

***Long Seamless Coil Tubing
Reduces Installation Cost
for CNG Stations***





CNG Station Construction: How to Lower Installation Cost

Many cities in the U.S. are ramping up to develop an infrastructure that will support compressed natural gas (CNG) vehicles. Though there are very few CNG-compatible, or even hybrid OEM passenger vehicles (Honda sells a CNG Civic and General Motors has started to produce a dual-fuel Chevrolet Impala), the market is growing for CNG-powered fleet trucks. From long-haul tractor trailers, to regional or local same-day shippers, to garbage trucks, CNG is becoming a fuel of choice among companies that carry the cost of fuel as a major operating expense. Even in the second half of 2014 and now the first half of 2015, while oil prices are at their lowest in over a decade, CNG remains significantly less per gallon equivalent than diesel.

U.S. Gain, a leading compressed natural gas provider to fleet operators, is predicting that the price of oil will not affect the move of many companies to cleaner, more cost-effective CNG. Companies with large truck fleets are planning long-term and speculating that the price of oil won't stay low. Some of those companies are consumer goods manufacturers whose customers prefer to purchase from organizations that promote sustainability, said U.S. Gain's General Manager, Bill Renz.



Photo courtesy of The Atlantic County Utilities Authority

Another highly visible industry is waste disposal. We see waste trucks every day. The largest waste disposal company in the U.S., Waste Management, Inc. continues its push to be environmentally friendly, not just in how it disposes of waste, but also in the fuel emissions from their fleets. The organization has converted 2,000 of their collection vehicles to natural gas. This has elevated Waste Management to the largest heavy-duty natural gas fleet in the country.

As private companies and local municipalities take steps to build CNG stations, they find there are particular state regulations which outline specific building requirements, as well as the permitting and inspection processes. One organization, PEI ([Petroleum Equipment Institute](#)), leads the way in setting many of the standards.

The cost of developing an entire CNG station or single islands for dispensing CNG are those related to demand, station design and equipment. The cost of a project can vary



greatly station-to-station. A small CNG station can range from \$250,000-\$600,000, while a large station can cost between \$1.2 and \$1.8 million, according to a report issued by the U.S. Department of Energy.

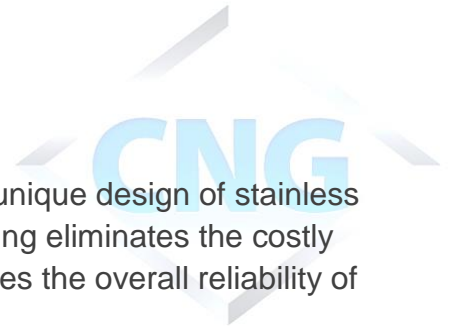
In recent years, many sources have reported on the CNG infrastructure. Some reports state there are approximately 1,500 stations in the United States, while construction is underway for an additional 200 to 300 by the end of 2015. Public access to almost half of the stations allows any vehicle the ability to refuel. While the other half will be private access, servicing city transit busses, school busses and refuse trucks. This growth rate represents an increase of over 400% from 2010.

Though half of the infrastructure is public access (able to provide fuel for passenger vehicles), most of their customers come from long-haul tractor trailers. These drivers and companies find it more economical to go out of their way in an effort to significantly reduce fuel costs. However, even the need to 're-route' is becoming less necessary as more national chain truck-stops are installing islands with CNG dispensers (pumps).

Though there are special codes and requirements for adding CNG to existing facilities or building new CNG stations (public or private), the procedures are very different. Construction of CNG stations is typically done by contractors with experience in liquid fuel service installations, such as gas and diesel. It is often difficult to navigate the permitting and inspection process to ensure safe construction of a station and ensure that the installation of equipment and underground tubing/piping meets code. NFPA 52-98, section 4-9, mandates installation of piping, jointing and venting must be performed by factory trained installers to prevent serious damage. There are specialty contractors in the industry, focusing on installation of high-pressure, severe-service piping and tubing. Some organizations and associations such as NGVi ([Natural Gas Vehicle Institute](#)) offer special training courses to certify installers.

Conclusion – Special CNG Tubing Lowers Installation Cost

When building a CNG station or installing an island, [special CNG tubing](#) is an important part of safe construction. Traditional CNG station design uses multiple 20-foot-long sticks of tubing or pipe to span the distance from the compressors to dispensers. Because the tubing runs underground for hundreds of feet, these shorter, 20-foot 'stick' lengths of tube must be welded together, not joined with fittings. Fire regulations do not allow the use of mechanical fittings for joining tubing carrying flammable gas underground.



Advances in manufacturing technology have allowed for the unique design of stainless steel coil tubing with ½", ¾" and 1" outer diameters. Coil tubing eliminates the costly labor associated with welding shorter lengths. It also increases the overall reliability of the station by minimizing leak points.

Some specialty manufacturers are able to provide continuous lengths of high pressure tubing with ½" ¾" and 1" outer diameters and working pressures of 5,500 psi. Restricted tolerances and uniquely designed wall thicknesses allow for optimized flow of compressed natural gas. To provide a safe fill in a quicker amount of time, look for manufacturers that can provide tubing to transport CNG with the below requirements:



Photo courtesy of SSP

Outer Diameter [OD]	OD Tolerance	Wall Thickness [WT]	WT Tolerance	Design Pressure*
0.500"	+0.005/-0"	0.070"	±10%	5,500 psi
0.750"	+0.005/-0"	0.104"	±10%	5,500 psi
1.000"	±0.005"	0.139"	±10%	5,500 psi

*Internal design gage pressure calculated per ASME B31.3 for temperatures -425 to 300°F

Key advantages of using specialty manufactured CNG tubing are:

- Significantly reduced installation costs
 - Installing continuous length, seamless stainless steel tubing specifically designed for CNG applications, takes much less time and effort than welding shorter lengths.
- The right fit
 - When fittings are required, high pressure tubing for CNG with restricted tolerances provides a tight seal.
- Improved reliability
 - Using fewer welds reduces opportunity for defect, such as leak points and other long-term failures.
- Increased installer and operator confidence
 - The entire length of CNG Tubing is 100% pressure tested and passes Positive Material Identification prior to being used in the field.



Photo courtesy of SSP

The stainless steel coil tubing is run off of large spools and straightened in the field by a portable tubing straightener. Once the tube is straightened to the desired length, it is cut with traditional tube cutters. Because a typical installation does not permit a straight path from compressor to dispenser, the tubing is bent with a special tool, run through protective conduit and then placed into the trench. Long length stainless coil tubing delivers a seamless solution to costly welding, decreases potential leak paths

and can reduce installation time from days to hours. The labor savings and reduced time to build a station or install fueling islands is so significant that the use of long coils of seamless stainless steel tubing is becoming the standard in this high-growth industry.

Sources:

- [Consumer Energy Center](#)
- [GAIN®](#)
- [JSONLINE.COM • Journal Sentinel • Milwaukee, Wisconsin](#)
- [SSP Corporation](#)
- [Waste Management](#)
- [U.S. Department of Energy](#)
- [Oregon Live](#)
- [Atlantic County Utilities Authority](#)

Also see:

- [CNG Tubing brochure](#)



About HandyTube Corporation

HandyTube Corporation, a Handy & Harman Company, is a premium manufacturer of long-length tubing for compressed natural gas fueling stations. HandyTube's seamless stainless steel coils are also used in applications for the oil and gas, chemical process, shipbuilding, instrumentation, aerospace and defense, process automation and life sciences industries. You can contact HandyTube at +1 302.697.9521 or visit HandyTube online at www.handytube.com.