VES-MATIC CUBE 80
FULLY AUTOMATED BENCH-TOP ANALYZER FOR THE DIRECT DETERMINATION OF ERYTHROCYTE SEDIMENTATION RATE (ESR) IN PRIMARY EDTA TUBES

Features of the System:

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<td>ESR Directly from EDTA Tubes</td>
<td>Complete Sample Traceability</td>
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<td>Works with any Brand/Type of EDTA Tubes</td>
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<td>No Sample Consumption</td>
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<td>No Production of Waste Fluids</td>
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INSTRUMENT OVERVIEW:

The Ves-Matic Cube 80 is an automatic bench top analyzer designed and programmed to determine the Erythrocyte Sedimentation Rate (ESR) on whole blood samples anti-coagulated with EDTA. It can analyze up to 95 blood samples per hour. The instrument performs the analysis making use of the full blood count samples and accepts any kind of brand/model of top lavender tubes available in the market; it’s therefore neither necessary to use a dedicated Citrate tube nor to transfer the blood from the tube inside the instrument.

The main innovation of the system is that the sedimentation of red cells in autologous plasma is read directly in the original EDTA tubes used for the full blood count, by means of a specially designed optical system. Due to this feature, no part of the system comes in contact with or consume any of the blood samples during its operation. As a result, there is no transfer of blood from the original tube into any part of the analyzer and no production of waste fluids. The system is therefore designed to maximize the operator safety and protection.
The Ves-Matic Cube 80 is environmentally friendly since it eliminates the possibility of biological contamination of the environment via biological waste and reduces the amount of plastic tubes that have to be disposed of. The Ves-Matic Cube 80 is a true walk-away system. Sample analysis is executed completely automatically (mixing of the samples and reading of the sedimentation) and the results, obtained in only 20 minutes, correlate with those obtained with the Westergren Citrate standard method (60 minute sedimentation performed at 18°C using dedicated glass pipettes of 200 mm, with an internal bore with a diameter of 2 mm). The total duration of the analysis of the first sample is 22 minutes, after which the results are reported with a cadence of 38 seconds. Samples can be loaded continuously using dedicated rack, thus maximizing the workflow.

The principal parts of the Ves-Matic Cube 80 are the “Loader/Classifier Module, the “Analysis Module” and the “User Interface Module”

The “Loader/Classifier Module”
This module is located in the frontal part of the instrument and it is the part of the analyzer where the samples are loaded and automatically sorted before testing. The samples are loaded into the instrument in a dedicated rack which has 112 (14x8) positions: 56 (14x4) of them are dedicated to the loading of samples and 56 (14x4) are dedicated to the transfer of samples after testing is completed (Classifier) (Figure 1).

A very important feature of the system is the possibility of using EDTA tubes of different brands and models simultaneously, without any restriction.

Figure 1- The Loader/Classifier Module and rack

ESR and non-ESR samples are automatically sorted by the system: by means of a robotized two-way clamp each sample tube is placed in front of the barcode reader and rotated until the ID Code is read; the two way connection to the LIS and the complete host integration allow the automatic selection of the samples for which ESR testing is required (Figure 2). ESR samples are transferred to the Analytical Chain and then carried over to the Analytical Module. Non-ESR samples are returned back in their original position in the Sample Loading rack. Once a complete row of four tubes is automatically sorted, the rack moves one position forward. Turn-around time is reduced and productivity is maximized thanks to the continuous loading of racks.

Figure 2 – Bar-Code reading
The “Analysis Module”
The “Analysis Module” is the heart of the system where the samples are automatically mixed and analyzed. The ESR samples, coming from the Loading/Classifier module, are automatically inserted into a dedicated sample chain by which they are moved, step by step, to the mixing unit and then to the reading groups (Figure 3). The speed of the chain movement is controlled to allow the samples to settle for a period of 20 minutes before the final reading is performed. The total duration of the analysis of the first sample is of 22 minutes; after that, the next results are reported every other 38 seconds. The mixing unit gently shakes and rotates each sample of 120° 15 times, assuring a thorough mixing, as recommended by ICSH\(^{(1)}\).

Time 0 of sedimentation is recorded immediately after the mixing step is completed.

The “User Interface Module”
The “Tablet PC Central Unit” contains the User Interface Module by which the operator communicates with the instrument. Herein resides the application software that controls, manages and receives data, via serial connection from the single peripheral microprocessor cards where the EEPROM resides and all parameters of the instrument are memorized. The intuitive computer graphics and icons on the touch screen allow the operator to manage all the instrument functions. Information about any sample is available at any time via the User Interface, making sample traceability easy to manage (Figure 4). The built-in printer is included in this module and prints information regarding the processed test tubes (ESR result, date, time, temperature, position in the sample holder rack).

Sample Traceability
The Ves-Matic Cube 80 has been designed to ensure complete sample traceability. The ID code of the sample rack and the position of each tested tube are matched with the corresponding sample ID code (bar code). The print-out report shows all of this information, which is also stored in the Historical Data Base. The User Interface contains a “Find” function, displayed on the screen, through which it is possible to track each sample.
Host Computer Connection
The Ves-Matic Cube 80 can be connected to a Host Computer via the RS232C serial interface. The bi-directional communication to the LIS allows the instrument to receive the work list containing the barcodes of the samples for which ESR testing is requested.

Temperature Correction
The Ves-Matic Cube 80 contains a temperature sensor; it measures the working temperature inside the instrument and is positioned inside the Analysis Module. The actual temperature is displayed in the ‘temperature window’ on the screen, either in Celsius (°C) or in Fahrenheit (°F) degrees. The instrument reports the results corrected to the standard temperature of 18°C according to Manley’s Normogram\(^2\) (Figure 5). Never the less it is possible to de-activate the temperature correction feature for differing laboratory needs.

Quality Control (QC)
The Ves-Matic Cube 80 has a built-in internal QC function. A bi-level (normal and abnormal) ESR Control blood is available to verify the proper functioning of the instrument. The ESR Control is a modified and stabilized human blood that can be used to monitor the accuracy and precision of the Ves-Matic line instruments. The range of expected values associated with each instrument model is shown in the ESR Control product insert. The QC Archive is a “circular” database and allows the storage of up to 3,000 QC results, in chronological order.

ESR CONTROL
Ref. 10430 2 x 9 mL vials normal + 2 x 9 mL vials abnormal
Ref. 10434 1 x 9 mL vials normal + 1 x 9 mL vials abnormal

Transponder
The ‘Transponder’ is an electronic device that allows the instrument to have a defined number of executable tests available. For every result the Transponder will automatically undergo a decrease in the number of available tests. Once number of available tests is exhausted, the operator must reload the instrument with a new Transponder. The Transponder has the dimensions and appearance of a normal CBC test tube (Figure 6). To reload the instrument simply insert the new Transponder in the dedicated red holder inside the analyzer: the Transponder tube will automatically transfer the reload to the instrument.
At the end of the operation the Transponder tube is empty and cannot be used again.

TRASPONDER
Ref. 10290 10.000 tests
Ref. 10291 5.000 tests
Ref. 10292 1.000 tests

Figure 5 – Manley’s Normogram

Figure 6 - Trasponder
TECHNICAL SPECIFICATIONS

- Current Europe: 230Vac@50Hz; Usa/Canada: 110-120Vac@60Hz
- Absorbed electric power: 265VA
- Fuse block: 2 x 5.0 AT (Delayed) (5 x 20 mm) UL
- Dimensions: 650 x 570 x 690 mm (l x h x d)
- Weight: 60 Kg
- Room temperature: In operation from +15 to +35°C - Storage from +5°C to +45°C
- Allowable relative humidity: from 20% to 80% without condensation
- Central unit: Microprocessor Intel XScale PXA 255 32 MB; FLASH 64MB SDRAM
- Display: TFT 800x600 color with Touch Screen
- Control unit peripherals: Microprocessor card on owner bus
- Internal analytic section: 89 position chain for the appropriate test tube
- Optic group: Two couples of optic-electronic elements (Led & analogical sensor)
- Printer: Alphanumeric with thermal paper 58 mm wide, 36 characters per line, speed 20mm/sec.
- Interface: 2 x RS232C, 2 USB Host, 1 USB Client, 1 Slot Compact Flash
- Protection category: CLASS I
- Security of the device: EN61010-1
- EMC EN61326-1
- Installation category II

The Ves-Matic Cube 80 instrument is a bench-top analyzer and requires a dedicated work space due to its dimensions. No special electrical system requirements nor waterworks nor air conditioning are required.

The Ves-Matic Cube 80 is supplied with all the accessories and settings required for the optimal functionality.

No daily or programmed maintenance of the instrument is required to the operator.

Bibliography: