

THE WORLD LEADER IN PRECISION BORE SIZING TECHNOLOGY

  
ABOVE AND BEYOND HONING



Precision Machines, Quality Accessories,  
& Unparalleled Service and Support:

*That's The Sunnen Solution.*



# WHEN IT COMES TO PRECISION BORE SIZING AND FINISHING

MORE MACHINES | MORE TOOLING | MORE ABRASIVES | MORE FLUIDS | MORE GAGING | MORE SERVICES

SUNNEN PRODUCTS COMPANY is the leader in precision bore sizing systems worldwide. When you choose the *Sunnen Solution*, you get the industry's best bore sizing and finishing machines, precision bore gages, tooling, fixturing, abrasives, honing oils, coolants, and accessories – all working together to satisfy your specific production needs.

With more than 90 years of technological leadership, Sunnen provides innovative, precision

solutions for an incredibly wide range of industries and applications. We produce the industry's largest selection of honing machines – horizontal or vertical, single or multi-spindle, automated or manual, standard or customized – and our systems are designed with a focus on reliability, flexibility and ease of use.

As the world's largest integrated honing systems supplier, we maintain Advanced Technology Centers around

the globe, dedicated to finding specialized solutions to our customers' specific application challenges. Within those centers are climate-controlled metrology laboratories, outfitted with state-of-the-art bore measurement equipment, allowing Sunnen to continually push the envelope in tolerances and surface finish.

No matter what your bore sizing and finishing challenge may be, we have the *Sunnen Solution* for you!



## FUEL INJECTORS

Delivering high pressure injectors, lower emissions and better fuel economy.



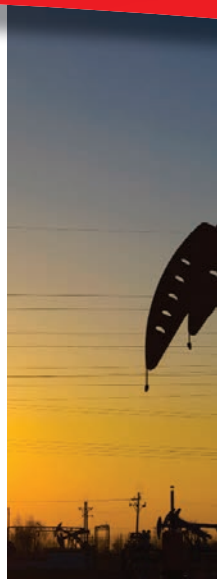
## HYDRAULICS

Longer lasting and higher performing hydraulic valves, cylinders, pumps, and motors.



## GEARS

Greater precision and advanced surface finishes for smoother running gears.



## OIL & GAS

The technological precision honing down-hole oil field and tubes.

*Sunnen's wide range of standard products and*



# AND FINISHING SOLUTIONS, SUNNEN DELIVERS.

FIXTURING | MORE AUTOMATION | MORE PRECISION | MORE CHOICES

## SUNNEN'S MISSION:

*To deliver solutions that improve the performance of our customers. Better products make a better world.*  
**TECHNOLOGY. QUALITY. PARTNERSHIP.**



& GAS

l leader for high  
of all types of  
ld instruments



CYLINDER LINERS

Consistent crosshatch and better geometry for lower emissions, better fuel economy, and reduced oil consumption.



SMALL ENGINES

Superior accuracy and advanced surface finishes deliver lower emissions and greater fuel efficiency.



SMALL BORES

Honing small bores such as rifle barrels and injection-molding should dramatically improve surface finish, roundness and diameter consistency.

custom solutions all have one thing in common: **THEY EXCEED OUR CUSTOMERS' EXPECTATIONS.**





## SV-2000/SV-2100 SERIES VERTICAL HONING MACHINES

The SV-2000/SV-2100 Series is capable of holding the industry's tightest production environment tolerances – as fine as 0,00025 mm (0.000010 inch) – tolerances far superior to I.D. grinding.

Built on a proven, modular platform, the systems can be easily customized and automated to suit your exact specifications – whatever your needs demand, from multiple spindles to air gaging and automation. Plus, this flexible system supports both single-pass and conventional reciprocating honing. A Windows®-based PC control features easy-to-use drop-down menus and the ability to save job set-ups for later use.

Perfect for mid- to high-production manufacturers, the SV-2000/SV-2100 delivers the lowest cost per honed part with the tight bore tolerances you expect from Sunnen.

### SV-2000 BORE DIAMETER RANGE (I.D.):\*

3 mm – 65 mm  
(.118 inch – 2.56 inch)

### SV-2100 BORE DIAMETER RANGE (I.D.):\*

3 mm – 20 mm  
(.118 inch – .79 inch)



## SV-2400 SERIES VERTICAL HONING MACHINE

This versatile system combines power, precision, durability, and technology to make vertical honing more economical and productive than ever before.

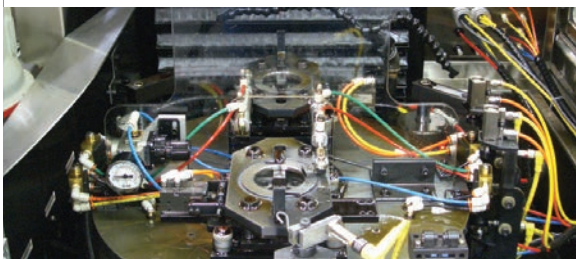
The SV-2400 Series incorporates a patent-pending stroking system that produces a true vertical stroke and can dwell in any part of the hole, end-to-end, producing the straightest, roundest bore possible. A Windows®-based PC control simplifies the honing process.

For ease of setup, the SV-2400 Series features a 3-axis hand wheel for fine-tuning the vertical stroke, honing tool position, and column position. Multiple positions can be programmed for in-line bore honing. And, because it's built on a proven, modular platform, this system can be automated or otherwise customized to meet your exact requirements, including in-process air gaging.

The SV-2400 Series machines are available in 30 in., 58 in., and 90 in. stroke travel.

### BORE DIAMETER RANGE (I.D.):\*

19 mm – 200 mm  
(.75 inch – 8 inch)



\* OTHER SIZES  
AVAILABLE  
UPON REVIEW.





## SV-2500 SERIES

### VERTICAL HONING MACHINE

The SV-2500 Series features the latest in honing technology. Using a linear feed system that allows the most precise and fastest feed control on the market, this system delivers mid- to high-volume manufacturers the lowest costs per honed part.

The all-new, patent pending stroking system produces a true vertical stroke that can dwell in any part of the bore – selectively removing stock – delivering a true constant crosshatch pattern throughout the entire length of the bore with no rollover. And the Auto-Dwell feature corrects bore straightness automatically – great for blind bores.

A Windows®-based PC control simplifies the honing process while a 3-axis hand wheel allows fine-tuning of the vertical stroke, honing tool position and column position for ease of set-up.

Built on a proven, flexible platform, this versatile system can be automated or otherwise customized to satisfy most any application requirements, including in-process air gaging.

#### **BORE DIAMETER RANGE (I.D.):\***

19 mm – 300 mm  
(.75 inch – 12 inch)



## VSS® SERIES 2

### SINGLE STROKE® HONING SYSTEM

The VSS-2 is a value-priced single-pass honing machine that delivers precise bore size, geometry and surface finish. It is very easy to set up and operate and is the most productive machine in its class.

An advanced spindle design and multiple spindle configurations (up to six) make the VSS-2 a versatile solution for virtually any production environment. The system's PLC control with Sunnen software makes set-up and operation easy. Column feed and spindle speed are easily varied throughout the cycle for process optimization.

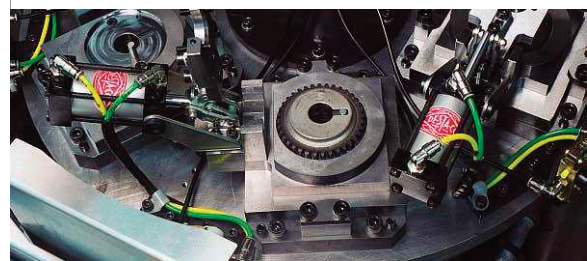
The system is the perfect solution for mid- to high-production applications that are suited to single-pass bore sizing.

#### **BORE DIAMETER RANGE (I.D.):\***

4 mm – 65 mm  
(.156 inch to 2.56 inch)



\* OTHER SIZES  
AVAILABLE  
UPON REVIEW.







## SV-15 VERTICAL HONING MACHINE

The SV-15 is designed with power, precision, durability, and advanced technology to deliver state-of-the-art performance, and is perfect for honing large, heavy, and odd-shaped work pieces.

The SV-15 is power packed with two motors – one for the spindle and one for the stroker. This combination provides the muscle to run our DH-Series Diamond Hone Heads with multi-point cutting action. In addition to Sunnen's well-known CK/CV tools, many other automotive and industrial tools from Portables to Mandrels can also be run.

The easy-to-use, yet highly advanced touch screen control projects Sunnen's patented full-bore profile display. This real time graphical display of the cross section allows the operator to dwell in the exact position where the bore is visually smaller – eliminating guesswork.

### **BORE DIAMETER RANGE (I.D.):\***

19 mm – 203 mm  
(.75 inch – 8 inch)



\* OTHER SIZES  
AVAILABLE  
UPON REVIEW.



## SV-30 SERIES VERTICAL HONING MACHINES

Designed for low- to mid-volume production, the Sunnen® SV-30 is a workhorse for large-part honing applications. With a proven ball screw servo stroking system, the SV-30 produces precise bore geometries on compressor blocks, oil field components, multi-bore gas/diesel engine blocks and other similar applications. Step- and-repeat functionality provides automatic bore-to-bore operation with servo X-axis and GH LF series tooling.

There are six models of the SV-30 to best suit most honing applications.

Ideal for job shops, OEM and repair facilities, the SV-30 is available with a variable-speed 5.5 hp (4.1 kW) spindle motor, powerful enough to drive two-stage, metal-bond, diamond abrasives for short cycle times with high accuracy and minimal labor.

### **BORE DIAMETER RANGE (I.D.):\***

19 mm -203 mm



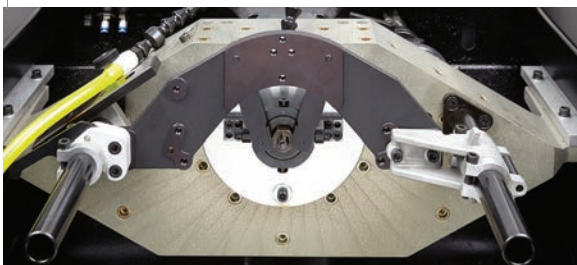


**SH-2000**  
*HORIZONTAL HONING MACHINE*

For superior high-performance, high-production bore sizing and finishing, the new Sunnen SH-2000 is extremely easy to setup and operate – even an inexperienced operator can run the SH-2000 with ease.

Complete setup is handled from the front of the machine without raising a cover, cutting setup times in half over older Sunnen machines. Universal honing fixtures handle nine out of ten jobs, with no chucks, fixtures or special tooling. Feed rates, stroke length and stroke speed are set and locked in, greatly reducing the chance for human error. And in many cases, you can use your existing tooling for even lower investment costs.

**BORE DIAMETER RANGE (I.D.):\***  
 1,5 – 165,1 mm  
 (.060 – 6.500 in.)



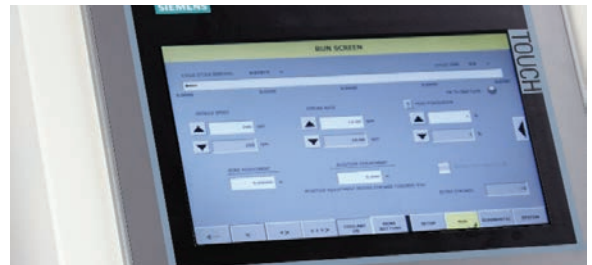
**SH-4000/SH-5000**  
*HORIZONTAL HONING MACHINES*

From its designer styling and lack of manual controls to its digital repeatability and touchscreen HMI, Sunnen's new SH-4000/5000 builds on the 21-year heritage of the successful EC and ML series machines. Simply stated, the SH-4000/5000 takes honing to the next level of capability.

The machines are the result of a four-year development process with input from around the globe. All aspects of the machine have been analyzed for improvement and tested. The machine is engineered to improve operator productivity. New generation SH-4000/SH-5000 models have a 15.75 in stroke travel.

The next generation of power stroked horizontal honing machines are suited for quick changeover for medium-to-high volume production and with a higher level of control and new technology throughout.

**BORE DIAMETER RANGE (I.D.):\***  
 1,5 – 165,1 mm  
 (.060 – 6.500 in.)





**SH-6000**  
KROSSGRINDING® SYSTEM

Sunnen's SH-6000 builds on the 25-year heritage of the successful high precision CGM and KGM series KROSSGRINDING® machines. Simply stated, the SH-6000 takes precision honing to the next level. Both high speed and high torque models are available to replace existing CGM/KGM models.

The SH-6000 uses a variety of precision plated diamond tools to provide extreme accuracy, excellent stock removal and long tool life. The machine is engineered to improve operator productivity and increase reliability.

The next generation of high precision KROSSGRINDING machines are suited for quick changeover for medium-to-high volume production with a higher level of control and new technology throughout.

**BORE DIAMETER RANGE (I.D.):\***

- CGT: 3 MM - 32 MM (.118 - 1.260 IN)
- CRT: 53,84 - 63,75 MM (2.120 - 2.510 IN)
- SRT: 35 - 90 MM (1.375 - 3.56 IN)
- TC: 25,4 - 75 MM (1.0 - 2.95 IN)



**SVL-2115**  
LAPPING SYSTEM

Sunnen's SVL-2115 automated lapping machines bring increased safety, productivity, and part consistency to what is traditionally a manual process. The SVL-2115 is based on the same machine platform as the proven SV-2100 honing system and provides single setup processing of aerospace hydraulic control valve sleeves, fuel system components and other parts that are prone to distortion when honed.

Sunnen has developed patent pending laps to accompany this system. Easy tooling and probe changeovers accommodate frequent part changes during the course of a shift. A stack light allows operators to monitor cycle completions or faults from a distance. The lapping system is available with Sunnen's new SVF-15 filtration system.

**BORE DIAMETER RANGE (I.D.):\***

- 7.9 TO 20 MM
- (.311 TO .787 IN)





## SUNNEN PRECISION TUBE HONING SYSTEMS

### HT SERIES PRECISION HORIZONTAL TUBE HONING SYSTEMS

Sunnen's HT Series tube honing systems are designed for a wide range of industries and processes.

Whatever your application – from aircraft components to gun barrels to very large hydraulic cylinders – Sunnen has a high performance tube honing system for you.

### HTA SERIES

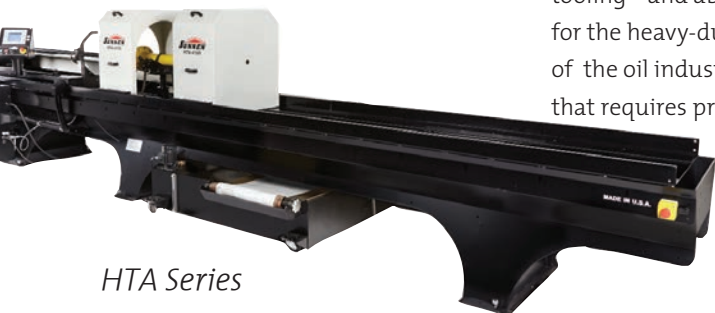
**SPINDLE POWER:** 2.24 kW (3 Hp)  
**STROKE LENGTH:** Models available from 2 to 8 meters (6.56 to 26.2 ft)

**BORE DIAMETER RANGE (I.D.):**  
64 – 533 mm  
(2.5 inch – 21 inch) with some applications down to 1.0 inch.

### HTB SERIES

**SPINDLE POWER:** 3.5 kW (4.7 Hp)  
**STROKE LENGTH:** Models available from 2 to 10 meters (6.56 to 32.8 ft)

**BORE DIAMETER RANGE (I.D.):**  
25 – 350 mm  
(1.0 inch – 13.78 inch)  
Optional up to 550 mm (21.65 inch)



HTA Series

### HTC SERIES

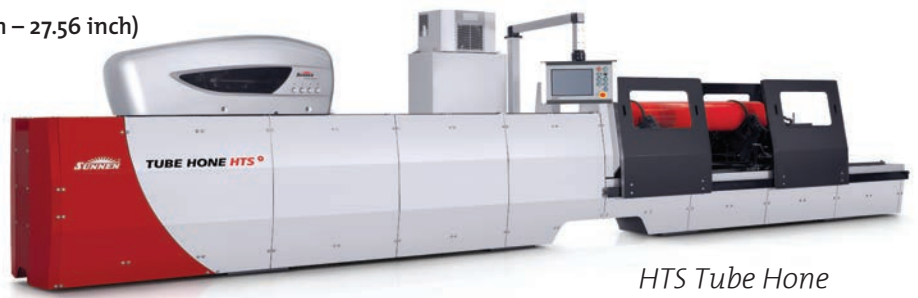
**SPINDLE POWER:** 1.1 and 9 kW models available (1.5 and 12 Hp)  
**STROKE LENGTH:** Models available from 950 mm to 12 meters (37.4 in to 39.37 ft)

**BORE DIAMETER RANGE (I.D.):**  
3 – 1000 mm  
(.118 inch – 39.37 inch)

### HTD SERIES

**SPINDLE POWER:** 22 and 30 kW models available (29.5 and 40.23 Hp)  
**STROKE LENGTH:** Models available from 4-16 meters (13.12 to 52.5 ft)

**BORE DIAMETER RANGE (I.D.):**  
50 – 700 mm  
(1.96 inch – 27.56 inch)



HTS Tube Hone

### HTE 1600W

**SPINDLE POWER:** .75 kW (1 Hp)  
**STROKE LENGTH:** 1600 mm (63 inch)

**BORE DIAMETER RANGE (I.D.):**  
4 - 20 mm (0.15 - 0.79 inch)

### HTG HEAVY DUTY TUBE HONE

The Sunnen HTG tube hone, with GH tooling and abrasives, is the solution for the heavy-duty yet precise demands of the oil industry... and any industry that requires precise honing of long parts.



HTG Series

**SPINDLE POWER:** 29.83 kW (40 Hp)  
**STROKE LENGTH:** Models available from 4 meter (13.12 ft) - 14 meter (45.93 ft)

**BORE DIAMETER RANGE (I.D.):**  
50.8 - 609.6 mm (2-24 inches)

### HTH SERIES

**SPINDLE POWER:** 7.5 kW (10.2 Hp)  
**STROKE LENGTH:** Models available from 4-16 meters (13.12 to 52.5 ft)

**BORE DIAMETER RANGE (I.D.):**  
25 - 800 mm (1.00 - 35.1 inch)

### HTS SERIES

The HTS all-electric tube hone combines servo precision and cycle-automation features for a versatile system well suited for job shops and manufacturing facilities.

**SPINDLE POWER:** 2 kW (16 HP)  
**STROKE LENGTH:** Up to 13 meters (42.65 ft.)

**BORE DIAMETER RANGE (I.D.):**  
20 – 900 mm (.8 inch – 35.4 inch)

## INTEGRATED HIGH-PRODUCTION SYSTEMS

Sunnen's new generation of high precision honing systems represent the very finest solutions available anywhere in the world. Sunnen systems are reliable, durable, and flexible and are designed to deliver the precision our customers have grown to expect.

From design to delivery, you have the Sunnen commitment to service and quality. Our technical experts will work with you to create a complete *turnkey* solution to fit your exact

requirements, including the machine model, number of spindles, style of tooling, fixture design, abrasives selection, automation and gaging packages, and any other platform integrations you may require.

After your system is built, we'll set up a live run-off demonstration at our facility. Once it meets all specifications, we'll commission your system and train your staff.

### ***MULTI-FEED TECHNOLOGY***

Sunnen's patented multi-feed technology gives users a revolutionary choice of tool-feed modes to achieve the shortest cycle times, lowest part cost, and longest abrasive life.

Multi-feed combines Sunnen's controlled-force tool-feed with its controlled-rate feed system. The two different tool-feed modes allow the user to select the better option to suit

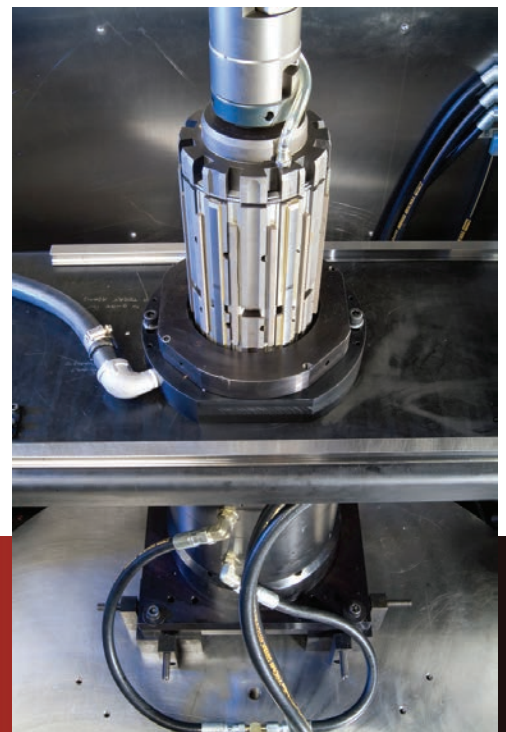
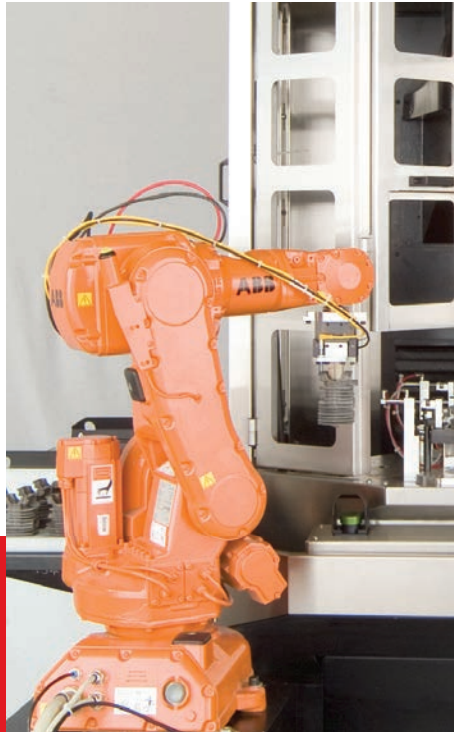
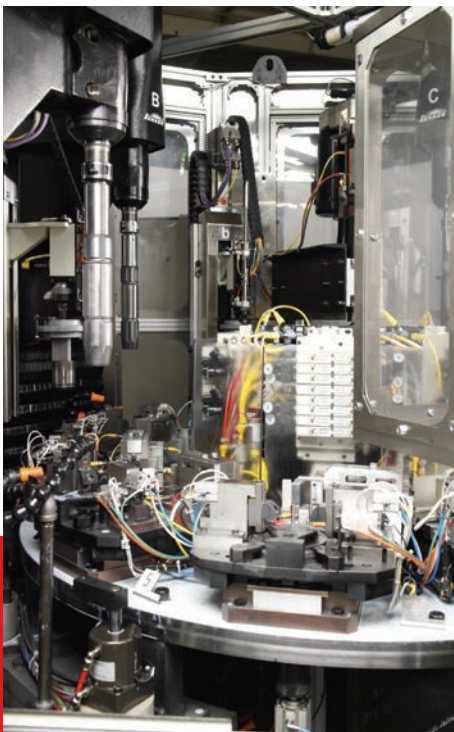
the workpiece geometry, material and tool type/size. Multi-feed technology is available as an option on machines in Sunnen's SV-2000 and SV-2500 Series, as well as a retrofit for existing machines in these series.

### ***AUTOMATION OPTIONS***

A two-axis or multi-axis servo robot can be integrated into a Sunnen modular honing system for automated parts handling.

### ***INTEGRATED AIR GAGING***

At the beginning, middle, or end of the honing process, Sunnen's integrated air sizing systems are designed to ensure precise bore size and straightness, part after part.





## COOLANT SYSTEMS

Sunnen's SVF Series Grit Guard® coolant filter is a build-to-suit solution with progressively higher levels of filtration available, along with chilling, to meet process requirements in abrasive machining.

Base Grit Guard models are available in 208- and 416-liter (55- and 110-gallon) capacities, equipped with twin and quad PF filter canisters with a total filtration capacity of 5.7m<sup>2</sup> and 11.4m<sup>2</sup> (8800 in<sup>2</sup> and 17600 in<sup>2</sup>) respectively.

The modular design allows adding a deep bed paper filter (110 gallon only), magnetic separator and cooling to suit the application.



## CUTTING FLUIDS FOR HONING, LAPPING, SKIVING, ROLLER-BURNISHING, AND DEEP-HOLE DRILLING.

Sunnen offers the right cutting fluids including a sustainably-sourced oil, low-VOC oil, Boeing- and SAFRAN-approved oils, and water base coolant for virtually any application. Our premium line of oils and coolants, developed by Sunnen specifically for honing, lapping and chip cutting applications, will help deliver superior cutting rates and produce the lowest overall cost per part.

Typically, cutting fluid cost per part is less than one percent of the total. Yet, a slight decrease in cycle time or a decrease in abrasive consumption resulting from better lubricant repays the cost of premium oils many times over.

Your investment in top-quality Sunnen cutting fluids, saturated with surface active agents, provides the extreme lubricity and chip removal that allows you to use higher cutting pressure while avoiding damage to the abrasives or cutters.

Some applications produce better results using one of Sunnen's water base coolants. You can rely on your Sunnen Field Engineer or our Sunnen Technical Centers to advise you whether Sunnen honing oil or water base coolant is best for your specific application.



## THE SUNNEN SOLUTION: HIGH-PERFORMANCE TOOLING AND ABRASIVES

### TOOLING

As the world's foremost authority on honing, we have more than 90 years of experience in the development and production of honing tools. Our tooling line includes standard mandrels, retractable stone mandrels, plated-diamond Single Stroke® and KROSSGRINDING® tools, the MPS Modular Tool System, General Hone® brand heavy duty hone heads, MMT™ Mandrels, the new KRQ Quick Change mandrels, and a wide variety of two-stage and multi-stone tools.

### ABRASIVES

Sunnen offers the industry's most comprehensive line of honing stones, including diamond and CBN superabrasives. The line includes both mounted abrasives and unmounted stick abrasives compatible with non-Sunnen machines. Sunnen honing stones are manufactured in our own dedicated facility to meet our own exacting quality standards. With Sunnen abrasives, our honing operation can achieve the optimum in precision, quality, and consistency.





## SUNNEN SKIVING/ROLLER BURNISHING SYSTEM AND TOOLS

To complete the precision bore sizing line, Sunnen offers a cost effective solution for hydraulic cylinders and other high production applications. The SHD skiving and roller burnishing systems are 80 to 90 percent faster than traditional honing and are engineered to deliver precise tolerances and quality surface finishes.

The SHD systems are easy to setup and use and provide a consistent finish and fast part cycle time. Sunnen offers the complete solution with machines, tools, chip management, coolant systems and cutting fluids. It is a one stop shop with global service and support.

Only Sunnen offers both honing and skiving/roller burnishing so the most cost effective bore finishing process may be selected for your specific application.

**SPINDLE POWER:** 45 kW (60 Hp)  
**STROKE LENGTH:** 2 meter (6.56 ft) or  
4 meter (13.12 ft)



SHD-2400

**Bore Diameter (OD):**  
60 - 244.5 mm  
(2.38 - 9.62 inch)

**Bore Diameter (ID):**  
50.8 - 177.8 mm  
(2.0 - 7.0 inch)



BTA Heller, the industry leading manufacturer of deep hole tooling and systems is a division of Sunnen Products Company. Sunnen is your partner in skiving/roller burnishing with tools, machines and cutting fluids.

BTA Heller skiving tools produce a geometrically true round bore, a prerequisite for successful roller burnishing. This process has proven to be the fastest method of ID finishing of seamless or DOM tubing, with rates of metal removal of 100 up to 150 inches per minute (2540 mm - 3180 mm/minute). In cases where depth of cut exceeds the capacity of the skiving knives, a counter-bore cutter can be added to



the skiving/roller burnishing tool assembly. The resulting tool assembly is capable of removing up to as much as 6.35 mm (.250 in) total stock removal in one operation.

BTA Heller offers a full range of individual or combined skiving/roller burnishing tool assemblies. These tool assemblies are available for use on non-Sunnen machines with ranges dependent on the machine and application of 12 - 500 mm (.5 - 20 in).

## BORE GAGES

Shops around the world know the best way to check the accuracy of honed parts is with Sunnen bore gages. We offer two styles and dozens of models to meet your specific bore sizes and applications, all robustly designed for continuous use on the floor shop.



The **SUNNEN PG BORE GAGING SYSTEM** is a unique mechanical system (gage and setting fixture) that makes I.D. gaging simple, reliable and economical. No need to buy and maintain costly master rings and air gage probes. Both gage and setting fixture are built tough for everyday use, making them ideal for bore inspection during production.

PG gages and setting fixtures are available to cover diameters from .090" to 4.310" (2,29 mm to 109,47 mm) with .000050" and .0001" increments (0,001 mm for metric versions).



**SUNNEN'S EASY-TO-READ DIGITAL DIAL BORE GAGES** will simplify data analysis as the gage connects directly to your computer's SPC software spreadsheet. Available in 16 standard models as well as special lengths, it can be ordered on any Sunnen dial bore gage.



**SUNNEN'S DIAL BORE GAGES** offer foolproof setup with Sunnen Setting Fixtures – eliminating the need for ring gages, micrometers or jo blocks. These gages are easy to use, fast, durable, and accurate. Sunnen Dial Bore Gages and Setting Fixtures are available to cover diameters from .054" to 6" (13,71 mm to 152,4 mm), optional to 12" diameters (309 mm).



## SUNNEN ... YOUR PARTNER IN BORE SIZING



Sunnen machines have a long history of reliability and durability. Now Sunnen is backing this with a new 3-year standard machine warranty (or 6000 spindle hours whichever comes first for machines that are equipped with spindle hour meters). This warranty is the best in the business.

How can Sunnen offer a 3-year warranty on all of our honing machines? It is simple - our machines are manufactured using top brand PC controls, drives and motors, all designed to work together with our Sunnen-built tooling and abrasives. Compare Sunnen machines with any of the market and the quality and durability will show through.

The 3-year warranty applies to all Sunnen base machines and factory installed options. All custom fixturing, automation, external coolant systems, tooling, gages, and other accessories are covered by a revised one year warranty.





A LEGACY OF EXCELLENCE SINCE 1924.

## WORLDWIDE

Our global manufacturing, distribution, and sales and service network allows us to deliver quality Sunnen solutions worldwide.

And our state-of-the-art Technical Services Centers allow our technical experts to develop innovative solutions to customer application challenges. The Centers also provide answers for customer questions and training for Sunnen representatives around the world.

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