# About the EEA reference grid

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The present document is a short specification of the EEA reference grid which is available in EEA data service as vector dataset that can be downloaded at [0]. For each EEA member country, and for Europe as a whole, three polygon shapefiles are made available, according to grid resolutions of 1, 10 and 100 km. The EEA grid builds on the recommendations from the 1st Workshop on European Reference Grids, see [1].

Coordinate reference system and recommended grid resolutions

The coordinate reference system (CRS) is ETRS89-LAEA Europe, also known in the EPSG Geodetic Parameter Dataset under the identifier: EPSG:3035, see [2]. The Geodetic Datum is the European Terrestrial Reference System 1989 (EPSG:6258). The Lambert Azimuthal Equal Area (LAEA) projection is centred at 10°E, 52°N. Coordinates are based on a false Easting of 4321000 meters, and a false Northing of 3210000 meters.

Being based on an equal area projection, the EEA reference grid is suitable for generalising data, statistical mapping and analytical work whenever a true area representation is required. Recommended grid resolutions are 100 m, 1 km, 10 km and 100 km. Alternatively, 25 m or 250 m resolution can be used for analysis purposes, where the standard 100 m or 1 km grid cell size is not appropriate.
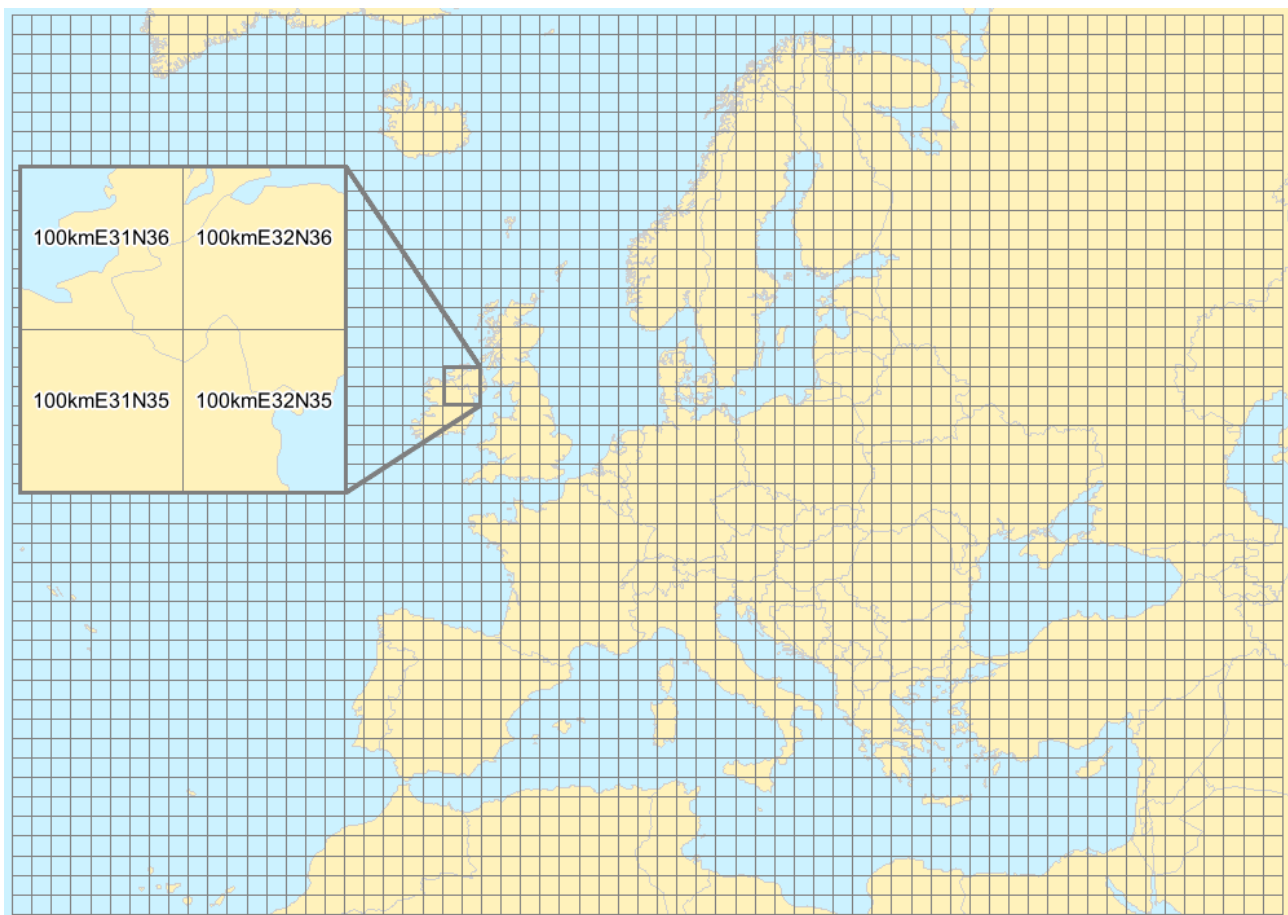
The above map above illustrates a sample of the 100 km ETRS89-LAEA grid. This sample grid covers the area from 900000 meters East, 900000 meters North to 7400000 meters East and 5500000 meters North. The inset map shows some grid cells for Ireland, together with their cell codes.

Coding system for grid cell identifiers

The objective of the coding system is to generate unique identifiers for each cell, for any of the recommended resolutions. The cell code is a text string, composed of cell size and cell coordinates. Cell codes start with a cell size prefix. The cell size is denoted in meter (m) for cell sizes below 1000 m and kilometre (km) for cell sizes from 1000 m and above. Examples: a 100 meter cell has an identifier starting with "100m", the identifier of a 10000 meter cell starts with "10km".

The coordinate part of the cell code reflects the distance of the lower left grid cell corner from the false origin of the CRS. In order to reduce the length of the string, Easting (E) and Northing (N) values are divided by 10^n (n is the number of zeros in the cell size value). Example for a cell size of 10000 meters: The number of zeros in the cell size value is 4. The resulting divider for Easting and Northing values is 10^4 = 10000.

Example #1: Defining a cell code identifier for the 1 kilometre grid

Distance from false origin: 5432000 meters East and 4321000 meters North. Cell size is 1000 meters.

1. Define cell size prefix: 1000 meters => "1km"
2. Identify the number of zeros to remove from Easting and Northing values:
   The grid size value 1000 has 3 zeros => divide Easting and Northing values by 10^3 = 1000.
3. Define string value based on Easting: 5432000 meters divided by 1000 => "E5432"
4. Define string value based on Northing: 4321000 meters divided by 1000 => "N4321"
5. Concatenate string parts into cell code: "1kmE5432N4321"

Example #2: Defining a cell code identifier for the 250 meter grid

Distance from false origin: 10250 meters East and 220000 meters North. Cell size is 250 meters.

1. Define cell size prefix: 250 meters => "250m"
2. Identify the number of zeros to remove from Easting and Northing values:
   The grid size value 250 has 1 zero => divide Easting and Northing values by 10^1 = 10.
3. Define string value based on Easting: 10250 meters divided by 10 => "E1025"
4. Define string value based on Northing: 220000 meters divided by 10 => "N22000"
5. Concatenate strings into cell code: "250mE1025N22000"

The above coding system has been included into the INSPIRE Guidelines on Geographical Grid Systems, as "Requirement 4", see [3]. For computations and analysis it might be easier (and faster) to work with numeric cell identifiers, rather than using the alphanumeric cell codes. For this purpose, the reference grid shapefiles include two separate integer attributes named EofOrigin and NofOrigin, representing the Easting and Northing values of the lower left cell corner, in meters.

References

[0] The most recent version of the reference grid dataset in EEA data service
http://www.eea.europa.eu/data-and-maps/data/ds_resolveuid/D63BFD62-6597-4D5F-BD35-9E06265102E0

[1] Short Proceedings of the Workshop on European Reference Grids, Ispra, 27-29 October 2003
http://eusoils.jrc.ec.europa.eu/projects/alpsis/Docs/ref_grid_sh_proc_draft.pdf

[2] EPSG Geodetic Parameter Registry, http://epsg-registry.org/

[3] D2.8.I.2 INSPIRE Specification on Geographical Grid Systems – Guidelines
http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/INSPIRE_Specification_GGS_v3.0.1.pdf