respons®940

Iron FS* Ferene

Order Information

Cat. No.	Kit size
1 1911 99 10 921	Σ 480 (4 x 120)

Intended Use

Diagnostic reagent for quantitative in vitro determination of iron in human serum or heparin plasma on automated respons®940.

Summary

Iron exists in the body as a component of hemoglobin and myoglobin as well as bound to transferrin for the transport in plasma and stored in ferritin. Increased iron concentrations occur in hemochromatosis and liver damage [1]. Malabsorption due to gastrointestinal diseases can cause decreased iron levels, and may thus lead to anemia. Blood loss after gastrointestinal lesions or heavy menstrual bleeding can generate anemia, too [2].

Method

Photometric test using Ferene

Iron bound to transferrin (Fe^{3+}) is completely released under acidic conditions and reduced to Fe^{2+}. Iron forms a blue complex with Ferene. The absorbance at 595 nm is directly proportional to the iron concentration.

$$\text{Transferrin } (Fe^{3+})_2 \xrightarrow{\text{Ascorbic acid, Buffer}} 2\ Fe^{2+} + \text{Transferrin}$$

$$Fe^{2+} + 3\ \text{Ferene} \longrightarrow \text{Ferrous Ferene (blue complex)}$$

Reagents

Components and Concentrations

R1:	Acetate buffer	pH 4.5	1 mol/L
	Thiourea		120 mmol/L
R2:	Ascorbic acid		240 mmol/L
	Ferene		3 mmol/L
	Thiourea		120 mmol/L

Storage and Stability

Reagents are stable up to the date of expiry indicated on the kit, if stored at 2 – 8°C and contamination is avoided. Do not freeze and protect from light.

The open-vial stability of the reagent is 18 months until expiry date.

Warnings and Precautions

1. Components contained in Iron FS Ferene are classified according to EC regulation 1272/2008 (CLP) as follows:

⚠ Reagent 1: Danger. Contains Dodecan-1-ol, ethoxylated and Alcohols, C9-11-iso-, C10-rich, ethoxylated. H315 Causes skin irritation. H318 Causes serious eye damage. P264 Wash hands and face thoroughly after handling. P280 Wear protective gloves/protective clothing/eye protection. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 Immediately call a POISON CENTER/doctor.

2. In very rare cases, samples of patients with gammopathy might give falsified results [3].
3. In case of product malfunction or altered appearance that could affect the performance, contact the manufacturer.
4. Any serious incident related to the product must be reported to the manufacturer and the competent authority of the Member State where the user and/or patient is located.
5. Please refer to the safety data sheets (SDS) and take the necessary precautions for the use of laboratory reagents. For diagnostic purposes, the results should always be assessed with the patient's medical history, clinical examinations and other findings.
6. For professional use only.

Waste Management

Refer to local legal requirements for chemical disposal regulations as stated in the relevant SDS to determine the safe disposal.

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

Reagent Preparation

The reagents are ready to use. The bottles are placed directly into the reagent rotor.

Materials Required

General laboratory equipment

Specimen

Human serum or heparin plasma

Only use suitable tubes or collection containers for specimen collection and preparation.

When using primary tubes, follow the manufacturer's instructions.

Separate serum/plasma at the latest 2 h after blood collection to minimize hemolysis.

Stability [4]:

7 days	at	20 – 25°C
3 weeks	at	4 – 8°C
1 year	at	-20°C

Only freeze once. Discard contaminated specimens.

Calibrators and Controls

DiaSys TruCal U is recommended for calibration. Calibrator values have been made traceable to the NIST Reference Material SRM 682. Use DiaSys TruLab N and P for internal quality control. All target values of the controls are traceable to DiaSys reagent/calibrator system. Quality control must be performed after calibration. Control intervals and limits have to be adapted to the individual requirements of each laboratory. Results must be within the defined ranges. Follow the relevant legal requirements and guidelines. Each laboratory should establish corrective action in case of deviations in control recovery.

	Cat. No.	Kit size
TruCal U	5 9100 99 10 063	20 x 3 mL
	5 9100 99 10 064	6 x 3 mL
TruLab N	5 9000 99 10 062	20 x 5 mL
	5 9000 99 10 061	6 x 5 mL
TruLab P	5 9050 99 10 062	20 x 5 mL
	5 9050 99 10 061	6 x 5 mL

Performance Characteristics

Measuring range from 7 µg/dL up to 1000 µg/dL. Linearity < 12 µg/dL is given with ± 3.6 µg/dL, between 12 µg/dL to 20 µg/dL within ± 10%, at > 20 µg/L within ± 5%.
In case of higher concentrations re-measure samples after manual dilution with NaCl solution (9 g/L) or use rerun function.

Limit of detection**	7 µg/dL
Limit of quantitation**	7 µg/dL
Onboard stability	7 weeks
Calibration stability	1 week

Interference by	Interferences ≤ 10% up to	Analyte concentration [µg/dL]
Ascorbic acid	70 mg/dL	58.2
	70 mg/dL	188
Bilirubin (conjugated)	70 mg/dL	57.8
	70 mg/dL	184
Bilirubin (unconjugated)	65 mg/dL	58.3
	65 mg/dL	182
Copper	250 µg/dL	61.8
	250 µg/dL	177
Hemolysis	30 mg/dL	61.0
	100 mg/dL	184
Lipemia (triglycerides)	2400 mg/dL	53.3
	2400 mg/dL	175
Zinc	600 µg/dL	58.9
	600 µg/dL	184
For further information on interfering substances, refer to the literature [5,6].		

Precision			
Repeatability (n=20)	**Sample 1**	**Sample 2**	**Sample 3**
Mean [µg/dL]	29.1	164	233
CV [%]	3.63	1.09	0.717
Within-laboratory (n=80)	**Sample 1**	**Sample 2**	**Sample 3**
Mean [µg/dL]	38.8	165	261
CV [%]	8.88	2.73	1.44

Method comparison (n=163)	
Test x	Competitor Iron (cobas c 501)
Test y	DiaSys Iron FS Ferene (respons®940)
Slope	1.06
Intercept	-2.10 µg/dL
Coefficient of correlation	0.999

** according to CLSI document EP17-A2, Vol. 32, No. 8

Conversion Factor
Iron [µg/dL] x 0.1791 = Iron [µmol/L]

Reference Range [7]

	[µg/dL]	[µmol/L]
Children		
2 weeks	63 – 201	11 – 36
6 months	28 – 135	5 – 24
12 months	35 – 155	6 – 28
2 – 12 years	22 – 135	4 – 24
Women		
25 years	37 – 165	6.6 – 29.5
40 years	23 – 134	4.1 – 24.0
60 years	39 – 149	7.0 – 26.7
Pregnant women		
12th week	42 – 177	7.6 – 31.6
At delivery	25 – 137	4.5 – 24.5
6 weeks post partum	16 – 150	2.9 – 26.9
Men		
25 years	40 – 155	7.2 – 27.7
40 years	35 – 168	6.3 – 30.1
60 years	40 – 120	7.2 – 21.5

Each laboratory should check if the reference ranges are transferable to its own patient population and determine own reference ranges if necessary.

Literature

1. Wick et al, Clinical Aspects and Lab Iron Metabolism, Anemias. Novel concepts, Springer,5th ed. Wien New York 2003 p141 – 147.
2. Fairbanks VF, Klee GG. Biochemical aspects of hematology. In: Burtis CA, Ashwood ER, editors. Tietz Textbook of Clinical Chemistry. 3rd ed. Philadelphia: W.B Saunders Company; 1999. p. 1642-1710.
3. Bakker AJ, Mücke M. Gammopathy interference in clinical chemistry assays: mechanisms, detection and prevention. ClinChemLabMed 2007;45(9):1240-1243.
4. Guder WG, Zawta B et al. The Quality of Diagnostic Samples. 1st ed. Darmstadt: GIT Verlag; 2001; p. 34-5.
5. Young DS. Effects of Drugs on Clinical Laboratory Tests. 5th ed. Volume 1 and 2. Washington, DC: The American Association for Clinical Chemistry Press 2000.
6. Young DS. Effects on Clinical Laboratory Tests - Drugs Disease, Herbs & Natural Products, https://clinfx.wiley.com/aaccweb/aacc/, accessed in March 2024. Published by AACC Press and John Wiley and Sons, Inc.
7. Thomas L. Clinical Laboratory Diagnostics [Internet]. Prof. Lothar Thomas; 2024 [cited 2024 May 13]. https://www.clinical-laboratory-diagnostics.com

Additions and/or changes in the document are highlighted in grey. Deletions are communicated via customer info by stating the edition no. of the package insert/instruction for use.

IVD CE

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* Fluid Stable

respons®940

Iron FS Ferene

Application for serum and plasma

Test Details			Test Volumes			Reference Ranges		
Test	:	FE				Auto Rerun		☐
Report Name	:	Iron				Online Calibration		☐
Unit	:	µg/dL	Decimal Places	:	2	Cuvette Wash		☐
Wavelength-Primary	:	570	Secondary	:	700	Special Diluent		☐
Assay Type	:	2-Point	Curve Type	:	Linear	Warn after	:	20
M1 Start	:	24	M1 End	:	24	Reagents Used	:	2
M2 Start	:	57	M2 End	:	57	Reagent R1		FE R1
Sample Replicates	:	1	Standard Replicates	:	2	Reagent R2		FE R2
Control Replicates	:	1	Control Interval	:	0	**Consumables/Calibrators:**		
Reaction Direction	:	Increasing	React. Abs. Limit	:	0.0000	Blank /Level 0		0
Prozone Limit %	:	0	Prozone Check	:	Lower	Calibrator 1		*
Linearity Limit %	:	0	Delta Abs./Min.	:	0.0000	Calibrator 2		
Technical Minimum	:	7.0000	Technical Maximum	:	1000.0000	Calibrator 3		
Y = aX + b a=	:	1.0000	b=	:	0.0000	Calibrator 4		
Reagent Abs Min	:	0.0000	Reagent Abs Max	:	0.0000	Calibrator 5		

Test Details			Test Volumes		Reference Ranges
Test	:	FE			
Sample Type	:	Serum			

Sample Volumes

Normal	:	11.00 µL	Dilution Ratio	:	1 X
Increase	:	15.00 µL	Dilution Ratio	:	1 X
Decrease	:	4.00 µL	Dilution Ratio	:	1 X
Standard Volume	:	11.00 µL			

Reagent Volumes and Stirrer Speed

RGT-1 Volume	:	180.00 µL	R1 Stirrer Speed	:	Medium
RGT-2 Volume	:	45.00 µL	R2 Stirrer Speed	:	High

Sample Types

- ☑ Serum
- ☐ Urine
- ☐ CSF
- ☑ Plasma
- ☐ Whole Blood
- ☐ Other

Test Details			Test Volumes	Reference Ranges
Test	:	FE		
Sample Type	:	Serum		
Reference Range	:	DEFAULT		
Category	:	Male		

Reference Range

		Lower Limit (µg/dL)	Upper Limit (µg/dL)
Normal	:	#	#
Panic	:	#	#

Sample Types

- ☑ Serum
- ☐ Urine
- ☐ CSF
- ☑ Plasma
- ☐ Whole Blood
- ☐ Other

* Enter calibrator value
\# Editable by user