

## **ASTM D1250-07**

### Working Paper

Contains a short, high-level description of the title subject.

# Contents

---

- ASTM D1250-07 ..... 1
  
- WORKING PAPER..... 1
  - Contents ..... 2
  - Introduction ..... 3
  - 1. Content ..... 4
  - 2. New Definitions..... 5
    - 2.1. Procedures instead of tables ..... 5
    - 2.1 Correction Factors ..... 5
  - 3. Conclusion ..... 7

## Introduction

---

In May 2007 a new version of the latest major standard for petroleum products measurement:

**“Standard Guide for Use of the Petroleum Measurement Tables”**

was released, otherwise known as “API 2004”, “ASTM D1250-04” or “IP 200/04”.

The current ASTM Designation is:      D1250–07

The IP Designation is:                      200/07

## 1. Content

---

This standard does not change any of the calculation methods defined in ASTM D 1250-04; however it clarifies the new generation of standards and the associated procedures, correction factors and terminology to be used in relation with these standards.

## 2. New Definitions

---

### 2.1. Procedures instead of tables

In older historical standards, calculations were defined in the form of printed tables. As early as the ASTM D 1250-80 standard, these tables were replaced by equations; however each table (e.g. 6a, 6b, 23a, etc.) was represented by an individual equation. Thus, even although the equations existed, they still were called tables. The quintessence of the ideas presented in ASTM D1250-80 was progressive; however the retention of names stemming from a different approach was a little confusing.

From a technical perspective, the replacement of each table from the standard by its own equation could not solve the problem of inconsistent calculations. For further information, see the QuantityWare Working Paper “ASTM D1250. A Historical and technical overview” at the following location:

[www.quantityware.com](http://www.quantityware.com) → Product → Downloads → Working Papers

Since the release of ASTM D 1250-04 procedures were defined and referred to instead of tables. Two procedures are designed to calculate from:

- OBSERVED -> BASE and
- BASE -> ALTERATE conditions.

All other procedures orientate themselves around these two major procedures and are designed to support these calculations with differing conditions and units.

### 2.1 Correction Factors

Before ASTM D 1250-04, the standards' tables only took account of the temperature when correcting densities and volumes.

Consequently, only a VCF – “Volume Correction Factor” was available and calculated.

From ASTM D 1250-04 onwards, the procedures correct density and volume for temperature AND pressure.

Instead of the VCFs we now have:

- CTL - Correction Factor of TEMPERATURE for Liquid
- CPL - Correction Factor of PRESSURE for Liquid
- CTPL - Correction Factor of TEMPERATURE AND PRESSURE for Liquid

If no pressure is specified, pressure will not be taken into account during the calculations and only temperature correction will take place as was the case with the former VCF of the 1980 and earlier standards (this is a “CTL” calculation).

Test calculations show that at common pipeline pressures of 700 PSI (about 48 bar) liquid products with various densities are affected as follows:

- 1.150 kg/m<sup>3</sup>: -0,192% volume
- 850 kg/m<sup>3</sup>: -0.345% volume
- 620 kg/m<sup>3</sup>: -1.042% volume

when compared to calculations performed at standard atmospheric pressure.

i.e. the customer receives between 0,19% and 1.04% excess product.

### 3. Conclusion

---

ASTM D 1250-07 states clearly that a new, improved, calculation has been defined. The main emphasis of the document being on the following points:

- A clear definition of the latest conditions
- The tables known from API 1980 no longer exist, but have been replaced with procedures based on equations
- Now that pressure is considered when calculating, the correction factors have been newly defined as CTPL instead the former VCF model.