

FERR4

Tina-quant Ferritin Gen.4

cobas®

Order information

REF	CONTENT	Analyzer(s) on which cobas c pack(s) can be used
08057648190	Tina-quant Ferritin Gen.4 (400 tests)	System-ID 2057 001 cobas c 303, cobas c 503
Materials required (but not provided):		
11355279216	Calibrator f.a.s. Proteins (5 x 1 mL)	Code 20656
10557897122	Precinorm Protein (3 x 1 mL)	Code 20302
11333127122	Precipath Protein (3 x 1 mL)	Code 20303
05117003190	PreciControl ClinChem Multi 1 (20 x 5 mL)	Code 20391
05947626190	PreciControl ClinChem Multi 1 (4 x 5 mL)	Code 20391
05117216190	PreciControl ClinChem Multi 2 (20 x 5 mL)	Code 20392
05947774190	PreciControl ClinChem Multi 2 (4 x 5 mL)	Code 20392
08063494190	Diluent NaCl 9 % (123 mL)	System-ID 2906 001

English

System information

FERR4: ACN 20570

Intended use

In vitro test for the quantitative determination of ferritin in human serum and plasma on Roche/Hitachi **cobas c** systems.

Summary^{1,2,3,4,5,6,7,8,9}

Ferritin is the iron storage protein. It has a molecular weight of ≥ 440000 daltons, depending upon the iron content, and consists of a protein shell (apoferritin) of 24 subunits and an iron core containing an average of approx. 2500 Fe^{3+} ions (in the basic isoforms). Common to all isoforms is their construction from two separate subunits, the acidic H (heavy)-type subunit and the weakly basic L (light)-type subunit. The basic isoforms are responsible for the long-term iron storage function and are mainly detectable in the liver, spleen and bone marrow. Acid isoforms are found mainly in the myocardium, placenta, tumor tissue and - to a lesser extent - in the depot organs.

The determination of ferritin is necessary above all in iron metabolism diagnosis, monitoring iron therapy, ascertaining the iron reserves in groups at risk and in the differential diagnosis of anemias. It encompasses prelatent and latent iron deficiency as well as iron overloading. It is also used to distinguish between hypoferric anemia and hypochromic anemia (chronic infection and tumor anemias, sideroblastic anemia or thalassemia).

Ferritin determinations are particularly suitable for monitoring renal anemia when iron utilization and distribution disorders are present during therapy with erythropoietin. The ferritin detectable in blood is in equilibrium with the body's depot iron and hence acts as an indicator for the level of the iron stores.

A variety of routine methods are available for determining ferritin, e.g. enzyme-linked immunosorbent assays (ELISA), fluorescence immunoassays (FIA), luminescence immunoassays (LIA), nephelometric and turbidimetric immunoassays.

The automated Roche ferritin assay is based on the immunological agglutination principle with enhancement of the reaction by latex.

Test principle⁹

Particle enhanced immunoturbidimetric assay

Human ferritin agglutinates with latex particles coated with anti-ferritin antibodies. The precipitate is determined turbidimetrically at 570/800 nm.

Reagents - working solutions

- R1** TRIS buffer, pH 7.5; immunoglobulins (rabbit); preservative, stabilizers
- R3** Aqueous matrix containing latex particles coated with anti-human ferritin antibodies (rabbit); preservative, stabilizers

R1 is in position B and R3 is in position C.

Precautions and warnings

For in vitro diagnostic use for health care professionals. Exercise the normal precautions required for handling all laboratory reagents.

Infectious or microbial waste:

Warning: handle waste as potentially biohazardous material. Dispose of waste according to accepted laboratory instructions and procedures.

Environmental hazards:

Apply all relevant local disposal regulations to determine the safe disposal.

Safety data sheet available for professional user on request.

Reagent handling

Ready for use

Mix **cobas c** pack well before placing on the analyzer.

Storage and stability

Shelf life at 2-8 °C: See expiration date on **cobas c** pack label.

On-board in use and refrigerated on the analyzer: 26 weeks

Specimen collection and preparation

For specimen collection and preparation only use suitable tubes or collection containers.

Only the specimens listed below were tested and found acceptable.

Serum

Plasma: Li-heparin, K_2^- or K_3^- -EDTA plasma

The sample types listed were tested with a selection of sample collection tubes that were commercially available at the time of testing, i.e. not all available tubes of all manufacturers were tested. Sample collection systems from various manufacturers may contain differing materials which could affect the test results in some cases. When processing samples in primary tubes (sample collection systems), follow the instructions of the tube manufacturer; with K_3^- -EDTA tubes pay particular attention that the tubes are adequately filled.

Centrifuge samples containing precipitates before performing the assay.

See the limitations and interferences section for details about possible sample interferences.

Stability:¹⁰ 7 days at 15-25 °C
7 days at 2-8 °C
1 year at (-15)-(-25) °C

Do not thaw frozen specimens in a 37 °C bath. Violent mixing may denature ferritin.¹¹

Sample stability claims were established by experimental data by the manufacturer or based on reference literature and only for the temperatures/time frames as stated in the method sheet. It is the responsibility of the individual laboratory to use all available references and/or its own studies to determine specific stability criteria for its laboratory.

Materials provided

See "Reagents – working solutions" section for reagents.

FERR4

Tina-quant Ferritin Gen.4



Materials required (but not provided)

See "Order information" section
General laboratory equipment

Assay

For optimum performance of the assay follow the directions given in this document for the analyzer concerned. Refer to the appropriate operator's manual for analyzer-specific assay instructions.

The performance of applications not validated by Roche is not warranted and must be defined by the user.

Application for serum and plasma

Test definition

Reporting time	10 min		
Wavelength (sub/main)	800/570 nm		
Reagent pipetting		Diluent (H ₂ O)	
R1	60 µL	–	
R3	60 µL	–	
Sample volumes	Sample	Sample dilution	
		Sample	Diluent (NaCl)
Normal	7.5 µL	–	–
Decreased	7.5 µL	10 µL	70 µL
Increased	7.5 µL	–	–

For further information about the assay test definitions refer to the application parameters setting screen of the corresponding analyzer and assay.

Calibration

Calibrators	S1: H ₂ O S2-6: C.f.a.s. Proteins
Calibration mode	Non-linear
Calibration frequency	Automatic full calibration - after reagent lot change Full calibration - as required following quality control procedures

Calibration interval may be extended based on acceptable verification of calibration by the laboratory.

Traceability: This method has been standardized against the Elecsys Ferritin assay (immunological method) which is traceable to NIBSC (WHO).

Quality control

For quality control, use control materials as listed in the "Order information" section. In addition, other suitable control material can be used.

The control intervals and limits should be adapted to each laboratory's individual requirements. It is recommended to perform quality control always after lot calibration and subsequently at least every 26 weeks. Values obtained should fall within the defined limits. Each laboratory should establish corrective measures to be taken if values fall outside the defined limits.

Follow the applicable government regulations and local guidelines for quality control.

Calculation

cobas c systems automatically calculate the analyte concentration of each sample in the unit µg/L (pmol/L, ng/mL).

Conversion factors: ¹²	µg/L × 2.247 = pmol/L
	µg/L = ng/mL

Limitations - interference

Criterion: Recovery within ± 4 µg/L of initial values for samples ≤ 40 µg/L and within ± 10 % for samples > 40 µg/L.

Icterus:¹³ No significant interference up to an I index of 60 for conjugated and unconjugated bilirubin (approximate conjugated and unconjugated bilirubin concentration: 1026 µmol/L or 60 mg/dL).

Hemolysis:¹³ No significant interference up to an H index of 500 (approximate hemoglobin concentration: 310 µmol/L or 500 mg/dL).

Lipemia (Intralipid):¹³ No significant interference up to an L index of 1000 (approximate Intralipid concentration: 1000 mg/dL). There is poor correlation between the L index (corresponds to turbidity) and triglycerides concentration.

Rheumatoid factors: No significant interference from rheumatoid factors up to a concentration of 1200 IU/mL.

Drugs: No interference was found at therapeutic concentrations using common drug panels.^{14,15}

High-dose hook effect: Using prozone check automatically performed by the analyzer, no false result without a flag was observed up to a ferritin concentration of 80000 µg/L (80000 ng/mL).

The polyclonal antibodies used in this assay are specific for ferritin from human liver and also recognize ferritin from human spleen. The antibodies show no cross reactivity to the human ferritin H subunit, which is the major component of human heart ferritin.

In very rare cases, gammopathy, in particular type IgM (Waldenström's macroglobulinemia), may cause unreliable results.¹⁶

For diagnostic purposes, the results should always be assessed in conjunction with the patient's medical history, clinical examination and other findings.

ACTION REQUIRED

Special Wash Programming: The use of special wash steps is mandatory when certain test combinations are run together on **cobas c** systems. All special wash programming necessary for avoiding carry-over is available via the **cobas** link. The latest version of the carry-over evasion list can be found with the NaOHD/SMS/SCCS Method Sheet for information. For further instructions refer to the operator's manual.

Limits and ranges

Measuring range

5-1000 µg/L (11.2-2247 pmol/L)

Determine samples having higher concentrations via the rerun function. Dilution of samples via the rerun function is a 1:8 dilution. Results from samples diluted using the rerun function are automatically multiplied by a factor of 8.

Lower limits of measurement

Limit of Blank, Limit of Detection and Limit of Quantitation

Limit of Blank	= 3 µg/L (6.7 pmol/L)
Limit of Detection	= 5 µg/L (11.2 pmol/L)
Limit of Quantitation	= 8 µg/L (17.9 pmol/L)

The Limit of Blank, Limit of Detection and Limit of Quantitation were determined in accordance with the CLSI (Clinical and Laboratory Standards Institute) EP17-A2 requirements.

The Limit of Blank is the 95th percentile value from n ≥ 60 measurements of analyte-free samples over several independent series. The Limit of Blank corresponds to the concentration below which analyte-free samples are found with a probability of 95 %.

The Limit of Detection is determined based on the Limit of Blank and the standard deviation of low concentration samples.

The Limit of Detection corresponds to the lowest analyte concentration which can be detected (value above the Limit of Blank with a probability of 95 %).

The Limit of Quantitation is the lowest analyte concentration that can be reproducibly measured with a total error of 20 %. It has been determined using low concentration ferritin samples.

Expected values¹⁷

Adults: Expected values for ferritin concentrations in clinically healthy subjects are strongly dependent upon age and sex.

Results of a study with Tina-quant Ferritin on samples from 224 healthy test subjects (104 women, mainly premenopausal, and 120 men) are given below. These values correspond to the 5th and 95th percentiles.

µg/L

Men (20-60 years)	30-400 µg/L
Women (17-60 years)	15-150 µg/L

pmol/L

Men (20-60 years)	67-899 pmol/L
Women (17-60 years)	34-337 pmol/L

Each laboratory should investigate the transferability of the expected values to its own patient population and if necessary determine its own reference ranges.

Specific performance data

Representative performance data on the analyzers are given below. These data represent the performance of the analytical procedure itself.

Results obtained in individual laboratories may differ due to heterogeneous sample materials, aging of analyzer components and mixture of reagents running on the analyzer.

Precision

Precision was determined using human samples and controls in accordance with the CLSI (Clinical and Laboratory Standards Institute) EP05-A3 requirements with repeatability (n = 84) and intermediate precision (2 aliquots per run, 2 runs per day, 21 days). Results for repeatability and intermediate precision were obtained on the **cobas c 503** analyzer.

Repeatability	Mean µg/L	SD µg/L	CV %
PCCC1 ^{a)}	108	0.906	0.8
PCCC2 ^{b)}	202	1.37	0.7
Human serum 1	10.6	0.781	7.3
Human serum 2	29.8	1.18	4.0
Human serum 3	207	1.14	0.6
Human serum 4	479	2.71	0.6
Human serum 5	827	4.68	0.6

Intermediate precision	Mean µg/L	SD µg/L	CV %
PCCC1 ^{a)}	108	1.26	1.2
PCCC2 ^{b)}	202	2.10	1.0
Human serum 1	10.6	0.816	7.7
Human serum 2	29.8	1.30	4.4
Human serum 3	206	1.62	0.8
Human serum 4	479	3.96	0.8
Human serum 5	827	7.50	0.9

a) PreciControl ClinChem Multi 1

b) PreciControl ClinChem Multi 2

The data obtained on **cobas c 503** analyzer(s) are representative for **cobas c 303** analyzer(s).

Method comparison

Ferritin values for human serum and plasma samples obtained on a **cobas c 503** analyzer (y) were compared to those determined using the corresponding reagent on a **cobas c 501** analyzer (x).

Sample size (n) = 73

Passing/Bablok ¹⁸	Linear regression
$y = 1.007x + 0.488 \mu\text{g/L}$	$y = 0.980x + 2.67 \mu\text{g/L}$
$r = 0.960$	$r = 0.999$

The sample concentrations were between 6.70 and 800 µg/L.

Ferritin values for human serum and plasma samples obtained on a **cobas c 303** analyzer (y) were compared to those determined using the corresponding reagent on a **cobas c 501** analyzer (x).

Sample size (n) = 89

Passing/Bablok ¹⁸	Linear regression
$y = 1.030x - 0.666 \mu\text{g/L}$	$y = 1.029x - 0.379 \mu\text{g/L}$
$r = 0.966$	$r = 1.000$

The sample concentrations were between 6.00 and 979 µg/L.

References

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A point (period/stop) is always used in this Method Sheet as the decimal separator to mark the border between the integral and the fractional parts of a decimal numeral. Separators for thousands are not used.

Any serious incident that has occurred in relation to the device shall be reported to the manufacturer and the competent authority of the Member State in which the user and/or the patient is established.

Symbols

Roche Diagnostics uses the following symbols and signs in addition to those listed in the ISO 15223-1 standard (for USA: see dialog.roche.com for definition of symbols used):

CONTENT

Contents of kit

0108057648190c503V4.0

FERR4

Tina-quant Ferritin Gen.4

cobas®



Volume for reconstitution

GTIN

Global Trade Item Number

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