

## Section 8. Hydraulics File Components

<b>Sub-Section</b>	<b>Description</b>
8.1	Source agency code (C4) MANDATORY
8.2	Site ID number (C1) MANDATORY
8.3	Record type (C744,C746) MANDATORY
8.4	Record sequence number or sequence number of parent (C790,C99) MANDATORY
8.5	Record sequence number of child (for COEF only) (C106) MANDATORY
8.6	Person creating record(C475,C478)
8.7	Date and time created (C476, C479)
8.8	Person updating record (C477, C480)
8.9	Date and time of last update (C745,C747)
8.10	Record ready for Web flag (C874,C875)
8.11	Data dependent on record types

The HYDRAULICS record is used to store components that relate to the hydraulics of the aquifer. Two types of hydraulics data are included, each identified by a component record type. The following is a list of the component codes used in the HYDRAULICS data file.

<b>Record Type</b>	<b>Description of Contents</b>	<b>Data Table Name</b>
<b>HYDR</b>	Includes the aquifer and test interval	gw_hydr_##
<b>AQFR</b>	Includes the aquifer coefficients for the specified HYDR record	gw_coef_##

The related HYDRAULICS records have two record types and form a parent/child relationship. HYDR is the parent record to related COEF child records; the HYDR record must be established before any COEF records can be entered. The HYDR/COEF records are coded as follows:

### 8.1 Source Agency Code

**(HYAGY/C4 - MANDATORY PRIMARY-KEY CHAR X(5) -- agency\_cd):**

This is the agency that reported the data. The reporting agency is mandatory and a part of the primary key. Data for the site will not be stored if this field is blank.

### 8.2 Site Identification Number

**(HYID/C1 - MANDATORY PRIMARY-KEY CHAR X(15) -- site\_no):**

This is the 15-digit site identification (Site ID) number of the site to which the hydraulics data applies. If the site has not been entered into the Sitefile, this operation must be

completed before the hydraulics data are input. The Site ID number is mandatory and a part of the primary key.

### 8.3 Record Type

**(HYTYP/C744,C746 - MANDATORY SECONDARY-KEY CHAR X(4)):**

The RECORD TYPE identifies the category of data included in the record. There are two categories with the HYDRAULIC data. This field is mandatory and is a secondary key. The categories are as follows:

Record Type	Description
HYDR	Hydraulic unit record (C744)
COEF	Coefficients record (C746)

### 8.4 Record Sequence Number or Sequence Number of Parent

**HYSEQ/C790,C99 - MANDATORY PRIMARY-KEY CHAR X(3) -- hydr\_seq\_nu):**

This is a number assigned at the time of data entry to keep data by category in logical order. This number is mandatory and a part of the primary key. The component number for the record sequence number depends on the record type as follows:

Record	Description	Attribute Name
HYDR	Hydraulic Unit Record (C790)	hydr_seq_no
COEF	Coefficients Record (C99)	hydr_seq_no

### 8.5 Record Sequence Number of Child (for COEF only)

**(HYCSEQ/C106 - MANDATORY PRIMARY-KEY CHAR X(3) -- coef\_seq\_nu):**

Each coefficient record for a site must have a unique identifying number in this space. The numbers need not be in sequence, but each can be used only once for that site. The entry number is mandatory; if this field is blank, coefficient data will not be stored. This field relates each coefficient record to the correct parent HYDRAULICS record, and the sequence number entered in this field must match the sequence number entered (hydr\_seq\_nu) in the related HYDR record.

### 8.6 Person Creating Record

**(HYCUID/C475,C478 - CHAR X(8) -- hydr\_cn or coef\_cn)**

This field contains the user identification of the person creating the record. The user ID is entered automatically by the NWIS software.

Record	Description	Attribute Name
HYDR	Hydraulic Unit Record (C475)	hydr_cn
COEF	Coefficients Record (C478)	coef_cn

### 8.7 Date and Time Created

(HYCRDT/C476,C479 - CHAR X(14) -- hydr\_cr or coef\_cr)

This field is the date and time the record was created. The date and time are entered automatically by the NWIS software.

Record	Description	Attribute Name
HYDR	Hydraulic Unit Record (C476)	hydr_cr
COEF	Coefficients Record (C479)	coef_cr

### 8.8 Person Updating Record

(HYUID/C477, C480 - CHAR X(8) -- hydr\_mn or coef\_mn)

This contains the user identification of the person updating the record. Entry of the user ID is made by the NWIS software automatically.

Record	Description	Attribute Name
HYDR	Hydraulic Unit Record (C477)	hydr_mn
COEF	Coefficients Record (C480)	coef_mn

### 8.9 Date and Time of Last Update

(HYUPDT/C745,C747 - CHAR X(14) -- hydr\_md or coef\_md):

This contains the date/time the record was last updated. Entry of this date is made by the NWIS software automatically. The component number for the date of the last update depends on the record type as follows:

Record	Description	Attribute Name
HYDR	Hydraulic Unit Record (C745)	hydr_md
COEF	Coefficients Record (C747)	coef_md

## 8.10 Record Ready for Web Flag

(HYWBFGB/C874,C875 - CHAR X(1) -- hydr\_web\_cd or coef\_web\_cd)

This field contains the status and availability of a record for display on the World-Wide-Web. ‘Y’ is the default. Only records flagged with a ‘Y’ are made available on the Web. The codes and their meanings are:

Code	Meaning
Y	Yes - Record has been checked and is ready for Web display.
C	Conditional - Record has not been checked. No Web display.
P	Proprietary Record. No Web display.
L	Local use only. No Web display.

Record	Description	Attribute Name
HYDR	Hydraulic Unit Record (C874)	hydr_web_cd
COEF	Coefficients Record (C875)	coef_web_cd

## 8.11 Data Dependent On Record Type

(HYDATA - CHAR X(82)):

These fields are described below for each record type.

### 8.11.1 Hydraulic Records -- HYTYP = HYDR

Sub-Section	Attribute Name	Description
8.11.1.1	hydr_unit_cd	Hydraulic unit ID (C100) MANDATORY
8.11.1.2	hydr_top_va	Depth to top of interval (C101)
8.11.1.3	hydr_bottom_va	Depth to bottom of interval (C102)
8.11.1.4	hydr_unit_tp	Hydraulic unit type (C103) MANDATORY
8.11.1.5	hydr_remark_tx	Hydraulic remarks (C104)
8.11.1.6	hydr_src_cd	Hydraulic source agency (C305)

The hydraulic data records are entered following the instructions in sections 8.1 through 8.10. Here is a brief review for your convenience:

Source agency code  
 Site identification number  
 HYDR  
 Record sequence number  
 Person creating record  
 Date and time created

Person updating record  
 Date and time of last update  
 Record ready for Web flag

The hydraulic data record is used to provide information about the geohydrologic unit to which the formation hydraulics data apply and the means by which the data were obtained. The entry of hydraulic test interval data is identified by coding "HYDR" in hydraulics type of record. The HYDR components are entered as follows:

**8.11.1.1 Hydraulic Unit**

**(HYHYUN/C100 - MANDATORY SECONDARY-KEY CHAR X(8) -- hydr\_unit\_cd):**

Enter the eight-character code for the geohydrologic unit to which the formation hydraulics data apply. Use the codes given in the "Catalog of Aquifer Names and Geologic Unit Codes Used by the Water Resources Division." This field is mandatory.

**8.11.1.2 Depth to Top of Interval**

**(HYHTOP/C101 - CHAR X(7) -- hydr\_top\_va):**

Enter the depth to the top of the tested interval, in feet below land surface.

**8.11.1.3 Depth to Bottom of Interval**

**(HYHBOT/C102 - CHAR X(7) -- hydr\_bottom\_va):**

Enter the depth to the bottom of the tested interval, in feet below land surface.

**8.11.1.4 Hydraulic Unit Type**

**(HYHTYP/C103 - MANDATORY CHAR X(1) -- hydr\_unit\_tp):**

Enter the code indicating the hydraulic character of the unit tested. The codes and their meanings are:

<b>Code</b>	<b>Meaning</b>
<b>A</b>	Aquifer
<b>S</b>	Confining layer

This entry is mandatory; hydraulic data will not be entered if this value is not specified.

**8.11.1.5 Hydraulic Remarks**

**(HYHRMK/C104 - CHAR X(40) -- hydr\_remark\_tx):**

Briefly describe the means by which the formation hydraulics data were determined. Forty characters are allowed. Use meaningful abbreviations. Examples:

- “Distance-drawdown, 3 wells”
- ”Specific-capacity test”
- ”Recovery, straight-line solution”

**8.11.1.6 Hydraulic Source Agency  
(HYHSAG/C305 - CHAR X(5) i-- hydr\_src\_cd):**

Enter the agency code of the organization that collected the hydraulic data.

**8.11.2 Coefficients Record -- HYTYP = COEF**

Sub-Section	Attribute Name	Description	Maximum # of Decimal places allowed on input	Field Length
8.11.2.1	transmissivity_va	Transmissivity (C107)	3	7
8.11.2.2	horiz_conduct_va	Horizontal conductivity (C108)	5	12
8.11.2.3	vert_conduct_va	Vertical conductivity (C109)	5	12
8.11.2.4	storage_coef_va	Storage coefficient (C110)	7	8
8.11.2.5	leakance_va	Leakance (C111)	4	9
8.11.2.6	diffusivity_va	Diffusivity (C112)	0	13
8.11.2.7	spfc_storage_va	Specific storage (C113)	9	10
8.11.2.8	barom_effic_va	Barometric efficiency (C271)	0	3
8.11.2.9	porosity_va	Porosity (C306)	3	4

The coefficients data records are entered following the instructions in sections 8.1 through 8.10. Here is a brief review for your convenience:

- Source agency code
- Site identification number
- COEF
- Record sequence number
- Record sequence number of child
- Person creating record
- Date and time created
- Person updating record
- Date and time of last update
- Record ready for Web

The coefficients record is used to record the hydraulic coefficients determined by the test data. This record is a lower-level record within the HYDRAULIC record.

The entry of coefficients data is identified by the coding of “COEF” in component HYTYP of the record. Definitions of the COEF components in the following sections are from Geological Survey Water-Supply Paper 1988, "Definitions of Selected Ground-Water Terms--Revisions and Conceptual Refinements" (Lohman and others, 1974). Enter the COEF components as follows:

**8.11.2.1 Transmissivity (T)****(HYCTRN/C107 - CHAR X(7) -- transmissivity\_va):**

Transmissivity is the rate at which water of the prevailing kinematic viscosity is transmitted through the unit width of the geohydrologic unit under a unit hydraulic gradient. Enter the computed transmissivity (T) in feet squared per day.

**8.11.2.2 Horizontal Hydraulic Conductivity (KH)****(HYCHHY/C108 - CHAR X(12) -- horiz\_conduct\_va):**

The hydraulic conductivity of the medium is the volume of water at the existing kinematic viscosity that will move in unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow. Enter the computed horizontal hydraulic conductivity (K) in feet per day.

**8.11.2.3 Vertical Hydraulic Conductivity (KV)****(HYCVHY/C109 - CHAR X(12) -- vert\_conduct\_va):**

Enter the computed vertical hydraulic conductivity (K) in feet per day.

**8.11.2.4 Storage Coefficient (S)****(HYCSTR/C110 - CHAR X(8) -- storage\_coef\_va):**

The storage coefficient is the volume of water a geohydrologic unit releases from or takes into storage per unit surface area of the geohydrologic unit per unit change in head. In an unconfined water body the storage coefficient is virtually equal to the *specific yield*. Enter the computed storage coefficient (Sy), dimensionless.

**8.11.2.5 Leakance****(HYCLKC/C111 - CHAR X(9) -- leakance\_va):**

The leakance is the vertical hydraulic conductivity of the geohydrologic unit divided by the thickness of the unit. Leakance is the inverse of the coefficient of leakage (Hantush, 1964). Enter the computed leakance in one/day.

**8.11.2.6 Hydraulic Diffusivity****(HYCDIF/C112 - CHAR X(13) -- diffusivity\_va):**

The hydraulic diffusivity is the parameter Transmissivity/Storage coefficient (T/S). Enter the computed hydraulic diffusivity (T/S, in feet squared per day).

**8.11.2.7 Specific Storage (Ss)****(HYCSPS/C113 - CHAR X(10) -- spfc\_storage\_va):**

The specific storage is the storage coefficient divided by the thickness of the geohydrologic unit. It is the volume of water the geohydrologic unit releases per unit volume per unit change in head. Enter the computed specific storage, dimensionless.

### **8.11.2.8 Barometric Efficiency**

**(HYCBRE/C271 - CHAR X(3) -- barom\_effic\_va):**

The barometric efficiency of an aquifer is the ratio of water level change to atmospheric-pressure change (Todd, 1980, p. 235-236). While it is theoretically possible for the barometric efficiency of an aquifer to range from 0% - 100%, barometric efficiency typically ranges from 20% to 75%. A warning will be displayed if the entered value is outside the typical range, but will be allowed if it is within the theoretical range. Enter the efficiency of the aquifer's response to barometric changes, in percent.

### **8.11.2.9 Porosity**

**(HYCPOR/C306 - CHAR X(4) -- porosity\_va):**

The porosity of the geohydrologic unit is its property of containing interstices or voids and may be expressed quantitatively as the ratio of the volume of its interstices to its total volume. At most, three digits are allowed. Enter the porosity as a decimal fraction; include the decimal point.