12 Profiles

12.1 Introduction

A *profile* identifies a subset of this International Standard that has been specified to meet the needs of a specific application area. Only those subsets that can define, represent and/or process spatial positions shall be allowed. The core of a profile is a specified set of compatible ORMs and SRFTs. A profile definition includes error criteria for any functional implementations of SRF operations included in the profile. The default profile requires support for all ORMs and SRFTs specified in this International Standard. Additional profiles may be added by registration.

An ORM and an SRFT are *compatible* if the ORM is applicable to the SRFT. An ORM is *applicable* to an SRFT if the object associated with the ORM satisfies the object or object type specification of the SRFT and the ORM satisfies the ORM constraint specification of the SRFT.

The error criteria in a profile are defined in terms of accuracy domain templates for SRFTs. An *accuracy domain template* for an SRFT is a set of coordinate-component value interval constraints expressed in terms of the SRF template parameters and a set of error bounds for positional, directional, and ratio errors.

If S is an SRF based on an SRFT with a specified accuracy domain template, the *accuracy domain* of S is the set of valid coordinates in the coordinate-space of S that satisfy the accuracy domain template interval constraints evaluated with the SRFT parameter values for S. Error bounds pertain to SRF operations on the coordinates in the accuracy domain of S.

The error criteria specified in a profile are used to specify functional conformance (see Clause 14).

An SRM profile specification includes:

a) a description of the profile (see 13.2.4),

b) a specification of a non-empty subset of standard and registered ORMs (along with their corresponding RTs (see 7.4.5)) each of which shall be applicable to at least one SRFT specified in c,

c) a specification of a non-empty subset of the set of standard and registered SRFTs such that each SRFT in the set is compatible with some ORM specified in b,

d) specifications of subsets of standard and registered SRFs and SRFSs based on compatible ORMs in b and SRFTs in c,

e) a (possibly empty) subset of the set of standard and registered DSSs, and

f) a specification of an accuracy domain template and positional, directional, and ratio error bounds for each SRFT specified in c.

The "default" profile is specified in 12.3. Guidelines for registering profiles are in 13.3.12. The proposal format for profile registration is provided in H.13. Conformance requirements are specified in 14.2.

12.2 Profile specification

The elements of a profile specification are defined in Table 12.1.

Table 12.1 — SRM profile specification elements

Element	Definition		
Profile label	The label of the profile (see 13.2.2).		
Profile code	The code of the profile (see 13.2.3).		
Description	A description of the profile (see 13.2.4).		
ORM profile set	A non-empty subset of standard and registered ORMs, each of which shall be applicable to at least one SRFT in the SRFT profile set, and the RTs associated with each ORM in the set.		
SRFT profile set	A non-empty subset of standard and registered SRFTs such that each SRFT in the set is compatible with some ORM specified in the ORM profile set.		
SRF profile set	A subset of the standard and registered SRFs, including only SRFs derived from SRFTs in the SRFT profile set, and specifying an ORM in the ORM profile set.		
SRFS profile set	A subset of the standard and registered SRFSs, including only SRFSs that are derived from an SRFT in the SRFT profile set, and such that at least one ORM specified in the ORM profile set satisfies the ORM constraint of the SRFS.		
DSS profile set	A subset of the standard and registered DSSs.		
SRFT accuracy	This element may be repeated for single SRFTs or groups of SRFTs in the SRFT profile set. Each SRFT in the SRFT profile set shall appear in one and only one of these elements.		
	SRFT label(s)	The label(s) of the SRFT profile set member(s).	
	Error bounds	ε_P : the positional error bound in metres, ε_D : the directional error bound in radians, and ε_R : the ratio error bound. Optionally, error bounds for one or more subsets of the ORM profile set.	
	Accuracy domain template	A specification of the accuracy domain template using template parameters common to all SRFTs listed in the element.	

As specified in 4.11, the unit of length is the metre, and the unit of angular measure is the radian.

An SRF *belongs to a profile* if it is based on an SRFT in the SRFT profile set and on an ORM in the ORM profile set.

An implementation conforms to the *computational accuracy requirement* of a profile if for every SRF S that belongs to the profile, positional, directional and ratio errors for SRF operations on coordinates in the accuracy domain for S shall not exceed the positional, directional and ratio error bounds specified in the profile for the corresponding SRFT and ORM. These requirements assume computational digital accuracy at least as accurate as double precision, as specified in IEC 60559 (see [IEC 60559]).

Positional error is measured using the Euclidian distance for coordinates specified in Clause 10. Directional errors apply to spatial operations that compute an angle. Ratio errors apply to spatial operations that compute point distortion. For implementations of geodesic distance (see 10.7.2), the computational accuracy requirement shall apply to distances not exceeding 95% of the longest geodesic distance on the applicable oblate ellipsoid RD.