AS 2361—1990
NZS 6608—1990

Australian Standard®
New Zealand Standard

Freight containers—Automatic identification—Operating parameters

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The following organizations are represented on the Committees responsible for this Standard:

Standards Australia Committee TE/—, Telecommunications and Electronics Standards Board

AUSSAT
Australian Broadcasting Authority
Australian Electrical and Electronic Manufacturers Association
Australian Electronics Industry Association
Australian Information Industry Association
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Overseas Telecommunications Corporation (OTC)
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Telecom Australia
University of Queensland

Additional interests participating in preparation of Standard:

Associated Container Transportation, Australia (ACTA)
Association of Australian Port and Marine Authorities
Australian Customs Service
Manufacturers and Suppliers of Electronic Identification Systems.

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PREFACE

This Standard is issued as a Joint Standard under the terms of the Memorandum of Understanding between Standards Australia and the Standards Association of New Zealand with the objective of reducing technical barriers to trade between the two nations.

This Standard was prepared on behalf of the Standards Australia Telecommunications and Electronics Standards Board to provide guidance for continuing development work in the field of automatic electronic identification of freight containers.

The Standard does not provide a detailed technological solution to the problem but seeks to encourage future development along the most productive lines within defined operational parameters.

CONTENTS

FOREWORD

The major inadequacy of present freight distribution systems is the lack of an efficient automatic electronic tracking system. Present freight tracking systems are manpower intensive, inefficient, and susceptible to errors. In addition, tracking information is obtained only on entry to and exit from a distribution system. While it is possible to put a tracer on freight moving through a system, this is a manual operation that is both expensive and time consuming. Unless tracking information is available at various points within the distribution system, it is not possible to re-route freight, to apply priorities in the most economic way, or to change priorities. Currently, logistics managers cannot exercise efficient control over freight movements within distribution systems.

Over the past few years, technological progress in the area of electronic identification systems has advanced to the stage where the application of technology can provide significant cost and operational benefits to distribution systems worldwide. While total benefits will not accrue until entire systems are implemented, major benefits can be gained in the short term by implementing the tracking concept in conjunction with electronic freight management systems.

Many different types of systems are being developed and applied in the field of transportation. Each type consists of interrogation devices at various points within the distribution system and transponders (tags) that are programmed and affixed to containers as they enter the system.

One type uses a pulsed infrared beam which is received by a battery-powered transponder (active tag) which responds by transmitting a low-power radiofrequency signal containing the programmed identification data. The signal is received by the interrogation device.

A second type uses a continuous radiofrequency beam which is received by the transponder (semi-passive tag), coded with the programmed identification data, and reflected to the interrogation device.

A third type uses a totally passive tag (no batteries) which transmits its programmed data when it enters the low frequency, low power electromagnetic field generated by an interrogation device.

Operation does not rely on contact or close proximity between tag and interrogation device as is the case with bar coding of packages, a system found to be unsuited to many transport applications.

Containers may be fitted with two or more identically programmed transponders in order to facilitate interrogation under different modes of approach to an interrogation device.

Where interrogation devices are provided at each freight terminal or transhipment point, the containers from each ship, aircraft, train, or other vehicle can be interrogated and their identities can be stored temporarily in data logging devices or downloaded directly into computers, together with the geographic location of the interrogation device and the date/time of the interrogation.

Where containers are stacked awaiting transhipment, portable interrogation devices could be used to locate particular containers requiring priority or special treatment. Accordingly, the combination of automatic identification and manual location can provide means for managerial intervention at reasonable cost.

An automatic electronic freight tracking system as described can provide real time information on the location of containers within a distribution system. Accordingly managers would be able to identify, record, account for, locate and control the dispatch, receipt, routing or re-routing of freight at convenient points in a distribution system.

STANDARDS AUSTRALIA/STANDARDS ASSOCIATION OF NEW ZEALAND

Australian/New Zealand Standard

Freight containers—Automatic identification—Operating parameters

1 SCOPE. This Standard specifies operating parameters, conditions and constraints for transponder tags and interrogation devices used for the automatic electronic identification of freight containers used on land, sea, or in the air.

The Standard also deals with the data to be contained within the tag, the interrogation device, and the host computer equipment/system.

2 REFERENCED DOCUMENTS. The documents referred to in this Standard are listed in Appendix A.

3 SAFETY. Automatic identification equipment will be used in areas in which both occupational and non-occupational exposure limits apply. In accessible areas, emission levels of radiated energy from electronic automatic identification equipment shall therefore comply with Standards for non-occupational exposure and shall not exceed the specified limits for non-occupational exposure in Australia or New Zealand, depending on the Country of use.

For radiofrequency radiation, it is recommended that, notwithstanding the specified limits, the design and application of the equipment be such that exposure levels are As Low As Reasonably Achievable, economic and social conditions being taken into account (see Note 2).

NOTES:

1. For radiofrequency radiation, see IRPA Guidelines, also AS 2772.1 and AS 2772.2 (for use in Australia), NZS 6609.1 and NZS 6609.2 (for use in New Zealand).
2. The recommendation known as the ALARA principle made by ICRP in 1965 (see ICRP 9, Paragraph 52) was further developed in 1973 (see ICRP 22, Paragraph 12) and endorsed by WHO in 1981 (see WHO Environmental Health Criteria 16, Clause 1.2.6). The adverb ‘Reasonably’ replaces ‘Readily’ (see ICRP 22, Paragraph 20).
3. For laser radiation, see AS 2211.
4. For light and near-infrared radiation, see ACGIH limits.

Where equipment is to operate in areas which may be hazardous due to the presence of flammable gases or combustible dusts, the equipment shall be explosion-protected, i.e. it shall comply with AS 2380.7 or any other technique suitable for the particular area involved (see AS 1076.1).

Where equipment has to be designed and operated in order to achieve a negligible possibility of inadvertent initiation of electro-explosive devices (EEDs), reference should be made to BS 6657.

4 OPERATING FREQUENCY AND POWER. Equipment using radiofrequency shall be approved in respect of both operating frequency and power emission by the Department of Transport and Communications (for use in Australia) or by the Communications Division, Ministry of Commerce (for use in New Zealand).

5 TRANSPONDERS (TAGS).

5.1 Size and mass. The maximum dimensions and mass of a transponder including its means of mounting shall be—

breadth:	200 mm
length:	400 mm
depth:	20 mm
mass:	250 g

5.2 Operability. The transponder shall be fully operational when installed within ±15° of its intended orientation.

5.3 Method of fixing. The transponder shall be capable of being fixed to wood, plastic, or metal in a manner capable of withstanding normal freight handling procedures.

5.4 Environmental withstand. The transponder shall be physically robust and shall withstand the conditions specified in Table 1.

5.5 Data content. The transponder shall be arranged to hold the data specified in ISO 6346 which is as follows:

(a) Owner code: 4 capital letters

(b) Serial number: 6 Arabic numerals

(c) Check digit: 1 Arabic numeral

Other data may be incorporated as desired.

5.6 Battery life. Where a battery is incorporated, a transponder shall provide a normal operating life of eight years based on 20 transactions per day.