

INTEGRAL

Universal automatic hardness tester

Loads from 1 to 3000 kgf

9 positions motorized turret

Milling station for sample surface preparation

INTEGRAL

ONE START BUTTON

INTEGRAL is fully automatic and motorized, just one START button to get start the entire test cycle. Each phase of tests cycle are fully automatic:

- 1 - Contact with measuring surface
- 2 - Activation of the sliding lock
- 3 - Preloading and loading
- 4 - Objectives lens selection
- 5 - Autofocus through visual scanning of surface
- 6 - Evaluation through the camera and automatic return of the stroke to the set point

Each step happens in total safety for users and can be controlled and checked on LCD touch-screen. Accurate measures at the first one. Export data and edit tables is easy and customized. Ethernet connection for remote control and thecnical support.

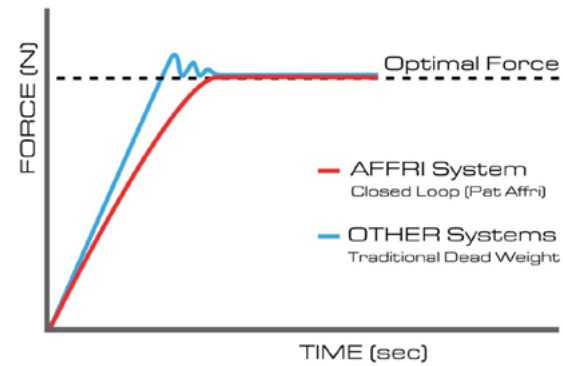


Test each point you need with our INTEGRAL hardness tester! The appropriate extension of the indenter let you to reach the threads of serrated and sharp profiles, test the internal walls of pipes or hollow surfaces. The results will always be accurate and real from the first measurement. (customizable capacity extensions on request)



ABSOLUTE ACCURACY

INTEGRAL assures absolute accuracy of results since first measurement, no needed repetitions of tests thanks to precision of AFFRI SYSTEM and CLOSED LOOP technology. Affri System is based on direct connection between load cells and indenter, on automatic recognition of testing surface from any distance. "Closed-Loop" (pat. AFFRI) controls electronically the load and force cells with 1000 pitch/sec frequency. This system eliminates problems such as structural deflection, external vibrations or wrong positioning of the piece and each test cycle always returns precise results.



MOTORIZED HEAD

Motorized head has a vertical stroke up to 700 mm customizable capacity extensions on request). Automatic recognition of testing surface from any starting point without losing contact.

CLAMPING SYSTEM

The new clamping system assures stability during the whole test cycle in any conditions. The head has 500 mm vertical stroke and includes the indenter and clamping.

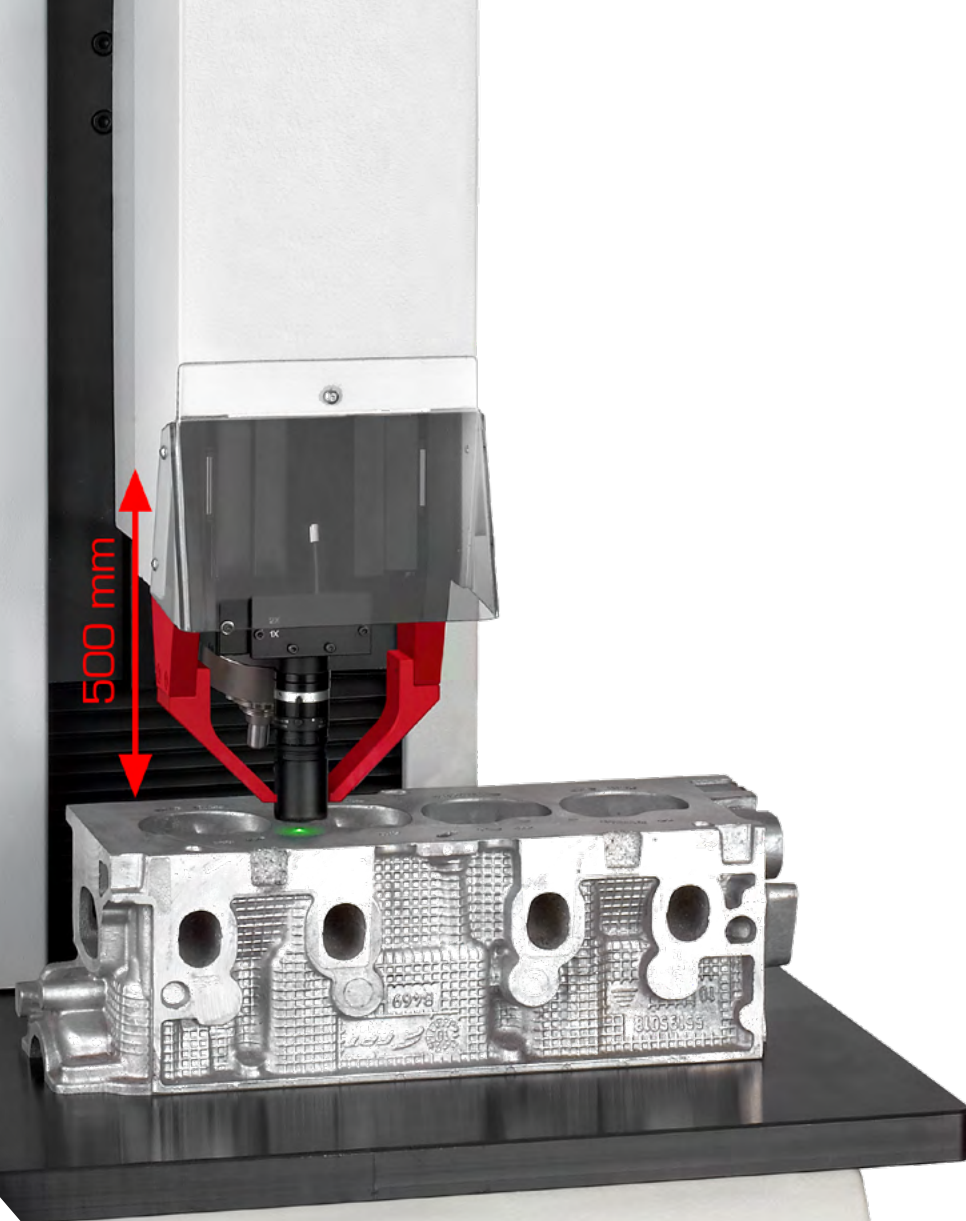
MOTORIZED INDENTER STROKE

Clamping and turret systems are inside and independent at the head. This separate system tolerates up to 500mm structural deflection and assures perfect measures without errors.



2 POSITIONS TURRET

The pneumatic turret has 2 positions: 1 indenter and 1 objective, which are interchangeable. Each step of hardness test is automatic. You can control and program a single indentation or a whole path of testing points thanks to Affri System included. Up to 9 positions at request.





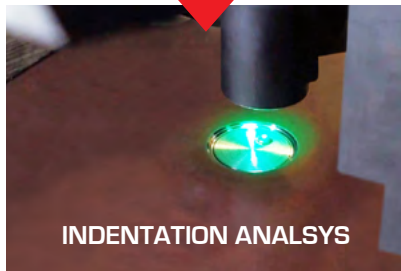
INFINITE WORK SPACE

The INTEGRAL structure allows to test any sample dimensions and weight because it support up to 3000 Kg (customizable capacity extensions on request).



MILLING

The milling head automatically prepares the test surface, ensuring optimal conditions for accurate and consistent results.



L.I.S.A. is a patented AFFRI laser pointer that marks the test area before the indenter touches the surface, allowing precise targeting of hard-to-reach points like gear teeth and jagged edges.

9 POSITIONS TURRET

The pneumatic turret has a 360° rotation and 9 positions between objectives and indenters. Indenters and optic lenses automatically interchange adapting to different hardness methods and the multiple objectives assure perfect indentation scanning. A milling head is part of the turret and which automatically prepares the surface before testing.



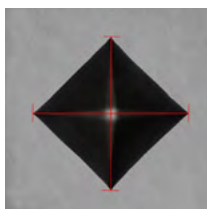
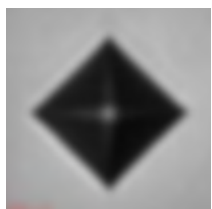


MILLING POINT

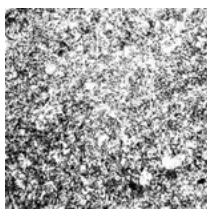
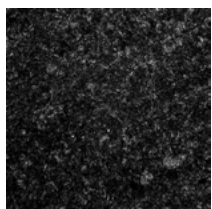
We offer our best innovation in INTEGRAL hardness tester: a milling system for sample preparation that is installed inside the instrument head. This system is one of the 9 positions included in the head and milling station automatically works to assure absolute measures in just few seconds.



Manual measurements are always possible.



Autofocus guarantees the best accuracy of results in any conditions and in just 0,001 sec.



Autofocus and smart lighting allow correct indentation analysis even in conditions without

THE BEST IMAGE RESOLUTION

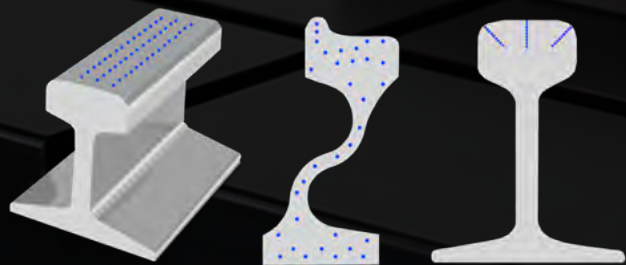
Our technicians and developers studied a new solution for image analysis based on interference elimination, such as shadows and reflections. They reached a combination of optical lenses and different contrast-illumination methods to obtain indentation measurements for the Brinell and Vickers scales. Our measuring results are 10 times more accurate than competitive standards. Affri offers response of 3D image analysis and 360 ° visual in 0.001sec.





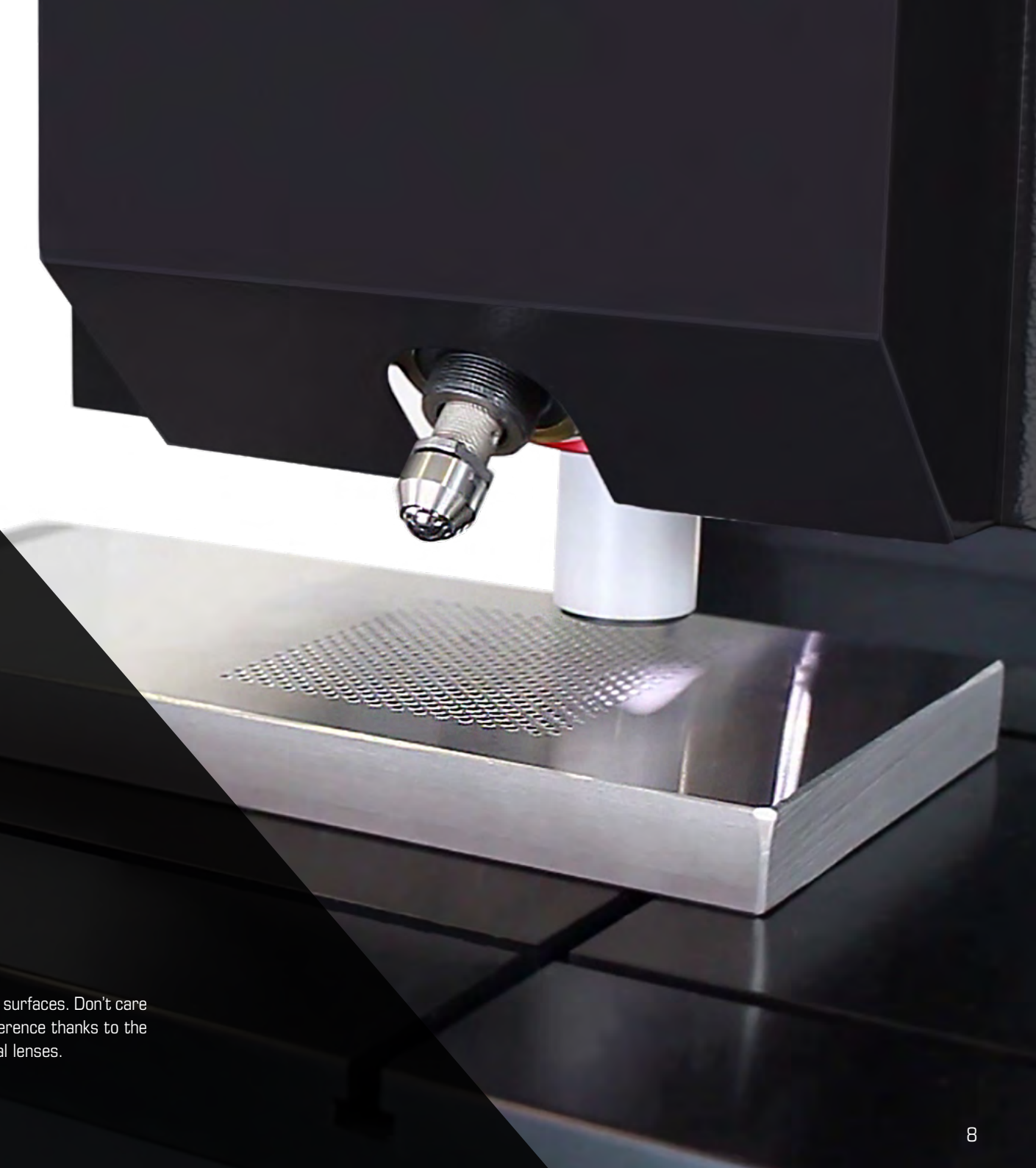
MOTORIZED XY STAGE

The motorized X-Y stage has 100x200mm movement and 0,001mm accuracy. It's perfect for only one indentation or for whole testing paths. [customizable capacity extensions on request]



CRITIC SURFACES

INTEGRAL functions guarantee absolute results even on rough testing surfaces. Don't care about sample conditions, our innovative system eliminates any interference thanks to the motorized turret with multiple objectives and different adaptive optical lenses.



INTEGRAL SOLUTIONS



MAXIINTEGRAL XY
on cylinders and bottles.
Built-in programmable milling.



INTEGRAL SPRINGS
on cylinders and bottles.
Built-in programmable milling.



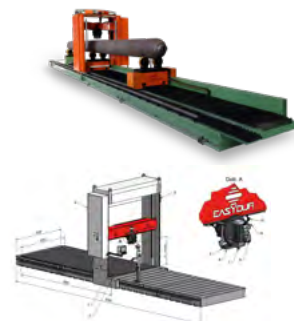
MAXIINTEGRAL
on cylinders and bottles.
Built-in programmable milling.



INTEGRAL BOTTLE
Brinell up to 3000kgf. Fully automatic
multi-indentation cycles on cylinders and
bottles. Built-in programmable milling.



EASYFLAG
Rockwell and Brinell up to 3000kgf - Fully automatic with no limit of weight and
dimension of the sample. Built-in programmable milling.



PORTALE
CNC portal for Brinell tests up to 3000kgf, 14 m, 4 axes with programmable milling
included and automatic test cycle with image analysis.



ACCESSORIES

INDENTERS

033.0.2.550 - Diamond 120° HR
 033.0.2.551 - Diamond 136° HV
 033.0.2.553 - Ball W ø1mm
 033.0.2.554 - Ball W ø2.5mm
 033.0.2.555 - Ball W ø5mm
 033.0.2.556 - Ball W ø10mm
 033.0.2.552 - Ball W ø1/16"
 033.0.2.557 - Ball W ø1/8
 033.0.2.558 - Ball W ø1/4
 033.0.2.559 - Ball W ø1/2



TEST BLOCKS

600.0.0.003 - HBW 2.5/62.5
 601.0.0.005 - HBW 2.5/187.5
 600.0.0.001 - HBW 5/125
 600.0.0.010 - HBW 5/250
 600.0.0.009 - HBW 5/750
 600.0.0.008 - HBW 10/250
 600.0.0.007 - HBW 10/500
 600.0.0.006 - HBW 10/1000
 600.0.0.005 - HBW 10/1500
 600.0.0.004 - HBW 10/3000
 602.0.0.003 - HV10
 602.0.0.004 - HV30
 601.0.0.001 - HRA
 601.0.0.002 - HRB
 601.0.0.003 - HRC
 601.0.0.004 - HRD
 601.0.0.010 - HR15N
 601.0.0.011 - HR30N
 601.0.0.012 - HR45N
 601.0.0.020 - HR15T
 601.0.0.021 - HR30T
 601.0.0.022 - HR45T

ANVILS

A013.0.000 - Fix anvil support
 A014.0.001 - Flat anvil ø60mm
 A014.0.002 - Flat anvil ø150mm
 A014.0.003 - V face anvil ø60mm for diameters from 8 to 220mm
 A014.0.004 - Double Spot anvil Ø25mm flat + V for diameters from 5 to 30 mm
 A009.0.005 - V Support H 50mm
 A009.0.006 - V Support H 100 mm
 A014.0.005 - Ball Anvil reclining self aligning
 A014.0.006 - Diamond spot anvil for thinplate



EXTRA ACCESSORIES

O22.0.3.009 - Fix Clamping piece
 A049.1.001 - Adjustable vice from 0 to 50mm
 A009.0.001 - Manual table 100x100mm with 10µm step
 A.000.0.CNC - CNC control system to program X Y table movement
 A017.4.001 - Self identify the border of test sample trough optic system vision
 A022.0.002 - AUTO START command trough pedal for series tests
 A115.1.002 - Automatic start cycle connectable to PLC control
 A055.0.001 - Motorized stage 300x200mm. Range 200x100mm div. 0,5 µm
 A055.0.002 - Motorized stage 150x150mm. Range 100x60mm. Div.0.5µ/step
 A095.0.001 - Objective 1x (6 mm). HB 25 to 3000 Kg, ball 10mm and 5mm
 A095.0.002 - Objective 2x (3 mm) HB 6,25 to 187,5 Kg, ball 2.5mm - HV50, HV100
 A095.0.004 - Objective 5x (1,2 mm) HB 2 to 30 Kg, ball 1mm - HV20, HV30
 A095.0.008 - Objective 10x (0,5 mm) HV5 and HV10

REAL TIME SUPPORT

Real Time Support. Connect your hardness tester to Internet, so that we can remotely diagnose any technical issue, provide additional operator training and update software version.

INTEGRAL

INTEGRAL1: Brinell ISO 6506 / ASTM E10-23 from 15.6 to 3000 kgf.

INTEGRAL2: Rockwell, Vickers, Brinell ISO 6508, 6507, 6506 / ASTM E18, E92, E384-22, E10-23 from 1 to 250 kgf

INTEGRAL3: Rockwell, Vickers, Brinell ISO 6508, 6507, 6506 / ASTM E18, E92, E384-22, E10-23 from 3 to 1000 kgf

INTEGRAL5: Rockwell, Vickers, Brinell ISO 6508, 6507, 6506 / ASTM E18, E92, E384-22, E10-23 from 10 to 3000 kgf

FORCE RANGE

Rockwell / Superficial R.:	Preload: 29.4 - 98.1 N (3 - 10 kgf) / Rockwell: 588.4 - 980.7 - 1471 N (60 - 100 - 150 kgf) / Superficial Rockwell: 147.1 - 294.2 - 441.3 N (15 - 30 - 45 kgf)
Brinell:	9.807 - 24.52 - 49.03 - 61.29 - 98.07 - 153.2 - 245.2 - 294.2 - 306.5 - 612.9 - 1226 - 1839 - 2452 - 4903 - 7355 - 9870 - 29421N (1 - 2.5 - 5 - 6.25 - 10 - 15.625 - 25 - 30 - 31.2 - 62.5 - 125 - 187.5 - 250 - 500 - 750 - 1000 - 3000kg)
Vickers/Knoop:	9.807 - 29.42 - 49.03 - 98.07 - 147.1 - 196 - 294.2 - 490.35 - 980.7 N (1 - 3 - 5 - 10 - 15 - 20 - 30 - 50 - 100 kgf)
Optional tests:	Test loads can be extended from 0,3 kgf when using the 7 position motorized turret. 49 - 132 - 358 - 961 N (for plastic and rubber)

FEASIBLE TESTS - Depending on the models

Rockwell:	HRA - HRB - HRC - HRD - HRE - HRF - HRG - HRH - HRK - HRL - HRM - HRP - HRR - HRS - HRV
Superficial Rockwell:	HR15N - HR30N - HR45N - HR15T - HR30T - HR45T - HR15S - HR30S - HR45S - HR15W - HR30W - HR45W - HR15X - HR30X - HR45X - HR15Y - HR30Y - HR45Y
Brinell HBW:	1/1 - 1/2.5 - 1/5 - 1/10 - 1/30 - 2.5/6.25 - 2.5/15.625 - 2.5/31.25 - 2.5/62.5 - 2.5/187.5 - 5/25 - 5/31.25 - 5/62.5 - 5/125 - 5/250 - 5/750 - 10/100 - 10/125 - 10/250 - 10/500 - 10/1000 - 10/1500 - 10/3000
Brinell HBTW:	1/30 - 2.5/15.6 - 2.5/31.5 - 5/125(3) [Aluminum and its alloys] - 2.5/62.5(2) [Aluminum and its alloys] - 2.5/187.5(6) [Aluminum and its alloys] - 2.5/187.5(5) [Carbon steel] - 2.5/187.5(1) [Cast iron] - 5/125 - 5/250 - 5/750 - 10/500 - 10/1000 - 10/1500 - 10/3000
Vickers/Knoop:	HV 1 - HV 2 - HV 3 - HV 5 - HV 10 - HV 20 - HV 30 - HV 50 - HV 100
CHD:	Automatic Case depth measure with non-destructive process HDT method tracing case depth curve. Range till 1.5 mm / 0.06"
Temperature:	Measure range from - 40.0 to + 80.0 °C
Optional:	ISO 2039, Shore A and D hardness scales for plastic

TECHNICAL DATA

Conformity Standards:	ISO 6508, ISO 6507, ISO 6506, ASTM E18, ASTM E92, ASTM E384-22, ASTM E10-23, ASTM 103-24
Load accuracy:	Better than 0.05 %
Head Stroke:	Fully motorized 500mm / 20"
Height / Depth Capacity:	Height: 500 mm / 20" (As option can be extended) - Depth: 170 mm / 6.5" (As option can be extended)
Max Sample Weight:	3000kg
Turret:	Motorized and pneumatic automatic turret. Self-switching 1 indenter + 1 objective (optional 5-7 steps)
Camera / Lighting:	Firewire included / LED
Temperature Range:	From 10 °C to 35 °C
Power supply / Data Output:	110 or 220 V / 50÷60 Hz - Pneumatic Air - RS 232 C (USB as option)
Software:	AFFRI - EASYDUR
Principle of Operation:	Load Cell and Closed-Loop (AFFRI patent)
Fields Of Use:	For all metals: iron, steel, tempered steel, cast iron, brass, aluminum, copper and metal alloys. Heat treatment, hardening, nitriding, cementation and hardfacing. Hard and soft plastics.
Packing:	160 x 130 x 230 cm / 62 x 51 x 90" - 600kg

The information and technical data present in this catalogue are subject to changes. The manufacturer has the right to modify the current data, at any time, in function of the evolution of raw material and new technology.

 Made by:
EASYDUR
Via Maja, 5, 21051 ARCISATE - (VA) - ITALY
Website: www.easydur.com

 Europe/Asia:
ATI S.r.l.
AFFRI TESTING INSTRUMENTS S.r.l.
Via M. Tagliaferro, 8, 21056 INDUNO OLONA (VA) - ITALY
Phone: +39 0332 201533 - Mail: info@affri.com - Website: www.affri.com

 America:
AFFRI inc.
850 Dillon Dr. Wood Dale, IL 60191
Phone: +1 224 374 0931 / +1 630 303 1588
Mail: sales@affriusa.com - Website: www.affri.com