



UIC CODE

Leaflet to be classified in Volumes :

V - TRANSPORT STOCK

VIII- TECHNICAL SPECIFICATIONS

842-1

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Brought up to date on

TECHNICAL SPECIFICATION FOR THE SUPPLY
OF PAINT PRODUCTS FOR THE PROTECTION
OF RAILWAY VEHICLES AND CONTAINERS

**NUMERISATION DANS
L'ETAT DU DOCUMENT**

(Reprint, 01-12-88)

842-1

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1 - PURPOSE

1-1 - Nature of the products

This specification defines the general characteristics, also the acceptance conditions, of paints and paint systems intended for the protection of railway vehicles and containers.

1-2 - Classification

The characteristics of the paint products are verified by series of tests effected :

- in delivery condition,
- when ready for application,
- in the dry film state.

1-3 - Reference documents

Reference is made to the following documents in the text of this specification :

UIC Leaflets 842-2 : Methods of testing for paint products

842-4 : Technical specification for the protection against corrosion and painting wagons and containers.

842-5 : Technical specification for the protection against corrosion and painting of coaches and tractive units.

ISO Standard 2409 : Paint and varnish. Quadrillage tests.

1-4 - Details to be shown in the orders

The purchasing Railway must specify in the order which tests it has adopted for the approval and acceptance of the paints. It must also specify the results to be obtained for the tests in paragraphs : 2-13, 2-24, 2-311, 2-313, 2-316, 2-317 :

- any extensions of tests prescribed in 2.52 and 2.53,
- the guarantee period prescribed in 2.16,
- the method of submission for acceptance prescribed in 4,
- the additional inscriptions it wishes to be shown on the containers - 5-2,

and supply the samples prescribed in 2.42.

2 - CHARACTERISTICS

2-1 - Characteristics in delivery condition

2.11 - Nature and composition

No condition is imposed concerning the nature and composition of the paint products, subject to them complying with the characteristics required by this specification, that they are in conformity with legislation concerning toxicity in force on the purchasing Railway, and that the components and their proportions are the same as those recorded on the approved sample, within the tolerances.

2-12 - Mass per unit volume

The mass/unit volume of the product, determined in accordance with the provisions of 3-11 of leaflet 842-2, must not differ by $\pm 5\%$ from that recorded at the same stage on the approved product.

2-13 - Content of volatile and non-volatile materials

The content of volatile and non-volatile materials is determined in accordance with the provisions of 3-12 of UIC Leaflet 842-2.

The content of non-volatile materials of the product is fixed by the purchasing Railway.

2-14 - Consistency

The consistency of the product, determined in accordance with the provisions of 3-13 of UIC Leaflet 842-2, must be equivalent, within the limits of the permissible tolerances, to the value recorded on the approved sample.

2-15 - Fineness in powder form

The fineness of the product in powder form, determined in accordance with the provisions of 3-14 of UIC Leaflet 842-2, must be :

- $\leq 30 \mu\text{m}$ for anti-corrosive priming paints,
- $\leq 20 \mu\text{m}$ for the paints of intermediate and finishing coats,
- $\leq 10 \mu\text{m}$ for reactive priming paints (wash primers).

Concessions may be granted by the purchasing Railway on written request of the supplier.

2-16 - Stability during storage

The stability during storage is determined in accordance with the provisions of 3-15 of UIC Leaflet 842-2.

The paint products must retain, without suffering any appreciable change - especially the forming of skins or excessive settling of pigments, all the properties described in this technical specification, at least during the guarantee period defined by the purchasing Railway, with effect from the date of delivery by the manufacturer.

2-17 - Resistance to frost of paint products with a water solvent

The resistance to frost of paint products with a water solvent is checked in accordance with the provisions of 3-16 of UIC Leaflet 842-2.

The products must not show any trace of separation and must retain their application characteristics.

2-18 - Flash-point - danger class.

The flash point is determined in accordance with the provisions of 3-17 of UIC Leaflet 842-2, and must be $\geq + 21^{\circ}\text{C}$.

As an exception, a concession can be granted to the supplier on his written request, by the purchasing Railway, which shall fix the permissible flash-point.

2.2 - Characteristics when ready for application

2-21 - Consistency

The consistency is determined in accordance with the provisions of 3-13 of UIC Leaflet 842-2, and must permit correct use of the paint product.

2-22 - Mass per unit volume

The mass/unit volume of the product, determined in accordance with the provisions of 3-11 of UIC Leaflet 842-2, must not differ by $\pm 5\%$ from that recorded at the application stage on the approved paint sample.

2-23 - Colour concentration per unit volume - CPV

The colour concentration per unit volume of the product, determined in accordance with the provisions of 3-21 of UIC Leaflet 842-2, must not differ by $\pm 2\%$ from that recorded at the application stage on the approved paint sample.

2-24 - Pot life

The pot life of the mixture of components at application consistency is determined in accordance with the provisions of 3-22 of UIC Leaflet 842-2, and must not be less than that specified by the purchasing Railway.

At the end of this period, the mixture must not show any signs of curdling, or appreciable gelling.

2-25 - Softening

The determination of softening is effected in accordance with the provisions of 3-23 of UIC Leaflet 842-2.

After the drying period indicated in 3-21 of UIC Leaflet 842-4 and 3-212 of UIC Leaflet 842-5, it must be possible to overcoat the paint with a further coat of paint, either by spraying or with a brush.

The application of this latter coat must not render soluble to an excessive degree the paint film for testing already applied or give rise to any change in the system which is visible after the final coat has dried.

2-26 - Drying times

The drying times are determined in accordance with the provisions of 3-24 of UIC Leaflet 842-2; they must not be less than those mentioned in 3-21 of UIC Leaflet 842-4 and 3-212 of UIC Leaflet 842-5.

2-27 - Covering power (opacity) on a contrasting surface

The covering power (opacity) on a contrasting surface is determined in accordance with the provisions of 3-25 of UIC Leaflet 842-2. It must be obtained from a dry coat thickness corresponding to 75% of the thickness of the coats prescribed in 3-21 of UIC Leaflet 842-4 and 3-212 of UIC Leaflet 842-5.

2-28 - Thickness of the dry paint coat

The thickness of the dry paint coat is determined in accordance with the provisions of 3-261 of UIC Leaflet 842-2.

For a paint system comprising several coats, the thickness of the dry film of the finishing paint must be $\geq 35\%$ of the thickness of the wet film.

For the other coats, and in all other cases, the thickness of the dry paint film must be $\geq 45\%$ of the thickness of the wet film.

In the case of paints which are required to serve as thermal or acoustic insulation, it must be possible to achieve dry coats of paint 10 mm in thickness.

2-29 - Tendency to run

The tendency to run is determined in accordance with the provisions of 3-27 of UIC Leaflet 842-2.

The thickness of paint when wet, applied under normal conditions, without any visible tendency to run occurring, must be at least 50% greater than that applied to obtain the dry film thickness prescribed in 3-21 of UIC Leaflet 842-4 and 3-212 of UIC Leaflet 842-5.

*2-3 - Characteristics of the dry film**2-31 - Mechanical characteristics**2-311 - Possibility of rubbing down the coatings*

After a drying time specified by the purchasing Railway under the conditions prescribed in 2-22 of UIC Leaflet 842-2, it must be possible for the final coating to be subjected satisfactorily to an accepted wet mechanical method of rubbing down.

2-312 - Flexibility

The flexibility tests are carried out in accordance with the indications in 3-311 of UIC Leaflet 842-2.

The dry paint film of the complete system must not show any cracking or loosening during the bend test on a cylindrical mandrel with a diameter of ;

- 10 mm : for 2 component paints and resin-alkyd based paints,
- 20 mm : for bituminous based paints,
- 100 mm : for zinc powder, insulating bituminous, VPS (vinyl polyacetate) insulating paints, and for coatings.

2-313 - Ball test

The ball test is effected in accordance with the provisions of 3-312 of UIC Leaflet 842-2.

The dry paint film formed by the complete paint system, coverings excepted, must not show any cracks or loosening when the depth of penetration of the ball reaches :

- 4 mm for 2-component paint systems,
- 8 mm for other paint systems.

The purchasing Railway may specify higher values in the order.

2-314 - Adhesion

The adhesion test is effected in accordance with the provisions of 3-313 of UIC Leaflet 842-2.

The dry paint film formed by the complete paint system and by each of the paints of the system must have the quality 1 appearance defined in 6-1 of ISO Standard 2409.

2-315 - Impact strength

The impact strength test is effected in accordance with the provisions of 3-314 of UIC Leaflet 842-2.

The paint film must not show any cracking or loosening under the effect of the impact.

2-316 - Resistance to scratching

The test for resistance to scratching is effected in accordance with the provisions of 3-315 of UIC Leaflet 842-2.

The result to be obtained is specified by the purchasing Railway.

2-317 - Hardness

The hardness test is effected in accordance with the provisions of 3-316 of UIC Leaflet 842-2.

The hardness value to be obtained is specified by the purchasing Railway.

2-318 - Resistance to abrasion of paint with a high zinc content

The test for resistance to abrasion of paint with a high zinc content is effected in accordance with the provisions of 3-317 of UIC Leaflet 842-2.

The corrosion observed must not affect more than 2% of the surface of the test panel.

2-4 - Visual characteristics

2-41 - General appearance

When examined with the naked eye, the dry paint film must be uniform, free of any specks and porosity, with evenness of colour. It must not show any pronounced orange peel or ropey appearance.

2-42 - Tension, colour and brilliance

Determination of the tension, colour and brilliance of the dry film is effected in accordance with the provisions of 3-321 of UIC Leaflet 842-2.

The tension, colour and brilliance of the dry paint film must conform to the sample supplied by the purchasing Railway.

2-5 - Physico-chemical characteristics

2-51 - Resistance to artificial ageing

The resistance to artificial ageing is determined in accordance with the provisions of 3-331 of UIC Leaflet 842-2.

The dry film of anti-corrosion priming paint, consisting of one or two coats, must not show any signs of deterioration.

The dry film formed by the complete paint system may only show a slight variation in colour and brilliance in relation to the initial condition.

However, thread-like corrosion at the level of incisions in the form of a cross on the dry paint film may attain a maximum of 2 mm.

2-52 - Resistance to salt mist

The resistance to salt mist is determined in accordance with the provisions of 3-332 of UIC Leaflet 842-2.

The dry film of anti-corrosion priming paint must not show any deterioration before a period of 500 hours has elapsed.

However, thread-like corrosion level with incisions in the form of a cross on the dry paint film may attain a maximum of 2 mm.

At the request of the purchasing Railway, this test can be extended to the complete paint system or to each of the coats forming this system.

2-53 - Resistance to alternating cooling

Resistance to alternating cooling is determined in accordance with the provisions of 3-333 of UIC Leaflet 842-2.

The dry film of anti-corrosion priming paint must not show any signs of deterioration.

At the request of the purchasing Railway, this test may be extended to the complete paint system or to each of the coats forming this system.

2-54 - Resistance to natural ageing

The resistance to natural ageing is determined in accordance with the provisions of 3-334 of UIC Leaflet 842-2.

The dry film, consisting of the complete paint system or each of the coats forming this system, must not show any of the following defects:

- deterioration visible to the naked eye by blistering or glazing,
- deterioration by chalking, in the case of polyurethane resin systems and dispersion paints, limited deterioration being tolerated in other cases,
- variation in the colour and brilliance for polyurethane resin systems and dispersion paints, limited deterioration being tolerated for other paint systems,
- deterioration by thread-like corrosion exceeding 2 mm with effect from an incision in the form of a cross, on the dry paint film.

In addition, the dry film of wash primer reactive priming paint, applied with a thickness of 15 to 20 microns, which must also give temporary protection against corrosion, must afford complete protection of the covering.

2-55 - Resistance to chemical products

The resistance to chemical products is determined in accordance with the provisions of 3-335 of UIC Leaflet 842-2.

The film consisting of the complete paint system must not show any deterioration of the colour and gloss, or permanent change of the film structure.

2-56 - Resistance to washing for paints soluble in water

The resistance to washing for paints soluble in water is determined in accordance with 3-336 of UIC Leaflet 842-2.

The film consisting of the complete paint system must not show any deterioration of the colour and gloss or permanent change to the film structure.

2-57 - Resistance to water

The resistance to water, for dispersion paints and coatings is determined in accordance with 3-337 of UIC Leaflet 842-2.

The dry film of the dispersion paint system must show a slight variation in colour only.

It must be possible for the dry films of the coatings to be classified as "very good" or "good" in accordance with the definitions of 3-33721 of UIC Leaflet 842-2.

2-58 - Resistance to heat

The determination of the resistance to heat is effected in accordance with the provisions of 3-338 of UIC Leaflet 842-2.

The dry paint film must not show any blistering. A limited variation in colour and gloss may be accepted, however.

2-59 - Suitability for welding

The suitability for welding is determined in accordance with the provisions of 3-339 of UIC Leaflet 842-2.

The progress of spot welding and, in the case of arc welding, the weld parameters, particularly the depositing speed, must only be slightly impaired by the presence of the paint film.

The protecting film must only be slightly burned.

In the case of arc welding, the porosities tolerated must not be more numerous than in the case of welding without the intervention of paint.

In the case of spot welding, stripping must be carried out by unfastening or stripping of the plate. There must be no projection of metal between the plates.

Extracted weld cores must have the same shape and practically the same dimensions, and have no internal defect.

3 - MANUFACTURE

The supply of paint products may only be entrusted to suppliers accepted by the purchasing Railway, whose products have been previously approved by it.

4 - INSPECTION

The procedures for batching, sampling and testings are defined in UIC Leaflet 842-2.

The batches of paint products are submitted for acceptance in accordance with the instructions in the order, in vats or containers.

The purchasing Railway shall specify the tests it has selected for the approval and acceptance of the paint products.

Any batch of paint products which does not completely satisfy the tests selected by the purchasing Railway or which is not in accordance with the accepted products, shall be rejected.

5 - DELIVERY AND STORAGE

5-1 - Packing

The paint products are delivered in containers, of a shape and size approved by the purchasing Railway, and these containers must be sufficiently strong to satisfy the ordinary requirements of forwarding, without deterioration.

The sealing procedures shall be settled by common agreement between the purchasing Railway and the manufacturer.

5-2 - Marking of the containers

Each container must bear the following marks :

- name of the manufacturer,
- description of the paint or components and auxiliary agents, comprising the references of the paint system, specified in 3-21 of UIC Leaflet 842-4 and 3-21T of UIC Leaflet 842-5.
- number of this UIC Leaflet,
- application process,
- the components to be mixed and the proportions of each, in the case of paint products with several components;
- nature of the thinner,
- colour
- number of the batch of manufacture,
- net volume or weight,
- the number of the month and the last two figures of the year of delivery,
- any other marks requested or authorised by the purchasing Railway, together with toxicity instructions, where applicable.

5-3 - Storage

The storage conditions of the paint products and auxiliary agents must be such that they satisfy the safety statutory provisions for the type of product in question - fire, toxicity, etc. - and that, in addition, they do not give rise to any deterioration in the characteristics defined in this leaflet, during the storage period specified by the purchasing Railway - see 2-16.

6 - GUARANTEE

The guarantee period shall be fixed at 6 months, with effect from the end of the month of delivery marked on the containers.

Paint products which, during the guarantee period, prove unsuitable for use or present anomalies likely to decrease their service life, shall be rejected.

Before being finally rejected, the defective paint products may, however, be submitted to a check test between the purchasing Railway and the supplier, if the latter so requests in writing.

When the check test confirms the defects are definitely imputable to the manufacture, the paint products shall be finally rejected.

In the event of the results of the check test failing to produce an agreement between the purchasing Railway and the supplier, the matter shall be referred to experts approved by both parties in order to settle the dispute.

In both these cases, only the ISO Standards, where these exist, must be applied.

The costs are then borne by the party on whom the responsibility devolves.

The paint products are made available to the supplier, with a view to their replacement or to reimbursement at their value on the day of rejection.

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APPLICATION

All Railways in the Union.

RECORD REFERENCES

Headings under which the question has been dealt with :

- Preparation of specifications for paints for vehicles.

(Sub-Committee for Specifications ; Paris, January, 1975).