XT-SERIES
Outstanding!
Yet again.
Fluorescence flow cytometry – the basis for advanced clinical utility

Success of excellence
Together with Sysmex’ haematology analysers of xe-series and xs-series, xt-2000i and xt-1800i constitute the x-class. Its success is based on many factors with the most striking being fluorescence flow cytometry (FFC). Of the three x-class analyser lines, xt-series is designed to fit labs looking for advanced analytical performance from a compact analyser with moderately high speed to tackle their workload. Both xt models offer a steady throughput of 80 samples/h.

Clinical utility with diagnostic impact
Modern extended parameters obtained through fluorescence flow cytometry allow improved diagnosing and patient monitoring. The capabilities of this innovative technology are still explored further today, as can be seen from continuous evaluations by users and development of further extended parameters based on these clinical results. Well-proven since several years, Sysmex combines the reticulocytes’ maturation stages including the immature reticulocyte fraction (IRF), the fluorescence-platelet count (PLT-fl) and the immature granulocyte count (IG) in one system. All this expertise is fully applicable to xt-2000i, and, with the exception of the RET channel, also to xt-1800i.

Fluorescence immature granulocytes
The immature granulocyte (IG) count becomes available on xt-series as a diagnostic and reportable parameter with the xt-ig master software. It allows detection and monitoring of immature granulocytes beyond pure flagging. Thus, it supports validation and assists in deciding when to review samples by microscopy. Moreover, studies evidently suggest that analysis of IG may also be useful in the timely detection and determination of sepsis.

Fluorescence reticulocytes (xt-2000i)
The immature reticulocyte fraction (IRF) provides clinical information on the erythropoietic status and assists in anaemia diagnosis. This quantitative erythropoiesis information is now completed by additional information on its quality via the RET-He parameter available with the optional xt-ret master software. Both aspects together provide highly valuable information for clinical decisions, e.g. related to cost-intensive EPO therapy.

High-fluorescence lymphocytes
xt-series also determines a WBC research parameter called ‘OTHER’, representing antibody-secreting lymphocytes, e.g. plasma cells. In reactive conditions these cells may point to recovery from infections. Due to their high fluorescence signal, these cells can be clearly distinguished from monocytes and lymphocytes and thus be identified separately.

Fluorescence-optical thrombocytes (xt-2000i)
The fluorescence-optical platelet analysis allows accurate counting of platelets even in extreme thrombocytopenia. Thus, the PLT-fl count provides valuable support e.g. in blood transfusion therapy and helps to obtain accurate results in cases of giant platelets or blood cell fragments, both of which are known to often cause interference in impedance counting.
Save on space, time and sample volume

Health care budget constraints turn investment and follow-up costs into first-rate decision factors. From installation to result validation xt-series is built to meet these challenges.

**Truly compact**
Requirements for space, reagents and sample volume are minimised in xt-series making this true 5-part differential haematology analyser one of the most compact in its class. Sample-specific selective testing adapts the reagent consumption to actual analytical needs. Even if the system is operated offline and without bar code labelling of samples, then selective sample analysis is maintained by using the work list function. And all it takes is 85μL of whole blood to be aspirated in the manual mode.

**Low review rates**
Fluorescence flow cytometry technology results in optimum separation of normal and abnormal WBC sub-populations. Thus, smear preparation, staining and review of blood films can be kept to a minimum. This is particularly effective if the sensitivity of suspect flags is adapted to individual trigger criteria of each laboratory, which may be done through the adjustable Q-flag settings. Moreover, reviewing the Q-flag results of a sample provides a graded judgment of each IP message beyond the conventional flagging system of just ‘yes’ or ‘no’. For blood banks usually sensitive flagging is essential while e.g. for laboratories dealing exclusively with oncology samples requirements are different. In both cases the specificity of each suspect flag remains untouched.

The Q-flag screen of xt-series allows an assessment of the expressivity of the flag, related to the severity of a possibly underlying disease.

The impact of potential interferences caused by lyse-resistant RBC, lipids or leukocytosis are minimised for all parameters including haemoglobin because of the technology applied to the different channels of xt-series. Furthermore, extended linearity ranges enable the user to obtain results without manual dilution steps. All this, including the resulting low false-positive flagging rates, speed up the turn-around time and reduce operator involvement.

Cutting down on operational costs without compromising analytical performance? Deciding for an xt instrument will show that this is well possible.
Easy to use – easy to maintain

Truly reliable
Thousands of users worldwide confirm it every day: the xt-series analysers are ready to use when needed. High-quality components used in manufacturing ensure continuous, smooth operation even when analysing body fluids. The only daily preventive maintenance for the operator is to administer the cleaning reagent CELLCLEAN for the fully automated shutdown sequence at the end of the routine. On a periodical basis, no further maintenance sequences or replacements of parts are required.

Safe operation
The definition of different password levels allows user traceability and hence increases data and operation safety especially with a view to accreditation criteria. Respective log files store logon names and time, data modification or deletion, as well as reagent exchange.

Illustrative software icons for easy guidance
The display of graphical and numerical patient results is adaptable to the requirements of each individual laboratory. Software menus are clearly arranged, and illustrative icons guiding the user make the operation easy and intuitive. Especially troubleshooting becomes an easy matter by the dedicated help menu suggesting the applicable countermeasures. Simply by confirming the suggestion, the system will automatically perform its self-check without further interaction necessary by the user. Due to this, just a minimum operator training is required.

All our pursuit: high quality
An easy-to-use and reliable system requires much more than just excellent hardware. Innovative reagents, smart software, reliable internal and external quality control and minimum preventive maintenance are crucial factors to ensure the quality standard of the system and its results, gaining increasing topicality each day.

High-quality analysis results can only be obtained from comprehensive high-quality concepts. xt-series offers high quality in all aspects.

Positive identification of samples and QC material accepting various types of bar codes and a bi-directional communication with the laboratory or hospital information system (LIS/HIS) optimise sample and information flow and increase safety in data management.

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Advanced solutions with X-CLASS haematology analysers

The X-CLASS concept
Workloads and workflows differ from each hospital or laboratory to another, but the need for easy operation, reliable results and simplified logistics remains the same under all circumstances. With this in mind, the X-CLASS concept was developed, and all three system lines that constitute the X-CLASS (XE-, XT- and XS-series) are characterised by the
- same technology,
- same reagent system,
- same e-check (XE) quality control material,
- same flagging system including Q-flags,
- same user interface, menus and graphics,
- and the same results, as far as technical limitations (e.g. non-availability of a channel) permit.

XT-series is the partner of first choice in hospital labs and commercial laboratories alike, either as a stand-alone instrument, as a backup for an XE instrument or teamed up with an XS system serving as its backup. Under such conditions the X-CLASS concept ensures smooth operation and reduced training effort, especially for staff members who work frequently in different locations.

Combining internal and external QC in one go
Using SnCS (Sysmex Network Communication System) iQAS ONLINE, QC results are collected internationally via the Internet and are statistically processed. Within minutes, the individual analyser’s performance is compared with peer group results, as well as with reference instruments on an international basis. The combination of internal and external quality control in a single measurement is an essential improvement in quality assurance.

Interaction with the work area manager sis
Network capability via a standard protocol allows fast and easy communication. The data transfer between different locations via a central data base, where expert review or final validation are performed, is a further leap forward in efficiency.

XT-series can be connected to the Sysmex Information System (sis), a work area management system offering various configuration possibilities up to interlinking Sysmex analysers in different locations. Sis acts as a rule-based system for flexible, fast and standardised validation, triggering various added orders if necessary, or automatically validating also positive samples. As an example, flexible rules for smear preparation can be set to combine haematology parameters with patient demographics and clinical diagnoses, which results in a reduction of blood films requiring further investigation by microscopy.
Success of excellence
- built on the fluorescence flow cytometry platform of SYSMEX X-CLASS
- reliable systems requiring minimum maintenance (just one shutdown cycle/day)
- excellent WBC differential due to specific fluorochrome staining

Valuable information with diagnostic impact
- reticulocyte enumeration including maturation indices for efficient monitoring of the erythropoietic activity (xt-2000i)
- fluorescence-optical platelet count, e.g. for cases with small RBC or large PLT (xt-2000i)
- cumulative patient data and Delta Check function

Easy to use
- Windows® user interface
- Q-flags for quantitative flagging to adapt the diagnostic sensitivity to laboratory needs
- comprehensive software programs for internal and external QC

Economical integration
- four random access selective test profiles for xt-2000i and two for xt-1800i
- real-time bidirectional Host communication
- SNCS (SYSMEX Network Communication System) for efficient user support

Flexibility
- XT-MASTER software modules for advanced analytics
- TCM permits to connect two XT-2000i or two XT-1800i main units to a single IPU
- a variety of optional components for flexible adaptation

Design and specifications may be subject to change due to further product development.

Technologies
- fluorescence flow cytometry: WBC DIFF, IG, RET (xt-2000i), PLT-fl (xt-2000i)
- DC sheath flow method: RBC, HCT, PLT cyanide-free SLS method: HGB

Parameters
- WBC, RBC, HGB, HCT, MCV, MCH, MCHC, PLT
- NEUT (%), LYMPH (%), MONO (%), EO (%), BASO (%), IG (%)
- RDW-SD, RDW-CV, MPV, P-LCR, PDW, PCT
- RET (%), LFR, MFR, HFR, IRF, PLT-fl (xt-2000i)
- research parameters: OTHER (%)

Linearities
- WBC: 0 – 440.0 x 10^9/L
- RBC: 0 – 8.00 x 10^12/L
- HGB: 0 – 25.0 g/dL (15.5 mmol/L)
- HCT: 0 – 60.0 % (0.6 L/L)
- PLT: 0 – 5000 x 10^9/L
- RET: 0 – 23.0 % and 0 – 0.72 x 10^12/L (xt-2000i)

Throughput
- stand-alone: 80 samples/hour
- twin: 160 samples/hour

Aspiration volume
- 150 µL for sampler/manual closed mode
- 85 µL for manual open mode
- 40 µL sample volume for capillary mode

Data storage
- 10,000 samples (incl. graphics)
- 5,000 patients’ information
- 1,000 selective test orders

Quality control
- 20 QC files, 1 XbarM file (300 data points)
- optional: daily external QC IQAS ONLINE

Interfaces
- Host (Ethernet or serial)
- graphic printer (parallel or USB)

Standard modules
- XT-PRO, XT-IG MASTER

Options
- rack sampler, bar code reader, manual cap piercer, hand-held bar code reader, XT-RET MASTER (xt-2000i)
- XT-TWIN (tcm*)

Dimensions/weights
- 530x630x720/59 (main unit with sampler)
- 280x400x355/17 (pneumatic unit)
- 305x85x345/8 (IPU: information-processing unit)

* tcm = TWIN CONFIGURATION MANAGER