

Schedule 40 and 80 PVC Conduit Frequently Asked Questions

TEMPERATURE LIMITATIONS

Maximum Ambient Temperature

Per NEC 352.12(D) PVC conduit has a maximum ambient temperature of 50° C or 122° F.

Low Temperature Limit

Schedule 40 does not have a lower temperature limitation since it is not allowed to be used in areas where subject to physical damage. (NEC 352.10(F)). When Schedule 40 PVC is exposed to very low temperatures it will become more brittle. This is only a problem when it gets impacted. Schedule 80 PVC Conduit is listed for uses in areas of physical damage and has been used in impact areas of low temperatures throughout the years without a problem. We always recommend erring on the side of safety. If you believe that low temperatures and areas of impact are going to be a problem use a metal conduit.

90°C Wire

Prime Conduit Schedule 40 & 80 conduit is ETL Listed to UL651. UL651 6.15 states the requirements for Schedule 40 and 80 is approved for use with 90° wire.

The NEC 352.12(I) reads as follows: "(I) Insulation Temperature Limitations. Conductors or cables rated at a temperature higher than the listed temperature rating of the PVC conduit shall be permitted to be installed in PVC conduit, provided the conductors or cables are not operated at a temperature higher than the listed temperature rating of the PVC conduit."

One example of an application for this exception is the use of 105°C rated medium voltage cables, Type MV, where the cable ampacity at the 105°C rating is reduced to the cable ampacity at 75°C or 90°C and, thus, matches the listed operating temperature rating of the nonmetallic conduit (75°C or 90°C.)

Always refer to the latest edition of the NEC to validate all answers.

APPLICATIONS

Patient Care Areas

Per NEC 517 all branch circuits serving patient care areas shall be installed in a metal raceway so that a redundant ground path is present (ground wire plus the metal raceway). Nonmetallic raceways, exposed, or concealed or encased in concrete are not permitted for branch wiring when installed in patient care areas.

Watertightness / Wet Locations

All conduits and ducts, whether they are nonmetallic or metal, will get moisture in them. The moisture gets in through leaky joints or condensation that occurs from the heating and cooling of the conductors. Water does not seep through the PVC itself. That is why the National Electrical Code started to require that all conductors or cables installed in these raceways be listed for a "Wet Location" (NEC 300.5 (B)). Also Schedule 40 conduit does not have a NEMA 6P rating or an IP68 rating.

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Greenhouse Applications

PVC conduit has been used in greenhouses where the overall temperature could range from 90-120° F. You are required to use expansion joints though, to account for the temperature differential.

Indoor Applications

PVC Schedule 40 is approved to be used indoors. It can be used behind wall or on the surface of the wall (provided it's not subject to physical damage). If it penetrates a fire wall, it has to be firestopped. If Schedule 40 is run vertical between floors and the floor is fire rated then a certified fire stop will have to be used at the penetration. Refer to NEC 352.10 for Uses Permitted. PVC cannot be used in air handling plenums.

Romex & Swimming Pool Applications

You cannot use standard Romex in an underground raceway. Raceways installed underground are considered "Wet Location" and only cabling listed for wet location can be used. Refer to NEC 680 for the requirements of wiring around a swimming pool.

Pressure Rated Conduit

Only pressure rated PVC conduit or tubing can be used for air pressure applications. Prime Conduit's Schedule 40 & 80 PVC Conduit is a listed raceway for electrical conductors and cables. We do not make pressure rated conduits. Therefore, we do not provide technical information such as burst strength because our conduit is not intended for internal water or air pressure, such as water pipe would be; therefore we are not worried about it bursting.

Transporting Liquids or Gases

Our PVC Conduit is not designed to transport liquids nor gasses. PVC corrosion resistance chart is for conduit that may come into contact with these chemicals, usually externally.

CODES & STANDARDS

ASTM D-1784

Prime Conduit's electrical conduit meets or exceeds several different ASTM tests. However, the primary one that is most referenced is ASTM D-1784. Our conduit is ETL Listed to UL651. UL651 states "The compound of which rigid PVC conduit and fittings are made shall be as described in Standard Specifications for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds, ASTM D 1784." Therefore, because it is ETL Listed to UL651, it meets ASTM D 1784.

Intertek / ETL mark

Prime Conduit has added the Intertek/ETL to our family of Nationally Recognized Testing Laboratories (NRTLs). The ETL Listing mark is on our conduit and elbows of our Schedule 40, Schedule 80, and EB 20 Conduit and Elbow product lines. Nearly every installation falls under the jurisdiction of some regulatory agency. Most of the electrical installations are regulated by state, local and national installation codes. The most commonly used Regulations are found in the National Electrical Code (NEC). Rigid PVC conduit and elbows are covered by Section 352.6 states "Listing Requirements. PVC conduit, factory elbows, and associated fittings shall be listed." Listing can be provided by any OSHA approved NRTL. A Nationally

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Recognized Testing Laboratory (NRTL) is an independent laboratory recognized by the Occupational Safety and Health Administration (OSHA) to test products to the specifications of applicable product safety standards – such as those from Underwriters Laboratories (UL), CSA, NSF and other standards – writing bodies. A NRTL's function is to provide an independent evaluation, testing and certification of any electrically operated product. For more information regarding Nationally Recognized Testing Laboratories go to: <http://www.osha.gov/dts/otpca/nrtl/>.

Schedule B Code (AKA Harmonized Tariff Code)

Per the 2013 Schedule B Book, PVC conduit is 3917230000 (TUBES, PIPES & HOSES, RIGID, OF POLYMERS OF VINYL CHLORIDE) 39.17 - Tubes, pipes and hoses, and fittings therefor (for example, joints, elbows, flanges), of plastics: 3917.23.0000 - - - Of polymers of vinyl chloride

Click on the following link to search the latest information: <http://www.census.gov/foreign-trade/schedules/b/index.html>

ECCN

ECCN, stands for Export Control Classification Number. An ECCN is an alpha-numeric classification used in the Commerce Control List to identify items for export control purposes. An ECCN is different from a Schedule B number, which is used by the Bureau of Census to collect trade statistics. It is also different from the Harmonized Tariff System Nomenclature, which is used to determine import duties.

A Customer Service Rep. told Prime Conduit that conduit's ECCN number falls in the "catch all" category of EAR99.

Click on the following link for additional information regarding ECCN numbers: http://www.bis.doc.gov/licensing/doi_needaneccn.html#qfour

MSDS

MSDS are not provided for conduit, elbows, or fittings, etc. because those products are an "article" under the OSHA Hazard Communication Standard (HSC), 29 CFR 1910.1200.

The Hazard Communication Standard has an exemption for articles. To fall under the article exemption, the product must be a manufactured item: (1) which is formed to a specific shape or design during manufacture; (2) which has end-use functions dependent in whole or in part on its shape or design; and (3) which does not release, or otherwise result in exposure to, a hazardous chemical under normal conditions of use. The PVC conduit, elbows, or fittings, etc. produced by Prime Conduit meet all of these criteria and, consequently, are exempt from the Hazard Communication Standard.

Please refer to the following web page for more information: <http://www.osha.gov/>

INSTALLATION PRACTICES

NEMA TCB 2

Please refer to NEMA TCB 2, *NEMA Guidelines for the Selection and Installation of Underground Nonmetallic Raceways*, which covers recommendations for the selection, handling and installation of underground single bore rigid nonmetallic conduit (RNC) or raceway for power, lighting, signaling, and communications applications. For the purposes of this guideline, rigid nonmetallic conduit (RNC) or raceway refers to HDPE, PE, PVC or RTRC conduit and duct.

Connecting Schedule 40 & 80 Conduit

Schedule 40 and 80 can be connected with the use of couplings or their integral bell. The inside diameter of the spigot of the Schedule 80 conduit should be reamed to allow a smooth transition from the 40 to the 80.

Minimum Bending Radius

The minimum-bending radius for schedule 40 & 80 conduits is found in Table 2, Chapter 9 of the NEC. Also refer to NEC 352.24 & NEC 352.26 for additional bend information. Prime Conduit's standard elbows meet this minimum bend radius.

Cold Field Bending

Bending PVC conduit without the use of heat is known as cold field bending. Refer to NEMA TCB-2 (NEMA Guidelines for the Selection and Installation of Underground Nonmetallic Duct) for additional information on cold field bending.

Wirefill

Per NEC 352.22: Number of Conductors. The number of conductors shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9. Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. The number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9.

Installing corrugated HDPE inside Schedule 40 & 80 Conduit

The number of corrugated HDPE innerducts that can be installed in our conduit is dependent on several factors like length of run, OD of innerducts, number of bends, and so forth.

Threading

Prime Conduit's Schedule 40 & 80 Conduit is ETL Listed to UL651. UL651 4.1.7 states "Rigid PVC conduit and elbows shall not be threaded". Therefore threading Schedule 40 or 80 conduit would void the ETL Listing.

Support

Schedule 40 and 80 PVC Conduit is not identified in its listing as a means of support for other raceways, cables or conductors as described in 300.11(B). Therefore conductors are not permitted to be supported by the raceway on the exterior of the product.

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Disposal of PVC Conduit

PVC will not decompose and therefore it is not ideal for landfills. PVC is a recyclable material and it should be recycled whenever possible.

PROPERTIES

Pipe Stiffness

Prime Conduit does not have listed PSI ratings for our Schedule 40/80 ETL listed PVC Conduit. Our Schedule 40/80 ETL listed conduit meets NEMA TC2 and UL651 requirements, in regards to crush testing requirements. Furthermore, our products do not have an internal PSI rating as they are not intended for transfer of any fluids or gases.

Crush Rating of Schedule 80 Conduit

The crush rating is listed in UL651. Our ETL listed Sch 80 meets the crush requirements of section 6.9 and table 6.3 per the UL651 standard. For sizes 1/2" - 6" it shall not deflect more that 30% at a load of 2000lbs/force.

Crush Rating of Schedule 40 Conduit

The crush rating is listed in UL651. Our ETL Listed Sch 40 conduit meets the crush requirements of section 6.9 and table 6.3 per the UL651 standard.

It shall not deflect more that 30% at the following lbs/force loads:

Trade Size	Schedule 40
1/2"	1000 lbf
3/4"	1000 lbf
1"	1000 lbf
1-1/4"	1000 lbf
1-1/2"	750 lbf
2"	700 lbf
2-1/2"	1000 lbf
3"	1000 lbf
3-1/2"	1000 lbf
4"	900 lbf
5"	850 lbf
6"	850 lbf

Kinking

PVC Conduit does not kink because of its yield strength. Instead it will break when over bent.

Sunlight/UV Resistance

Our Schedule 40 and 80 PVC Conduit has been evaluated for sunlight exposure by ETL per UL651 - 6.14. UV is an issue for all plastic products. Fortunately there are additives that are added to plastics to make the material UV resistant. ETL Listed Schedule 40 and 80 PVC conduit utilizes these additives and are UV

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resistant. Listed Schedule 40 and 80 Conduit have been used in Florida for years including on rooftops. It is preferred along the coast because it is corrosion resistant. When used in an exposed environment where there are changes in temperatures please be sure to use enough expansion fittings.

Fire Rating

PVC conduit is not fire rated like an outlet box would be. When conduit penetrates a fire wall assembly the fire stop that is used is classified for the conduits it can be used with. Listed PVC Conduit is "Flame Retardant" per Section 352.100 of the NEC. The flame testing is found in the product standard UL651. Our product is ETL listed to UL651. Listed PVC conduit is not capable of conveying a flame. PVC is a self-extinguishing material that does drop flaming particles.

Resistance to Impact

Schedule 40 & 80 PVC Conduit meet the Resistance to Impact test per UL651, section 6.6. Samples are impacted with weights at the following heights. Seven out of ten samples need to pass. For specific information regarding the test refer to the UL651 standard.

Trade Size	Schedule 40 20 lb weight 73.4 ±3.6°F	Schedule 80 75 lb weight 73.4 ±3.6°F
1/2"	2-1/2 ft	1-1/4 ft
3/4"	4 ft	1-1/4 ft
1"	5 ft	2 ft
1-1/4"	6 ft	2-1/4 ft
1-1/2"	7-1/2 ft	2-1/2 ft
2"	9-1/2 ft	4 ft
2-1/2"	10-1/2 ft	5 ft
3" – 6"	11 ft	7 ft

Resin, Impact Resistance, Tensile Strength, Modulus of Elasticity, and Deflection Temperature

Prime Conduit's Schedule 40 & 80 ETL listed conduit is equal to or exceeds the minimum cell classification specified in UL651 (4.1.1) 12123 as described in Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds in ASTM D1784. The cell classification specifies the properties of base resin, impact resistance, tensile strength, modulus of elasticity, and deflection temperature under load. Refer to UL651 and ASTM D1784 for additional information.