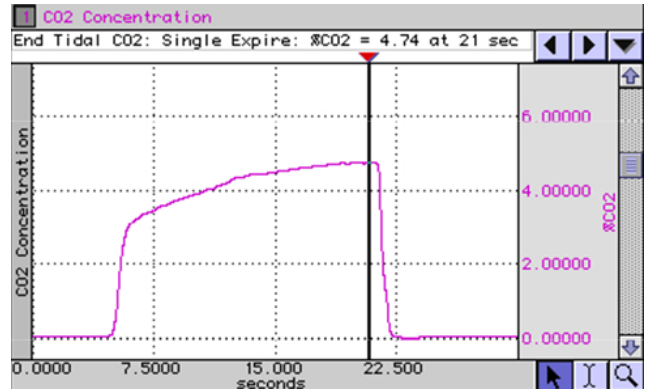


## Application Note 278 End-Tidal Carbon Dioxide (ETCO<sub>2</sub>)

This Application Note describes how to record percent End-Tidal CO<sub>2</sub> (% ETCO<sub>2</sub>) using a BIOPAC CO2100C Carbon Dioxide Amplifier. When a BIOPAC CO2100C Carbon Dioxide Measurement Amplifier is used in conjunction with the MP160 or MP150 Data Acquisition System and *AcqKnowledge* software, it's easy to perform, real-time, breath-by-breath measurements. The *AcqKnowledge* software will calculate the peak expired CO<sub>2</sub> signal to report percent End-Tidal CO<sub>2</sub>.

End-Tidal CO<sub>2</sub> can also be combined with other pulmonary function measurements when a flow transducer and oxygen measurement amplifier are added to the system. With the use of the correct subject interfaces, measurements can also be taken from inside an MRI.



The following equipment is necessary when measuring percent End-Tidal CO<sub>2</sub>.

[MP160WS/W Data Acquisition System with AcqKnowledge](#)

[CO2100C Carbon Dioxide Measurement Amplifier](#)

[AFT20 Gas Sample Line \(connects between CO2100C and AFT21/AFT22/AFT25\)](#)

Listed below are the subject interface options

### Subject Interface Options - Non MRI

#### High flow setup without a mask



- [AFT21 Non-Rebreathing T-Valve](#)
  - [AFT9 Mouthpiece](#)
  - [AFT3 Noseclip](#)
  - [AFT24 Head Support \(optional\)](#)

or

**Low flow setup without mask option**



- [AFT22 Non-rebreathing T-Valve](#)
  - [AFT2 Mouthpiece](#)
  - [AFT3 Noseclip](#)
  - [AFT10 Facemask \(alternative to mouthpiece\)](#)

or

High flow setup with a mask



- [AFT25 Face Mask with T-Valve](#)

## Subject Interface Options - MRI

[AFT31-MRI Gas Sampling Tubing for MRI \(connects between CO2100C and AFT35-MRI\)](#)

[AFT35-MRI Airflow Subject Interface Kit for MRI](#)

**Note:** The AFT31-MRI replaces the AFT20 Gas Sample Line.

The AFT20 or AFT31-MRI gas lines interface between the AFT21/22/25 T-valve and CO2100C amplifier and the pump in the module draws a constant flow of gas as the subject breathes. For MRI applications, the gas sampling line is run through the wave guide and into the control room. The gas line is long enough to support a 10 meter distance between the subject and the amplifier module.

The End-Tidal CO<sub>2</sub> calculation is measured in real-time using the *AcqKnowledge* Rate calculation function. The Rate calculation will measure the peak of the CO<sub>2</sub> signal to provide a breath-by-breath measurement of percent End-Tidal CO<sub>2</sub>. The associated ET<sub>CO<sub>2</sub></sub> graph template file will provide the necessary settings to measure and display End-Tidal CO<sub>2</sub>.

**Note:** The CO2100C amplifier should be properly calibrated before any measurements are undertaken. See the hardware guide for further information about calibration.

Humidity effects of tubing, filters, and module setup are discussed in the [O2100C-CO2100C](#) spec sheet for Gas Concentration Measurement Modules.

See also: [Application Note 151 - CO2100C Module for MP System](#)

[Application Note 152 - CO2100C Module Application Example](#)