

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION  
DECISION SUMMARY  
ASSAY ONLY TEMPLATE**

**A. 510(k) Number:**

k060677

**B. Purpose for Submission:**

New device

**C. Measurand:**

Carbohydrate-deficient transferrin (CDT)

**D. Type of Test:**

Quantitative immunonephelometric assay and calibrators

**E. Applicant:**

Dade Behring Inc.

**F. Proprietary and Established Names:**

N Latex CDT Kit: includes Assay, Controls and Calibrators

**G. Regulatory Information:**

1. Regulation section:

21 CFR §862.1360 (GGT Test System)

21 CFR §862.9 (b) limitations of exemptions

2. Classification:

Class I, exempt, meets limitations of exemptions 21 CFR 862.9 (b)

3. Product code:

NAO

4. Panel:

Clinical Chemistry (75)

**H. Intended Use:**

1. Intended use(s):

See indications for use below.

2. Indication(s) for use:

“In vitro diagnostic for the quantitative determination of carbohydrate-deficient transferrin (CDT) in human serum by means of particle-enhanced immunonephelometry using the BN™ II and BN ProSpec® System. The N Latex CDT assay must be run concurrently with the N Antisera to Human Transferrin

assay so that the result can be expressed as a relative ratio, i.e., %CDT of the total transferrin. The calculation of %CDT can be used as a tool to identify possible chronic heavy alcohol consumption.”

3. Special conditions for use statement(s):  
Indicated for prescription use only
4. Special instrument requirements:  
BN II and BN ProSpec System

**I. Device Description:**

The N Latex CDT Kit consists of reagents, standards, and controls. There are three reagents: Reagent 1 contains a suspension of polystyrene particles coated with CDT, Reagent 2 contains a suspension of polystyrene particles coated with anti-CDT mouse monoclonal antibodies, while the Supplementary Reagent is a buffered saline solution. Standards and controls contain stabilized human serum matrix and known concentrations of CDT.

*Note: This assay and the N Antiserum to Human Transferrin Assay must be used in conjunction to calculate %CDT. CDT values obtained from this assay and transferrin values obtained from the transferrin assay are used to calculate %CDT by onboard software. Transferrin assay components were not evaluated in this submission (see k972840).*

All human source materials were tested for HBsAg, HCV, and HIV-1/2 and found to be negative.

**J. Substantial Equivalence Information:**

1. Predicate device name(s):  
Axis-Shield %CDT
2. Predicate 510(k) number(s):  
k992502
3. Comparison with predicate:  
The devices have a similar intended use, consist of assay reagents, calibrators, and controls, and are based on immunoassays that use mouse monoclonal antibodies. Both assays report %CDT (mg/mL CDT divided by mg/mL total transferrin).

The assays differ in technology, preparation technique and unit of measure. The predicate method utilizes an ion-exchange column to separate CDT isoforms from other transferrin molecules. The CDT content in the eluted fraction is then determined by a turbidimetric immunoassay. The N Latex CDT assay does not have a separation step but relies on the ratio of the results of two separate assays to calculate %CDT. The measuring ranges of the assays differ.

**K. Standard/Guidance Document Referenced (if applicable):**

Precision	CLSI EP5-A2	User Evaluation of Precision Performance of Clinical Chemistry Devices
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**L. Test Principle:**

This is a competitive immunoassay; CDT in the sample competes with CDT-coated polystyrene particles for a limited number of mouse monoclonal anti-CDT binding sites on polystyrene particles. CDT in the sample inhibits the aggregation of the polystyrene beads resulting in lower turbidity and therefore less scattered light. The ratio of scattered light to directed light is compared to a known standard to calculate the concentration of CDT.

**M. Performance Characteristics (if/when applicable):**

1. Analytical performance:

a. *Precision/Reproducibility:*

Imprecision was determined by measuring two controls and two serum pools (one low, one high) eight times a day over five days (n = 40) using a BN II system. Imprecision results were within the acceptance criteria set by the sponsor.

**Imprecision of the N Latex CDT Assay**

	Mean Value	Within-run	Run-to-run	Total
	% CDT	% CV	% CV	% CV
Control Level 1	2.2	4.2	1.6	4.2
Control Level 2	5.7	2.8	1.5	3.0
Serum Pool – Low	1.8	4.9	7.6	8.9
Serum Pool – High	8.7	3.5	2.4	4.0

b. *Linearity/assay reportable range:*

Linearity of the N Latex CDT Kit was evaluated by serially diluting a known sample with high concentrations of CDT and transferrin with N Diluent. Each dilution was tested five times on a BN ProSpec System and the mean % recovery was calculated.

Recovery of samples relative to the target value ranged from 94% to 121% (mean recovery 102%) for %CDT and 98% to 120% for mg/L CDT (mean recovery 104%). Recovery was within the sponsor's acceptance specifications.

c. *Traceability, Stability, Expected values (controls, calibrators, or methods):*

*Traceability:* The standards and controls are calibrated against an internal master calibrator that is in turn calibrated against CRM 470, a reference standard for transferrin. The master calibrator value is corrected for the

difference in masses between the carbohydrate portions of CDT and normal transferrin.

*Stability:* Unopened assay components were shown to be stable for 12 month at +2 to +8 °C by real-time testing. Opened, all components are stable for two weeks stored at +2 to +8 °C. On-board stability for all components is a minimum of three days.

*d. Detection limit:*

Twenty replicates of the N-Diluent were run on a BN ProSpec. The analytical sensitivity of the N Latex CDT assay was defined as the mean value plus two standard deviations. The resulting value, 0.003 g/L was within the sponsor's acceptance criterion.

*e. Analytical specificity:*

Normal serum samples were spiked with the compounds below at various concentrations and the concentration of CDT was compared to that of an unspiked sample as determined on a BN II System. The sponsor reports no interference (defined by the sponsor's acceptance criterion as less than  $\pm 20\%$  of the unspiked sample) up to the concentrations listed in the table below:

**Interference Data Summary for the N Latex CDT Assay**

<b>Interferent</b>	<b>No interference below:</b>	<b>Interferent</b>	<b>No interference below:</b>
Bilirubin	60 mg/dL	Rheumatoid Factors	3390 IU/mL
Hemoglobin	1000 mg/dL	Ethanol	0.5%
Triglycerides	820 mg/dL	Paraprotein	32 g/L
HAMA*	1494 ng/mL		

\* HAMA = human anti-mouse antibodies

*f. Assay cut-off:*

Not applicable: see reference range study below for expected CDT concentrations in normal subjects.

2. Comparison studies:

*a. Method comparison with predicate device:*

Serum samples (n = 116) were evaluated with the N Latex CDT Assay and the predicate Axis-Shield %CDT assay on a BN II System. The majority (n = 101) of the samples were collected from patients undergoing routine CDT testing; the balance were spiked samples. These patients were suspected of having heavy alcohol consumption but other clinical details were not available. Sample concentrations ranged from 1.1 to 32.0 %CDT. Regression analysis of the results yielded the following equation:  $y = 0.720x + 0.75$  % CDT,  $r = 0.99$ .

- b. *Matrix comparison:*  
Not applicable: this assay is intended for use with serum samples.
3. Clinical studies:
- a. *Clinical Sensitivity:*  
Not applicable.
- b. *Clinical specificity:*  
Not applicable.
- c. Other clinical supportive data (when a. and b. are not applicable):
4. Clinical cut-off:  
Not applicable.
5. Expected values/Reference range:  
A normal reference range was established by determining the CDT concentration and % CDT of 561 adult Europeans (age 19- 60, about equally divided between male and female, ethnicity not recorded) that consumed less than 40 g ethanol per day:

Assay		n =	Min	Max	Median	99 <sup>th</sup> Percentile
<b>N Latex CDT</b>	Total	561	24.1	85.7	45.4	75.0
<b>mg/L</b>	Male	255	24.1	72.0	43.6	66.1
	Female	306	27.5	85.7	47.0	79.2
<b>N Latex CDT</b>	Total	561	1.01	2.8	1.8	2.5
<b>% CDT</b>	Male	255	1.01	2.8	1.8	2.5
	Female	306	1.01	2.6	1.8	2.4

**N. Proposed Labeling:**

The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10.

**O. Conclusion:**

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.