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# International Standard



# 3892

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## **Conversion coatings on metallic materials — Determination of coating mass per unit area — Gravimetric methods**

*Couches de conversion sur matériaux métalliques — Détermination de la masse par unité de surface — Méthodes gravimétriques*

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**Descriptors :** non-metallic coatings, conversion coatings, chromate coatings, phosphate coatings, oxide coatings, anodic coatings, physical tests, density measurement, specific surface.

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3892 was developed by Technical Committee ISO/TC 107, *Metallic and other non-organic coatings*, and was circulated to the member bodies in August 1977.

It has been approved by the member bodies of the following countries :

Australia	India	Romania
Austria	Israel	Spain
Brazil	Italy	Sweden
Czechoslovakia	Japan	Turkey
France	Mexico	United Kingdom
Germany, F. R.	Netherlands	USA
Hungary	Poland	USSR

The member bodies of the following countries expressed disapproval of the document on technical grounds :

South Africa, Rep. of  
Switzerland

# Conversion coatings on metallic materials — Determination of coating mass per unit area — Gravimetric methods

## 1 Scope and field of application

This International Standard specifies gravimetric methods for determining the coating mass per unit area of conversion coatings on metallic materials.

The methods are applicable to

- phosphate coatings on iron and steel;
- phosphate coatings on zinc and cadmium;
- phosphate coatings on aluminium and its alloys;
- chromate coatings on zinc and cadmium;
- chromate coatings on aluminium and its alloys.

The methods are applicable only to conversion coatings which are free from any supplementary coating such as oil, water- or solvent-based polymers, or wax.

## 2 Apparatus

Ordinary laboratory apparatus and

**2.1 Vessel**, of glass or other appropriate material, in which the conversion coatings can be dissolved.

**2.2 Analytical balance**, capable of weighing to a precision of 0,1 mg, for weighing the test pieces under examination before and after dissolution of the conversion coatings.

**2.3 Electrical equipment for electrolytic dissolution**, in the case of chromate coatings on zinc and cadmium.

## 3 Test pieces

The test pieces shall have a maximum mass of 200 g and a total surface area large enough to give a loss of mass sufficient to test, with adequate sensitivity, conformity with the requirements of the relevant material or product specification.

In order to achieve an adequate accuracy in the determination, the total surface area shall be in conformity with the following table :

Table — Total surface areas of test pieces

Expected mass of coating per unit area	Minimum total surface area of test piece
g/m <sup>2</sup>	cm <sup>2</sup>
less than 1	400
1 to 10	200
over 10 to 25	100
over 25 to 50	50
over 50	25

In order to achieve an overall precision (see 5.2) of 5 %, the surface areas should be measured to an accuracy of 1 %.

## 4 Reagents and procedures

For the preparation of solutions, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

If a sufficient number of test pieces is available, carry out each determination in duplicate or, better, in triplicate.

### 4.1 Phosphate coatings on iron and steel

#### 4.1.1 Manganese phosphate coatings

##### 4.1.1.1 Reagent

An aqueous solution containing 50 g of chromium(VI) oxide (CrO<sub>3</sub>) per litre.

##### 4.1.1.2 Procedure

Dry the test piece (area *A*) and weigh it on the analytical balance (mass *m*<sub>1</sub>, in milligrams), to the nearest 0,1 mg. Then immerse the test piece for 15 min in the reagent (4.1.1.1), main-