## ISO Geodetic Registry

Item class Transformation

NAD 83 (1986) to NAD 83 (HARN) [v1]

Item statusVALIDIdentifier498

Information source Title NADCON 5.0: Geometric Transformation Tool for

points in the National Spatial Reference System

Author D. Smith, A. Bilich

Publisher NOAA's National Geodetic Survey

Publication date 2017-03-27 Edition date 2017-03-27

Series/Journal name NGS Technical Report

Other citation details Replaces version 4.2 and all earlier. Provides

gridding algorithm, datum transformations, and

extents of covnversion grids.

Information source Title Notice to Adopt Standard Method for Horizontal

**Datum Transformation** 

Author US Government

Publisher Office of Federal Register, NARA

Publication date 1990-08-10 Edition date 1990-08-10

Series/Journal name Federal Register Notice

Issue identification Volume 55, No. 155, Document: 00-18809

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Other citation details Mandates use of NADCON for official

transformations between datums

Data source ISO Geodetic Registry
Remarks Grid Transformation

Operation version v1

Scope Spatial referencing

Operation accuracy 0.05 m

Source CRS NAD 83 (1986) - LatLon
Target CRS NAD 83 (HARN) - LatLon

Operation method NADCON 5 (2D)

## Extent

United States (USA) - onshore and offshore
- CONUS (Alabama, Arizona, Arkansas,
California, Colorado, Connecticut, Delaware,
Florida, Georgia, Idaho, Illinois, Indiana, Iowa,
Kansas, Kentucky, Louisiana, Maine, Maryland,
Massachusetts, Michigan, Minnesota,
Mississippi, Missouri, Montana, Nebraska,
Nevada, New Hampshire, New Jersey,
New Mexico, New York, North Carolina,
North Dakota, Ohio, Oklahoma, Oregon,
Pennsylvania, Rhode Island, South Carolina,
South Dakota, Tennessee, Texas, Utah,
Vermont, Virginia, Washington, West Virginia,
Wisconsin, Wyoming).

Geographic Bounding Box	West-bound longitude	-135.0	
	North-bound latitude	50.0	
	East-bound longitude	-66.0	
	South-bound latitude	24.0	

## Operation parameter values

Latitude difference file	nadcon5.nad83_1986.nad83_harn.conus.lat.trn.20 60901.b
Longitude difference file	nadcon5.nad83_1986.nad83_harn.conus.lon.trn.20160901.b

## ISO Geodetic Registry

Item class OperationMethod

Name NADCON 5 (2D)

Item status VALID Identifier 73

Alias NADCON
Alias NADCON 5

Data source ISO Geodetic Registry

Remarks The latitude and longitude offsets at a point are derived by interpolation

within the gridded data. Separate grid files are given for latitude and longitude offsets. The grid file format is given in documentation available from the information source. Biquadratic interpolation is used to derive the offset values. For the forward calculation the interpolated value of the offset is then added to the source CRS coordinate value to give the coordinates in the target CRS. Transformations between NAD27 and NAD83(1986) and between NAD83(1986) and NAD83(HARN) are only two dimensional (latitude and longitude) as those CRS are ONLY defined in two dimensions. Hence, this operational method is used to make those transformations. Later realizations of NAD83(HARN) included heights and use the other operational method. NADCON includes all versions from 1 through 5 (released in 2017). While the first and the last used slightly different grids and interpolation methods, the differences are deemed to be within the errors of the methods and considered equivalent. Hence users of NADCON 2.1 should generate equivalent results for transformations using NADCON 5.0. Note that this operational method is for 2D transformation (latitude and longitude only). Another method uses only a 3D transformation. Reversibility: Iteration is required for the reverse transformation. The coordinate reference system for the coordinates of the grid nodes is the source coordinate reference system for the forward transformation. Then in forward transformations the offset is obtained through straightforward interpolation of the grid file. But for the reverse transformation the first grid interpolation entry will be the value of the point in the second coordinate reference system, the offsets are interpolated and applied with sign reversed, and the result used in further iterations of interpolation and application of offset until the difference between results from successive iterations is insignificant.