

## 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 SRFTs, along with an applicable set of ORMs, and sets of SRFs and/or SRF sets that can be specified using these SRFTs and ORMs. A profile definition also may include error criteria for conformance (see [Clause 14](#)) of any functional implementations of operations that apply to the SRFs included in the profile. The default profile requires support for all SRFTs and ORMs specified in this International Standard. Additional profiles may be specified by registration in accordance with [Clause 13](#).

An SRM profile specification includes:

- a) a description of the profile (see [13.2.4](#)),
- b) a specification of a non-empty subset of standardized and registered ORMs, such that each ORM in the set shall be applicable to at least one SRFT specified in c,
- c) a specification of a non-empty subset of the set of standardized and registered SRFTs such that for each SRFT in the set, there is at least one ORM specified in b that is applicable to that SRFT,
- d) specifications of subsets of standardized and registered SRFs and SRF sets based on SRFTs specified in c, and applicable ORMs in b; these subsets shall not both be empty,
- e) a (possibly empty) subset of the set of standardized and registered [DSSs](#), and
- f) optional specifications of error criteria, consisting of an accuracy domain template and positional, directional, and ratio error bounds, for SRFTs specified in c.

Accuracy domain templates and error criteria are defined in [14.2.1](#). The “default” profile is specified in [12.3](#). Guidelines for registering profiles are in [13.3.13](#). 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
<b>Profile label</b>	The label of the profile (see <a href="#">13.2.2</a> ).
<b>Profile code</b>	The code of the profile (see <a href="#">13.2.3</a> ).
<b>Description</b>	A description of the profile (see <a href="#">13.2.4</a> ).
<b>Standard edition used</b>	The edition number of the SRM standard from which the entries in the profile are obtained.
<b>Amendment(s) used</b>	A list of all associated amendment numbers from which the entries in the profile are obtained, or "0" if no amendments are used.

Element	Definition	
<b>Registered concept(s) included</b>	"Yes" or "No", indicating whether any registered entries from the <a href="#">International Register of Items</a> are included in the profile.	
<b>ORM(s)</b>	A non-empty subset of standardized and registered ORMs, such that each ORM in the subset shall be applicable to at least one SRFT in the profile.	
<b>SRFT(s)</b>	A non-empty subset of standardized and registered SRFTs, such that for each SRFT in the subset, there is at least one ORM in the profile that is applicable to that SRFT.	
<b>SRF(s)</b>	A subset of the standardized and registered SRFs that are derived from an SRFT in the profile, and specifying an ORM in the profile.	
<b>SRF set(s)</b>	A subset of the standardized and registered SRF sets that are derived from an SRFT in the profile, and such that at least one ORM specified in the profile satisfies the ORM constraint of the SRF set.	
<b>DSS(s)</b>	A subset of the standardized and registered DSSs.	
<b>Error criteria</b>	This optional element may be repeated for single SRFTs or groups of SRFTs in the profile. An SRFT in the profile shall appear in at most one of these elements.	
	<b>SRFT label(s)</b>	The label(s) of the SRFT in the profile.
	<b>Error bounds</b>	$\varepsilon_P$ : the positional error bound in metres, $\varepsilon_D$ : the directional error bound in radians, and $\varepsilon_R$ : the ratio error bound. Optionally, error bounds for one or more subsets of the ORM profile set.
	<b>Accuracy domain template</b>	A specification of the accuracy domain template using template parameters common to all SRFTs listed in the element.

The non-empty subsets of ORMs, SRFTs, SRFs, SRF sets and DSSs may be explicit or may be expressed in a clear and unambiguous short-hand form that, when expanded, ensures the intended subset is produced.

EXAMPLE 1 "All standardized ORMs".

EXAMPLE 2 "All standardized SRFs".

EXAMPLE 3 "All object-fixed ERMs".

EXAMPLE 4 "All standardized ORMs in the profile SRM\_3\_0\_MARS\_PROJECT\_PROFILE", where SRM\_3\_0\_MARS\_PROJECT\_PROFILE is the label of an existing profile.

As specified in [4.12](#), the unit of length is the metre, and the unit of angular measure is the radian.

An implementation conforms to the computational accuracy requirement of a profile if for every SRF that is included in the profile or is a member of an SRF set that is included in the profile, positional, directional and ratio errors for operations on SRF coordinates in the accuracy domain shall not exceed the positional, directional and ratio error bounds (if any) specified in the error criteria element applicable to both the ORM and SRFT of the SRF. These requirements assume computational digital accuracy at least as accurate as double precision, as specified in [ISO/IEC/IEEE 60559:2011](#).

Positional error may be estimated from coordinate values using the methods in [1.6](#). 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.

### 12.3 Default profile

The default profile is specified in [Table 12.2](#). This profile supports all of the functionality specified in this International Standard but does not include any registered items. This profile includes all ORMs, SRF templates, SRF sets, SRF set members, and standardized SRFs as defined in this International Standard. Error criteria are provided for conformance of implementations of the corresponding operations and functionality.

**Table 12.2 — Default profile specification**

Element	Specification	
<b>Profile label</b>	SRM_3_0_DEFAULT_PROFILE	
<b>Profile code</b>	1	
<b>Description</b>	Full functionality for standardized SRM concept instances.	
<b>Standard edition used</b>	3	
<b>Amendment(s) used</b>	0	
<b>Registered concept(s) included</b>	No.	
<b>ORMs</b>	All standardized ORMs. (See <a href="#">Annex E</a> .)	
<b>SRFTs</b>	All standardized SRFTs. (See <a href="#">8.5</a> .)	
<b>SRFs</b>	All standardized SRFs. (See <a href="#">8.6</a> .)	
<b>SRF sets</b>	All standardized SRF sets. (See <a href="#">8.7</a> .)	
<b>DSSs</b>	All standardized DSSs. (See <a href="#">9.8</a> .)	
<b>Error criteria</b>	<b>SRFT label(s)</b>	CELESTIOCENTRIC LOCAL_SPACE_RECTANGULAR_3D LOCAL_TANGENT_SPACE_EUCLIDEAN LOCOCENTRIC_EUCLIDEAN_3D SOLAR_MAGNETIC_ECLIPTIC SOLAR_MAGNETIC_DIPOLE LOCAL_SPACE_RECTANGULAR_2D
	<b>Error bounds</b>	$\varepsilon_P = 0,001\text{m}$ , $\varepsilon_D = 0,000\ 1$ , $\varepsilon_R = 0,000\ 1$ .
	<b>Accuracy domain template</b>	Euclidean distance from the origin $\leq 1\ 000\ 000\ 000\ \text{m}$ .

Element	Specification	
Error criteria	SRFT label(s)	LOCAL_TANGENT_SPACE_AZIMUTHAL_SPHERICAL LOCAL_TANGENT_SPACE_CYLINDRICAL CELESTIOMAGNETIC EQUATORIAL_INERTIAL SOLAR_ECLIPTIC SOLAR_EQUATORIAL HELIOSPHERIC_ARIES_ECLIPTIC HELIOSPHERIC_EARTH_ECLIPTIC HELIOSPHERIC_EARTH_EQUATORIAL LOCAL_SPACE_AZIMUTHAL LOCAL_SPACE_POLAR
	Error bounds	$\varepsilon_P = 0,001\text{m}$ , $\varepsilon_D = 0,000\ 1$ , $\varepsilon_R = 0,000\ 1$ .
	Accuracy domain template	$\rho \leq 1\ 000\ 000\ 000\ \text{m}$ .
Error criteria	SRFT label(s)	CELESTIODETTIC PLANETODETTIC
	Error bounds	$\varepsilon_P = 0,001\text{m}$ , $\varepsilon_D = 0,000\ 1$ , $\varepsilon_R = 0,000\ 1$ . Oblate ellipsoid ORMs restricted to ellipsoid RD's with $a \leq 6\ 400\ 000$ and $f \leq 1/150$ .
	Accuracy domain template	$-50\ 000\text{m} \leq h \leq +1\ 000\ 000\text{m}$ .
Error criteria	SRFT label(s)	TRANSVERSE_MERCATOR
	Error bounds	$\varepsilon_P = 0,001\text{m}$ , $\varepsilon_D = 0,000\ 1$ , $\varepsilon_R = 0,000\ 1$ . Oblate ellipsoid ORMs restricted to ellipsoid RD's with $a \leq 6\ 400\ 000$ and $f \leq 1/150$ .
	Accuracy domain template	$-3,5\left(\frac{\pi}{180}\right) \leq \lambda - \lambda_{\text{origin}} \leq 3,5\left(\frac{\pi}{180}\right)$ , $-89,5\left(\frac{\pi}{180}\right) \leq \varphi \leq 89,5\left(\frac{\pi}{180}\right)$ , and $-50\ 000\text{m} \leq h \leq +1\ 000\ 000\text{m}$ .
Error criteria	SRFT label(s)	MERCATOR EQUIDISTANT_CYLINDRICAL
	Error bounds	$\varepsilon_P = 0,001\text{m}$ , $\varepsilon_D = 0,000\ 1$ , $\varepsilon_R = 0,000\ 1$ . Oblate ellipsoid ORMs restricted to ellipsoid RD's with $a \leq 6\ 400\ 000$ and $f \leq 1/150$ .

Element	Specification	
	<b>Accuracy domain template</b>	$-89,5 \left( \frac{\pi}{180} \right) \leq \varphi \leq 89,5 \left( \frac{\pi}{180} \right)$ , and $-50\,000\text{m} \leq h \leq +1\,000\,000\text{m}$ .
<b>Error criteria</b>	<b>SRFT label(s)</b>	OBLIQUE_MERCATOR_SPHERICAL
	<b>Error bounds</b>	$\varepsilon_P = 0,001\text{m}$ , $\varepsilon_D = 0,000\,1$ , $\varepsilon_R = 0,000\,1$ . Oblate ellipsoid ORMs restricted to ellipsoid RD's with $a \leq 6\,400\,000$ and $f \leq 1/150$ .
	<b>Accuracy domain template</b>	$(\lambda, \varphi) : k(\lambda, \varphi) \leq 5$ , where $k(\lambda, \varphi)$ is the point distortion function, and $-50\,000\text{m} \leq h \leq +1\,000\,000\text{m}$ . (See <a href="#">Table 5.19</a> .)
<b>Error criteria</b>	<b>SRFT label(s)</b>	LAMBERT_CONFORMAL_CONIC
	<b>Error bounds</b>	$\varepsilon_P = 0,001\text{m}$ , $\varepsilon_D = 0,000\,1$ , $\varepsilon_R = 0,000\,1$ . Oblate ellipsoid ORMs restricted to ellipsoid RD's with $a \leq 6\,400\,000$ and $f \leq 1/150$ .
	<b>Accuracy domain template</b>	$(\lambda, \varphi) : k(\lambda, \varphi) \leq 5$ , where $k(\lambda, \varphi)$ is the point distortion function, and $-50\,000\text{m} \leq h \leq +1\,000\,000\text{m}$ . (See <a href="#">Table 5.21</a> .)
<b>Error criteria</b>	<b>SRFT label(s)</b>	POLAR_STEREOGRAPHIC
	<b>Error bounds</b>	$\varepsilon_P = 0,001\text{m}$ , $\varepsilon_D = 0,000\,1$ , $\varepsilon_R = 0,000\,1$ . Oblate ellipsoid ORMs restricted to ellipsoid RD's with $a \leq 6\,400\,000$ and $f \leq 1/150$ .
	<b>Accuracy domain template</b>	$0 \leq \varphi \leq +\pi/2$ (north aspect), or $-\pi/2 \leq \varphi \leq 0$ (south aspect), and $-50\,000\text{m} \leq h \leq +1\,000\,000\text{m}$ . (See <a href="#">Table 5.22</a> .)

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