

Product Guide

DTC Conduits

Select Guide



Table of Contents

Table of Contents	1
Summary	2
Quote Checklist	3
PEX Conduit	4
Purpose/Applications	4
Dimensions	4
Other Specifications	5
Bending/Routing	5
Handling	5
PEX Transitioning	6
Flex Conduit	8
Purpose/Applications	8
Dimensions	8
Other Specifications	9
Bending/Routing	9
Handling	9
Flex Transitioning	9
HDPE Conduit	10
Purpose/Applications	10
Dimensions	11
Other Specifications	11
Bending/Routing	11
Handling	12
Transitioning	12

Summary

When it comes to **beadedstream** temperature cable installations, selecting the appropriate conduit is crucial for ensuring the long-term performance of your monitoring program. This guide helps in selecting which conduit suits your specific needs. **beadedstream** preloads your Digital Temperature Cables (DTCs) into the chosen conduit at our shop, allowing your installation team to quickly install the cable and conduit at the site.

To simplify the decision-making process, we've prepared a summary chart outlining the key features and uses of different conduit types. Additional details about each conduit can be seen in later sections of this document.

Note: **beadedstream** also provides [stainless steel conduit](#) for high fluid pressure applications (>500 psi/3.5MPa). This conduit is not discussed in this document. Please contact our team to learn more.

Disclaimer: The information in this document is for informational purposes only and is supplied by 3rd parties.

Feature	PEX	Flex	HDPE
Application	Direct bury or underwater. Helps with abrasion and crush resistance	Suitable for protecting above-ground segments or sections exposed to UV light during the construction phase	Suitable for protecting segments where chemical resistance is needed
Flexibility (at room temp)	Partially Flexible	Flexible	Rigid
Operating Temperature Range	-40°F to 200°F -40°C to 93°C	-22°F to 176°F -30°C to 80°C	-50°F to 180°F -46°C to 82°C
UV Safe	No (needs to be buried)	Yes	Yes
Strength and Durability	Medium	High	High

Quote Checklist

When considering various conduit options, it's important to take the following questions into account. When requesting a quote, having answers to these questions readily available may expedite the quotation process. Please consider the specifications for each temperature cable on the project.

1. What is the instrumented length and lead length for each temperature cable?
2. How much of the cable is buried under ground and how much above ground?
3. Considering both long-term conditions but also shorter term during construction phases:
 - a. If the conduit is left at the surface over the construction season, or over winter, will it be exposed to UV?
 - b. Or would it be better to use Flex conduit along these segments?
4. How much of the cable do you want to be in conduit?
5. What type of conduit fits best for your application?
6. Where does the temperature cable terminate? A panel box? A logger? Other?



PEX Conduit



Purpose/Applications

PEX conduit is most commonly used for shielding. PEX provides a flexible and workable layer around our DTCs, enhancing abrasion and crush resistance and providing the capacity to direct-bury. It is typically used for shallower installations where ground movements from freeze/thaw cycles, settlement, or similar can put strain on the cable.

Important Note: It is not suitable for high fluid pressure applications such as deep drill holes, where our stainless steel conduit is most suited (please contact beadedstream for more information about stainless steel conduit).

Adapter fittings allow transitions to bare cable lead, flex conduit, or directly into panel boxes. The DTCs pre-loaded in conduit usually get shipped on a pallet, for lengths greater than 50 feet, for quick deployment into the ground once it arrives at the project site.

Dimensions

Dimension	Imperial	Metric
US Trade Size	0.75"	0.953 cm
Average Outer Diameter	0.875" ± 0.004"	2.22 cm ± 0.01 cm

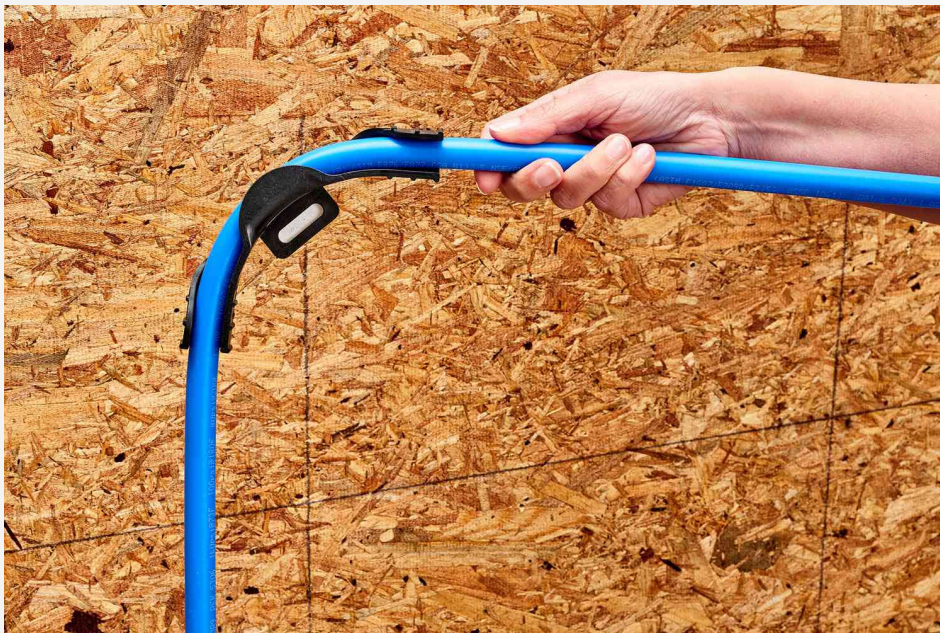
Maximum Outer Diameter (with fittings)	1.5"	3.81 cm
---	------	---------

Other Specifications

Conduit	Weight	Thermal Conductivity	Linear Expansion	Working Temperature Range
PEX	0.10 lb/ft (0.149 kg/m)	0.24 BTU/(hr.ft.°F) 0.41 W/(m°K)	9.33×10^{-4} in/(ft.°F) @ 68°F	-40°F to 200°F -40°C to 93°C

Bending/Routing

The bracket (as shown in the image below) is designed to aid in creating a 90-degree bend in the PEX conduit. It effortlessly attaches, supplying the essential support to shape the conduit, under for instance, a building foundation. Bends smaller than the pictured radius are likely to “kink” or crack (in cold weather).



Handling

PEX is known for its moderate flexibility, durability, and corrosion resistance, but it is sensitive to UV radiation. When PEX is exposed to sunlight, the UV rays cause the material to break down over time. This degradation may manifest as changes in color, reduced flexibility, and overall deterioration of the PEX structure, potentially compromising its performance and longevity. For any portion of a conduit that is exposed to UV radiation, even if just for a

construction season or over the winter, it is recommended that Flex conduit be used for that portion.

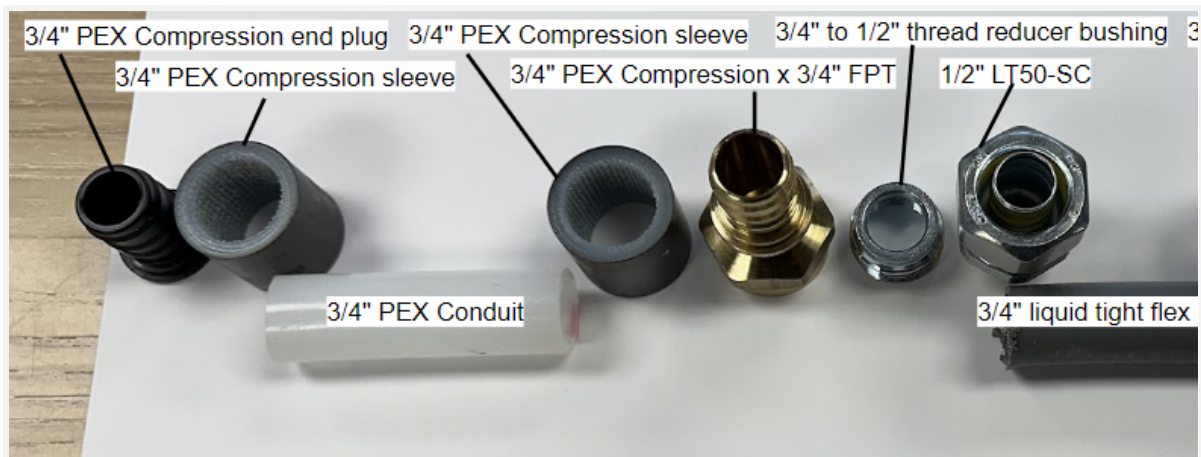
Cold Weather

Cold PEX becomes more rigid, making it challenging to manipulate during installation. When installing PEX conduit in cold weather, consider using a controlled warm environment, such as a heated workspace, to enhance flexibility.

PEX Transitioning

To Flex Conduit

As seen in the image below, the following is used when transitioning from PEX to Flex.



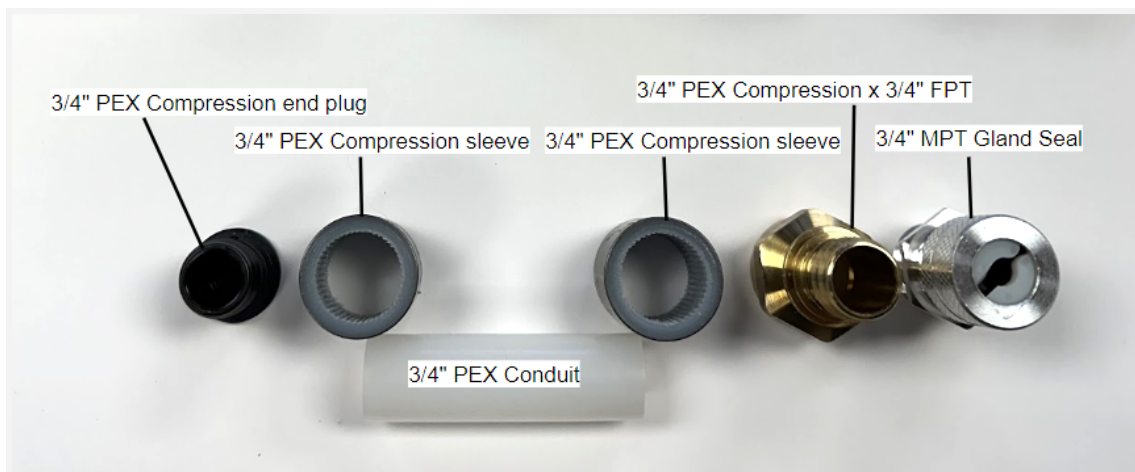


To Panel Boxes

PEX is not commonly used directly to a panel box as above ground sections are often encountered. Instead, Flex conduit is often used to span from the in-ground PEX conduit to the above ground panel box. Alternatively, a bare cable with water-proof fittings can be utilized.

Bare Cable

Bare cable can be used and fitted into a panel box or can be used in a variety of other applications. A $\frac{3}{4}$ " MPT Gland Seal is used to seal from water ingress to the conduit.



Flex Conduit



Purpose/Applications

Flex conduit offers a versatile and practical solution for our DTCs, boasting enhanced durability against abrasion and crushing. Its flexibility allows for easy installation, including direct burial applications. Unlike PEX, Flex conduit is more pliable and resistant to UV rays, making it suitable for above-ground applications exposed to sunlight.

Dimensions

Dimension	Imperial	Metric
US Trade Size	0.5"	1.27 cm
Average Outer Diameter	0.83" ± 0.01"	2.11 cm ± 0.03 cm
Maximum Outer Diameter (with fittings)	1.5"	3.81 cm

Other Specifications

Conduit	Weight	Working Range
Flex	0.13 lb/ft (0.199 kg/m)	-22°F to 176°F -30°C to 80°C

Bending/Routing

Flex conduit is moderately flexible and doesn't require brackets for making right-angle bends.

Handling

Cold Weather

When handling Flex conduit in cold weather, it's crucial to use specific techniques to maintain performance. Like PEX, Flex stiffens in the cold, making installation harder. If flexibility remains a concern, gently warming the Flex conduit with a heat gun or similar device can facilitate easier handling and reduce the likelihood of kinking or damage.

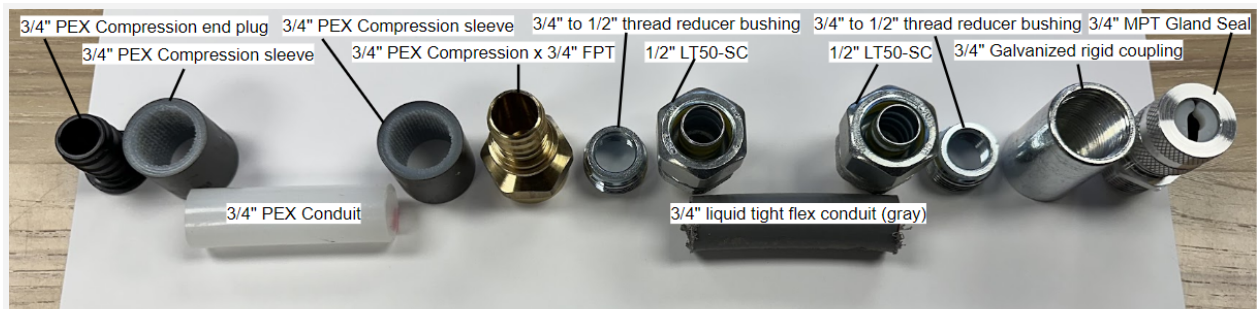
Flex Transitioning

To PEX

Refer to the "[PEX Transitioning to Flex Conduit](#)" section.

Panel Boxes

The following image shows the ½ LT50-SC fitting which may terminate into the panel box.



Bare Cable

As seen in the figure above, the ¾" MPT Gland Seal can be used when there is bare cable.

HDPE Conduit

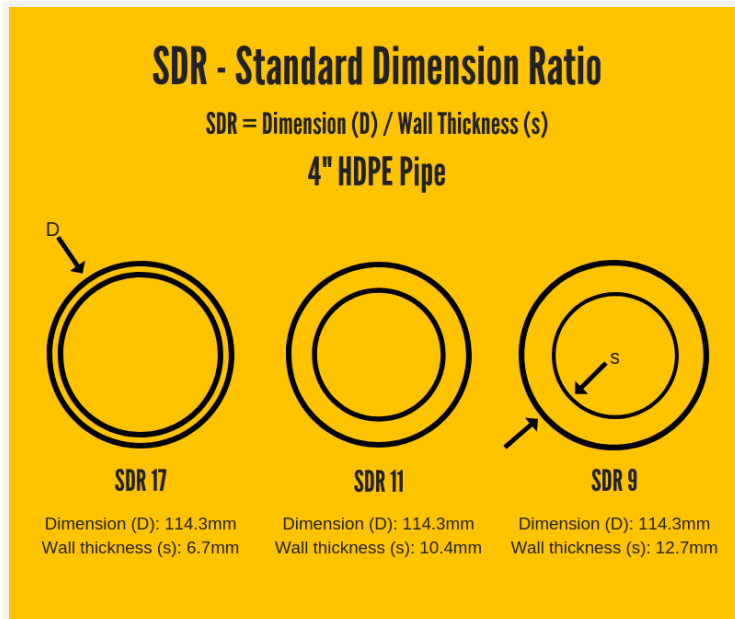


Purpose/Applications

HDPE is known for its durability and resistance to chemicals and environmental elements. It provides excellent protection for cables and pipes, making it a preferred choice for underground installations in potentially corrosive environments. Please visit this link to view HDPE chemical resistance performance specifications:

<https://www.ineos.com/globalassets/ineos-group/businesses/ineos-olefins-and-polymers-usa/products/technical-information--patents/ineos-hdpe-chemical-resistance-guide.pdf>

The illustration below provides a comprehensive explanation of the significance of SDR (Standard Dimension Ratio) in relation to HDPE and the implications of various SDR values. Among these, SDR 11 is supplied by beadedstream, reflecting its widespread usage and applicability across different contexts within the industry.



Dimensions

Dimension	Imperial	Metric
US Trade Size	0.75"	0.95 cm
Average Inside Diameter	0.85"	2.16 cm
Average Outer Diameter	1.05"	2.67 cm
Maximum Outer Diameter (with fittings)	1.5"	3.81 cm

Other Specifications

Conduit	Weight	Thermal Conductivity	Linear Expansion	Working Range
HDPE (SDR 11)	0.12 lb/ft (0.179 kg/m)	0.28 BTU/(hr.ft.°F) 0.48 W/(m°K)	8.04×10^{-4} in/(ft.°F) @ 68°F	-50°F to 180°F -46°C to 82°C

Bending/Routing

HDPE piping is known for its robustness but lacks the flexibility of PEX conduit. Unlike PEX conduit, HDPE is too rigid to be bent at a 90-degree angle without significantly increasing the

radius of the bend. Consideration will need to be given to routing the conduit at the project site, given these limitations.

Handling

Cold Weather

Even though HDPE is naturally rigid, cold weather exacerbates its stiffness, making installation tasks like bending or maneuvering around obstacles more complex. Moreover, its material properties can pose challenges for field cutting and joining.

Transitioning

To Flex

HDPE to Flex Transition Fitting with a $\frac{3}{4}$ " MPT coupler



Panel Boxes

Preloaded DTCs in HDPE usually transition to Flex first and then the Flex connects to the panel box. Alternatively, in the case where you don't use Flex, you can utilize two $\frac{3}{4}$ " MPT Gland Seals.

Bare Cable

As mentioned above, the $\frac{3}{4}$ " MPT Gland Seal can be used when there is a bare cable.
