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GUIDE TO THE PROTECTION OF IRON AND STEEL AGAINST EXTERIOR ATMOSPHERIC CORROSION

STANDARDS ASSOCIATION OF AUSTRALIA
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The following interests are represented on Committee MT/14:

Aluminium Development Council

Australasian Corrosion Association

Australasian Institute of Metal Finishing

Australian Gas Association

Australian Institute of Steel Construction Ltd

Australian Zinc Development Association

Bureau of Steel Manufacturers of Australia

Commonwealth Scientific and Industrial Research Organization

Confederation of Australian Industry

Copper Development Association of Australia Limited

Department of Defence

Electricity Supply Association of Australia

National Association of Australian State Road Authorities

Railways of Australia Committee

Society of Automotive Engineers—Australasia

State Electrolysis Committees

Telecom Australia

University of New South Wales

Representatives of the following interest also participated in the drafting of this standard:

Department of Housing and Construction

AUSTRALIAN STANDARD

GUIDE TO THE PROTECTION OF IRON AND STEEL AGAINST EXTERIOR ATMOSPHERIC CORROSION

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PREFACE

This edition of this standard was prepared under the direction of the Association's Committee on Corrosion of Metals by its subcommittee on corrosion protection of steelwork, to supersede AS 2312—1980. The standard provides guidance for architects, engineers, builders, the surface coating industry and users of protective services in general on coating systems for the protection of iron and steel against exterior atmospheric corrosion.

The subject of this standard was previously dealt with in SAA MA1, Manual on Steel Structures, Part 5—Protection of Steel from Corrosion, and the standard represents both a revision and an expansion of SAA MA1.5; whereas, however, SAA MA1.5 contained descriptive information from which a user of the document could arrive at a satisfactory method of protection, this standard is more detailed in that systems have been included with specified lives to first maintenance. Attention is drawn to the fact that the standard is also available in the MA1 format, as a revised edition of SAA MA1.5 so that users of the Manual will continue to have a complete set of the Parts of the Manual.

During drafting of the first (1980) edition of this standard, consideration was given to BS 5493* to which ackowledgement is made. During 1980 a series of seminars was held around Australia to introduce AS 2312, and to discuss aspects which related to the preparation and use of the standard. Comments forthcoming from the seminars were considered by the subcommittee as being desirable for inclusion in AS 2312 since they provided additional information and elaboration on particular subjects, and their inclusion initiated this second edition.

In providing recommendations on appropriate protection systems, the committee was aware of the large number of systems used commercially but to avoid confusion included only a limited range of systems for each type of environment.

The committee acknowledges the developments which are taking place in the protection of iron and steel and will monitor these in order to make such changes to this standard as may become necessary.

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*BS 5493 Code of Practice for Protective Coating of Iron and Steel Structures Against Corrosion.

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FOREWORD

Introduction

This standard gives recommendations for the selection and specification of protective measures against atmospheric corrosion that are to be applied to structural steelwork. It is written on the assumption that a decision has been taken to use such measures.

It is important at the design stage to determine the prime reasons for requiring corrosion protection, as these can influence the type of protection system to be specified. For instance, there are many situations in which corrosion protection may not be necessary nor economically feasible because the corrosion rate is too low to affect the integrity of the structure, or an appropriate allowance of section thickness could be made for corrosion in the design. Under these circumstances a protection system may be applied for reasons other than structural integrity, e.g. aesthetics.

Examples where protection against structurally damaging corrosion may not be required are as follows:

—Temporary steelwork.

—Interiors of most closed and many partly open buildings.

—Steel exposed for short periods only, e.g. during construction.

—Hot and dry climates.

—Steel surrounded by an adequate thickness of concrete.

—Underground piling (depending on the surface soil conditions).

—Hermetically sealed interiors of hollow steel members.

—Structures which are approaching the end of their economic lives.

The painting of the interiors of buildings where low corrosive conditions normally prevail is covered by AS 2311. Whereas AS 2311 allows the common practice of 'wire brush clean and prime' on steel components such as roof trusses and ceiling joists, this standard deals with the more corrosive situations found in the external atmosphere, where steel is subject to the action of the elements, and atmospheres inside some industrial buildings in which corrosive agents are released, e.g. pickling shops.

This standard also includes recommendations for the protection of steel for reasons other than the prevention of structural damage caused by corrosion, such as—

—aesthetics

—increasing the level of light in work areas

—the protection of inaccessible points in marginally corrosive situations

—a form of insurance in situations regarded basically as being of low corrosivity but where there is some doubt about the assessment.

The prime reason(s) for the application of a corrosion protection system having been decided, this standard offers a selection of systems based on expected service lives to first maintenance in various environments. The systems recommended herein represent acceptable standards which may be used for the purpose and which are based on good industrial practice and usage. Nevertheless, it must be borne in mind that local knowledge of any corrosion problem may influence the decisions taken in the selection of an appropriate system.

Many of the systems outlined will provide equal performance in the field. The system chosen will depend on many factors such as—

—supplies of materials

—location

—available equipment

—labour

—cost.

This standard has been prepared in sections so as to be of the greatest benefit to the user. Reference to each of these sections is of the utmost importance where a specification for an appropriate system is being prepared.

Guidance on the Use of the Standard

This standard cannot be called up unaccompanied by the detail intended to be derived from it.

For each contract the owner or designer should draw up a complementary protection schedule detailing the surface preparation, the coating system, methods, conditions of application and inspection procedures.

As a consequence, the calling up of this standard without the complementary specification renders such cross-referencing invalid.

The following information highlights the various steps which need to be taken in using this standard to the best advantage.

The most frequent use to which this standard is expected to be put is for the protection of steel structures where it has been decided that such action is required.

When a decision has been taken to protect a structure, certain basic steps should be undertaken. These include the following:

(a) Decide a life requirement to first maintenance for the coating systems chosen, based on the requirements of the structure.

(b) Identify the exposure conditions and select an appropriate group of systems.

(c) Identify the microenvironment, compare and select a particular system from within the group of systems chosen in step (b) above.

(d) Specify the system as completely as possible.