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Add Consistency to Your Results

N Latex FLC kappa and N Latex FLC lambda Assays

Answers for life.

Monoclonal Disorders— a Wide Spectrum of Diseases

Monoclonal diseases range from asymptomatic, premalignant monoclonal gammopathy of undetermined significance (MGUS) to life-threatening manifestations such as light chain AL amyloidosis or fast-progressing multiple myeloma requiring highly aggressive therapy.

In monoclonal diseases, an increase of either free light chain (FLC) kappa or FLC lambda might be observed, resulting in an abnormally low or high FLC kappa/lambda ratio.

Clinical Application of FLC Testing

FLC kappa and lambda measurements are used as an aid in the diagnosis, assessment, and monitoring of monoclonal diseases, including:

- Multiple myeloma
- Waldenström's macroglobulinemia
- AL amyloidosis
- Light chain deposition disease
- Lymphocytic neoplasm

Serum determination of FLC provides significantly improved sensitivity and specificity for the diagnosis of monoclonal gammopathies compared to determination of total light chains in serum or urine. Consequently, serum FLC testing is recommended in several national and international guidelines for diagnosis, assessment of prognosis, and therapy monitoring for monoclonal gammopathies.[1-3]

Another important advantage of serum FLC is that it eliminates the need for cumbersome, error-prone 24-hour urine collection.

Analytical Requirements for FLC Assays

FLC assays have rigorous requirements for analytical performance. Such assays must be:

Specific

FLC assays must be highly selective for the free form of light chains, using only those antibodies that are highly specific for free light chain kappa or lambda. Specificity is critically important to prevent misdiagnosis of malignant disorders in non-affected individuals.

Reliable

Reliable results with no false-low measurements caused by antigen excess are essential for FLC assays. Physicians must be able to trust FLC results, and highly reliable results minimize the need for costly reruns.

Sensitive

FLC assays must be highly sensitive and precise to allow for appropriate clinical management of patients.

Consistent

Patients with multiple myeloma and other monoclonal gammopathies require regular, long-term monitoring. To identify regression or progression of the disease in an early stage, and to adapt therapy accordingly, results must be consistent across different reagent lots.

Characteristics of the N Latex FLC Assays

Siemens N Latex FLC kappa and N Latex FLC lambda assays are highly sensitive reagents for the quantitative determination of free light chains in human serum and plasma. These assays are designed for use on BN™ II and BN ProSpec® Systems.[4,5]

Siemens FLC assays deliver the specificity, reliability, sensitivity, and lot-to-lot consistency required for screening, diagnosis, and monitoring of patients with monoclonal disorders.

Unique Monoclonal Antibodies

Conventional FLC assays based on polyclonal antibodies are affected by significant limitations in analytical performance.[6-9] These issues include:

- Variability and inconsistency in results obtained from different reagent lots
- False-low results caused by excessive antigen levels
- Gross overestimation in certain samples with FLC polymerization

Siemens FLC kappa and lambda assays are based on unique monoclonal antibodies against free and not bound free light chains, coupled to polystyrene beads. The combination of the latex-based assay with highly specific monoclonal antibodies and the assay-specific supplementary reagent has demonstrated high-performance characteristics and reliability.

Narrow Reference Range

The N Latex FLC assays exhibit narrow reference ranges within those of the conventional FLC method, demonstrating the high specificity of these monoclonal assays:

N Latex FLC kappa	6.7–22.4 mg/L	(2.5^{th} – 97.5^{th} percentile)
N Latex FLC lambda	8.3–27.0 mg/L	(2.5^{th} – 97.5^{th} percentile)
N Latex FLC ratio	0.31–1.56	(minimum – maximum)

Wide Measuring Range

The Siemens N Latex FLC assays feature a wide measuring range. The initial measuring range covers the complete reference range.

Initial measuring range	3.5–110 mg/L (FLC kappa) 1.9–60 mg/L (FLC lambda)
Total measuring range	0.174–≥9000 mg/L (FLC kappa) 0.47–≥6000 mg/L (FLC lambda)

Variety of Sample Types

N Latex FLC assays accommodate serum, heparin plasma, and EDTA plasma samples.

Highly Sensitive, Precise Performance

Siemens N Latex FLC assays are confirmed to be highly precise and sensitive compared to the immunofixation method currently regarded as the reference method for detection of monoclonal components.

Precision

Repeatability:	≤4.0%
Within-lab CV:	≤6.3%

Analytical/Functional Sensitivity

FLC kappa:	0.174 mg/L
FLC lambda:	0.47 mg/mL

Sensitivity vs. Immunofixation

IFE κ positive	N Latex FLC kappa	Freelite kappa
60	60 (100%)	59 (98.3%)
IFE λ positive	**N Latex FLC lambda**	**Freelite lambda**
59	58 (98.3%)	56 (94.4%)

Reliable Test Results Clinicians Can Trust

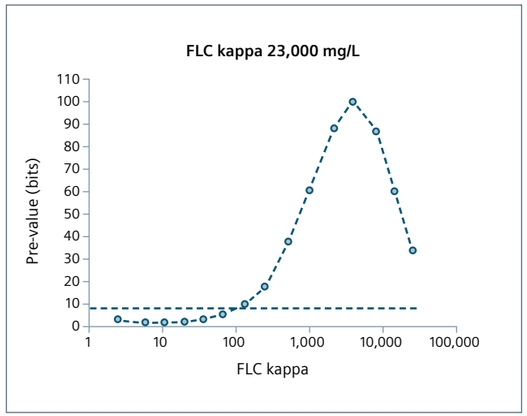
Antigen-excess security is crucial in delivering reliable FLC test results. Extremely high FLC concentrations can cause dissolution of immunoprecipitates, which produces misleading, false-low test results. Such false-low results compromise clinicians' confidence in test results and require expensive and time-consuming reruns.

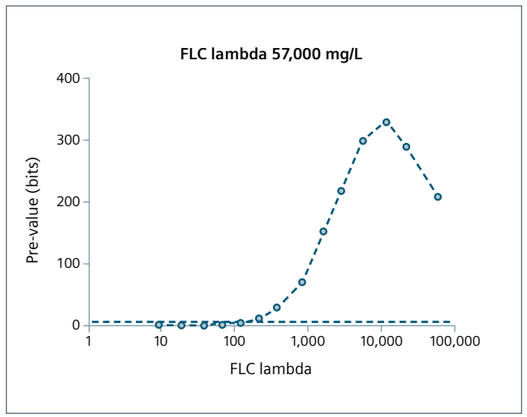
Siemens N Latex FLC assays use built-in pre-reaction protocols for detection of antigen excess. These protocols ensure that, even with very high FLC concentrations, no false-low test results are generated. This antigen-excess security built into Siemens N Latex FLC assays yields results clinicians can trust and minimizes the need for costly reruns.

Even the highest FLC kappa and lambda concentrations observed in the clinical trials were correctly determined by the N Latex FLC assays:

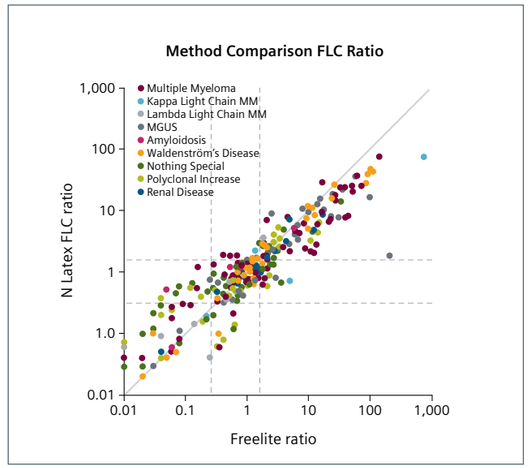
Highest Tested FLC Concentrations

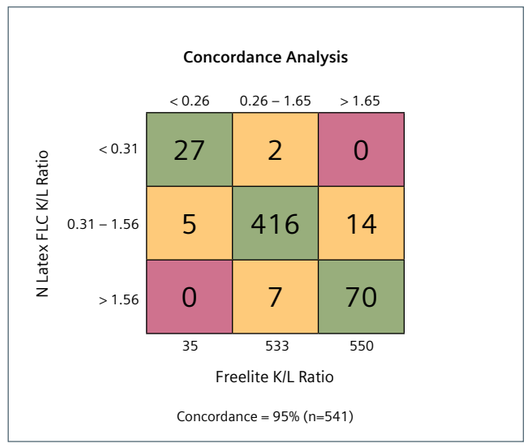
FLC kappa:	23,000 mg/L
FLC lambda:	57,000 mg/L





Pre-reaction cutoff = antigen excess detection threshold





Results Comparable to Conventional, Polyclonal Assays

In testing a total of 541 consecutive patients with (N=164) and without (N=366) monoclonal gammopathy (11 patients were not classified), the concordance between the Siemens N Latex FLC and Freelite* assays based on classification of results as abnormal low, normal, and abnormal high was 91% for FLC kappa, 85% for FLC lambda, and 95% for FLC ratio.

Overall, the majority of patient results obtained with both methods provided the same classification and showed good correlation. However, for individual patients, larger differences between the two methods can occur. The amount of difference between the methods is patient-specific due to individual differences in the monoclonal component. Parallel testing is recommended during a transition period to the N Latex FLC assays.

*Freelite is a trademark of The Binding Site Group, Ltd.

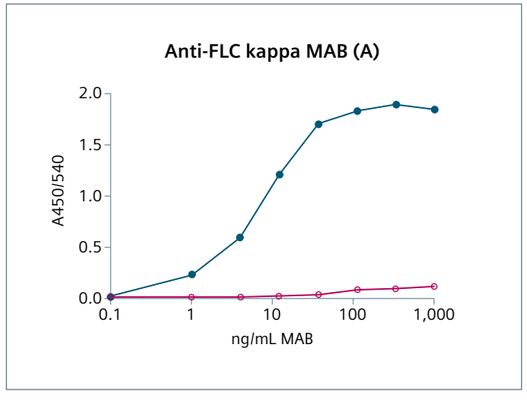
Specific, Selective Monoclonal Antibodies

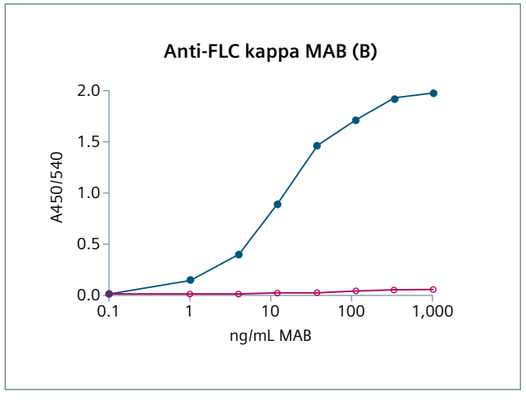
High Analytical Specificity

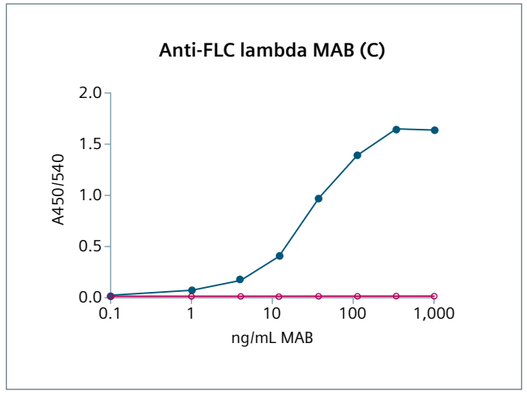
The Siemens N Latex FLC kappa and lambda assays each incorporate two monoclonal antibodies that are highly selective for the free form of the kappa and lambda light chain, respectively.

Graphs A and B show the reactivity of the anti-kappa antibodies with FLC kappa (closed symbol) or IgG kappa (open symbol). Graphs C and D show the reactivity of the anti-lambda antibodies with FLC lambda (closed symbol) or IgG lambda (open symbol).

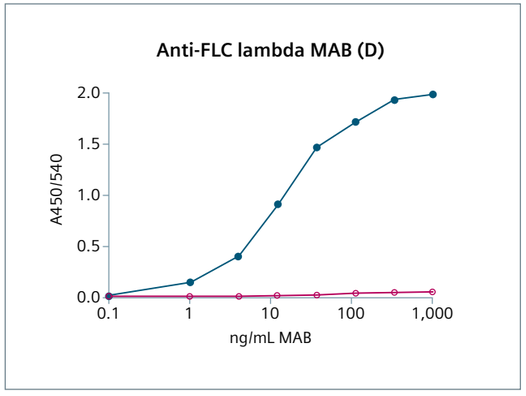
The very low reactivity with complete immunoglobulin demonstrates the high specificity of the assays' monoclonal antibodies selected for FLC kappa and lambda.







● Bence Jones kappa or lambda
○ IgG-kappa or IgG-lambda



(Graphs A, B, C, and D from te Velthuis H. Clin Chem Lab Med. 2011)

High Clinical Specificity

The following table shows the FLC kappa/ lambda ratios observed for the Siemens assays and the conventional method:

	Clinical Specificity	
	N Latex FLC ratio	Freelite ratio
Patients submitted for screening without renal disease or polyclonal stimulation	99.4% (164/165)	97.6% (161/165)
Patients with renal disease	98.6% (143/145)	96.6% (140/145)
Patients with polyclonal stimulation	98.2% (55/56)	98.2% (55/56)
All patients screened (N=366)	98.9% (362/366)	97.3% (356/366)

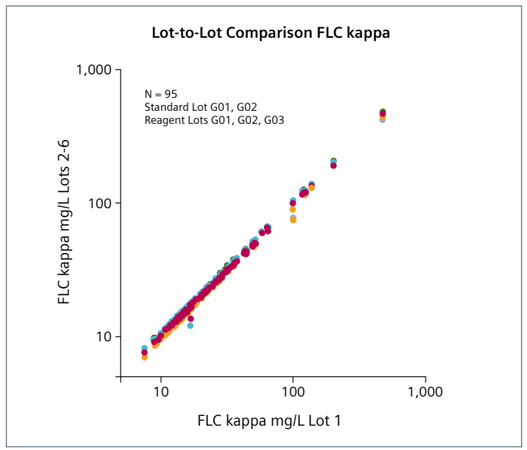
Consistent Results across Reagent Lots

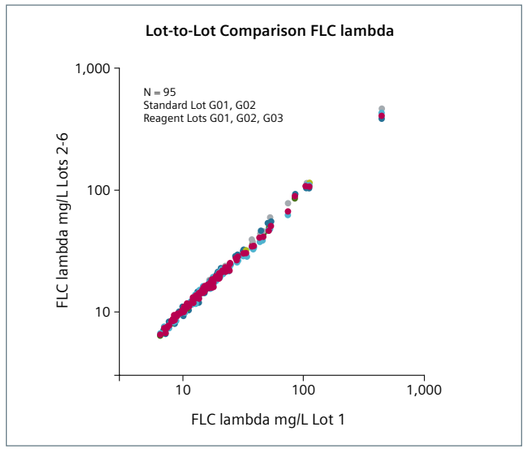
Patients with premalignant and overt malignant disease must be monitored over the long term to evaluate the course of disease and decide on the appropriate therapy. Highly consistent test results across different batches or lots of reagents are crucial for accurate patient monitoring and evaluation.

The monoclonal antibodies used in Siemens N Latex FLC assays provide highly stable, consistent reagent lots. The graphs below show the results obtained from tests run with three reagent and two calibrator lots (six combinations in total).

Differences were less than 7.5%, with a correlation coefficient greater than 0.99, demonstrating excellent lot-to-lot consistency for N Latex FLC kappa and lambda.

Results generated by Siemens FLC assays remain consistent and reliable over long periods of patient monitoring. This allows early detection of changes in disease activity and subsequent adjustments to therapy, and ultimately contributes to improved patient management and outcomes.





Innovative Packaging for Efficient, Cost-Effective Processing

All Siemens N Latex FLC assay components are packaged individually. Thus they can be ordered separately and used interchangeably and lot-independently.

This allows labs to order only the components they need, rather than having to order an entire new kit of components. All components can be completely consumed, minimizing waste and reducing cost.

Also, Siemens N Latex FLC assays require only 6 positions on the analyzer, compared to 10 positions for the competing product.

Single-Source Service and Support for Assays and Analyzers

Siemens N Latex FLC assays are designed specifically to run on Siemens BN systems. Now you can obtain service and support for FLC assays and analyzers from a single, trusted source.

Add Consistency to FLC Test Results

Siemens N Latex FLC assays deliver the accuracy and consistency of results that clinicians demand for patient screening and long-term monitoring. By allowing earlier detection of disease remission or regression and subsequent adjustments to therapy, they ensure optimized patient management and support improved patient outcomes.

Ordering Information		
Catalog No.	Product Description	Quantity
OPJA03	N Latex FLC kappa	3 x 37 tests
OPJB03	N Latex FLC lambda	3 x 37 tests
OPJC03	N FLC Supplement Reagent	3 x 0.5 mL Supp A, 3 x 2 mL Supp B
OPJD03	N FLC Standard SL	3 x 1 mL
OPJE03	N FLC Control SL1	3 x 1 mL
OPJF03	N FLC Control SL2	3 x 1 mL

References:

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3. Katzmann JA, Kyle RA, Benson J, et al. Screening panels for detection of monoclonal gammopathies. Clin Chem. 2009;55:1517-22.
4. te Velthuis H, Knop I, Stam P, et al. N Latex FLC – new monoclonal high-performance assays for the determination of free light chain kappa and lambda. Clin Chem Lab Med. 2011;49:1323-32.
5. Hoedemakers RMJ, Pruijt JFM, Hol S, et al. Clinical comparison of new monoclonal antibody-based nephelometric assays for free light chain kappa and lambda to polyclonal antibody-based assays and immunofixation electrophoresis. Clin Chem Lab Med. 2012;50:489–495.
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7. de Kat Angelino CM, Raymakers R, Teunesen MA, et al. Overestimation of serum free light chain concentration by immunonephelometry. Clin Chem. 2010;56:1188-90.
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For FLC results you can trust, contact your Siemens representative.