

G476/476 Hydrology - Introduction to Aquifer Testing

AQTESOLV User Notes

AQTESOLV is a groundwater software program that allows the user to estimate transmissivity and storativity for an aquifer from pump test or slug test data. The following are some random notes to help you get started using the software.

1. Getting Started

AQTESOLV will be installed on the C:\AQTW directory of the PC's in the computer lab. You may access the software through windows or at the dos prompt. Through windows explorer use the file manager to find the C:\AQTW directory, select and run the aqtesolv.exe file. This should start up the program

A copy of the user's manual will be made available in the Geology Lab Rm 218. The manual is not to be removed from the lab, please put it back when you're done using it.

2. Basic Parameters of the Program

Aqtesolv allows the user to input data, save the data to a file, and then analyze the data to derive a time-drawdown plot and determine T and S for the aquifer.

Basic Data for Pump Tests

- Pumping Rate/discharge from pumping well
- Distance to observation well
- Time vs. drawdown for observation well

Basic Slug Test Data

- Radius of screen
- Radius of well casing
- Length of screened interval
- Saturated thickness of aquifer

Maximum water displacement during test (at time 0 slug removal / introduction)

3. A Word About Units

When solving the assigned problems, make sure you have this data ready before using aqtesolv. All units should be consistent: e.g. all length units should be in Ft or M, all time units in Min, Sec or Days, all volume units should be of similar character as the length term (e.g. if using Ft, volume should be in cu. Ft not gallons; if using M volume should be in cu. M)

AQTESOLV will not ask you to specify data units, its up to you to make sure they are consistent. T is commonly expressed as sq. Ft/min when using aqtesolve with the english system.

For example don't use a pumping rate in gallons/minute with a length term of Ft, first convert gal to cu. ft (1 cu ft = 7.48 gal). Don't use a discharge term of gallons/day with time-drawdown data of Ft and Min, convert gallons/day to cu. Ft/min first.

4. Maneuvering Around Aqtesolv

Here's a Sampling of the Main Menu

File

New create a new aqtesolv project
Open open an existing aqtesolv project
Close
Save save a project
Save As
Import import a DOS version of Aqtesolv
Export
Print print parts of the project
Print Preview
Page Set Up set up the page margins / formatting

Edit

Units units in which calculations are made
Title title of project to print
Project Info name of project / company / student
Aquifer Data thickness of aquifer, etc.

Pumping Well
Observation well

Slug Test Well

Test Type choose slug or pump

View

Data
Error Logs
Zoom
Other stuff you want to look at

Format

Plot
Axes
symbols
legends
curves / lines

Solution Type

Confined Aquifer type
Unconfined Aquifer type

Match

Curve matching routines to solve equations

Window

show different styles of windows / view

Help

online help and tutorials

Examples of UNCONFINED Aquifer SOLUTIONS

Theis Method
Cooper Jacob Method
Papadopulous -Cooper Method for Pumping well only
Papadopulous -Cooper Method for observation well only
Recovery/Theis Method

Examples of CONFINED Aquifer SOLUTIONS

Theis Method
Cooper-Jacob Method
Neuman Method

Examples of LEAKY Aquifer SOLUTIONS

Hantush Method: no storage in aquitard
Hantush Method: storage in aquitard
Moench Method: pumped well with storage in aquitard
Moench Method: Observation well with storage in aquitard

Examples of SLUG TEST SOLUTIONS (Apply to data created with Dataset Manager)

Bouwer-Rice Method
Cooper et al. Method

****Once having chosen a "solver" then AQTESOLV will calculate the well parameters and prepare the data plots**

For each solver package, the user will be allowed to view the calculated parameters (Transmissivity and Storativity) for the aquifer and is allowed to change the default solver routine.

Options to Change and Modify in the Solvers (under the "Match" menu)

Maximum No. of Iterations- by default set to 25, calculations are made by curve approximations, iterations = the no. of times AQTESOLV will attempt a best-fit during the curve matching process. 25 iterations sounds good to me.

Starting Guesses- allows user to set the beginning proximations of S and T, also allows user to set values of Hantush well function r/B . You will need to do this in one of the homework problems.

Upper and Lower Bounds- allows user to specify limits to the S and T estimates. I would leave this alone.