

FIXED-TURNING®

The technology that will meet all your needs
throughout your professional life...

...Elite Power Contouring...

ENGLISH



EPOC-XL™

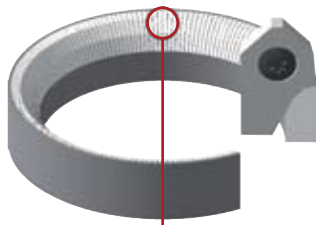
The distinction and the success
of the professional!

NEWEEN®

A World of Experience with Every Machine!

Valve seat machining, one century of evolution and ... the solution!

Before
PLUNGING
and the carbide form tool



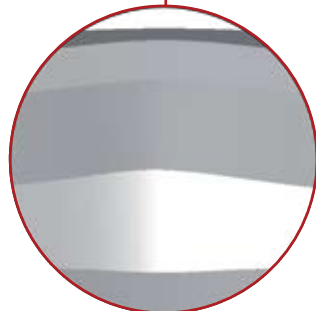
x24



Drawing 1
Chatter Marks



x17



Drawing 2
Undulations

The lapping of powder metal valve seats, or of some cast iron valve seats, brings about unavoidable chatter marks. Chatter marks are very harmful to a valve since gases escape through them while the valve is shut.

The machined valve seat will consequently deform rapidly and its seal will never be adequate. Chatter marks result from carbide form tool scrapping a large surface of a material with a grainy structure made of different materials (such as powder metals, nodular cast irons...).

Traditional valve seats machined with the lapping technique (form tools), all present, undulations measuring hundredths of millimeters that are the direct result of irregular cutting efforts on a 360 degree rotation. The resultants of changing cutting efforts transmit irregular forces on machine spindles that will flex more or less depending on the machine and will yield irregular shapes. This phenomenon, well known by operators of manual machines, is compensated for, when large visible defects appear, with quick and forceful pressure on the spindle command.

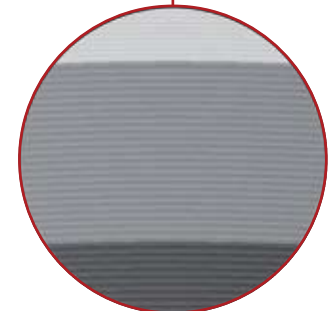
The above results in considerable spindle efforts and, while it can help smooth out small defects, it can in no way rectify the geometry.

These undulations, inherent to the very principle of machining by lapping, have unquestionable consequences on valve sealing and require further lapping of each valve on its valve seat to obtain an acceptable seal. Valve lapping, so far accepted out of necessity by engine builders and their customers, has long been banished by engine manufacturers and anyone seeking the minimum quality required by current engine generations.

Now
FIXED-TURNING®
and the single point tool



x34



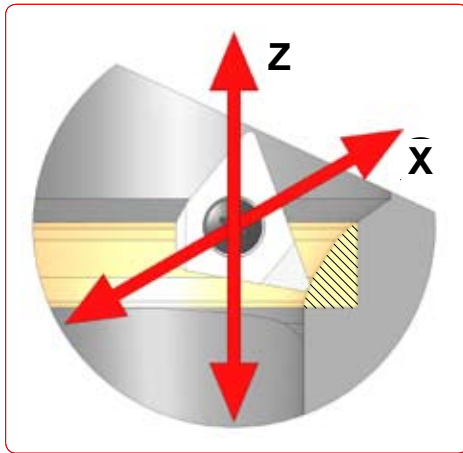
Drawing 3
Geometrical precision

Machining by Interpolation, **FIXED-TURNING®**, definitely eliminates all defects shown on Drawings 1 and 2.

Micro-chatter marks and undulations are virtually impossible to generate. Single point machining does not allow the formation of such defects. One only needs to consider machining on a lathe to convince oneself.

Machining with a turning tool traveling on two interpolated axes generates a circular micro-groove, perfectly round. The depth of the groove and the interval between 2 grooves is controlled by the numerical control of the machine, yielding the finest achievable surface finishes.

Much like cutting efforts, reduced considerably (300 times and more), surface finish defects are reduced to levels that rank **FIXED-TURNING®** at the very top of quality scales defined by leading OEMs.



Like the principle of the turning lathe, FIXED-TURNING® is based on the simultaneous shifting of a single-point cutting tool around two axes (x, z). Unlike the lathe where the piece rotates, FIXED-TURNING® sees the tool rotating beyond its two axes (x, z) while the piece (cylinder head) remains still.

The tool, piloted by a numerical system, has the capacity to describe the longest profiles (within the limit of the spindle) together with the most complex ones, including radii, straight lines and diverse concave or convex curves. Like the precision lathe, FIXED-TURNING® tool machines the most complex shapes with the highest precision.

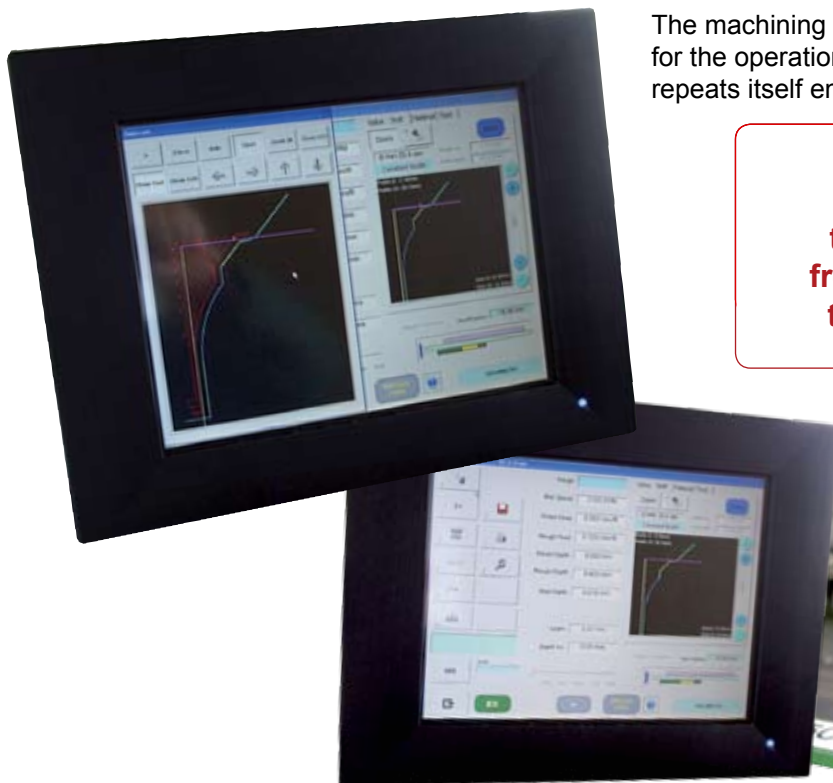
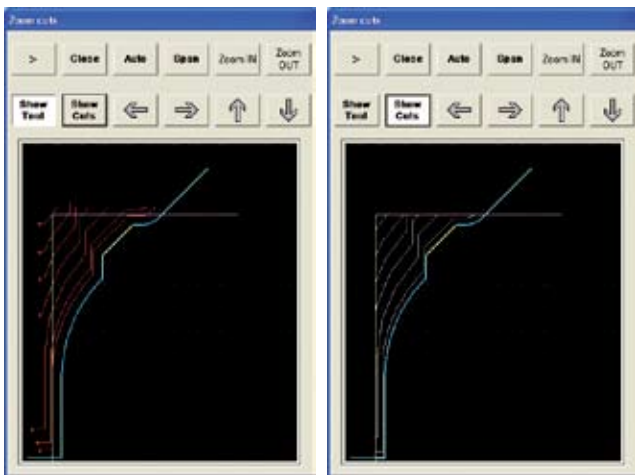
FIXED-TURNING® carries out different operations, including curves, straight lines, inclined in all the directions. The NEWEN® numerical control pilots the shifting of the tool so that the cutting section remains identical regardless of the portion of the machined profile. A powerful computer continuously calculates the optimal trajectory of the tool so that the cutting efforts are regular and reduced to a minimum. Every single shaving calculated from a fraction of a second to a fraction of a second is produced in such way that no fluctuation of the cutting efforts can disrupt the balance and the flexibility of the spindle.

FIXED-TURNING® performs a perfect operation and ensures the air-tightness of the valve seats.

The custom developed NEWEN® electronic board pilots the numerical axes with an extreme precision and guarantees total uniformity. The computer and its flat touch-screen represent the most user-friendly interface for an operator who will be freed-up of the programming constraints by using the NEWEN® software that allows him to carry out the most complex operations without necessarily having any programming skills.

The machining programs are automatically optimised and memorized for the operations to follow one another while the precision repeats itself endlessly.

**As in many other domains,
the NEWEN® numerical control
frees the operator and guarantees
the excellence of a professional**



NEWEN EPOC-XL™

Elite Power Contouring!

FIXED-TURNING® numerically controlled axes driven by satellite roller screws and servo- motors of the latest generation. A precision of the tool travelling by interpolation is measured in thousandths of mm.

Z-axis (327 mm / 12.87"): Pantograph™ system (Patented) allows to raise or lower the machine head and spindle at the level of the valve seat to machine. The Pantograph™ is balanced and its movements are pneumatically assisted in order to conserve maximum feel while introducing the centering pilot within the valve guide. The Pantograph™ gives added rigidity to the whole machining head and provides a lot of flexibility. Increased machining precision. A NEWEN®'s exclusive.

A simplified control panel allows to make necessary changes during production. Adjustments for machining depth, cutting tool positioning and cutting tool replacement are simplified considerably. An electronic wheel allows to manoeuvre the different axes. A special command makes the cutting tool describe a selected profile while the spindle is not rotating so as to visualize the travel of the cutting tool prior to machining. Control panel fitted with push-buttons and protected by interchangeable lexan, multifunctional high-precision electronic wheel. Precision. Reliability.

Stress relieved welded frame coated with industrial resin, resistant to any chemical agent (High frequency stabilization during welding).

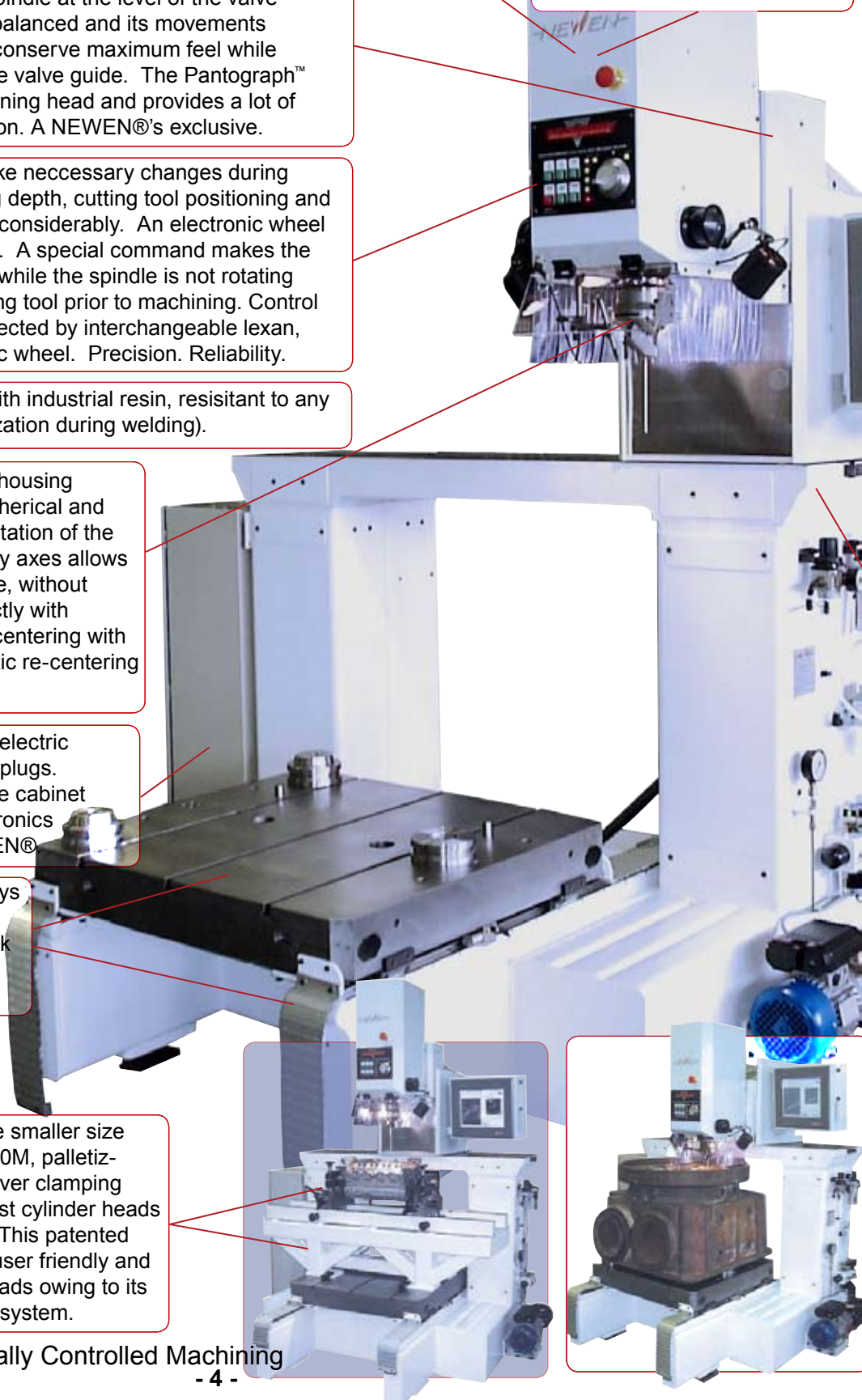
The spindle glides through a spherical housing supported by a double air cushion, spherical and plane. The combination between the rotation of the sphere and its movement on the x and y axes allows the sphere to take any position in space, without any constraint, and to align itself perfectly with respect to the valve guide. Automatic centering with programmable temporization. Automatic re-centering of the spindle with pneumatic jacks.

Side electrical cabinet. Electronic and electric components interconnected with quick plugs. Automatic ventilation and filtration of the cabinet each time the machine is in use. Electronics conceived and manufactured by NEWEN®.

Heavy duty table mounted on linear ways x2 greased for life, entirely protected. Simple, fast and efficient pneumatic lock to ensure effortless positioning of any cylinder head weighing up to 2 tons.

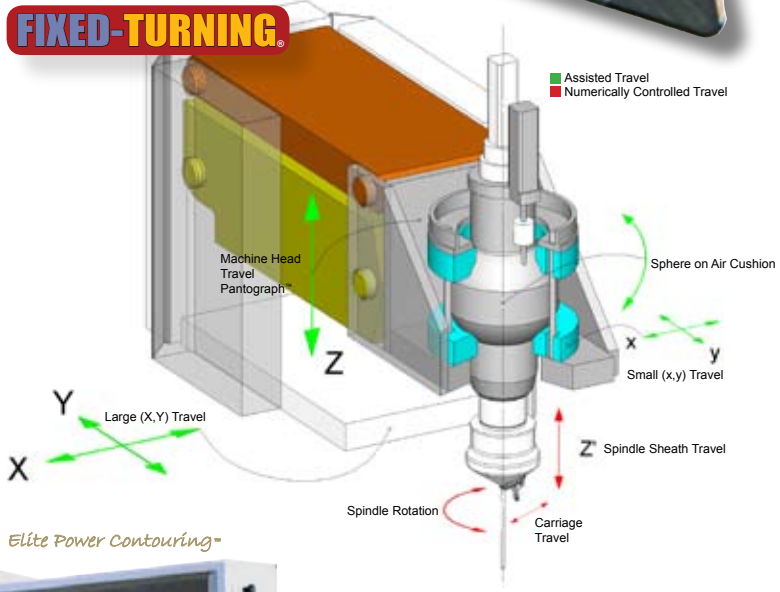
Modular upper bench to accommodate smaller size cylinder heads, Featured with SGC200M, palletizable™, 360° double-angle manual rollover clamping fixture. Allows quick positioning of most cylinder heads regardless of the valve guide angles. This patented system is quick, universal, very rigid, user friendly and does not put any stress on cylinder heads owing to its independant jaws and spherical collet system.

Machine head, pressurized by constant air flow for protection of all the mechanical precision components against metallic operating dusts.



FIXED-TURNING® and Numerically Controlled Machining

FIXED-TURNING®



Elite Power Contouring™

All NEWEN® FIXED-TURNING® Machines Feature:

- Thermal Dynamic Compensation
- ARDC™, Automatic Repetitive Depth Control
- HEPTAX™ Spindle
- Venturi Profile Ability
- Dynamically Balanced Spindle
- Pressurized Machine Head (Spindle)

Machining spindle mounted on special high precision bearing, greased for life. Powerful transmission via machined high precision spiral bevel pinion set.

NEWEN FIXED-TURNING® machining head featuring patented friction free, pinion free and maintenance free kinematics, capable of machining with the highest degree of precision, year after year. Pilot centered and held by an original and particularly efficient crush sleeve system.

Industrial PC of the latest generation with incorporated 15 inch flat touch-screen. A user-friendly and intuitive dialogue between the machine and the operator. Unlimited memory capacity. Network ready.

Solid honeycomb-design machine upper ways confers stability, longevity and precision to the machine.



Technical Characteristics

NEWEN® EPOC-XL™ : 3+1-Axis Single Point CNC Valve Seat & Guide Machine.

NEWEN FIXED-TURNING® MACHINING PROCESS (PATENTED)

Longitudinal head travel (distance from guide to guide - X)	1320mm (51.97")
Y-Axis machining head travel	80mm (3.15")
Machine parallels mounted on linear ways x2 – Displacement Y	340mm (13.39")
Z-Axis: Pantograph™ System with Hydraulic Lock	327mm (12.87")
Z' machining travel (sheath travel for machining purposes only)	95mm (3.74")
Automatic carriage displacement radius 22 mm in diameter <small>(6x - if tool set with a diameter of 20 mm, max machining dia without repositioning tip holder 42mm)</small>	19mm (.748")
Machining capacity with Standard Tooling	13.5-mm- 200mm+ (.53" - 7.874"+)

Possible Profiles	unlimited
Material to be machined	Any type of material from aluminum to tempered steels
Spindle rotation speed	5-4500 Rpm
Spindle motor	5 HP AC Servo
Spindle feed and carriage motors	Servo Motors
Hydraulic unit	200 Bars (2,900psi)
PC	Industrial type with touch screen
Connections	RS232 – Ethernet Centronics – USB
Operating System	Windows XP Pro
Electrical Cabinet with interchangeable filter	
Incorporated low-voltage multipoint lighting	
Electronic depth gauge LVDT	
Numerical control	NEWEN®
Software	NEWEN®

CYLINDER HEAD DIMENSIONS

Maximum height (without removing pilot)	400mm/810mm (14.96"/31.89")
Maximum length:	unlimited
Maximum width	unlimited

MACHINE DIMENSIONS

Machine Height	2300mm (90.55")
Machine Width:	2500mm (98.43")
Machine Depth:	2215mm (87.21")
Machine net weight:	1450 Kg (3190 Lbs)
Machine gross weight:	1750 Kg (3858 Lbs)
Voltage	220V Single Phase, 50-60 Hz
Air Pressure	Mini 6 bars, 90 Psi

PACKING DIMENSIONS

Height	2300 mm
Depth	2320 mm
Length	1800 mm

NO LIMITS



Chatter Free

The untimely chatter marks destroying the surface finish of a valve seat has been, for decades, the engine rebuilder's nightmare. No cutting tool design, no cutting method, no machine or tool brand have been able to solve this recurrent and fatal quality problem.

The origin of this calamity lies in the very nature of the form-tools used. The highly developed profiles composed of multiple segments generate important and irregular cutting efforts giving life to more or less elevated frequency chatter marks.

Modern heads require minimum machining and very light cuts, making the most destructive chatter marks unavoidable. The very nature of modern sintered materials accentuate these harmful phenomena. In many instances, it is not possible to rework the valve seat in acceptable conditions. With NEWEN® FIXED-TURNING® chatter marks are not only improbable, they are definitely eliminated. The shavings do not exceed 1/1000 of mm² and the cutting efforts cannot, in any case, give place to chatter marks and/or undulations. The most sensitive repairs can be carried out.

Unparalleled Geometric Qualities

FIXED-TURNING® allows the lightest cuts. Refreshing a valve seat profile a fraction of one thousands is possible, all the cylinder heads can be re-machined while respecting the most stringent specifications.

FIXED-TURNING® guarantees geometric qualities never reached before. A perfectly round seat (circularity <3 microns) is the first condition to obtain a perfect seal. The optimum concentricity also obtained with this system, as well as the

perfection of angles and radii will give to the engine its very optimum output, superior to its original condition.

Valve seat angles can be adjusted, at will, every one hundredth of a degree. One will attain a PERFECT SEAL between the valve seat and its valve, the first time around, WITHOUT LAPPING.

Unlimited Valve Seat Profiles

There are no impossible valve seat profiles for FIXED-TURNING®. All profiles are feasible, including Venturis, unimaginable with any other known machining systems on the market today.

One same single point cutter allows to machine all the valve seats, regardless of their shape and/or composition.

The machine has over 300 profiles stored in memory -- the most commonly used ones in the industry. An unlimited number of profiles can be added. Over 300 cutters totally free, always available, never to be renewed.

The single point cutter may be a coated tungsten carbide tool (TIN or ceramics coating) but may also be a Cermet, a CBN or a PCD tool, ideal to machine softer materials such as copper beryllium alloys, aluminum alloys or the toughest ones such as stellites materials, induction hardened seats, etc...

No more waiting periods, no more headaches to select the correct profile, no more expensive carbide tip inventory, you are always ready to serve your customers, all your customers, no matter what type of work they might be bringing you, all with 2 or 3 tip-holders and your pilots. *Here starts the era of savings!*

Machining Capacity

The NEWEN's FIXED-TURNING® range stands as the most comprehensive range of machines dedicated to precision valve seat machining. From 13mm to over 200mm and beyond, the system guarantees circularities within 3 microns.

New perspectives

Manufacturing processes have been revolutionized by computers, software and other new technologies. More than ever before, technological revolutions succeed one another, forcing aftermarket service suppliers to adapt at the same pace.

OEMs constantly use new materials, optimize designs thereby adding to the difficulty, they multiply cylinder heads models and shapes at a rate never seen before, while tightening machining specifications.

The engine rebuilder saw himself banned from the machining of small motorcycle cylinder heads, multi-valve cylinder heads, large industrial cylinder heads..., valve seats too hard, valve seats too soft, until its market got reduced further by numerous limits set forth by OEMs.

NEWEN FIXED-TURNING® eliminates all the constraints and limits. The engine rebuilder is once again able to successfully provide its service to everybody.

With NEWEN FIXED-TURNING®, the toughest OEM challenges become usual business.

*OEM Productivity,
Job Shop Flexibility.*





NEWEN®

EPOC-XL™ - The Most Universal Machine Ever Built

Machine seat ranging in diameter from 13mm (.52") to over 200mm (8"), from the smallest multi-valve motorcycle cylinder heads to the extra large Wartisila W40 cylinder heads.

- Machine stellite valve seats at high speeds with CBN cutting tools for unparalleled geometry - not permitted by any other system.
- Adjust actual valve seat angles at will, every one hundredth of degree.
- Incomparable precision, flexibility and user friendliness.
- Attain a **PERFECT SEAL** between the valve seat and its valve, the first time, **WITHOUT LAPPING**.
- Guaranteed circularity, within 3 microns per 100mm increment, even on valve seats as large as 200mm in diameter.
- Guaranteed concentricity owing to NEWEN's Patented centering system.
- Unparalleled speed of execution: 1 to 3 minutes to machine a 170mm valve seat.
- Constant speed guarantees perfection each and every time, particularly critical on large diameter valve seats - not permitted by any other system.
- Price: A fraction of the cost of a specialized machining center, shortest machining time guarantees optimum productivity; only minutes to machine a complete cylinder head as opposed to several hours with any other system.

QUALITY IS NOT ASSUMED! IT IS MEASURED AND PROVEN

Traditional measuring means are not sufficient to precisely control valve seats and valve guides machined with NEWEN® FIXED-TURNING® machines.



NEWEN® has equipped itself with a TALYROND 365XL control machine, especially conceived and dedicated to the measurement of shapes, coaxilities, surface finish...

This machine whose resolution is 1/100 of a micron allows to automatically control all geometric parameters that define the quality of a guide and of valve seat: circularity, concentricity, run out, cylindricity, segment linearity, angles, surface finish... The control reports and graphs resulting from the tests are indisputably recognized by the control departments of the most prestigious OEMs.

All NEWEN® FIXED-TURNING® machines automatically and regularly produce valve seats with form defects not exceeding 3 microns (.003mm/ .00012"). A quality envied by the most reputable and most avant-garde OEMs.

NEWEN®
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