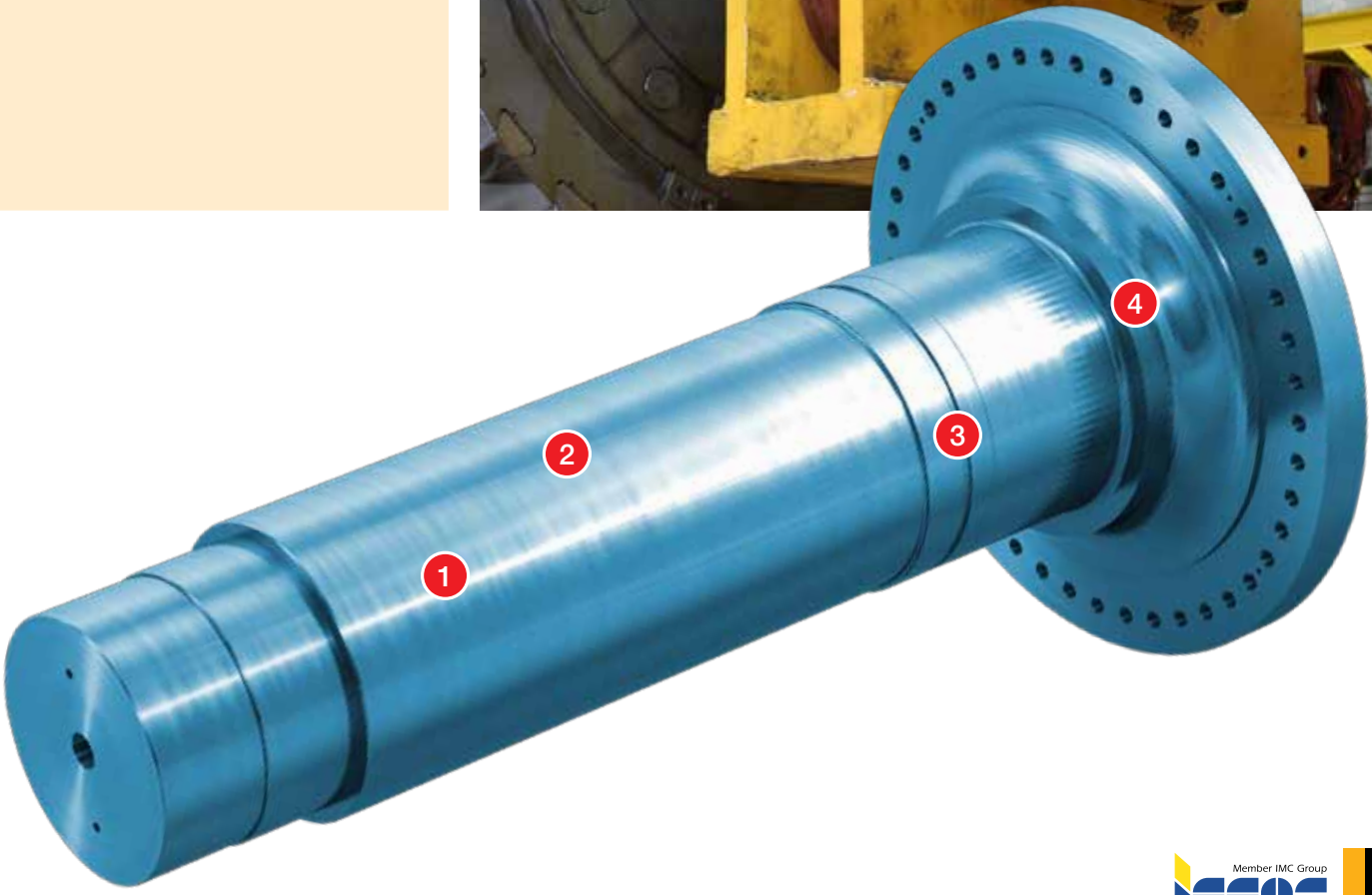
The main shaft of the wind turbine is usually forged from hardened and tempered steel. The main shaft transmits low speed rotational force from the rotor hub. Kinetic wind energy to the gearbox enables high speed rotation, which spins the generator and creates electrical energy.

ISOTURN

External Turning (Finishing)

A line of external and internal tools, as well as large-sized inserts for heavy duty applications.





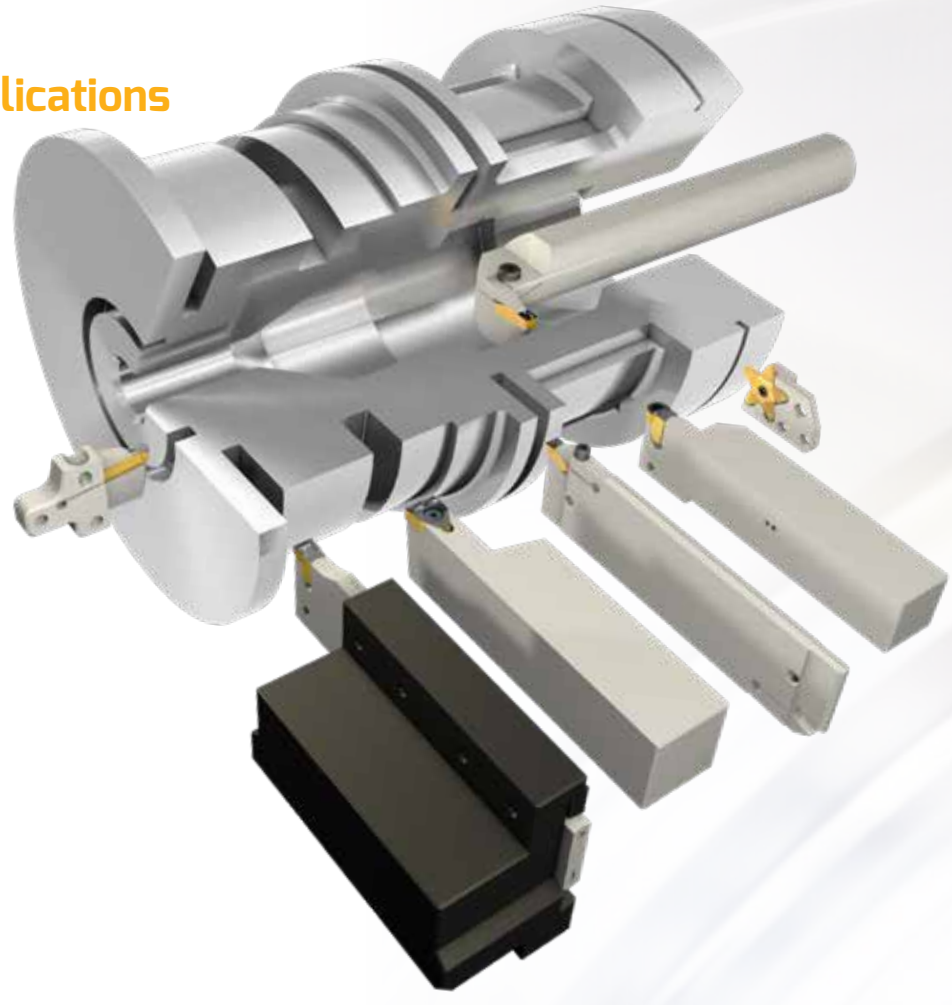
Grooving

Single-ended inserts for deep heavy grooving, and turning applications designed for extra rigidity required for liver slot and rotation conditions.

Key Factors:

1. Tangentially oriented pocket, with very rigid clamping
2. High feed rates (up to 1.0 mm/Rev)
3. Machining large diameter parts and heavy interrupted cuts
4. No upper jaw for unobstructed chip flow

Typical Applications

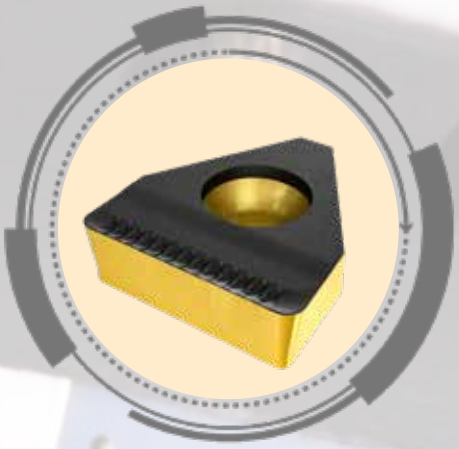


Typical Round Inserts

H-Type chipbreaker for heavy profiling negative T-land for extra edge toughness suitable for heavy interrupted machining width - 12 mm

TIGER Inserts

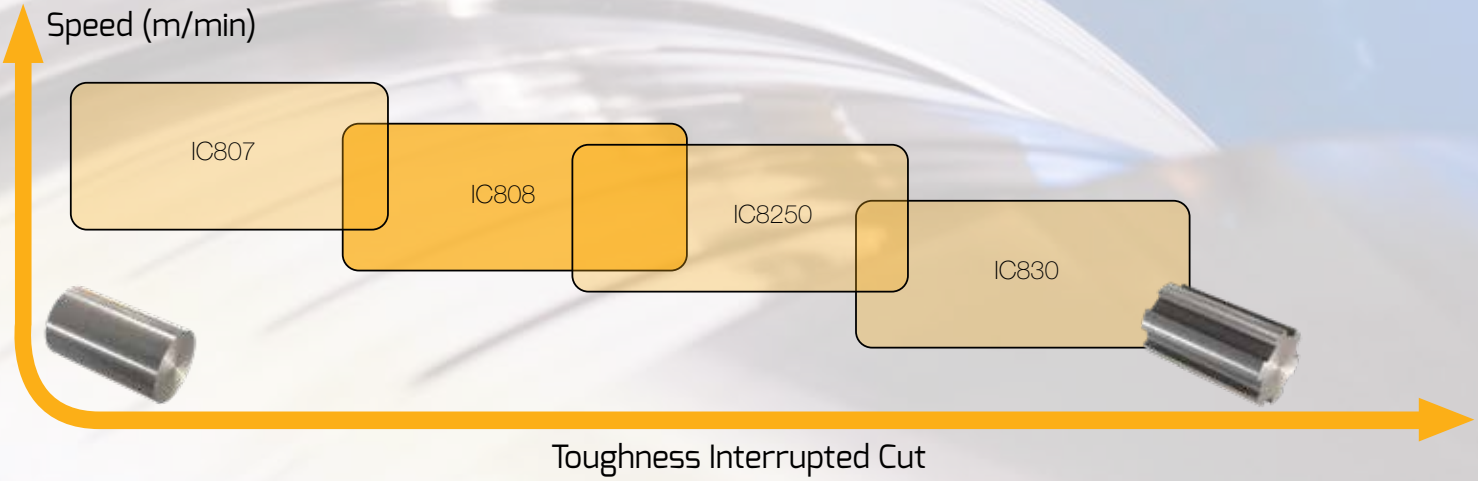
Utility single-ended inserts for external heavy grooving and deep machining



TIGER "V" Inserts

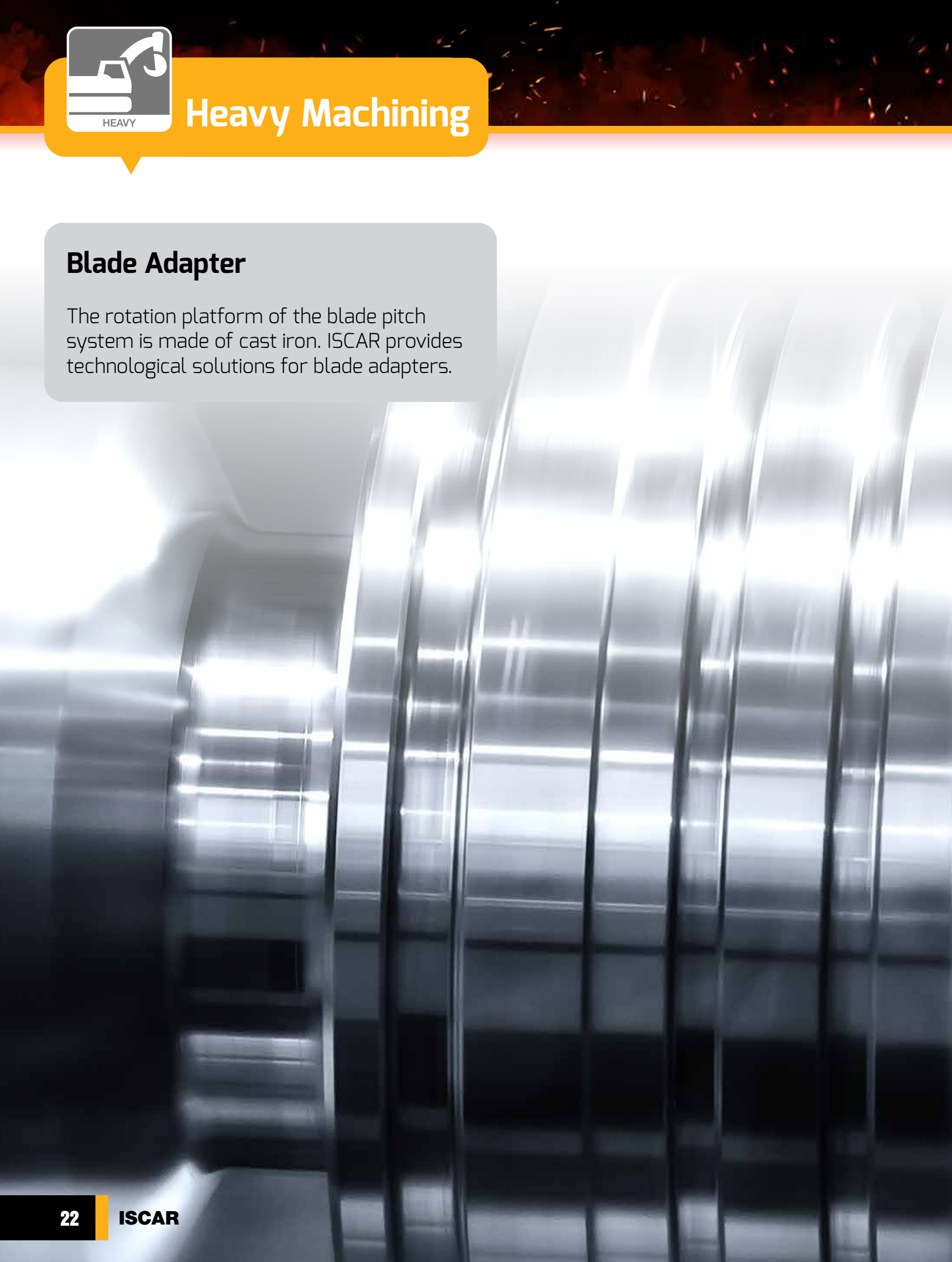
CW-Type chipformer for heavy grooving on carbon and alloy steels width range 14, 17 and 20 mm

Grades position



Blade Adapter

The rotation platform of the blade pitch system is made of cast iron. ISCAR provides technological solutions for blade adapters.



SUMO-GRIP
HEAVY DUTY LINE

Heavy Grooving and Turning

Single-ended insert for heavy grooving and turning applications is based on the very successful **TANG-GRIP** family.

DOVE IQ-GRIP
TIGER LINE

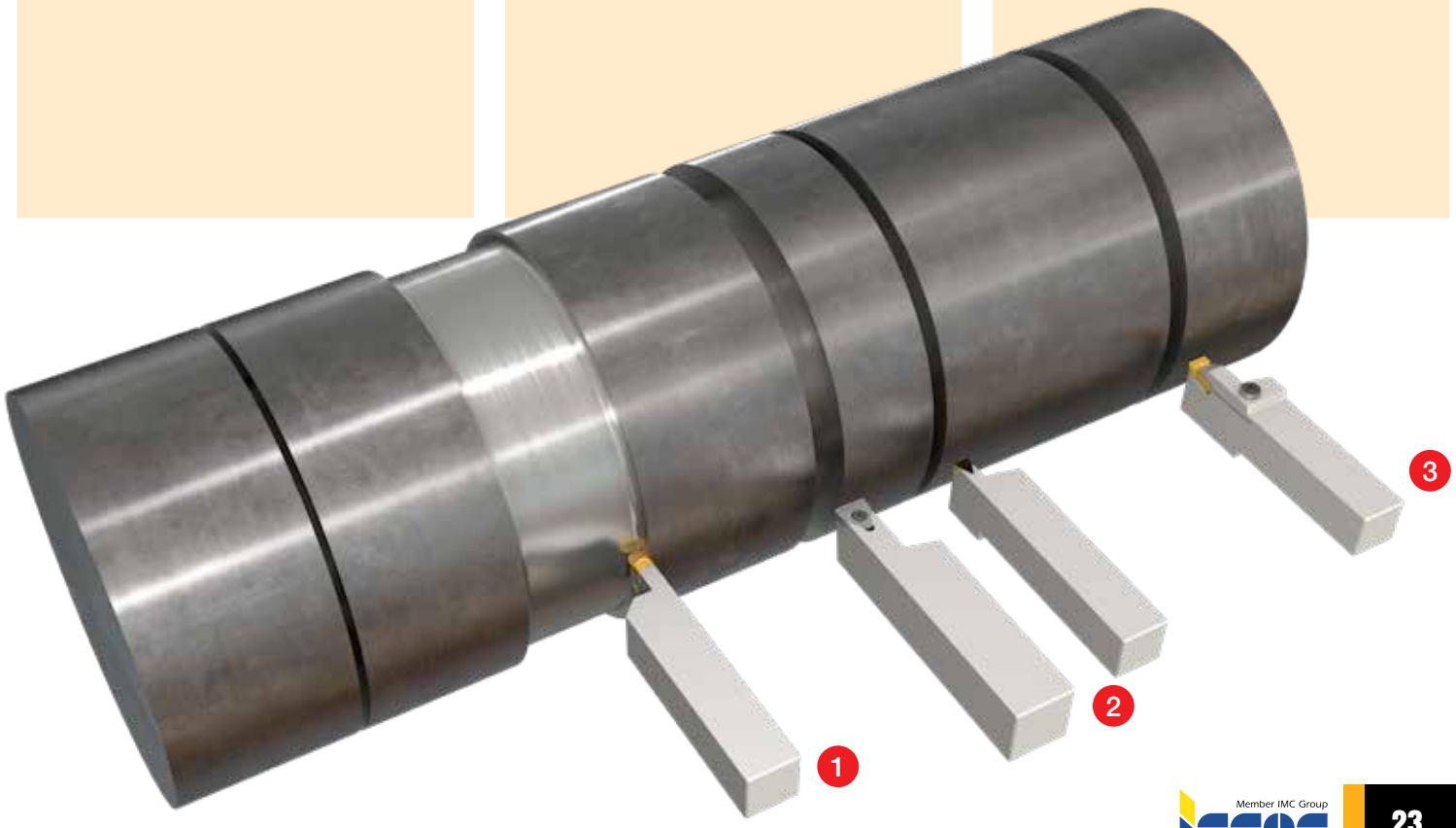
Heavy Duty Grooving

Deep heavy grooving with a unique frontal locking mechanism.

CUT-GRIP

Heavy Goorving

Heavy grooving chipformer for on carbon and alloy steels width range 14, 17 and 20 mm.



Heavy Milling

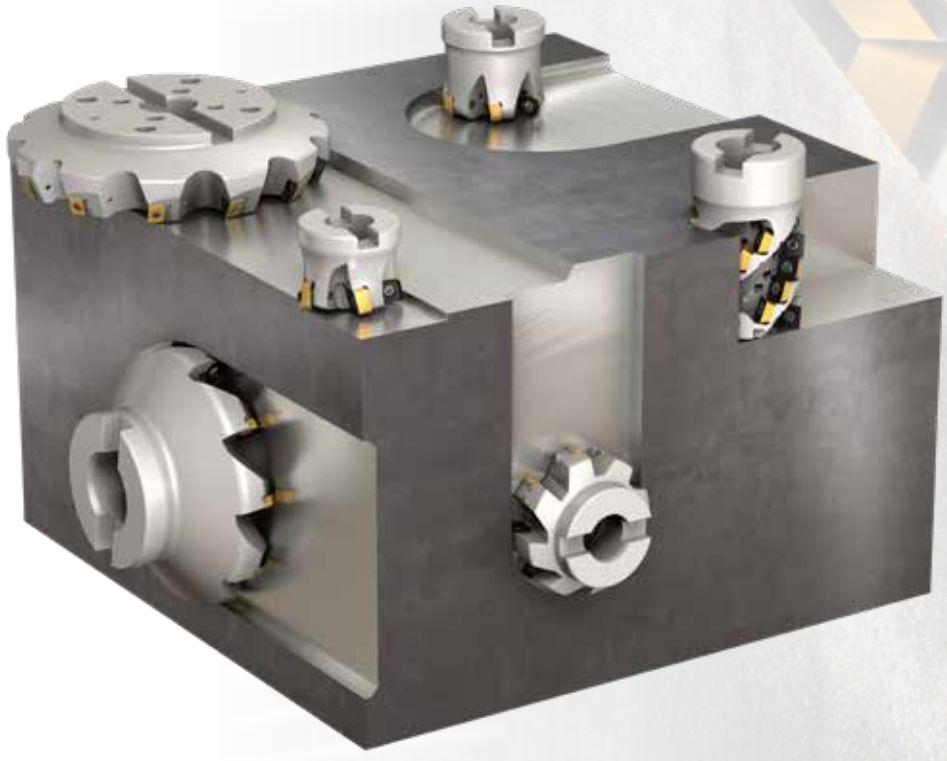
Heavy milling involves machining processes of complicated castings with hard forging skins often polluted by sand. The milling of large parts requires high metal removal rates. The main priorities for such operations are HFM High Feed Milling and Face Mill cutters which are proven to be stable for high feeds and large depths of cut.

Key Factors:

Cutters with 90° and 45° and round inserts with a large radius.

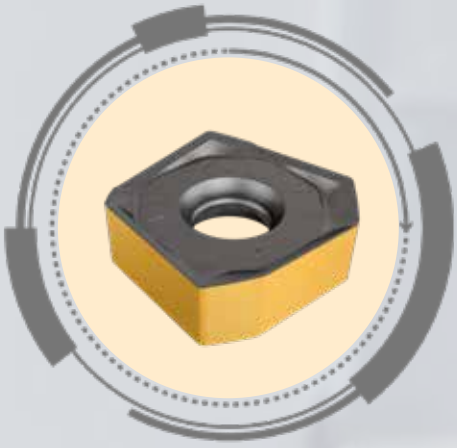
1. Inserts with strong cutting edges
2. High metal removal rates
3. Reduced cutting forces and power consumption
4. Cutter diameter range

Typical Applications



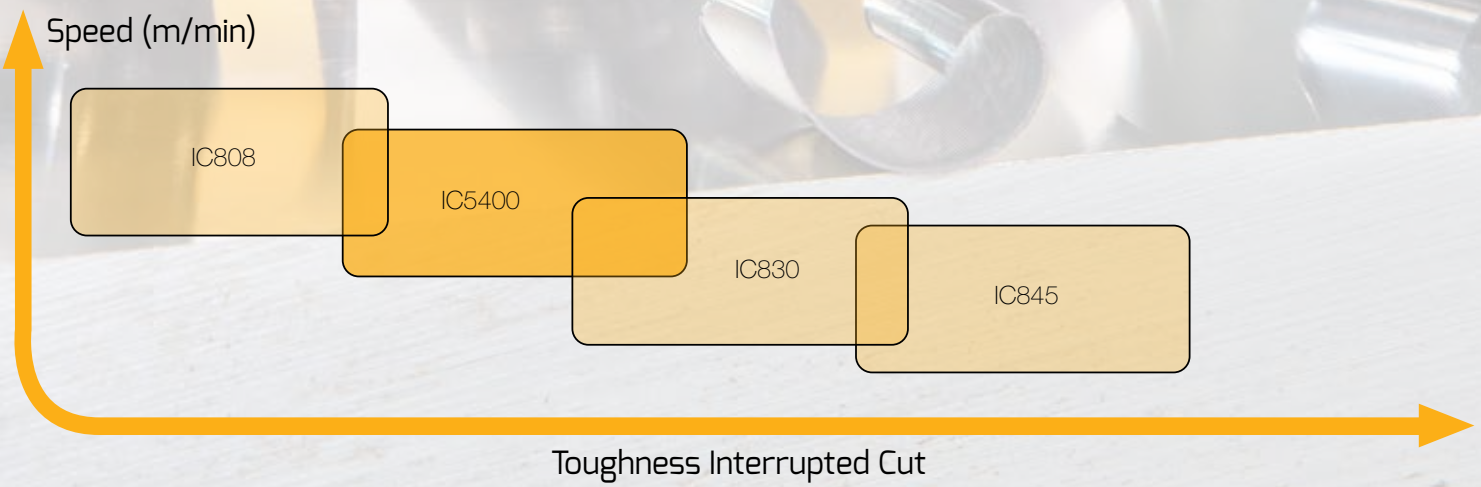
ONMU 1008
Economical octagonal double-sided 45° insert with 16 cutting edges

T465 LNHT/LNMT 2212
Tangentially clamped insert with 4 cutting edges. Used on 65° cutters, for up to 19 mm depth of cut



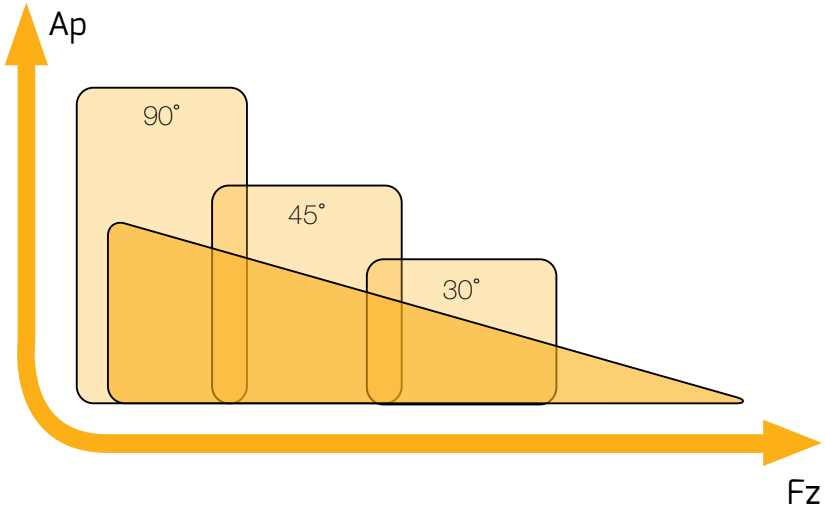
S845 SNMU 2608
Heavy duty double-sided insert with 8 cutting edges

Grades Position



Heavy Machining

Diagram of Different Cutter Concepts

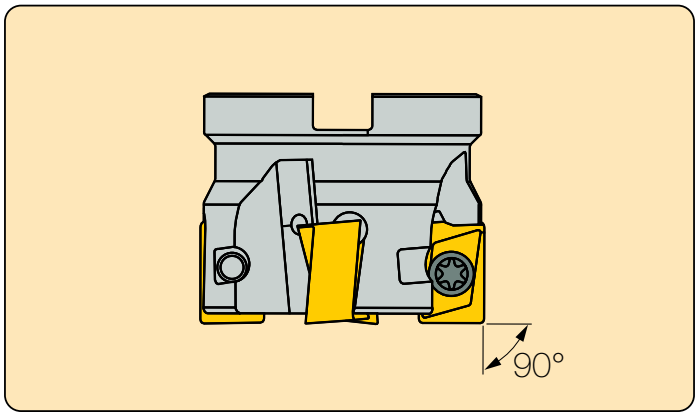


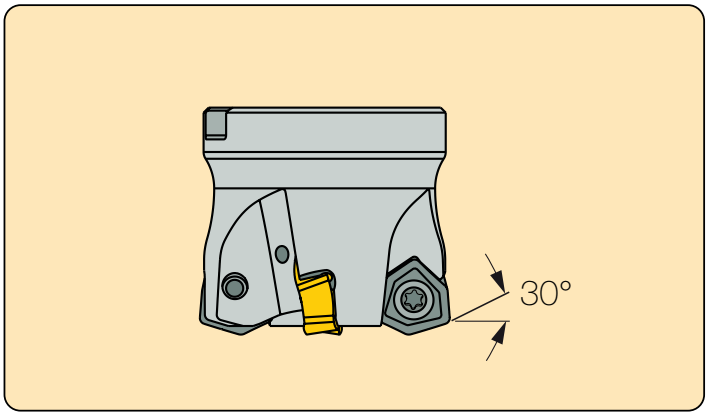
30° Milling Cutters:
Optimal metal removal and machining uneven, wavy surfaces

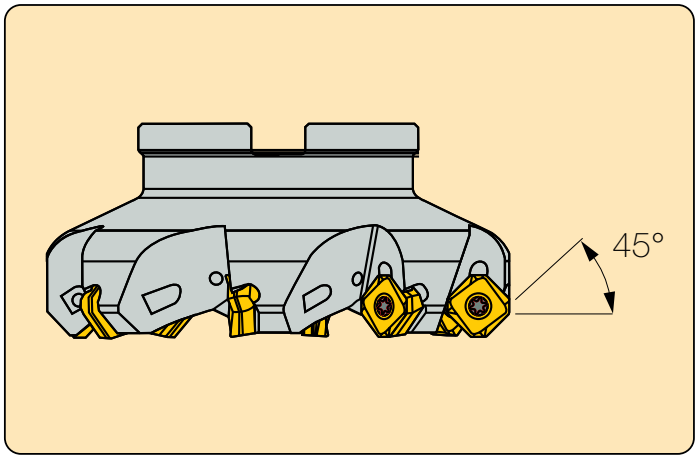
45–90° Milling Cutters:
For tough conditions in larger machining centers suitable for medium-duty face

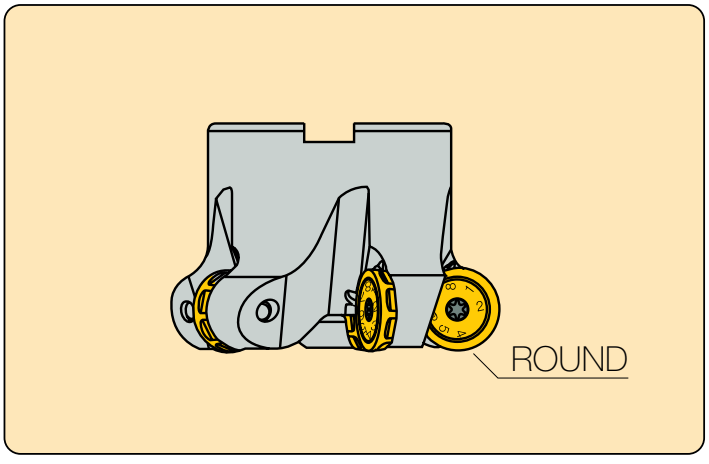
Cutters for Round Inserts:
Cutter with strong edges for tough conditions, milling cavities and interrupted cutting

Cutting Forces Direction for Different Entry Angles



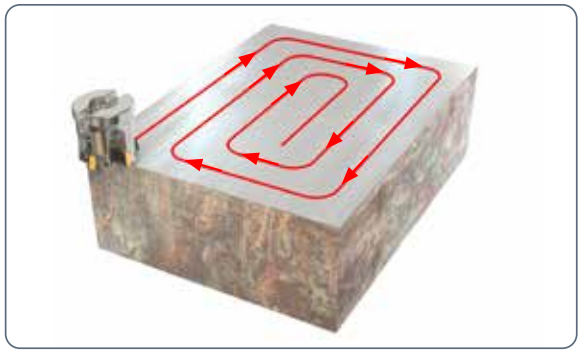






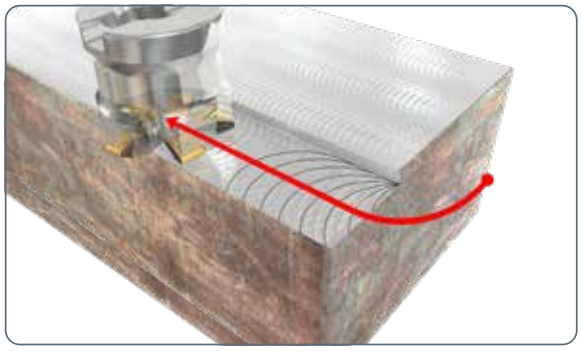
Face Milling
Next to Square Shoulder

- It is recommended that the width of cut be no more than diameter DC in order to prevent tooth overloading, due to excess machining allowance in cusps produced after stepdown
- Down (climb) milling is preferable



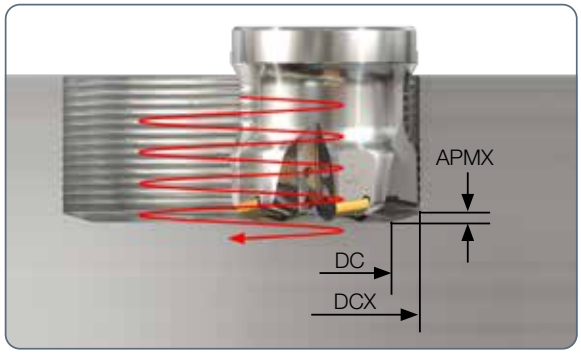
Entry into Material

- In milling, an approach cut by arc ("rolling in") is preferable. When a milling cutter enters a machined material by use of an arc, chip thickness grows to a maximum value progressively and then gradually diminishes to zero. It significantly contributes to machining stability, improves tool life, and reduces vibrations



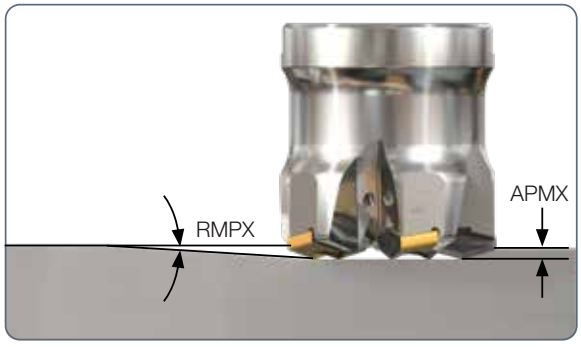
Milling Hole of Diameter D by Helical Interpolation

- Maximum and minimum hole diameters Dmax and Dmin correspondingly:
- Dmax = 2 x DCX – 1, Dmin = DCX + DC
- Down (climb) milling is recommended, however if chip evacuation is problematic, up (conventional) milling provides better results
- Helical pitch should not exceed maximum depth of cut APMX
- Helix angle should not exceed maximum ramping angle RMPX
- It is recommended to reduce feed per tooth f_z by 30-40%



Ramp Down Milling

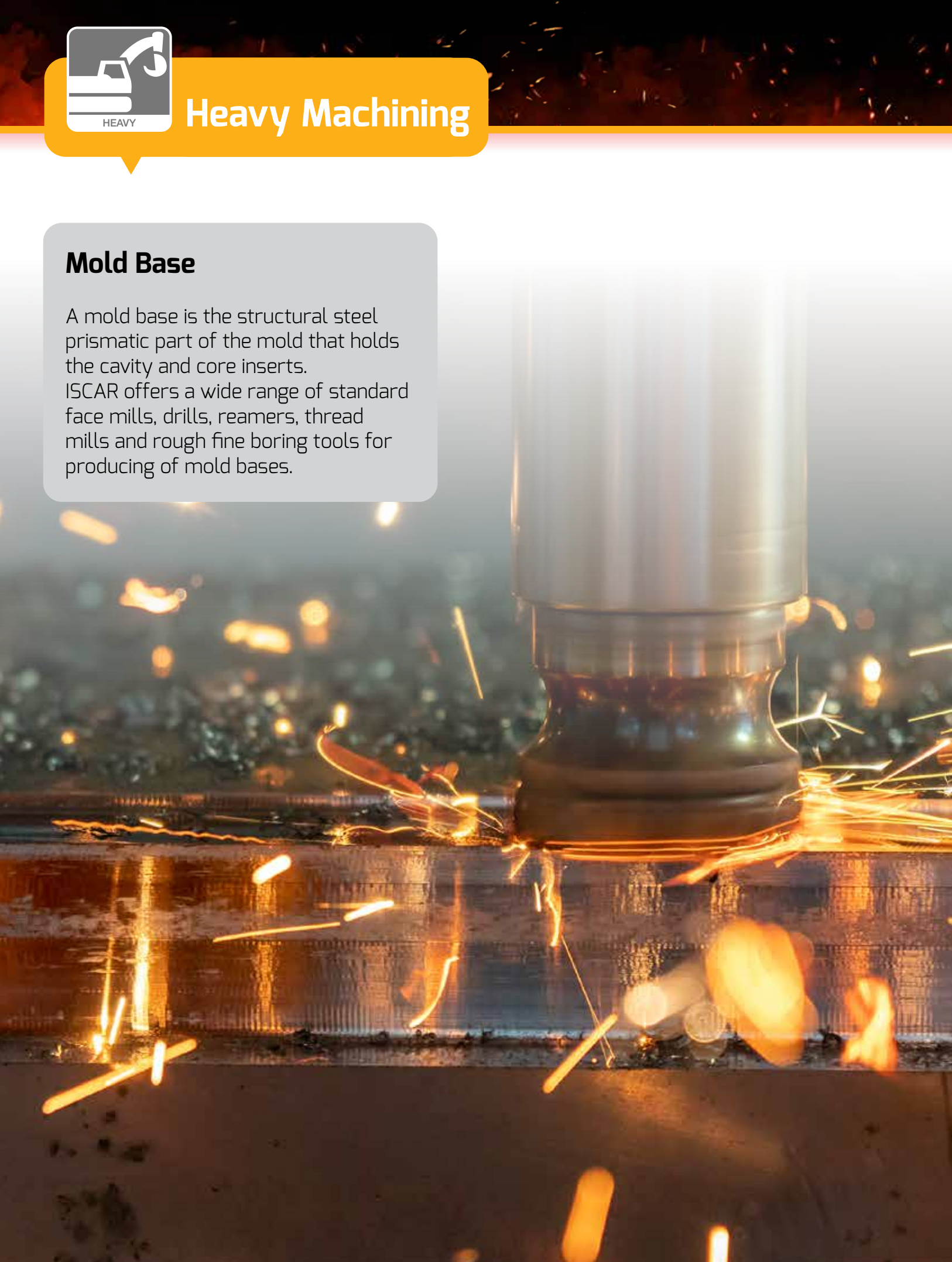
- Depth of ramping per pass should not exceed maximum depth of cut APMX
- Ramping angle should not exceed maximum ramping angle RMPX
- Down (climb) milling is preferable
- It is recommended to reduce feed per tooth f_z by 30-40%



Heavy Machining

Mold Base

A mold base is the structural steel prismatic part of the mold that holds the cavity and core inserts.
ISCAR offers a wide range of standard face mills, drills, reamers, thread mills and rough fine boring tools for producing of mold bases.



HELIDO 1200 UPFEED LINE

Milling

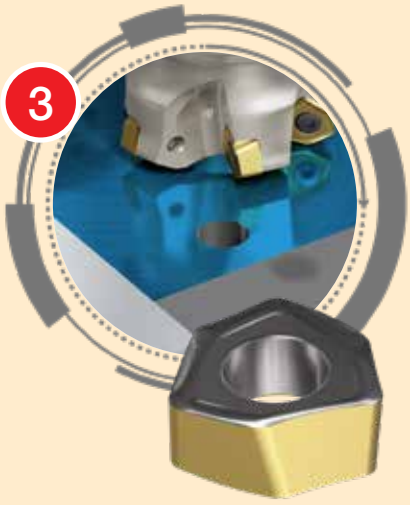
F45NM 45° face mills which mount octagonal ONHU/MU 0806... inserts with 16 cutting edges.

DOVE IQ MILL 845 LINE

Milling

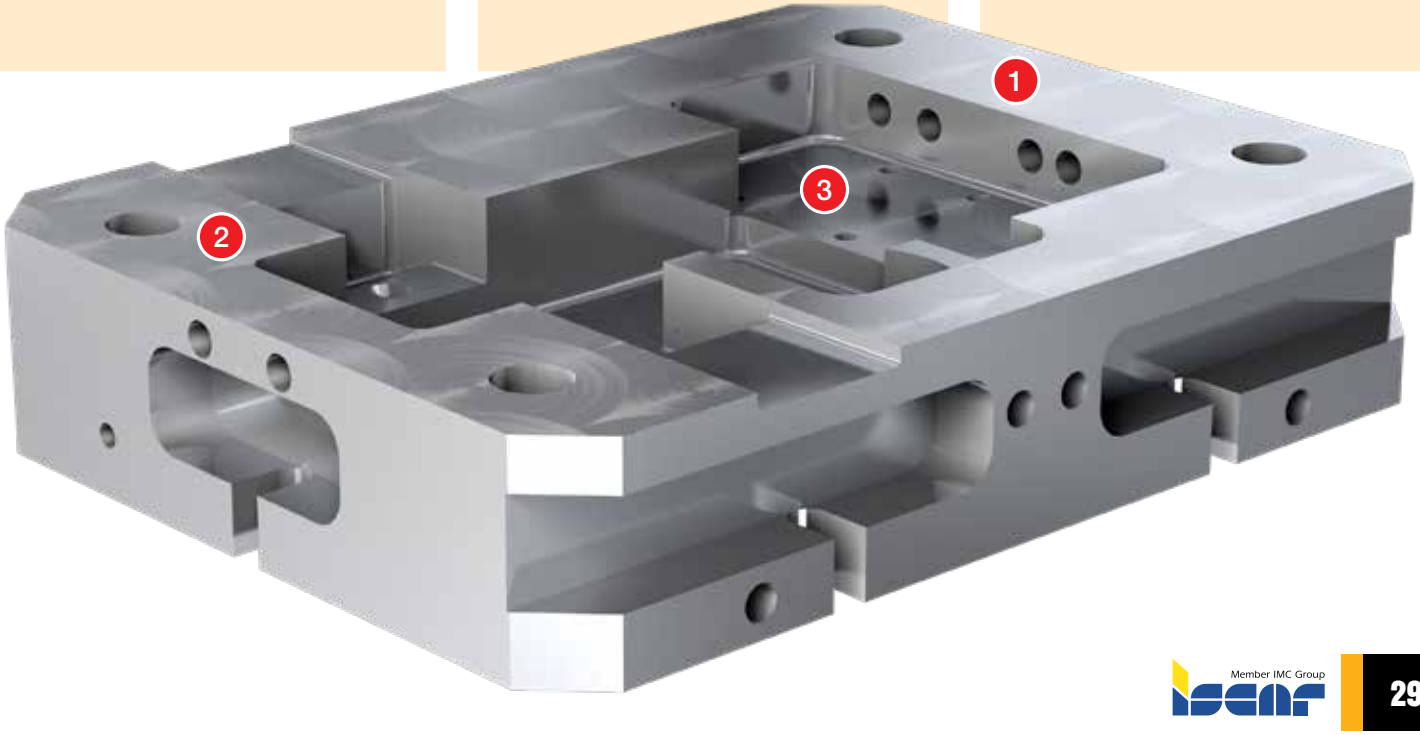
SOF45-26 heavy duty 45° face mills mount square or octagonal double-sided inserts with 8/16 cutting edges.

HELIDO 600 UPFEED LINE



Milling

FF FWX and **MF FWX** face mills mount hexagonal inserts with 6 cutting edges.



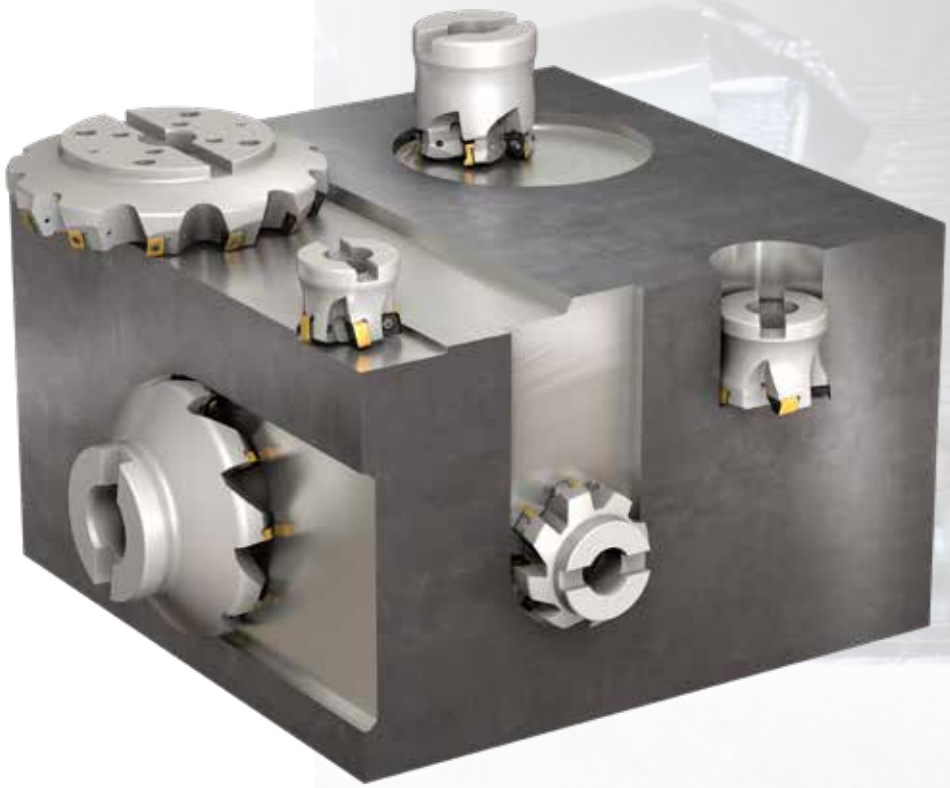
HFM - High Feed Milling

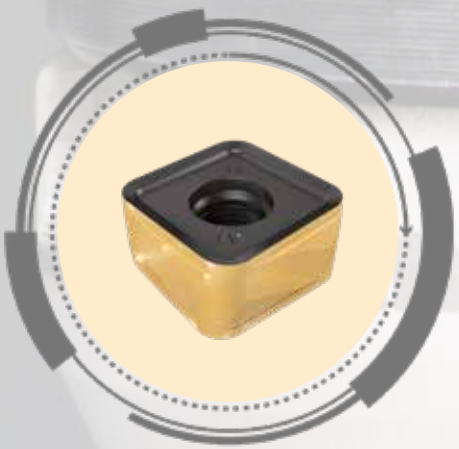
High feed milling refers to milling at very fast feed rates with relatively small depths of cut. These high feed rates are possible due to a small approach angle of the cutting edge, in a way which maintains uniform chip thickness. ISCAR provides diverse high feed milling tools and inserts, which cover a wide range of applications.

Key Factors:

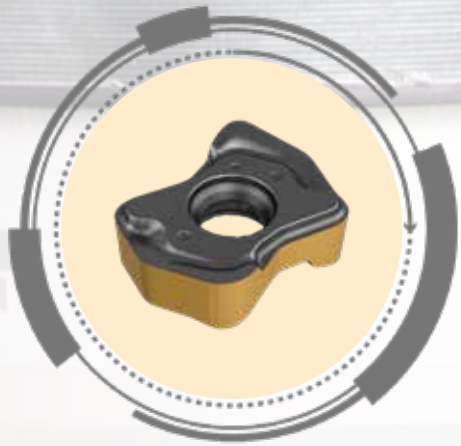
1. Positive tool rake angle assures smooth cutting, reduced cutting forces and power consumption
2. High metal removal rates
3. Large diameter range of milling cutters

Typical Applications





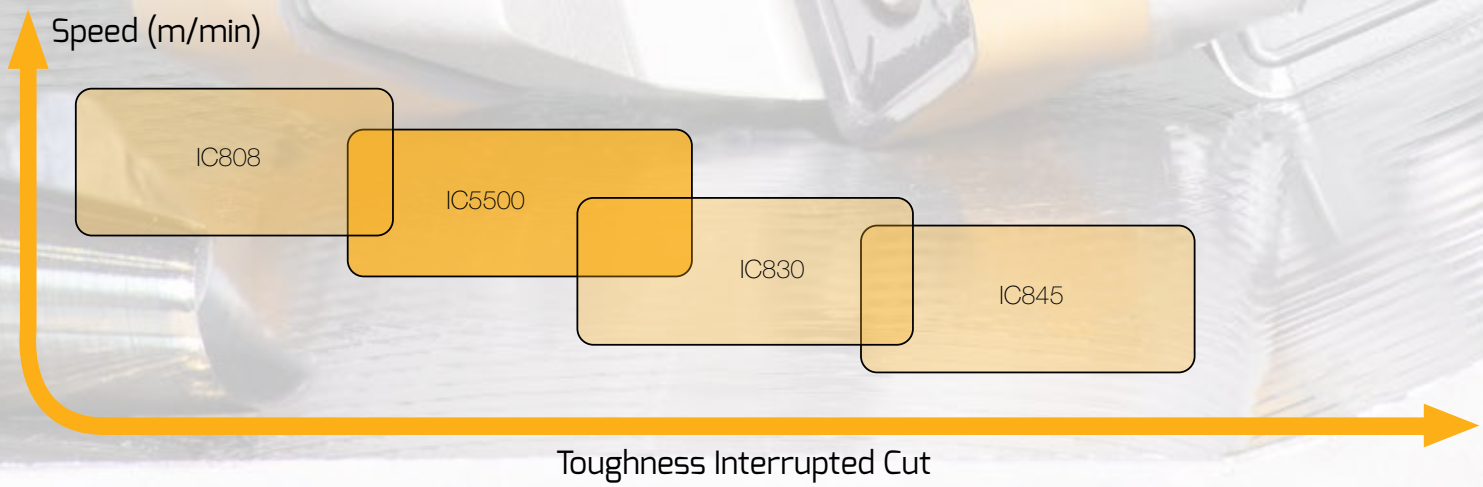
FFQ8 SZMU
Square double-sided inserts with 8 cutting edges for high feed milling



FFX4 XNMU
"Bone shaped" inserts with 4 cutting edges for fast feed milling

H600 WXCU
Double-sided inserts with 6 cutting edges for fast feed machining

Grades Position



Heavy Machining

Pressure Valve

Pressure valves are popular component in pressure control systems for heavy duty conditions intended for surface and subsea operations. The high strength of stainless steels, duplex and super duplex alloys assure long lasting pressure systems and are very common in the pressure control system field.
ISCAR offers a wide range of standard and special mills for the production of pressure valves.

HELIDO
600 UPFEED LINE

Rampdown Milling Interpolation

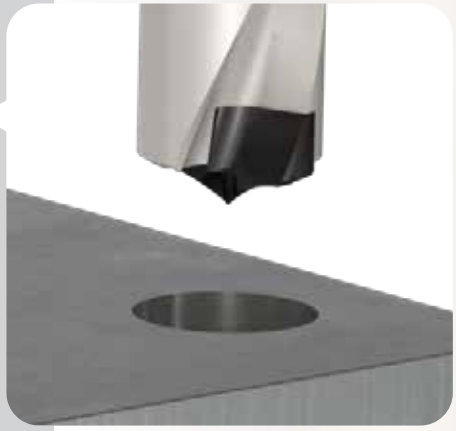
Double-sided, 6-edged insert combines **HELIDO**'s strength and **FEEDMILL**'s special geometry to facilitate milling at very high feed rates of up to 2 mm (0.078")/tooth for high volume metal removal rates.

Hole Making

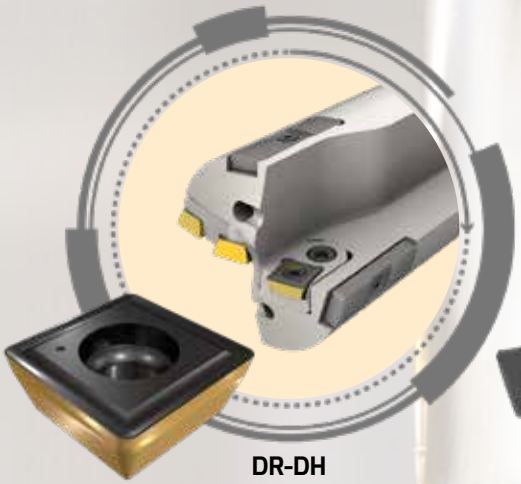
Holemaking is characterized by large diameter drills and boring systems able to withstand high cutting conditions.

Key Factors:

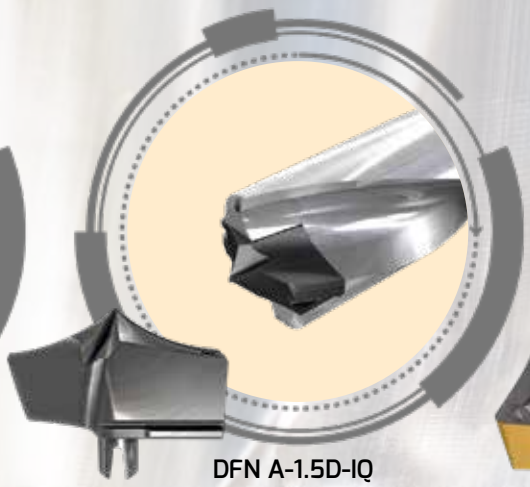
1. Large diameter drilling for demanding cutting conditions
2. Drilling without a pilot hole
3. Interrupted-cutting
4. Exchangeable PVD inserts
5. Indexable drilling inserts
6. Exchangeable drilling heads



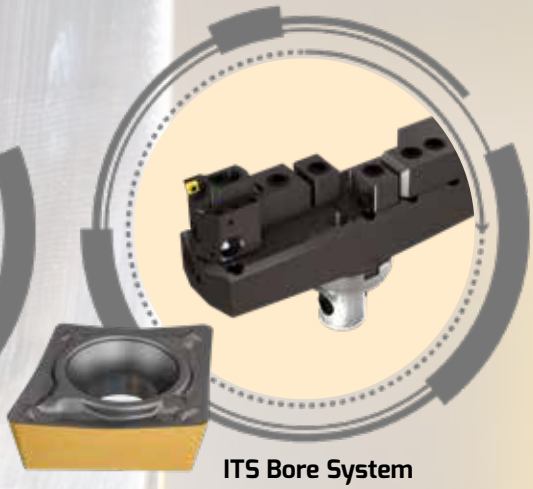
Typical Applications



DR-DH
Large drilling depth: L=5xD and higher – up to 800 mm (31.5") mount standard indexable inserts

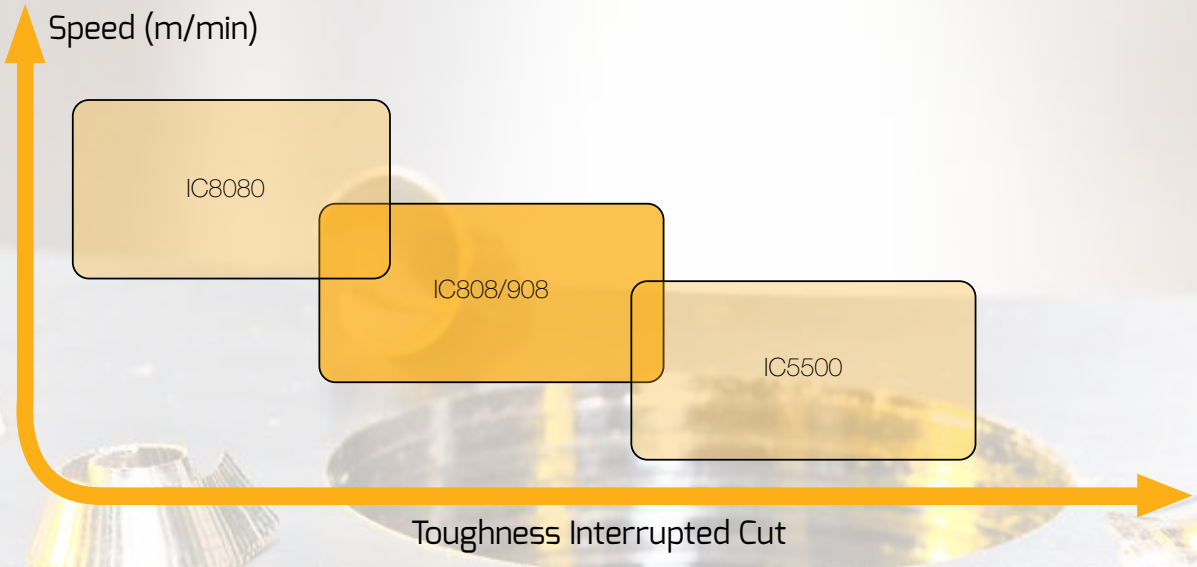


DFN A-1.5D-IQ
Drilling range of 33 to 40 mm with 1.5, 3, 5 and 8 length to diameter ratios



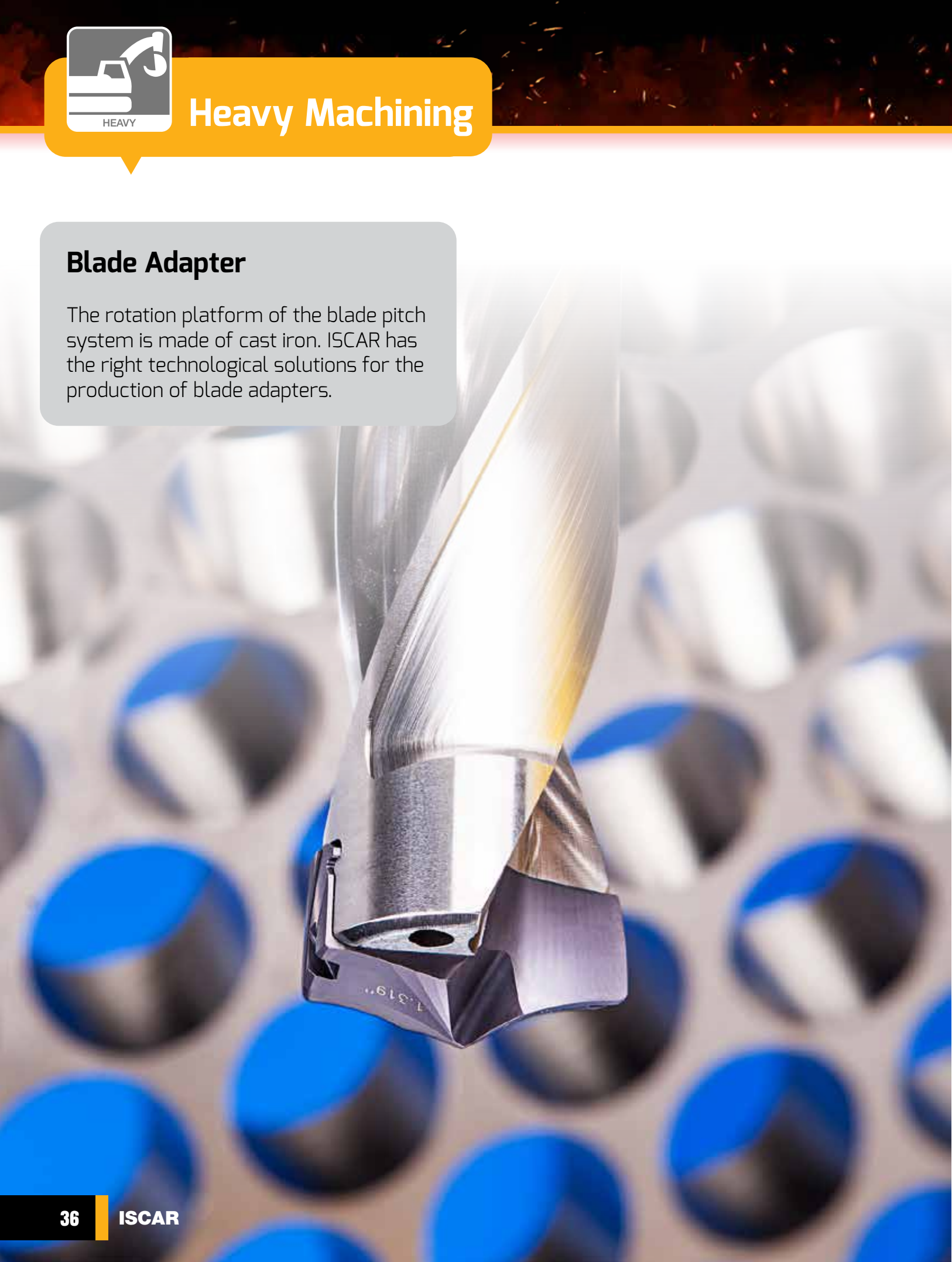
ITS Bore System
TCH AL Aluminum twin cutter heads for rough and fine boring operations

Grades Position



Blade Adapter

The rotation platform of the blade pitch system is made of cast iron. ISCAR has the right technological solutions for the production of blade adapters.



CHAM IQ DRILL
700 LINE

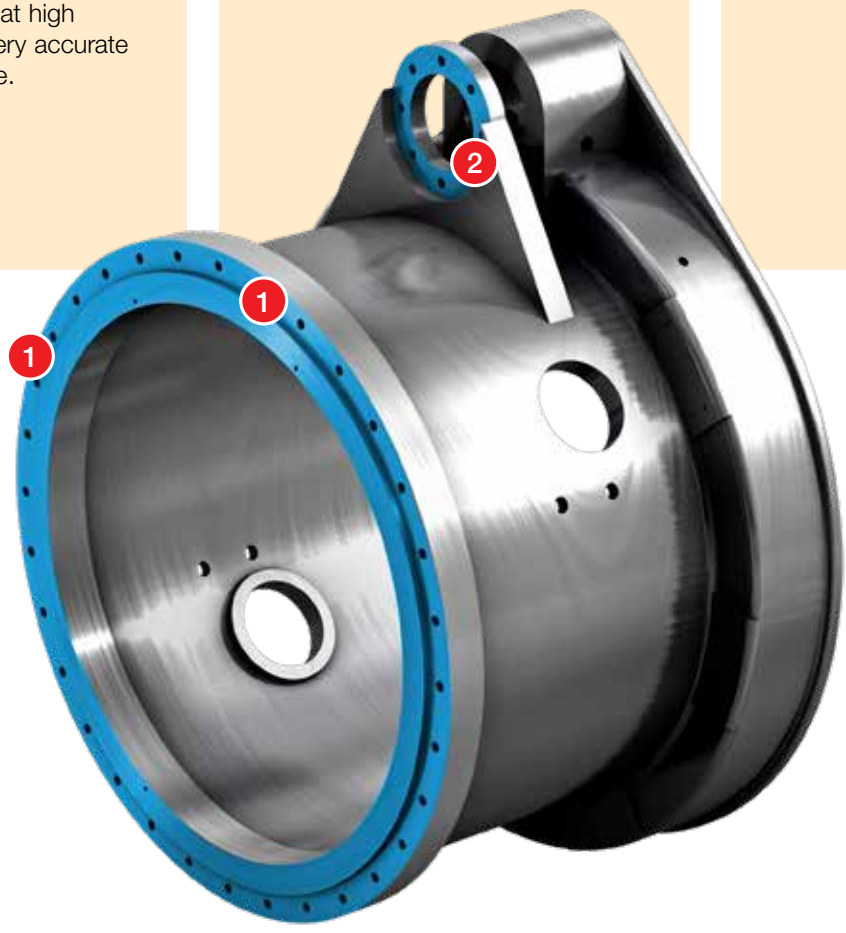
Drilling

The **CHAM-IQ-DRILL** features a unique design, eliminating the need for clamping accessories. The robust structure of the drill with the concave cutting edge design enables drilling at high feed rates, providing very accurate IT8 – IT9 hole tolerance.

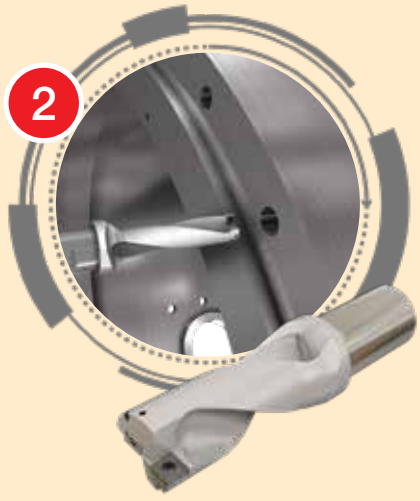
SUMOCHAM
CHAMDRILL LINE

Drilling

SUMOCHAM comprises a revolutionary clamping system that enables improved productivity output rates, while enabling more insert indexes.



DR-TWIST
INDEXABLE DRILL LINE



Drilling

Drills designed with twisted coolant channels, allows a strong body with excellent resistance to torsion and very efficient chip evacuation.

Key Codes

Metric	
MN	SUMOCHAM heads
MNC	COMBICHAM
MF	CHAM-IQ-DRILL
M3N	LOGIQ-3-CHAM
MD	IDI Heads
MR	XOMT/SOMT/SOMX Inserts
MC	Assembly
MH	Combi Holder

Metric
#.##

Metric
#.##

Other Characteristics	
F	Cartridge
A	Adjustable Cartridge
R	No Cartridge
L	Left-Hand Drill
B	Boring Tool
S	Stacked Plates
T	Flat Bottom
C	Frontal Coolant
H	Heavy Metal
P	Combi Head
Y	Combi Assembly
M	Twisted

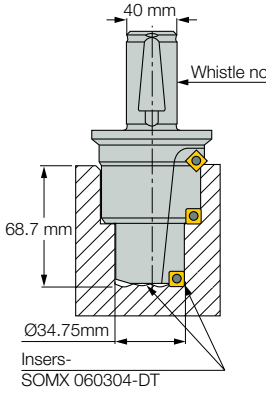
Inch	
IN	SUMOCHAM heads
INC	COMBICHAM
IF	CHAM-IQ-DRILL
I3N	LOGIQ-3-CHAM
ID	IDI Heads
IR	XOMT/SOMT/SOMX Inserts
IC	Assembly
IH	Combi Heads

Inch
#.##

Inch
#.##

ANSI	ISO
A - 2	SOMT 06
F - 3	SOMT 09
H - 4	SOMT 12
K - 5	SOMT 16
T - 4	AOMT 04
P - 5	SOMX 05
Q - 6	SOMX 06
R - 7	SOMX 07
J - 10	SOMT 10
I - 11	SOMT 11
L - 14	SOMT 14
N - DCN/D3N Pocket	
E - DCM Pocket	

Line	Drill Diameter		Drilling Depth		Shank/Flange Code	Insert Size		Insert Qty	Other
M	R	3	4	8	-	0	6	9	N	D	-	Q	4	R



Shank Type Code	
F	One Parallel Flat
D	Two Parallel Flats (DZ Metric Type)
E	Extended Lengh (For Coolant Ring)
N	Whistle Notch (DR Metric Type)
L	One Flat (ISO 9266 Cham Shank)
R	Round (Fully Rounded)
W	Weldon
M	Morse
H	HSK
X	Special
P	CLICKFIT
B	BBS (ABS Compatible)(1)
K	IM (ISO 26622-1 standard)
C	CAMFIX
V	VDI (ISO 26623-1 standard)

Other types on request

(1) The trademark ABS® is owned by the KOMET GROUP

Shank/Diameter Type Code			
P	10 mm	Z	.375"
S	12 mm	T	.437"
Q	14 mm	V	.500"
R	16 mm	W	.562"
H	18 mm	U	.625"
A	20 mm	J	.750"
B	25 mm	K	1.000"
C	32 mm	L	1.250"
D	40 mm	M	1.500"
E	50 mm	N	2.000"
F	63 mm	2	MT2
G	80 mm	3	MT3
X	Special	4	MT4
		5	MT5

General - Calculations

Spindle Speed (min^{-1})

$$n = \frac{v_c \cdot 1000}{\pi \cdot D}$$

Cutting Speed (m/min)

$$v_c = \frac{\pi \cdot D \cdot n}{1000}$$

Table Feed (mm/min)

$$v_f = f \cdot n$$

Material Removal Rate (cm^3/min)

$$Q = \frac{v_f \cdot \pi \cdot D^2}{4000}$$

Power Requirement (kW)

$$P_c = \frac{Q}{60.000 \cdot \eta} \cdot k_c \cdot \sin k$$

Torque (Nm)

$$M_c = \frac{f \cdot k_c}{1000} \cdot \frac{D^2}{8} \cdot \sin k \cdot km$$

Feed Force (approx.) (N)

$$F_f = 0.63 \cdot \frac{D}{2} \cdot f \cdot kc \cdot \sin k \cdot kf$$

Machining Time (min/piece)

$$T_c = \frac{L+h}{v_f}$$

Machining Cost ($/piece)

$$C_c = \frac{C_{Mh}}{60} \cdot Tc$$

Example

Drill DR 220-044-25-07-2D-N (Ø22 mm) - Material No. 4

k_c=2200 N/mm^2 k=90°, sin k=1

v_c=200 m/min C_{Mh}=50 $/h □=0.75

km=1 kf=1 f=0.15 mm/revL=25 mm h=10 mm

$$n = \frac{vc \cdot 1000}{\pi \cdot D} \cdot \frac{200 \cdot 1000}{\pi \cdot 22} = 2894 \text{ min}^{-1}$$

$$v_f = f \cdot n = 0.15 \cdot 2894 = 434 \text{ mm/min}$$

$$Q = \frac{vf \cdot \pi \cdot D^2}{4000} = \frac{434 \cdot 3.14 \cdot (22)^2}{4000}$$

$$= 165 \text{ cm}^3\text{/min}$$

$$P_c = \frac{Q}{60.000 \cdot \eta} \cdot K_c \cdot \sin k$$

$$= \frac{65}{60.000 \cdot 0.75} \cdot 2200 \cdot 1 = 8.06 \text{ kW}$$

$$M_c = \frac{f \cdot Kc}{10000} \cdot \frac{D^2}{8} \cdot \sin k$$

$$= \frac{0.15 \cdot 2200}{10000} \cdot \frac{222}{8} \cdot 1 \cdot 1 = 20 \text{ Nm}$$

$$F_f = 0.63 \cdot \frac{D}{2} \cdot f \cdot K_c \cdot \sin k$$

$$= 0.63 \cdot \frac{22}{2} \cdot 0.15 \cdot 2200 \cdot 1 \cdot 1 = 2286 \text{ n}$$

$$T_c = \frac{L+h}{V_f} = \frac{25+10}{434} = 0.08 \text{ min/piece}$$

$$C_c = \frac{CMh}{60} \cdot Tc = \frac{50 \cdot 0.08}{60}$$

$$= 0.067 \text{ \$/piece}$$

k_c Values

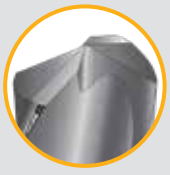
Drilling Tool Wear

Edge Chipping

Cause
- Low wear resistance Carbide grade
- Built-up edge has been formed
- Insufficient coolant fluid

Remedy
- Reduce feed rate
- Increase cutting speed
- Increase coolant pressure
- Improve jet direction in case of external coolant supply
- Change to different geometry
- Check tool and part clamping rigidity

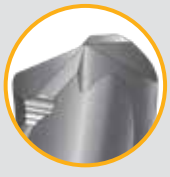
Land Wear



Cause
- Cutting speed too high
- Low wear resistance Carbide grade
- Radial run-out is too high

Remedy
- Check that the correct geometry is used
- Check that T.I.R. run-out does not exceed 0.02 mm
- Reduce cutting speed
- Increase coolant pressure
- Improve jet direction in case of external coolant supply
- Check and improve tool and part clamping rigidity
- Check if pocket gripping forces are too low - if so, replace the tool body

Corner Fracture

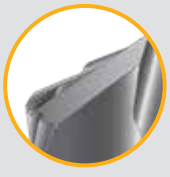


Cause

Caused by excessive insert wear before indexing the insert
- The grade and geometry may be too weak for the applications
- Excessive load on the insert
- Built-up edge has been formed on the insert

Remedy
- Check radial run-out
- Reduce feed rate
- Increase the speed
- Check tool and part clamping rigidity
- Check if pocket gripping forces are too low, replace the holder
- Increase coolant pressure
- Improve jet direction in case of external coolant supply

Corner Chipping



Cause
- Radial run-out is too high
- Insufficient coolant fluid

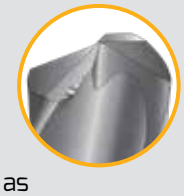
Remedy
- Check radial run-out
- Reduce feed rate, increase the speed
- Check tool and part clamping rigidity
- Check if pocket gripping forces are too low - if so, replace the holder
- Increase coolant pressure
- Improve jet direction in case of external coolant supply

Chisel Chipping

Cause
- Chisel run-out is too big
- Combination of high feed and low speed

Remedy
- Reduced feed rate and increased cutting speed
- Check that chisel misalignment does not exceed 0.02 mm
- Check tool and part clamping rigidity
- Check if pocket gripping forces are too low - if so, replace the holder

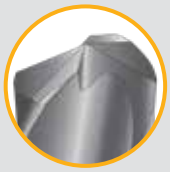
Built-up Edge



Cause
- Cutting zone temperature is too low
- Negative cutting geometry
- Machining of very sticky materials such as low-carbon steel, stainless steels, and aluminum

Remedy
- Increase feed
- Increase cutting speed
- Increase coolant pressure
- Check oil percentage in the coolant fluid

Land Wear



Cause
- Cutting temperature is too high

Remedy
- Check cutting parameters
- Reduce cutting feed
- Increase coolant pressure/volume
- Use harder grade
- Check that the correct geometry is used

Crater Wear

Cause
- Excessive cutting temperatures and pressures on the top of the insert

Remedy
- Reduce cutting feed
- Check that the correct geometry is used

Thermal Cracking

Cause
- Excessive variations in surface temperature, intermittent machining, or variations in coolant supply

Remedy
- Increase coolant pressure/volume
- Increase oil concentration percentage

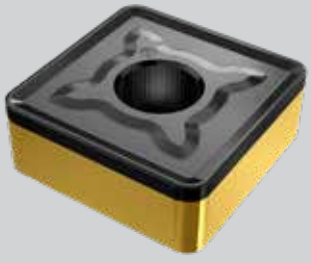
Flank Wear

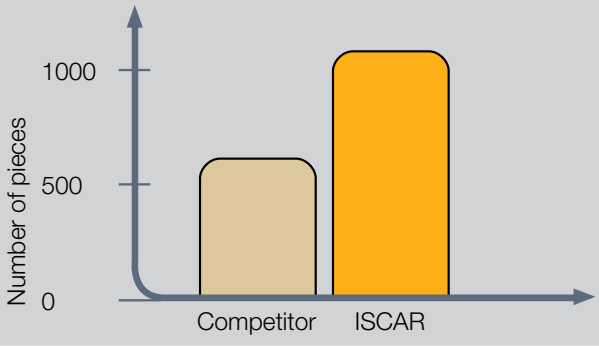
Cause
- High cutting speed
- Low wear resistance Carbide grade

Remedy
- Check that the correct geometry is used
- Increase coolant pressure
- Change to harder grade
- Increase oil concentration percentage
- Reduce cutting speed and increase feed

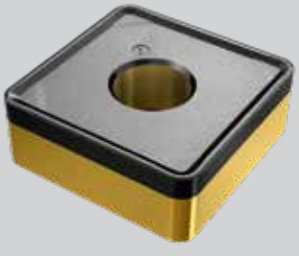
Turning - Test Reports

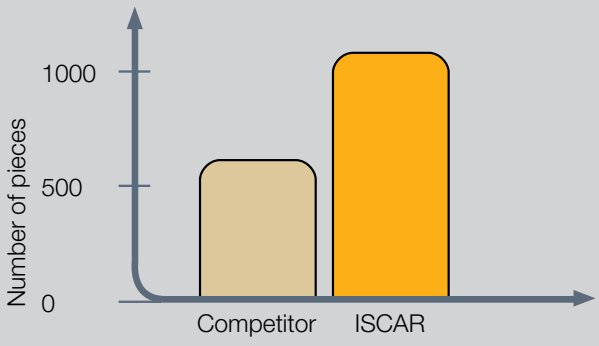
Test Parameters	
Tool	MCLNR 32-8
Insert	SNMM 866-H4P
Carbide grade	IC8250
Cutting speed (m/min)	190 (m/min)
Feed (mm/rev)	0.64 (mm/rev)
Depth of cut (mm)	12.7 (mm)
Number of passes	1
Parts per cutting edge	1.5



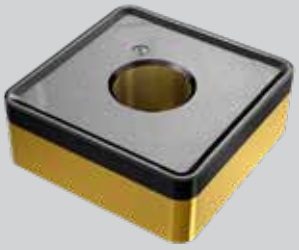


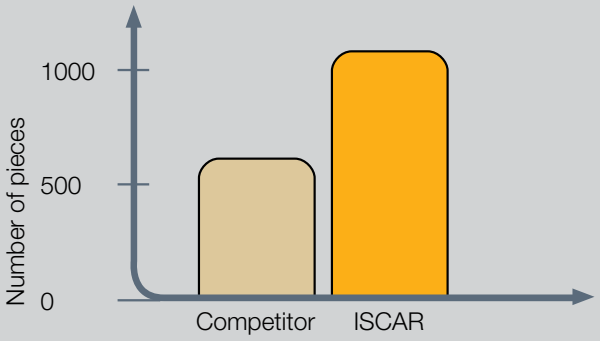
Test Parameters	
Tool	PSBNR 4040S-2509
Insert	SNMM 250924-R3P
Carbide grade	IC8150
Cutting speed (m/min)	65 (m/min)
Feed (mm/rev)	0.7 (mm/rev)
Depth of cut (mm)	7.5 (mm)
Number of passes	2
Parts per cutting edge	3



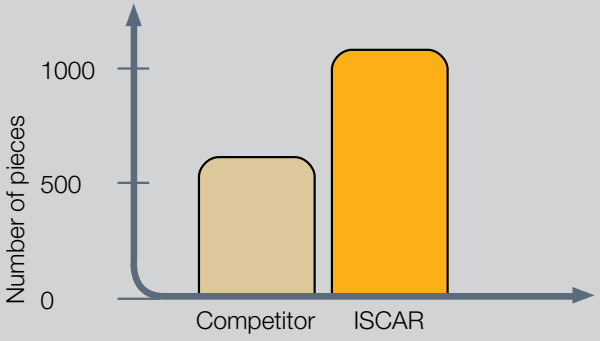


Test Parameters	
Tool	
Insert	SNMM 250924-R3P
Carbide grade	IC8150
Cutting speed (m/min)	140 (m/min)
Feed (mm/rev)	0.9 (mm/rev)
Depth of cut (mm)	8 (mm)
Number of passes	5
Parts per cutting edge	1.5



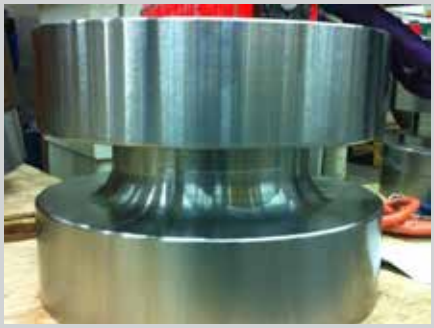


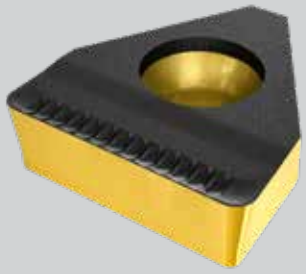
Test Parameters	
Tool	MCLNR 32-8
Insert	SNMM 866-H4P
Carbide grade	IC8250
Cutting speed (m/min)	190 (m/min)
Feed (mm/rev)	0.64 (mm/rev)
Depth of cut (mm)	12.7 (mm)
Number of passes	1
Parts per cutting edge	1.5



Grooving - Test Reports

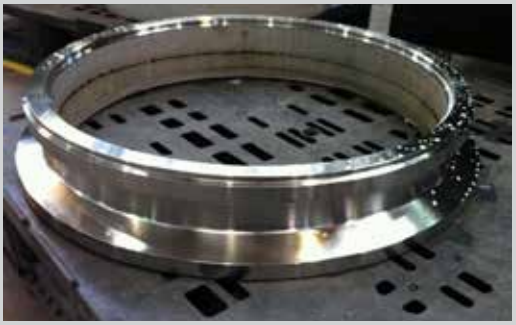
Test Parameters	
Tool	
Insert	TIGER 1415Y-IQ
Carbide grade	IC808
Cutting speed grooving (m/min)	120 (m/min)
Feed grooving (mm/rev)	0.32 (mm/rev)
Depth of cut groove (mm)	14 (mm)
Number of passes grooving	5
Parts per cutting edge	4
Material removal rate grooving (cm^3/min)	5.9

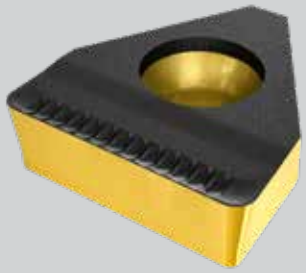




Test Parameters	
Tool	
Insert	TAGB 1260
Carbide grade	IC808
Cutting speed grooving (m/min)	220 (m/min)
Feed grooving (mm/rev)	0.7 (mm/rev)
Depth of cut groove (mm)	4 (mm)
Number of passes grooving	1
Parts per cutting edge	1
Machining time (min)	8.5

Test Parameters	
Tool	THDR 3232-14T20-IQ
Insert	TIGER 1415Y-IQ
Carbide grade	IC808
Cutting speed grooving (m/min)	120 (m/min)
Feed grooving (mm/rev)	0.32 (mm/rev)
Depth of cut groove (mm)	14 (mm)
Number of passes grooving	5
Parts per cutting edge	4
Machining time (min)	5.9

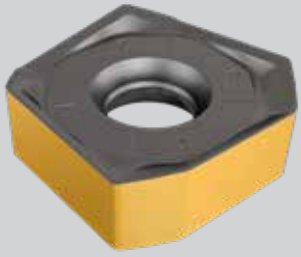




Test Parameters	
Tool	TGBHL 25-12
Insert	TAGB 1260Y
Carbide grade	IC8250
Cutting speed grooving (m/min)	120 (m/min)
Feed grooving (mm/rev)	0.6 (mm/rev)
Depth of cut groove (mm)	6 (mm)
Number of passes grooving	5
Parts per cutting edge	8
Machining time (min)	12

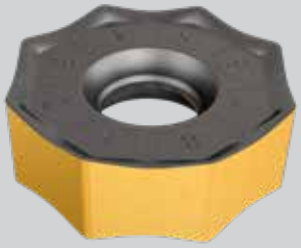
Milling - Test Reports

Test Parameters	
Tool	SOF45WG D200-12-60-R26
Diameter (mm)	200
Total no. of teeth	8
Effective no. of teeth	8
Insert	S845 SNMU 2608ANR-RM
Carbide grade	IC808
Cutting speed (m/min)	157
Spindle speed (rpm)	250
Depth of cut (mm)	10
Width of cut (mm)	186
Feed per tooth (mm/t)	0.5
Table feed (m/min)	1500
Parts per cutting edge	320
Material removal rate (cm^3/min)	2790



Test Parameters	
Tool	T465 FLN D315-12-60R-22ST
Diameter (mm)	315
Total no. of teeth	12
Effective no. of teeth	12
Insert	T465 LNMT 2212-ZNTR
Carbide grade	IC810
Cutting speed (m/min)	175
Spindle speed (rpm)	177
Depth of cut (mm)	10
Width of cut (mm)	250
Feed per tooth (mm/t)	0.43
Table feed (m/min)	912
Parts per cutting edge	0.2
Material removal rate (cm^3/min)	2281.22

Test Parameters	
Tool	SOF45 D160-08-40-R26
Diameter (mm)	160
Total no. of teeth	8
Effective no. of teeth	16
Insert	ONMU 100816-N-HL
Carbide grade	IC810
Cutting speed (m/min)	251
Spindle speed (rpm)	500
Depth of cut (mm)	
Width of cut (mm)	120
Feed per tooth (mm/t)	0.43
Table feed (m/min)	1720
Parts per cutting edge	2
Machine load (%)	52



Test Parameters	
Tool	FFQ8 D080-07-27-12
Diameter (mm)	80mm/z=7
Insert	FFQ8 SZMU 120520T
Carbide grade	IC808
Cutting speed (m/min)	160
Depth of cut (mm)	1.5
Width of cut (mm)	60 (mm)
Feed per tooth (mm/t)	1.5
Tool life (min)	20
Proccessing time (min)	38

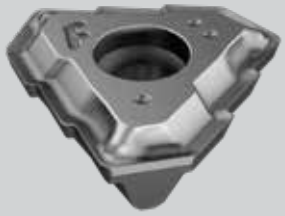
Holemaking - Test Reports

Test Parameters	
Drill	DFN 380-304-32A-8D-IQ
Insert	HFN 380-IQ-P
Insert grade	IC08
Tool/insert material	Carbide Uncoated
Hole diameter	38
Hole depth	200
Cutting speed (m/min)	113
Spindle speed (rpm)	947
Feed (mm/rev)	10
Table feed (m/min)	331
Holes per cutting edge	195
Chip type	Comma/Helical
Material removal rate (cm^3/min)	375.73

Test Parameters	
Drill	MNC 490-245 A40-259-12
Insert	HCP 259-IQ
Insert grade	IC908
Tool/insert material	
Hole diameter	49
Hole depth	45
Cutting speed (m/min)	120
Spindle speed (rpm)	480
Feed (mm/rev)	0.2744
Table feed (m/min)	214
Holes per cutting edge	540
Chip type	Comma/Helical
Material removal rate (cm^3/min)	403.37

Test Parameters	
Drill	MD-DR-DH 380 070707-06
Insert	SOMX 070305-DT
Insert grade	IC908
Tool/insert material	Carbide Coated
Hole diameter	38
Hole depth	421
Cutting speed (m/min)	85
Spindle speed (rpm)	712
Feed (mm/rev)	0.15
Table feed (m/min)	107
Holes per cutting edge	30
Chip type	Spiral
Material removal rate (cm^3/min)	121.13

Test Parameters	
Drill	MNB 0600-050 X25-20-T10
Insert	TOGT 100305-DT
Insert grade	IC908
Tool/insert material	
Hole diameter	60
Hole depth	420
Cutting speed (m/min)	90
Spindle speed (rpm)	477
Feed (mm/rev)	0.14
Table feed (m/min)	67
Holes per cutting edge	8
Chip type	Comma/Helical
Material removal rate (cm^3/min)	189



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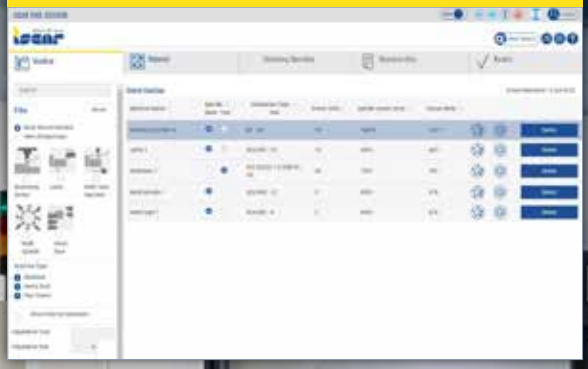
NEO ITA System Workflow

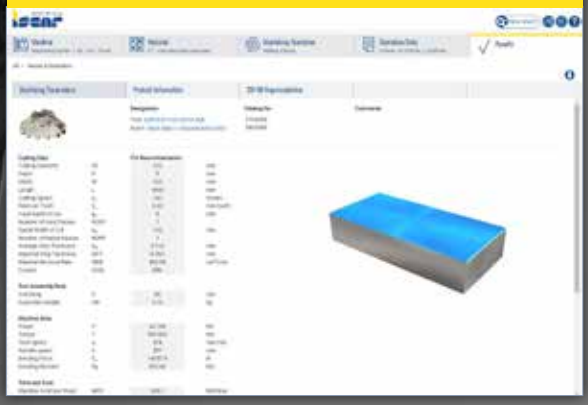
Select a Machine



Define and customize machine specifications

Search material by groups or by random choice

Choose a Tool Recommendation



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