



# NEMESIS 9000™ SERIES

Universal Hardness Tester





**NEMESIS 9000™ SERIES**  
0.5KGF TO 3000KGF, 6 POSITION MOTORIZED TURRET

**UNIVERSAL HARDNESS TESTERS****NEMESIS 9000™ SERIES**

NEMESIS 9000™ Series, represents the latest top of the range development on universal hardness testing by Innovatest. Modern design, innovated technology, multi purpose hardness testing instrument, based on the application of mechatronic components and high resolution video machine vision systems. A superior level of precision combined with High Definition imaging creates an almost unlimited field of applications.

The NEMESIS 9000™ Series represents universal hardness testing, in the most versatile meaning of Universal. Aircraft engine parts, automobile parts, production lines, general quality assurance and laboratory use, are all fields covered by the NEMESIS 9000™ Series.

Manual operation or full scale automation to the highest possible level are both standard on NEMESIS.

NEMESIS 9000™, Load Cell, Closed loop, Force feedback system, to give what is due, in a modern way, with unlimited flexibility, suitable for the following:

**OPTICAL HARDNESS TESTING METHODS:**

- Vickers (HV), EN ISO 6507, ASTM E 92
- Knoop (HK) ISO 4545, 4546
- Brinell (HB) EN ISO 6506, ASTM E 10

**DEPTH MEASURING HARDNESS TESTING METHODS:**

- Rockwell (HR) EN ISO 6508, ASTM E 18
- Vickers depth measurement HVT VDI/VDE 2616-1
- Brinell depth measurement HBT VDI/VDE 2616-1
- Ball indentation hardness (H) (ISO 2039-1) (plastics)

**FEATURES**

- Rockwell, Superficial Rockwell, Vickers, Knoop, Brinell, Ball indentation, HVT and HBT scales
- Superior range of testloads/force application ranging from 500gf to 3000kgf (over 3 models)
- Fixed workpiece position (no spindle)
- Descending test head with automatic workpiece detection
- Free definable, manual or motorized 6 position turret for objectives and indentors at choice
- High Definition INNOVAZOOM™ optical system for images of 0.7x to 1000x magnification
- PC based INNOVATEST IMPRESSIONS™ hardness testing firmware and database file system, standard
- Large, adjustable 15" industrial touch screen (or mouse with normal 22" LCD screen at choice)
- Automatic or manual focus, manual or fully automatic indent measurement, standard
- Built-in hard disk offers nearly endless file storing, standard
- LAN, WLAN, USB-2, RS-232, Printer and DVI connectivity, standard
- On board built-in driver for (optional) motorized X-Y stage, standard
- Free definable test patterns case depth, traverse, free style, etc., optional
- Machine covers made of shock, damage and fire proof recyclable materials
- Large range of optional accessories
- Large testpiece accommodation H=300mm, D=220mm  
can be upgraded to a taller frame of for instance H=450mm, D=220mm or 300mm;  
even years after purchasing the tester
- 3 years free firmware upgrade, standard
- Designed and manufactured in The Netherlands, 24 months limited guarantee

NEMESIS has a rigid linear force actuator to move the test head in the required position. This can be done in 3 different ways. Automatic: the test head will decent to the workpiece after pressing the start button. Automatic workpiece position detection. The descending can also be realized in a manual high speed mode or in a manual "focus" mode.

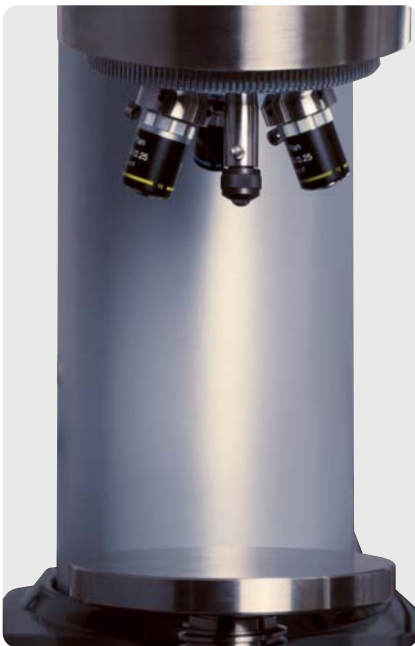


### 6 POSITION TURRET, STANDARD ON NEMESIS

A special feature of the NEMESIS 9000™ is the motorized turret which comes as a standard on each system. The turret can hold 3 different indentors and 3 objectives up to 40x magnification, or 6 different indentors on a PURE ROCKWELL model

Combine the turret with an optional X-Y stage, a rotary table or inclination table and create the worlds most comprehensive 4 or 5 axis hardness testing system.

Workpiece position is fixed. No handwheels, no difficult supporting and no spindle to carry heavy parts. No wear and tear caused by heavy workpieces. No workload and no additional drive systems required.



### PROTECTION, SAFETY, ONLINE SYSTEMS

NEMESIS 9000™ intelligent sensor systems will register any irregular or unusual force being applied to the turret, and will stop the test head from descending. In this way the system cannot cause injuries. No significant force is applied when any of the objectives are in viewing position.

The NEMESIS test head with force actuator, with or without turret, can be used in on-line structures or being integrated in to production lines requiring automatic testing procedures. The newly developed INNOVAZOOM™ optical system allows stunning, High Definition indent magnification (0.7x to 1000x). Refined algorithms guarantee for accurate automatic measurement.

### IMPRESSIONS 9000™, FIRMWARE

IMPRESSIONS 9000™ is the advanced user operating system of the NEMESIS 9000™ Series. The software incorporates, manual and automatic measurement for all scales, image editing, file storing, image storing, report printing, turret operation, manual or automatic focussing and many other advanced functions.

The firmware converts to 3 different hardness (and tensile) scales simultaneously. The conversions can be set to material and standard (ISO/ASTM)

The system also controls an (optional) X-Y stage, rotary or inclining table that can be plugged into the standard built-in driver of the tester. No additional charges, no external devices.

In combination with an X-Y stage the tester offers the option of running case depth hardness programs, pre defined testing patterns and/or other specific or special tasks defined by the user.

All data can be copied or exported in to MS applications like Word, Excel, or a report generator that emails test results directly to your workstation, or server. All data can be accessed over the LAN or WLAN connections.



## ANVILS , TEST TABLES, SPECIAL INDENTORS

Each NEMESIS 9000™ is supplied with a standard set of test anvils and worktables. Such set includes 1 V-groove anvil, 1 flat anvil 80mm, 1 large round testing table ø200mm.

Additionally, you can opt for a large range of specific anvils such as a spot anvil, set of V-groove anvils tungsten alloy or diamond surface anvils.

The tester can be equipped with a furnace or cooling unit to test workpieces under high or low temperature. Robot workpiece loading and unloading can be supported by the built-in industrial computer.

To support large workpieces or cylinder blocks you can opt for the (350mm x 250mm) large working stage that incorporates T-grooves for solid workpiece fixing.

### Flexible working heights

The NEMESIS 9000™ has a standard working height of 300mm. In case you have larger components NEMESIS is available with different frame heights ranging up to 500mm workpiece height and up to 350mm depth. Ask our sales department for customized options.



## X-Y STAGES, ROTARY TABLES, INCLINATION DEVICES

Being Universal means being ready for any task. NEMESIS 9000™ can be equipped with a variety of X-Y stages suitable for different applications. Different testforces require different specifications of the X-Y stages. Size, testload and positioning accuracy can be offered according to your particular requirement.

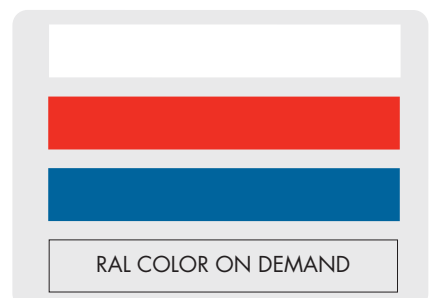
CNC rotary tables and inclining testing tables are available depending on the complexity of your workpieces.



## TESTER COLORS

The standard color of NEMESIS 9000™ “ABS” covers is “black”. Your tester can be supplied in any color or paint structure of your choice.

INC-1LW	Laboratory White
INC-2CGM	Charcoal Grey Metallic
INC-3FR	Ferrari Red
INC-4BRG	British Racing Green
INC-5ABL	Atlantic Blue
INC-RAL XXXX	Any RAL color on demand



## UNIVERSAL HARDNESS TESTERS

TECHNICAL SPECIFICATIONS	NEMESIS 9001™ UNIVERSAL	NEMESIS 9002™ UNIVERSAL
<b>SCALES / TEST LOADS/FORCE</b>	<b>0.5kgf to 250kgf</b>	<b>1kgf to 750kgf</b>
ROCKWELL, A, B, C, D, E, F, G, H, K, L, M, P, R, V	All scales	All scales
SUPERFICIAL ROCKWELL, N, T, X, Y	All scales	All scales
MACRO ROCKWELL HRM	Yes	Yes
VICKERS HV	500gr to 120kgf	500gr to 120kgf
KNOOP	All scales	All scales
HVT	50, 100kgf	50, 100kgf
BRINELL	500gr to 250kgf	1 to 750kgf
HBT	5/250	5/250
H (ball indentation)	Up to 250kgf	Up to 750kgf
<b>FORCE APPLICATION SYSTEM</b>		
Linear force actuator	Standard	Standard
Load cell, closed loop, force feed back system	Standard	Standard
Motorized heavy duty TURRET with 6 positions	Standard	Standard
Indentor positions	3	3
Objective positions	3	3
LED optical indent illumination	Standard	Standard
LED ring light indent illumination	Optional	Optional
<b>OPTICAL MEASURING SYSTEM</b>		
5 mega pixels INNOVAVIEW™ optical ZOOM system	Standard	Standard
Auto focus	Standard	Standard
Manual focus	Standard	Standard
Fully automatic indent measuring	Standard	Standard
Manual on screen indent measuring	Standard	Standard
Zoom and magnification ratio	0.7x to 1000x	0.7x to 1000x
Dual view™ working area overview camera	Optional	Optional
External Electronic Brinell microscope and objectives	No	No
<b>DEPTH MEASUREMENT SYSTEM</b>		
Heidenhain™ high resolution scale & reading head	Standard	Standard
<b>HARDWARE &amp; USER INTERFACE</b>		
Built-in industrial Pentium PC and harddrive	Standard	Standard
Adjustable 15" full color industrial touch screen	Standard	Standard
MS Windows 7 Ultimate license	Standard	Standard
IMPRESSIONS 9000™ hardness testing firmware	Standard	Standard
Automatic image and file storage	Standard	Standard
Stores and handles 3000 files & images	Standard	Standard
Stores and handles 9000 files & images	Optional	Standard
Forms 9000™ set of customized certificates	Optional	Standard
Universal motorized X-Y stage controls	Standard	Standard
<b>CONNECTIVITY</b>		
External digital (DVI) TFT screen output	Standard	Standard
External keyboard & mouse connections	Standard	Standard
LAN (local area network connection)	Standard	Standard
WLAN (Wireless network connection)	Standard	Standard
Bi-directional RS-232	Standard	Standard
Printer / USB-2 output	Standard	Standard
Built-in motorized X-Y stage driver	Standard	Standard

**Workpiece accommodation height** : 300mm (opt. 500mm)

**Workpiece accommodation horizontal** : 220mm from center (opt. 300mm)

**Machine dimensions**

: 1400mm x 420mm x 640mm (HxWxD)

**Machine weight**

: 242kg

**Tester color (standard)**

: Black / Metallic silver

**Light source**

: White power LED (Opt. green/blue/red)

**Power**

: 220volt / 50Hz, others on request

**Objectives**

: 3 installed for 0.7x to 1000x

**Force tolerance**

: Max. < 1%

**Force control**

: 1-99 sec.

**Hardness resolution**: 0.01 Rockwell, 0.1 Vickers,  
1 Brinell

## NEMESIS 9000™ SERIES

NEMESIS 9003™ UNIVERSAL	NEMESIS 9004™ PURE ROCKWELL	NEMESIS 9005™ PURE VICKERS	NEMESIS 9006™ PURE BRINELL
<b>10kgf to 3000kgf</b>	<b>0.05kgf to 150kgf</b>	<b>0.5kgf to 120kgf</b>	<b>10kgf to 3000kgf</b>
All scales	All scales	No	No
No	All scales	No	No
Yes	Yes	No	No
10kgf to 120kgf	No	500gf to 120kgf	No
No	No	All scales	No
50, 100kgf	No	No	No
10kgf to 3000kgf	No	No	10kgf to 3000kgf
5/250	No	No	No
Up to 3000kgf	No	No	Up to 3000kgf
Standard	Standard	Standard	Standard
Standard	Standard	Standard	Standard
Standard	Standard	Standard	No
3	3 (or 6, option)	3	None
3	None	3	None
Standard	None	Standard	None
Optional	None	Optional	None
Standard	None	Standard	None
Standard	No	Standard	No
Standard	No	Standard	No
Standard	No	Standard	No
Standard	No	Standard	No
0.7x to 1000x	No	0.7x to 1000x	No
Optional	No	Optional	No
No	No	No	Standard
Standard	Standard	No	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	No	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	Standard
Standard	Standard	Standard	Standard
Standard	Standard	Standard	No

### Standard delivery

- Diamond Rockwell indenter (9001, 2, 3, 4)
- Vickers pyramid indenter (9001, 2, 3, 5)
- Brinell indenter (9001, 2, 3, 6)
- Flat anvil ø80mm, V-anvil ø80mm, ø200mm testing table
- Installation & user manual

### Optional accessories

- Large testing table 350mmx250mm with T-grooves
- Extra large testing table 450mmx350mm with grooves and support
- Long bar supports, to ease testing long bars
- Motorized X-Y stages, motorized rotary or tilting tables
- Built-in 5 axis support driver
- Certified indentors and reference blocks (DKD, UKAS, ASTM)

Represented by:

## **CORPORATE HEAD OFFICE**

### **MANUFACTURING, DISTRIBUTION & SERVICE**

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