



BSI Standards Publication

Space systems — Flight-to-ground umbilicals

National foreword

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The UK participation in its preparation was entrusted to Technical Committee ACE/68, Space systems and operations.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Foreword

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This document was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

This second edition cancels and replaces the first edition ([ISO 15389:2001](http://www.iso.org/iso/15389)), which has been technically revised. It also incorporates the Amendment ISO 15389:2001/Amd 1:2005 and the Technical Corrigendum ISO 15389:2001/Cor 1:2006.

The main changes are as follows:

- addition of [4.9](#) on the prevention of accidental cross-connection.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document establishes the general requirements and criteria for flight-to-ground umbilical systems used by space systems. The purpose of this document is to establish uniform engineering practices and methods and to ensure the inclusion of essential requirements in the design of reusable flight-to-ground umbilical systems that support the launch of space systems. This document is not intended to define how to design umbilicals but to define the minimum requirements for umbilicals.

Prevention of accidental cross-connection of umbilical system connectors and couplings is extremely important. Launch vehicle and spacecraft assemblies and features are often unique, requiring many connectors and couplings to be in close proximity to each other. The accidental cross-connection of service lines can result in very serious and even tragic consequences. For example:

- supplying other gas or fluids;
- supplying gas or fluid under other pressure;
- supplying the electric power with other parameters;
- supplying an error signal (command).

Therefore, differences in design of connectors and couplings that are located close to each other should be significant. Such differences can be both in design and in marking for identification.

International cooperation in space engineering assumes international cooperation in design, manufacture, and operation. The application of uniform methods increases the reliability of space systems by minimizing the accidental cross-connection of connectors and couplings. The application of unified symbols promotes mutual understanding and personnel training.