respons®940

# Rheumatoid factor FS*

## Order Information

| Cat. No. | Kit size |
|---|---|
| 1 7022 99 10 921 | Σ 400 (4 x 100) |

## Intended Use

Diagnostic reagent for quantitative in vitro determination of rheumatoid factors (RF) in human serum or heparin plasma on automated respons®940.

## Summary

Rheumatoid factors (RF) are a group of autoantibodies belonging to all immunoglobulin classes directed against the Fc fragment of altered or complexed IgG. Diagnostic tests for RF determination identify mainly RF of the IgM class, which are detectable in several rheumatic diseases, mainly of inflammatory origin [1,2]. RF occur in approx. 70 – 90% of patients with rheumatoid arthritis (RA), but they are not specific for RA as elevated concentrations are also observed in various non-rheumatic diseases and in 2 – 10% of the population without clinical symptoms of RA. The presence or absence of rheumatoid factors represents a valuable tool to aid in the diagnosis of patients with suspected rheumatic arthritis [2,3]. Additionally, high RF concentrations in RA are often associated with a more progressive clinical course of disease [3]. However, a positive RF value has to be confirmed by clinical and other laboratory findings [2].

## Method

Immunoturbidimetric test

Determination of the RF concentration by photometric measurement of antigen antibody reaction among heat aggregated IgG and rheumatoid factors present in the sample.

## Reagents

**Components and Concentrations**

| | | | |
|---|---|---|---|
| **R1:** | Phosphate buffer | pH 7.4 | 50 mmol/L |
| **R2:** | Heat aggregated human IgG | | ≤ 0.4 mg/mL |

## 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 12 months until expiry date.

## Warnings and Precautions

1. The reagents contain sodium azide (0.95 g/L) as preservative. Do not swallow! Avoid contact with skin and mucous membranes.
2. In very rare cases, samples of patients with gammopathy might give falsified results [4].
3. Samples containing heterophilic antibodies (e.g. HAMA) may interfere.
4. Icteric, hemolyzed or lipemic samples may interfere (Note: Details in section Performance Characteristics).
5. No further interference was found with common drug panels and diseases.
6. In case of product malfunction or altered appearance that could affect the performance, contact the manufacturer.
7. 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.
8. 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.
9. 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

Do not use sodium fluoride blood collection tubes.

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

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

Stability [5]:

| | | |
|---|---|---|
| 1 day | at | 20 – 25°C |
| 3 days | at | 4 – 8°C |
| 4 weeks | at | -20°C |

Only freeze once. Discard contaminated specimens.

## Calibrators and Controls

DiaSys TruCal RF is recommended for calibration. Calibrator values have been made traceable to the reference material NIBSC Code 64/002. Lot specific uncertainties can be obtained on request. Use DiaSys TruLab Protein Level 1 and Level 2 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 RF | 1 7020 99 10 059 | 5 x 1 mL |
| TruLab Protein Level 1 | 5 9500 99 10 046 | 3 x 1 mL |
| TruLab Protein Level 2 | 5 9510 99 10 046 | 3 x 1 mL |

## Performance Characteristics

| | |
|---|---|
| Measuring range from 7 IU/mL up to 500 IU/mL, depending on the concentration of the highest calibrator. Linearity < 10 IU/mL is given with ± 1.8 IU/mL, between 10 IU/mL to 20 IU/mL within ± 10%, at > 20 IU/mL within ± 5%.<br>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 IU/mL |
| Limit of quantitation** | 7 IU/mL |
| No prozone effect up to 3000 IU/mL. | |
| Onboard stability | 7 weeks |
| Calibration stability | 1 weeks |

| Interference by | Interferences ≤ 10% up to | Analyte concentration [IU/mL] |
|---|---|---|
| **Bilirubin** (conjugated) | 20 mg/dL | 23.5 |
| | 40 mg/dL | 75.1 |
| **Bilirubin** (unconjugated) | 28 mg/dL | 24.7 |
| | 50 mg/dL | 69.0 |
| **Hemolysis** | 100 mg/dL | 25.3 |
| | 240 mg/dL | 76.6 |
| **Lipemia** (triglycerides) | 430 mg/dL | 19.0 |
| | 1200 mg/dL | 73.8 |
| There is the possibility that other substances (e.g. ingestion, drugs or during specimen preparation) and medical conditions may lead to deviating results. Detailed information on every possible interfering substance or medical condition is beyond the scope of this script. | | |

| **Precision** | | | |
|---|---|---|---|
| **Repeatability (n=20)** | **Sample 1** | **Sample 2** | **Sample 3** |
| Mean [IU/mL] | 10.7 | 20.1 | 311 |
| CV [%] | 7.75 | 4.51 | 1.78 |
| **Within-laboratory (n=80)** | **Sample 1** | **Sample 2** | **Sample 3** |
| Mean [IU/mL] | 10.9 | 21.0 | 305 |
| CV [%] | 10.2 | 5.65 | 2.69 |
| **Reproducibility (n=75, no. of instruments=3** | **Sample 1** | **Sample 2** | **Sample 3** |
| Mean [IU/mL] | 10.5 | 18.4 | 188 |
| CV [%] | 11.7 | 11.6 | 2.84 |

| **Method comparison (n=103)** | |
|---|---|
| Test x | Competitor rheumatoid factor (cobas c 501) |
| Test y | DiaSys Rheumatoid factor FS (respons®940) |
| Slope | 1.01 |
| Intercept | -1.07 IU/mL |
| Coefficient of correlation | 0.984 |

| **Trueness** |
|---|
| Since the available reference material was found positive for HCV RNA by PCR method and is therefore a potential threat to the health of the user, the trueness is demonstrated by a method comparison with an established method on the market (refer to the section Method comparison). |

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

## Reference Range

In a healthy population, RF values are usually expected to be < 15 IU/mL (95th percentile) [6].

In a study, a cut-off value of 19 IU/mL was defined for optimum sensitivity (82.4%) and specificity (95.9%) for rheumatoid arthritis. With 1% RA prevalence, this results in a PPV of 16.9% and a NPV of 99.8% [7].

Positive likelihood LR+ (Sensitivity/(1-Specificity)) ≥ 0.5

Negative likelihood LR- ((1-Sensitivity)/Specificity) ≤ 1.13

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

## Literature


1. Moore TL, Dorner RW. Rheumatoid factors. Clinical biochemistry. 1993;26:75-84.
2. Shmerling RH, Delbanco TL. The rheumatoid factor: an analysis of clinical utility. Am J Med 1991; 91(5): 528-34.
3. Puente AD, Knowler WC, Pettitt DJ et al. The incidence of rheumatoid arthritis is predicted by rheumatoid factor titer in a longitudinal population study. Arthritis & Rheumatism. 1988; 31(10):1239-44
4. Bakker AJ, Mücke M. Gammopathy interference in clinical chemistry assays: Mechanisms, detection and prevention. Clin Chem Lab Med. 2007;45:1240-1243.
5. Guder WG, da Fonseca-Wollheim F, Heil W, Schmitt Y, Töpfer G, Wisser H, Zawta B. Quality of Diagnostic Samples. 3rd edition; 2010. p. 58-9.
6. Craig WY, Ledue TB, Ritchie RF. Plasma proteins: Clinical utility and interpretation. Vol. 108. Scarborough, ME: Foundation for Blood Research, 2001.
7. Ulvestad E, Kanestrom A, Madland TM, et al. Clinical utility of diagnostic tests for rheumatoid factor. Scandinavian Journal of Rheumatology. 2001;30:87-91.


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

# Rheumatoid factor FS

## Application for serum and plasma

### Test Details / Test Volumes / Reference Ranges

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Test | RF | | | | Auto Rerun | ☐ | |
| Report Name | Rheumatoid factor | | | | Online Calibration | ☐ | |
| Unit | IU/mL | Decimal Places | 1 | | Cuvette Wash | ☐ | |
| Wavelength-Primary | 340 | Secondary | 700 | | Special Diluent | ☐ | |
| Assay Type | 2-Point | Curve Type | 4P Logit-Log | | Warn after | : | 20 |
| M1 Start | 24 | M1 End | 24 | | Reagents Used | : | 2 |
| M2 Start | 63 | M2 End | 63 | | Reagent R1 | | RF R1 |
| Sample Replicates | 1 | Standard Replicates | 2 | | Reagent R2 | | RF R2 |
| Control Replicates | 1 | Control Interval | 0 | | **Consumables/Calibrators:** | | |
| Reaction Direction | Increasing | React. Abs. Limit | 0.0000 | | Blank /Level 0 | | 0 |
| Prozone Limit % | 97 | Prozone Check | Lower | | Calibrator 1 | | * |
| Linearity Limit % | 0 | Delta Abs./Min. | 0.0000 | | Calibrator 2 | | * |
| Technical Minimum | ** | Technical Maximum | ** | | 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 : RF

Sample Type : Serum

**Sample Volumes**

| | | | | | |
|---|---|---|---|---|---|
| Normal | 11.00 µL | Dilution Ratio | 1 X | | |
| Increase | 22.00 µL | Dilution Ratio | 1 X | | |
| Decrease | 2.00 µL | Dilution Ratio | 1 X | | |
| Standard Volume | 11.00 µL | | | | |

**Reagent Volumes and Stirrer Speed**

| | | | |
|---|---|---|---|
| RGT-1 Volume | 180.00 µL | R1 Stirrer Speed | High |
| RGT-2 Volume | 36.00 µL | R2 Stirrer Speed | High |

**Sample Types**

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

### Test Details / Test Volumes / Reference Ranges

Test : RF

Sample Type : Serum

Reference Range : DEFAULT

Category : Male

**Reference Range**

| | Lower Limit (IU/mL) | Upper Limit (IU/mL) |
|---|---|---|
| Normal | # | # |
| Panic | # | # |

**Sample Types**

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

* Enter calibrator value
** Technical limits are automatically defined by the software via the upper and lower calibrator level
# Editable by user