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Part 51: Standard transfer specification (STS) – Physical layer protocol for one-way numeric and magnetic card token carriers

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

METERING – PAYMENT SYSTEMS –

Part 51: Standard transfer specification (STS) – Physical layer protocol for one-way numeric and magnetic card token carriers

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International Standard IEC 62055-51 has been prepared by working group 15, of IEC technical committee 13: Electrical energy measurement, tariff and load control.

IEC 62055-51 is complementary to, and is to be read in conjunction with, IEC 62055-41.

The text of this standard is based on the following documents:

CDV	Report on voting
13/1406/CDV	13/1410/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

The IEC 62055 series covers payment systems, encompassing the customer information systems, point of sales systems, token carriers, payment meters and the respective interfaces that exist between these entities. At the time of preparation of this part, IEC 62055 comprised the following parts, under the general title *Electricity metering – Payment systems:*

Part 21: Framework for standardization

Part 31: Particular requirements – Static payment meters for active energy (classes 1 and 2)

Part 41: Standard transfer specification – Application layer protocol for one-way token carrier systems

Part 51: Standard transfer specification – Physical layer protocol for one-way numeric and magnetic card token carriers

Part 52: Standard transfer specification – Physical layer protocol for a two-way virtual token carrier for direct local connection

The Part 4x series specifies application layer protocols and the Part 5x series specifies physical layer protocols.

The standard transfer specification (STS) is a secure message protocol that allows information to be carried between point-of-sale (POS) equipment and payment meters and caters for several message types such as credit, configuration control, display, and test instructions. It further specifies devices and codes of practice that allow for the secure management (generation, storage, retrieval and transportation) of cryptographic keys used within the system.

The national electricity utility in South Africa (Eskom) first developed and published the STS in 1993 and transferred ownership to the STS Association in 1998 for management and further development.

Prior to the development of the STS a variety of proprietary payment meters and POS equipment had been developed, which were, however, not compatible with each other. This gave rise to a definite need among the major users to move towards standardized solutions in addressing operational problems experienced where various types of payment meter and POS equipment had to be operated simultaneously. An STS was developed that would allow for the application and inter-operability of payment meters and POS equipment from multiple manufacturers in a payment metering installation.

The TokenCarrier is the physical device or medium used to transport the information from the vending system to the payment meter. Two types of token carriers are specified in this part of IEC 62055, a magnetic card and a numeric token carrier, which have been approved by the STS Association. New token carriers can be proposed as new work items through the National Committees or through the STS Association.

Although the main implementation of the STS is in the electricity supply industry, it inherently provides for the management of other utility services like water and gas. Future revisions of the STS may allow for other token carrier technologies like smart cards and memory keys with two-way functionality and to cater for a real-time clock and complex tariffs in the payment meter.

The STS Association has established a D-type liaison with working group 15 of IEC TC 13 for the development of standards within the scope of the STS and is thus responsible for the maintenance of any such IEC standards that might be developed as a result of this liaison.

The STS Association is also registered with the IEC as a Registration Authority for providing maintenance services in support of the STS (see Clause C.1 of IEC 62055-41 for more information).

ELECTRICITY METERING – PAYMENT SYSTEMS –

Part 51: Standard transfer specification (STS) – Physical layer protocol for one-way numeric and magnetic card token carriers

1 Scope

This part of IEC 62055 specifies a physical layer protocol of the standard transfer specification (STS) for transferring units of credit and other management information between a point-of-sale (POS) system and an STS-compliant electricity payment meter.

It specifies

- encoding of token data onto token carriers in the physical layer protocol at the POS for various TokenCarrierTypes such as numeric and magnetic cards;
- decoding of token data from token carriers in the physical layer protocol at the payment meter for various TokenCarrierTypes such as numeric and magnetic cards.

It is intended for use by manufacturers of payment meters that have to accept tokens that comply with the STS, and also by manufacturers of POS systems that have to produce STS-compliant tokens, and should be read in conjunction with IEC 62055-41.

NOTE 1 Although developed for payment systems for electricity, the standard also covers tokens used in other utility services, such as water and gas.

NOTE 2 STS-compliant products are required to comply with selective parts of this International Standard only, which should be the subject of the purchase contract (see Annex A).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-300, *International Electrotechnical Vocabulary – Electrical and electronic measurements and measuring instruments – Part 311: General terms relating to measurements – Part 312: General terms relating to electrical measurements – Part 313: Types of electrical measuring instruments – Part 314: Specific terms according to the type of instrument*

IEC 62051, *Electricity metering – Glossary of terms*

IEC 62055-31:2005, *Electricity metering – Payment systems – Part 31: Particular requirements – Static payment meters for active energy (classes 1 and 2)*

IEC 62055-41, *Electricity metering – Payment systems – Part 41: Standard transfer specification – Application layer protocol for one-way token carrier systems*

ISO/IEC 7810:2003, *Identification cards – Physical characteristics*

ISO/IEC 7811-2:2001, *Identification cards – Recording technique – Part 2: Magnetic stripe – Low coercivity*

ISO/IEC 7813:2006, *Information technology – Identification cards – Financial transaction cards*