

AN ATC PRIMER

What is ATC?

ATC stands for Automatic Temperature Compensation. It is the automatic correction of a petroleum liquid’s volume to a “standard” volume during the process of metering a delivery. In the metric system, this long-standing international standard is defined to be at 15 deg C. Different petroleum products expand or contract with the change of temperature to a smaller or larger degree. To simplify the application of ATC, authorities agreed on a given density for a given product since density variations are small and have only a negligible impact. Among liquid automotive consumer products (gasoline, diesel and LPG), LPG has the highest change in volume with a given change of temperature.

Why bother with ATC?

ATC in petroleum retail application exists today as a result of industry looking for ways to reduce product losses, achieve better inventory control and increase profits. Subsequently, authorities recognized ATC as a means for a “fair” delivery. ATC was implemented initially in those countries with colder climates or large annual variations in temperature since the benefits outweighed the cost of implementation. Depending on the jurisdiction, ATC may be mandatory for LPG but voluntary for gasoline and diesel. If ATC is employed, authorities usually do not permit the arbitrary activation or deactivation of ATC to ensure “fair” measure. Therefore, the decision to employ ATC would be based on company policy or as a requirement regulated by authorities. Savings of one to three percent of total volume are possible with LPG delivery in colder climates. Contrarily, if the annual average temperature is above 15 deg. C, cost is increased because more product is delivered.

VCF Values for 510 kg/m ³ LPG		
LPG		
Temperature (°C)	VCF @ 510 kg/m ³	VCF Delta
-40.0	1.139	
-35.0	1.128	1.1%
-30.0	1.115	1.3%
-25.0	1.103	1.2%
-20.0	1.092	1.1%
-15.0	1.080	1.2%
-10.0	1.068	1.2%
-5.0	1.055	1.3%
0.0	1.042	1.3%
5.0	1.028	1.4%
10.0	1.014	1.4%
15.0	1.000	1.4%
20.0	0.986	1.4%
25.0	0.970	1.6%
30.0	0.954	1.6%
35.0	0.939	1.5%
40.0	0.923	1.6%
45.0	0.905	1.8%
50.0	0.888	1.7%
55.0	0.869	1.9%
60.0	0.850	1.9%

How does ATC work?

An ATC system consists of a temperature probe, immersed in the main liquid stream close to the metering device, and corresponding computing hardware and software. During delivery, frequent samples (several times a second) of the temperature of the petroleum liquid are taken and corrections to the metered (gross) volume are applied to provide a corrected (net) volume. Typically, temperature, net- and gross- volume read-outs are accessible to verify proper operation of the ATC.