

## Kit RAL Stainer Fluo-RAL

REF. 360230-0000

Acid fast bacilli differential fluorescent staining



IFU058A-RAL

For professional use only.  
Please read all information carefully before using this device.

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### Intended Use

Kit RAL Stainer Fluo-RAL is intended to be used in combination with RAL Stainer instrument for acid fast bacilli differential fluorescent staining prior microscopic examination.

If applicable, RAL Diagnostics recommends using the associated RAL Diagnostics products and cannot guarantee that the expected results will be achieved if used in combination with products of other brands.

### Principle

Kit RAL Stainer Fluo-RAL allows a fluorescence detection of mycobacteria or Acid Fast Bacilli (AFB). The characteristic structure of the mycobacteria walls hampers discoloring agent penetration. This property allows AFB to keep auramine staining after discoloring with acid and alcohol. Other bacteria (non-AFB) and cell elements are counterstained by Thiazine Red.

## Kit description

### R1 Fixative Fluo-RAL

Clear colorless solution  
REF. 362115-0200 1 X 200 mL

### R2 Auramine Fluo-RAL

Cloudy yellow solution  
REF. 362325-0100 1 X 100 mL

### R3 Solution for Auramine

Clear colorless solution  
REF. 362530-0100 1 X 100 mL

### R4 Discolouring solution Fluo-RAL

Clear colorless solution  
REF. 362210-0200 1 X 200 mL

### R5 Thiazine Red Fluo-RAL

Clear red solution  
REF. 362780-0100 1 X 100 mL

### R6 Solution for Thiazine Red

Clear colorless solution  
REF. 362610-0100 1 X 100 mL

For a specific batch, refer to the analysis certificate of the batch available at [my.ral-diagnostics.fr](http://my.ral-diagnostics.fr).

## Storage

Storage temperature: 15-25°C away from light.

Bottle shelf life before opening: refer to the expiry date on the label.

Bottle shelf life after opening: 1 week after opening or 300 slides.

Once opened, the duration of use overrules the expiry date



## Active components

### R1 Fixative Fluo-RAL

Trichloroacetic acid -CAS- 76-03-9: ≤ 1%

### R2 Auramine Fluo-RAL

Ethanol -CAS- 64-17-5: < 10%

Auramine O -CAS- 2465-27-2: < 1%

Phenol -CAS- 108-95-2: < 3%

### R3 Solution for Auramine

Phenol -CAS- 108-95-2: < 10%

### R4 Discolouring solution Fluo-RAL

Ethanol -CAS- 64-17-5: ≤ 95 %

Hydrochloric acid, 37% -CAS- 7647-01-0: < 1%

### R5 Thiazine Red Fluo-RAL

Thiazine red -CAS- 2150-33-6: < 1%

Sodium carbonate -CAS- 497-19-8: < 1%

### R6 Solution for Thiazine Red

Phenol -CAS- 108-95-2: < 1%

## Hazard classification and safety information

### R1 Fixative Fluo-RAL

Danger: H314 - Causes severe skin burns and eye damage. H412 - Harmful to aquatic life with long lasting effects.

P280 - Wear protective clothing, protective gloves, eye protection. P301+P330+P331+P310 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER or doctor. P303+P361+P353+P310 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a POISON CENTER or doctor. P305+P351+P338+P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor.



### R2 Auramine Fluo-RAL

Warning: H226 - Flammable liquid and vapour.

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.



### R3 Solution for Auramine

Danger: H302 - Harmful if swallowed. H314 - Causes severe skin burns and eye damage. H341 - Suspected of causing genetic defects.

P201 - Obtain special instructions before use. P264 - Wash hands thoroughly after handling. P280 - Wear protective gloves, protective clothing, eye protection, face protection. P301+P330+P331+P310 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER or doctor. P303+P361+P353+P310 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a POISON CENTER or doctor. P305+P351+P338+P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor.



**CONT** CH<sub>6</sub>H<sub>5</sub>OH

### R4 Discolouring solution Fluo-RAL

Danger: H225 - Highly flammable liquid and vapour. H314 - Causes severe skin burns and eye damage.



P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P280 - Wear protective gloves, protective clothing, eye protection. P301+P330+P331+P310 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER or doctor. P303+P361+P353+P310 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a POISON CENTER or doctor. P305+P351+P338+P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor.

### R5 Thiazine Red Fluo-RAL

No labelling applicable

### R6 Solution for Thiazine Red

No labelling applicable

The RFID label used is a passive short-range contactless memory chip (13,56MHz).

## Personnel qualification

All samples and products must be handled by qualified and authorized personnel, using individual or collective protection, in accordance with the national directives in force in the laboratories. Personnel must also be aware of the classification of hazardous materials indicated on the label and the safety data sheet (available at [my.ral-diagnostics.fr](http://my.ral-diagnostics.fr)).

The specimen must be treated in accordance with procedures available in the laboratory and required by national authorities.

The diagnosis must be conducted by qualified and authorized personnel, in accordance with the procedures in force within the laboratory.

## Specific equipment and reagents required but not provided

Microscope slides, Fluorescence microscope with FITC filter Set (Auramine: Ex. 430 nm/Em. 510 nm, Thiazine Red: Ex. 510 nm/ Em. 600 nm) and these following RAL Diagnostics devices:  
RAL Stainer REF. 405000  
SUREFIX REF : 336000-0050

This equipment may vary depending on the protocol. Please refer to the relevant protocol (see the section operating procedure) to ensure that you have the necessary equipment to carry out tests.

## Operating procedure

The equipment used for sample processing must comply with the supplier's instructions for use.

### Sample preparation

Pre-treatment of sample from liquid culture media: Take around 300 to 400 µL of liquid culture medium (including a few beads if possible) and pour it into a microtube. Centrifuge for 1 min at 10 000 rpm and discard supernatant. Then add 2 to 3 drops of physiological saline to the microtube and vortex or stir with a loop. The sample is now ready to be smeared.

Manual bacterial smear: made a thin film of bacteria sample and leave the slide to dry at room temperature. Then bacterial smear can be fixed with mild heat source (Bunsen burner or hot plate) or chemically fixed with chemical fixative (methanol, ethanol, acetic acid, or formalin...)

***NB: Never pass through the flame a smear that is not entirely dry, this could cause cracklings and dissemination of bacteria (creation of aerosols).***

If necessary, the two fixations can be combined.

Manual bacterial smear from liquid or solid culture: Apply a drop of SUREFIX on a slide and with a loop place on top of the SUREFIX drop, the preparation from a liquid culture (as described above) or a colony from a solid culture. Mix SUREFIX drop and the sample and made a uniform smear layer. Eventually Leave the smear to air dry before placing the slide on a hot plate for 30 min at a temperature of 80 °C.

### Reagents and instruments preparation

R1 Fixative Fluo-RAL and R4 Discolouring solution Fluo-RAL are ready to use.  
Prepare Auramine solution by adding the content of R3 Solution for Auramine in the Bottle of R2 Auramine Fluo-RAL.  
Prepare Thiazine Red solution by adding the content of R6 Solution for Thiazine Red in the Bottle of R5 Thiazine Red Fluo-RAL.

The reagents containers have been designed to be used for slides staining.  
Place the 4 bottles labelled 1 to 4 in their respective set position and remove the caps and security rings.

The usual rinsing liquid for staining, validated by the laboratory, can be tap water, demineralized water, etc. Only de-ionized water is deprecated because it can cause a dysfunction of the RAL Stainer level sensor.

### Protocols

The staining steps of the protocols indicated below consist of a successive dipping of the slides in the different staining baths.

Staining settings, recommended by RAL Diagnostics, are pre-set in the RFID tag.

### Protocol for bacterial smear staining – Automated bath method- Manual microscopic analysis

Processing time: 27 min 30 s

Steps	Reagent	Time [mm: ss]	Indications
Fix	R1 Fixative Fluo-RAL	05:00	Without agitation
Rinse	Rinsing liquid	00: 10	With agitation
Stain	Auramine solution	15: 00	Without agitation
Rinse	Rinsing liquid	01: 00	With agitation
Discolor	R4 Discolouring solution Fluo-RAL	01: 00	Without agitation
Rinse	Rinsing liquid	00: 10	With agitation
Stain	Thiazine Red solution	05: 00	Without agitation
Rinse	Rinsing liquid	00: 10	With agitation
Dry	No	03:00	No

### Expected results

#### Bacterial smear

**A.F.B:** fluorescent green yellow

**Background of the preparation:** red

If observed results vary from those expected, please contact RAL Diagnostics technical service through your usual supplier for assistance.

## Performance

The efficacy of the Kit RAL Stainer Fluo-RAL reagents was evaluated in a hospital laboratory with 1 pure inbred strain and 207 clinical samples of pulmonary origin (sputum, bronchoalveolar fluid, bronchial aspirate) and non-pulmonary origin (node, parotid gland, CSF, liver biopsy, synovial fluid, pleural fluid, ascites fluid, bone biopsy, gastric tubing, urine, skin biopsy).

The sensitivity of the Kit RAL Stainer Fluo-RAL was evaluated in comparison with the laboratory's manual reference technique: the Kit Fluo-RAL. All tests were performed in parallel under the same conditions. Each clinical sample was cultured to determine its status.

The results obtained in this study show that the efficiency of the Kit RAL Stainer Fluo-RAL is 100% equivalent to the manual routine method for fluorescent samples of human origin and cultures.

Moreover, it was observed that positive slides made with the Kit RAL Stainer Fluo-RAL show more intense fluorescence than the manual routine method.

To ensure product performance, use clean and dry laboratory equipment.

The laboratory is responsible for notifying the manufacturer and state competent authority of any serious incident relating to the use of the medical device.

## User quality Control

Users are responsible for determining the appropriate quality control procedures for their laboratory and complying with applicable laboratory regulations.

RAL Diagnostics recommend using a positive smear and a negative smear from different patient samples at reagents renewal and for the first staining cycle of each day. Slides stained for quality control purposes should be checked to ensure that they are satisfactory for intended test (properly stained and free of precipitate).

Slides can be prepared in advance and heat-fixed appropriately for storage.

This control could be done using a positive patient sample or a dilute suspension of AFB recognized positive (such as *Mycobacterium abscessus* CIP 108541).

Staining results for each cell type must also be compliant with this manual expected results

These quality control procedures should only be performed by qualified personnel.

## Other products

For more information contact your usual supplier.

## Recommendations, notes, and troubleshooting

### Products appearance

If the appearance of the products differs from the description above, do not use it and contact RAL Diagnostics technical service through your usual supplier for assistance.

### Procedures notes

To prevent products degradation, please comply with the storage and handling recommendations specified in this manual.

R2 Auramine Fluo-RAL is normally turbid.

Auramine and Thiazine Red solutions can be kept one week after reconstitution.

It is necessary to perform a preliminary fixation of the bacterial smear.

The microscopic examination is usually performed with x20 and x40 dry objectives and without coverslip.

Each time fluorescent organisms are detected; it is necessary to confirm the presence of Acid Fast Bacilli (AFB) by a hot or cold Ziehl-Neelsen staining (Kit RAL Stainer Cold ZN).

It is recommended to use two different staining kits, one for direct examination smears and another one for smears coming from cultures.

Decontamination of the rinsing container must be carried out according to the recommendations of the RAL Stainer operating manual.

### Products stability

Every RAL Diagnostics product can be used until the expiry date indicated on, in its original packaging if it is still hermetically sealed.

### Staining stability

Staining quality and reproducibility depend on the correct use of the products.

## Instructions for cleaning and waste disposal

All biological samples, effluents and used consumables should be considered potentially hazardous.



To avoid any risk, apply the following instructions: dispose of samples, effluents and consumables in accordance with laboratory standards and applicable national and local standards and regulations.

Chemical and biological waste must be collected and processed by specialized, registered companies.

## Table of symbols and abbreviations

Depending on the product, you may find the following symbols on the device or the packaging material.

GHS PICTOGRAMS	INTERPRETATION
	Explosive
	Flammable
	Oxidizer
	Compressed gas
	Corrosive
	Toxic
	Harmful
	Health Hazard
	Environmental Hazard
	No labelling applicable

SYMBOL	INTERPRETATION
	Batch code
	Serial number
	Catalogue reference
	Date of manufacture
	Use up to
	Unique device identifier
	Manufacturer
	Importer
	Entry distributing the medical advice in the region concerned
	CE marking device
	In vitro diagnostic medical device
	Authorised Representative in the European Community
	Authorised Representative in Switzerland
	Complies with UK guidelines
	Do not use if packaging is damaged
	Keep away from light
	Temperature limit: 15-25°C
	Temperature limit: 15-30°C
	Keep dry
	Box: handling upwards
	Fragile
	Sterilised by irradiation
	Single sterile barrier system with outer protective packaging
	Sterile and radiation-sterilised barrier suit
	Do not reuse
	Do not re-sterilize
	Contents sufficient for n tests
	Hazardous material contained
	Consult instructions for use
	Use
	After opening, use within XX months
	The product must not be used in conjunction with an automatic colouring machine
	Indicates a medical device that contains potentially carcinogenic, mutagenic or reprotoxic (CMR) substances, or substances classified as endocrine disruptors

## Bibliography

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## Change tracking

Date	Version	Changes
05/2022	IFU058A-RAL	IVDR (EU) 2017/746 compliance

