



# Oil and Gas

Industries



# Global Network



- Marketing Support
- Marketing Support & Production Center

# Make the RIGHT CHOICE

## A Global Metalworking Company

In a world of different languages and different mentalities, it is important to have a fully equipped, knowledgeable local supplier to meet your needs.

ISCAR knows this. We have subsidiary offices and agents located in 52 major industrial countries. In some of the larger countries, regional offices have been opened to bring ISCAR personnel and facilities as close as possible to customer production sites.

Many of our subsidiaries have fully equipped training centers. These centers are dedicated to providing a local location where metalworking personnel can be trained in the latest techniques and products for metal removal.

ISCAR has global manufacturing facilities in each of the following countries:

### In Europe

-  France
-  Germany
-  Italy
-  Spain
-  Switzerland
-  Turkey
-  Hungary
-  Slovenia

### In the Americas

-  Argentina
-  Brazil
-  United States

### In Asia

-  South Korea
-  China
-  Israel

## Strong Industry Powering the World

While the population of the world continues to grow, with 9.2 billion people expected by 2050, so does the average standard of living driven by a sustainable economic average in emerging and developed economies.

Investments in R&D and manufacturing technology are crucial to maintain a long term competitive advantage.

While making these important investments, companies also have to focus on controlling costs, improving

productivity and searching for new technologies.

There is a growing demand for machining exotic materials in the oil and gas industry, capable to withstand the most hostile environments such as high temperatures, corrosion and extreme pressure conditions

For this purpose ISCAR brings its customers innovative tooling solutions, combined with the highest quality assurance standards worldwide.

The oil and gas industry is usually divided into 3 main segments, **upstream**, **midstream** and **downstream**. Midstream operations are usually included in the downstream category.



### Upstream

Exploration and production of crude oil and natural gas



### Midstream Pipeline

Transportation, storage and marketing of oil and gas derivatives



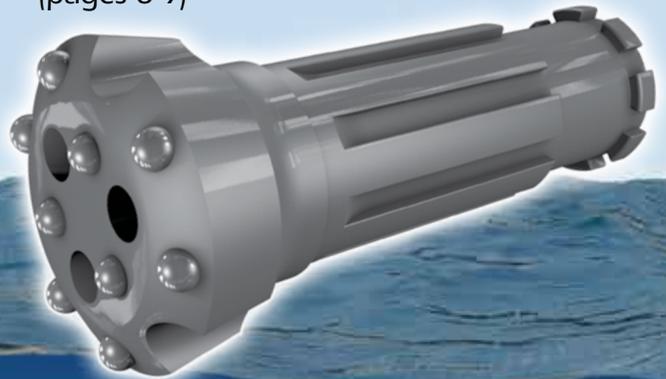
### Downstream LNG Plant

Refining crude oil, purifying and processing raw natural gas

# Upstream Sector

This sector involves all the activities related to the exploration and production (E&P) of crude oil and natural gas. The upstream oil and gas segment include: exploration for potential underground or underwater oil and natural gas reservoirs, drilling of exploratory wells, and operating/producing the oil and natural gas wells that “pay” with crude oil and/or natural gas.

## Rock Bits (pages 8-9)



## Wellheads X-MAS Tree (pages 14-15)



**Pipe**  
(pages 10-11)



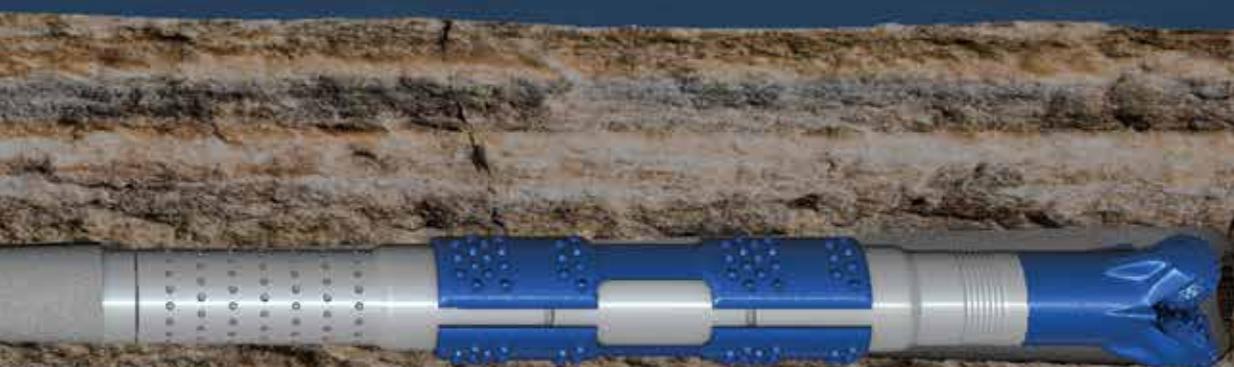
**Coupling Sleeves**  
(pages 12-13)



**Pressure Valve**  
(pages 16-19)



**Frac Pump**  
(pages 20-21)



# Drill Bits Machining Solutions

Drill bits are part of the downhole equipment used to dig down into the earth's crust. Like a common hand-held drill, the spinning of the drill bit allows for penetration of even the hardest rock. The drill bit is located at the bottom end of the

drill string, and is responsible for actually making contact with the subsurface layers, and drilling through them. The drill bit is responsible for breaking up and dislodging rock, sediment, and anything else that may be encountered while drilling.

## Carbide Bit Holes

Range: Ø6-32.9 mm (Ø.236-1.295")

1

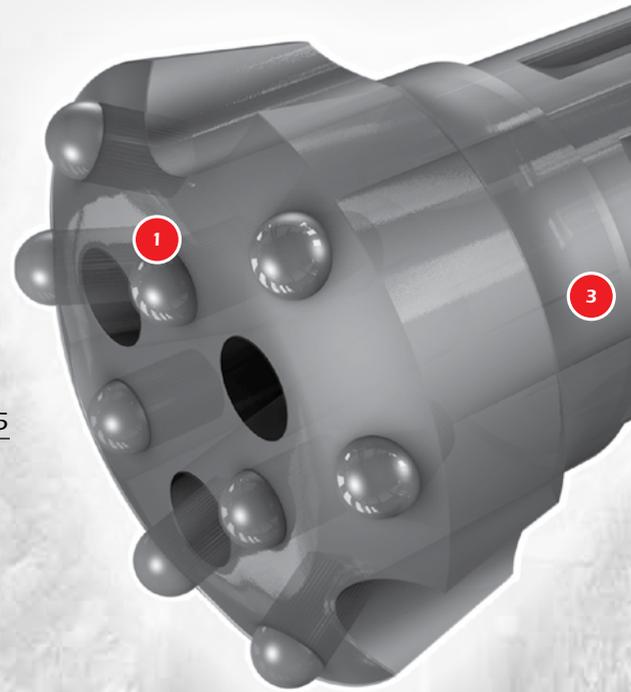
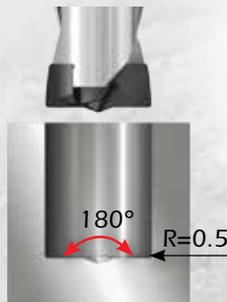
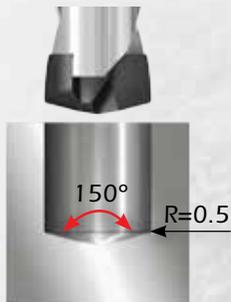
### SUMOCHAM

CHAMDRILL LINE

SUMOCHAM comprises a revolutionary clamping system that enables improvement in productivity output rates, while enabling more insert indexes. Uses standard 1.5xD drill head. Point angle can be offered from 130° up to 180° with corner radius.

908

P M K N S H  
✓ ✓ ✓ ✓ ✓ ✓



## Slot Milling

Range: Ø6-25.4 mm (Ø.0236-1.00")

2

### MULTI-MASTER

INDEXABLE SOLID CARBIDE LINE

A family of tools with unique interchangeable heads, for a variety of milling applications including ball nose, straight shoulder, slitting and slotting applications.

908

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✓ ✓ ✓ ✓ ✓ ✓

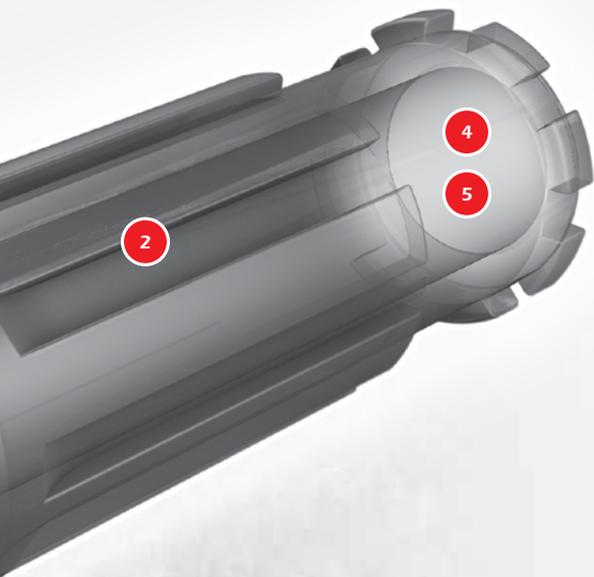


## External Rough Turning

3

### **DOVE IQ TURN** HEAVY DUTY LINE

Rough turning is characterized by high D.O.C. 4-10 mm (0.157-0.393") and high feed rates 0.4-1.0 mm/rev (0.016 -0.0393 ipr). Large single-sided inserts are used to withstand interrupted cut and high machining load.



## Deep Hole Drilling System\*

Range: Ø8-300 mm (Ø.315-11.8")

4

### **ISCAR DEEP DRILL**

**DTS** – Double Tube System -

Range: Ø18.41-168.99 mm (Ø.724-6.65") IT9-IT10

**STS** – Single Tube System -

Range: Ø14.51-Ø245.99 mm (Ø.571-Ø9.68"), IT9

**9025**

P M K N S H  
✓ ✓

\* See page 18.



## DR-DH Deep Drills for Milling Centers and Lathe Machines

Range: Ø25-100 mm (Ø.984-3.94")

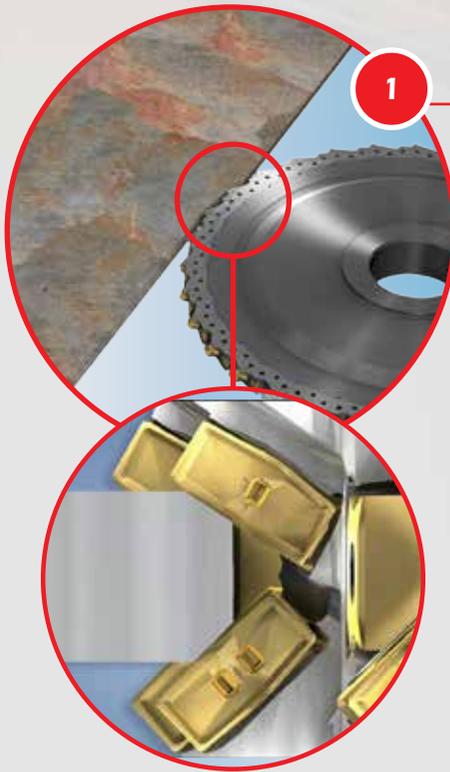
5

### **ISCAR DR-DH**

These long drills for a drilling depth-to-diameter ratio of 7XD and up, can be used on standard horizontal milling centers, turning, and multi-task machines. Use of supplementary machine and setup may be avoided.



# Pipe Machining Solutions



1

## Welding Edge Preparation Profile Milling Cutters

Innovative design based on precise exchangeable segments. Strong tangential inserts enhance the performance of these reliable tooling systems. Minimal cutting tool maintenance costs and fast segment replacement.



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TAILORED**



2

## Skiving of External Weld Seam

A negative insert with 8 cutting edges to remove the burr right after the welding process (material temperature is usually 300-400°C (572-752°F)). Cutting speed varies from 40-150 m/min (132-495 sfm), depending on the diameter of the tube.

SUMO TEC  
**8150**  
P M K N S H  
✓ ✓





Welded Pipe



Seamless Pipe

## Tube End Cut-Off

### TANG-GRIP

The revolutionary TANG-GRIP system has proven to be the utmost solution for heavy duty oilfield tubular goods cut-off application, providing very accurate grooving repeatability.



## External Rough Turning

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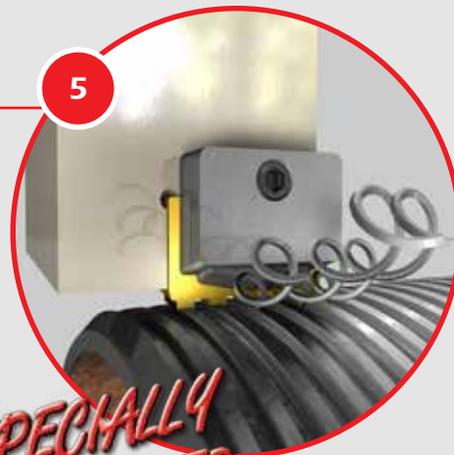


## Oilfield Threading

### ISCAR THREAD

ISCAR offers a wide range of API and premium profiles for the oil and gas industry.

From single point through laydown triangular, to complex high accurate threading chasers, ISCAR's threading line offers one of the best products in this application field.



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# Coupling Machining Solutions

## Charpy V-Notch Test

This standardized high strain rate test determines the amount of energy absorbed by a material during fracture. This absorbed energy is a measure of a given material's toughness and acts as a tool to study temperature-dependent ductile-brittle transition. It is widely applied in industry, since it is easy to prepare and conduct and results can be obtained quickly and cheaply.



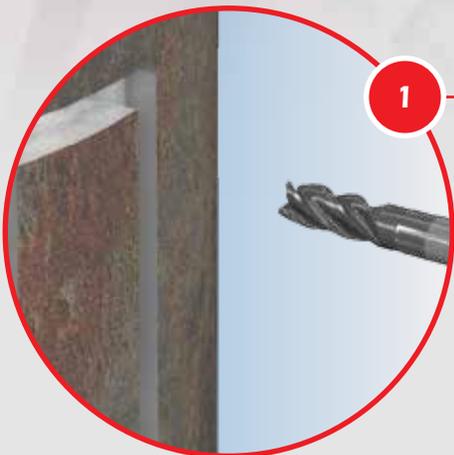
## Roughing Operation Solid Carbide Milling

Range: Ø3-25 mm (Ø.113-.985")

### **CHATTERFREE** SOLID MILL LINE

Revolutionary CHATTERFREE solid carbide endmills provide improved dampening performance, resulting in 20-25% longer tool life, even at large metal removal rates.

**900**  
P M K N S H  
✓ ✓ ✓ ✓ ✓ ✓



## Finishing Operation Solid Carbide Milling

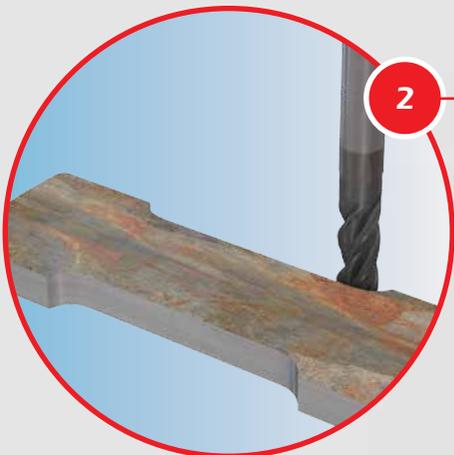
Range: Ø6-25 mm (Ø.236-.984")

### **FINISHRED**

ISCAR offers new 4 and 5 flute, 38° helix endmills with variable pitch for roughing and finishing operations.

The new EC...CF solid endmills and MM EC...CF MULTI-MASTER milling heads feature excellent chatter dampening ability, due to their variable pitch.

**900**  
P M K N S H  
✓ ✓ ✓ ✓ ✓ ✓



## High Feed Turning

### **DOVE IQ TURN** HEAVY DUTY LINE

The new PWXOL 3232P-10-TF-IQ lever lock 18.5° lead angle toolholders for fast feed, up to 3 mm/rev (0.118" ipr) and up to 2.8 mm (0.110") D.O.C., is the ultimate solution for longitudinal high feed turning.

SUMO TEC  
**8250**  
P M K N S H  
✓ ✓

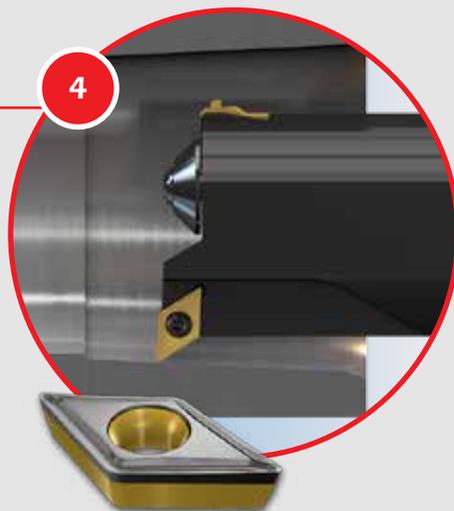


## Internal Turning (Finishing)

### **ISOTURN**

ISCAR boring bars are equipped with internal coolant channels. The unique design extends tool life, improves chip flow and machining reliability.

SUMO TEC **8150** SUMO TEC **8250**  
P M K N S H P M K N S H  
✓ ✓ ✓ ✓



## Laydown Threading

### **ISCAR THREAD**

ISCAR leads the way as the first choice cutting tool supplier, covering a wide range of intelligent cutting tool solutions, from external high output roughing rates through tight API and premium tolerance accuracy in threading.



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TAILORED**

# Wellheads Machining Solutions

The "easy oil" era has come to an end; nine out of ten of the world's giant oil fields are being depleted. The next frontier relies on the deepwater and ultra-deepwater exploration research which is critical to unlocking more oil to meet the world's growing demand.

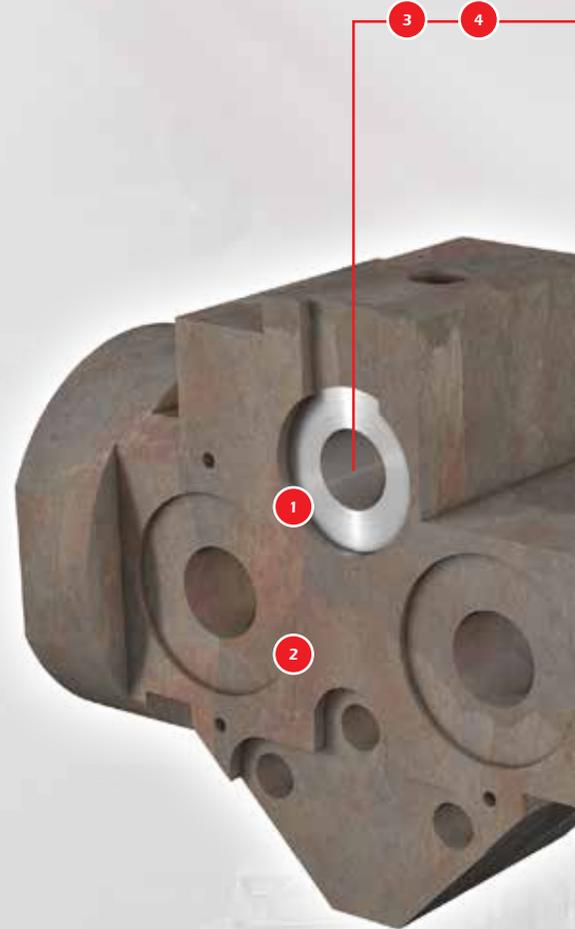
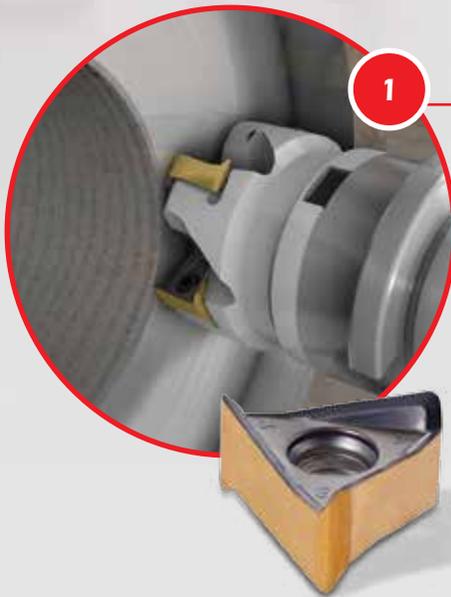
## Double-Sided Triangular Milling Inserts with 6 Cutting Edges

Range: Ø50-200 mm (Ø1.96-7.87")

**HELIDO**  
690 LINE

This revolutionary design of triangular inserts, coupled with a rigid pocket design, provides extremely high durability and very stable performance. The tools can machine accurate 90° shoulders up to 14 mm (0.55") depth, and in addition perform slotting, ramping down and facing operations.

SUMO TEC  
**330**  
P M K N S H  
✓ ✓ ✓



## Rough Boring

The growing demand for machining H.T.A. (High Temperature Alloy) has led ISCAR to develop a unique ISO insert suitable for machining H.T.A. materials more efficiently.

ISO-TURN insert with 4 cutting edges for truncated radius.

A configuration which facilitates heat transfer from the cutting area.

SUMO TEC  
**806**  
P M K N S H  
✓

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TAILORED**





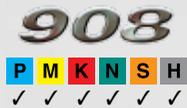
**Inconel Cladding**



**Rough Helical Interpolation**  
Range: Ø25-160 mm (Ø.985-6.3")

**MILLSHRED**  
ROUND LINE

Milling cutters that can carry either round inserts with a serrated cutting edge or regular round inserts. The serrated insert has four indexing orientation options and minimize chamfering in long overhang interpolation, (Wellheads bottom face holes).



**Precise Boring**

**ITSBORE**

High accuracy in boring operations have a strong impact on the machining process strategy to be adopted on the production floor. The wide range of tools offered by ISCAR's ITSBORE system brings the best solution for stiffness and precision in boring operations.



# Pressure Valve Machining Solutions

Valves, fittings and pumps are popular components in pressure control systems, providing the requested well security at heavy duty conditions 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. Other exotic materials such as titanium, inconel, powder metals and forging are also well-known in this sector. ISCAR has a wide range of tooling and carbides for these materials. It is only the process of tooling selection that needs to be addressed, and this is where ISCAR's experience has a great advantage over any other cutting tool supplier.

## Face Milling Insert with 16 Economical Cutting Corners

Range: Ø40-315 mm (Ø1.57-12.40")

### 16MILL

Each insert has 16 cutting edges, either right- or left-hand. Maximum depth of cut is 5.5 mm (0.216") if 16 cutting edges are required, or 13 mm (0.511"); in which case only 8 cutting edges can be used.



## Hole Making

Range: Ø6-32.9 mm (Ø.236-1.295")

### SUMOCHAM CHAMDRILL LINE

The new DCN drills feature cylindrical shanks, which enable clamping of the drill in hydraulic toolholders (most recommended) or in spring collets.



## Milling

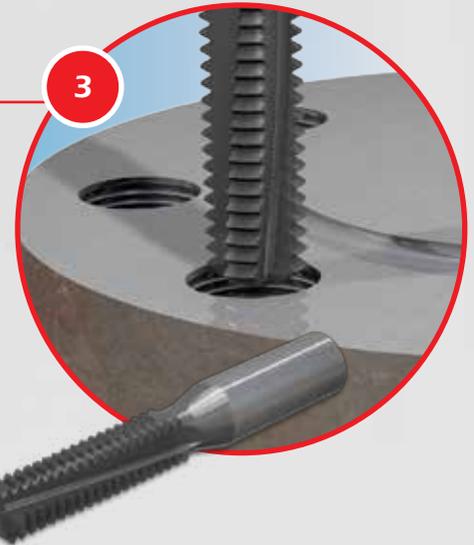
Range: Ø3-25 mm (Ø0.118-.985")

### **SOLIDTHREAD**

SOLIDTHREAD milling cutters are available in addition to thread milling cutters, with indexable thread milling inserts for any thread profile.

**908**

**P M K N S H**  
✓ ✓ ✓ ✓ ✓ ✓



## Hole Making

Range: Ø61-80 mm (Ø2.40-3.15")

### **DR-TWIST** INDEXABLE DRILL LINE

The inserts are available with two chipformer types for low alloy steel, stainless steel and high temperature alloys for high speed drilling of cast iron and steel, used for the peripheral insert.

**SUMO TEC 808**      **908**  
**P M K N S H**      **P M K N S H**  
✓ ✓                      ✓ ✓      ✓ ✓ ✓ ✓ ✓ ✓



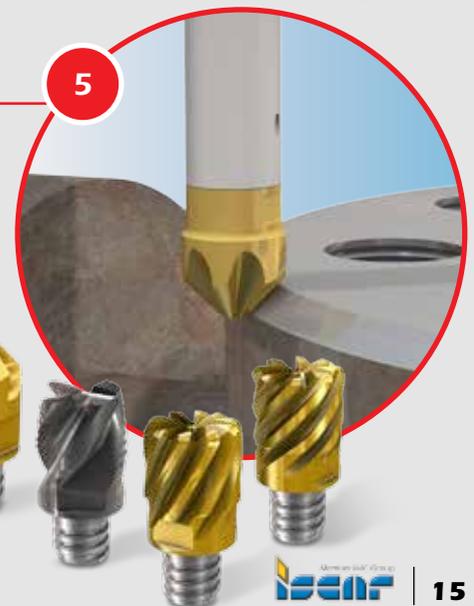
## MULTI-MASTER Endmills

### **MULTI-MASTER** INDEXABLE SOLID CARBIDE LINE

The innovative family of carbide interchangeable heads provides a large range of applications in milling including ball-nose, shouldering, slitting, chamfering, counter boring, etc.

**908**

**P M K N S H**  
✓ ✓ ✓ ✓ ✓ ✓



# Pressure Control Machining



## Turning Tools for High Pressure Coolant

**JETCUT**  
**ISOTURN**

High temperature alloys generate a very high temperature as they are being cut.

By effectively removing with JET HP LINE products, the heat from the cutting edge tool life is dramatically improved and the chips become less ductile and thus easier to break.



## Ring Groove Tooling Face Trepanning

Specially designed to improve productivity output. Optimal engineering design is applied to cut down machining costs.

Best option for BX, RX, R and similar API-style ring grooves.



## Rampdown Milling Interpolation

Range: Ø16-125 mm (Ø.63-4.92")

### **HELIDO** 600 UPFEED LINE

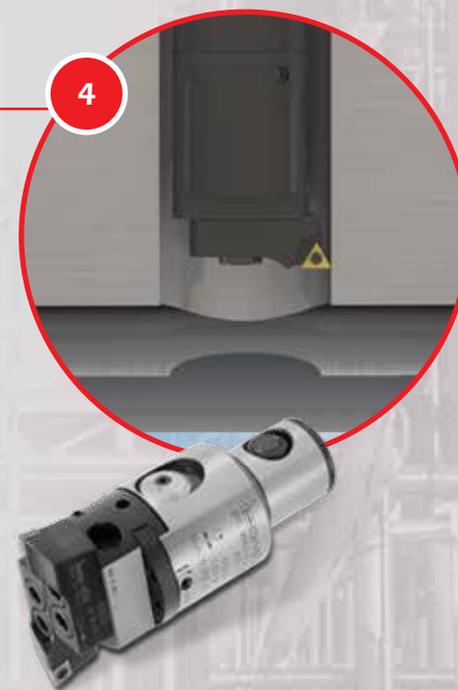
ISCAR's H600 WXCU ... HELIDO-FEEDMILL trigon double-sided, 6-edged insert combines HELIDO's strength and FEEDMILL's special geometry to facilitate milling at very high feed rates of up to 2 mm (0.078")/tooth for high volume metal removal rate.



## Fine Boring

### **ITSBORE**

The wide range of tools offered by ISCAR's ITSBORE system brings the best solution for stiffness and precision in boring operations. BHE boring heads are capable of reaching up to 10µm [0.00004"] in diameter accuracy and are equipped with a graduated dial of 0.01 mm [0.0004"] circular vernier. BHF Fine Boring Heads, the most accurate tooling system in ITSBORE line, are capable of reaching high precision machining up to 2µ [0.0000078"] tolerance and high surface quality.



# Frac Pump Machining Solution

Hydraulic fracturing equipment used in oil and natural gas fields usually consists of a slurry blender, one or more high-pressure, high-volume fracturing pumps such as powerful triplex or quintuplex pumps, and monitoring units.

Associated equipment includes fracturing tanks, one or more units for storage and handling of proppant, high-pressure treating iron, a chemical additive unit, low-pressure flexible hoses, and many gauges and meters for flow rate, fluid density, and

treating pressure. Fracturing equipment operates over a range of pressures and injection rates, and can reach up to 100 megapascals (15,000 pse) and 265 liters per second (9.4 cu ft/s) (100 barrels per minute).

## 1 Deep Hole Drilling System

### ISCAR DEEP DRILL

**Single Tube System:** requires the use of dedicated machines.  
STS – Single Tube System  
Range: Ø14.51-Ø245.99mm (Ø.571-Ø9.68”), IT9

**Double Tube System:** Can be applied on standard machines.  
DTS - Double Tube System  
Range: Ø18.41-168.99mm (Ø.724-6.65”) IT9-IT10

**9025**  
P M K N S H  
✓ ✓



#### Brazed Drills

- For short production series
- Multiple tips for chip splitting
- For difficult-to-machine materials, high temperature alloys, hardened steel
- Risky application (low cost head)
- Recommended for use by an experienced operator



#### Indexable Drills

- For high volume production
- Wide chip gullet for better chip evacuation
- High accuracy
- Ceramic guide pads available upon request, for titanium and stainless steel



#### Trepanning Drills

- Requires less power than a solid drilling application
- Trepanning leaves a core that can be used for material analysis and production of other parts
- Hole tolerance is not as accurate as with solid drilling



## 2 Fully Effective Large Diameter

### COMBICHAM

ISCAR's new large diameter drill (X59) is a fully effective tool with high penetration rate for increased productivity.

The COMBICHAM combines the best of two worlds: peripheral economical 4-cornered inserts from the DR-TWIST line + a central SUMOCHAM drill head.

**908**  
P M K N S H  
✓ ✓ ✓ ✓ ✓ ✓





## HTP... Side Plungers for Efficient Plunge Milling

Range: Ø16-80 mm (Ø.63-6.00")

### TANGPLUNGE

PLUNGING LINE

TANGPLUNGE HTP plungers carry tangentially clamped inserts on the frontal face of the tools, featuring high durability and excellent cutting performance. They all have coolant holes for efficient edge flushing and chip evacuation.



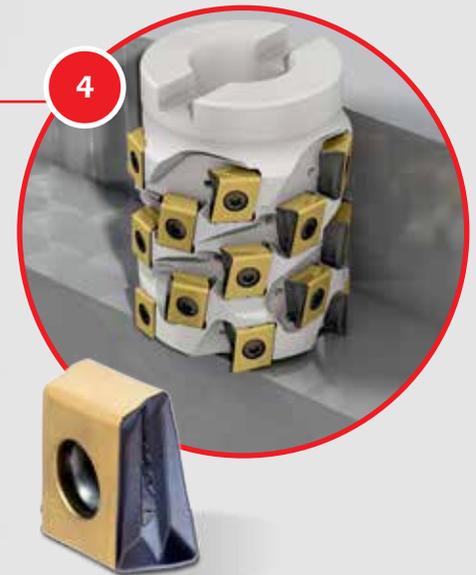
## Tangential Extended Flute Shoulder Milling

Range: Ø20-125 mm (Ø1.00-4.00")

### HELITANG

T490 LINE

HELITANG T490 is a family of milling tools that uses tangentially clamped inserts with four right-hand helical cutting edges. The T490 inserts are available in 8, 13 and 16 mm long cutting edges.



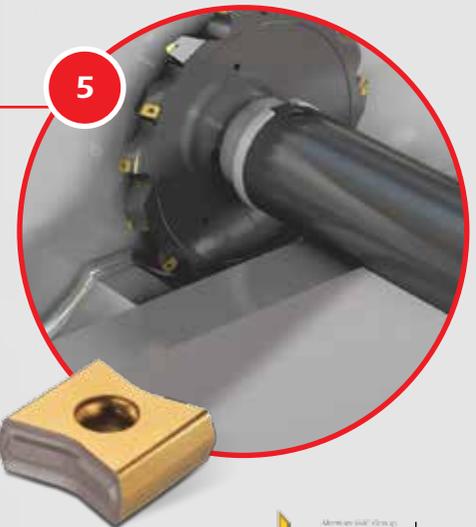
**SPECIALLY  
TAILORED**

## Slotting Cutter with Coolant Through

Range: Ø100-250 mm (Ø3.94-9.84")

### TANGSLOT

**Front and Back Milling**  
(FST slotting cutters) ISCAR's tangential slot milling cutters use cutting inserts with 4 cutting edges. They are suitable for high table feeds, resulting in increased productivity.



# Downstream Sector

The downstream segment of the oil and gas industry covers the refining and transformation of hydrocarbons into more valuable products such as fuels, lubricants and petrochemicals; including fertilizers, rubbers and polymers. Compressors, steam turbines, heavy duty gas turbines and reactors and steam condensers are widely used in the downstream sector and are

present in refineries, oil rigs, LNG plants, etc. One of the most important pieces of equipment at these industrial sites, especially in the oil and gas industry, is the heat exchanger, that is designed to efficiently transfer heat. Despite their name, heat exchangers can actually be used for either heating or for cooling. In the oil and gas industry they are typically used for the purpose of cooling.



**Flange Cover**



**Flange Shell**



**Stacked Plate Baffles**



**Tube Sheets**



**Heat Exchanger**

# Heat Exchangers

## Reaming Applications

### High Productivity Indexable Carbide Heads

Range:  $\varnothing 11.5-32$  mm ( $\varnothing .453-1.26$ " )

## BAYO T-REAM

In comparison to the conventional method, this advanced solution allows for increasing the feeds dramatically. This feature is most advantageous in mass production industries. When large quantities of workpieces are involved, the savings in machining time, labor cost and productivity are greatly multiplied.

**908**  
**P M K N S H**  
 ✓ ✓ ✓ ✓ ✓ ✓



## Fully Effective Core Drill

Range:  $\varnothing 60$  mm (2.36") and up

## TREPANDRILL

- Fully effective tool which requires less power than solid drills
- Solid core left after drilling can be applied as a workpiece
- Standard double-ended, self clamped GRIP inserts

**908**  
**P M K N S H**  
 ✓ ✓ ✓ ✓ ✓ ✓



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## Slitting Applications

### Double Groove-Mill System for Internal Slitting

Range:  $\varnothing 15.5-24.5$  mm ( $\varnothing 0.61-1.00$ " )

## MULTI-MASTER

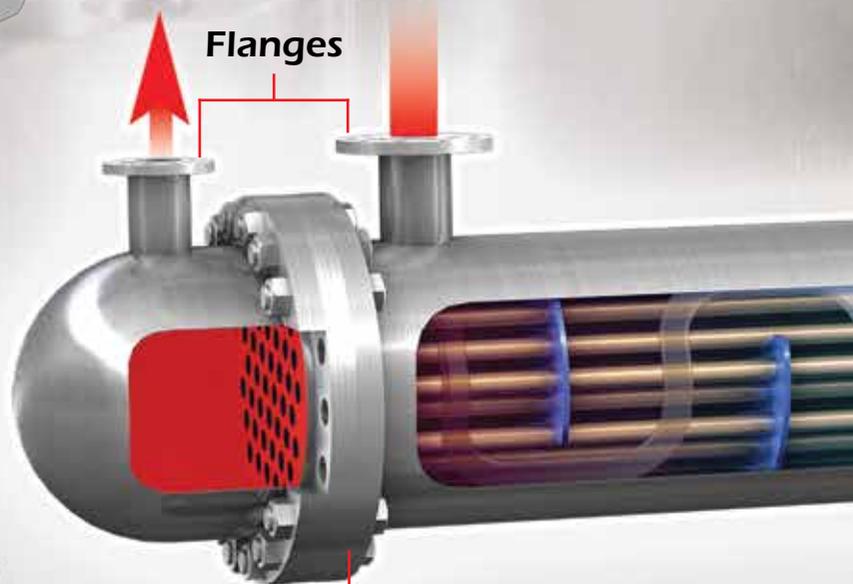
INDEXABLE SOLID CARBIDE LINE

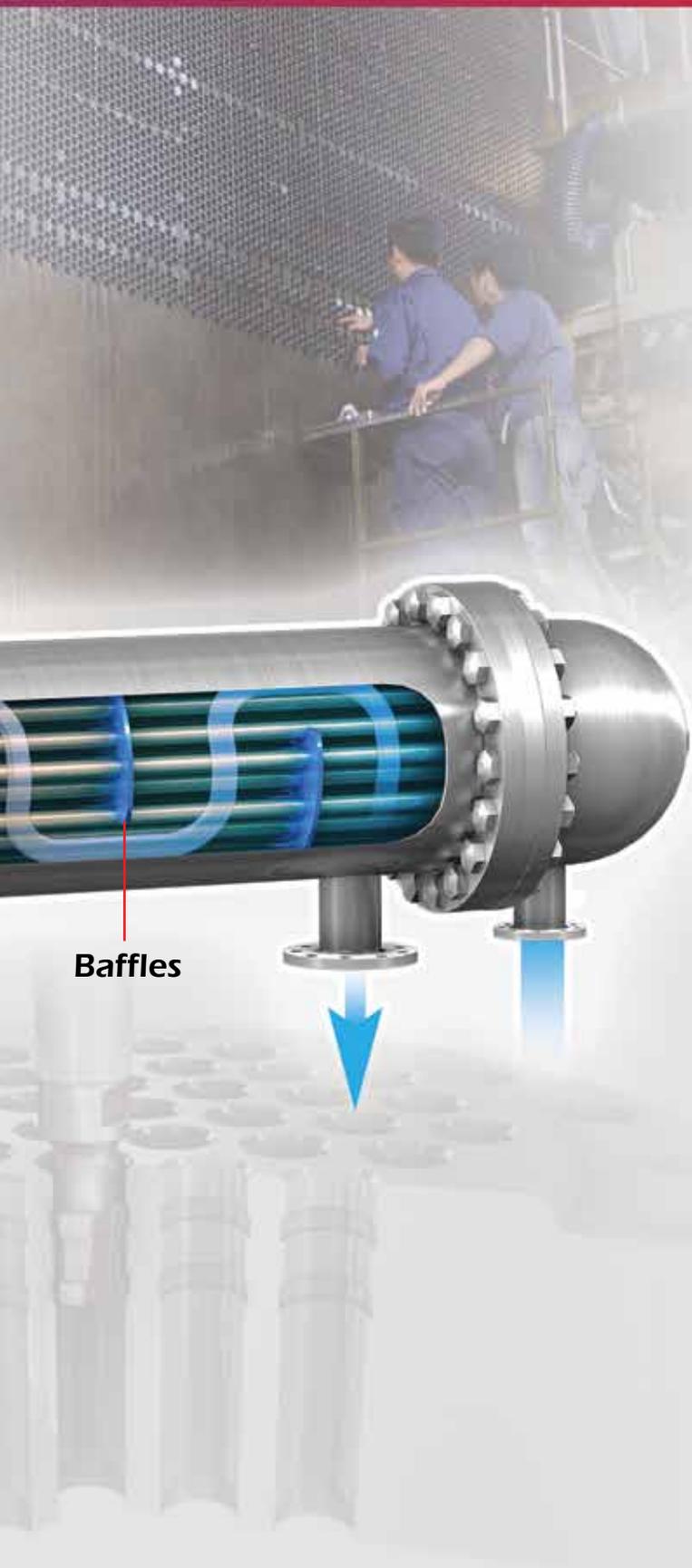
- For internal slitting of small grooves
- Slitting widths are 3 mm (1/8") at grooving depths of up to 0.5 mm (.02")
- No deburring operation is needed, as no burr remains on grooved edge.

**908**  
**P M K N S H**  
 ✓ ✓ ✓ ✓ ✓ ✓



Tube Sheet





## Fully Effective Large Diameter Drill

Range: Ø26-50 mm (Ø1.023-1.968")

### COMBICHAM

The **COMBICHAM** combines the best of two worlds: Peripheral economical 4-cornered inserts from the DR-TWIST line + a central SUMOCHAM drill head. No pre-hole is needed up to 5XD drilling ratio.

908

P M K N S H  
✓ ✓ ✓ ✓ ✓ ✓



## Hole Making

Range: Ø6-32.9 mm (Ø.236-1.295")

### SUMOCHAM CHAMDRILL LINE

The DCN drills feature cylindrical shanks, which enable clamping of the drill in hydraulic toolholders (most recommended) or in spring collets. All drill bodies feature helical coolant holes.

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## Deep Hole Drilling System\*

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9025

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✓ ✓



\* See page 18.



# Oil and Gas

Industries



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