



PVT (Pressure-Volume-Temperature) Cell for Diffusion Studies

Product Overview

A **PVT Cell** is a specialized equipment widely used in chemical engineering and materials science to investigate **phase behavior** and **physical properties** of fluids and mixtures under **high-pressure** and **high-temperature** conditions.

When adapted for **diffusion studies**, the PVT cell becomes an essential tool to measure **molecular mass transfer rates**, enabling precise analysis of how molecules of one substance move through another.

Key Features

- High-accuracy pressure monitoring (**$\pm 0.05\%$ full scale**)
- Dual thermocouple setup for precise temperature measurement
- Robust leakage detection system (24-hour CO₂ pressurization test)
- Capable of handling **up to 3000 psia** pressure range
- Versatile ports for **gas, water supply, and evacuation**
- Suitable for advanced **diffusion and phase behavior studies**

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.



Export Sales: +91-9829132777
India Sales: +91-9588842361



IT-2013, Ramchandrapura Industrial Area,
Sitapura Extension, Jaipur-302022, India.



info@tesca.in
www.tescaglobal.com

Experimental Setup Description

The **PVT Cell for Diffusion** (as shown in Figure 1) was designed to measure the **mass transfer rates of CO₂ in water** inside a **closed PVT cell** under controlled conditions.

- **Cell Dimensions:**
 - Diameter: **5.5 cm**
 - Length: **28.5 cm**
- **Temperature Monitoring:**
 - Two thermocouples installed **above and below** the PVT cell ensure accurate measurement of cell temperature.
- **Pressure Measurement:**
 - Equipped with a **high-accuracy pressure transducer**
 - Accuracy: **±0.05 % full scale**
 - Pressure Range: **3000 psia**
 - Transducer located at the **top of the PVT cell**

System Components

1. **PVT Cell**
 - Closed cylindrical cell (5.5 cm × 28.5 cm)
 - Designed for CO₂-water diffusion experiments
2. **Gas Storage Cylinder**
 - Volume: **365 cm³**
 - Connected through a **needle valve**
 - Feed gas: **CO₂**, supplied from a pressurized cylinder
3. **High-Pressure Gas Compressor**
 - Increases pressure inside the gas storage cylinder to experimental conditions
4. **Water Supply Container**
 - Connected to the bottom port of the PVT cell
5. **Vacuum Pump**
 - Connected to the bottom port for **evacuating the PVT cell before**

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.



Export Sales: +91-9829132777
India Sales: +91-9588842361



IT-2013, Ramchandrapura Industrial Area,
Sitapura Extension, Jaipur-302022, India.



info@tesca.in
www.tescaglobal.com

the experiment

6. Leakage Detection System

- Entire system pressurized with **CO₂** before testing
- Pressure monitored continuously for **24 hours** to ensure **zero leakage**

Applications

- Study of **molecular diffusion** in high-pressure systems
- Investigation of **phase behavior of CO₂ and water mixtures**
- Research in **chemical engineering** and **material sciences**
- Validation of **mass transfer models** under high-pressure/high-temperature conditions

NOTE : Above mentioned figure is just schematic diagram, actual design may look like slightly different.

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.



Export Sales: +91-9829132777
India Sales: +91-9588842361



IT-2013, Ramchandrapura Industrial Area,
Sitapura Extension, Jaipur-302022, India.



info@tesca.in
www.tescaglobal.com