

# IMPORTANT INFORMATION

# FOLLOW ALL INSTRUCTIONS

## 1.0 General Information

These installation instructions contain important information about the proper installation of OPW's FlexWorks Flexible Vent Piping Systems. This information and instructions primarily deal with underground fuel vent piping. Other components such as product piping, tank sumps, dispenser sumps, vent transition sumps and other piping systems and remote fill lines have their own individual installation instructions. Refer to OPW-FCS's FlexWorks Flexible Piping Manual for more detailed instructions.

This flexible piping is used for the transmission of aromatic fuel vapors and is designed for direct burial of the pipe and fittings for use with or without the requirement for secondary containment. The intended use for Vent is for venting vapors from an underground storage tank to a remotely located vent stack. The Vent piping system requires the use of standard couplings & fittings. Unlike liquid supply piping connections, OPW permits Vent swivel connections to be direct buried when properly protected. (See Section 9.7)

**NOTICE: OPW Vent piping (V20 and V30) should only be utilized for vent and vapor application. It is NOT intended and should not be used in the transfer of fluids. OPW's system components may only be installed and serviced by a factory trained and currently certified installer in order for the product warranty to be valid. The use of non-certified personnel or any deviations from these written procedures could result in damage or leakage of the system and void the product warranty. Contact OPW-FCS's Customer Service Department for more information at 1-800-422-2525.**

## 2.0 UL Listings

FlexWorks double wall vent piping is listed with Underwriter's Laboratories (UL®) under file #MH16678 and labeled as follows: Motor Vehicle Fuels, High Blend Fuels, Concentrated Fuels and Aviation and Marine.

FlexWorks Vent Pipe Couplings		
Sizes	Couplings	Male Adaptors
2" FlexWorks Vent (V20)	DPC-2200A	SMA-2020
2" FlexWorks Vent (V20)	SBC-2200	N/A
3" FlexWorks Vent (V30)	DPC-2300A	SMA-3030

## 3.0 UL Listed Warranted Fuels

These are the listed fuels that have been tested under UL 971 and are warranted for use with the FlexWorks Flexible Vent Piping System.

### Motor Vehicle Fuels

- 100% ASTM Reference Fuel No. 2
- 100% ASTM Reference Fuel C
- 85% Reference Fuel C – 15% MTBE
- 70% Reference Fuel C – 30% Ethanol
- 85% Reference Fuel C – 15% Methanol

### High Blend Fuels

- 50% Reference Fuel C - 50% Methanol
- 50% Reference Fuel C - 50% Ethanol

### Concentrated Fuels

- 100% Methanol
- 100% Ehtanol
- 100% Toluene

### Aviation and Marine Fuels

- 100% Premium Leaded Gas
- 100% Kerosene

**WARNING: Failure to secure written approval from OPW concerning non-warranted fuels and liquid chemicals, will void the product warranty and could potentially cause environmental damage or personal injury.**

## 3.1 Regulatory Guidelines

OPW Flexworks Vent Piping should be installed in compliance with the following industry standards:

- PEI RP100, reference section 10.12
- NFPA 30, reference section 27.8
- NFPA 30A, reference section 5.6
- AHJ requirements (Local Authority Having Jurisdiction)

#### 4.0 Piping Applications

FlexWorks vent piping may be used in the following applications.

- Tank Vent Piping
- Stage II Vapor Recovery Piping

**WARNING: FlexWorks piping is not warranted for above ground transmission of flammable liquids or vapors due to the possible exposure to fire.**

#### 5.0 Operating Pressures & Vacuums

FlexWorks piping and its associated fitting systems have a minimum five to one (5:1) safety factor from maximum rated operating pressure for the primary pipe. The vapor transferred should not exceed the maximum operating pressures indicated on each pipe size.

#### 6.0 Operating Temperatures

FlexWorks pipe is for underground use only and a maximum operating temperature of 125°F (52°C).

#### 7.0 Allowable Bend Radius

FlexWorks piping is a semi-flexible pipe and should never be bent at a radius of less than the designed bend radius. If a section of pipe becomes kinked, the kinked section should be cut-out of a piping length and it should be discarded and never used. **NOTICE: For cold weather conditions (below freezing) refer to the Flexible Piping Manual for important installation tips.**

<u>Pipe Diameter</u>	<u>Min Bend Radius</u>
2"	36"
3"	18"

#### 8.0 Storage, Transit & Handling

OPW-FCS requires that all piping, fittings and system components be stored in such a manner that they will not be subject to direct sunlight and /or excessive environmental conditions. OPW-FCS requires that the piping, fittings and system components are handled in such a manner that it will not cause any unnecessary damage. Do not drop, cut or cause severe impact to any of the components. Keep all piping, fittings and other components in the original packaging until ready for use. Keep all coupling protector caps/ covers on couplings and fittings until assembly. Inspect all fittings prior to installing. Parts that have been cut, cracked or otherwise misused should be replaced. Do not drive over, drag or damage FlexWorks Piping. Any damaged or compromised section of pipe should be discarded and not be used.

**NOTICE: Never use knives or razor blades to open packaging as damage to piping could occur.**

#### 9.0 Assembly of FlexWorks Vent Piping System

FlexWorks vent piping must be installed with OPW-FCS tools and fittings. These include an OPW-FCS coupling machine fitted with the appropriate size swage kit, bull nose plugs, a pipe cutter tool and wrenches for the appropriate size pipe. Failure to use OPW-FCS tools and fittings may cause damage or failure of the system and void product warranty.

#### 9.1 Pipe Burial Requirements

FlexWorks vent piping is strong, yet flexible, piping systems and must be buried in such a manner so that they will not compress. Be sure that proper pipe trenching, backfill materials and burial depth requirements are followed and in place prior to measuring and cutting FlexWorks piping. Refer to the Flexible Piping Manual for complete instructions and warranty compliance.

**Note: FlexWorks vent piping is intended for installation in normal soil applications.**

**CAUTION: Use extra caution when backfilling piping in trenches or open excavations so as not to damage or crush the piping or any associated fittings. Avoid sudden impacts from dumping backfill materials. Spread backfill gradually and evenly. Failure to do so could cause immediate or long-term damage to the piping.**

**CAUTION: FlexWorks vent piping can be punctured by grade stakes or other sharp objects driven into the ground. The use of tracer tape or a schematic of the underground piping should always be kept onsite and marked off prior to commencing any work that may damage the pipe.**

**NOTICE: Installation instructions for containment sumps are not contained within this FlexWorks Piping instructions. Refer to the dedicated product manuals for the correct installation procedures and techniques for the containment sumps and entry boots.**

#### 9.2 Installing Pipe Adapters

FlexWorks DPC fittings have proprietary threads and cannot be directly connected to standard National Pipe Thread (NPT) pipe fittings without an OPW-FCS adapter. After all plumbing assemblies have been fabricated and installed on the vent riser and vent transition sumps (if applicable), install the appropriate OPW-FCS pipe adapter (Swivel Adapter or Fitting) into NPT threaded pipefitting. This is done with standard pipefitting tools, but caution should be taken not to damage the OPW-FCS threads or O-ring surfaces.

**NOTICE: For NPT threads, use only UL classified thread sealant specifically formulated for gasoline and petroleum products. Do not over-tighten fittings for it could cause damage to the tapered threads.**

#### 9.3 DPC Swivel Coupling FlexWorks Vent Piping

The FlexWorks vent piping system w/ DPC couplings requires the use of the OPW-FCS Coupling Machine for proper installation of the pipe couplings onto the ends of the flexible pipe sections. Refer to the Flexible Piping Manual for proper coupling machine use and warranty compliance. Different sizes of Swivel Couplings require their own swage kit to properly swage the coupling onto the pipe. Refer to the OPW-FCS Products Price List for a list of the appropriate swage kit.

**NOTICE: Do not use silicone-based lubricants to lubricate the swage. Only metal assembly paste or black moly grease should be applied into the coupling insert. Make sure entire coupling assembly is on the machine prior to swaging.**

**NOTICE: Make sure that the pipe is in a vertical position and that the coupling ferrule is against the coupling and the swivel nut is flush against the faceplate at all times during the swaging cycle.**

## 9.4 Connecting Pipe Sections

**NOTICE:** Prior to connecting Swivel Couplings, inspect the pipe couplings to make sure all seals are in place and free of dirt and debris. Look for any damage to the seals that may have occurred during the coupling procedure or when in-stalling through the Access Pipe.

When installing swivel couplings, hand tighten the coupling onto the OPW-FCS fittings until it is snug. Tighten the coupling nut ¼ turn more or to 200 in/lbs. Do not allow the pipe to rotate while tightening. The ¼ turn procedure will prevent over tightening of the coupling past the maximum 200 in/lbs.

**CAUTION:** Over tightening of the coupling will cause damage to the coupling gasket and result in the eventual leak of the system.

**CAUTION:** Never use pipe dope or sealant on the threads of a DPC Swivel Coupling.

## 9.5 SBC Bolt-On Vent Piping Coupling

OPW Swivel Barbed Couplings (SBC) are designed to be used with FlexWorks product piping and vent piping. When using FlexWorks flexible piping, be sure the cut is straight and clean.

**NOTICE:** Before installing, refer the OPW Flexworks Swivel Bolt-On Installation Instructions (SBC-002) for detailed instruction and proper installation. Inspect barbed surfaces of fittings for loose debris or damage which may have occurred during shipping.

**IMPORTANT:** Only use UL Approved pipe sealant for the type of fuel you are using. TELFON TAPE IS NOT AN APPROVED THREAD SEALANT.

### 9.6 Tank Connections Within Tank Sump

If the tank's vent connection is contained within a tank sump, the vent line should enter through an applied entry fitting. A male adapter fitting should be used to complete the connection within.

### 9.7 Tank Connections Extractor Fitting

If the tank's vent connection is not contained within a tank sump, then a male SMA adapter fitting should be installed in the extractor fitting to accept the OPW Piping. The adapter and coupling/fitting should be properly protected. If an SBC bolt-on coupling is used, it can be threaded directly into the extractor fitting. All buried metal should be covered with dielectric tape and coated with 3M 08883 (or equivalent) Rubberized Undercoating to further protect the fitting components from corrosion.

### 9.8 Pipe Branch Connections

In between the beginning and end of a Vent piping line it may be necessary to install tee fittings to interconnect numerous pipe runs into a main return line to the tank.

### 9.9 Vent Stack Connections

At the other end of a vent pipe line the pipe connects to a vent stack for tank vapor venting applications. This connection is made using an elbow fitted to the appropriate coupling. Metallic fittings should be covered with dielectric tape and coated with 3M 08883 (or equivalent) Rubberized Undercoating to further protect the fitting components from corrosion.

## 10.0 Vent Pipe Installation

OPW Flexworks Vent Piping should be installed following PEI Recommended Practices RP100, reference section 10.12:

"The vent piping for all tanks should be adequately sized. Use an extractor fitting at the tank connection to facilitate future testing. Slope vent piping no less than 1/8 inch per foot back to the tank. Carefully grade the bedding for the vent piping to avoid sags or traps in the line where liquid could collect. Construct aboveground vent risers using appropriately sized steel pipe. Any metallic vent piping or fitting installed underground and in contact with the soil should be protected from corrosion to prevent corrosion failure."

**Warning:** Some vent piping designs for gasoline tanks may share a common vent manifold. Diesel and Kerosene, as well as other non-gasoline tank vents must not be manifolded with gasoline vents.

"Locate vent outlets away from building openings, air intakes and property lines; above adjacent rooflines and canopies; and high enough above grade to ensure that discharged vapors will not produce fire or safety hazards. Consult applicable codes for specific guidance on vent height and location. Free-standing vent installations should be protected from vehicular traffic and capable of supporting themselves with respect to normal loads imposed by wind and testing procedures. Securely fasten vents attached to buildings to avoid damage from wind an testing procedures.

### 10.1 NFPA30A 27.8.2 Vent Piping for Underground Tanks

**27.8.2.1** "Vent pipes from underground tanks storing Class I liquids shall be located so that the discharge point is outside of buildings, higher than the fill pipe opening, and not less than 12 ft (3.6M) above the adjacent ground level."

**27.8.2.2** "Vent pipe outlets shall be located and directed so that vapors will not accumulate or travel to an unsafe location, enter building openings, or be trapped under eaves and shall be at least 5ft (1.5M) from building openings and at least 15ft (4.5M) from powered ventilation air intake devices."

**27.8.2.3** "Vent pipes shall not be obstructed by devices provided for vapor recovery or other purposes unless the tank and associated piping and equipment are otherwise protected to limit back-pressure development to less than the maximum working pressure of the tank and equipment by the provision of pressure-vacuum vents, rupture discs, or other tank-venting devices installed in the tank vent lines."

**27.8.2.4** "Vent outlets and devices shall be protected to minimize the possibility of blockage from weather, dirt, or insect nests."

**27.8.2.9** "Vent pipes and vapor return piping shall be installed without sags or traps in which liquid can collect."

### 10.2 Vent Pipe Sloping Requirements

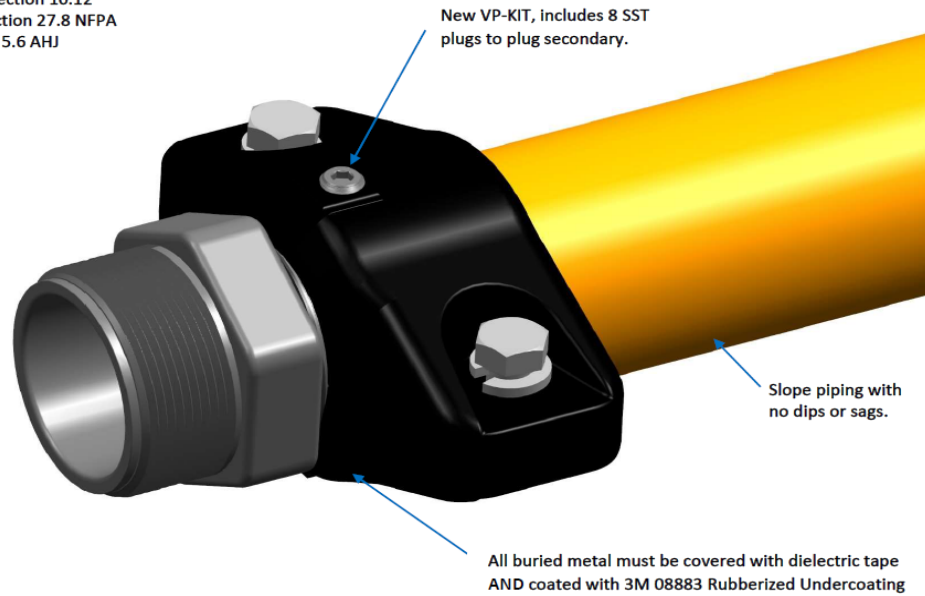
OPW Flexworks vent piping should be installed to maintain no less than 1/8" per foot of slope back to the tank. Vent pipe must not have any sags or traps in which liquid can collect. OPW Flexworks vent pipe is shipped on reels and may experience "pipe memory" when un-rolled from the reel leaving bends in the pipe. OPW recommends keeping the pipe reel in a warm location until ready to install. The pipe should then be unrolled and straightened while it is warm, it will cool in a straighter position making it easier to install. For cold weather installation, please refer to **OPW Flexible Underground Piping Manual (UPM-0001) sec 13.2 Cold Weather Pipe Handling**. Even if the pipe is unable to be warmed prior to installation, the pipe should still be unrolled from the reel and laid flat on the surface at least 24 hours prior to installation to help remove "pipe memory".

If the pipe is still "wavy" or experiences slight bends or turns in the run, the curves or "snakes" in the pipe should be laid in an "S" pattern sweeping side to side on a horizontal plane. The pipe should not be permitted to undulate up and down on a vertical plane. Properly supporting the pipe with backfill or supports will aid in keeping the pipe on a horizontal plane during installation. Any external supports in contact with the pipe, should be removed prior to final backfill. Care should be taken place backfill material underneath the piping during backfilling to prevent dips. Backfill material should never be dropped directly on the piping.

## V20 with SBC-2200 Vent Pipe

UL 971 approved Normal Vent (NV)

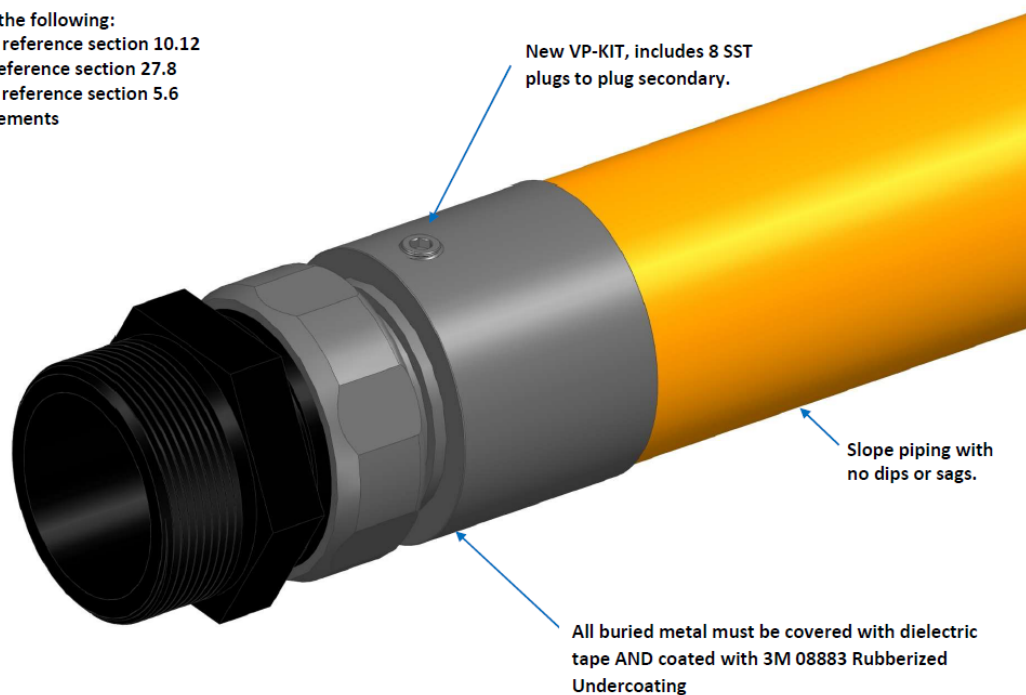
Install per the following:  
PEI RP100, reference section 10.12  
NFPA 30, reference section 27.8 NFPA  
30A, reference section 5.6 AHJ  
requirements



## V20 with DPC-2200A & SMA-2020 Vent Pipe

UL 971 approved Normal Vent (NV)

Install per the following:  
PEI RP100, reference section 10.12  
NFPA 30, reference section 27.8  
NFPA 30A, reference section 5.6  
AHJ requirements



## 11.0 Testing

**CAUTION:** Integrity testing with air, gas or water can be dangerous and it is very important that the proper testing equipment be used and that the testing procedures be adhered to. OPW-FCS assumes no responsibility or liability for the consequences of any testing practices. Only qualified and experienced personnel should conduct the air pressure testing. Never disconnect couplings, caps, or plugs unless the air pressure has been released.

**NOTICE:** All testing requirements must be in accordance with all applicable codes.

**NOTICE:** Significant temperature changes can result in a pressure reading differential.

### 11.1 Primary Pressure Testing

**Pre Backfill Pressure Testing:** Before backfilling of the pipe, an air pressure hold & soap test is required. This can be done during the Underground Storage Tank and components pressure test. If the pipe is tested while open to the tank, do not exceed 5psi. If the pipe is tested independent from the UST, make sure a test plug is installed in the bottom of the extractor fitting to isolate the UST from the vent piping run. Only then can the primary pipe be pressurized to sixty pounds per square inch (60 PSI). Gradually apply air pressure into the flexible piping line and maintain this pressure for a minimum of 1 hour, or in accordance with the authority having jurisdiction (AHJ), prior to backfilling.

### 11.2 Secondary Pressure Testing

**Pre Backfill Air Pressure Testing:** If the vent pipe is installed in a jurisdiction requiring double-wall vent lines and pipe end couplings are contained in a sump, the secondary can be tested utilizing OPW TTT-36 Test Termination kit. After the primary line pressure stabilizes, gradually apply air pressure into the interstitial space of the flexible piping line. Do not exceed ten pounds per square inch (10psi) or 69kPa, making sure there is no drop in pressure for a minimum of one hour, or in accordance with the authority having jurisdiction (AHJ). If the secondary pipe is not going to be tested, please install VP-KIT plugs in the interstitial test ports on the DPC or SBC coupling

**Note:** Please refer to OPW Flexible Underground Piping Manual detailed instructions on pipe testing and equipment.

### 11.3 Installing VP-KIT Interstitial Vent Plug

The V20 and V30 vent piping are double-wall coaxial pipes. If your jurisdiction does not require double-wall vent pipe, the interstitial space must be plugged to insure water does not migrate into the space. Both DPC and SBC are double wall couplings and designed with integrated test ports into the interstitial space. The test port in the coupling can be easily plugged by utilizing the VP-KIT plug kit. Each kit includes (8) 1/8" stainless steel plugs that can be threaded directly into the test port on the coupling. Apply UL approved pipe sealant to the plug prior to threading into port. Teflon tape should not be used as thread sealant. Install plugs prior to taping and coating the coupling before backfilling

### 11.0 OPW Retail Fueling Contact

OPW Retail Fueling can be contacted if there are any questions concerning the installation, maintenance or repair of FlexWorks piping.

**For detailed information and installation tips for all Flexworks Piping Systems, please refer to Product Manual "Flexible Underground Piping Manual". Publication Number: UPN-0001**

Additional publications are also available on OPW-FCS's website [www.opwglobal.com](http://www.opwglobal.com) or upon request.



Notice: OPW-FCS products must be used in compliance with applicable federal, state, provincial and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and material to be handled. OPW-FCS makes no warranty of fitness for a particular use. All illustrations and specifications in this literature are based on the latest production information available at the time of publication. Prices, materials and specifications are subject to change at any time, and models may be discontinued at any time, in either case, without notice or obligation. For complete OPW-FCS warranty information, visit our web site at [www.opwglobal.com](http://www.opwglobal.com).

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