U.S. National Grid System (USNG) Map Plotting and Handheld GPS Units

MAP COORDINATE SYSTEM

A Map Coordinate System uses sets of numbers combined with geometric grids to specify positions on a map or globe. There are several types of map coordinate systems. The most well known system is the Latitude-Longitude coordinate system. Much of the world uses the Universal Transverse Mercator (UTM) grid coordinate system. The U.S. Military adapted the UTM to form the **Military Grid Reference System (MGRS)** which is also called the **U.S. National Gird** in the civilian world. It is easy to read and is based on the Metric measurement system.

USNG is based on various zones. The first zone is the **Grid Zone Designation**. The globe is broke up into 60 zones that are divided every 8 degrees of latitude.

The graphic to the right is a section of the Grid Zone Designator. As you can see, Maine is located in the "19T" GZD box.



Each Grid Zone Designation is further subdivided into "**100,000 meter square identification**" grid boxes as shown in the graphic to the right. Belfast, Maine is located on dividing line of the 100,000 meter squares identified as "DK" and "EK".



MGRS^{*} and USNG 100,000-meter Square Identification

*Use this table for MGRS with the WGS 84 datum, older datums (NAD 27) should use the alternate chart.

You can easily find this on a newer topographical map. The picture to the right is the USNG designation box on the 1:24,000 USGS topographical map called "Belfast". East Belfast is located on the "Searsport" map, which is located in the "EK" 100,000 meter square.

Therefore, downtown Belfast is located in 19T DK.



The breakdown of the USNG continues as each side of the 100,000-meter square is divided into 10 equal parts. This division produces lines that are 10,000 meters (or 10 kilometers) apart. This is the **10,000-meter grid squares**.

To obtain **1,000-meter squares**, each side of the 10,000-meter square is divided into 10 equal parts. This division appears on USGS 1:24,000 topographical maps as actual grid lines; they are 1,000 meters or 1 kilometer apart.



The 1,000-meter square can be further divided by either estimating or using a plastic transparent grid reader or Coordinate Scale and Projector. The whole numbers allow you to identify a **100-meter square**. Within the 100-meter square, you can estimate down to a 10-meter square.

Make sure that you are using a Grid Reader square that matches the map you are using. USGS TopoMaps are 1:24,000.



Identifying a USNG Coordinate

The rule to remember when reading USNG coordinates is to read across the map from LEFT to RIGHT and then UP. The first half of the reported set of coordinate digits represents the left-to-right (Easting) grid label, and the second half represents the label as read from the bottom to top (Northing).

The USNG coordinate for the Waldo County EOC is:

19T DK 9911 1874

19T = Grid Zone Designation

DK = 100,000-meter square

9911 = the Easting

1874 = the Northing

The coordinate is 99,110 meters east and 18,740 meters north of the 0, 0 (lower left corner) of the EK square.



Precision of a USNG Coordinate

The precision of a point location is shown by the number of digits in the coordinates: the more digits, the more precise the location.

19T	EK	100,000 meter square
19T	EK 9 1	. 10,000 meter square
19T	EK 99 18	. 1,000 meter square
19T	EK 991 187	100 meter square
19T	EK 9911 1874	10 meter square

What shows on a Smartphone App or a GPS

The screen on a Smartphone or a handheld GPS will display the coordinate accurate down to 10 meters. This is about as accurate is it can be.

Remember, the $\underline{8582}$ is the X scale coordinate or Easting and the $\underline{3218}$ is the Y scale coordinate or Northing.

