

DATA INPUT FOR AQUIFER TEST INTERPRETATION - MANUAL METOD

Introduction

In [Lesson 2](#) you learned how to enter aquifer test data into ANSDIMAT using wizard input. This lesson will teach you how to input aquifer testing data in the manual mode. Manual data input is an advanced method that is recommended for more complex conditions (e.g. complex shape of boundaries).

The data for this lesson are the same as for Lesson 2. You can find description of the conceptual model in the Lesson 2 tutorial. Excel spreadsheet "[Lesson2 Excel](#)" contains original and formatted data and can be downloaded from our website.

To start this lesson, you have to create a new ANSDIMAT project. This is done through the menu "Aquifer test analysis>New project". Each project consists of several files and needs to be saved in a separate folder. For this lesson, create a new folder "...\\ANSDIMAT_lesson 3" and then save your ANSDIMAT model in this folder under the name "Lesson3". After the project is created, the data input wizard opens automatically. Press button "Close" to enter into the manual input mode.

"General info" panel

This panel contains the main characteristics of the test: type of conceptual model, names of pumping and observation wells, aquifer thickness etc. Enter the text "Lesson 3 – Constant Rate Test" in the *Project Title* field (Figure 1). The next step is to define the pumping and observation wells.

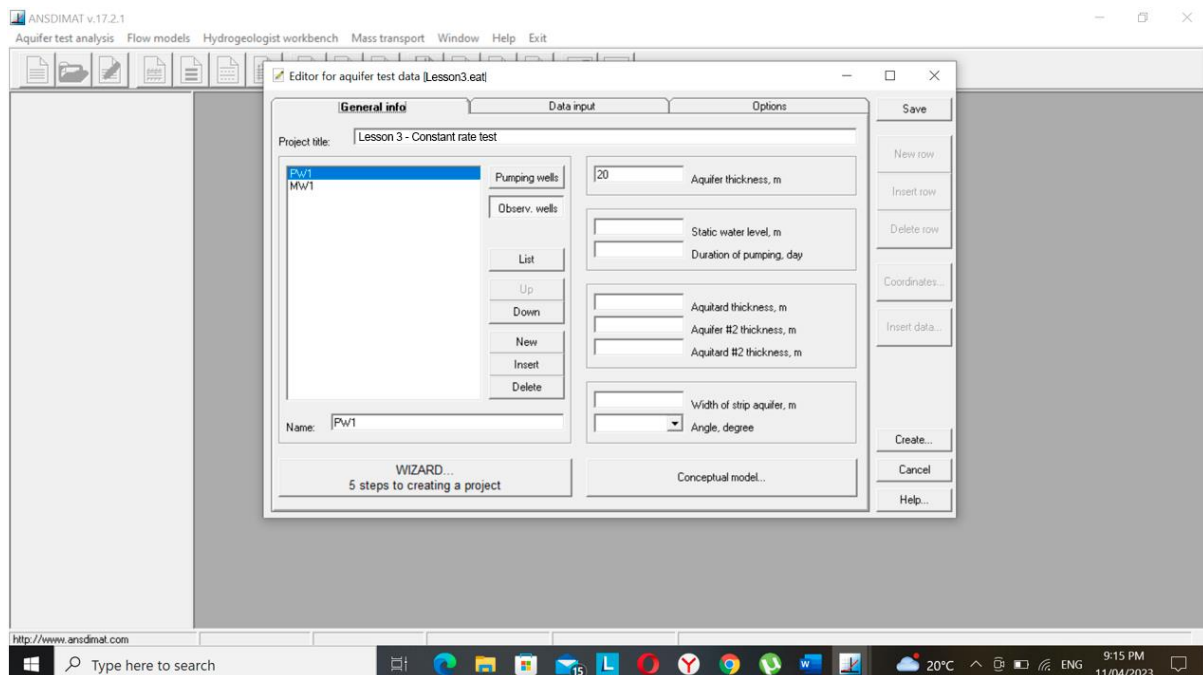


Figure 1. General Info panel for Lesson 3

Pumping and observation wells

Press button “*Pumping wells*” and change the well name by typing “PW1” in the field “Name”. This will rename the well “w1” that was automatically created, when opening the editor. Additional wells can be added by pressing the “New” button. As there is no other pumping well in this scenario, press the button “*Observ. wells*” to define observation wells.

After pressing button “*Observ. wells*”, rename the default name to PW1 (i.e. pumping well becomes also an observation well), then add the second observation well by pressing button “New” and typing “MW1” in the “name” field. Now, when all the wells involved in the test have been created, the next step is to define the conceptual model for the aquifer.

Conceptual model

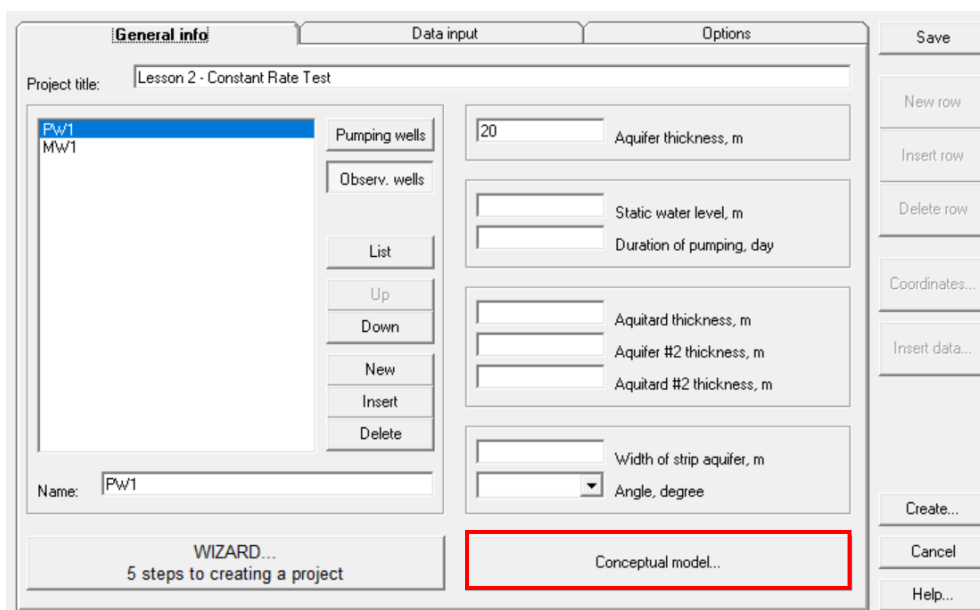


Figure 2. Launch the “conceptual model” graphical interface

Launch the “*Choose conceptual model*” graphical interface window by pressing the button “Conceptual model” (lower right corner of the tab). ANSDIMAT includes a significant number of conceptual models and boundaries, and this window gives access to the list of aquifer types and hydrodynamic boundaries. For this lesson, choose “Confined aquifer: Theis solution” as a conceptual model and “Unbounded” for boundary condition. This selection is illustrated on the Figure 3 and it is best applied to aquifer test interpretation in a confined infinite aquifer. Click “*Ok*” to close the window and validate your choice. The next step is to define the parameters of the aquifer.

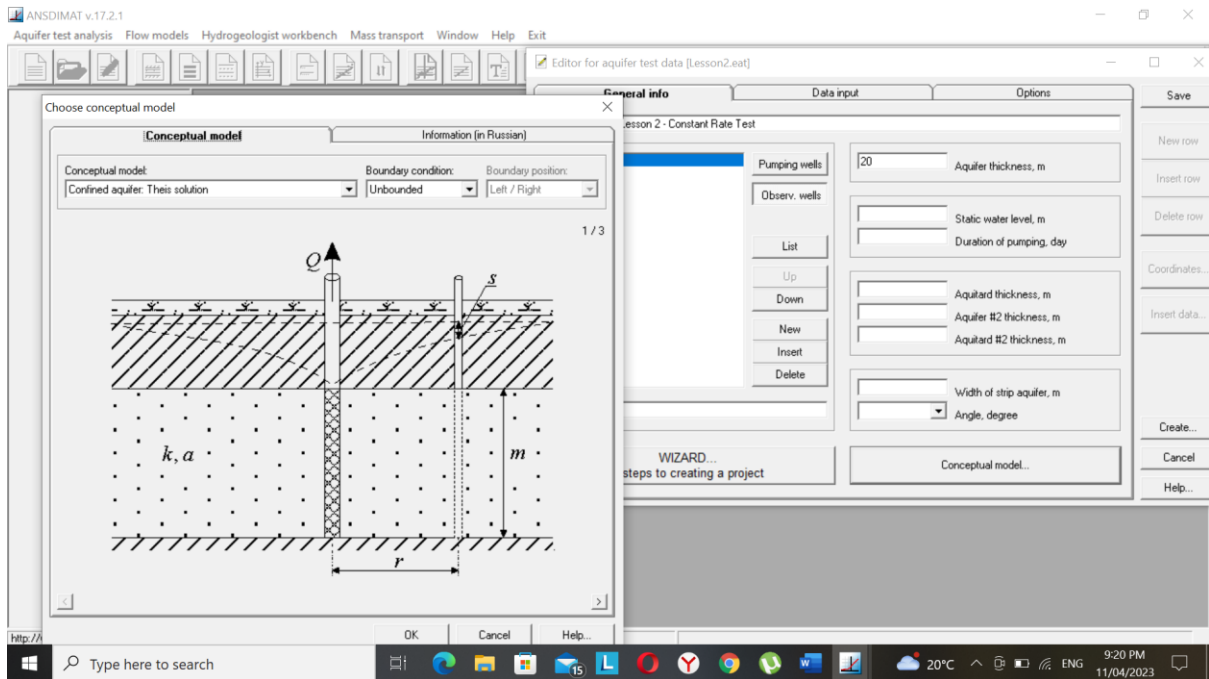


Figure 3. Copy of “Conceptual model” dialog window for Lesson 3

Aquifer parameters

The “*Aquifer thickness*” field corresponds to the thickness of the aquifer: input the value “15”. In this case, as the aquifer is confined, this also corresponds to the entire thickness of the geological layer.

“*Static water level*” field: the static water level is measured from the base of the aquifer, that is regarded as the reference level. For this test, the static, or pre-testing, piezometric level is 45 m.

“*Duration of the pumping*” field: based on the field spreadsheet (file “[Lesson2_Excel.xlsx](#)”) pumping continued for 1440 minutes or for 1 day.

Other fields are not required for the selected conceptual model, so you should leave them empty. Save the model and click on the “*Data input*” panel.

“Data input” panel

On the left hand of this panel, you can see a list of specific tables for data input. Some tables are inactive, as they are not required for this model setup. The required tables are automatically activated after selection of conceptual model.

Constant rate

This table requires an input of a time-constant pumping rate in the units that are selected from the drop-down list “Pumping rate units” (lower left corner of the tab): make sure to check that the units in ANSDIMAT correspond to the units of your measurements. In this case, keep “m³/day” as a unit and enter a value of 150 in the field “Rate” (Figure 4). You don’t need to specify delay time, because the well is pumped from the time “0”. The “Drawdown” field is not applicable to this lesson; it is used for the situations, when constant head (drawdown) is assigned to the pumping well instead of constant pumping rate.

Distance

The table shows distances between pumping and observation wells. Distance between pumping well PW1 and observation well PW1 equals to the radius of this well. For this lesson, input a value of

0.075 m corresponding to the nominal radius of PW1. Distance between MW1 and the pumping well is 5 m.

Distances can be also calculated from the coordinates of pumping and observation wells with the button “Coordinates”. As ANSDIMAT does not support coordinate system reprojection, make sure that all your coordinates are in the same coordinate system before starting your interpretation. Coordinates can be edited manually in the data editor.

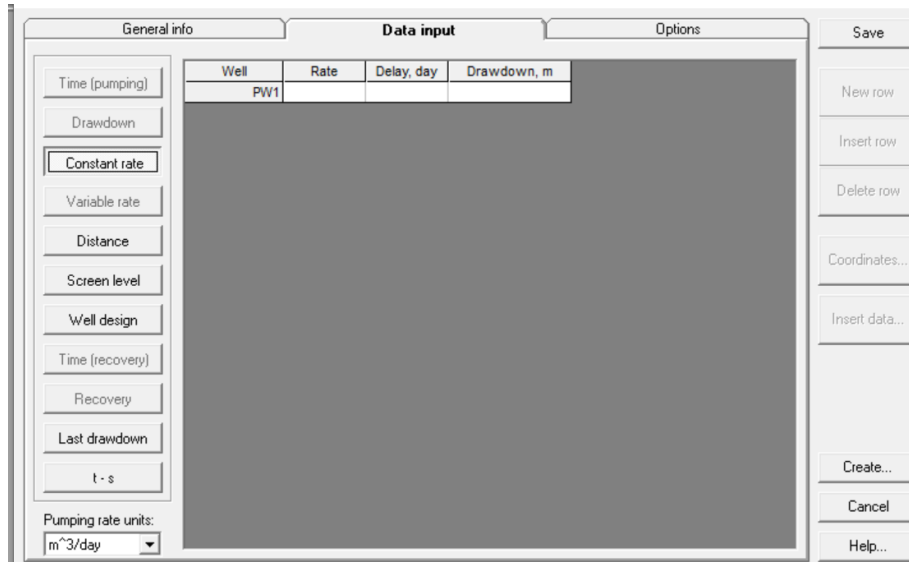


Figure 4. Panel “Data input” with active table “Constant rate”

Screen level

This table contains vertical distances between the middle of the screens of the pumping well and the observation well. As the both wells are fully penetrating and screened across the entire aquifer, the input values should be “0”. You can also keep these fields empty.

Well design

This table requires design parameters for pumping and observation wells, such as screen lengths and screen locations relative to the aquifer top/bottom etc. For this lesson with fully penetrating and fully screened wells these parameters are not required and the table should be left empty. Press button “Help” in the right bottom corner of the dialog window, if you want to learn how to use these fields for other conceptual models.

Last drawdown

The table contains last drawdowns (before recovery starts) for both observation wells: PW1 and MW1. You can copy these values from the provided [EXCEL file](#) or from the last rows of “t-s” tables for drawdowns (see below).

t-s

This menu item combines all time series inputs: drawdown, recovery and pumping rates. The easiest way to input drawdown and recovery data is to copy and paste them from an EXCEL spreadsheets. The worksheet “Formatted data” of the spreadsheet “[Lesson2_EXCEL.xlsx](#)” contains the pumping test measurements that were already formatted for ANSDIMAT: for each field (Drawdown, Recovery) and each well, copy the corresponding table in the excel file and paste it in the corresponding table in ANSDIMAT. You will need to input 4 tables in this dialog window:

- Pw1 time, Pw1 drawdown;
- Pw1 time, Pw1 recovery;
- Mw1 time, Mw1 drawdown;
- Pw1 time, Pw1 recovery.

Select time unit “Minutes” from the drop-down list “Time”, as this time unit is used in the EXCEL spreadsheet. To fill in the tables:

- 1) Choose “PW1” and “Drawdown” from the drop-down lists
- 2) Copy the corresponding table from the worksheet “Formatted data” and paste it in the ANSDIMAT dialog
- 3) Repeat this process for drawdown in MW1 and recovery in the both wells. Drawdown and recovery tables for PW1 should look the same as on Figure 5 and Figure 6.
- 4) After copying all the data into their corresponding four tables, press the button “Insert data” and select the option “New data”. Then click “OK”

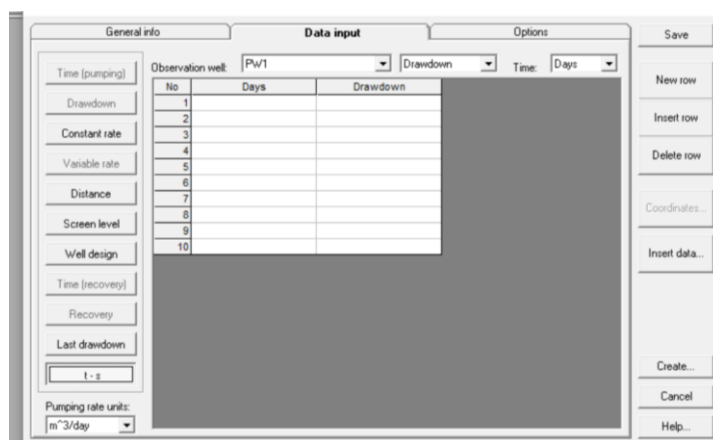


Figure 5. “t-s” table for drawdown observations at PW1

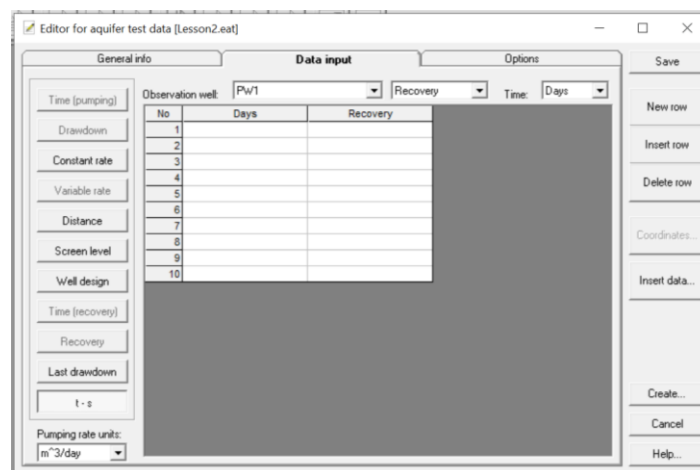


Figure 6. “t-s” table for recovery observations at PW1

As this is a constant pumping rate test, the table “Rate” should remain empty.

Panel “Options”

This panel allows uploading logger data and performing simple mathematical operations with tables. This lesson doesn’t require using options of this panel. Press button “Help” in the right bottom corner of the dialog window, if you want to learn more about using this panel.

Create .oat file and proceed to interpretation

Data input is now finished. You can press button "Create" to save the project and create file "Lesson3.oat" file, that can be used by the aquifer test interpretation module. If you got lost during this exercise, you can download the correct versions of .eat and .oat files from our website.

Upon pressing the "Create" button, ANSDIMAT automatically checks the input data for errors. If errors are detected, ANSDIMAT will open directly the dialogue window where the error was entered and where it can be corrected.

When all entries are correct, ANSDIMAT proceeds with data analysis and interpretation. The input data are automatically opened in the Aquifer Test Interpretation module, a copy of the dialog window is presented on Figure 7.

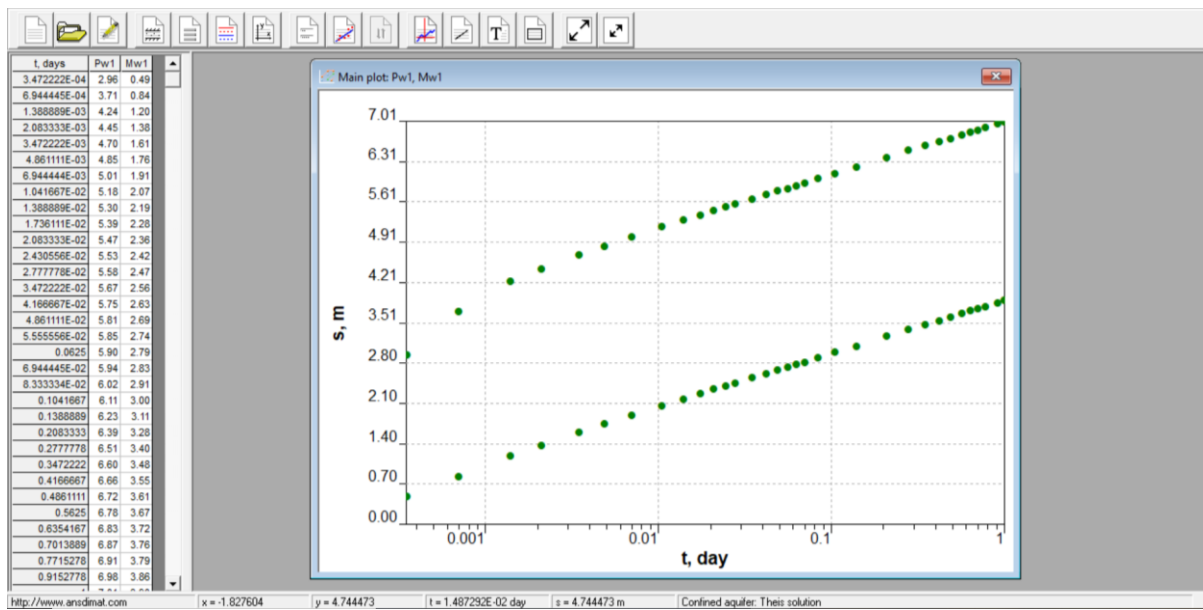


Figure 7. Dialog window in Aquifer Test Interpretation model that contains Lesson 3 data