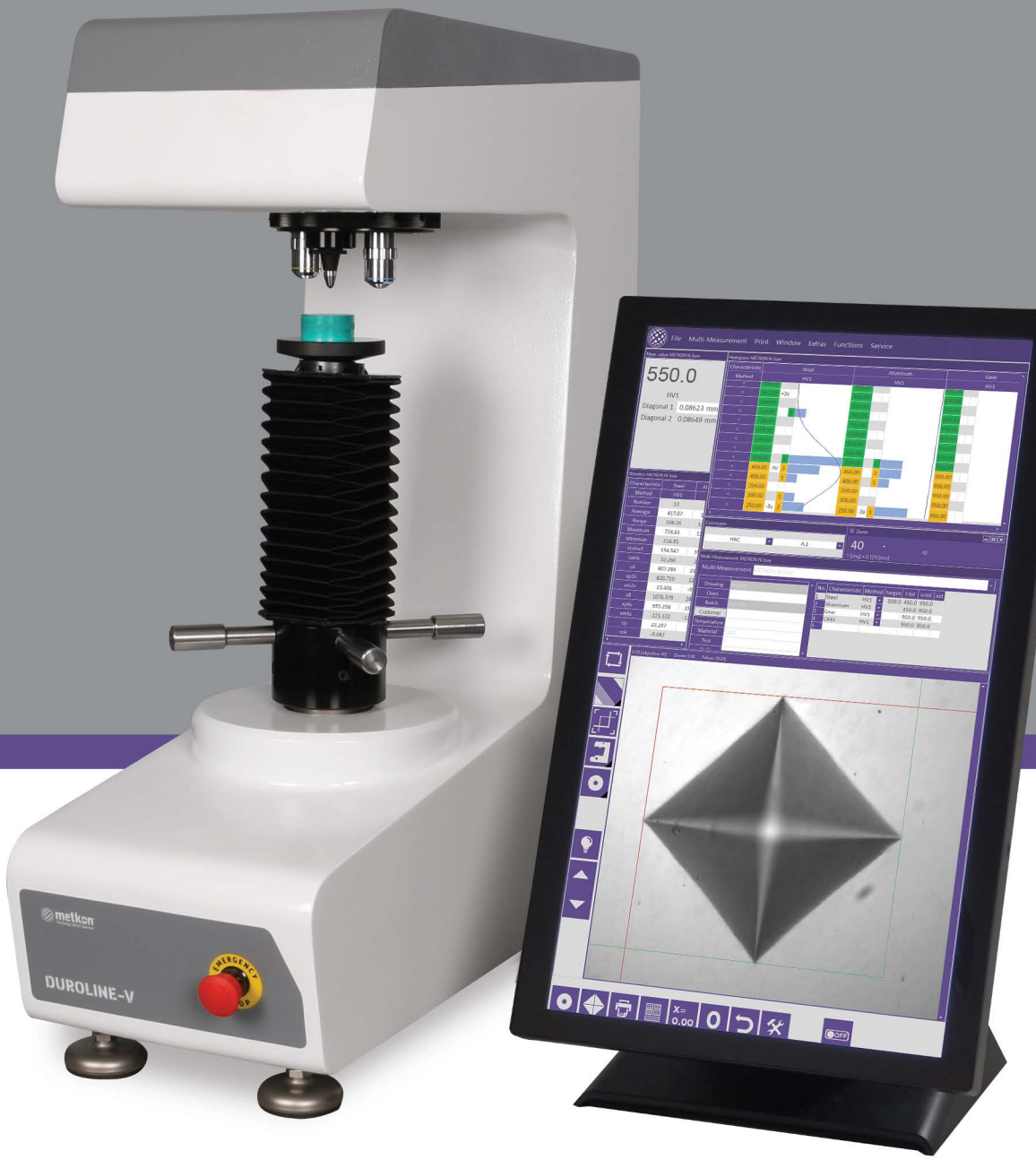
metkon
Technology behind Specimen



HARDNESS TESTING

DUROLINE V SERIES

metkon.com

QUARTER CENTURY OF EXPERIENCE

MICRO-MACRO VICKERS

AUTOMATIC HARDNESS TESTING

DUROLINE V1

Smart hardness testing with smashing performance

– NEW GENERATION –

Main system features

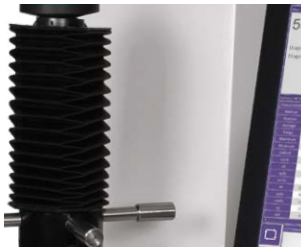
- Versatile Micro+Macro load range for HV/HK scales from 300gf up to 30kgf
- Closed-Loop Controlled load application by load cell technology
- Auto Measurement with Zoom Window for more accurate measurement
- Flexible Windows 10 based hardness test & measurement program METKON *N*-Sure
- Database generating test results and reports
- 22" Full HD Capacitive 10-point Multi-Touch desktop monitor
- Integrated high-res camera 420MB/s with USB 3.1 interface with zoom capability
- Integrated LED light source with controller
- Integrated Windows operated mini-pc, Intel, SSD specs
- Interface network USB (4), RS-232 (1), HDMI (1)
- Very robust opto-mechanical system
- New generation electronics and motors in full system integration ensuring reliable performance
- Service friendly, remote accessability
- Meets latest ISO, ASTM and JIS standards

DESIGN

DUROLINE V Series are ideal instruments for quality assurance, quality control, research and metallurgical departments to monitor the hardness during fabrication and after heat treatment or welding as well as for the performance analysis on metal parts and new alloys. Typical applications are determining the Vickers micro- and macro-hardness of steel alloys and metal components, small precision parts, thin material or wire, coatings and performing case depth determinations (CHD, EHT, NHT) on cross sections.

Recently developed by an international multi-disciplinary team with a wide hardness testing experience, the DUROLINE V-Series are based on the latest technology available, focused on fast cycle time with high reproduceable accuracy within international standards. The system features a smart and very service-friendly synergy of a robust and proven mechanical construction with load cell force control and integrated electronics system control featured by a fast CANBUS technology and a high-quality Windows based mini-pc. Monitoring the hardness testing process significantly improved by using modern user interfacing technology such as 10-point multi-touch screen operation supported by a fast & secure display connection. Combined with top quality components and a high performance mini-pc, this system guarantees customers a solid and accurate performance over many years to come. In this way, the DUROLINE V Vickers hardness tester series offers a highly functional and reliable automated indentation test & measurement system.

DUROLINE V-Series Macro-Micro Vickers Hardness Tester



Robust Mechanical Design

22" Full HD Capacitive 10-point Multi-Touch desktop monitor

Complete micro/macro-load range for HV/HK scales from 300gf to 30kgf

By selecting between 9 loads steps for micro- and macro-hardness testing in Vickers or Knoop, any specimen can be tested and measured within the applicable standards. Fast and easy setting of loads by touch screen monitor menu icon.

Magnification range

Combining the excellent performance of the digital camera, LED illumination and software with a series of available objectives, the DUROLINE V Series provide correct measurement under any test load within the international standards.

AUTOMATIC TEST & MEASUREMENT

The METKON *N*-Sure software program features a flexible Windows based user interface that increases productivity and operator efficiency by automating the test & measurement process. Since the application and removal of the test loads and measurement are fully automatic, repeatability is excellent, testing time is reduced, and throughput is increased. As a result, costly and time-consuming rework is eliminated.

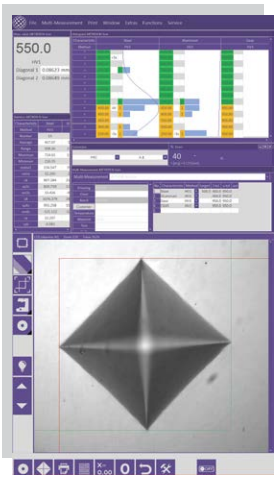
For high-volume mounted sample testing, multi-sample mount holders are available for automated test applications to further increase the productivity and throughput of samples.

The easy-to-operate test & measurement program, clear images capture by integrated camera and high-resolution display on 22" touch screen monitor provide the lab staff easy access and shared visibility of indent results to analyze and discuss together. Operators are guided by the user-friendly program logic combined with quick manual system settings using the *N*-Sure user interface. Vickers or Knoop hardness values are automatically generated on screen by use of the standard provided Auto-measurement function.

Database generating test results and reports

METKON *N*-Sure software program provides advanced database management of test results, report generation and printing fuctions. Saving and retrieving measurement data is an absolute requirement when it comes to testing hardness results of critical components in various industrial segments. The *N*-Sure program ensures that data is safely stored and presented in standard or customized reporting form.

22" Full HD Capacitive 10-point Multi-Touch desktop monitor



METKON *N*-Sure Advanced User Interface Software

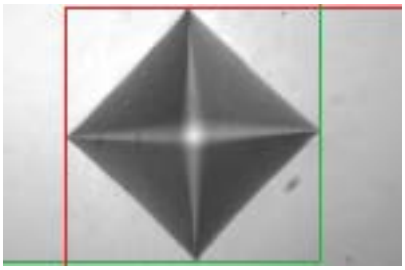
Factory Certificated Direct and Indirect Calibration Report

All DUROLINE V-Series testers are calibrated in Metkon Factory according to DIN EN ISO 6507-2:2018 Vickers hardness test standard.

Comes with ISO/DaKKs Certificated Vickers Indenter (Made in Germany)

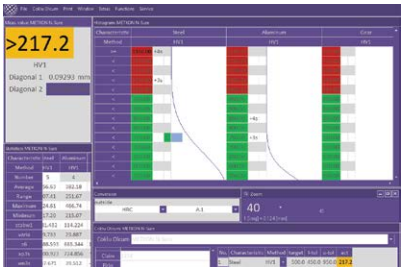
An ISO/DaKKs Certificated Vickers Diamond Indenter is included as standard for all DUROLINE V-Series Hardness Testers.

GENERAL FEATURES HIGHLIGHT



Automatic Test & Measurement

The measurement program provided as standard the Auto-measurement function for fast and repeatable results. This provides extra convenience and time saving. Manual measurement is always possible, as well as re-measurement or deleting single hardness values.



N-Sure Advanced User Interface Software

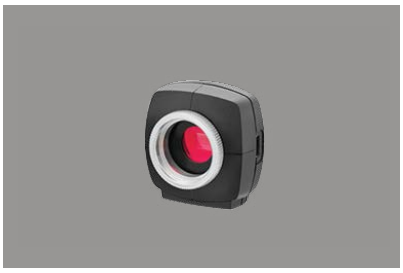
The METKON *N*-Sure software program features a flexible Windows based user interface that increases productivity and operator efficiency by automating the test & measurement process. The User Interface has an immediate recognition and provides a user-friendly flexibility in settings and daily operation.

22" Full HD Multi-Touch Desktop Monitor

The easy-to-operate test & measurement program, clear images capture by integrated camera and high-resolution display on 22" touch screen monitor provide the lab staff easy access and shared visibility of indent results to analyze and discuss together.

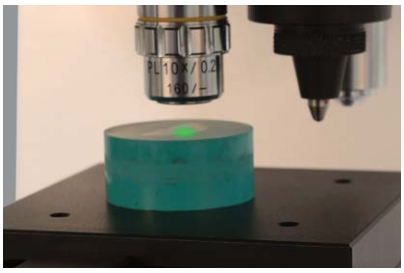
Integrated Windows Operated Mini-PC

A Windows operated industrial mini-pc is hidden inside the hardness tester. Thus, no additional space is required for your laboratory. It is capable to work 24/7 thanks to its compact, robust design. Equipped with powerful Intel processor and SSD drive to provide smooth and fast operation.



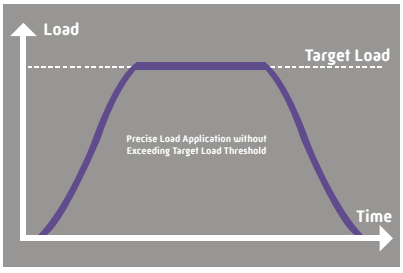
Integrated High Resolution CCD Camera

A high resolution CCD camera is hidden inside the hardness tester. It has 6.4 MP resolution which provides to capture very clear indentation image for accurate auto measurement. It has 420MB/s USB 3.1 interface to transfer image to monitor without any delay. This means; when you move the specimen that under the objective, the image on the monitor also moves very smoothly and quickly at the same time.



Automatic Light Brightness

The light brightness is automatically adjusted by the user interface software for the best image quality and the most accurate auto measurements. The hardness tester equipped with powerful LED light source and compact optic system to provide excellent image quality.

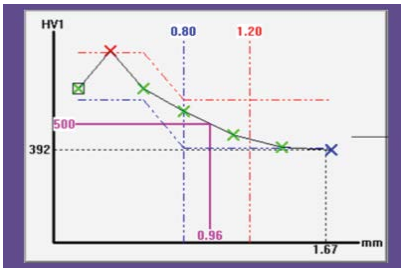


Closed-Loop Controlled Load Application by Load Cell Technology

All DUROLINE V-Series testers equipped high technology closed-loop load cell sytem. Load cell system provides maximum accuracy and repeatability for all test loads without exceeding target load threshold.

High precision spindle

For accurate Vickers hardness testing, the elevating speed and backlash of the spindle are critical. By using quality components and design experience, the DUROLINE V Series spindles guarantee long life without loss of accuracy due to wear and friction, even for large and heavy specimens.



EHT - CHD Testing

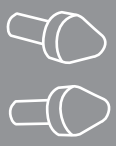
XY-stage with one Slyvac digital micrometer and software module for EHT-CHD testing are optionally available for all DUROLINE V-Series. Possibility to direct reading of Slyvac micrometer signals by *N*-Sure software and generate case hardening depth graph.

ACCESSORIES

Object Lenses, 5X/10X/20X/40X

GR 2041
GR 2042
GR 2043
GR 2044

Vickers/Knoop Indenters

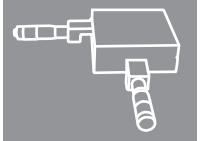


GR 2047
GR 2048

Flat and V-Anvils

GR 2021
GR 2022

Manual XY-Stages

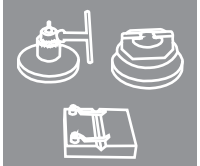


GR 2023
GR 2024

Precision vise (opening 43mm)

GR 2025

Fine specimen holders



GR 2026
GR 2027
GR 2028

Specimen Holder for Mounted Samples Ø25/30/40/50 mm

GR 2031
GR 2032
GR 2033
GR 2034

Multiple Specimen Holder for Multiple Mounted Samples Ø25/30/40 mm

GR 2035
GR 2036
GR 2037

Certificated Standard Test Blocks

GR 2061
...
GR 2069

Certificated calibration scale glass.

GR 2071

Softre Module for EHD, CHD Testing

GR 2081

Test stages

The DUROLINE V Series feature various stages and fixtures that fit any application. Starting with the basic manual XY-stage with either mechanical or digital micrometers. The hardness tester can also be equipped with single or multi-sample holders to fix mounted specimens. To fix various geometries of specimen that are not mounted, there are several clamping devices available to finish job quick and precise.

High Precision Manual XY Stages

High Precision Test Anvils

Object Lenses

DUROLINE V equipped with 10x and 20x high quality German made object lenses for maximum image sharpness. 5x and 40x objectives are also optionally available for all kind of testing needs.

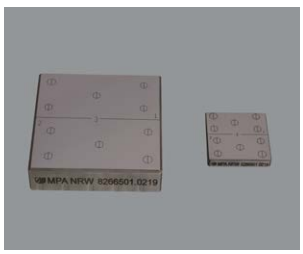
Test Blocks

ISO/DaKKS certificated German made test blocks are optionally available for Indirect verification of tester.

Indenters

ISO/DaKKS certificated German made Vickers and Knoop indenters are optionally available for most accurate and reliable testing.

High Precision Sample Holders



ISO/DaKKs Certificated Test Blocks

ISO/DaKKs Certificated Vickers and Knoop Indenters

High Quality Object Lenses with 5X, 10x, 20x and 40x Magnification

SPECIFICATIONS

ORDER NO		72 11
MODEL NO		V1
Hardness Scales	Vickers HV as per ISO 6507, ASTM E384, E92	HV0,3 - HV0,5 - HV1 - HV2 - HV3 - HV5 - HV10 - HV20 - HV30
	Knoop HK as per ISO 4545, ASTM E384, E92	HK0,3 - HK0,5 - HK1 - HK3
	Hardness conversions to other scales	As per ISO 18265
Test Loads	Test Loads (gf)	300gf - 500gf - 1kgf - 2kgf - 3kgf - 5kgf - 10kgf - 20kgf - 30kgf
	Test Loads (N)	2,942N - 4,904N - 9,807N - 19,631N - 29,420N - 49,033N - 98,067 - 196,033N - 294,200N
	Test Load Accuracy	All loads within +/- 1,0% As per ISO standard (and ASTM E-384, ASTM E-92-17, JIS B7725, JIS B7734)
	Test Load Dwell Time	"from 5 - 99 sec with 1 sec increments As per ISO standard (and ASTM E-384, JIS B7725, JIS B7734)"
	Test Load Application Speed	For all loads not more than 0.200 mm/s As per ISO standard (and ASTM E-384, JIS B7725, JIS B7734)
	Load Force Application	Motorised force application with closed loop load cell control, Automatic load, dwell, unload
	Load Selection	By METKON *N*-Sure test settings
Turret	Turret Configuration	Motorized 3-mount turret: 1 indenter, 2 objectives Position Auto-indication
	Indenter	Including 1 Vickers Diamond Indenter (ISO/DaKKs certified, Made in Germany)
	Objectives	"Standard objectives 10X, 20X, optional 5X, 40X (Made in Germany) Image capture by integrated CCD-camera (no eyepiece)"
Optic System	Sample Image Capture	By Integrated CDD Camera, 6.4 MP, 420MB/s USB 3.1 (Made in Germany)
	Indent Measurement Resolution	0,00002 mm (0,02 µm)
Illumination	Illumination Source	Built-in LED Light Source
	Automatic Brightness Control	Standard for highest contrast and sharpnes
Spindle	Z-axis (Spindle Vertical Movement)	Manual
Controller System	Controller	"Built-in Windows operated mini-PC, communicates the hardness tester electronics by CANBUS Protocol"
	Interface Network	4xUSB, 1xRS-232, 1xHDMI
	Auxilliary	Optional Keyboard, Mouse (wireless)
	Monitor	"External 22" Full HD Capacitive 10-point Multi-Touch Desktop Monitor, IPS Panel, Antistatic Shield, Tiltable, Integrated Power Adaptor"
User Interface	Operating System	Windows 10
	User Interface Software	METKON *N*-Sure
	Test Settings	Scale, Load Dwell Time , Start, Turret positioning, Hardness Conversion, Illumination, Screen preference settings, Alerts for errors
	Measurement Settings	Surface Image capture, Indentation capture, Manual measurement and Auto-measurement, Single indents, Manual pattern, Preset pattern, CHD, EHT, NHT, GO/NG judgement, Statistics, Conversion, Cilindrical correction, Language, Database, Test Reports with image analysis data, Data export, User management, Service and Calibration Settings
Tester Body	Operational Environmental Conditions	"Ambient Operating Temperature Range: 23°C +/- 5°C Ambient Humidity Range: RH 40% to 70% relative humidity, non-condensing"
	Dimensions, WxDxH	240x560x735 mm
	Specimen Accomodation	Vertical 223 mm, Horizontal (throat depth) 164 mm
	Weight	75 kgs
	Mains	100-240 V, 1-phase, 50/60 Hz, autosetting

SPECIFICATIONS

72 11 — **DUROLINE V1**

Vickers/Knoop Micro/Macro-Hardness Tester with Test & Measurement software Windows 10 "*N*-Sure" including Auto-Measurement module, closed loop load cell controlled force application
Test Loads: 300gf, 500gf, 1kgf, 2kgf, 3kgf, 5kgf, 10kgf, 20kgf, 30kgf
HV0,3-HV0,5-HV1-HV2-HV3-HV5-HV10-HV20-HV30
HK0,3-HK0,5-HK1-HK3 in compliance with standard ISO 6507, ASTM E-384, ASTM E92-17 User Interface by 22" full HD 10-point multi-touch desktop monitor, integrated high resolution 6.4 MP USB3.1 CCD camera, automatic measurement with zoom capability and automatic light brightness, with automatic test sequence by motorised turret and load motor force control by closed loop load cell system, adjustable internal LED illumination, large sample accomodation area, emergency stop. Automatic voltage setting 100-240 V, 1-phase, 50/60 Hz.

Standard delivery includes:
Hardness Tester equipped with macro-spindle, Desktop Monitor on solid stand, METKON *N*-Sure software incl. Auto-Measurement module, ISO/DaKKs Certified Vickers diamond indenter, Objective 10x, Objective 20x, flat anvil dia. 80mm, 4 adjustable tester feet, Water level indicator, Indenter protection nose, Dust Cover, Power Cable, Monitor Interface Cable, Factory Test Certificate with ISO/ASTM verifications, solid accessories box.

Note: Select below the additional XY-stage, anvils, sample fixtures and test blocks.

Object Lenses for Hardness Testing

GR 2041 — Object lens 5x
GR 2042 — Object lens 10x
GR 2043 — Object lens 20x
GR 2044 — Object lens 40x

Indenters for Hardness Testing

GR 2047 — ISO/ASTM Certificated Vickers diamond indenter
GR 2048 — ISO/ASTM Certificated Knoop diamond indenter

Anvils and XY-Stages Hardness Testing

GR 2021 — Flat anvil diameter 80mm
GR 2022 — Ø80 V-anvil for cylindrical parts above 5 mm diameter
GR 2023 — Manual XY-stage 100x100mm, travel 25x25mm, with two analogue micrometers
GR 2024 — Manual XY-stage 120x120mm, travel 25x25mm, with one digital Slyvac micrometer incl. cable and one analogue micrometer

Specimen Holders for Hardness Testing

GR 2025 — Precision vise (opening 43mm)
GR 2026 — Thin specimen holder
GR 2027 — Fine specimen holder (Horizontal type)
GR 2028 — Fine specimen holder (Vertical type)
GR 2031 — Specimen holder for Ø25 mm specimens
GR 2032 — Specimen holder for Ø30 mm specimens
GR 2033 — Specimen holder for Ø40 mm specimens
GR 2034 — Specimen holder for Ø50 mm specimens
GR 2035 — Multiple specimen holder for 6xØ25 mm specimens
GR 2036 — Multiple specimen holder for 6xØ30 mm specimens
GR 2037 — Multiple specimen holder for 6xØ40 mm specimens

Verification Tools for Hardness Testing

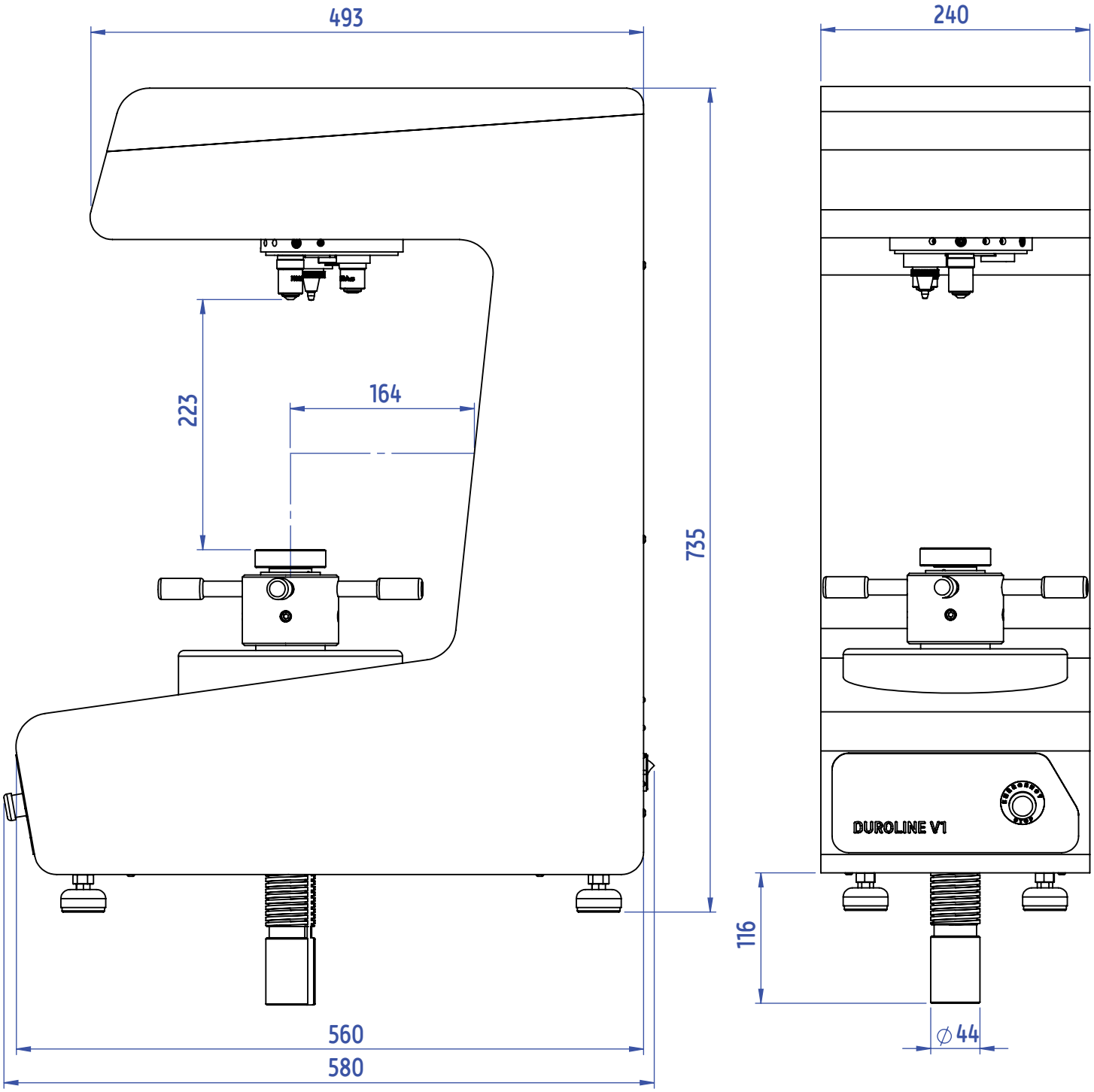
GR 2061 — ISO Dakks Germany Certified standard block 200HV0.3 (30x30x6mm)
GR 2062 — ISO Dakks Germany Certified standard block 450HV0.3 (30x30x6mm)
GR 2063 — ISO Dakks Germany Certified standard block 700HV0.3 (30x30x6mm)
GR 2064 — ISO Dakks Germany Certified standard block 200HV1 (30x30x6mm)
GR 2065 — ISO Dakks Germany Certified standard block 450HV1 (30x30x6mm)
GR 2066 — ISO Dakks Germany Certified standard block 700HV1 (30x30x6mm)
GR 2067 — ISO Dakks Germany Certified standard block 200HV5 (60x60x6mm)
GR 2068 — ISO Dakks Germany Certified standard block 450HV5 (60x60x6mm)
GR 2069 — ISO Dakks Germany Certified standard block 700HV5 (60x60x6mm)
GR 2071 — ISO Certificated calibration scale glass.

Software Modules for Hardness Testing

GR 2081 — Software Module for CHD Testing (EHT)
(Digital XY-Stage (GR2024) or Motorized stage is required)
(To be ordered simultaneously with the machine order)

*** Other voltages and frequencies available upon request. Please state when ordering. All specifications are subject to change without notice.**

DIMENSIONS



550.0
HV1
File Multi-Measurement Print Window Extras Functions Service
QUARTER CENTURY OF
EXPERIENCE

metkon
Technology behind Specimen

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