EN25

QUICK-SEARCH
YG-1 PRODUCTS!!
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ENERGY

TOOL SOLUTIONS FOR INDUSTRIES





YG-1 and THE ENERGY INDUSTRIES

There is no doubt, the search for more efficient methods of generating energy, and the ever-growing demand for it, are one of man-kinds greatest needs.

Recent developments in nuclear reactor technology have brought nuclear energy back into consideration. Small size nuclear fusion reactors have minimized the time, and costs associated with traditional nuclear power plants, along with reduced environmental and safety concerns.

However, oil and gas are not only used as a fuel source for vehicles and power plants, but they are also used in the manufacturing process itself. Petroleum based products are used in producing everything from plastics to various fabrics, and even used in the pharmaceutical industry, making petroleum sourced products more common than people think. Although great strides have been made in developing environmentally friendly renewable energy sources, traditional energy sources such as oil and gas are here to stay – at least for the foreseeable future.

PELTON TURBINE - HYDROELECTRIC POWER 05

STEAM TURBINE COMPONENTS - THERMAL POWER 07

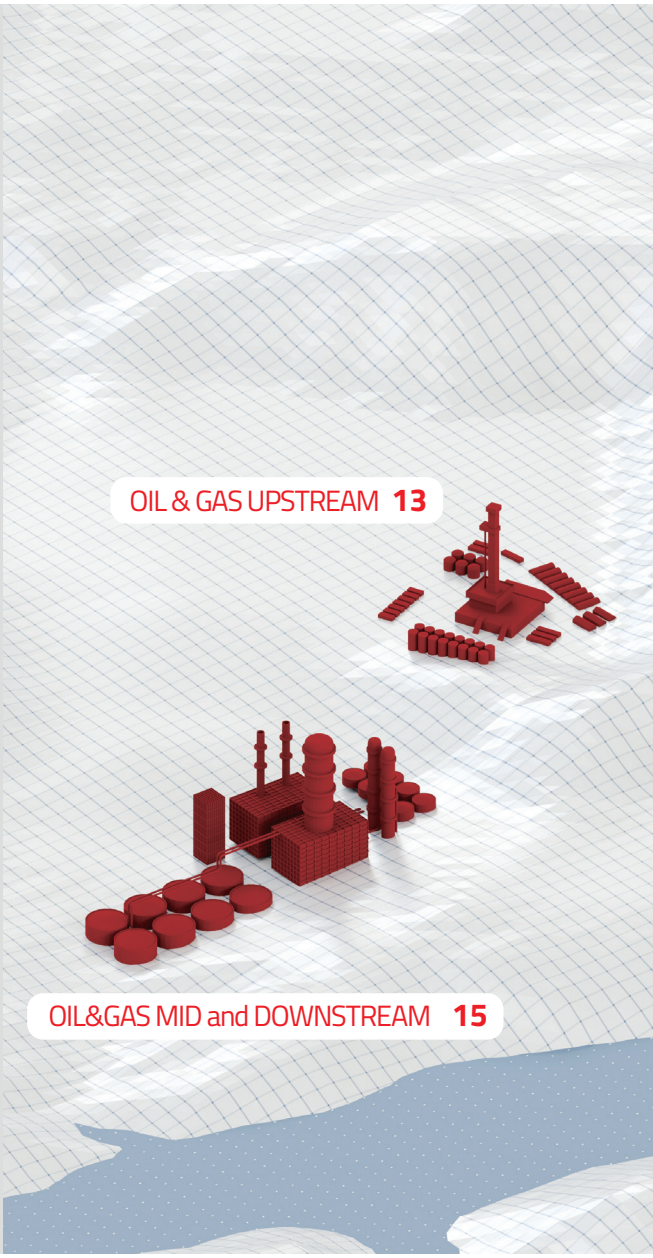
STEAM TURBINE BLADES - THERMAL POWER 09

HEAT EXCHANGER - NUCLEAR POWER 10

ROTOR HUB - WIND POWER 11

FLUID END - OIL & GAS UPSTREAM 13

PIPES, FITTINGS, VALVES - OIL&GAS MID and DOWNSTREAM 15



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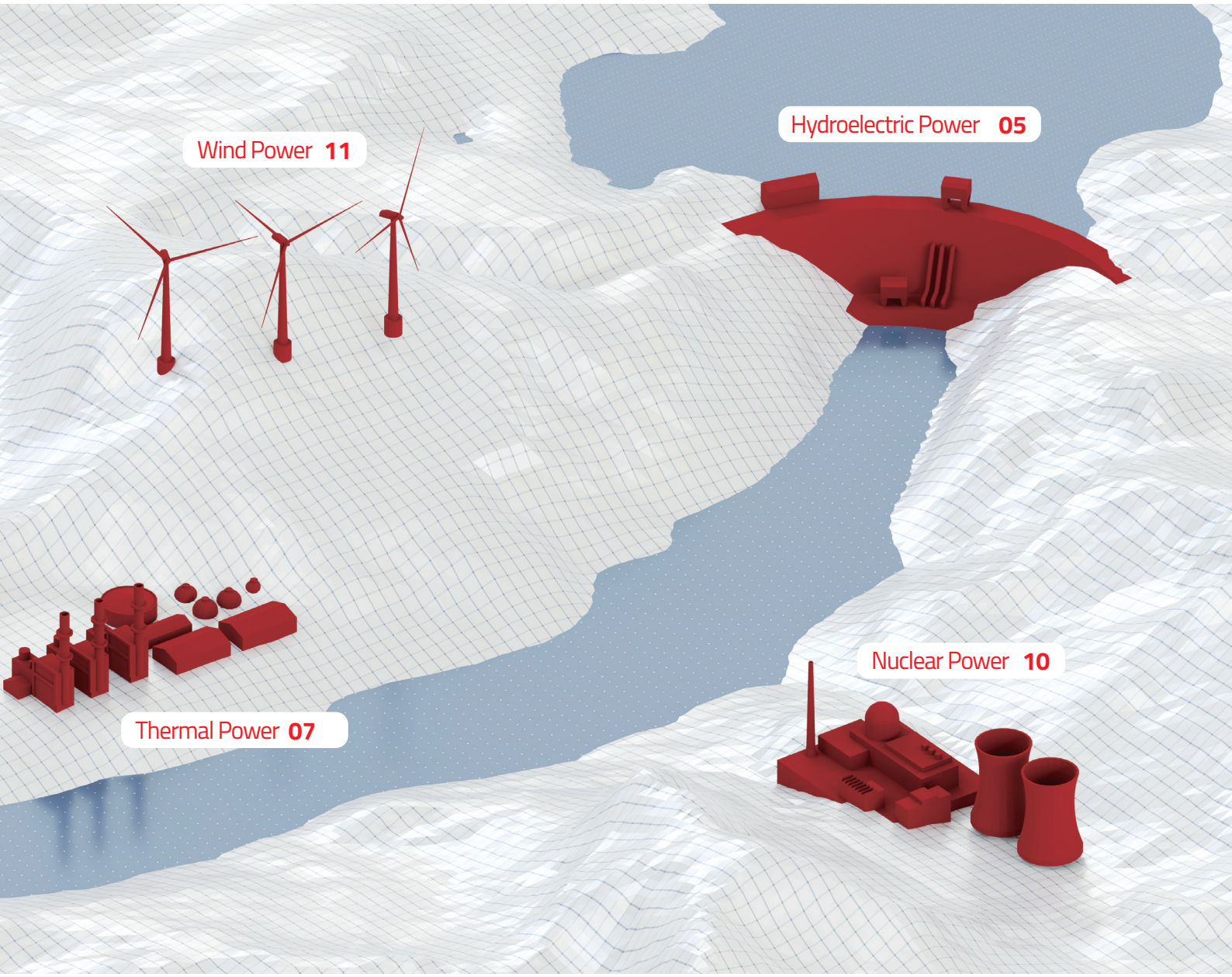
YG-1's ever-expanding catalog of industry solutions has this critical area covered.
Have a look at our Energy solutions to find what we have to offer you!



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PELTON TURBINE

M Stainless Steel

Pelton turbines are very efficient devices that use the impulse of a water jet to drive an electric generator.

They are typically used in mountainous regions where the head (water level above the turbine) is relatively high and the flow is low. These Pelton turbines are commonly made of stainless steel, since they are constant contact with water.

YG-1 has a variety of tools designed for machining stainless steel, even the complex design of a Pelton turbine blades.



YG TURN

The body of the Pelton turbine (excluding the blades) is relatively straightforward to machine. External and internal turning tools by YG-1 are ideally suited for precision machining in stainless steel.

YG-1's PVD grades such as YG211, YG213, YG214, and our newest grade YG2025 are ideally suited for the task of machining stainless steel.

Stainless Steel Turning Grades



YG211 High wear resistant grade for stainless steel



YG2025 CVD grade for general machining



YG213 First choice grade for low cutting speed of stainless steel



YG214 Heavy interrupted cut and low cutting speed

YG MILL

Efficient material removal is achieved with our YG MILL line of indexable milling cutters. Both shell mill and shank style cutters are available in a wide range of geometries, including button cutters for round forms, to fit your particular application.







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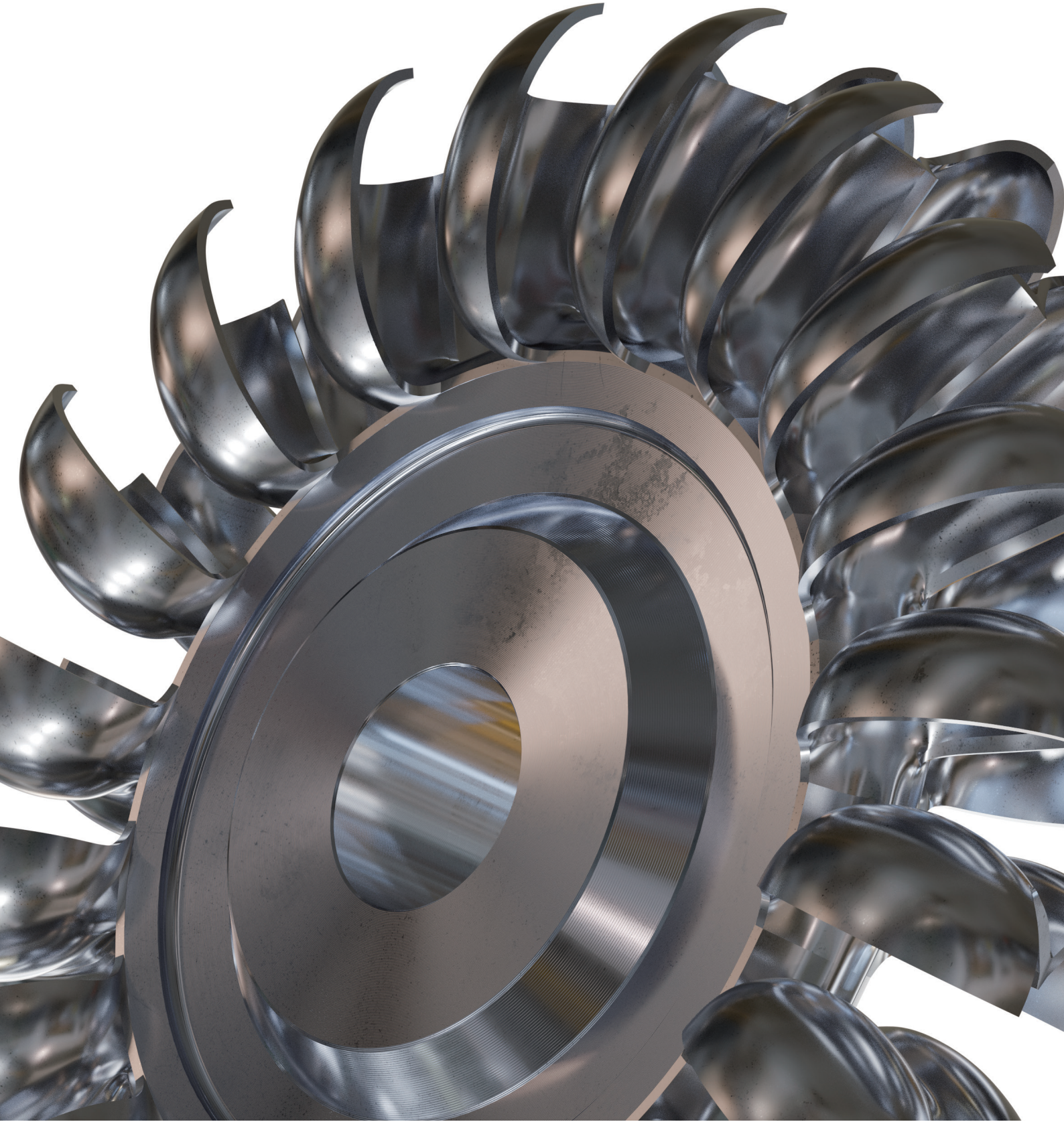

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STEAM TURBINE Components

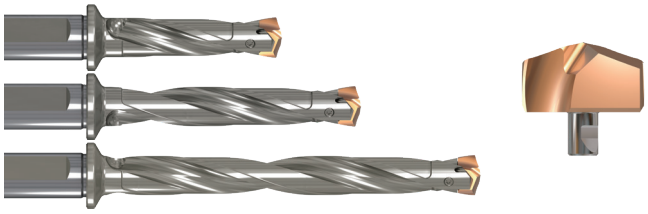
P Shaft - 4130 Alloy Steel, Cr Mo V Containing Alloys
Casing - ASTM A105/A216 Carbon Steel

Modern day steam turbines are the heart of power stations around the world. A fuel source such as nuclear or fossil fuels heats water until it is converted to steam. This steam is then used to drive the turbine to produce energy. Steam turbines can be incredibly large, and their design complex, requiring the best grades of steel to be able to operate continuously even in challenging conditions.

YG-1 has the tools to meet the stringent machining requirements of the casing and shaft shown in the picture [below right] as well as tools for the turbine blades themselves.

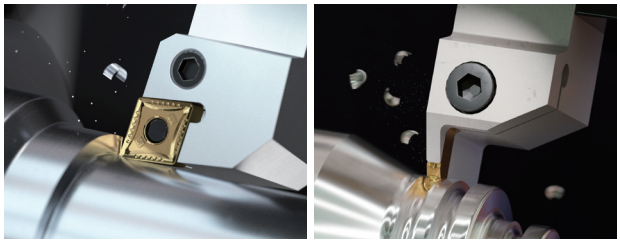
i-ONE DRILL

YG-1's leading product in the holemaking category is our i-One drill. Each drill body accepts a range of drill tips sizes, and eachquick-change drill tip will fit several lengths of drill bodies, making the i-One drill.
Extremely cost effective for high-volume drilling applications.



YG TURN & YG GROOVE

Turning operations play a major role in the manufacturing of steam turbine components.
YG-1 offers an extensive line of tools, in a variety of shapes and sizes, to cover applications such as turning, grooving, and parting.

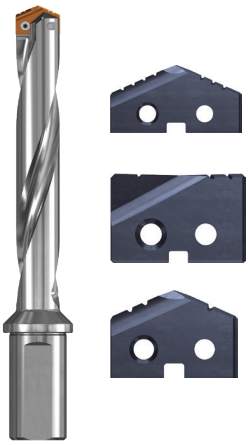


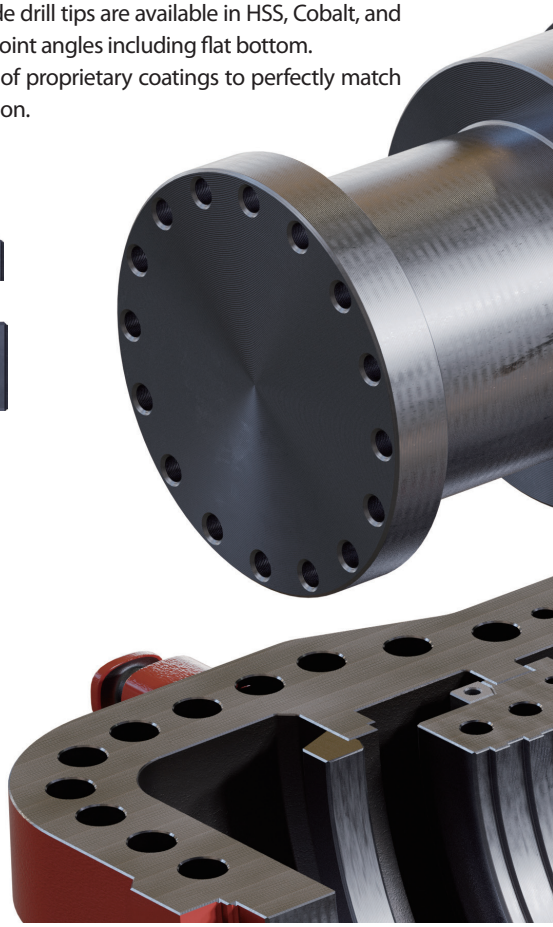
Shown Top to Bottom

- YG 602G grade TDY series turn-groove insert
- The CVD grade turning insert
- The new grade YG3115 turning tool

SPADE DRILL

A large number, of large diameter holes are a breeze for YG-1's spade drill. The replaceable spade drill tips are available in HSS, Cobalt, and Carbide with numerous point angles including flat bottom.
YG-1 also offers a variety of proprietary coatings to perfectly match the tool with the application.





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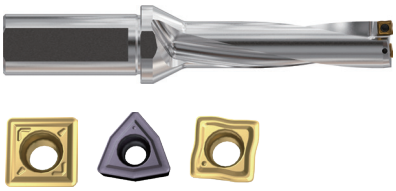
YG MILL

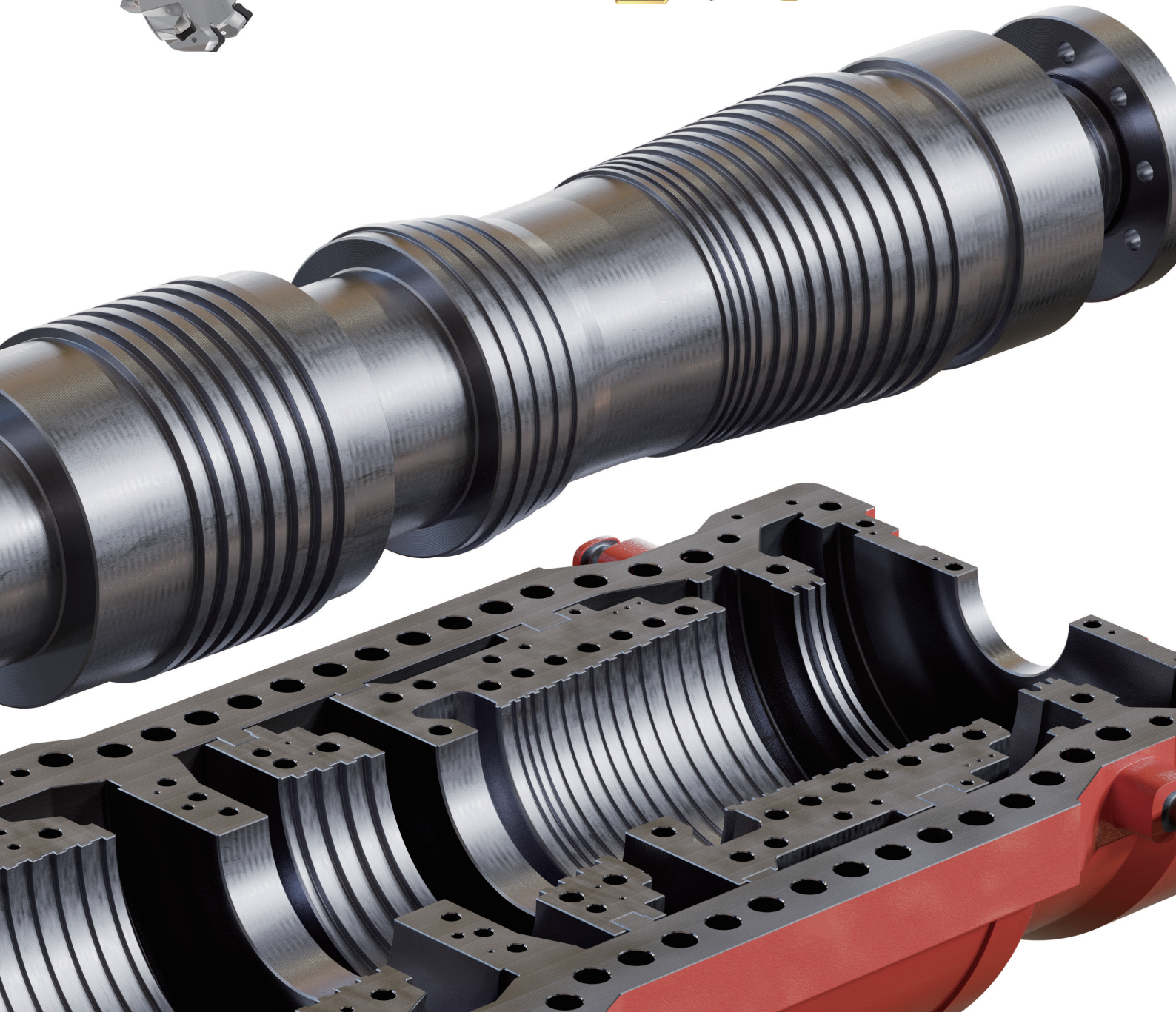
For facing large areas quickly,
YG-1 offers a wide range of heavy-duty indexable shell mill cutters, with inserts available in the grades and geometries you need for your application.



YG DRILL / YG X-DRILL

Along with turning and facing,
drilling plays a substantial role in the manufacturing of turbine cases as you can see in the images below. With the high number of holes in each case, precision and efficiency are imperative.
For an accurate and economical hole, try our YG DRILL line of indexable drills, including our new coolant thru YG X-DRILL line.





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STEAM TURBINE Blades

S High Pressure Blades - Ni-Based Super Alloys



YG5X

The manufacture of turbine blades is a precise operation which involves a combination of the right engineering, right materials, right machines and right tools.
YG-1 has got the latter part covered, with various solid and indexable tools specifically designed for machining super alloys.
Pictured below - blade machining using the YG5X taper head tool.





SOLID CARBIDE END MILL

TITANOX-POWER / TITANOX-POWER HPC

TitaNox-Power and its advanced derivative – TitaNox-Power HPC, are ideal tools for machining notoriously difficult materials such as Titanium, Ni and Co-based Super Alloys, and Stainless Steels. Featuring a large variety of length and corner geometry options, the tools will be a welcome addition to any production floor.

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HEAT EXCHANGER

M Stainless Steel

Heat exchangers play a critical role in the day-to-day operation of a power plant. This role is even more critical where the source of energy is nuclear. Simply put, the heat exchanger's role is to transfer heat from one closed system to the other.

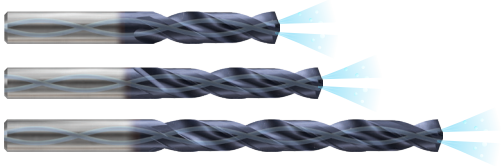
It is used in applications to condense steam, or as in the case of a nuclear power plant, to transfer heat between two loops of steam, from the irradiated, to the 'clean' loop. To avoid dangerous and costly contamination, it is imperative to follow strict guidelines and maintain precise tolerances when machining the components of a heat exchanger.

Stainless steel is the material of choice since it is highly resistant to corrosion, which is exacerbated to a large degree, in the presence of radiation.
YG-1 meets the challenge, with its product lines that are optimized for machining stainless steel.



DREAM DRILL INOX

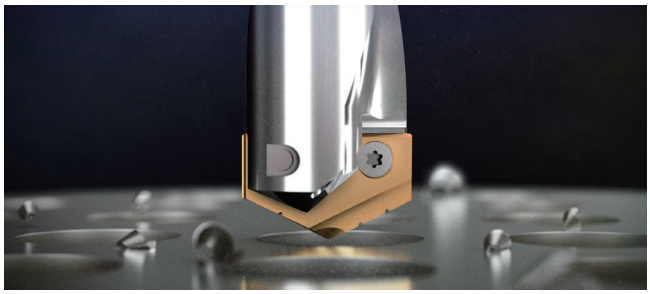
YG-1's DREAM DRILL lines offer various products designed for specific material applications. One example is our DREAM DRILL INOX, with geometry, and an advanced coating specifically designed for holemaking in stainless steel. DREAM DRILL INOX will make quick work of your next stainless steel drilling project.



CUSTOMIZED SOLUTIONS

YG-1's dedicated team of engineers is constantly working with our customers to develop tailor-made solutions for their most challenging applications.
Let us help you find a time-saving, cost-effective solution.





SPADE DRILL

YG-1's SPADE DRILL extensive product line offers a versatile, cost-efficient way of drilling a large number of large diameter holes such as those needed in the heat exchanger industry. [As shown in the image below.]
With a variety of replaceable drill tip grades, geometries, and coatings, we have specifically what you need for your next stainless steel application.

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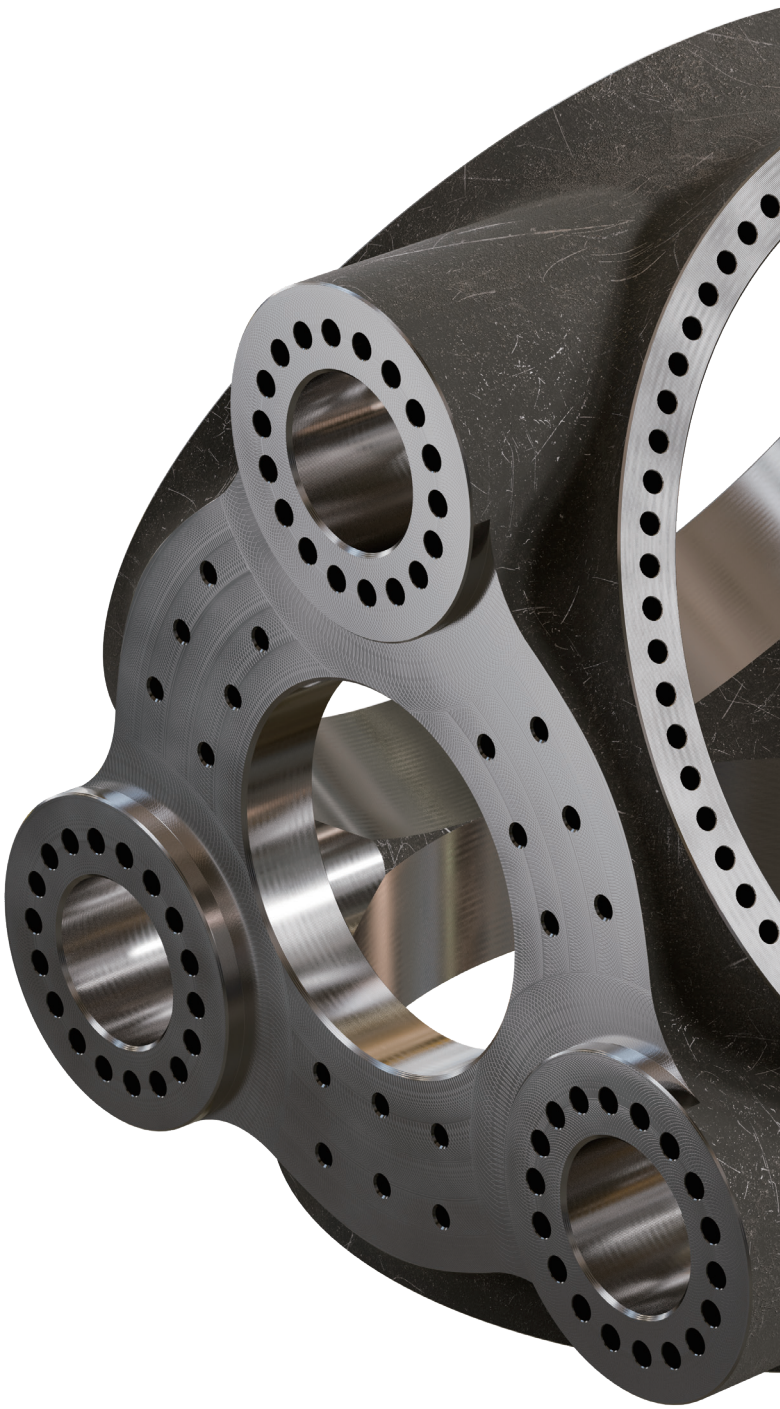
ROTOR HUB

K Cast Iron

Renewable energy projects are gaining momentum around the globe, and are a welcome addition to the ever-growing demand for energy. Wind energy is one of the methods used to supply some of the energy needs of the nations, while keeping the impact to the environment relatively low.

A critical component of an electricity producing wind turbine is the rotor hub. Made to carry the weight (Up to 30 metric tons on land and 100 metric tons offshore) and the tremendous forces exerted by the turbine blades while in full swing, the part must be made in a single cast piece of iron or steel.
After casting, the part has its mating surfaces machined to final specs.



YG MILL

YG-1's line of indexable milling tools is a perfect solution for machining flat surfaces quickly and with precision. Grades **YG501** and **YG5020** are specifically designed for machining cast iron. [See image below.]



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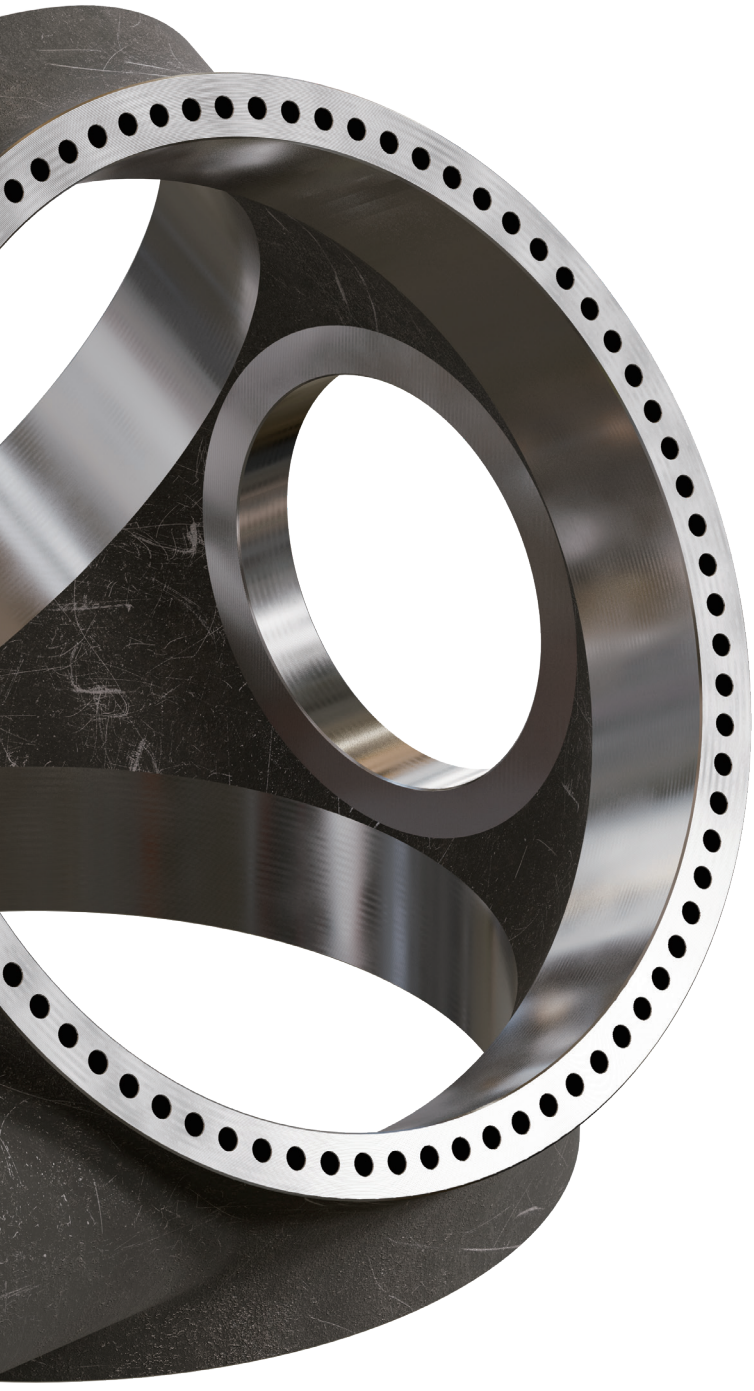
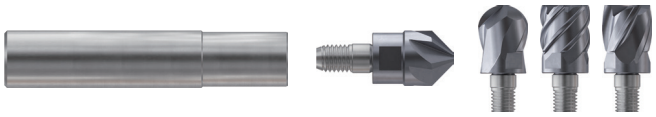


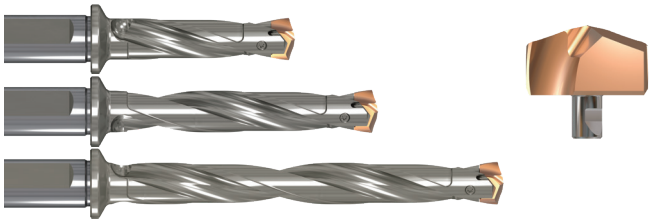
i-SMART
MODULAR TYPE END MILL

YG-1's i-SMART product line features an industry standard screw-on coupling system, which will fit right in with the customers' existing tools of this kind.
Offering an economical way to access long reach milling applications, i-SMART may be the solution you are looking for. A variety of geometries, including heads for chamfering, are available.



i-ONE DRILL

YG-1's i-One line of drill, with exchangeable drilling tips, provides an efficient solution for drilling a large number of holes, while keeping the cost per hole low. i-One drills are specifically designed to produce excellent results in steel and cast iron. A single drill body can hold a range of drill tip sizes, keeping your investment in drill bodies low, while the positive locating and secure locking mechanism of the drill tip will ensure long tool life with consistent and repeatable accuracy.



YG TAP CAST IRON

Our YG TAP series of threading taps are designed from the outset to be optimized for a specific material. Such is the case with YG Tap Cast Iron, which provides long tool life due to its specific geometry and high hardness.



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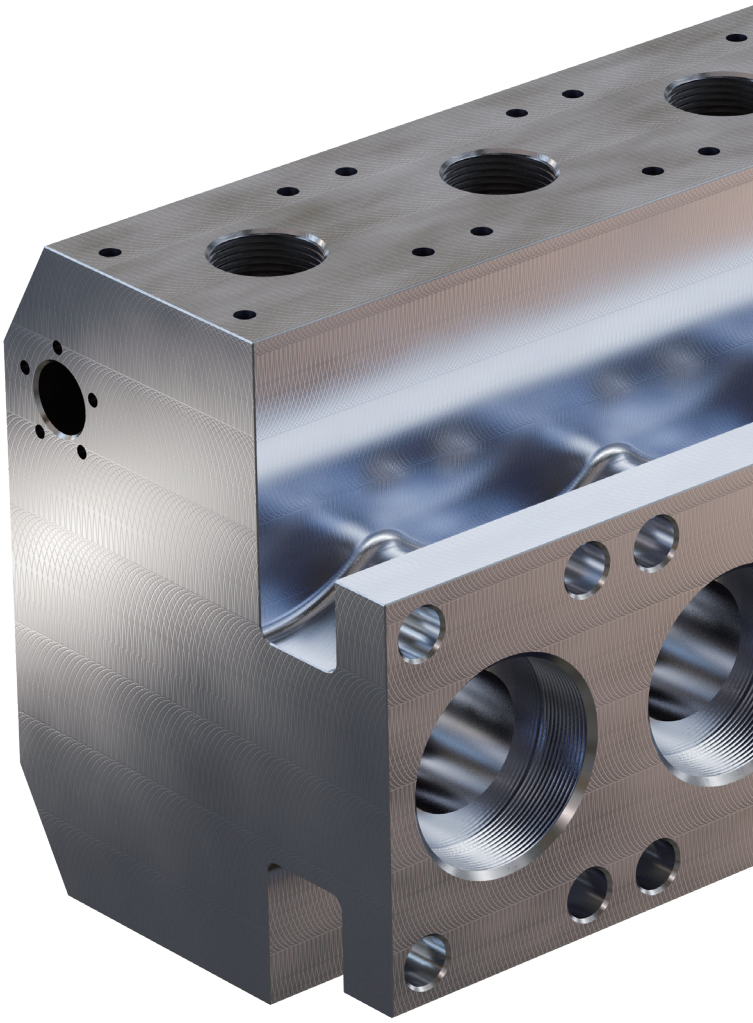
Frac Pump
FLUID END

M Stainless Steel

Fracking, or hydraulic fracturing, is a relatively new method employed by the oil and gas industry to stimulate wells using a pressurized liquid. As fracking technology has developed and matured over time, it has become feasible to extract oil and gas from sources previously thought of as economically unprofitable, if not physically impossible. A modern day ‘frac ’pump has two main components, the power end and the fluid end.
The power end is the component that drives all the moving parts required to create the pressure in the fluid end.

The fluid end is the high-pressure component of the pump that takes fluid into a chamber at low pressure and discharges it at higher pressure. Considered the ‘business’ end of the pump, it is made of a single billet of stainless steel, to withstand both high pressure, and resist corrosion.



DREAM DRILL INOX

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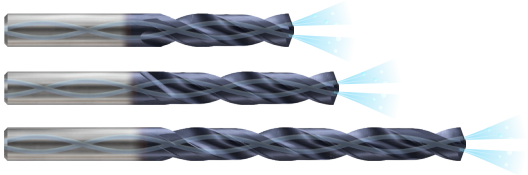
DREAM DRILL INOX will make quick work of your next stainless steel drilling project.



X-DRILL

The X-Drill can use both as center and periphery for best-in-class cost-efficiency.
In addition, the drill insert is designed with our proprietary technology and the twisted coolant channels to achieve optimal chip evacuation, providing a highly stable process and precise machining dimensions.





TOOLING SYSTEM

FINE BORING SYSTEM

As fine boring system is a modular structure, various heads and parts are easily combined and it has good expandability in boring range from Ø20mm to Ø154mm with precise boring range adjustment.



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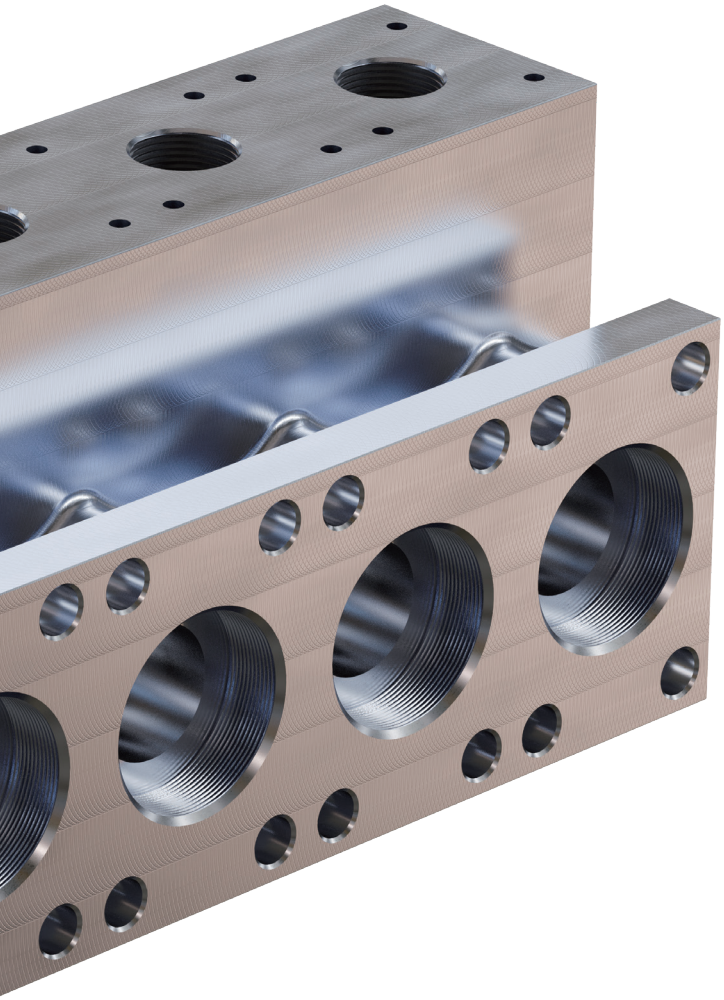


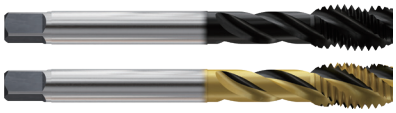
YG FM10 MILL PNMU

Recently, with modern machining centers,
it has become possible to remove material at extremely high metal removal rates. High metal removal rates are the objective in many metal cutting industries, including the manufacture of 'fluid end' blocks for the oil and gas industry.
Products within YG-1's YG MILL line will allow you to achieve these high metal removal rates with exceptional tool life while also allowing you to maintain a fine surface finish.



YG TAP INOX

Designed with a geometry to reduce cutting forces while minimizing the effects of irregular chip formation.
Choose from a range of finishes from low cost solutions to high performance anti-galling PVD coatings.



HSS-PM

SYNCHRO TAP with Internal Coolant

YG-1's SYNCHRO TAP line is ideal for cutting threads in the 'fluid end' of 'frac' blocks, producing threads with an excellent surface finish in stainless steel.
SYNCHRO TAP is designed to excel in applications requiring strength, repeatability and precision.



SPECIAL TOOLS

As with any complicated project, the job is made easier when given the right tools!
Engineering departments at YG-1's tech centers, located around the world, work closely with our clients, designing highly specialized custom tools for their specific applications, often able to combine several operations into one, saving both time and money.



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PIPES, FITTINGS, VALVES

P Steel

M Stainless Steel

S Heat Resistant Super Alloy



Here you can see a selection of pipes, fittings and valve specimen used in the Oil & Gas Industry.

Pipes create a crucial network for transporting petroleum-based products, as well as natural gas. From the huge pipes that span across entire continents, to the more modestly sized pipes carrying products within the refineries and storage facilities, pipes play a critical role in connecting everything together.
While most pipes are made through extrusion and/or welding, their adapters, flanges, and connectors have some form of machining involved in their production.

These pipe networks also incorporate various types of valves, which are typically cast and machined to their final dimensions when appropriate.

The larger diameter pipes are usually made of carbon steel, while the smaller ones are some variant of stainless steel to protect them from the corrosive environment in which they operate.
Occasionally, an even stronger material is required–this is where nickel-based superalloys such as inconel or hastelloy enter the picture.

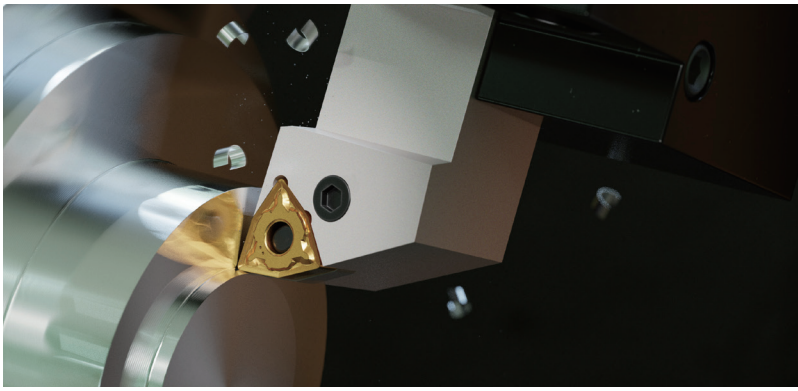
YG TURN

The YG TRUN has an extensive line of indexable turning grades specially designed for all the materials commonly used in pipe products machining, including the heat resistant super alloy [HRSA]

TURNING GRADES TABLE for Steel, Stainless Steel and Heat Resistant Super Alloy

Turning Grades for Steel

	YG3115	P15-P25	First choice grade For high cutting speed in steel.
	YG3125	P20-P30	Optimized choice for high-efficiency machining in steel applications.
	YG3030	P20-P35	Low cutting speed And interrupted cut in steel.
	YT100	P10-P20 M10-M20	New generation of cermet grade.



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Carbon Steel Pipe

Inconel 625 Pipe

310 Stainless Steel Pipe



Stainless Steel Union

Stainless Steel Elbow

Stainless Steel Pressure Valve

Stainless Steel Ferrule

DREAM DRILL INOX

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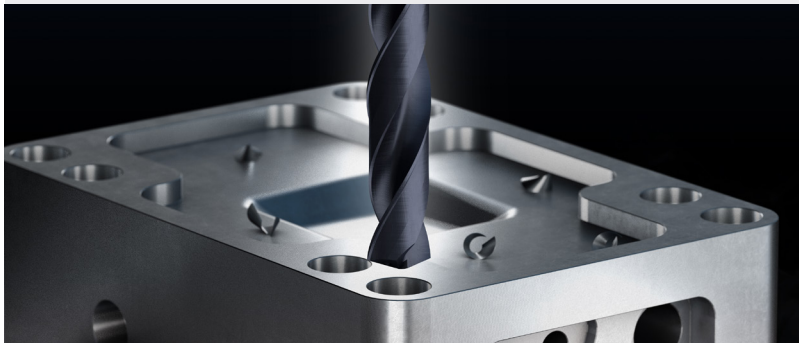

YG TAP INOX

Designed with a geometry to reduce cutting forces while minimizing the effects of irregular chip formation. Choose from a range of finishes from low cost solutions to high performance anti-galling PVD coatings.



HSS-PM

PRIME TAP

Whenever the highest quality thread is required, be sure to choose our premier tap line– PRIME TAP. Excellent for working in the stainless-steel applications found in the energy sector. PRIME TAP is available in both spiral point and spiral flute design.



Turning Grades for Stainless Steel

	**YG2025**	M15-M35	CVD grade for general machining.
	**YG211**	M05-M25	High wear resistant grade for stainless steel.
	**YG213**	M20-M35	First choice grade for low cutting speed of stainless steel.
	**YG214**	M30-M40	Heavy interrupted cut and low cutting speed.

Turning Grades for Heat Resistant Super Alloy

	**YG401**	S10-S20	Continuous cut for HRSA.
	**YG214**	S25-S30	Interrupted cut for HRSA.

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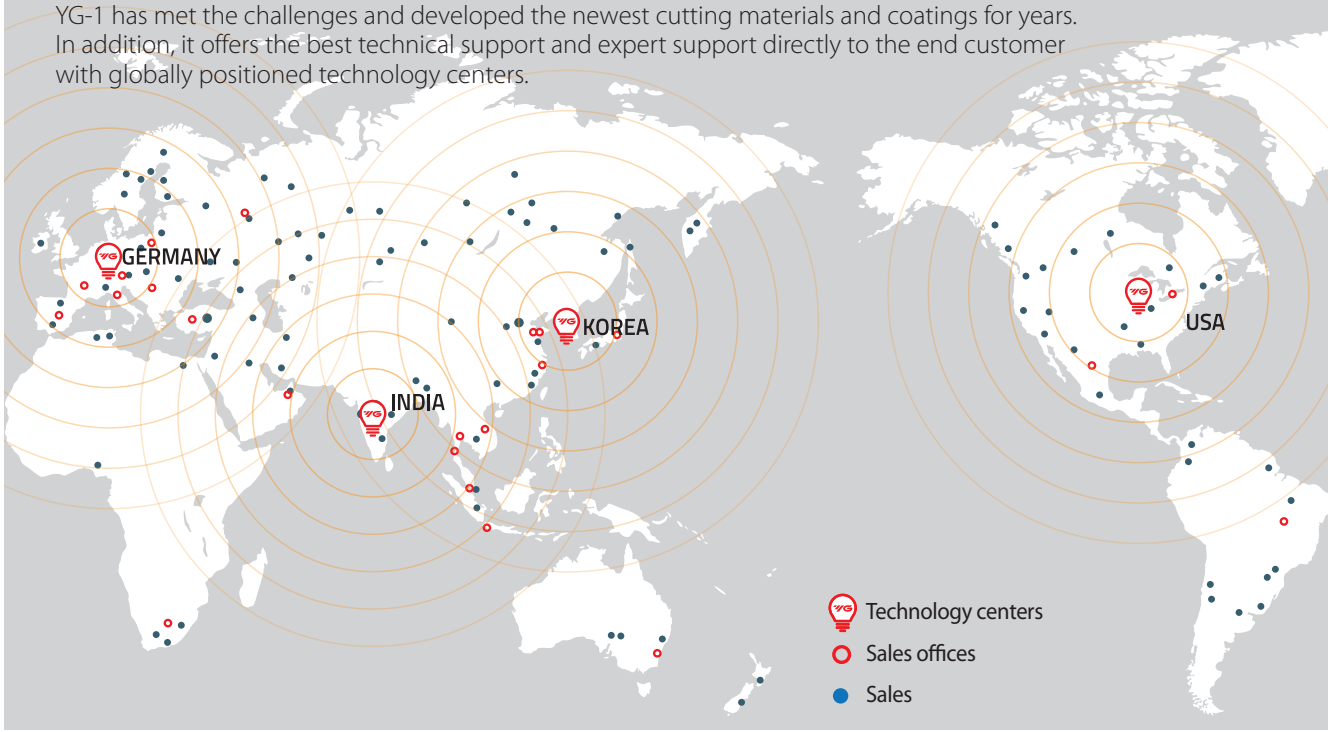
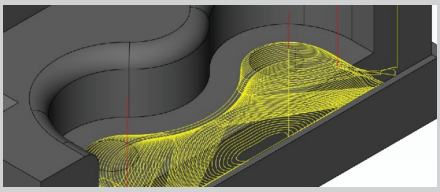
GLOBALLY POSITIONED TECHNOLOGY CENTERS

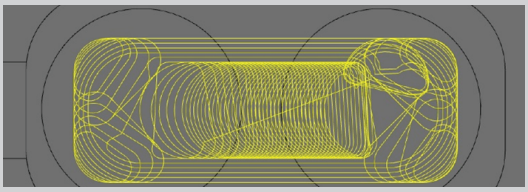
YG-1 has met the challenges and developed the newest cutting materials and coatings for years. In addition, it offers the best technical support and expert support directly to the end customer with globally positioned technology centers.



DESIGN, SIMULATE, PRODUCE AND TEST IN THE INDUSTRY'S MOST ADVANCED FACILITIES

INTRODUCING THE ULTIMATE SOLUTION IN TOOL–MAKING TECHNOLOGY





DESIGN

- Advanced CAD/CAM assisted application simulation to assure precise design integrity.
- On-site R&D specialists for advanced high-production solutions.
- Expertise & problem solving for the Automotive industry as well as other industries.
- Designing our products to meet the needs of the client each time.

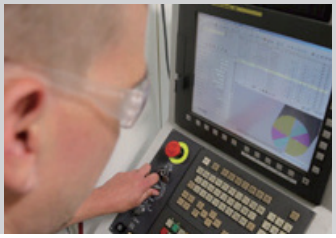
SIMULATE

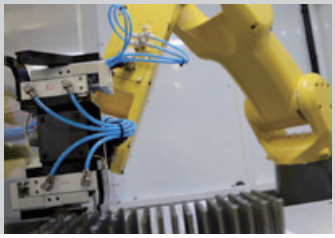
- Computer aided simulation to assure cost-effective manufacturing.
- Machining solutions for steel, stainless steel, hard metals and non-ferrous materials.
- We can help you optimize paths for your YG-1 tools, with the help of our experts, insuring that you can get the best productivity.

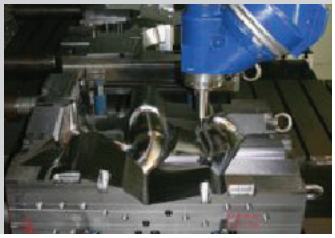
PRODUCE

- 5-axis CNC grinding machines for rapid production.
- World-class sub-micron carbide blanks to assure increased tool life.
- Latest generation in PVD and CVD coatings for enhanced wear resistance and edge protection.









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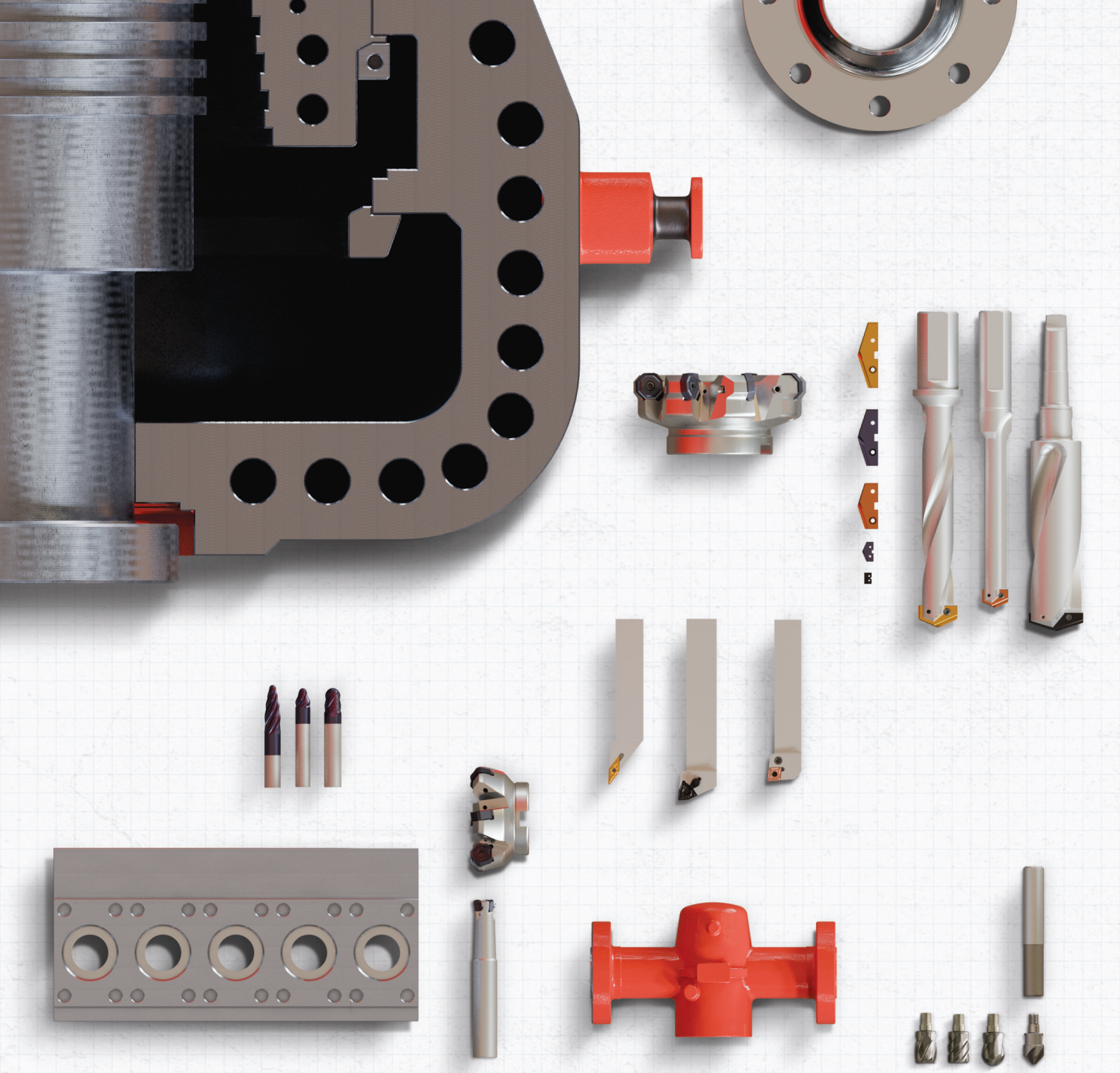

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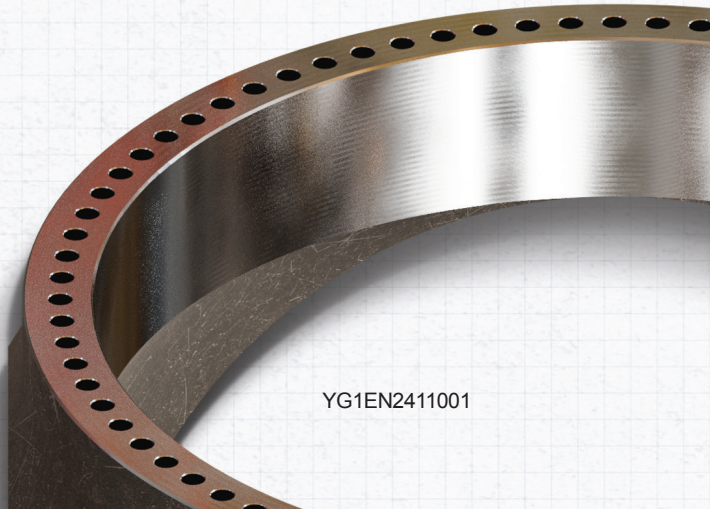

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