

BRUGG

Pipes



FLEXWELL®-HL

Double Wall Stainless Steel Pipe for Above Ground,
Below Ground, Marina and Commercial Fuel Systems



Flexible, double-wall corrugated pipe system with continuous interstice for leak detection

GENERAL DESCRIPTION

The FLEXWELL®-HL pipe system is specifically designed for hazardous fluids and gases, such as gasoline, ethanol blends, biodiesel, LPG and other hazardous fluids typically transported in chemical plants. The pipe is used in gas stations underground as well in above ground applications such as marinas and bulk facilities. FLEXWELL®-HL can operate as a suction or pressure systems and can be continuously monitored via suitable and approved leak detection systems.

CONSTRUCTION

FLEXWELL®-HL is a flexible pipe system made of corrugated 316L (1.4404) stainless steel primary and secondary pipes for operating pressures of up to 145 PSIG (10 bar). The interstitial space between primary and secondary pipe can be used for leak detection. The pipe is corrosion protected by a polyethylene jacket. The stainless steel pipe provides an enduring, impermeable barrier, even with future new fuels or fuel combinations.



Closed end fitting, open end fitting – available in NPT or EZ-Fit

APPLICATIONS

- suction pipes
- pressure pipes
- fill pipes

SIZES AND PRESSURE RATINGS

FLEXWELL®-HL is available with an ID of 1" (ND 25) to 3" (ND 80) for conventional use at an operating pressure of up to 145 PSIG (10 bar) and temperatures between – 50 °C (– 58 °F) to + 60 °C (+ 140 °F). For gases such as LPG the pipe can be operated at up to 360 PSIG (25 bar) with a special end fitting that connects the reinforcement tape in the interstitial space.

INSTALLATION

FLEXWELL®-HL is manufactured in factory lengths up to 3,000 ft.

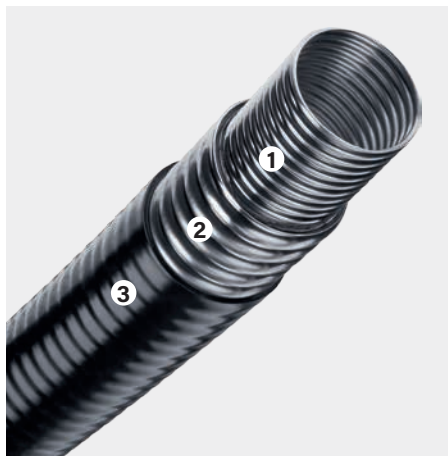
FLEXWELL®-HL can be laid directly into a trench in one piece following any directions without necessity of intermediate joints or fittings. The corrugated design of the primary and secondary pipes assure excellent impact resistance while at the same time providing a high degree of flexibility.

TWO HOUR FIRE RATING

FLEXWELL®-HL has a two hour fire rating per UL 1369.

LEAK DETECTION

The interstitial space between the primary and secondary pipes is designed for leak detection via either pressure or vacuum, depending on local regulations or operating requirements.



FLEXWELL®-HL pipe

- 1 corrugated stainless steel primary pipe
- 2 corrugated stainless steel secondary pipe
- 3 polyethylene jacket



NEW: UL 1369 Above Ground Certified

Physical properties of FLEXWELL®-HL pipes

Model:		HL 30/48	HL 48/71	HL 60/83	HL 98/134
Material:	primary pipe: 316L (1.4404)	•	•	•	•
	secondary pipe: 316L (1.4404)	•	•	•	•
	corrosion protection: LDPE jacket	•	•	•	•
Operating pressure:	vacuum	suction operation	suction operation	suction operation	suction operation
Primary pipe (fuel etc.):	pressure	145 PSIG / 10 bar	145 PSIG / 10 bar	145 PSIG / 10 bar	145 PSIG / 10 bar
Nominal ID:		1" / ND 25	1½" / ND 40	2" / ND 50	3" / ND 80
Dimensions:	inside diameter (ID)	1.2" / 30 mm	1.9" / 48 mm	2.4" / 60 mm	3.9" / 98 mm
	outside diameter (OD)	1.9" / 48 mm	2.8" / 71 mm	3.3" / 83 mm	5.3" / 134 mm
	volume of primary pipe (gal/ft) / (liter/m)	0.06 / 0.8	0.16 / 2.0	0.24 / 3.0	0.67 / 8.4
Min. bending radius:	with bending machine	20" / 500 mm	26" / 650 mm	28" / 700 mm	40" / 1000 mm
Weight:	(lb/linear ft.) / (kg/linear m)	0.9 / 1.3	2.7 / 3.8	3.1 / 4.8	7.1 / 11
Available end fitting:	closed	•	•	•	•
	open		•	•	•
Permanent monitoring	vacuum	- 8.7 PSI / - 0.6 bar	- 8.7 PSI / - 0.6 bar	- 8.7 PSI / - 0.6 bar	- 8.7 PSI / - 0.6 bar
pressure secondary pipe:	pressure up to	145 PSIG / 10 bar	145 PSIG / 10 bar	145 PSIG / 10 bar	145 PSIG / 10 bar

All technical data subject to change.



A BRUGG GROUP COMPANY

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BRUGG FLEXWELL-HL

Flexible double wall stainless steel pipe –
for projects which demand the best

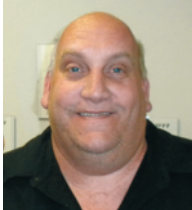
UL 1369
"Severe"
certified

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BRUGG FLEXWELL®-HL Pipe Deployment in Manhattan

BRUGG FLEXWELL®-HL Pipe Supplies Fuel to Helicopters at New York's Wall Street Heliport



Tony Ramos,
Core Engineered Solutions

"We at Core sell compliance, value and long service life. The BRUGG pipe offers all of these values and stands alone in above ground applications. It also exceeds all the criteria for pipe below ground and under piers. I don't know any other double-wall pipe that protects against fires, UV and offers the same durability and flexibility. Surprisingly the flow rates are not affected by the pipe corrugation. BRUGG's people throughout the process were models of how a supplier should service their customers and product. Core looks forward to many more opportunities with this product."

The Wall Street Heliport, located in lower Manhattan, is used for both tourist excursion flights and business air traffic. Currently there are 5 separate, active helicopter excursion companies catering that share this location. Combined, these businesses operate a total of twenty 5 to 6 passenger Bell helicopters. Each of these sightseeing tours lasts between 15 and 30 minutes, with approximately 10 to 15 minutes of ground time allowed between return and departure of the next tour. On any typical sunny summer day at the height of the tourist season, this heliport will experience more takeoffs and landings than JFK International Airport over the same period of time. In addition to the tourist flights, there are also regular business flights, most of which consist of modern Sikorski Helicopters. In July, during this peak operating season, a new fueling system was installed using BRUGG Pipesystems' FLEXWELL®-HL pipe.

Core Engineered Solutions is a firm, which specializes in fuel storage and supply system installations for applications such as diesel generators, emergency power systems, wastewater treatment plants, and aviation fueling installations. Core's leading product line is "Convault", a ma-



Wall Street Heliport in Manhattan/New York City

nufacturer of concrete reinforced fuel storage tanks. Core was awarded the contract to construct a new fueling terminal for the prominent and highly visible Wall Street Heliport. This heliport is located on the East River, very close to "Ground Zero". In order for this project to be approved and completed, Core was required to use piping material which was marina-proof, flexible, sturdy and resistant to UV exposure. BRUGG FLEXWELL®-HL pipe met all of these requirements. Thanks to the efforts of BRUGG's Manufacturer's Representative, Yeager Engineered Systems, Core was introduced to the right pipe for the job. To complete this project, 560 feet of 2" pipe, 20 feet of 3" pipe and a total of 8 couplings were used.

With temperatures approaching 100 degrees, the pipe installation was completed in July 2010 with the expert assistance from BRUGG factory personnel. Not only the intense helicopter traffic but also the 7 to 10 foot tidal changes had to be considered in the planning of this



Deployment of 500 ft. of
FLEXWELL®-HL pipe



Temporary attachment of the pipe



Final attachment of the pipe to
the pier



Installation work during ongoing
helicopter traffic

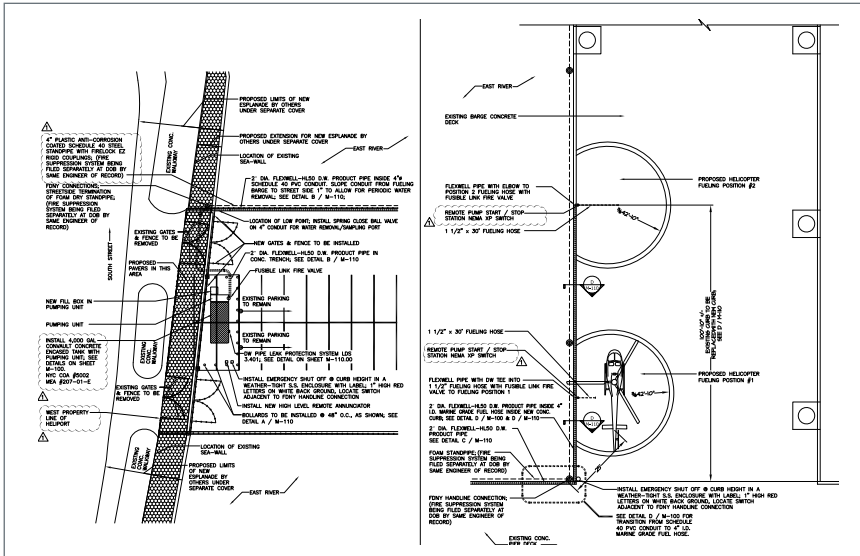
Solutions for the Future

BRUGG PIPESYSTEMS
Flexible solutions

BRUGG FLEXWELL®-HL Pipe Supplies Fuel to Helicopters at New York's Wall Street Heliport

installation. The first step was to lay out a 500 ft. length of pipe along the length of the pier, to the first fuel station. The pipe was then connected, using a coupling, to the dispenser manifold. The whole length of pipe was then carefully secured to the side of the pier, using a boat and mobile crane located onsite. This was a very complex and difficult process to complete, due to the changing tides, wave action caused

by the movement of boat traffic on the East River and the constant helicopter rotors. At this point the piping was placed beneath the deck of the pier, and positioned in a channel between a support beam and the deck, and finally raised through a hole into the pump station – all the while being subjected to the constant waves on the river.



Plan layout of the fueling system at the Wall Street Heliport

Lastly, an additional length of 3" and 2" piping was installed between the tank and the pump station for filling and transferring jet fuel. The final pressure test confirmed that the BRUGG FLEXWELL®-HL piping installation had no errors or leaks anywhere in the system. The customer will be able to rely on the quality, reliability and durability of this pipe installation for many years to come.

Because of the preparation and planning by Core Engineered Solutions and American Environmental (installation), and to the know-how of the BRUGG personnel on site, this project was completed in one week. During the course of this installation, the local technicians were trained and certified in the installation of BRUGG FLEXWELL®-HL piping.

To obtain additional information please fill in the data below and fax to No. 706.235.6035

- Please send me additional information
- I have a project and would like to be contacted

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BRUGG FLEXWELL®-HL Pipe Rises Above the Rest ...

BRUGG-FLEXWELL®-HL piping to supply fuel for Boat Fueling Docks



James Taylor,
Walter's West End Supply

"After I saw the BRUGG FLEXWELL®-HL pipe, I knew that the County authorities would be completely satisfied with it. After examining the pipe firsthand, the County approved its use. As a result, the customer decided to proceed with the project, and gave us a very narrow timeframe to complete it in. I want to acknowledge the hard work and effort of BRUGG, and their knowledge and experience in constructing marina fueling sites. Without their assistance, we would not have finished the project on time, and to the satisfaction of the customer."

Marinas located on the ocean present special challenges when installing fuel systems. Especially for floating dock marinas, BRUGG has developed new ways of connecting the mainland with the floating dock utilizing its proven and virtually indestructible FLEXWELL®-HL piping system. Until now, flexible fuel hoses were used to absorb the tidal variations and the resulting length changes across the gangway in addition to the continuous wave action. This means that there are couplings located over the water which can lead to leaks. BRUGG developed a system, in which the flexibility of the FLEXWELL®-HL would compensate this change in length and the wave action at the same time. As a result this pipe eliminates any couplings over the water, and in most cases, can be installed in one continuous length from the fuel storage tank to the fuel pumps. This not only saves installation time, but also eliminates the cost of pipe couplings, transition boxes, etc.

The owner of the Wyncote Yacht Club in Huntington (Long Island, New York, USA) received an order from the authorities to upgrade and improve their fueling operation. They contacted an engineering firm,

Transition of pipe from gangway to floating dock

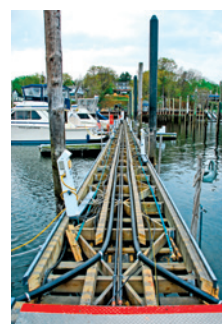


Connection to the dispenser sump

who in turn worked with a petroleum equipment supply company to develop the required fueling system upgrade. This firm contacted BRUGG, because of BRUGG's reputation with marine applications. This installation required running two 2" lines, one for gasoline and one for Diesel. These lines would run from a sump on the shore, across the gangway and over about 459 feet inside a floating dock to the fueling pumps. In this case, the difference between high and low tide was approx. 10 feet, which can be even greater during storm conditions. As a result, the piping would have to compensate a length change across the gangway of almost two feet.

Before any work could begin, the piping and installation concept had to be approved by the authorities. This review didn't just address the approval request for the BRUGG FLEXWELL®-HL pipe, but they

Right:
Pipe run from gangway to fuel dock



Far right:
FLEXWELL®-HL pipe installed underneath gangway



Solutions for the Future

BRUGG-FLEXWELL®-HL piping to supply fuel for Boat Fueling Docks

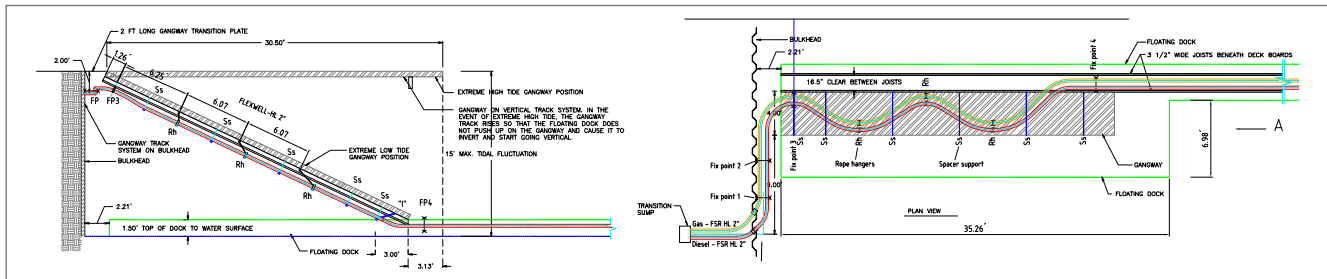
completed their own intensive internal investigation using their own engineers. They analyzed every aspect, including our own concept for the compensation of the tidal fluctuations. As a result of this detailed and exhausting review, the BRUGG FLEXWELL®-HL pipe is the only approved fuel piping for marinas in Long Island today.

BRUGG personnel supervised every aspect of the pipe installation. First, the two pipe runs were pulled from the shore, across the gangway, to the manway in the dock, and then brought to the fuel dispensers. Because the filling dock and the boat dock are separate from each other, the fueling lines had to be kept free and flexible over this transition. After this segment of the installation was complete, both pipelines had to be laid in a serpentine fashion under the gangway, so that the twice daily tidal effects on the pipe length could

be absorbed. This serpentine-shaped piping was then supported by frames, which were attached to the underside of the gangway.

Lastly, both pipelines were attached along the seawall and fed to the shore through two underground openings. The piping was run approximately 10 feet inland from the seawall to a transition sump, and connected to the rest of the installation. The total length of each of these two pipe runs was 560 feet, with eight bends.

Thanks to the professionalism and preparation shown by the engineering team, the installation company and the expertise provided by BRUGG, this installation was completed in four days. Also, as a result of this installation, three employees of the installation company were certified as BRUGG FLEXWELL®-HL pipe installers.



Layout drawing of the Wyncote installation

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