

May 2024

THE MOST UNIQUE AND RELIABLE RESOURCE FOR TODAY'S ELECTRICAL CONTRACTOR

THE ELECTRIC CURRENT

**More Precise
Timekeeping
Device Synchronizes
Critical Utility
Functions**

**Positive Reaction:
Chemical Processor
Sees Significant
Savings with HDPE
Cooling Towers**



RHINO

SWITCHBOARD MATS

FUSEBOX SAFETY MAT™

Rhino Switchboard Mats For The "If" in Life.

Easily carried to job or construction sites, **Fusebox Safety Mat™** by Rhino provides portable insulation when working in close proximity to exposed energized equipment. around substations, transformers, switches, electrical panels, or high-voltage equipment. **Fusebox Safety Mat™** should be used in any area where Health and safety risk assessment shows a possibility of high-voltage shock.

Safety Focused. Results Driven

Rubber-insulating gloves, insulated hand tools, and switchboard-insulating mats are vital components of a successful PPE system. All should be used in conjunction with engineering safeguards and associated work practices.

Quality You Can Count On

All are tested to ASTM D178/ANSI J6.7 specifications with

Extreme-Duty Series Class 4
1/2" thick Corrugated Surface
Test Voltage 50,000 VAC
Proof Test 40,000 VAC
Recommended 36,000 VAC

certification printed on the back.
Two sizes available 2ft X 3ft and 3ft X 3ft.
Two thicknesses 1/2" and 1/4"
Available at most Electrical and
Safety Supply Houses,
ask for Rhino **Fusebox Safety Mat™**,
Home Depot online or
contact us at
713-228-5543 / Info@rhinomats.com

www.rhinoswitchboardmats.com

Heavy-Duty Series Class 2
1/4" thick Diamond Surface
Test Voltage 30,000 VAC
Proof Test 20,000 VAC
Recommended 17,000 VAC





Upgrade Your Building Wire with Copper-Clad Aluminum (CCA).



Cost Stable

Reduce your exposure to volatile price fluctuations.



Code Compliant

NEC referenced since 1971, Copperweld is accepted by builders and inspectors.



Easy to Install

A similar metal to copper for electrical connections, CCA is light and easy to bend.



COPPERWELD®
BUILDING WIRE



Copper where it counts™

Contact us for sales and info:

615-622-4662

buildingwire@copperweld.com
copperweld.com

PG 4	Positive Reaction: Chemical Processor Sees Significant Savings with HDPE Cooling Towers
PG 10	More Precise Timekeeping Device Synchronizes Critical Utility Functions
PG 28	Ad Index



Vol. 24 Issue 5

PRESIDENT

Glen Hobson
205-441-5591
glen@handfmedia.net

ASSOCIATE PUBLISHER

Steven Goodwin
205-624-2181
steve@handfmedia.net

ADMINISTRATIVE DIRECTOR

Steven Hobson
steven@handfmedia.net

EDITOR

Brandon Greenhill
brandon@handfmedia.net

CREATIVE/ WEB DIRECTOR

Jacklyn Greenhill
jacklyn@handfmedia.net

Made to order polymer composite
HOUSEKEEPING PADS

ZANITE PLUS POLYMER COMPOSITE
A base you can build on.

 Proudly made in the U.S.A.

Outperforms traditional concrete
Quick Installation no waiting for concrete to cure
Labor Saving no forms or pouring field materials
Mounting stainless steel inserts for equipment and floor anchors

Flexible Designs built to exact size specifications including conduit openings
Built to Last corrosion resistant and extremely durable (seismic ready)
Precast with limited colors available

basetek.com | info@basetek.com | 877.712.2273

BASETEK Built to last and outperform. We guarantee it.

©2024 BaseTek, LLC. Zanite Plus is a registered trademark of BaseTek LLC.

P.O. Box 1568 • Pelham, AL 35124
Phone: 205-441-5591 • Fax: 205-624-2181
www.theelectriccurrent.com
info@theelectriccurrent.com



The Electric Current™ is published twelve times a year on a monthly basis by Southern Digital Publishing, Inc. *The Electric Current™* is distributed free to qualified subscribers. Non-qualified subscription rates are \$57.00 per year in the U.S. and Canada and \$84.00 per year for foreign subscribers (surface mail). U.S. Postage paid at Birmingham, Alabama and additional mailing offices.

The Electric Current™ is distributed to qualified owners and managers in the electrical industry. Publisher is not liable for all content (including editorial and illustrations provided by advertisers) of advertisements published and does not accept responsibility for any claims made against the publisher. It is the advertiser's or agency's responsibility to obtain appropriate releases on any item or individuals pictured in an advertisement. Reproduction of this magazine in whole or in part is prohibited without prior written permission from the publisher.

POSTMASTER: Send address changes to
Southern Digital Publishing, Inc. P.O. Box 1568
Pelham, AL 35124
PRINTED IN THE USA



SP PRODUCTS, INC.
Productivity and value thru ideas
FOR SAFER BETTER FASTER JOBS

We're Proud to be the Electricians' Friend for Over 50 Years!

Qwik Duct Safer Better Faster

HDPE CUSTOM TEMPLATES
In Any Configuration Required

IP3b

Patent Pending



PVC Offset

Sizes 1/2" thru 6"
Meets Flexible Mandrel Test Requirements

Bore Spacers

Sizes 1/2" thru 6"
Roll assembled conduit into caissons and under obstructions

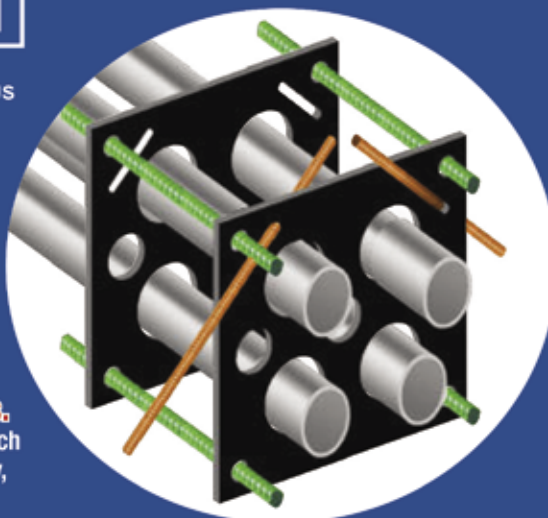
IP2



IP1



Patent Pending



IP13A-F

Conduit Transition Couplings



PVC Schedule 40 & 80
Transitions in Less Than 5 Minutes

PATENT PENDING



IP15

PVC/PVC

PVC/EMT

PVC/Rigid

PVC/Liquidite

PVC/Stainless

PVC/Alum

PVC/Flex

IP14a

End Bell Adapter

Schedule 40/80 PVC



PATENT PENDING

Save Cost on the Rigid Nipple, Tape & Labor
Use for Entire Job - Not Just for Repair

1 Piece Reaming Bit

1/2" thru 6"
 Schedule 40/80

*Plus More Being Invented for **SAFER BETTER FASTER** Jobs . . . Call With Your Ideas!*



SPProducts.com 800-233-8595 info@SPProducts.com



Positive Reaction: Chemical Processor Sees Significant Savings with HDPE Cooling Towers

Replacing a cooling tower in disrepair with modern engineered plastic units allows global chemical manufacturer to reduce maintenance and energy costs, improve efficiency.

When it comes to heavy industrial cooling applications like oil refineries, chemical plants, and paper mills cooling towers have been employed for decades. Yet, according to industry research, the utilization of the technology in these sectors is on the rise. There are several notable reasons including a longer average lifespan, consistent reliable cooling, and significant energy savings over alternative cooling options.

Traditionally, however, these heavy industrial manufacturers required cooling towers that were the size of buildings and constructed on-site. This is no longer the case, as advanced cooling tower technologies are not only offering a smaller footprint but also delivering greater efficiencies with significantly less maintenance.

So was the case for a chemical processor in North Carolina where after years of incurring considerable expenses refurbishing and maintaining its aging cooling towers, the plant finally reached a critical point. The facility was looking to replace its existing wooden crossflow units with a more modern cooling tower solution. By switching to towers constructed of high-density polyethylene (HDPE) engineered plastic, the facility has been able to not only dramatically reduce its maintenance costs, but also boost efficiency.

“The company was spending tens of thousands of dollars each year on maintenance trying to keep the old towers operational and it just became cost prohibitive,” explains Varun Ganesh, sales engineer with Tencarva Machinery, a Greensboro, N.C.-based integrator of industrial process equipment.

Enduring the elements

LIGHTING YOUR WAY FORWARD

Contractor Lighting gives you the solutions for success.

Free shipping on orders \$300+ | All product specs at your fingertips online
Get access to our free Lighting Layout tool or we'll create a layout for you.



877-664-5483

contractorlighting.com

FROM THE INDUSTRIAL



TO THE OFFICE



AND FOR ALL EMERGENCIES



We're experienced Lighting Professionals who can't wait to talk lighting with you.



natural and chemical causes of rust and corrosion. They also require lower amounts of expensive water treatment chemicals and less downtime for repair or maintenance requirements.

"When spending such a large capital investment on a major utility they were not going to compromise on quality," adds Ganesh. "They were also hoping to find the lowest total cost of ownership and the engineered plastic tower's corrosion-proof shell gave the facility the opportunity to greatly minimize repair and maintenance costs over time."

In addition to the costs associated with maintenance, the efficiency of the old towers was also beginning to decline. Recognizing the need to reduce maintenance expenses and enhance efficiency, the company decided something had to be done. Given the nature of their chemical process, they needed a cooling tower solution that could withstand the demands of their environment.

"In this operation, there was a high likelihood that chemicals from the processing plant would enter the cooling system and deteriorate a metal tower," says Ganesh. "So, they looked at two replacement options which included cooling towers made of stainless steel and engineered plastic."

In this application, the industrial cooling towers are used to reduce the heat from the equipment required to produce the chemical reaction. In the closed-loop system, water circulates from the source, also called "the pond," around several reactor tank vessels that require external jacketed cooling. The water then runs through the cooling towers where the temperature must be reduced by as much as 10-15-degrees Fahrenheit. Then the cooled water is recycled back into the pond.

While stainless steel was considered early in the process, the company ultimately decided on engineered plastic. HDPE cooling towers are impervious to the

Bonding with Plastics

Ultimately, the chemical processor selected four TM series towers from Delta Cooling. Together the engineered plastic towers offer a cooling capacity of 1,580 tons and can cool about 6,000 gallons of water per minute. Delta Cooling developed the first HDPE cooling towers in the 1970's with many of the original towers still in operation today.

While HDPE cooling towers typically cost less than comparable stainless-steel models, there was another big reason that the chemical manufacturer felt confident in transitioning to engineered plastic.

"I think the 20-year warranty offered by Delta Cooling goes a long way to relieve any concerns," says Ganesh. "That's significantly longer than any stainless-steel or even galvanized-metal models that I am aware of."

In addition to virtually eliminating maintenance – aside from standard preventive activities – the engineered plastic towers are proving to be significantly more energy efficient than the previously installed crossflow towers, further decreasing the overall cost of ownership.

Go From Facility To Fortress



PANELGUARD®

Industrial-Grade Surge Protection

Defend Industrial and Manufacturing Facilities from Harmful Power Surge Events

New **PANELGUARD+ M Series and P Series Surge Protective Devices** offer even greater protection than legacy PANELGUARD solutions and are specifically designed for the most rigorous industrial and manufacturing applications.

PANELGUARD+ solutions are highly customizable and deliver up to 10 modes of protection. They're an excellent fit for major new construction and renovation projects (e.g., distribution centers, large industrial facilities).

Choose PANELGUARD L Series and H Series for light commercial and industrial applications. The robust surge protective devices provide up to 7 modes of protection and can be easily installed at individual disconnects, sub-panels, distribution panels, and service entrance locations.



Scan the QR code to view
additional product information.

Learn more today at [Intermatic.com/PANELGUARD](https://www.intermatic.com/PANELGUARD)



5,000 Lumen (50W) Rechargeable/AC Dual Head LED Tripod Work Light



- Tool-Free 360° Swivel Head Adjustment
- Extendable Tripod
- 16Ft 18/2 SJTW Charge/AC Cord
- Maximum Height 75"
- (1) On/Off Switch
(1) Light Setting Switch
- Run Time: Hi-2/
Med-4/Low-8hrs
- Charge Time: 6hrs
- Dual Function:
Plug In and Use
Continually On
**Medium Light
Mode Only**
- Reversible Ground
Spikes for Secured
Footing

"The older crossflow towers used large, 30-horsepower fans on each unit, which demanded a lot of electric power," explains Ganesh. "The new Delta HDPE units are equipped with smaller, 60-inch fans that operate at a lower horsepower, so the energy consumption is far less."

Delta Cooling also offers fans that are directly driven by a variable frequency drive (VFD). This lets them vary the fan speed and avoid running them at max RPM except when necessary. The ability to tailor fan usage to cooling demand encourages greater energy efficiency – and substantial savings.

High yield, low corrosion

The towers have also proven to be more efficient. The original installation at the plant consisted of four cooling towers constructed of a corrugated metal outer shell with internal parts fabricated out of wood. During the warm summer months, the facility required all four to properly cool the water. However, with the new, engineered plastic towers only three of the four are needed during peak times, a significant gain in efficiency.

"The final cell of the new towers is now available for increasing capacity at the facility if the chemical processor needs to scale up production in the future," adds Ganesh. "Plus, not having to use the additional motors on the fourth tower further increases their energy savings."

Furthermore, the ease of installation is facilitated by the fact that the cooling towers are pre-assembled in the factory and arrive at the site in just two pieces. The modular design of the towers required a smaller footprint allowing for two towers to fit in the same footprint as one of the old wooden cooling towers.

According to the plant maintenance supervisor, the towers are already offering a return on investment for the project.

"Plant management says they are getting better cooling now than they ever experienced at this location before," concludes Ganesh. •

1-866-4VOLTEC (486-5832)

REPAIR CONDUIT IN A SNAP!

- No Tape
- No Plastic Straps,
- No Metallic Straps

NO KIDDING!

**Designed especially for
power, communications,
and fiber optics**



"The World Leader In Split Conduit Products"



Conduit Repair Systems, Inc.

The World Leader In Split Conduit Products

800-670-1804

fax: 435-673-8724

email: crs@conduitrepair.com



**Step 1: Remove
Damaged Conduit**



**Step 2: Cut Split
Duct Conduit to Fit**



**Step 3: Snap in
Place**




**Step 4: Attach
Adapters**



**Step 5: Finish Job
in Record Time**

Please Visit Our Website at WWW.CONDUITREPAIR.COM

More Precise Timekeeping Device Synchronizes Critical Utility Functions



Utility substations require extremely precise sub-millisecond time synchronization to facilitate improved location of faults, multi-rate billing, power-flow monitoring and event reconstruction.

Precise timekeeping is fundamental to the function of the power grid and is used in many applications to improve reliability, reduce costs, predict and prevent faults, and check operation of devices. As such, the power grid requires precise time synchronization across system-wide devices, often with sub-millisecond accuracy.

To accomplish this, extremely precise satellite clocks serve as the time source for the network time protocol, and the information is distributed to the other devices on the network. In fact, satellite clocks are standard within electric utility substations and at certain distribution line locations.

“If all of your distribution points or substations have access to a satellite clock, they share a common source for correlation,” says Nathan Irvin, product manager of networking products at NovaTech Automation, a leading U.S. provider of automation and engineering solutions for power utilities headquartered in Quakertown, PA.

Despite being extremely accurate, utilities are continuously seeking even greater precision in timekeeping. Luckily, advancements in satellite clock design and programming can enhance accuracy. Currently, the accuracy is pushing towards achieving a margin of plus or minus 20 nanoseconds.

Utilities anticipate significant benefits from the improved accuracy, including more precise location of faults, multi-rate billing, power-flow monitoring, and event reconstruction.



Maddox is the one-stop shop for your transformer needs

Founded by a team of industry veterans focused exclusively on the transformer and transformer-related needs of industrial and commercial clients.



Sell

Maddox stocks and sells the highest quality transformers from dry types and padmounts to substations.

Rent

With thousands of units in stock, Maddox rents out transformers for the temporary power needs of customers across North America.

Repair

With shops on both coasts Maddox inspects, tests, and repairs transformers to ensure that they are in top working condition.

Purchase

We offer a great price that includes handling all the transportation and environmental issue.

1-800-270-2011

sales@maddoxtransformer.com

maddoxtransformer.com



Highly accurate satellite clocks

Satellite clocks work by connecting with orbiting satellites that maintain precise time using highly accurate atomic clocks. At the substation, the satellite clock receives time from the satellites in orbit. Utilizing advanced algorithms, it then accounts for external factors to provide an accurate time.

To improve the speed of connection and accuracy, some clocks provide multi-constellation support, which provides the ability to lock into any available satellites orbiting the planet. The satellites include GPS, maintained by the US but used globally; European Union's global navigation satellite system GALILEO; China's BEIDOU satellite navigation system; and Russia's GLONASS global navigation satellite system.

The satellite clock serves network time protocol (NTP) to other devices on the network. These devices are typically "agnostic" and can be used as a time source for any device in the substation, regardless of brand.

Still, companies like NovaTech continue to invest in research and development to achieve even incremental improvements in clock accuracy in the sub-millisecond range.

Novatech has long served the utility industry. The company's flagship product, Orion, is a communication and automation processor that can con-

nect to nearly any substation device in its native protocol, perform advanced math and logic, and securely present the source or calculated data to any number of clients in their own protocol. Orion connects to IED's such as microprocessor-based relays, meters, event recorders, and RTUs before connecting to a preexisting enterprise network or SCADA system.

"While any satellite clock can access satellites as a time source, the hardware and software within the satellite clock can make it more precise and accurate," says Irvin. "So, in addition to our previous utility solutions, NovaTech offers timekeeping devices."

The latest release is the Kronos Series 3. Named after Kronos, the God of Time, the satellite clock provides multi-constellation support and includes several upgraded features including antenna-cable delay compensation.

According to Irvin, "By building antenna cable-delay compensation into the algorithms for calculating time, along with multi-constellation support, we're able to provide best in class accuracy."

The Series 3 offers increased output flexibility for syncing devices with their optimal mechanisms, supporting both traditional legacy formats and the latest technologies, such as Ethernet over fiber.

"When Disasters Strike, First Responders Rely On Us!"

Our complete control, communication and convenience Utility Truck Console is becoming the new standard for truck fleets of all sizes. Loaded with standard and optional features that maximize ergonomics, productivity, and fleet/telecom standards into a one exceptional Mobile Console Solution.



MOBILE DESK
MOBILE OFFICE SOLUTIONS
1-877-663-3375
www.mobiledesk.com



The Kronos 3 supports Parallel Redundancy Protocol (PRP) and the High-availability Seamless Redundancy (HSR) within an ethernet network. These protocols are used to implement zero-loss redundancy on wired ethernet.

The Kronos Series 3 supports PTP, NTP, and SNTP. Common legacy formats also supported include modulated and unmodulated IRIG-B over twisted pair, coax, or fiber; and PPS or PPM signals

"Because it is critical to maintain time and communication between the various IEDs, utilities want to build their ethernet networks in a way

that if one ethernet network goes down, there is a back-up that the same traffic flows across," says Irvin.

The net results of these upgrades are more precise time with sub-millisecond accuracy.

"In the prior version of Kronos, the master clock was able to achieve 60 nanosecond maximum time deviation while locked with the satellite. For Series 3, that drops to 20 nanoseconds," says Irvin.

Satellite clocks must also be concerned with "holdover," which refers to the ability of a clock or timing device to maintain its accuracy and continue functioning reliably even when it temporarily loses its external reference signal due to adverse weather conditions, interference, or other factors.

During holdover, the satellite clock relies on its internal oscillator or timing mechanism to continue providing timekeeping information until it can reestablish a connection with the satellites. For this, Kronos Series 3 offers enhanced accuracy through



An ounce of prevention is worth a pound of cure



Line Guard | Pole Guard | BirdBloc
Learn More at [CritterGuard.org](https://www.CritterGuard.org)




Find. Fix. Fast.



EMSCO

ELECTRIC MOTOR SUPPLY COMPANY

- ✓ Busway & Plugs
- ✓ Circuit Breakers
- ✓ Fuses
- ✓ Motor Control Centers
- ✓ Panelboards
- ✓ Safety Switches
- ✓ Switchgear
- ✓ Transformers

If we don't have what
you're looking for,
we find it.

GET 10% OFF
YOUR FIRST ONLINE ORDER

With code

ELECUR10

**Home of Thousands of Transformers,
Breakers, Switches, Bus Plugs,
Circuit Breakers and Motor Controls.**



250,000st of
inventory



Every product
certified



Quick Ship
Fast lead-time

EMSCO stocks obsolete, reclaimed, and
hard to find electrical components.

www.EMSCOMN.com



**24-HOUR
HOTLINE**

Get what you need, when
you need it.

CONTACT US

800.328.1842

24-Hour Emergency Line

an optional oven-controlled crystal oscillator for better accuracy in longer holdover situations. An oven-controlled crystal oscillator (OCXO) is a type of crystal oscillator that maintains its frequency stability by controlling the temperature of the crystal within a temperature-controlled oven. This helps to minimize frequency drift caused by temperature variations, resulting in better accuracy over longer holdover periods.

"In holdover, TCXO has typical drift of 9ms/day, whereas OCXO has a typical drift of less than 100µs/day. All clocks also support out-of-bounds alarm when the time drifts more than a specified value," explains Irvin.

Utilities benefit

According to Irvin, there are many applications in the power grid that can benefit from more precise timekeeping.

Multi-rate billing: Typically required accuracy: 0.5

to 1 second.

To get better utilization of the grid, power utilities often charge different prices at different times of the day. The revenue meters of utility and consumer as well as the machines and processes at the user's site need a common time-base.

"Although this application does not require exceptional time accuracy, it can benefit utilities that implement a multi-rate billing structure," says Irvin. "To ensure they are charging the end customer accurately, they need to have a precise time source to know when they should switch the rates."

Event reconstruction, sequence-of-events (SOE): Typically required accuracy: 1 to 5 ms (sub-cycle of the 50/60 Hz sine wave).

Events in the power grid need a spatial-temporal frame of reference (what happened where, what

Twintier[®]
RB611T

TYING CONDUIT TO REBAR HAS NEVER BEEN EASIER OR FASTER!

SCAN TO WATCH IT IN ACTION:

OUR TWINTIER TECHNOLOGY ALLOWS THE RB611T TO TIE 5,000 TIES PER CHARGE, WHILE DELIVERING JUST THE RIGHT AMOUNT OF WIRE FOR GREATER PRODUCTIVITY AND COST SAVINGS.

MAX
maxusacorp.com



***Want to speed up your snow
removal or dirt work?***

***WE HAVE
YOU COVERED***



All Hydraulic Snowblowers



Available for Tractors, Compact
Wheel Loaders & Skid Steers!

990 Gallon Fuel Carts



Bring fuel to your equipment;
not the other way around

Sandpiper Spreader



Scoop
up media
and spread
it from 30 feet
to 30 inches

***A Cut
Above***

With over 25 years of
experience and
an ISO9001 certified
manufacturing process;
we will ensure your
equipment serves you
for years to come



Eject Sticky
Material with Ease!

Pushout Buckets



Grade
with
Ease,
Speed, &
Precision

Dual Dozer Grading System

**Contact Us At 507-847-4049
or email us at
marketing@hitchdoc.com**

**Scan the Code Below
to Learn More!**



happened when) so that cause and effect can be correctly understood.

In the analysis of the large blackout of August 2003 that lasted almost 48 hours and affected 10 million people in the Northeastern and Midwestern United States and the Canadian province of Ontario, more time was spent ordering and manually time-tagging unsynchronized event recordings than on any other task.

"If some devices have a less accurate time source than others, then manual adjustments are required to properly reconstruct the events," says Irvin. "Synchronizing the devices in the network with a satellite clock eliminates a lot of this type of work."

Power-flow monitoring: Typically required accuracy: 1 to 10 μ s.

The phase component of the so-called synchrophasors can be used to estimate the power flow

and the stability of a power grid. The computation of synchrophasors is only possible if all the phasor measurement units (PMUs) use a common time base.

Traveling wave-based fault location: Typically required accuracy: better than 1 μ s (for a 300 m fault location accuracy).

The location of faults can be accomplished by precisely time tagging wavefronts. Faults on the power transmission system cause transients that propagate along the transmission line as waves. Each wave is a composite of several frequencies, ranging from a few kilohertz to several megahertz, having a fast-rising front and a slower decaying tail.

"Composite waves have a propagation velocity and characteristic impedance and travel near the speed of light away from the fault location toward line ends. The location of faults can be accomplished by precisely time-tagging wave fronts as



Don't get caught off guard when we deliver this FAST.

So fast you might not be ready for it.

LS Cable & System USA lead times are the best in the business.
Order today and get your product months ahead of the competition.

lscusa.com



LS Delivering quality **3x faster!**

*"As a safety professional, you always want your workers to have access to leading edge safety tools that improve safety and focus. Working with **COOLSHIRT SYSTEMS** over the past two years allowed me to help design a tool by lineman for lineman."*

*The **A.R.C. Hybrid Cooling System** by **COOLSHIRT SYSTEMS** allows lineman to remain more focused and less fatigued by reducing their core body temperature in extreme environments, therefore reducing the possibility of unintended accidents."*

-James "Jim" Bonner
Compliance Coordinator- Retired
Alabama Power



A.R.C. Hybrid Cooling System

Complete Arc Rated Portable Cooling Solution

Developed in conjunction with major power companies for use in extreme heat conditions, the **A.R.C. Hybrid Cooling System** uses liquid cooling to reduce fatigue, injury, and heat stress related illness.

Designed specifically for use by linemen, the **A.R.C. Hybrid Cooling System** features a compact design with a custom woven strap mounting system. The use of S-hooks offers the versatility of mounting inside or outside of the bucket. The system includes our mobile ice based cooler, a 7 hour lithium ion battery with charger and a **CAT 2, 12 CAL** rated Liquid Cooled Vest for **70E Arc Flash** protection.

Designed with portability in mind, measuring **6" x 6" x 20"** and weighing in at **less than 10 lbs dry**, the unit is entirely self-contained and built to last with a 20,000 hour pump.

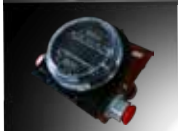


A.R.C. Hybrid Cooling System
2002-0017



COOLSHIRT®
LIQUID COOLED GARMENTS

The test tools you need - for the information you require.



From monitoring equipment, tools and test instruments to the need for on-going calibration requirements and the training to understand everything - there is no wonder the maintenance professional is overwhelmed. With the availability of new and upcoming technology, information overload can quickly set in when trying to put together the best maintenance solution. **That's where we come in.** EDE can demystify electrical testing programs, offer support, training programs and the high tech equipment to make your maintenance activities straight forward and motors and generators doing what they are supposed to do - run. We will help you **Find the Way.**

• 970/292-8207 • www.edeinst.com •

they cross a known point typically in substations at line ends," says Irvin.

Integration of Renewable Energy Resources

To connect to the national grid, the electrical energy from solar panels, wind turbines, or batteries is passed through inverters or power electronic converters. These devices convert the DC (direct current) output from the sources into AC (alternating current) suitable for transmission and distribution on the grid. In order to integrate renewable energy into the grid effectively, it must be synchronized with the existing grid frequency.

"With all these distributed renewables, it is important for them to properly tie into the existing line. They need to match the waveform frequency accurately when they are adding power to the line," says Irvin. "In addition to the synchronization, it's important to accurately understand how much power is being added and when that power is added, which is where satellite clocks can play a crucial role in renewable integrations."

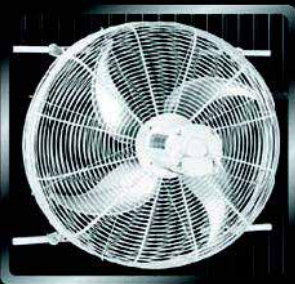
For utilities, precision timekeeping plays a critical role in the operation and efficiency of the power grid, emphasizing the necessity for exact time synchronization across devices to enhance reliability, minimize costs, and facilitate fault prediction and prevention.

With the use of highly accurate satellite clocks providing time synchronization with the potential to reach accuracies within plus or minus 20 nanoseconds, utilities are on the verge of achieving even greater operational precision.

For more information on solutions for a continuously evolving power grid from NovaTech Automation, visit www.novatechautomation.com or call (913) 451-1880.

www.novatechautomation.com •

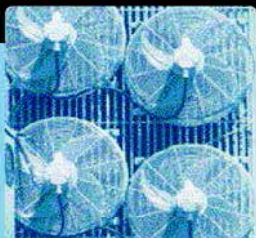
Get Cool!



**Extend
transformer
life!**

**Increase
transformer
capacity up
to 166%!**

- expert technical assistance
- large inventory
- low sound levels
- one-piece cast aluminum blades
- energy-efficient motors
- galvanized or stainless steel guards



p.o. box 187 germantown, wisconsin 53022

262.255.2310

www.krenzvent.com



Reliable and Safe. The Power of Us.

40+ OFFICES
ACROSS THE U.S. & CANADA

- ⚡ Electrical Testing and Maintenance
- ⚡ Commissioning and Start-Up Testing
- ⚡ Power Quality Analysis
- ⚡ Cable Testing and Fault Location
- ⚡ Online and Offline Cable Partial Discharge Testing
- ⚡ Engineering Services
- ⚡ Electrical Safety Training
- ⚡ Renewable Energy Systems Testing
- ⚡ Power Distribution System Testing
- ⚡ Power System Troubleshooting and more...



SERVICES

TRANSFORMERS

SYSTEMS

COMPONENTS



resapower.com



Network with us on LinkedIn and follow us on social media as we routinely publish the most recent company news, share best practices, post open jobs, and more.



SCAN ME

GOT A TOUGH ONE?



800-576-RESA



sales@resapower.com



evluma

RoadMax Roadway Lighting

RX1 | RX2 | RX3

RoadMax[®]

Redefine the Road Ahead



Evluma builds off a legacy of low-glare lighting with RoadMax, a new family of roadway luminaires. For utilities and municipalities concerned with disability glare, meeting stringent roadway specifications, and achieving an efficient use of existing poles and roadway infrastructure this is a game changing luminaire.

evluma.com

sales@evluma.com

425-336-5824

LONE WORKER PROTECTION
FALL PROTECTION
SUSPENSION TRAUMA PREVENTION

 **SECURE 1/2 MILE
LINE-OF-SIGHT** 



ASSIGNED MONITORING ATTENDANTS



Grace Web Portal Dashboard



Custom Check-In Schedule



TEXT/Email Notification

Receive a GPS Map Link

Check-In System



LEARN MORE



GRACE GATEWAYS

Iridium Satellite/Cellular

Mobile or Portable Worksite Models

SALTTM System Loop Test Indicator

Supports up to 20 Grace Pendants



WORKFORCE[®] LONE WORKER PENDANT

Fall Detection

Manual Panic Button

Motion Detection

GPS Location



SAFETY FIRST

OPTIMIZE YOUR WORKSPACE

Available in both
CHAIN & CABLE
Configurations

- Customizable height and reach to best fit your space.
- Ergonomic positioning for easy low strain use.
- Create a safe, efficient work environment.



The Sky Hook is your personal safety lifting solution, preventing lifting injuries while saving you both time and money!

800-4-SKYHOOK

800-475-9466 • 208-365-5770

www.skyhookmfr.com

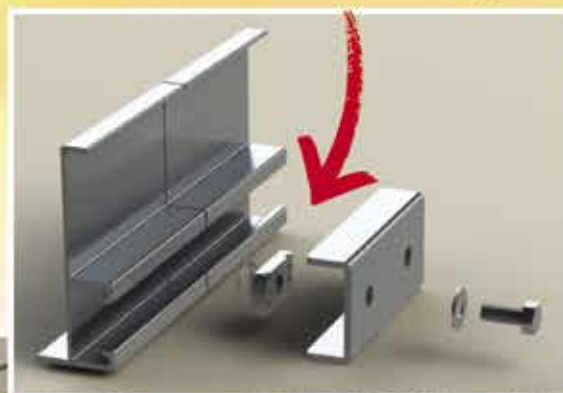


Zip

- Fast Installation
- Easy to Install
- Aluminum
Lightweight



SINCE 1994



Aluminum Cable Tray Systems



Made in
Canada

1 866 818 0299

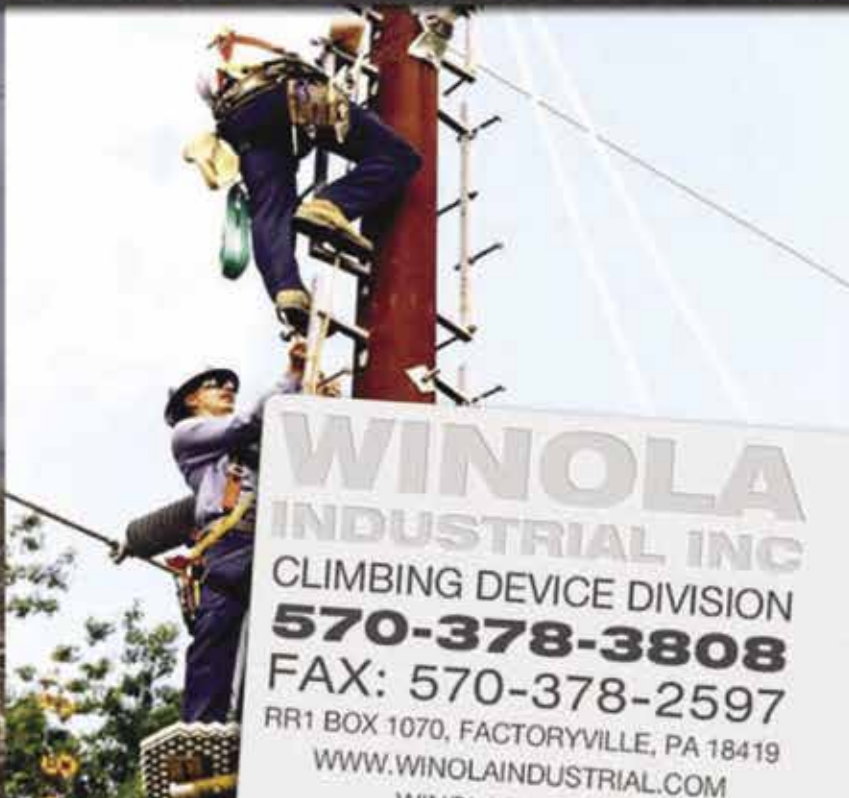
info@ziptray.ca

www.ziptray.ca



Zip Cable Tray Systems Inc • 97 Hymus Blvd. • Pointe-Claire, QC • H9R 1E2

THE SAFEST WAY TO CLIMB A STEEL POLE IS WITH WINOLA INDUSTRIAL INC.



WINOLA
INDUSTRIAL INC
CLIMBING DEVICE DIVISION
570-378-3808
FAX: 570-378-2597
RR1 BOX 1070, FACTORYVILLE, PA 18419
WWW.WINOLAINDUSTRIAL.COM
WINOLA@EPIX.NET



Galvanized
Weathering Steel
Powder Coated



Basic Device
for Working
(steps adjacent)



Basic Climbing
Device
(steps staggered
for climbing)



NEW!
Safety
Tie-offs



Knurled, Impact
Tested Rungs

Overhead View



Step Bulbs
Not Aligned



Ladder Pegs
Pegs are Aligned
for Easier Climbing

Visit us at: www.winolaindustrial.com

OVER 4 MILLION LADDERS PRODUCED SINCE 1971

Payroll People meet at a Tradeshow

Our payroll takes 2 minutes to prepare and keeps us compliant with the DAVIS BACON ACT

Our payroll takes many hours and 3 people to put together

We get an 80% savings in time and money with compliant client - compared to manually prepared payroll

Compliant client sounds great.
My friend's construction company was heavily fined being out of compliant.
He might go to jail!

I USE COMPLIANT CLIENT BY EMARS

WE MANUALLY PREPARE PAYROLL

Our payroll is certified, worry Free and very inexpensive plus it is DOL APPROVED

- Encrypted
- Free Demo
- Works with Excel
- 55,000 + Client
- Web Based
- Paperless
- Works with Time Clock

Compliant
 **client**
by eMars

emarsinc.com
480-595-0466

Ad Index

Company	Pg.	Website
Base Tek	2	www.basetek.com
Conduit Repair	9	www.conduitrepair.com
Contractor Lighting	5	www.contractorlighting.com
Cool Shirt	19	www.coolshirt.com
CopperWeld	1	www.copperweld.com
Critter Guard	14	www.critterguard.org
EDE Electric Motor Testing	20	www.edeinst.com
Emars Inc	27	www.emarsinc.com
Emsco	15	www.emscomn.com
Evluma	22	www.evluma.com
Grace Industries	23	www.graceconnectedsafety.com
Hitch Doc	17	www.hitchdoc.com
Intermatic	7	www.intermatic.com/panelguard
Krenz Vent	20	www.krenzvent.com
LS Cables	18	www.lscusa.com
Maddox	11	www.maddoxtransformer.com
Max USA	16	www.maxusacorp.com
Mobile Desk	13	www.mobiledesk.com
Resa Power	21	www.resapower.com
Rhino Switchboard Mat	IFC	www.rhinoswitchboardmat.com
Ronk Electrical	BC	www.ronkelectrical.com
SP Products	3	www.spproducts.com
Skyhook Mfr	24	www.skyhookmfr.com
Underground Devices	IBC	www.udevices.com
Voltec	8	www.voltecpowerlighting.com
Winola	26	www.winolaindustrial.com
Working Concepts	28	www.safeworker.com
Zip Tray	25	www.ziptray.ca

Work shouldn't hurt.

SOFT KNEES®

No-Strap Knee Pads

STOP a LADDER®

Another fine **ergoKNEEL** product
www.ergokneel.com




888-456-3372 • www.safeworker.com • info@safeworker.com

THE SECRET TO

UNDERGROUND POWER TRANSMISSION



OUR WUNPEECE TRANSMISSION SPACERS REDEFINE THE INDUSTRY STANDARD
FOR UNDERGROUND POWER TRANSMISSION INSTALLATIONS.
WITH PRECISION ENGINEERING AND UNMATCHED QUALITY,

JOIN THE RANKS OF INDUSTRY LEADERS WHO TRUST
UNDERGROUND DEVICES FOR THEIR POWER TRANSMISSION NEEDS.



VISIT WWW.UDEVICES.COM

AND EXPERIENCE THE FUTURE OF UNDERGROUND POWER INSTALLATION

AMERICAN MADE. RONK SOLID.

RONK Electrical Industries not only designs and manufactures high-quality products and solutions that help lower costs, increase efficiency, and stabilize power usage, but also provides you and your customers with vast industry knowledge and unbeatable customer service and support.

RONK's Roto-Con® Rotary Phase Converter units manufacture three-phase current from a single-phase supply. This unit is built to allow the use of three-phase motors and equipment where installation of a commercial three-phase supply is impractical or too expensive. Available in Type P, Type D-1, and Type CP, these units are flexible in operating a range of different loads for multiple applications to meet your unique needs, making them easy to install and maintain.

RONK

Sales: 1-800-221-7665 | **Service:** 1-217-563-8333

www.ronkelectrical.com



RONK ROTO-CON® ROTARY PHASE CONVERTER



COMMON APPLICATIONS

- Metal and woodworking equipment
- Grain handling and milling
- Battery chargers
- Print shops
- Welders
- Food processing machinery
- Irrigation pumps