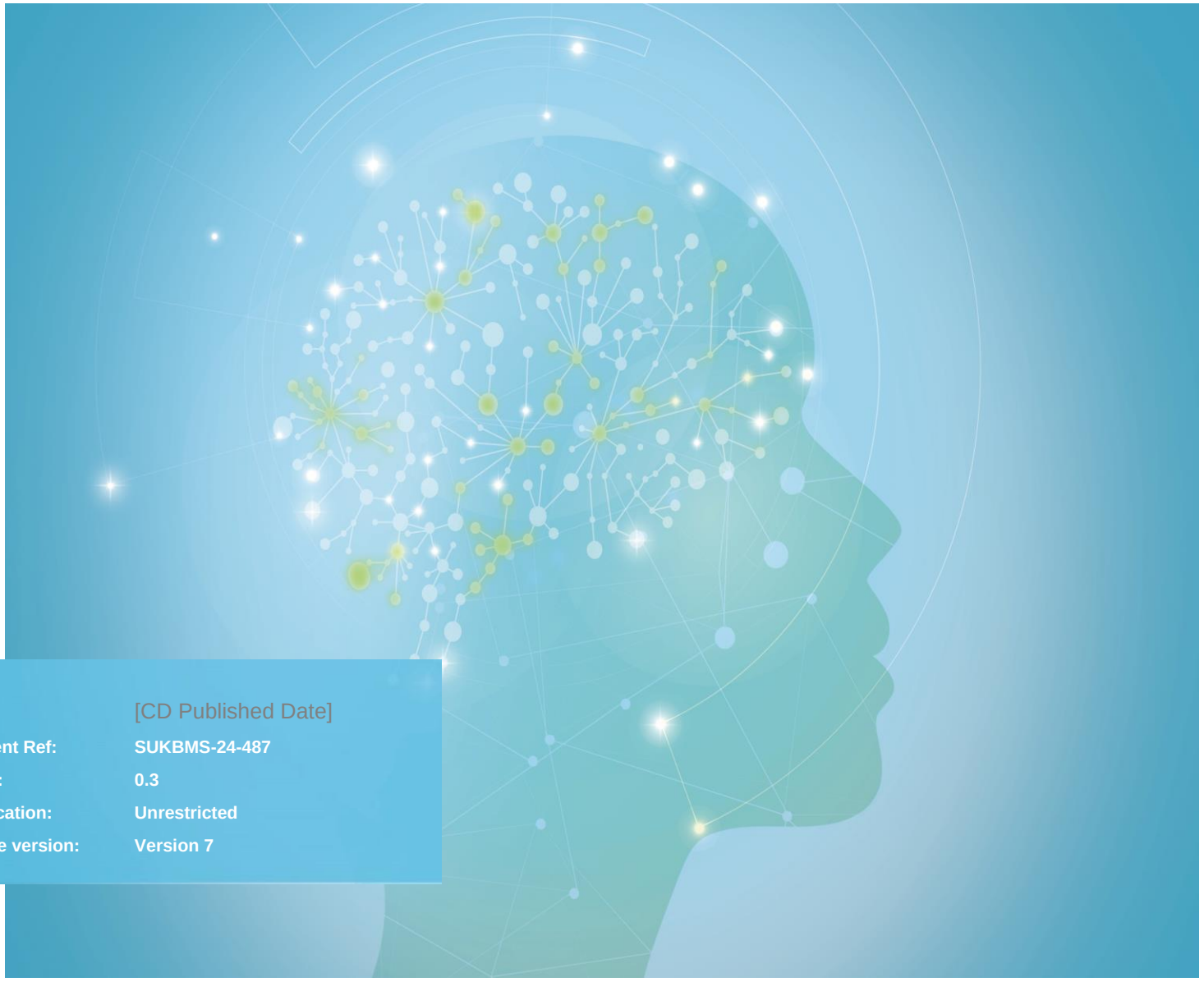
Theory Training Workbook

Digital Morphology (DI-60/DM-Series)



Date:	[CD Published Date]
Document Ref:	**SUKBMS-24-487**
Version:	**0.3**
Classification:	**Unrestricted**
Software version:	**Version 7**

Sysmex House, Garamonde Drive, Wymbush, Milton Keynes, MK8 8DF, United Kingdom · Phone +44 333 320 3460 · Fax +44 1908 267 901
academy.training@sysmex.co.uk · **www.sysmex.co.uk**

Contents

Disclaimer

Please note the information in this presentation, workbook or training session provided by Sysmex should not be used as an alternative to your sites Standard Operating Procedure (SOP)/Contract. If you have any particular questions regarding any site-specific use of reagents, consumables and/or equipment please contact your Management Team.

Revision History

Revised section	Alteration	Name	Date
New Document	New document to replace the following documents: - DM-96 Onsite Training Workbook - DM1200 Onsite Training Workbook - DI-60 Onsite Training Workbook	J Hammersley	September 2020

Reference Documents

Document title	Version	Date
CellaVision Review Software – Instructions for use 7.0	PM-10892-01	27 May 2019
CellaVision DM1200 – Instructions for Use Software 7.0	PM-10835-01	01 June 2018

Digital Morphology Analyser Overview

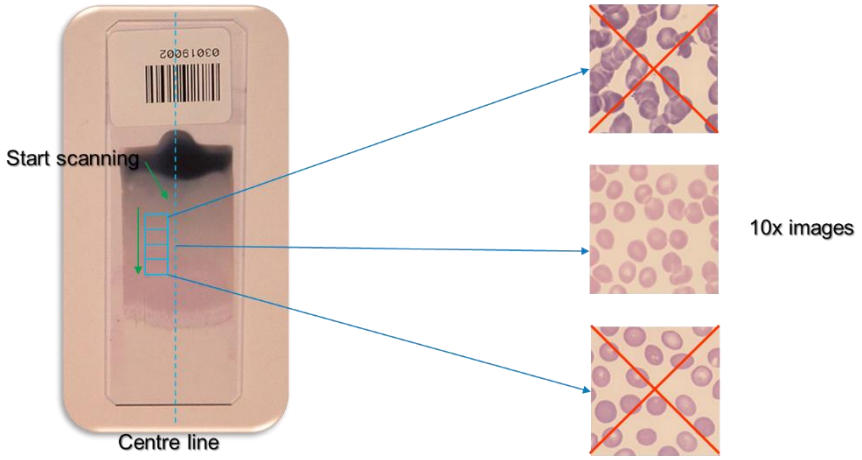
Digital morphology analysers are used for the precalssification/reclassification of cells in peripheral blood films and body fluid cytospin smears. DM-Series analysers are standalone analysers whereas the DI-60 can be standalone or connected to a Sysmex automated slide maker and stainer such as SP-10 or SP-50 using a CF-60 or CF-70 unit respectively, allowing full automation of smear workflow. Through the 'Remote Review Software' there is the ability for collaboration and remote viewing by users from other locations. Databases on the analyser allow permanent electronic images of the slides to be stored.

Facts and Figures			
Analysers	**DI-60**	**DM9600**	**DM1200**
Modes	Peripheral Blood Mode (PB) Body Fluid Mode (BF)		
Throughput - Peripheral Blood Application Processing Database	30 slides per hour (RBC/PLT/100-WBC)		20 slides per hour (RBC/PLT/100-WBC)
Slide storage capacity	CF-60 - 120 CF-70 - 50	96	12
Objectives	10x and 100x		
Intermediate optics	0.5x and 1.0x		
Magnifications	5x, 10x, 50x and 100x		
Quality control	Cell location (PB and BF mode) Smear checker (PB mode only)		
Databases	Processing database Export Database Scan Database		
Slide requirements	75.7 - 76.3 x 25.7 - 26.3 x 0.9 - 1.2 Ground edge slides with frosted end Cut corners		
Optional Applications	Advanced RBC Application Body Fluid Application Veterinary Software		

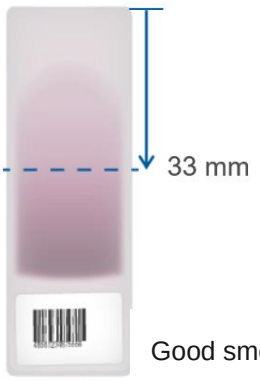
Principles of Analysis

Step 1: Determination of Analysis Area

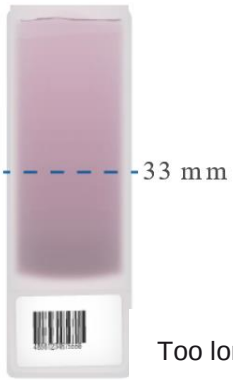
Slide analysis starts with the determination of the analysis area using the 10x magnification (10x objective and 1x intermediate optics). The 10x objective moves from a fixed start point, 33 mm from the non-frosted end of the slide, down the central line of the slide towards the tail end of the smear. The motorised microscope takes continuous images, analysing the number of RBC contours and the average size of the cell. Once set criteria have been fulfilled the analyser knows where to perform WBC analysis (WBC monolayer). The RBC/PLT analysis area has a predetermined start point set from within the WBC analysis area and is where at a later stage the RBC/PLT monolayer is created and RBC pre-characterisation is performed.



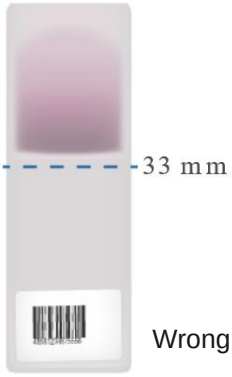
Because of the fixed start point 33 mm from the end of the slide the quality of slide analysed is critical. Slides that are too short, too long or have the wrong start point will cause total failure of analysis or incomplete analysis, respectively, due to insufficient monolayer. The quality of the slide produced can be examined using SmearChecker software.



Good smear



Too long

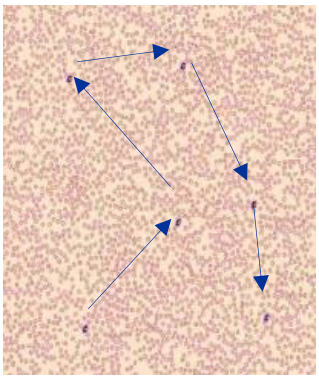


Wrong start point

Step 2: Locating Nucleated Cell Coordinates

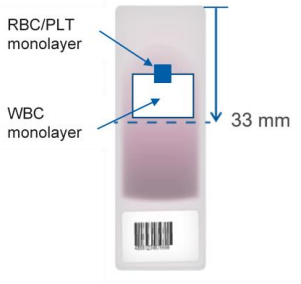
Following the identification of the WBC monolayer the coordinates of the nucleated cells are obtained at 10x magnification (10x objective and 1x intermediate optics).

Nucleated cells are located by battlement tracking using 10x objective in the pre-defined monolayer. The coordinates of 3 times as many nucleated cells than required are stored. For example, for a 100 cell WBC differential, 300 nucleated cells coordinates are located and stored.



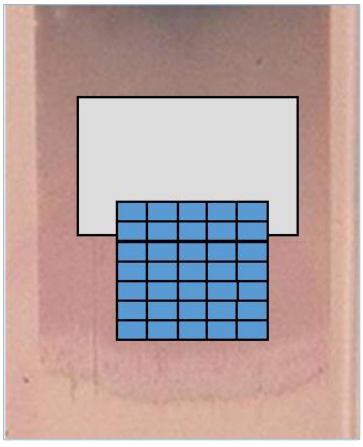
Step 3: Determination of RBC/PLT Monolayer

Following determination of the nucleated cells coordinates the RBC/PLT monolayer is created.



The RBC/PLT monolayer is created using 50x magnification (100x objective and 0.5x intermediate optics). The 100x objective moves using battlement tracking, towards the thinner part of the film, continuously taking images. The RBC/PLT monolayer is created by stitching together 35 images taken at 50x magnification giving an overview image of the entire area.

Step 4: Pre-classification of RBC

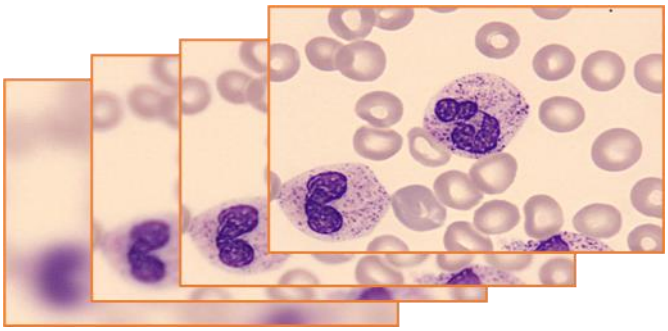


Cells within the RBC/PLT monolayer are evaluated for colour, size and shape. They are then classified into 6 RBC characteristics according to mathematical algorithms:

- Polychromasia
- Hypochromia
- Anisocytosis
- Microcytosis
- Macrocytosis
- Poikilocytosis

Step 5: WBC Image Capture

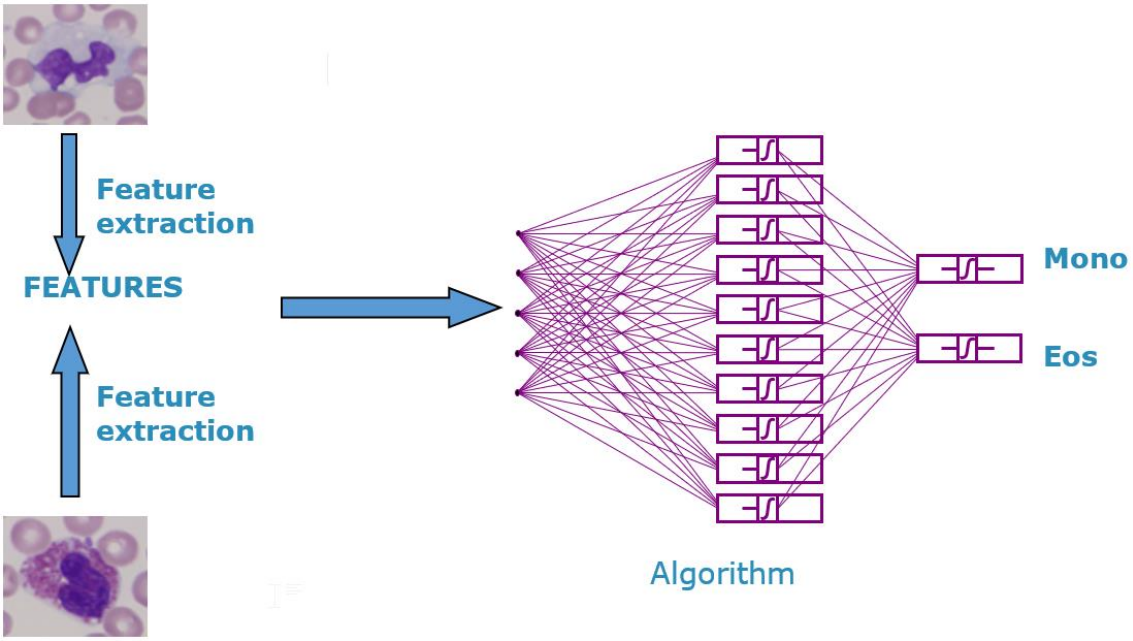
Following analysis of the RBC/PLT monolayer the analyser performs WBC image capture using a magnification of 100x (100x objective and 1x intermediate optics).



The digital microscope obtains the WBC images using 100x magnification by going back to the nucleated cell coordinates stored following identification of the WBC monolayer, during which continuous focus is used to maintain image quality. Once images are captured, they are automatically enhanced and compressed to bring out the maximum detail.

Step 6: WBC Pre-classification

As soon as individual WBC images are captured cell pre-classification is performed. Cell pre-classification is achieved using an Artificial Neural Network (ANN). Microscope images are transformed into electrical signals using the red, green, and blue light signals produced by the stain used. These signals are used to identify over more than 300 different features. The cytoplasmic and nuclear features for each cell are then processed through the ANN, where algorithms compare the features identified to the standard values determine for each cell type. Once the desired number cells have been pre-classified no further WBC images will be obtained and the smear results will be ready for review.



Contact Us

Mail

Training Academy
Sysmex UK Ltd
Garamonde Drive
Wymbush
Milton Keynes
MK8 8DF

Phone

Product Hotline For urgent application support	0333 320 3466 (UK)
Service Hotline For technical support and service team	0333 320 3467 (UK)
Reagent ordering	0333 320 3470 (UK)

Email

Product mail (non-urgent)	productmail@sysmex.co.uk
Training Academy (non-urgent)	academy.training@sysmex.co.uk
Jennifer Hammersley	hammersley.jennifer@sysmex.co.uk
Karl Elgerton	elgerton.karl@sysmex.co.uk
Natalie Bowen	bowen.natalie@sysmex.co.uk