iCAP 7000 Series ICP-OES Spectrometer

iTEVA Installation Procedure

This is section 3 (of 3) for part number 8423 460 10030

Thermo
SCIENTIFIC

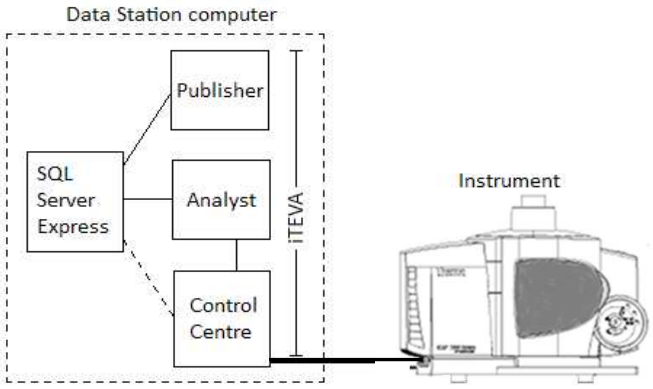
Contents

1 iTEVA 9.9

iTEVA 9.9 firmware and software cannot be downgraded to any other version of iTEVA.

A symptom of iTEVA being downgraded is every 30 seconds the drain sensor error will occur.

iTEVA is needed for repairs and fault diagnosis. It should be only used by a certified Engineer and installed on a customer PC to verify the purge is good.

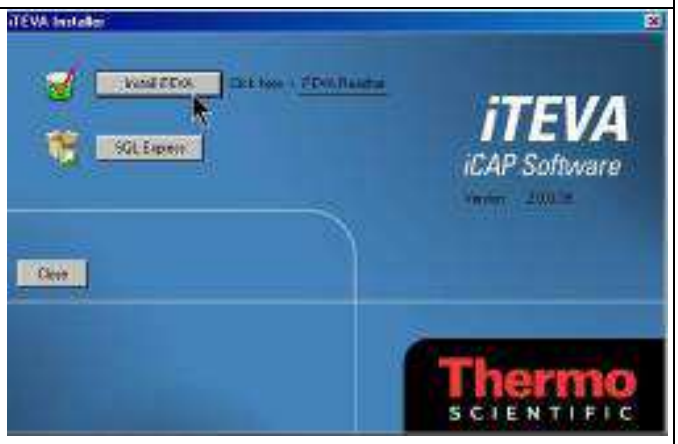


2 Installing iTEVA and SQL

(Issue 9.9 onwards)
The software installation disc contains all components necessary to run the instrument as shown here

2.1 iTEVA

- Insert the iTEVA disc into the PC.
- **READ the 'iTEVA Readme' file on the iTEVA installation window before starting the install**
- Then click on Install iTEVA
- **Make sure you follow the instructions precisely**

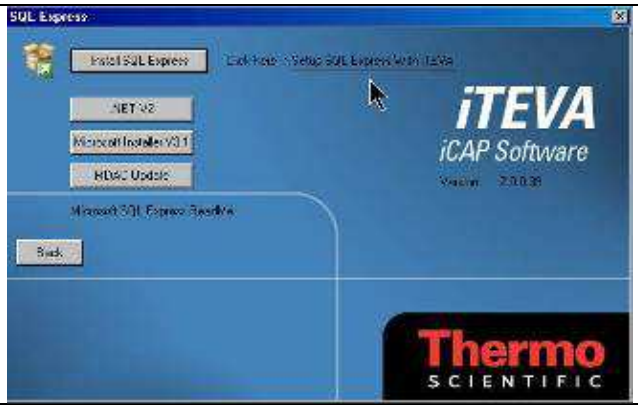


Note: Do not run iTEVA after the installation is complete

The iCAP software and (iTEVA and the service/manufacturing software) both use SQL Server to store results, in different database formats; therefore it is recommended that the SQL Server is installed locally as follows.

2.2 Installing SQL Server Express for use with iTEVA

- Before starting to install SQL Express click on "Setup SQL Express With iTEVA"
- This will guide you through the setup procedure
- Click on Install SQL Express
- **Make sure you follow the instructions precisely**
- When loaded click on back, then close.
- Place a short-cut for iTEVA on the Desktop



NOTE: The password set when installing SQL Server is '**Thermo-123**'. This is a change from previous versions of software to accommodate stronger password requirements for Windows 7.

If the customer wishes to install a full version of SQL server you must first install the **supplied SQL Express** on the PC with iTEVA on it. This is in order that all the necessary components are installed for **Publisher** to run.

2.3 Connect up Computer system

- Connect up Instrument using supplied network cable
- Start iTEVA software
- Create a Database connection (see below)

After a few moments your instrument should connect to your PC. You will hear a noise from the optics motors and iTEVA will report that the instrument is initialising. When finished "Connected to the Instrument" will appear in the journal.

The first time the instrument connects to the PC you will be asked to enter a name for the instrument and unless the customer wants a different option, choose the instrument serial number for the name.

2.4 Create a database for the storage of service analysis only

Click on **Tools/Options** on iTEVA control panel and select the **Application Database** Tab.

Click on **Run database wizard** box.

Type .**\iTEVA** in Server Name box

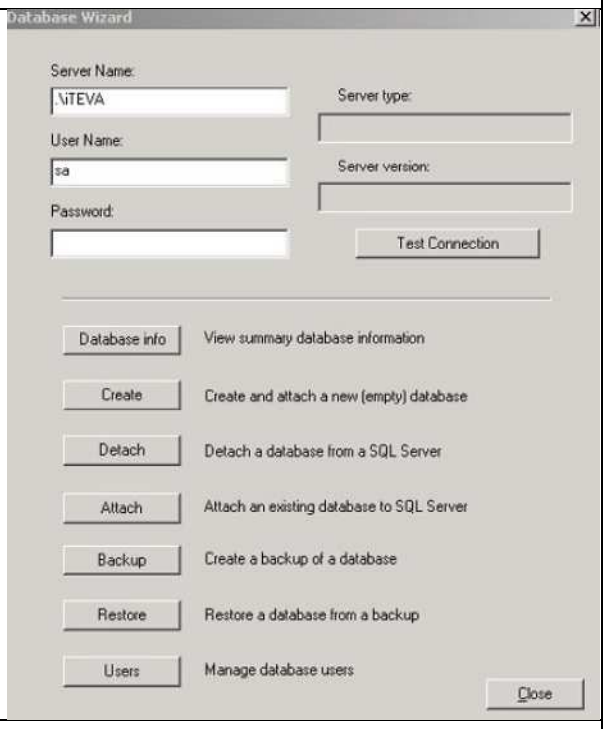
Type **sa** in User Name box

Type **Thermo-123** in Password box (or whatever was chosen during setup if Windows 7 required a stronger password.)

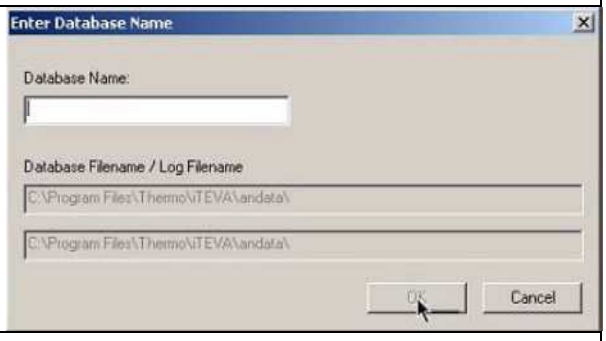
Click on **Test connection** box

This should fill in the Server type and Server version boxes.

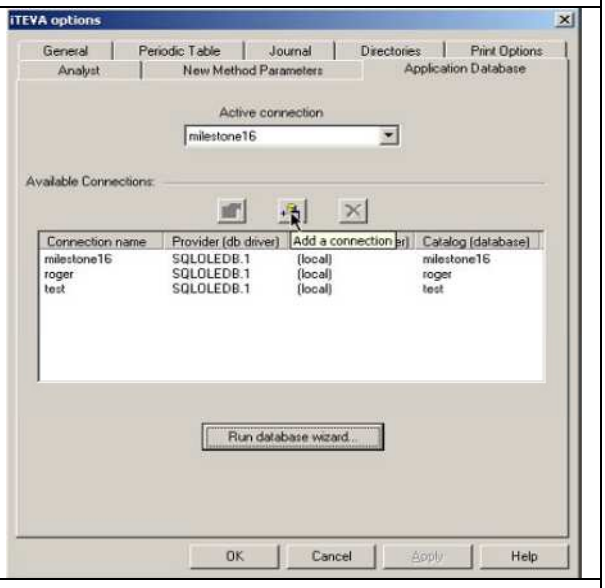
Click on **Create** box

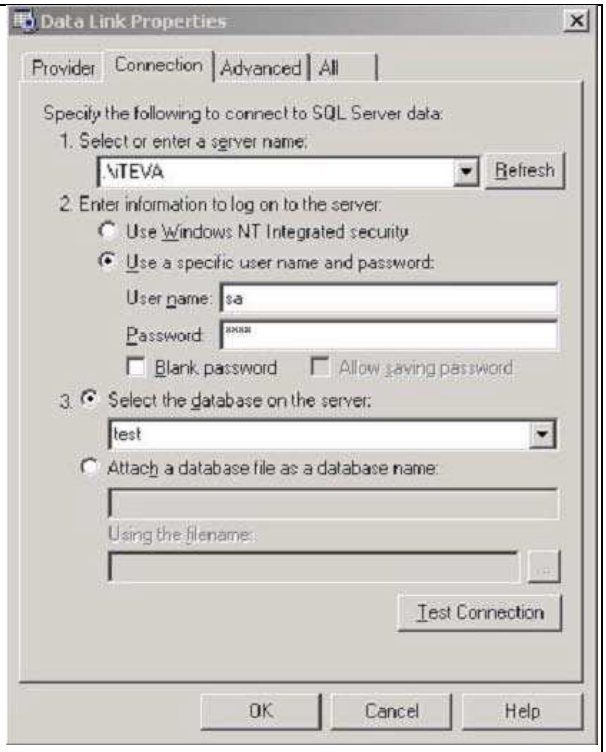


Enter required name for database ('service' for example), click **OK**.



Click on the '**add a connection'** box (as shown).



Type **.\iTEVA** in server name box Type **sa** in User name box Type **Thermo-123** in Password box From the **Select the database on the server** box choose the Database required Click on **Test Connection** Click **OK**	
Fill in an appropriate name (make the connection name the same as the database name)	
The newly created database will now appear in the list of databases Select the created database from the **Active connection** drop down box and click on **OK** This will now make the new database active.	
2.5 Run iTEVA	
Change the iTEVA Journal option to Debug, by navigating to the iTEVA Control Centre, Tools/Options/Journal and ticking the box Debug.	

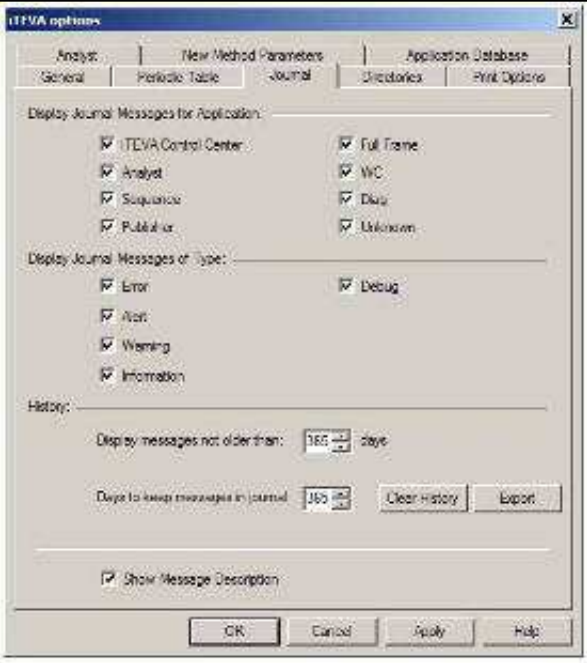
3 Alignment checks

Required if installation performance tests fail

To ensure that the optics have not moved in transit it is necessary to check the optical alignment.

To do this perform a Spectrometer Optimisation and check the debug wavelength positions.

Note: ensure that Debug is switched on.



Select **Optimise Spectrometer** from the **Instrument menu** in Analyst. The status bar at the bottom of the screen will indicate progress. Once this is complete the wavelength check will appear in the journal as shown below. If this is **less than ± 3** in both x and y then continue to the Performance Checks.

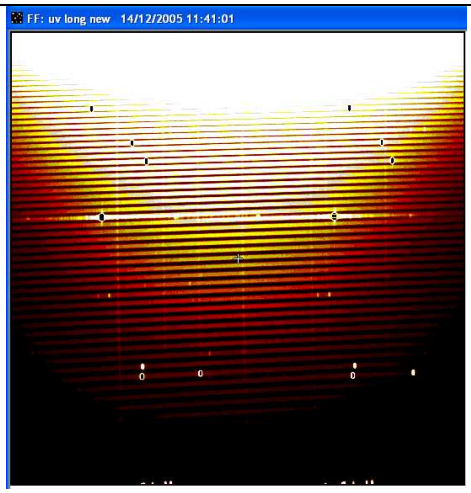
Type	Date/Time	Message	User name	Application
	22/07/2009 15:55:42	Plasma On	admin	iTEVA Control Center
	22/07/2009 15:55:47	Plasma ignition successful	admin	iTEVA Control Center
	22/07/2009 15:56:27	D33534 - Debug:Wavelength check : x = -1.987, y =-2.363	admin	iTEVA Control Center
	22/07/2009 19:59:03	D33534 - Debug:Wavelength check : x = -1.852, y = -2.366	admin	Analyst

If the check shows more than ± 3, or the Optimise Spectrometer fails refer to your diagnostics manual for optical alignment instructions.

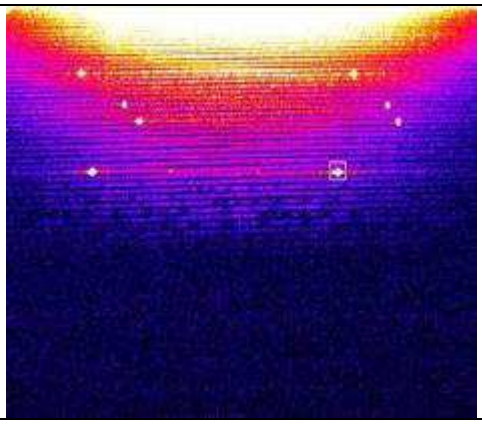
Alignment OK ☐

4 Optical Problem Solving

- Run a full frame low/UV wavelength image using loaded blank solution.
- Full frame should look like the one on the right. If it does optics are OK and the purge is good.
- If not see below

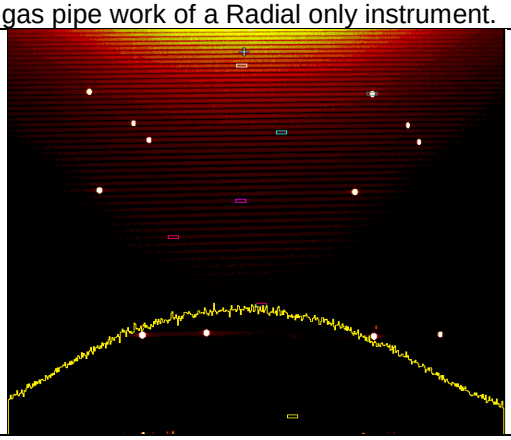


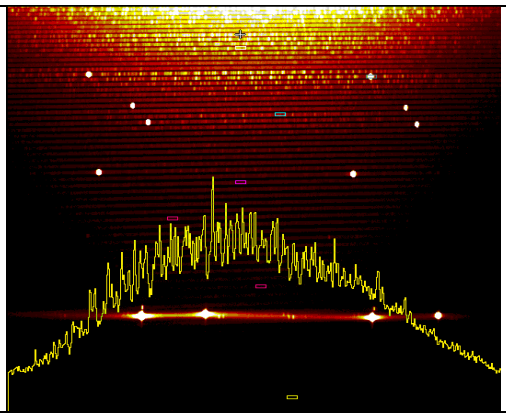
- If full frame is similar to the one on the right this would tend to indicate a badly purged system
- Note the lack of Nitrogen lines at the bottom half of the image.
- Run purge for at least 30 minutes and re-run the full frame, if there is no improvement check for Argon/Nitrogen leaks around the purge system also check the quality of the purge gas.



4.1 Coolant leaks.

The following full frame exposures (of loaded blank) illustrate the effect of leaks in the coolant gas pipe work of a Radial only instrument.





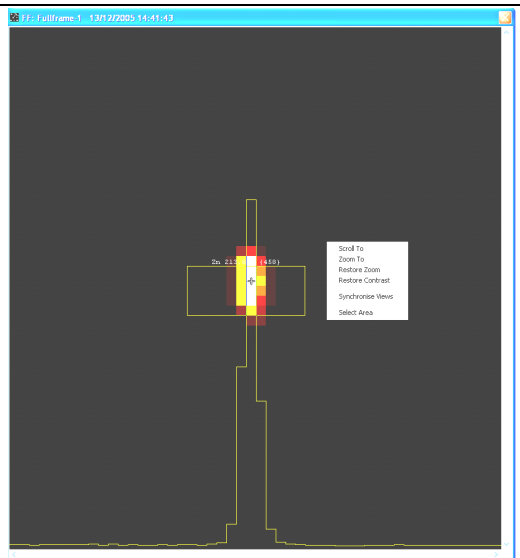
The left hand picture shows the correct normal situation without leaks. The orders are smooth - barring some noise. The right hand picture shows the same system with a small leak in the coolant gas pipe work. There are now a mass of emission lines on the spectrum on top of the orders. There is banding in the vertical direction in the observed intensity of the orders. The nitrogen lines are much more intense. There is likely to be a small reduction in the height of the bright plasma cone visible. It is very easy to spot this phenomenon. Such a spectrum would make it very difficult to use the system for analytical purposes because there are many hundreds of potentially interfering lines.

This shows up with quite a small leak. The leak can be anywhere in the coolant gas system from the torch box to the torch. Possible places for the leak are:

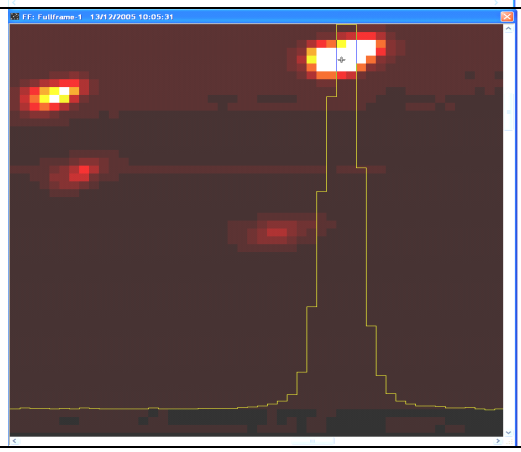
a) any of the push fit gas connectors after the gas box
b) the twist lock connection of the O-ring in the metal torch holder – the O-ring may be damaged or the torch box casting may have a poor surface at this connection
c) The torch outer diameter may be too small – the outer diameter may start to taper down before the rounded bottom end of the outer tube making the torch too small a diameter at the O-ring which is supposed to seal on the outer torch diameter.

4.2 Focus Problems

- Run a full frame low wavelength image using loaded blank solution.
- Full frame image of Zn should look like the one on the right. If it does focus is OK.
- If not see below

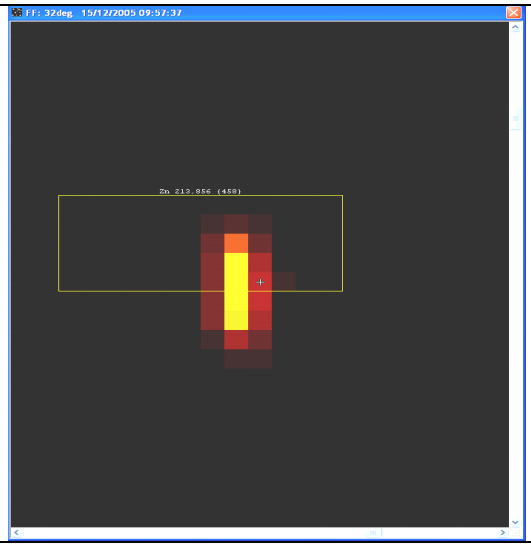


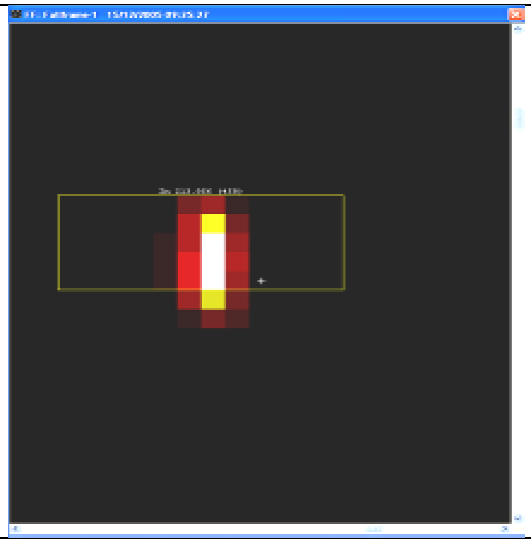
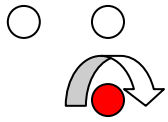
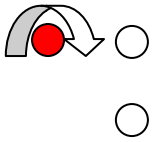
- If image looks similar to the one on the right focus needs attention
- Carry out optical alignment procedure using engineers test software.



4.3 Optical drift problems

- Image of zinc line, offset because either the tank temperature has not stabilized, or there has been a slight movement of the optics during transit
- Make sure temperature of tank reaches 38ºC before running any analysis.
- Check Debug x and Y parameters in the iTEVA Journal
- If still the wavelength is offset it may need to be recalibrated using the engineers test software



♦ A correct position of a Zinc line after successful wavelength calibration using engineers test software. Note: Optical tank temperature is 38ºC	
Remove purge seal screws over M3/M4 adjustment screws. **Note:** One half turn on the Yaw or Pitch screw is approximately equal to 60 pixels	 Pitch – adjustment in this direction moves the carbon position to the right on the screen  Yaw – adjustment in this direction moves the carbon position down on the screen

5 *Interlock Problem Solving*

Torch Compartment Interlock:- If red this indicates the torch door is open or the torch holder is not inserted correctly. The plasma will not light.

Plasma gas pressure:- should be green if the input pressure for the plasma gas is 5.5 Bar, if it turns red during the ignition sequence it indicates problems with the external gas supply to the iCAP. If red Plasma will not light.

Purge gas pressure:- should be green if the input pressure for the plasma gas is 5.5 Bar, if it turns red during the ignition sequence it indicates problems with the external gas supply to the iCAP. If red Plasma will not light.

Detector water flow:- This indicates that the water flow is correct for the camera to cool down and the RF to light the plasma. If Red the plasma will not light. (If the LED flickers even slightly the plasma will go out and this indicates is a problem with the chiller.

Drain Flow sensor. This indicates that the iCAP has not seen an air bubble in the drain sensor for two minutes, This will turn the plasma off. To reset the drain sensor turn the pump to 45RPM.

Exhaust flow This interlock checks that the exhaust is of sufficient flow to ensure the safe removal of heat and combustion gases. (In a 20 second period the extraction needs to be bad for 5 seconds for the interlock to occur.

Detector Temperature:- This interlock indicates that the camera has cooled down to -45ºC and is ready to measure samples. (Note RED = too hot, Green = -45ºC Blue = Too cold.) The detector will take five minutes to cool down to -45ºC.

Optics temperature:- This indicates that the optics heater has reached 38ºC (the correct operating temperature for the optics tank). From room temperature this could take two hours to achieve and an addition alone hour to fully stabilize.