



# KAISER PERMANENTE®

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# Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

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## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

**Purpose** This procedure outlines the steps for performing a body fluid cell count using the SYSMEX XN hematology analyzer and Data Innovation (DI) Instrument Manager middleware.

**Scope** This procedure is intended for use by Clinical Laboratory Scientists (CLS) who will utilize the SYSMEX XN analyzer to perform automated body fluid cell counts, as well as other laboratory personnel who may need to review the assay as part of quality management.

**Principle** Fluorescent flow cytometry, utilizing side-scattered light and side-fluorescent light, is employed to determine white blood cell (WBC) counts. The direct current detection method is used for counting red blood cells (RBCs).

**Specimen sources**

The XN-analyzers are cleared for analysis of the following body fluids.

Fluid Type	Anticoagulant	Test Order
1. Cerebrospinal Fluid (CSF)	Not required nor recommended	CC CSF GL
2. Serous Fluids (Peritoneal and Pleural)	Collected in EDTA-K <sub>2</sub>	Peritoneal: CC PERT GL Pleural: CC PLF GL
3. Synovial/Joint Fluid	Collected in EDTA-K <sub>2</sub> anticoagulant with added hyaluronidase (a dab on an applicator stick) breaks up the mucus	CC SF GL

**Note: Pericardial fluid, bronchoalveolar lavage, and amniotic fluid are not approved for analysis on the XN-series analyzers.**

Required sample volume: 1.0 mL or more.

Minimum sample volume:

- Open tube: 300 µL
- Open microtainer tube: 160 µL

Aspirated sample volume: approximately 88 µL.

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## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

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<b>Specimen Stability</b>	Body fluid specimens should be analyzed as soon as possible. The longer the delay, the more likely the elements are to lyse and deteriorate.
<b>Equipment</b>	Sysmex <sup>®</sup> XN <sup>™</sup> Analyzer
<b>Reagents</b>	Sysmex XN Reagents Sysmex <sup>®</sup> DCL CELLPACK Sysmex <sup>®</sup> DST CELLPACK
<b>Materials and supplies</b>	The following list contains the materials and supplies required.  12x75 mm Tubes Microtainers Calibrated MLA Pipettes for dilutions Hyaluronidase lyophilized powder, 400-1000unit/mg, 100 mg pack
<b>Safety Precautions</b>	Refer to the safety manual for general safety requirements.
<b>Quality Control</b>	XN CHECK BF – Automated Body Fluid Controls  <ul style="list-style-type: none"><li>• XN CHECK BF control levels: <b>All levels</b> will be run at least once daily on each XN instrument in the Manual BF mode.</li><li>• Results must be recorded and reviewed for acceptability before testing patient specimens.</li><li>• Follow local facility protocols if any.</li></ul>
<b>Before you begin</b>	<ul style="list-style-type: none"><li>• Inspect specimens for clots, ensuring specimens are properly mixed.</li><li>• Results may be compromised by improper mixing, cellular debris, or clotted specimens.</li><li>• Clotted and highly viscous specimens must not be run automatically due to the mucous material that could clog up the instrument, causing erroneous or misleading results.</li></ul>

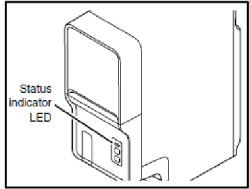
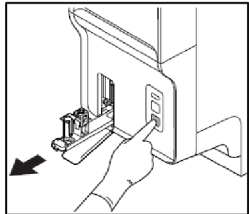
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## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

### Procedure – Analysis Preparation

Follow the steps below to prepare the analyzer for analysis of body fluid specimens.

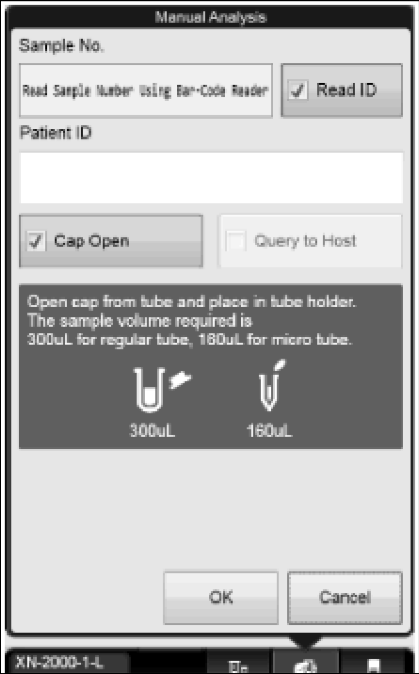
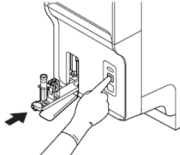
Step	Action						
1	Check the status of the analyzer. Check the Status indicator LED on the analyzer to confirm that the analyzer is in the <b>READY</b> state. 						
2	Press the mode switch to eject the tube holder. 						
3	Select the Change Analysis Mode button on the control menu.						
4	Select analysis mode [ <b>BODY FLUID</b> ], then select [ <b>OK</b> ]						
5	The analyzer automatically performs a Background Check on the diluent fluid and lysing agent to detect contamination that may affect the cell counts. <b>Note:</b> <ul style="list-style-type: none"> <li>The analyzer will automatically perform a background check up to three times (3X) to achieve an acceptable background check value.</li> </ul>						
6	Ensure <b>the Background Check passes, then proceed to the sample or QC analysis.</b> Acceptable Background Limits are as follows: <table border="1" data-bbox="560 1474 1414 1604"> <thead> <tr> <th>Checked Parameter</th> <th>Acceptable Value</th> </tr> </thead> <tbody> <tr> <td>WBC-BF</td> <td>0.001 x 10<sup>3</sup> / μL or less</td> </tr> <tr> <td>RBC-BF</td> <td>0.003 x 10<sup>6</sup> / μL or less</td> </tr> </tbody> </table>	Checked Parameter	Acceptable Value	WBC-BF	0.001 x 10 <sup>3</sup> / μL or less	RBC-BF	0.003 x 10 <sup>6</sup> / μL or less
Checked Parameter	Acceptable Value						
WBC-BF	0.001 x 10 <sup>3</sup> / μL or less						
RBC-BF	0.003 x 10 <sup>6</sup> / μL or less						

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## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

### Procedure – Body Fluid Specimen Analysis

Follow the steps below to perform a cell count using the Sysmex XN analyzer.

Step	Action
1	Place a well-mixed patient body fluid in a vial with the correct sample barcode for analysis in the sample tube holder. <b>Note:</b> Two sample tube holders are available. When performing a test on a micro collection tube, insert the tube so that the bottom of the tube is in contact with the bottom of the holder.
2	Click the <b>[Manual Analysis]</b> button in the analyzer area.
3	Enter the Sample ID in the Patient ID field or select <b>[READ ID]</b> to scan the barcode.
	
4	If the sample tube is uncapped, check the <b>[CAP OPEN]</b> box. If the sample tube is capped, ensure the <b>[CAP OPEN]</b> box is unchecked.
5	Click <b>[OK]</b> and press the start switch (Blue Button). <b>Perform AUTORINSE between sample runs.</b>
	
6	The analyzer's results will automatically crossover to the DI Instrument Manager Workspace, including the TCBF, RBCBF, WBCBF, and the two-part differential. Verify that the body fluid result is acceptable and there are no flags present, such as "W", etc.

*Continued on next page*

## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

1: 7/23/2025 12:09:40 PM									
RBCBF Linearity: Perform slide review or cytospin, Body Fluid									
Test Name /	Test Cod...	Test Sta...	Result...	Flag (1)	Err...	Test Instru...	Test C...	Read B...	Read ...
- FLUID									
Fluid RBC	RBCBF	Held for...	2000	H		GXN903			<input type="checkbox"/>
Fluid WBC	WBCBF	Held for...	135			GXN903			<input type="checkbox"/>
Total Count Bo...	TCBF	Held for...	137	H		GXN903			<input type="checkbox"/>
- FLUID AUTO DIFF									
Mono Nuc %	MNREF	Released	97.0			GXN903			<input type="checkbox"/>
Mono Nuc Abs	MNABF	Released	0.131			GXN903			<input type="checkbox"/>
Poly Nuc Abs	PMNABF	Released	0.004			GXN903			<input type="checkbox"/>
Poly Nuc %	PMNREF	Released	3.0			GXN903			<input type="checkbox"/>
- INSTRUCTIONS									
RUN COMME...	RUN CO...	Rejected	PRESENT						<input type="checkbox"/>
SMEAR	SMEAR	Rejected							<input type="checkbox"/>
- IMAGE									
Red Blood Co...	RBC Image	Rejected	2025-07...			GXN903			<input type="checkbox"/>
WDF Image	WDF Im...	Rejected	2025-07...			GXN903			<input type="checkbox"/>
WDF_FSC Image	WDF FS...	Rejected	2025-07...			GXN903			<input type="checkbox"/>

- If the linearity flag “@” is present on the XN printout, perform an offline dilution and rerun the sample.
- The dilution factor is applied in the DI Instrument Manager under run #2 if the sample was programmed appropriately on the XN to include the dilution factor.

### DI Instrument Manager Reporting

Step	Action												
<b>Automated Cell Count</b>													
1	Select the specimen accession from the specimen worksheet pane. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Specimen ID /</th> <th>Patient Name</th> <th>Specimen Co...</th> </tr> </thead> <tbody> <tr> <td colspan="3">7/23/2025</td> </tr> <tr> <td colspan="3">- (none)</td> </tr> <tr style="border: 2px solid red;"> <td>225204049587A</td> <td>OCI,TEST NEW</td> <td>Tests Held</td> </tr> </tbody> </table> </div>	Specimen ID /	Patient Name	Specimen Co...	7/23/2025			- (none)			225204049587A	OCI,TEST NEW	Tests Held
Specimen ID /	Patient Name	Specimen Co...											
7/23/2025													
- (none)													
225204049587A	OCI,TEST NEW	Tests Held											

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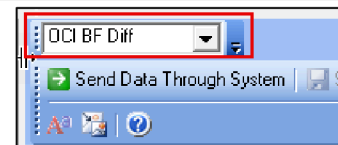
## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

2 The Run Worksheet screen displays the results from the Sysmex XN analyzer, including TCBF, WBCBF, RBCBF, and the two-part differential.

Test Name /	Test Cod...	Test Sta...	Result...	Flag (1)	Err...	Test Instru...	Test C...	Read B...	Read ...
1: 7/23/2025 12:09:40 PM RBCBF Linearity: Perform slide review or cytospin, Body Fluid									
- FLUID									
Fluid RBC	RBCBF	Held for...	2000	H		GXN903			<input type="checkbox"/>
Fluid WBC	WBCBF	Held for...	135			GXN903			<input type="checkbox"/>
Total Count Bo...	TCBF	Held for...	137	H		GXN903			<input type="checkbox"/>
- FLUID AUTO DIFF									
Mono Nuc %	MNREF	Released	97.0			GXN903			<input type="checkbox"/>
Mono Nuc Abs	MNABF	Released	0.131			GXN903			<input type="checkbox"/>
Poly Nuc Abs	PMNABF	Released	0.004			GXN903			<input type="checkbox"/>
Poly Nuc %	PMNREF	Released	3.0			GXN903			<input type="checkbox"/>
- INSTRUCTIONS									
RUN COMME...	RUN CO...	Rejected	PRESENT						<input type="checkbox"/>
SMEAR	SMEAR	Rejected							<input type="checkbox"/>
- IMAGE									
Red Blood Co...	RBC Image	Rejected	2025_07...			GXN903			<input type="checkbox"/>
WDF Image	WDF Im...	Rejected	2025_07...			GXN903			<input type="checkbox"/>
WDF_FSC Image	WDF_FS...	Rejected	2025_07...			GXN903			<input type="checkbox"/>

**Note: The two-part Fluid Auto Diff from the analyzer will always be automatically released in the Instrument Manager. The user can use these values as a guide and should always perform a manual differential.**

4 Perform the differential by selecting the “xxx BF Diff” module on the cell counter.



5 Click back on the run worksheet, then select the result of either the TCBF, RBCBF, or WBCBF. Right-click on the result and select the “Verify Run by Cell Counter” option or button on the menu bar to reopen the cell counter.

## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

	Test Name /	Test Cod...	Test Sta...	Result...	Flag (1)	Err...	Test Instru...	Test C...	Read B...	Read ...
	- FLUID									
	Fluid RBC	RBCBF	Held for...	2000	H		GXN003			<input type="checkbox"/>
	Fluid WBC	WBCBF	Held for...	135						<input type="checkbox"/>
	Total Count Bo...	TCBF	Held for...	135						<input type="checkbox"/>
	- FLUID AUTO DIFF									
	Mono Nuc %	MNREF	Released	97.0						<input type="checkbox"/>
	Mono Nuc Abs	MNABF	Released	0.1						<input type="checkbox"/>
	Poly Nuc Abs	PMNABF	Released	0.0						<input type="checkbox"/>
	Poly Nuc %	PMNREF	Released	3.0						<input type="checkbox"/>
	- INSTRUCTIONS									
	RUN COMME...	RUN CO...	Rejected	ERR						<input type="checkbox"/>
	SMEAR	SMEAR	Rejected							<input type="checkbox"/>
	- IMAGE									
	Red Blood Co...	RBC Image	Rejected	202						<input type="checkbox"/>
	WDF Image	WDF im...	Rejected	202						<input type="checkbox"/>
	WDF_FSC Image	WDF_FS...	Rejected	202						<input type="checkbox"/>
6	Perform a white blood cell differential and gross examination of the body fluid by either choosing from the drop-down or typing in the numerical values for the following parameters:									

## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

Cell Counter

OCI BF Diff 2

➔ Send Data Through System | 📁 Save Run Data to SM | ✖ Clear All Data | Enable Cell Counter Keys

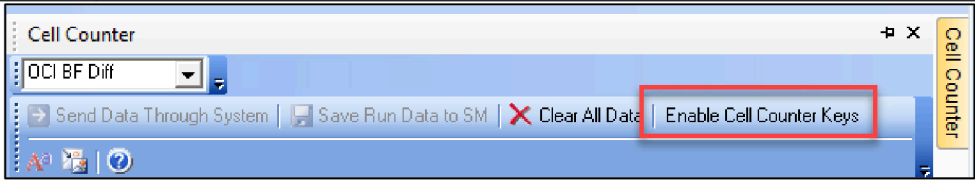
Specimen Information

Specimen ID	<input type="text" value="225204049587A"/>		
Instrument ID	<input type="text" value="OCI BF Diff 2"/>	Total Number of Cells to be Counted	<input type="text" value="100"/>
Operator ID	<input type="text" value="A689082"/>	Number of Cells Counted	<input type="text" value="0"/>
Comments	<input type="text"/>	Error Key	<input type="text"/>

	Test Code	Result	%	Absolute	Units	Test Comment(s)	Shortcut Key
*							
▶	<b>BODY FLUID</b>						
	BFVOL						
	XANTHR						
	COLRBF						
	APPBF						
	RBCBF						
	WBCBF						
	TCBF						
	TNCBFM						
	FNEUT	0	0.0%	0.00			Num +
	FLYMP	0	0.0%	0.00			Num 6
	FMONO	0	0.0%	0.00			Num 5
	FESIS	0	0.0%	0.00			Num 7
	FBASO	0	0.0%	0.00			Num 8
	FMESO	0	0.0%	0.00			Num 4
	FOTHER	0	0.0%	0.00			Num 1
[-]	<b>COMMENT</b>						
	SOURCE						
	COMNT						
[-]	<b>HEMACYTOMETER</b>						
	TCSQSZ						
	TNCSD1						
	TNCSD2						
	TCDIL						
	TCSQ						
	Red Cell Confirm						
	PLATELET						

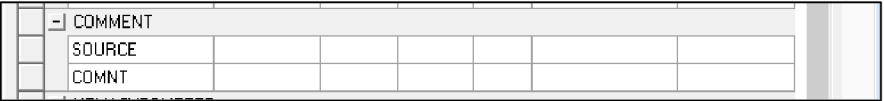
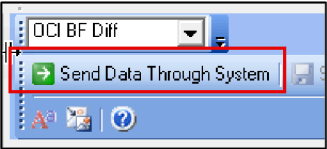
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## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

Test Code	Interpretation										
<b>BFVOL</b>	<b>BODY FLUID TOTAL VOLUME</b> Manually enter the BF total volume, if applicable										
<b>XANTHR</b>	<b>XANTHOCHROMIA (If indicated)</b> Manually enter the Xanthochromia response by choosing from the dropdown options. <ul style="list-style-type: none"> <li>➤ YES (#Y)</li> <li>➤ NO (#N)</li> </ul>										
<b>COLBF</b>	<b>BODY FLUID COLOR</b> Manually enter the BF color by choosing from the dropdown options. <ul style="list-style-type: none"> <li>➤ COLORLESS (#CLES)</li> <li>➤ YELLOW (#YEL)</li> <li>➤ PINK (#PNK)</li> <li>➤ RED (#RED)</li> </ul>										
<b>TCBF</b>	<b>TOTAL NUCLEATED BODY FLUID</b> Total Nucleated Count result from automated BF analysis										
<b>RBCBF</b>	<b>RED BLOOD CELL BODY FLUID</b> Total RBC Count result from automated BF analysis										
<b>WBCBF</b>	<b>WHITE BLOOD CELL BODY FLUID</b>										
	Click the “ <b>Enable Cell Counter Keys</b> ” to use the number keys to perform the Cell differential or input the value for each cell type directly into the result field that corresponds to each cell.										
											
9	<p>Using the counter keys, counting will automatically stop at 100 cell count.</p> <table border="1"> <thead> <tr> <th>TEST</th> <th>COUNTER KEY</th> </tr> </thead> <tbody> <tr> <td>FNEUT</td> <td>+</td> </tr> <tr> <td>FLYMPH</td> <td>6</td> </tr> <tr> <td>FMONO</td> <td>5</td> </tr> <tr> <td>FMESO</td> <td>4</td> </tr> </tbody> </table>	TEST	COUNTER KEY	FNEUT	+	FLYMPH	6	FMONO	5	FMESO	4
TEST	COUNTER KEY										
FNEUT	+										
FLYMPH	6										
FMONO	5										
FMESO	4										

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## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

		FEOSI	7	
		FBASO	8	
		FOTHER	1	
10	If necessary, add the specimen source and pertinent comments on the test comment field.			
				
11	<p>Click on the “Send Data Through System” button to send the completed result from the cell counter to the run worksheet.</p>  <p>WBCBF is calculated by DI, using the following equation:</p> $\text{WBC Cnt Auto} = \text{TNC Auto} - [\text{TNC Auto} \times (\text{Meso} + \text{Other Nucleated Cells})/100]$ <p>If values from the manual count were entered:</p> $\text{WBC Cnt Man} = \text{TNC Manual} - [\text{TNC Manual} \times (\text{Meso} + \text{Other Nucleated Cells})/100]$			
12	Accept all the results by selecting the accession from the Specimen Worksheet and clicking on the “Release” button. Select the [YES] button on the pop-up window to confirm releasing all tests for the selected specimen with a test status of “Held for Verification.”			

### **Perform the Cell Count manually whenever:**

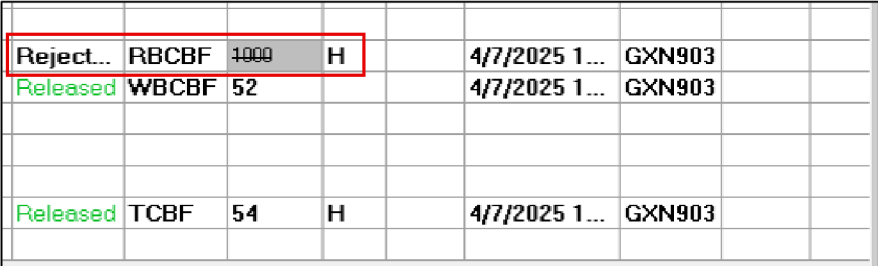
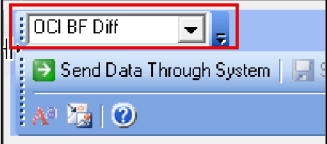
TC-BF result of  $\leq 0.003 \times 10^3 \mu\text{L}$  ( $\leq 3 \mu\text{L}$ ), AND/OR  
 RBC-BF result of  $< 0.002 \times 10^6 \mu\text{L}$  ( $< 2000 \mu\text{L}$ )

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## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

**DI Instrument  
 Manager  
 Middleware  
 Reporting-  
 Manual Cell  
 Count  
 Hemacytometer**

**Performing a Manual Cell Count (Hemacytometer)**

Step	Action																		
1	Select the specimen accession from the specimen worksheet pane.																		
2	The Run Worksheet screen displays the results from the Sysmex XN analyzer, including TCBF, WBCBF, RBCBF, and the two-part differential.																		
3	Perform a hemacytometer count (manual cell count) if the value falls outside the analyzer's linearity limits, or if some flags cannot be resolved.																		
4	Reject the parameter that failed the linearity limits or unresolved flagging by selecting the result and right-clicking to select the "Reject" option.																		
 <table border="1"> <tr> <td>Reject...</td> <td>RBCBF</td> <td>1000</td> <td>H</td> <td>4/7/2025 1...</td> <td>GXN903</td> </tr> <tr> <td>Released</td> <td>WBCBF</td> <td>52</td> <td></td> <td>4/7/2025 1...</td> <td>GXN903</td> </tr> <tr> <td>Released</td> <td>TCBF</td> <td>54</td> <td>H</td> <td>4/7/2025 1...</td> <td>GXN903</td> </tr> </table>		Reject...	RBCBF	1000	H	4/7/2025 1...	GXN903	Released	WBCBF	52		4/7/2025 1...	GXN903	Released	TCBF	54	H	4/7/2025 1...	GXN903
Reject...	RBCBF	1000	H	4/7/2025 1...	GXN903														
Released	WBCBF	52		4/7/2025 1...	GXN903														
Released	TCBF	54	H	4/7/2025 1...	GXN903														
5	Perform the differential by selecting the "xxx BF Diff" module on the cell counter. 																		
6	Click back on the run worksheet, then select the result of either the TCBF, RBCBF, or WBCBF. Right-click on the result and select the "Verify Run by Cell Counter" option to reopen the cell counter.																		
7	Perform a white blood cell differential and gross examination of the body fluid by either choosing from the drop-down or typing in the numerical values for the following parameters:																		
8	If necessary, add the specimen source and pertinent comments to the test comment field.																		
9	Perform the hemacytometer count and manually enter the hemacytometer result in the following field.																		

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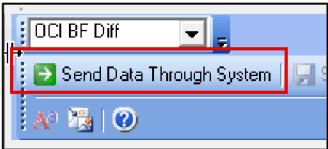
## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

-	HEMACYTOMETER						
	TCSQSZ						
	TNCSD1						
	TNCSD2						
	TCDIL						
	TCSQ						
	Red Cell Confirm						
	RBCSQSZ						
	RBCSD1						
	RBCSD2						
	RBCDIL						
	RBCSQ						

Test Code	Interpretation
<b>TCSQSZ/ RBCSQSZ</b>	<p><b>TOTAL NUCLEATED / RED BLOOD HEMOCYTOMETER CHAMBER SQUARES COUNTED</b></p> <p>Select which square is counted on the hemacytometer</p> <ul style="list-style-type: none"> <li>➤ Large</li> <li>➤ Small</li> </ul>
<b>TNCSD1/ RBCSD1</b>	<p><b>RAW COUNT ON ONE CHAMBER OF THE HEMOCYTOMETER</b></p> <p>Manually enter the TNC or RBC raw count of one chamber of the hemacytometer.</p>
<b>TNCSD2/ RBCSD2</b>	<p><b>RAW COUNT ON THE OTHER CHAMBER OF THE HEMOCYTOMETER</b></p> <p>Manually enter the TNC or RBC raw count of the other chamber of the hemacytometer.</p> <p><b>NOTE:</b></p> <p>CLS must verify that the counts from each chamber agree within 10%; if not, the count must be repeated. Multiply the 10% by the larger count value obtained.</p> <p>The difference between the two chamber counts must be less than the product obtained.</p>

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## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

Test Code	Interpretation
<b>TNCAVE/ RBCAVE</b>	<b>AVERAGE COUNT OF THE TWO CHAMBERS OF THE HEMOCYTOMETER</b>  Calculated TNC/RBC average for both raw counts.  <b>The DI Instrument Manager will automatically calculate after CLS enters responses on the:</b> <ul style="list-style-type: none"> <li>- TNCSD1 &amp; TNCSD2 for TNCAVE.</li> <li>- RBCSD1 &amp; RBCSD2 for RBCAVE.</li> </ul>
<b>TNCDIL/ RBCDIL</b>	<b>DILUTION FACTOR</b>  Manually enter the dilution factor.  Enter one (1) if no dilution was performed.
<b>TNCSQ/ RBCSQ</b>	<b>NUMBER OF SQUARES COUNTED IN EACH CHAMBER OF THE HEMOCYTOMETER</b>  Manually enter the number of squares counted.
<b>TCBFM/ RBCBFM</b>	<b>TOTAL NUCLEATED / RED BLOOD CELL MANUAL COUNT</b>  Calculated field for TNC/RBC.  <b>The DI Instrument Manager will automatically calculate after CLS enters responses on the following:</b> <ul style="list-style-type: none"> <li>- TNCCALC, TNCSD1, TNCSD2 and TNCDIL for TNCBFM.</li> <li>- RBCCALC, RBCSD1, RBCSD2 and RBCDIL for RBCBFM.</li> </ul> DI Instrument Manager Calculation Formula:  A. If large squares were counted: $(RBCAVE * RBCDIL) / (RBCSQ * 0.1)$ for large squares; replace for TNC as applicable.  B. If small squares were counted: $(RBCAVE * RBCDIL) * 10 / (RBCSQ * 0.04)$ for small squares; replace TNC as applicable.
7	Click on the "Send Data Through System" button to send the completed result from the cell counter to the run worksheet. 

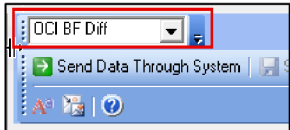
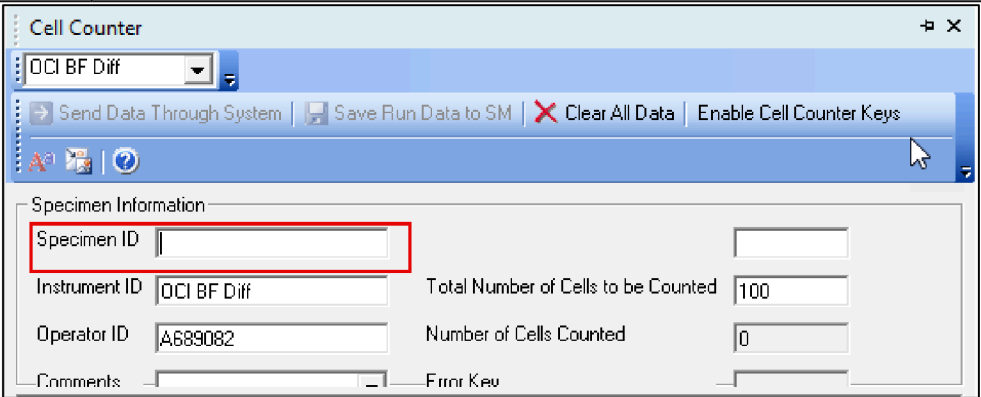
Continued on next page

## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

8	Accept all the results by selecting the accession from the Specimen Worksheet and clicking on the "Release" button. Select the [YES] button on the pop-up window to confirm releasing all tests for the selected specimen that has a test status of 'Held for Verification.'
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### DI Instrument Manager Middleware Reporting-Manual Cell Count (w/o Automated Count)

#### Reporting a Manual Cell Count (without Automated Count)

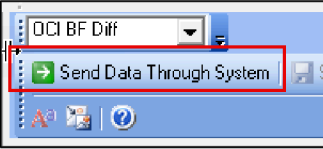
Step	Action
1	Perform a hemacytometer count (manual cell count).
2	Perform the differential by selecting the "xxx BF Diff" module on the cell counter. 
3	Manually input the specimen accession directly into the Specimen ID field of the Cell Counter.  <b>NOTE:</b> The specimen accession will not be displayed on the specimen worksheet pane since the sample did not run on the XN analyzer.
	
6	Perform a white blood cell differential and gross examination of the body fluid by either choosing from the drop-down or typing in the numerical values for the following parameters:
7	If necessary, add the specimen source and pertinent comments on the test comment field.
8	Complete the hemacytometer portion of the cell counter.

*Continued on next page*

## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

- HEMACYTOMETER			
	TCSQSZ		
	TNCSD1		
	TNCSD2		
	TCDIL		
	TCSQ		
	Red Cell Confirm		
	RBCSQSZ		
	RBCSD1		
	RBCSD2		
	RBCDIL		
	RBCSQ		

7 Click on the "Send Data Through System" button to send the completed result from the cell counter to the run worksheet. This will create the accession on the Specimen Worksheet.



Specimen Worksheet

Specimen ID ^	Patient Name	Specimen Co...
- 7/23/2025		
- (none)		
▶ 225204049587A	OCI,TEST NEW	Tests Held

Continued on next page

## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

8	Accept all the results by selecting the accession from the Specimen Worksheet and clicking on the "Release" button. Select the [YES] button on the pop-up window to confirm releasing all tests for the selected specimen with a test status of 'Held for Verification.'
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### Instrument Range

- Display range is the range over which the analyzer will report, display, print, and transmit results.
- Body fluids may be diluted offline using CELLPACK DCL.

Parameter	Reportable Range	Display Range	Units
WBC-BF	0.003 to 10.000	0.000 to 999.999	x 10 <sup>3</sup> /μL
RBC-BF	0.002 to 5.000	0.000 to 999.999	x 10 <sup>6</sup> /μL
TC-BF#	0.003 to 10.000	0.000 to 999.999	x 10 <sup>3</sup> /μL

### Reference Range

- CSF

Color	Colorless
Appearance	Clear
TNC Count	0-5 cells/mm <sup>3</sup>
WBC Count	0-5 cells/mm <sup>3</sup>
RBC Count	0 cells/mm <sup>3</sup>

- Synovial Fluid

TNC Count	0-9 cells/mm <sup>3</sup>
WBC Count	200 cells/mm <sup>3</sup>
RBC Count	2000 cells/mm <sup>3</sup>

- Pleural Fluid

Appearance	Clear
TNC Count	0-9 cells/mm <sup>3</sup>
WBC Count	0-9 cells/mm <sup>3</sup>
RBC Count	2000 cells/mm <sup>3</sup>

- Other Body Fluid

Appearance	Clear
TNC Count	0-9 cells/mm <sup>3</sup>
WBC Count	0-9 cells/mm <sup>3</sup>
RBC Count	500 cells/mm <sup>3</sup>

*Continued on next page*

## Body Fluid Cell Count Using Sysmex XN and DI Instrument Manager Middleware

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**Calculations**      The Data Innovation Instrument Manager performs the following Calculations

**Body Fluid Calculation**

TNCBFM - (TNCBFM x (FMESO + FOTHER)/100)

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**Non-Controlled Document/s**      The following non-controlled document/s support this policy.

    Sysmex XN-9000 Instructions for Use (North American Edition), Sysmex Corporation, Kobe, Japan.

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**Author(s)**              SCPMG Hematology Working Group

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*Regional Parent Document Reference Number: SCPMG-PPP-0452 Rev: 03*

## Signature Manifest

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**Revision:** 03

**Title:** Body Fluid Cell Count Using Sysmex XN and Data Innovation (DI) Instrument Manager Middleware

**Effective Date:** 05 Jan 2026

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All dates and times are in Pacific Standard Time.

### Hematology Regional Docs

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#### Operations Director Approval

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Name/Signature	Title	Date	Meaning/Reason
Annaleah Raymond (Q741709)	Laboratory Operations Director	30 Dec 2025, 04:54:11 PM	Approved

#### Medical Director Approval

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Name/Signature	Title	Date	Meaning/Reason
Mark Taira (P161328)	CLIA Director	05 Jan 2026, 07:42:26 AM	Approved