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FOUNDRAX

Faster, more reliable Brinell hardness testing

Large capacity Brinell hardness testing machines

X-BHD bridge Type and BHD radial arm

Welcome to Foundrax

Foundrax offer the highest hardness measurement performance within the industry, built to thrive in the toughest of industrial production environments. As Brinell test innovators and specialists, we have listened and partnered with our customers to deliver their requirements for over 65 years.

The Foundrax Brinell hardness testing range extends from the smallest Brinell accessories to very large custom designed machines incorporating the latest automatic optical Brinell measurement technology – the Foundrax BRINtronic system. For many years we have worked with both national and international bodies, including several primary national laboratories as well as the British Standards Institution and the International Standards Organisation.

The X-BHD and BHD ranges are designed by people who understand your application and your working environment. All machines in this range are available with either a Type D closed loop optical test head (with integral BRINtronic Brinell microscope), Type B closed loop non optical test head or simple manual hydraulic test head. The machines feature heavy duty static test beds which allow large heavy components to be located securely during testing without the risk of movement under load. Our machines are designed with long life in mind - the internal components of the Type B and D test heads are rated at over 4x factor of safety and the actuator column is rated for 6x factor of safety. The load cell is custom designed for Brinell hardness testing and is rated for over 10 million cycles.

- Foundrax specifically design and build machines suitable for the demanding environments of foundries, forges, steelworks and heat treatment plants.
- Providing tough rugged precision – laboratory accuracy under steelworks conditions.
- Custom designed machines mean our products can be designed around specific components and requirements.

Type D Test Head *

The Type D test head includes an integral BRINtronic automatic Brinell microscope and offers reliable and repeatable operator independent optical indentation measurement of the indentation. In the Type D, the optical components and indenter are housed in a heavy duty steel fabrication to give excellent protection, the top plate and side plates of the fabrication are 25mm thick are given further robustness by webs on each side. The base plate of the fabrication is 30mm thick. A hardened clamp face is fitted to the base of the fabrication base plate. When not in use, the indenter withdraws behind the clamp face for added protection.

On the Type D the indenter arm moves into place to make the indentation and is held securely by two further cam plates which act as both guides and added protection although the indenter arm itself is over 40mm thick and almost 60 mm deep over most of its length.

The load cell is built directly into the indenter arm and located close to the indenter ball to ensure no interference whatsoever in the force monitoring process. The force monitoring process uses a specially developed algorithm to give further enhanced reliability and failsafe protection and can monitor the force application at approximately 125 times per second.

The automatic authentic optical measurement of the indentation in the Type D is performed using an integral Foundrax BRINtronic fully automatic Brinell microscope which is fully networkable to allow for automatic downloading of batch parameters and uploading of results to the customer network if required.

Type D Test Head module with actuation integrated into customer machine frame.

Type B Test Head

The Type B test head is for indentation only and can be manufactured with extra-long narrow clamp to allow access to recess in components over 300mm deep.

The Type B is a simpler design than the Type D but again the load cell is custom designed and sits directly above the indenter. As with the Type D, the test head is protected by a heavy duty housing suitable for the toughest industrial environments.

* for further information on the test heads please refer to *Foundrax Brinell Test Heads brochure*

Brinell Test Heads

All test heads in the Foundrax range are very well proven and are designed specifically for harsh environments such as those found in foundries, forges, steelworks and Heat Treatment Plants. Both the Type B and Type D offer encoded servo motor and load cell control to ensure complete accuracy of both test force application and test force control during the test.

These test heads are in service all over the world, are well proven and have a solid track record for reliability in the harshest industrial environments. Many closed loop Brinell hardness testers on the market use an “off the shelf” load cell run at significantly over capacity to monitor the test force meaning extra vulnerability and giving reduced reliability in the long run.

The Type B and Type D heads feature load cells designed specifically by Foundrax for the forces created during Brinell hardness testing process and are rated for accuracy, repeatability and reliability at tens of millions of normal test cycles.

The Type B and D test heads feature a heavy duty ballscrew for totally smooth force application and ease of force control which is rated at approximately 12 tonnes static load for ultra-long life. The servo motor and servo drive which generates the force are manufactured by Emerson so as to give worldwide support capacity.

The test cycle is fully automatic and authentic with no operator influence over the indentation or (in the case of the Type D) the measurement process.

Problem Recognition and & Fault Detection

The Type B and D test heads both offer a number of problem recognition/fault diagnosis facilities as standard including:

- Load cell communications failure (for example if a cover is removed and a cable is accidentally damaged).
- Motor failure.
- Motor torque overload.
- Load application profile error: indication that the test force application process has failed (for example if there is movement in the component or frame under test).
- Problem Recognition & Fault Detection.
- Both the servo motor drive and PC offer Ethernet ports for easy networking and system integration.
- Electricity supply 380-415v 3ph 50Hz (3 phases, neutral and earth) or customer supply by specific agreement.
- The Type B and D test heads are supplied calibrated according to IS0 6506 & ASTM E10 in any two suitable Brinell scales unless otherwise agreed although extra scales available at extra cost.

The X-BHD

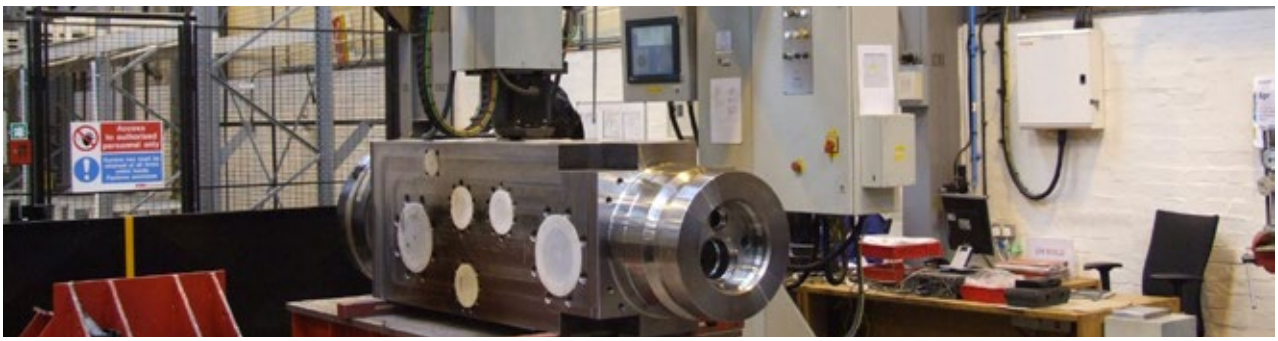
Bridge Type Brinell hardness tester

Featuring either our Type B or Type D closed loop servo motor driven test heads or a simple manual test head, this range offers a wide range of options including:

- Bespoke bed size.
- Fixed or moving bridge options.
- Possibility to integrate our bridge modules into your framework – create your own bespoke machine.
- Manual or powered movement of bridge and column.
- Optional surface preparation.
- Integral BRINtronic automatic Brinell microscope.

The machines consist of a Brinell Test Head for applying the test forces of up to 29 420N (3000kgf) and a heavy duty frame. Depending on the configuration, the Test Head of the machine may be manoeuvred anywhere over the working area of the test bed to accurately and easily position it for one or more tests without moving the workpiece. On machines where the bridge moves, it can be manoeuvred clear of the component with ease for simple loading and unloading.

Able to handle components of up to 50 tonnes.



Benefits of the X-BHD Range

Built to withstand heavy loads, this range has the ability to perform tests to the high levels of accuracy required in today's industry.

This range is available in various sizes, from small static bridge machines (either floor mounted or integrated into a rail system) to fully automatic machines with powered X, Y and Z movement giving an extremely robust machine suitable for use with very large components.

The X-BHD range features include a closed loop automatic multi-force Brinell test head (Type B) with optional integral BRINtronic automatic Brinell microscope (Type D). These machines are designed for heavy duty Brinell hardness testing in the most demanding industrial environments. They are extremely robust and will give accurate, repeatable and reliable results without operator influence on either the test process or the test results. The X-BHD range combines strength and rigidity yet is very easy to operate safely and the test can be made in any location on the upper face of the component. On some occasions where people need to test large components using more conventional machines there is the need to employ potentially dangerous practices such as using fork lift trucks or cranes to hold the component during the test. The fixed bed design of the X-BHD and BHD ranges ensure maximum operator safety, the test pieces rest directly on the bed of the machine and cannot move during the test thereby eliminating all the associated risk to the operator and test integrity.

The range offers bespoke bed size and fixed or moving bridge options. The X-BHD Type B and Type D offer an automatic timing cycle – once the component is loaded and the test head is located over the test site the test is initiated via push button control.

X-BHD Type D with powered bridge

Fixed bridge X-BHD Type D

Almost all parameters of the X-BHD range can be altered at the construction stage to allow for a customer's unique requirements and all solutions offer a range of test heads as described as well as differing test envelopes with and without powered bridge or horizontal actuator movement.

Advantages and Benefits

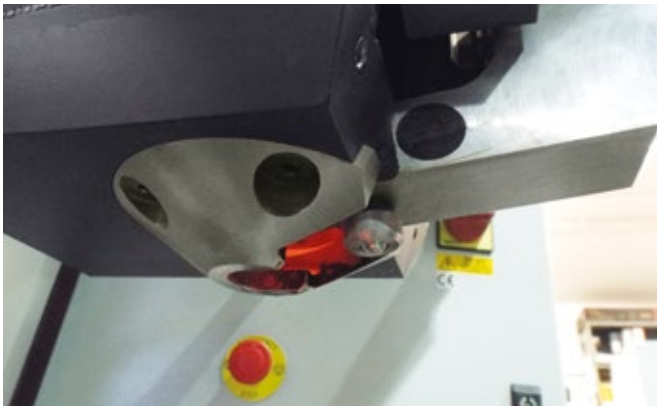
- Very low uncertainty of measurement gives high confidence - therefore reliable, accurate, repeatable results.
- Works as well on rough surfaces as mirror finishes.
- Completely operator independent results whoever the operator.
- Quick to move between batches & alternative test parameters.
- Surface preparation evaluation & warning (if required).
- Ovality-detection according to user-defined parameters.
- Displays test results in HBW and mm instantly.
- Provides results to 2 decimal places (HBW) and 4 decimal places (mm) as well as batch mean, standard deviation etc.
- Batch summary reports (batch size, batch mean, standard deviation, number of high and low rejects), with or without individual test results.
- User interface in any language.
- Single tests or tests in batches.
- Gives an indication of the quality of surface preparation.
- Uses up to 600 diameters to calculate the average diameter – even in the very worst case it would still use around 50 diameters – less than this and it will refuse to give an answer.
- Detects and highlights ovality as required by ASTM E10.
- Able to measure indentations from 0.6mm to 6mm.
- Many software traps to prevent the software giving incorrect results – an accurate result or no result.
- Gives confidence to your customers.
- Upload results live to network, set up batches for operator selection remotely Customise your batch parameters and reports.
- UKAS certified to ISO 6506:2014 and ASTM E10-15.
- No operator adjustment to illumination, lenses or calibration and no cursors to adjust.
- Easily integrated into production quality control systems.
- Designed with the Steelworks in mind.
- Only 3-5 seconds of surface preparation with a hand grinder under normal circumstances.
- Bespoke microscope illumination specifically optimised for Brinell measurement.
- Very low uncertainty of measurement - therefore reliable, accurate, repeatable results.
- Easily integrated into production quality control systems.
- Measures indentations made on all materials to which the standards are relevant.
- Measures indentations made on all kinds of surface from highly polished reference blocks to surfaces quickly and easily prepared using a hand grinder (in 3-5 seconds).
- UKAS certified to ISO 6506:2014 and ASTM E10-15.
- Tailored support; so we can easily cater for special requirements.
- Simple icon driven software for ease of use.

BRINtronic menu screen

No adjustment so no risk of error and no frequent reverification

The BRINtronic does not require the operator to make any adjustments to the type of illumination (for example switching between ring light illumination and overhead lighting) and therefore there is no risk of incorrect measurements as a result of operator setup error causing the system to find the edge incorrectly.

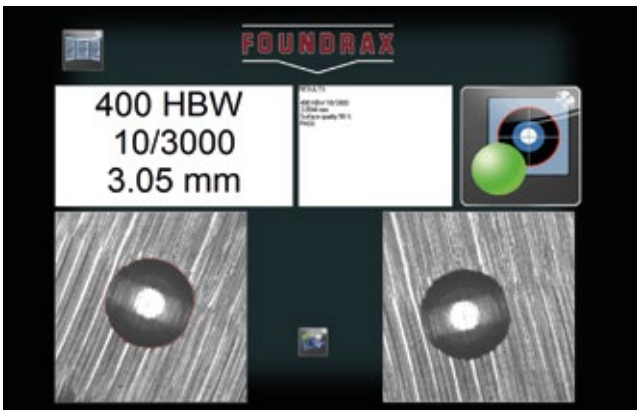
There is also no need for the operator to adjust any digital cursor or to subjectively decide where the edge is, the software easily and reliably finds the edge even on rough surfaces. The system fully conforms to ISO 6506:2014 and ASTM E10-15 so unlike machines which require adjustment every time you change material or hardness – be it via multiple lenses, alteration to the illumination, or cross calibration of materials, **Foundrax machines require no adjustment at all in daily use. This means they don't need frequent reverification (as per ISO 6506:2014).** The BRINtronic gives a level of accuracy, reliability and repeatability of results that is unsurpassed and require only annual reverification.



The illumination of the indentation requires no adjustment in use - whatever the material or hardness.

The BRINtronic will do all this without the need to adjust the illumination or change any lens.

The software features numerous traps and self-checks in order to ensure that the measurements it uses to define the indentation are validated in a number of independent ways. The principle behind the design is that the system gives you the right answer or no answer and that in the event of doubt the answer is either withheld or the operator is clearly warned (for example if the measurement is attempted on an unprepared surface) and even then the result should only vary by one or two points from the optimum. The BRINtronic optically measures the indentation under the toughest industrial conditions and the user friendly software gives the operator warnings if any parameters are in doubt.



BRINtronic test screen

X-BHD - Bridge Type Brinell hardness testers suitable for use with very large components such as those found in the oil Industry

The Foundrax X-BHD may be networked to allow automatic downloading of batch parameters. The range consists of heavy duty machines specifically designed to handle the forces generated in Brinell hardness testing. Automatically uploads and saves test results and batch statistics as required.

Foundrax Hardness Testers can be used on a wide range of surfaces from hand prepared through to mirror finish reference blocks.

But don't take our word for it...

"This machine has significantly reduced the impact of manual handling incidents... The process can be carried out without any safety implication for the operator."

- Zoe Simpson, European HSE Manager, Howco Group.

Accessories include integral milling head for automatic surface preparation

Foundrax can offer surface preparation by milling to an adjustable depth of 15mm (unless agreed otherwise) using a milling head custom designed by Foundrax to give long life reliability in a steelworks environment. We can also consider other requirements including handling equipment such as an integrated walking beam indexing conveyor suitable for the loading and unloading of your components from the X-BHD.

Where milling is included the machines feature separate mechanical systems to mill the surface, to clamp the component and to make the indentation. As the clamping system is independent of the indentation system there can be no possibility of movement during the milling or Brinell hardness test processes giving maximum reliability.

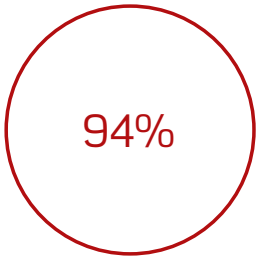
Integrate our modules into your own machine

We can supply elements of the X-BHD range to allow the customer to integrate our technology into their own systems, modules include stand-alone test heads, differing type of actuation and complete bridge modules. In the example shown here the customer has taken a complete X-BHD bridge system and integrated it into their own equipment to allow them to test cylinders up to 12 metres and more. The bridge is mounted on a customer supplied rail system and can move along the entire component length.

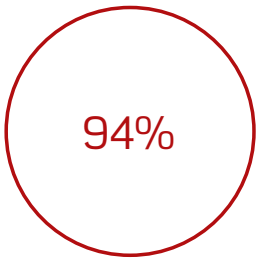
The BRINtronic demonstrably finds the indentation more effectively and the edge more reliably than any other automatic Brinell microscope. It recognises and ignores noise from grinding marks across all normal industrial test surfaces, you don’t need to worry about alignment of the grinding marks for reliable results. It can measure on all normal surfaces so you can use normal reference blocks (no need for special ones) and it requires only about 3-5 seconds of surface preparation with a hand grinder.

Comprehensive software traps protect you from false results which means that the BRINtronic will warn the operator if there is an issue and will refuse to publish a result where there is significant doubt – ensuring ALL measurements you record are reliable and providing unparalleled confidence to both you and your customers.

In a Recent Customer Survey:



of respondents stated that they classed our products as good or excellent.



of respondents stated that they considered our customer service good or excellent.

The BRINtronic system

On the shop floor or in the laboratory, the measurement of the indentation is the key to reliable results.

Over 30 years of experience of automatic measurement has created an algorithm that makes hundreds of accurate indentation diameter measurements every time on surfaces with only minimal preparation. Quicker surface preparation means lower cost and higher productivity.

The BRINtronic system features a simple, intuitive, icon driven interface and is quick to move between test screens, batches and alternative test parameters. It will automatically evaluate the quality of the surface preparation and warn the user if it is not good enough (although this is very unusual). It can summarise the batch reports with or without individual test results – including displaying the batch size, batch mean, standard deviation and the number of high and low rejects. The system is fully networkable and can communicate with a remote computer and download/upload batch data.

The BHD

Radial Arm Brinell hardness tester

The Foundrax model BHD, BHD Type B and BHD Type D radial arm Brinell hardness testers also offer the user a range of test head options. They are specifically designed to handle the forces generated in Brinell hardness testing and are not subject to the inherent weakness of machines based on converted radial arm drills.

The arm can be moved out of the test area to allow the workpiece to be lowered onto the table by crane or fork lift truck. The ultra smooth and light touch operation of the radial arm and column allows the Test Head of the machine to be manoeuvred onto the test location accurately and with ease. Once testing is complete the arm can once again easily be moved out of the way to allow safe removal of the component.

But don't take our word for it...

"We have been delighted with the performance, not just the user friendliness of the equipment but also the accuracy…. it's proved to be a fantastic tool for us."

- Gary Smith, Technical and Quality Director, Howco Sheffield.

The BHD range of radial arm Brinell hardness testers is perfect for testing large components in industrial applications

Heavy duty radial arm Brinell hardness testers specifically designed to handle the forces generated in Brinell hardness testing.

Components can be quickly and easily loaded onto the BHD, the large fixed bed eliminates the need for complex fixtures and enables tests to be completed in minutes - not hours. The machine's test head can be accurately hand-positioned to test large components. The BHD is designed to provide repeatable and reliable results in demanding industrial environments.

The BHD range provides strength and rigidity and can easily test any location within the reach of the machine on a component's upper face. The bed is designed to accommodate components up to 20 tonnes.

The Foundrax Model BHD series are specifically designed to handle the forces generated in Brinell hardness testing

Nominal specifications:

- Test height 900 mm, stroke 900mm (greater available if required).
- Maximum reach 600 mm or 650 mm depending on model.
- Floor space, standard bed: 720 mm x 1300 mm.
- Floor space, large bed: 1120 mm x 1400 mm.

BHD Type D

But don't take our word for it...

"Foundrax equipment is well engineered and the quality is outstanding. It is exceptionally well built, robust and very user friendly."

- Alex Marshall,
Operations Quality Manager, Cameron

The BHD range is designed for heavy duty Brinell hardness testing in the most demanding industrial environments.

The various Foundrax radial arm Brinell hardness testers offer the user a range of test head options

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Unlike converted machine tools which weren't built for the task and which prove unreliable in the medium and long term the BHD range is specifically designed and built for the task giving long life and reliability

Combines strength and rigidity with ease of use, purpose built and designed using finite element analysis to ensure the radial arm provides long term reliability.

These machines are designed for heavy duty Brinell hardness testing in the most demanding industrial environments, they are extremely robust and will give accurate, repeatable and reliable results without operator influence on either the test process or (if the integral BRINtronic is included) the test results.

Non-optical machines are ideally suited for use in conjunction with an external Foundrax BRINscope or BRINtronic microscope.

The 'C' frame is specifically designed to resist the forces generated in Brinell hardness testing and the bed will take components up to 20 tonnes approximately. The Type B and D models have a bed of 1000mm x 1000mm (entry level manual test head machine has a smaller bed but this larger one is available as an option) and they clamp the component during testing to ensure that there is no possibility of any movement of either the component or the machine during the test in order to ensure maximum reliability.

BHD

BHD Type B