

Annex D (normative)

RDs associated with physical objects

D.1 Introduction

This annex presents the specification of RDs whose parameters are determined as a result of measurements of a physical object. Parameter values are specified by value or by reference. Parameters specified by reference use the terminology of the cited references. Those terms are enclosed in brackets ({ }). Referenced values in length units other than metres are converted to metres to specify the corresponding RD parameter. The zero value of flattening for a sphere RD is a precise value.

D.2 RDs

The elements of an ORM specification are defined in [Table 7.9](#). [Table D.1](#) is a directory of these RDs organized by the type of RD surface. The RD entries in each table are grouped by physical object type and then ordered alphabetically by their label. [Table D.1](#) includes RDs specified in this annex and deprecated RDs specified in [Annex J](#).

Table D.1 — RD specification directory

RD specification table	Tables
non-sphere Oblate ellipsoid RD specifications	Table D.2 and Table J.2
Sphere RD specifications	Table D.3 and Table J.3
Prolate ellipsoid RD specifications	Table D.4 and Table J.4
Tri-axial ellipsoid RD specifications	Table D.5 and Table J.5

Table D.2 — Oblate ellipsoid RD specifications

RD label	RD code	Description	Parameters			Date	References
			Major semi-axis, a	Flattening, f	Error estimate		
Object type: Earth							
AIRY_1830	17	Airy	6 377 563,396	1/299,324 964 6	Assumed precise	1830	[83502T, App. A-1, "AA"]
APL_4r5_1968	20	APL 4.5	6 378 144	1/298,23	Unknown	1968	[DIGEST, Table 6.1, "AP"]
AUSTRALIAN_NATIONAL_1966	23	Australian national	6 378 160	1/298,25	Assumed precise	1966	[83502T, App. A-1, "AN"]
AVERAGE_TERRESTRIAL_1977	24	Average terrestrial system	6 378 135	1/298,257	Unknown	1977	[DIGEST, Table 6.1, "AT"]
BESSEL_1841_ETHIOPIA	26	Bessel (Ethiopia, Indonesia, Japan, and Korea)	6 377 397,155	1/299,152 812 8	Assumed precise	1841	[83502T, App. A-1, "BR"]
BESSEL_1841_NAMIBIA	27	Bessel (Namibia)	6 377 483,865	1/299,152 812 8	Assumed precise	1841	[83502T, App. A-1, "BN"]
CLARKE_1858	33	Clarke	6 378 235,6	1/294,260 676 8	Unknown	1858	[DIGEST, Table 6.1, "CA"]
CLARKE_1858_MODIFIED	34	Clarke - modified	6 378 293,645	1/294,26	Unknown	1858	[DIGEST, Table 6.1, "CB"]
CLARKE_1866	35	Clarke	6 378 206,4	1/294,978 698 2	Assumed precise	1866	[83502T, App. A-1, "CC"]
CLARKE_1880	36	Clarke	6 378 249,145	1/293,465	Assumed precise	1880	[83502T, App. A-1, "CD"]

RD label	RD code	Description	Parameters			Date	References
			Major semi-axis, a	Flattening, f	Error estimate		
CLARKE_1880_CAPE	37	Clarke - Cape	6 378 249,145	1/293,466 307 7	Unknown	1880	[DIGEST] , Table 6.1, "CE"]
CLARKE_1880_FIJI	38	Clarke - Fiji	6 378 301	1/293,465	Unknown	1880	[DIGEST] , Table 6.1, "CJ"]
CLARKE_1880_IGN	39	Clarke - IGN	6 378 249,2	1/293,466 020 8	Unknown	1880	[DIGEST] , Table 6.1, "CG"]
CLARKE_1880_PALESTINE	40	Clarke - Palestine	6 378 300,782	1/293,466 307 7	Unknown	1880	[DIGEST] , Table 6.1, "CF"]
CLARKE_1880_SYRIA	41	Clarke - Syria	6 378 247,842	1/293,466 351 7	Unknown	1880	[DIGEST] , Table 6.1, "CI"]
DANISH_1876	45	Danish - Andrae	6 377 104,430	1/300	Unknown	1876	[DIGEST] , Table 6.1, "DA"]
DELAMBRE_1810	47	Delambre	6 376 985,228	1/308,64	Unknown	1810	[DIGEST] , Table 6.1, "DB"]
EVEREST_1948	57	Everest	6 377 304,063	1/300,801 7	Assumed precise	1948	[83502T] , App. A-1, "EE"]
EVEREST_1956	58	Everest	6 377 301,243	1/300,801 7	Assumed precise	1956	[83502T] , App. A-1, "EC"]
EVEREST_1969	60	Everest	6 377 295,664	1/300,801 7	Assumed precise	1969	[83502T] , App. A-1, "ED"]
EVEREST_ADJ_1937	56	Everest 1830 - adjusted	6 377 276,345	1/300,801 7	Assumed precise	1937	[83502T] , App. A-1, "EA"]

RD label	RD code	Description	Parameters			Date	References
			Major semi-axis, a	Flattening, f	Error estimate		
EVEREST_BRUNEI_1967	61	Everest 1830 - 1967 definition (Brunei and East Malaysia - Sabah and Sarawak)	6 377 298,556	1/300,801 7	Assumed precise	1967	[83502T, App. A-1, "EB"]
EVEREST_REVISSED_1962	59	Everest 1830 - revised definition	6 377 309,613	1/300,801 7	Assumed precise	1962	[83502T, App. A-1, "EF"]
FISCHER_1960	62	Fischer - Mercury	6 378 166	1/298,3	Unknown	1960	[DIGEST, Table 6.1, "FM"]
FISCHER_1968	63	Fischer	6 378 150	1/298,3	Unknown	1968	[DIGEST, Table 6.1, "FC"]
GRS_1967	67	Geodetic Reference System (GRS)	6 378 160	1/298,247 167 4	Unknown	1967	[DIGEST, Table 6.1, "RE"]
GRS_1980	68	Geodetic Reference System (GRS)	6 378 137	1/298,257 222 101	Assumed precise	1980	[83502T, App. A-1, "RF"]
HELMERT_1906	70	Helmert	6 378 200	1/298,3	Assumed precise	1906	[83502T, App. A-1, "HE"]
HOUGH_1960	72	Hough	6 378 270	1/297	Assumed precise	1960	[83502T, App. A-1, "HO"]
IAG_1975	74	International Association of Geodesy (IAG) best estimate	6 378 140	1/298,257	Unknown	1975	[DIGEST, Table 6.1, "IA"]
INDONESIAN_1974	77	Indonesian	6 378 160	1/298,247	Assumed precise	1974	[83502T, App. A-1, "ID"]
INTERNATIONAL_1924	78	International	6 378 388	1/297	Assumed precise	1924	[83502T, App. A-1, "IN"]

RD label	RD code	Description	Parameters			Date	References
			Major semi-axis, a	Flattening, f	Error estimate		
KRASSOVSKY_1940	84	Krassovsky	6 378 245	1/298,3	Assumed precise	1940	[83502T, App. A-1, "KA"]
KRAYENHOFF_1827	85	Krayenhoff	6 376 950,4	1/309,65	Unknown	1827	[DIGEST, Table 6.1, "KB"]
MODIFIED_AIRY_1849	97	Modified Airy	6 377 340,189	1/299,324 964 6	Assumed precise	1849	[83502T, App. A-1, "AM"]
MODIFIED_FISCHER_1960	98	Modified Fischer	6 378 155	1/298,3	Assumed precise	1960	[83502T, App. A-1, "FA"]
PLESSIS_MODIFIED_1817	115	Plessis - Modified	6 376 523	1/308,64	Unknown	1817	[DIGEST, Table 6.1, "PM"]
SOUTH_AMERICAN_1969	125	South American	6 378 160	1/298,25	Assumed precise	1969	[83502T, App. A-1, "SA"]
SOVIET_GEODETTIC_1985	126	Soviet geodetic system	6 378 136	1/298,257	Unknown	1985	[DIGEST, Table 6.1, "SG"]
SOVIET_GEODETTIC_1990	127	Soviet geodetic system	6 378 136	1/298,257 839 3	Unknown	1990	[DIGEST, Table 6.1, "SN"]
STRUVE_1860	128	Struve	6 378 298,3	1/294,73	Unknown	1860	[DIGEST, Table 6.1, "ST"]
WALBECK_AMS_1963	140	Walbeck 1819 - AMS	6 376 896	1/302,78	Unknown	1963	[DIGEST, Table 6.1, "WB"]
WALBECK_PLANHEFT_1942	141	Walbeck 1819 - Planheft	6 376 895	1/302,782 156 5	Unknown	1942	[DIGEST, Table 6.1,

RD label	RD code	Description	Parameters			Date	References
			Major semi-axis, a	Flattening, f	Error estimate		
							"WA"]
WAR_OFFICE_1924	142	War office - McCaw	6 378 300	1/296	Unknown	1924	[DIGEST, Table 6.1, "WO"]
WGS_1972	146	World geodetic system	6 378 135	1/298,26	Assumed precise	1972	[83502T, App. A-1, "WD"]
WGS_1984	145	World geodetic system	6 378 137	1/298,257 223 563	Assumed precise	1984	[83502T, App. A-1, "WE"]
Object type: Planet (non-Earth)							
JUPITER_1988	82	Jupiter	{Equatorial radius (km)}	{Equatorial radius (km)} / ({Equatorial radius (km)} - {Polar radius (km)})	As specified accompanying the parameter value	1988	[RIIC, Table IV, "Jupiter"]
MARS_2000	89	Mars	{Equatorial radius (km)}	{Equatorial radius (km)} / ({Equatorial radius (km)} - {Polar radius (km), AVG})	As specified accompanying the parameter value	2000	[RIIC, Table IV, "Mars"]
NEPTUNE_1991	105	Neptune	{Equatorial radius (km)}	{Equatorial radius (km)} / ({Equatorial radius (km)} - {Polar radius (km)})	As specified accompanying the parameter value	1991	[RIIC, Table IV, "Neptune"]
SATURN_1988	123	Saturn	{Equatorial radius (km)}	{Equatorial radius (km)} / ({Equatorial radius (km)} - {Polar radius (km)})	As specified accompanying the parameter value	1988	[RIIC, Table IV, "Saturn"]
URANUS_1988	138	Uranus	{Equatorial radius (km)}	{Equatorial radius (km)} / ({Equatorial radius (km)} - {Polar radius (km)})	As specified accompanying the parameter value	1988	[RIIC, Table IV, "Uranus"]
Object type: Satellite							
LARISSA_1991	86	Larissa (satellite of Neptune)	{Subplanetary equatorial radius (km)}	{Subplanetary equatorial radius} / ({Subplanetary equatorial radius} - {Polar radius})	As specified accompanying the parameter value	1991	[RIIC, Table V, "Larissa"]