



EDITION 18

VOLUME 1

# 17 INTERESTING FACTS THAT BOOST THE DEPLOYMENT OF CABLE-IN-CONDUIT (CIC)

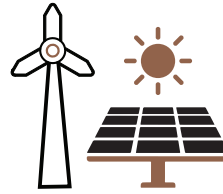
WRITTEN BY: Dr. Yuhsin Hawig, VP of Applications Engineering | Erika Akins, P.E., Applications Engineering Manager



## SIMPULL® CABLE-IN-CONDUIT (CIC)

Southwire's SIMpull® Cable-In-Conduit (CIC) solutions enhance jobsite

efficiency, reduce project costs, leverage sustainability, and more. This engineering whitepaper outlines 17 interesting facts about CIC including 8 market trends and 6 of the most frequently requested designs specified by end users in recent years. You can also learn more about the 20 engineering benefits of CIC by scanning the QR code.



## IRA & CLEAN ENERGY

The Inflation Reduction Act (IRA) of 2022, with provisions becoming effective in early 2023, is one of the most crucial climate

legislations in U.S. history, offering funding and incentives to advance the deployment of clean energy. IRA's \$370 billion in investments will lower energy costs for homes and small businesses, accelerate private investment in clean energy technology, reinforce supply chains, and create ample economic opportunities for American workers. Southwire's CIC products for renewable power generation are designed, certified, manufactured, and quality tested in the U.S. meeting Build America, Buy America Act (BABA) per the Infrastructure Investment & Jobs Act (IIJA).



## UTILITY'S STRATEGIC UNDERGROUNDING

Recent widespread power outages caused by natural disasters have expedited the hardening of our electrical grid. This can be accomplished in several ways, one of which includes

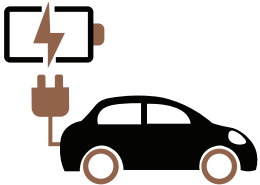
the conversion of critical overhead lines to a below grade network via CIC. Pulling a single reel containing cables protected by an impact-resistant high-density polyethylene (HDPE) duct saves labor, shortens installation time, and prevents field injuries due to an all-in-one material handling system. CIC is more robust than direct buried cables and can extend service life, lower cable replacement frequencies, and lessen outage interruptions. It is also a proven solution to mitigate wildfires.



## DOT PORTS & TERMINALS

In 2022, the U.S. Department of Transportation (DOT) announced more than \$700 million will be funded to support 41 projects in 22 states to improve port facilities through the Maritime Administration's Port Infrastructure Development

Program. This funding will benefit coastal seaports, Great Lakes ports, and inland river ports by improving the supply chain through increased port capacity and efficient operations. CIC is an approved product for DOT applications, including ports and terminals, and is more reliable due to the ruggedness of HDPE duct that prevents damage from accidental dig-ins. HDPE conduit also serves as a continuous physical barrier deterring copper theft and terrorist activities compared to direct buried power cables.



## EV INFRASTRUCTURE

With a heightened interest in clean energy coupled with the advancement of lithium battery production, electric vehicle (EV) adoption is occurring at a record speed. The rapid EV expansion

can also be attributed to the investment in grid infrastructure through Electrify America and the Bipartisan Infrastructure Law (BIL). Southwire's building wires, 600V underground service entrance, medium voltage cables, and more can be paired with CIC to power EV charging stations. These CIC assemblies to support EV infrastructure have gained much traction due to the elimination of separate packages and the avoidance of cable damage from onsite pulling.



## DOE'S GRID RESILIENCE PROGRAM

The Department of Energy (DOE)'s Grid Deployment Office is launching a \$10 billion Grid Resilience and Innovation Partnerships (GRIP) program as part of the

infrastructure law to enhance grid flexibility and the resiliency to fight against climate change and extreme weather events such as wildfires, hurricanes, storms, and flooding. Medium voltage cables in CIC are proven to be an excellent underground distribution solution to support the critical DOE initiative to modernize the electrical grid and reduce natural disaster impact.



For more information, please contact [cabletechsupport@southwire.com](mailto:cabletechsupport@southwire.com) or visit [southwire.com](https://southwire.com).

©2023 Southwire Company, LLC. All rights reserved. ®Registered Trademark & ™Trademark of Southwire Company, LLC.

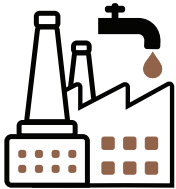
# 17 INTERESTING FACTS THAT BOOST THE DEPLOYMENT OF CABLE-IN-CONDUIT (CIC)



## MULTI-FAMILY HOMES

Our CIC products have won several Project of the Year awards from Plastic Pipe Institute (PPI). One of the largest CIC implementations, featuring 8,700

feet of CIC, was completed in Southern Texas to power temporary housing for oilfield workers. More than 1.5 miles of power cable in conduit were trenched and multiple runs of CIC laid next to each other in the hard Texas ground. Pulling cables during summer months in this area can be deadly, exposing the crews to over 100°F of dry heat. Having a single cable assembly eliminates the hours to pull cables through conduit therefore minimizing the heat exposure time and lowering the risk of heat strokes for workers.



## WASTEWATER TREATMENT & IRRIGATION

The Bipartisan Infrastructure Law (BIL) delivers more than \$50 billion to the U.S. Environmental Protection Agency (EPA) to improve drinking water,

wastewater, and stormwater infrastructure, which is the single largest federal investment in water ever implemented. Similar to irrigation sites, wastewater treatment plants (WWTP) typically have a more corrosive soil type compared to other commercial locations due to higher amounts of pesticides and fertilizers. CIC is produced with a high molecular weight HDPE resin, making it compatible with many common chemicals and aggressive soils. HDPE is hydrophobic, enabling the material to repel liquid or moisture. Schedule 80 HDPE duct, with the heaviest wall thickness, will not soften, degrade, or crack easily due to harsh environmental exposures in the ground.



## FUTURE PROOFING

As we continue to upgrade our nation's grid to accommodate the surge in electricity demand, it is essential to future proof the electrical wiring designs. We recommend

upsizing the HDPE conduit and incorporating a pull tape in CIC. This provides a tool to remove faulty or aged circuits safely and it creates the extra space to pull in larger replacement cables promptly. The high-strength flat tape, best known as muletape, is made of a cut-resistant polyester woven material and is printed with sequential footage for easy locating of circuit length. We offer several grades of pull tape with a tensile strength up to 2,500 lbs.



## XHHW-2

Southwire offers extensive *SIMPull* XHHW-2® cable options, with any color & size combination able to be bundled into a CIC assembly. HDPE conduit is made of a simple and pure formulation with a polyethylene-based resin. Both XHHW (crosslinked polyethylene) & HDPE (high-density polyethylene) are lead-free and naturally halogen-free with zero-acid gas emission compared to THHN/THWN pulled in a rigid PVC stick pipe. This is the most sustainable 600V/1kV wiring solution for any constructions requiring LEED building certifications, such as data centers. XHHW in CIC designs are also in great demand to power mega-scale EV infrastructure projects including level 2 and DC fast charging.



## THHN/THWN-2

Southwire's copper *SIMPull* THHN/THWN-2® cable in 20 different solid or striped color combinations from 14 AWG to 1,000 kcmil can be produced in a CIC system at our factory. Schedule 40 HDPE is one of the most requested conduit types, and it can enclose building wire products rated for either 75°C or 90°C. THHN/THWN-2 in CIC is gaining popularity for EV infrastructure, data centers, and commercial building applications due to its short lead time and cost-saving benefits.



## PV WIRES OR RHH-RHW-2

Copper or aluminum PV wires rated 600V or 2kV can be pre-bundled with or without an insulated green grounding conductor in a HDPE conduit prior to arriving at the solar farm. PV wires extruded with an XLPE insulation are dual marked as Type RHH-RHW-2 per UL-4703 and UL-44. One of the most common insulated equipment grounding conductor types is a green *SIMPull* XHHW-2® cable. Our patented low-friction technology allows the grounding conductor to be pulled out of the conduit efficiently to accelerate replacement in the future. Furthermore, extra PV wires can be incorporated into CIC as a backup power to shorten outage durations.



# 17 INTERESTING FACTS THAT BOOST THE DEPLOYMENT OF CABLE-IN-CONDUIT (CIC)



## 600V SECONDARY USE-2

Underground Service Entrance (USE-2) cables certified to UL-854, composed of 1 to 4 aluminum conductors, can be prefabricated into a CIC assembly. 600V secondary cables in conduit is the preferred wiring method to power multi-family homes, commercial buildings, and battery energy storage systems (BESS). The neutral conductor, full or reduced in size compared to the phase conductor, is typically marked with 3 yellow stripes for easy identification. The HDPE conduit can also be extruded with 3 continuous yellow stripes over the solid black color to signify the protective duct contains USE-2 phases with an insulated neutral.



## MV PRIMARY

Any MV cable rated 15, 25, to 35 kV designed with copper or aluminum conductors, TR-XLPE or EPR insulation, concentric neutrals or longitudinally-applied copper tape shield, and an overall LLDPE, XLPE, HDPE, or PP jacket can be preassembled into a flexible HDPE conduit at our factory. The continuous CIC length can be installed with fewer joints and without labor-intensive splicing. CIC can be installed via a Horizontal Directional Drilling (HDD), plowing, or trenching technique. HDD minimizes the construction impact with less interruptions to residential neighborhoods or commercial districts with heavy traffic. The Coefficient of Friction (CoF) of HDPE conduit can be 30% lower than PVC pipe due to a lubricant applied in advance at Southwire's CIC extrusion line.



## AIRPORT LIGHTING CABLE

Southwire's airport lighting cable meets FAA's AC 150/5345-7F entitled "Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits". These 2.4kV or 5kV non-shielded copper products, commonly known as L-824 Type C cables, are extruded with 110 mil of XLP insulation and are frequently used to power the lighting circuits for runways and control systems. The CIC options with 1, 2, or 3 airport lighting cables, pre-assembled at the factory, offer enhanced public safety and are the most efficient high-volume installation for critical infrastructure such as ports and terminals.



Southwire

## CABLETECH SUPPORT™

Services

## CABLETECHSUPPORT™ SERVICES

Southwire's CableTechSupport™ Services team has published

many whitepapers to help end users with the selection of products for the most challenging applications. Our Re<sup>3</sup>™ mission statement is based on sustainability: to Respond, Rectify, and Restore with



Reinforced, Resilient, and Reliable solutions. You can download engineering documents directly from the website by scanning the QR code:



Southwire™

## SPEED™

Services

## SOUTHWIRE SPEED™ SERVICES

Southwire SPEED™ Services focuses on expedited shipping

through our North American logistics footprint via our customer service centers and agent warehouses from coast to coast. We offer same day and next day shipping on stock items such as empty conduit and building wire in CIC. Delivering custom CIC products with the shortest lead time and below MOQ is one of the many dedicated



services celebrated by customers managing EV infrastructure, utility undergrounding, and DOT & DOE funded projects. You can learn more about Southwire SPEED™ Services by scanning the QR code:



Southwire®