USERS MANUAL FOR
ZINKER CLASS-FIRST COATING

Zinc-rich coating of Zinker or Galvanol — Zinker class first coating Zinc-rich coating
Russian test standard TU 20.30.12−004−27973127−2018 (aerosol container) TU 2312-001−61702992−2009 (euro tin cans) and ISO 12944 C5HIGH Certification , requirements defined in the UNE-EN ISO 12944-6:2018 standard for a Very High C4 and High C5 corrosion category. The very high durability range corresponds to more than 25 years and the high between 15 and 25 years according to UNE-EN ISO 12944-1:2018.

Zinc-rich coating is a method of application on a prepared surface of a special zinc composition containing active chemically pure zinc, polymer binders and volatile agents. The method is similar to that of applying varnish-and-paint (VPM) materials.

Zinc coatings, irrespective of their application method, exhibit protective action until they are capable of active dissolution under the effect of an external corrosive environment.

If zinc loses its active dissolution capability, its cathode protective effect degrades completely! The capability of the polymer film, during the solidification of some types of binders, to block zinc dissolution cancels the protector property in such coatings (in particular, polyurethane, epoxy resin, and acrylic ones).

The majority of zinc-filled materials in the Russian market are used as primer in coating systems «primer-top coat» or «primer-undercoat-top coat». Such compositions have no protector properties. Hence, they do not belong to zinc-rich coating and perform merely barrier functions. The Research and Production Centre for Anticorrosion Protection produces a high- quality composition GALVANOL® for zinc-rich coating. It has a 100% protector action typical of other kinds of zinc-rich coating, and of the metal-polymer aluminum-filled protective and decorative composition ALINOL®. The materials are ready to use, and can be readily applied by any varnish-and-paint method at any temperature (-35^{O}C to +50^{O}C), humidity, and even on rust.

PURPOSE AND AREA OF APPLICATION OF THE "ZINLER OR GALVANOL® ZINC-RICH COATING COMPOSITION

ZINTER/GALVANOL coating is a thin-film zinc coating that protects effectively ferrous metals against corrosion. It has superior protection properties and high adhesion to metal surfaces.
ZINKER /GALVANOL coating is intended for anticorrosion protection of surfaces of industrial equipment and metal constructions installed outdoors and indoors.
ZINKER/GALVANOL coating ensures simultaneous active (cathode) and passive (barrier) corrosion protection.

ZINKER/GAVANOL coating is elastic, resistant to vibration and shock loads and abrasion, and functions within the temperatures -60^{O}C to +150^{O}C (for a short time, up to

+180^{O}C to +210^{O}C during application of powder coatings).

Zinc-rich coating composition GALVANOL® can be used in such areas as industrial and civil engineering, transport construction, the oil and-gas economy, power engineering, railway facilities, marine port and hydrostructures, and automotive transport.
The anticorrosion protection of steelwork and structures used in atmospheric conditions of all macroclimate regions, and kinds of atmospheres and location categories shall comply with GOST 15150-69.

The coating is resistant in fresh and seawater, aqueous salt solutions (pH = 6.0- 10.0), and ethylalcohol and its aqueous solutions. In a combined coating with a metal-polymer aluminum-filled protective-and-decorative compound ALINOL®, it can be used in central cold water supply systems.

The coating is not resistant to petrol and some organic solvents.

Technical Characteristics of Zinker-rich coating composition

ZINKER / GALVANOL® is a single-component liquid composition (ready for application), comprising electrolytic zinc of high chemical purity, volatile agents and binders. The coating is supplied in sealed containers.

Each pack has a label with information:
1) Name of manufacturer;
2) Product designation;
3) Lot No. and date of manufacture;
4) Net mass.

Guaranteed shelflife–without limitation at temperatures from -40^{O}C to +30^{O}C
In intact plant packing. With further storage, the packages should be closed tight.

ZINC-RICH COATING COMPOSITION –TECHNICAL CHARACTERISTICS

Purpose	Protective anticorrosion coating (zinc-rich coating) of metal, as well as a primer for decorative VPM.
Consumption	250-280 g/m^2 with 40-mu thickness.
Colour	Grey matte, with no standard imposed on the tone.
External appearance of the dry coating	After drying, the film should be even, uniform, with no foreign matter and runs, and have a mat finish.
Solvent	Solvent (petroleum naphtha or coal tar naphtha), xylene.
Application viscosity at 20^{o}C	60s, measured with viscosity gauge B3-3.

Application	Pressure during application	Nozzle	Number of coatings
Spray gun with top-mounted bowl	3 bar	2,0-3,0 mm	1-2
Application life	Unlimited, dilute with a solvent if required.		
Dry film thickness	40-60 мu		
Holding time between coatings	10-40 minutes		
Painting with protective-decorative coatings	Only organic-soluble VPC, drying time before applying onto Galvanol® is 4-6 hours.		
Drying time at temperatures: - 30^{o}C - 10^{o}C +20^{o}C +60^{o}C	 50 minutes 40 minutes 20 minutes 10 minutes		
Thermal stability	from -60^{o}C to +160^{o}C (short-time to 210^{o}C during powder painting over the zinc-rich coating)		
Film bending elasticity	1 mm		
Coating adhesion	1 point		
Mass part of non- volatile matter	78%		
Composition density at 20^{o}C	2500 kg/m^3		
Rate of uniform open corrosion in seawater (according to the polarization resistance method)	0.020 mm/year		
Dressing	Acquires a metallic shine, but 5 mμ of the coating is abraded		
Working conditions	from -30^{o}C to +50^{o}C		
Packaging	Eurotin cans 2kg, 10kg and 40kg, aerosol container		

COMPATIBILITY WITH OTHER COATINGS

ZZINKER / GALVANOL® zinc-rich coating composition is readily compatible with 99% of organic-soluble top coatings. It is consistently compatible with polyurethane, urethane-acrylic, acrylic, epoxy resin, vinyl chloride, chlorinated rubber, and alkyl coatings. For ideal compatibility, the holding time after application of the ZINKER / GALVANOL® zinc-rich coating composition should be minimum 4-5 hours for the solvent to evaporate and not prevent adhesion in the future. The product can be used as a primer for powder paints.

The ZINKER / GALVANOL® zinc-rich coating composition effectively protects steel against corrosion in aqueous salt solutions (pH=6-9), and in fresh and seawater. The coating is not resistant to petrol and several other organic solvents; therefore, it should be covered with a medium-resistant top coating.

WORKFLOW

1. The workflow for obtaining an anticorrosion coating based on t ZINKER/GALVANOL® zinc-rich coating composition comprises the following sequence of operations:

1.1. Preparing the surface for application of the anticorrosion coating.
1.2. Preparing the working composition for application.
1.3, applying the protective coatings
1.4. Drying successively applied coatings.
1.5. Quality control of the anticorrosion coating.
1.6. Final holding of the anticorrosion coating prior to its commissioning

2. The anticorrosion coating workflow is recommended to be maintained at an ambient temperature not lower than minus 30^{O}C.

3. To perform anticorrosion protection operations in winter, the following conditions should be met:

3.1. Provide awnings screening for protection against the elements
3.2., The metal surface temperature should be no less than3o Chigherthan the dew point temperature.

PREPARING THE METAL SURFACE FOR APPLICATION OF THE COATING

1. All parts of an object to be protected should be accessible for inspection, preparing the surface, applying the protective coating and controlling its quality.

2. The surface of the object to be prepared for applying the coating should be free of burrs, sharp edges (radius less than 0.3 mm), welding spatter, solder bulging, burns-through, and flux residue. Sites for welding metalwork (structural angles, plates, etc.) shall have no inaccessible gaps and cavities. If oil, grease and other contaminants are found on the surface, clean it with detergents.

3. Prior to applying ZINKER OR GALVANOL®, prepare the metal surface as follows:

3.1. New steel (rolled stock) with tightly adhering scale shall be sand-blasted to level 2 as per GOST 9-402 and degreased.

3.2. Degrease new steel (rolled stock) with no scale.

3.3. Old rusty surface – loose rust is removed by hand or mechanically scrapers, brushes, and so forth) or with high-pressure fresh water at 10-20 MPa, followed by degreasing the surface.

3.4. Previously zinc-coated surface – contaminations and the upper layer of zinc salts are removed by hand or mechanically (high-pressure water at 10-20 MPa), followed by degreasing the surface.

3.5. Previously painted surface – the paint is removed chemically and by washing (by hand or mechanically or with water under super-high pressure 175-275 MPa), followed by degreasing the surface.

1. With mechanical working of the surface with grinding wheels or sand paper by hand the abrasive grain sizes shall be within 5 to 6 as per GOST 3647-71, or 180 to 220 as per the European FEPA standard. After using manual or mechanical cleaning methods, dust should be removed off the surface without missing any areas.

2. Compressed air for cleaning should be dry and clean, and meet GOST 9.010-80 requirements.

3. When degreasing small surface areas, use a brush moistened in solvents or xylene.

4. The working composition is applied onto a clean and degreased surface no later than in 12 hours if the metalwork was outdoors, and in 48 hours if it was indoors.

PREPARING THE WORKINGCOMPOSITION

1. ZINKER / GALVANOL® is totally ready for application with a brush, roller, or a spray gun. If required, the material can be diluted with solvents (petroleum naphtha or coal tar naphtha) or xylene. DO NOT dilute ZINKER/GALVANOL® with other solvents.

2. Prior to using, mix ZINKER/GALVANOL® in the container with a drill mixer-paddle to a homogeneous condition.

APPLICATION OF THEMATERIAL

1. The working composition is applied onto a clean and degreased surface no later than in 12 hours if the metal work was outdoors, and in 48 hours if it was indoors. Irrespective of the chosen method of application of the composition onto a prepared surface, hard-to-access welds and places should first be painted with a brush prior to applying the composition with painting equipment. If gaps and concealed cavities remain after welding, keep moisture out of these places (by any waterproofing methods that do not contaminate the surface).

2. GALVANOL® can be applied onto the worked surface with a brush, roller, and spray gun or by dipping.

    1. **Applying with a brush:** The brush should be with natural bristles, and free of dust and other contaminants. There is no need to dilute GALVANOL® with a solvent in standard conditions.
    2. **Applying with a roller:** The roller should be made of material resistant to organic solvents and free of contaminants and earlier used VPM. There is no need to dilute GALVANOL® with a solvent in standard conditions.
    3. **Applying with an air spray gun:** The equipment should be free of contaminants and earlier used VPM. If needed, GALVANOL® is diluted with solvent or xylene to 5% of weight. The air pressure should be 0.2-0.3 MPa (2-3 bar). The nozzle diameter should be 2.0-3.0 mm.
    4. **Airless spray application:** The equipment should be free of contaminants and earlier used VPM. If needed, dilute ZINKER / GALVANOL® with solvent or xylene to 4% of weight. Pressure 8-12 MPa (80-120 bar). Nozzle diameter 0.015-0.025 inches or 0.38-0.63 mm.
    5. **Dip method of applying:** If needed, dilute GALVANOL® with solvent or xylene to 15% of weight.
    6. The GALVANOL® working composition during application with any method should be regularly stirred (at 20-35-minute intervals).
    7. Application with an aerosol container: When applying the composition, hold the container vertically with the valve facing up at 25-35 cm from the surface being protected. Apply at an ambient temperature of +5^{O}C to +40^{O}C.

When applying the composition, hold the container vertically with the valve facing up at 25-35 cm from the surface being protected. Apply at an ambient temperature of +5^{O}C to +40^{O}C.

Having finished work, clean the valve: turn over the container and press the nozzle until clean gas is discharged. Remove composition residue with a swab moistened in solvent or xylene.

The material is applied layer-by-layer, with overlapping of the edge of the earlier applied coating strip.

The total coating thickness should be minimum 40 mu and maximum 160 mu. When applying onto constructions with slight mechanical deformation, the maximum thickness can be increased to 200 mu.

Perform work involving application of GALVANOL® (except when using an aerosol container) at -30^{O}C to +50^{O}C and relative humidity up to 90%.

The composition can be applied onto a moist surface. In this case, the surface should be free of water droplets. When applying at sub-zero temperatures, check for absence of ice crust. It is recommended to provide an awning when applying in precipitation conditions (snow, rain).

SAFETY PRACTICE DURING APPLICATION

The main safety requirements to work involving degreasing with solvents, and storage and transportation of chemical substances shall meet GOST 12.3.016.

During surface preparation work:

1. Wear individual protection gear to protect respiratory organs, the face and eyes;
2. Check for uninterrupted functioning of ventilation units and tightness of equipment and utility lines.

Safety requirements to the work place. The air in the work area of premises where metal surfaces are prepared shall meet GOST 12.1.005.

The noise and vibration levels during mechanical, abrasive and sand blasting operations shall be within norms set forth in GOST 12.1.003, GOST 12.1.012, and SP 2.2.1.1312.

Premises where degreasing is performed with solvents should have fire extinguishing equipment in place.

When working with compressed air, meet GOST 12.3.005 requirements.

Individual protection gear shall meet the requirements of the following standards:

-Breathing mask RPG – 67 A GOST 12.4.100
-Overalls – GOST 12.4.099 or GOST 12.4.100
-Shop coats – GOST 12.4.131 or GOST 12.4.132
-aprons – GOST 12.4.**029** **Remarks: GOST Standards equivalency to other standards available on request)**

1. special footwear – GOST 12.4.137
2. rubber boots – GOST 12265
3. rubber gloves – GOST 20010
4. Protective goggles – GOST P 12.4.230.1.

Application work can be performed by persons who have been specially trained, passed basics of technical safety tests and undergone medical inspection.

It is prohibited to use open fire within 50 m of the site of using and storing materials containing easily combustible or explosion-hazardous substances.

At workplaces, do not perform actions requiring the use of open flame or causing sparking.

During outdoor operations, workers should place themselves upwind to such operations.

When working in closed spaces, observe relevant safety rules (use a hose gas mask, a safeguarding person should be present, and so forth).

During work, keep hands and tools clean. Wash hands thoroughly not only during breaks and after completion of work, but also immediately after accidental exposure of hands to solvents. If working compositions get onto the skin, remove them with a dry swab, and then wash the skin with hot water and soap, using a brush.

QUALITY CONTROL OF ANTICORROSION WORK

Anticorrosion work is controlled both during separate operations and after the entire work has been completed.

Control quality by visual inspection. The coating after polymerization should be free of through pores, blisters and visible defects. The coating thickness is controlled with thickness gauges after drying.

ELIMINATION OF DEFECTS AND COATING REPAIR

Eliminate immediately all defects (scaling, blisters, etc.) occurring during application of the coating and when it is used. Dress the defect with sand paper, degrease and dry.

Prepare the surface and apply the anticorrosion coating according to the application process.

The coating thickness on a metal surface is checked with a thickness gauge.

TRANSPORTATION AND STORAGE

ZINKER OR GALVANOL® can be transported by all kinds of transport in closed transport vehicles according to cargo transportation rules in effect at each kind of transport.

The material is stored in closed ventilated storerooms or under awnings at temperatures within 35^{O}C. If the material is stored at higher temperatures, the manufacturer does not guarantee material compliance to specifications.

Keep ZINKER OR GALVANOL® in containers with tightly closed covers to prevent ingress of moisture, dust and other contaminants.

MANUFACTURER'S GUARANTEE

The manufacturer guarantees compliance of the material to specifications, provided the consumer shall meet transportation and storage rules, and observe application instructions. The material guaranteed shelf life is unlimited.

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