

Today's

November 2014

# Industrial Products & Solutions™

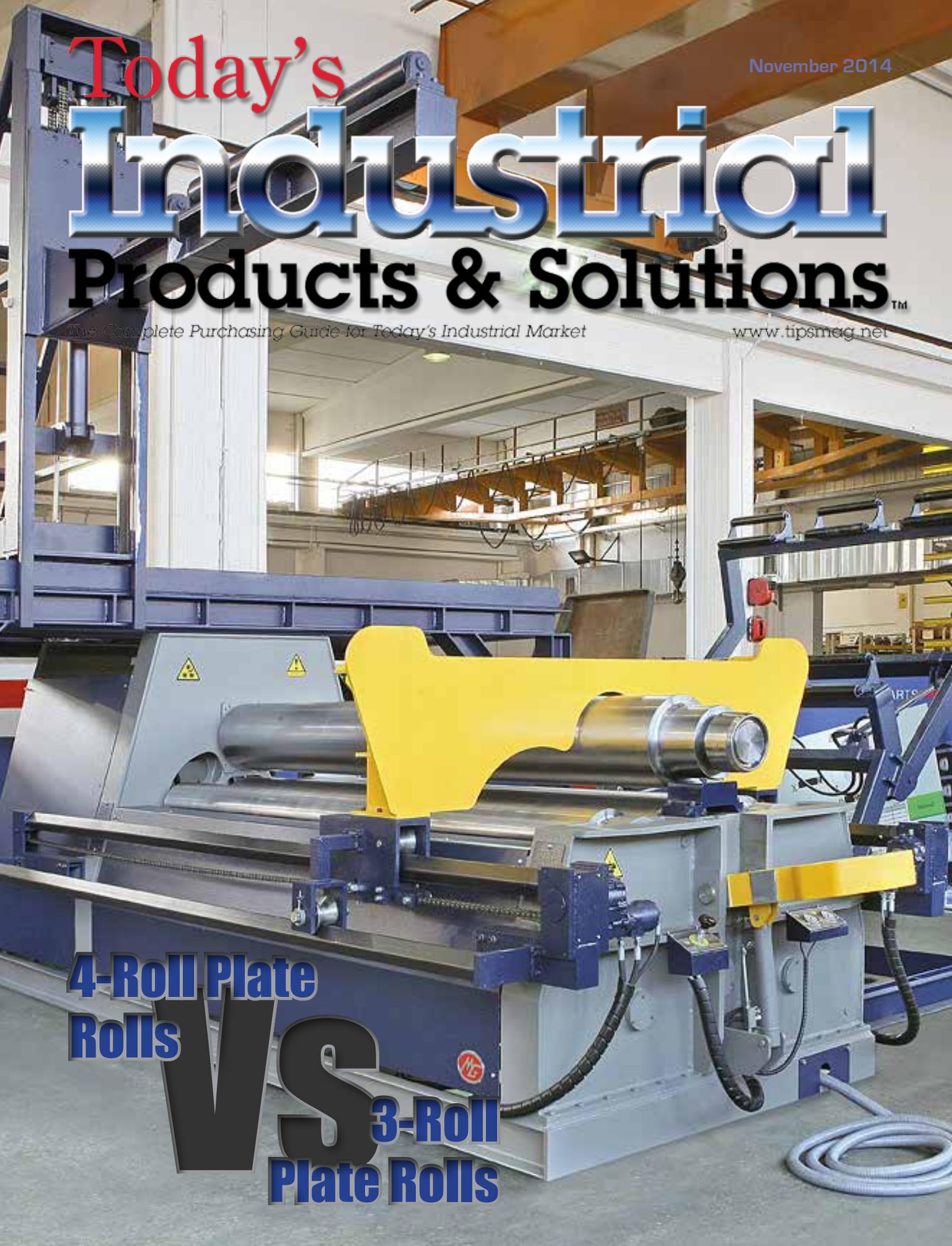
The Complete Purchasing Guide for Today's Industrial Market

[www.tipsmag.net](http://www.tipsmag.net)

4-Roll Plate  
Rolls

VS

3-Roll  
Plate Rolls





# KICK OUT YOUR CLUNKER

## & Transform Your Entire System

Retrofit your existing CO<sub>2</sub> or YAG Laser  
and enjoy all the benefits of IPG's Fiber Lasers



### INTRODUCING IPG'S NEW RETROFIT TEAM

Our premiere team of trained professionals will come to your facility to evaluate your needs and provide you with the most cost-effective and tailored solution to replace your older production laser with an energy-efficient fiber laser from IPG.

Operating worldwide, our team will provide you with an initial assessment of your current system and will re-qualify the application to assure you that IPG's products are the best solution toward improving your manufacturing operations.



By replacing older, inefficient lasers for applications such as **cutting, welding or cladding** with fiber lasers, manufacturers can utilize their existing motion system while gaining significant operating cost savings. Fiber lasers consume substantially less electricity compared to conventional lasers. It is estimated that fiber lasers are 15-30 times more electrically efficient than lamp pumped YAG lasers and 3 times more electrically efficient than CO<sub>2</sub> lasers.

Customers that switch to fiber lasers also benefit from lower maintenance, no diodes to replace and lower down time.

#### DID YOU KNOW?

You may be eligible to receive rebate money from your utility or state government by switching from old laser technology to efficient fiber lasers?



+1 (508) 373-1275 or +1 (508) 373-1144  
sales.us@ipgphotonics.com  
[www.ipgphotonics.com](http://www.ipgphotonics.com)



The Power to Transform<sup>®</sup>

# RUGGED PROTECTION

FOR YOUR FORKLIFT'S BATTERY



RUGGEDIZED SHUT DOWN TIMER

- Designed to protect your vehicle's battery from over discharge
- Programmed to automatically turn off electrical loads at a low voltage battery level, or at a preset time after the vehicle's ignition has been shut off
- No special tools required for installation
- Potted to protect against heat, moisture and humidity
- Can be installed in a vehicle or forklift's engine compartment (12V or 24V inputs)

To learn more about how Lind's **Ruggedized Shut Down Timer** can meet your mobile power needs, contact Lind at **1.800.897.8995**, via email at [info@lindelectronics.com](mailto:info@lindelectronics.com) or visit us online at [www.lindelectronics.com](http://www.lindelectronics.com).



POWER SPECIALISTS FOR  
MOBILE COMPUTING

## TIPS CONTENTS

- PG 4 The Importance of Water Quality for Waterjet Cutting
- PG 8 FABTECH 2014 has Georgia on Its Mind
- PG 10 4- Roll Plate Rolls vs 3- Roll Plate Rolls
- PG 20 The Development of Solar Hot Water Systems
- PG 28 Ad Index



# Today's Industrial Products & Solutions

The Complete Purchasing Guide for Today's Industrial Manager [www.tipsmag.net](http://www.tipsmag.net)

### GROUP PUBLISHER

Brandon Greenhill  
205-733-4343  
brandon@tipsmag.net

### ASSOCIATE GROUP PUBLISHER

Rick Harless  
205-382-618  
rick@handfmedia.net

### ASSISTANT SALES MANAGER

Tami Greer  
205-382-6974  
tami@handfmedia.net

### EDITOR

Annie McGilvray  
annie@handfmedia.net

### CREATIVE DIRECTOR

Jacklyn Greenhill  
jacklyn@handfmedia.net

### WEB DIRECTOR

Danny Thompson  
danny@handfmedia.net

### ADMINISTRATIVE DIRECTOR

Steven Hobson  
steven@tipsmag.net

### CEO

Christy Hobson

### PRESIDENT

Glen Hobson



### Executive and Advertising Offices

951 1<sup>st</sup> Ave. W.

Alabaster, AL 35007

phone: 205-624-3354 fax: 205-624-3354

[www.tipsmag.net](http://www.tipsmag.net) • [glen@tipsmag.net](mailto:glen@tipsmag.net)

*Today's Industrial Products & Solutions*™ is published ten times a year on a monthly basis by H&F Media Group, Inc., 951 1<sup>st</sup> Ave. W. Alabaster, AL 35007 USA. *Today's Industrial Products & Solutions*™ 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.

*Today's Industrial Products & Solutions*™ is distributed to qualified owners and managers in the industrial 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  
H&F Media Group, Inc., P.O. Box 1568  
Pelham, AL 35124

PRINTED IN THE USA

# Bent on

high quality

## A full line of Pipe, Tube, Profile, Section & Ornamental Benders

- Superbly engineered rolls for tube, pipe, coiling, sections, and profiles
- 20 Models ¾" to 3" Capacity
- Our Tooling is made In-House for Superior Quality Control
- Superior *PLATINUM* Warranties
- Over 1,000 Tooling & Accessories in stock for Rapid Delivery



**CP40H**  
Universal  
Section Roll



**CPS35** Universal Coiling Roll



**BA20** CNC Section Roll



251-937-0947 • [eaglebendingmachines.com](http://eaglebendingmachines.com)

## Serving The Americas for over 20 years



Want your production rates to go

# Straight Up?

## Next Generation Vertical Systems for Tank Production

- Use coil stock, 1 seam per shell
- Mild & stainless steel systems
- Shop and/or field versions
- Requires less shop space
- Increased production rates
- Reduced labor costs
- Reduced material handling costs
- Improved finished product quality
- Tank Diameters 6' to 200'

251-937-0947 • [www.carellcorp.com](http://www.carellcorp.com)

**CARELL**<sup>®</sup>  
CORPORATION  
FABRICATING MACHINERY

# The Importance of Water Quality for Waterjet Cutting

By Ali Kulick

## *Total Dissolved Solids*

The first hurdle in water quality is to filter out impurities before it can reach the high pressure line or cutting head. Impurities in water are measured in parts per million, or ppm, and consist of dissolved and suspended solids. The total dissolved solids (TDS) in average American tap water ranges anywhere from 140-400 ppm, with 500 ppm considered unsafe for human consumption.

The quality of the water supplied to the intensifier pump can directly influence the service life of waterjet components. A high concentration of TDS causes accel-

erated wear of any components that come in contact with the high pressure water because of the increased abrasiveness of the water from the TDS.

Although it would seem logical that zero parts per million is the desired quality water for a waterjet, it's actually counterproductive to remove all impurities from the water. Pure water (H<sub>2</sub>O) is considered 'the universal solvent' and its presence in a waterjet can cause major issues including metal pitting and other damage. Instead, most waterjet experts recommend aiming for low total dissolved solids in the water, with 60 - 70 ppm of total dissolved solids optimal.



# MAXIMUM POWER

## SECURE WIRELESS SOLUTIONS FOR INDUSTRIAL APPLICATIONS



MAX POWER, HIGH SPEED, LINE-OF-SIGHT  
**100, 300 and 800 Mbps**  
ETHERNET SOLUTIONS



- Maximum legal transmit power - 1 Watt
- RF data rates up to 866 Mbps
- Up to 540 Mbps Ethernet data rate
- Line of Sight Range up to 30 miles
- 3-Port POE out 802.3at option

Call today for your **FREE** wireless surveillance network configuration!



Leaders in Wireless IP Video Connectivity

**(866) 533-6216**

[www.avalanwireless.com](http://www.avalanwireless.com)



Reverse Osmosis (RO) and Deionization (DI) units are available as add-on's for waterjet owners interested in regulating the total dissolved solids. There are many different brands of RO and DI systems on the market and waterjet manufacturers can recommend which will work best with a machine. Many manufacturers also offer closed-loop systems which use the same water over and over again. Typically, these systems have built-in water treatment to manage TDS.

### *Suspended Solids*

In addition to the concern for total dissolved solids, water must be filtered for suspended solids. These are solids in water that can be trapped by a filter, whereas dissolved solids would pass through a filter. Suspended solids constitute a wide variety of material, including silt, decaying plant matter, industrial wastes, etc.

Suspended solids can also cause shortened pump life as well as difficulty with seals and nozzles. Also, if suspended solids make it into the high pressure stream, they can act as an abrasive and damage high pressure equipment. There are both pre-filtration and final filters designed for this purpose, depending on the size of the particle that needs to be removed. These filters are located inside of the pump prior to the intensifier and can be easily changed by hand. Generally, the pump PLC will send a notification when it is time to replace a clogged final filter.

### *pH Level*

Water pH is just as important as total dissolved solids and suspended solids. If the inlet water has a low pH, its acidic properties can damage the high pressure tubing which would cause it to be replaced more often than necessary. Similarly, if the inlet water has a high pH, its basic properties can cause scaly buildup of calcium carbonate on the inside of high pressure tubing. This calcium carbonate buildup will eventually break off, move through the high pressure tubing gaining momentum, and damage the waterjet orifice. Water used in a waterjet cutting system should ideally have a pH level of 7 which is neither acidic nor basic. The addition of a water softener to regulate the pH level of the inlet water

is an easy fix that is strongly recommended by waterjet technicians.

### *Water Temperature*

Water temperature also has a big effect on the life of waterjet components. Water entering the high-pressure pumps must be kept cold (below 70\* F) or else it can effect seal longevity. Water right out of the tap may already be cool enough for some companies, but if not, manufacturers often suggest a chiller system.

Environmental factors like rainfall and temperature of the climate can also affect the initial water temperature. In this case, waterjet professionals often recommend a closed-loop system with chillers to keep everything at a constant temperature.

### *Opposing Theory*

The use of a good quality water softener in conjunction with a 0.2 absolute final filter is very successful for treatment of water for the intensifier. One OEM has installed hundreds of waterjet systems using this setup without any shortened component life. In the worst case scenario, if seal life does not live up to expectations, then a DI or RO system can be installed.

### *Conclusion*

As part of installation planning, a water quality analysis should be performed by a commercial company that specializes in water conditioning equipment. The minimum information one should obtain from this analysis is TDS, silica content and pH value. Each waterjet manufacturer has different requirements for water quality. Check with the manufacturer to obtain the specifications for the particular machine.

As many waterjet technicians will attest, one of the best ways to improve machine life is to invest in water analysis and then incorporate the recommended water conditioning system into the machine. Although water quality should be analyzed by all waterjet owners, there are also instances where treatment is not necessary to have a well-functioning waterjet system.

# TANK MANUFACTURING EQUIPMENT

- Tank Turning Rolls
- Plate Rolls
- Fit-Up Rolls
- Off-Set Joggle Machines
- Side Beam Track Supports
- Tank Assembly and Girth Welding Machines

**TURNING ROLL**



**SLIP ROLL**



**FOUR ROLL  
HYDRAULIC PLATE ROLL**



*The* **WEBB** *Corp.*



402 E. Broadway, P.O. Box 549, Webb City, MO 64870

Phone: (417) 673-4646 • Fax: (417) 673-4649

[www.webbcorporation.com](http://www.webbcorporation.com)

# FABTECH 2014 has Georgia on Its Mind



FABTECH is flying south for November! North America's largest metal forming, fabricating, welding and finishing event is expected to attract over 27,000 attendees and 1,400 exhibiting companies to the Georgia World Congress Center in Atlanta on Nov. 11-13.

FABTECH exhibits will include live equipment demonstrations, offering visitors the unique opportunity to see, touch and compare products side-by-side and find cost-saving solutions. Special events at FABTECH 2014 will include (partial list): a keynote presentation on "Creating U.S. Jobs and Bringing Manufacturing Back Home" by Walmart VP for U.S. Manufacturing Cindi Marsiglio; a special panel discussion on "Bridging the Manufacturing Skills Gap with Veterans" to be held on Veterans Day (Nov. 11); a keynote speech by former Pittsburgh Steeler great Rocky Bleier;

and a special FABTECH Industry Night at the new College Football Hall of Fame in Atlanta.

This year's FABTECH expo comes against the backdrop of the continued resurgence of manufacturing in the U.S. Recent data shows that manufacturers contributed \$2.08 trillion to the economy in 2013, up from \$2.03 trillion in 2012. Offering a one-stop shop to source the best products and services from the U.S. and all over the world, FABTECH is an invaluable resource to the continued growth of the sector.

"With 14 million pounds of equipment over 500,000 net square feet of floor space, FABTECH 2014 will be more than 25 percent larger than it was in 2010, the last time the show was held in Atlanta," said John Catalano, show co-manager at SME. "We've had

record numbers of attendees at each of our last two shows in Chicago and Las Vegas because there is simply no better way to see new products and technologies than at FABTECH."

Simultaneously, FABTECH will once again host an educational program designed to enhance attendees' careers and businesses.

"Beyond the world-class exhibits at this year's show, attendees can add to their FABTECH experience by registering for more than 100 educational sessions and expert-led presentations," said Mark Hoper, show co-manager at Fabricators & Manufacturers Association International. "These sessions have become extremely popular, so we encourage attendees to sign up early if they are interested in learning more about the latest industry trends and technology in the metal forming, fabricating, welding and finishing industries."

To find out more about FABTECH and to register, visit the FABTECH attendee registration page. For more information about exhibiting at FABTECH, contact a sales representative.



# ISOLATED PROTECTION TO PREVENT GROUND LOOPS



The Lind Isolated Power Adapters provide a regulated, isolated DC output to power laptops, thin clients, monitors and other devices from a DC voltage source. Output and input DC returns are isolated, allowing the prevention of possible electrical noise caused by ground loops.

The Isolated Power Adapter's electronics are enclosed by an epoxy-sealed case to protect the internal circuits from damage caused by shock and/or vibration. Its durable construction withstands extensive wear and tear in any harsh mobile environment. Snap-in connections make replacing missing or damaged cables from anywhere in the field easy and hassle-free.

Lind's Isolated Power Adapters are built to work with most existing laptop brands and models. These adapters can also be designed for custom applications. Contact Lind to discuss solutions for your exact mobile power needs.



POWER SPECIALISTS FOR  
MOBILE COMPUTING

# 4-Roll Plate Rolls

*versus*

# 3-Roll Plate Rolls





# Advantages and Disadvantages

By Cary Mashall

Four-roll technology has been around almost since the turn of the century: however, it was impractical, as the improved production did not justify the costs.

With the advances in Fluid Technology this has changed dramatically. It is now possible to buy a four-roll machine for only about 20% more than a three-roll double pinch machine.

Is this an important development to plate roll users? To answer this question, let's briefly review the functions of the single initial pinch roll, double pinch roll and the basic pyramid roll.

## **Pyramid Roll:**

Unable to pre-bend, must either live with a large flat area at joining point of metal, or use a press brake to pre-bend prior to rolling. Its primary advantage is that it's inexpensive; however, unless you can live with a large flat area on cylinder, it ends up costing you more in terms of secondary equipment and material handling. It is also very difficult to roll cones.

## **Initial Pinch Roll:**

Has pre-bend capability and material can be introduced horizontally. The disadvantage is that it is difficult to do cone bending, and plate has to be removed from machine and rotated 180 degrees in order to pre-bend trailing edge. This is a serious

disadvantage as it requires that the plate is squared completely once again, and it's during the squaring operation that many of the mistakes are made that lead to bad parts. It is also responsible for many shop accidents when the plate is being rotated 180 degrees.

### **Double Pinch Pyramid:**

It can pre-bend both ends of a plate without removing plate from machine. The disadvantage is that it takes six different positioning of the rolls to complete a cylinder. Because of the pyramid design, it cannot pre-bend as close to the edge as an initial pinch or a four-roll machine. It is able to roll cones, but with difficulty.

For the purpose of comparison, I will be comparing against the initial pinch and the double pinch rolls.

The pyramid rolls, while they have a place in the market, are not considered when pre-bending is a prerequisite.

The purpose of this document is to demonstrate that the four-roll has all the desirable features of the other two without the disadvantages - plus, adds additional advantages the other two do not have.

### **MG Four-Roll Advantages**

#### **Simplicity:**

The single biggest advantage that four-roll machines have over the other two machines is simplicity.

In order to obtain a perfectly bent pipe with a three-roll double pinch, it is necessary to do three different operations:

1. It is necessary to pre-bend the leading edge of material. This is done by pinching plate

between one of the side rolls and top roll.

2. You must also lower the opposing side roll to create the proper geometry for the pre-bend. Because of this it's impossible to load and roll material in the horizontal position. It also requires a much larger area in the shop as the material must pass all the way through the machine in its stretch-out condition for the pre-bending so it requires at least equal distance on both sides of the machine.
3. It is necessary to completely change roll position and move plate back to center of machine and position side roll at correct position to achieve required diameter.

This sounds difficult because it is. Remember, every release of rolls is an opportunity for misalignment of plate.

To roll a given diameter on a four-roll is extremely simple. You introduce plate into the roll, touching it off to the opposing outboard roll for quick and accurate squaring of plate. You then raise lower central pinch roll and the plate is locked into position with no possibility of slipping. After this you back plate up to near tangent point of central rolls, and then raise the left or right outboard roll to the correct position to achieve your diameter and begin rolling. When the back edge gets close, simply release the left outboard roll and bring up the right outboard roll until it touches the plate and finish the pipe in one pass.

By comparison, a very simple operation. Because the plate is automatically squared and always pinched and not released until the pipe is complete, the net result of this difference is that the four-roll requires 66% less positioning and much less experience on the operator's part.

In most cases, it is difficult to determine the correct position of roll to achieve a given diameter. The op-

# UTILITY METALS

Manufacturing products  
you can look up to!



## UTILITY METALS...

Manufacturers of Quality:

- Area Lighting Poles
- Lighting Brackets
- Traffic Sign Structures
- Traffic Signal Structures
- Custom Manufacturing



### New "In-Stock" Product

- 4" Square Steel Pole
- 20 ft. Long
- Powder Coated Dark Bronze

In stock locations:

- Sparks, NV
- Malvern, PA



## UTILITY METALS

A Division of Fabricated Metals LLC.

P.O. BOX 9054

LOUISVILLE, KY 40209

800•627•8276

502•363•6681

Fax: 502•368•2656



Made in U.S.A.

erator takes his best conservative guess and moves up from there; however, given the fact that on a three-roll double pinch he must have 6 positionings to achieve a diameter (even a wrong one) it becomes very time consuming with a risk of scraping the material before correct diameter is reached. A four-roll machine, which requires only two positionings, never releases metal and arrives at correct diameter in less than half the time, with much less risk of a scraped piece.

Given the above, there is no question the four-roll is the simplest, most productive machine available in rolling technology today.

#### **Cone Bending:**

As cone bending is very difficult on an initial pinch roll it has, up until the last few years, been accepted that the best method to bend cones is with a double pyramid pinch roll. However, it is not an easy process with a double pyramid roll at all. In fact, it is not uncommon for jobbers, as well as manufacturers, to own a double pinch roll and still choose to bump out their cones on a press brake. The only machine capable of bending a cone properly is a four-roll machine.

To roll cones on a three-roll machine is very difficult. First you must realize that a cone has to be developed by rolling a plate at two different speeds at the same time. This is a difficult situation to achieve. Both the three-roll and the four-roll machines are capable of inclining the side rolls in a positive attitude, and both have a hardened contrast die to control and slow down the speed

of the small diameter. This is an equal comparison as far as it goes; but, by guiding the small diameter and inclining the roll (both of which are necessary to roll cones) you have still created an unnatural situation for rolling cones. Why? Because on three-roll double pinch machine all three-rolls are driven, which makes it very difficult for the contrast die to be able to retard the rotation on the small diameter while making the large diameter move faster? This causes lamination and scarring on plate and the roll.



So, why can a four-roll, which also has inclinable side rolls and a hardened contrast die, do this difficult function better than three-roll? The answer is this: the four-roll (lower central pinch roll) can be inclined in a negative attitude and is also capable of adjusting the force at which it pinches which allows the roll to grip the cone only on the large diameter which needs to turn faster and only with enough force to turn the part. This allows the small diameter to be slowed down more easily.

PATENT PENDING

# EZ DRAIN™ OIL VALVE

**NEW  
&  
IMPROVED**



REMOVABLE  
HOSE END

- REPLACES YOUR EXISTING DRAIN PLUG
- JUST TURN THE LEVER TO DRAIN OIL

## THE EASIEST OIL CHANGE

### Optional Hose Connections



LEVER  
CLOSED

ATTACH THE  
REMOVABLE  
HOSE END



LEVER  
CLOSED

CONNECT A HOSE



LEVER  
OPEN

OPEN THE LEVER  
TO DRAIN OIL



STRAIGHT HOSE END



L-SHAPED HOSE END

For Heavy Duty Trucks and Buses, contact the following distributors:

**NORTHWEST**  
Wesrep Sales Co.  
(253)851-9099

**ROCKY MOUNTAIN**  
TEWCO, INC.  
(800)558-8730

**NORTH CENTRAL**  
TEWCO, INC.  
(800)558-8730

**NORTHEAST**  
Gomco Sales Co.  
(800)793-0154

**SOUTHWEST**  
TMA  
(619)579-9603

**MIDWEST**  
Gomco Sales Co.  
(800)793-0154

**SOUTH CENTRAL**  
JJ O'Connell Co.  
(800)727-0770

**SOUTHEAST**  
Mys-Tec Sales  
(404)505-0163

**CANADA:** DKSI 1-(877) 508-3900 email: info@ezoildrain.com

For Cars and Pickups order from: [www.oildrainvalve.net](http://www.oildrainvalve.net)

**USA:** [www.EZoildrain.com](http://www.EZoildrain.com) **Canada:** [www.EZoildrain.ca](http://www.EZoildrain.ca)



To sum it up, rolling cones properly, absolutely requires a lower central pinch roll (fourth roll) capable of a negative inclination and adjustable pinch pressure. Only four-roll machines have this capability but, *be careful, not all four-roll machines have it.* Be sure to ask the builder about this feature. Also, make sure when inquiring about four-roll machines that the side rolls move independently so that one can be used as a squaring gauge.

### **Handling the Plate:**

Bending light sheet presents no particular handling problem to either type roll, although the three-roll must be lined up with a groove and then pressure applied to hold this position. On a four-roll, you merely bump the sheet off the back roll which acts as a positive stop and then pinches the plate to insure position.

The real problems start with the rolling of long plate. Because the three-roll pyramid has to lower one of the side rolls and pinch and pre-bend with the other, it's really not suited for long plates, as it would drag the ground. This leaves two options; the initial pinch and the four-roll.

The initial pinch can require as many as 2 or 3 people to help maintain control of the plate by using cranes, hoists, etc. Also remember, the plate has to be taken out of the machine and turned for the opposite pre-bend operation. Again, this sounds as a tough and time-consuming operation; companies doing this type of work will tell you it's tougher.

By contrast, once again, the four-roll is uniquely suited for this type of work. First, like the initial pinch, in a horizontal position allowing for conveyors or support stands, this is the safest, most controllable condition and does not require two or three men to control plate. Secondly, plate does not have to be turned around.

### **Speed:**

Because the initial pinch must turn plate for second pre-bend and the three-roll double pyramid must make six positioning to roll a pipe, it's conservatively estimated that the floor-to-floor time on making a pipe is 50% faster in production situations on a four-roll with much less operator expertise required. Put simply, if a three-roll can roll a vessel in 20 minutes, a four-roll could do it in 10 minutes, or twice as fast. Even if a company is rolling only a few pipes a day, there is no reason not to do them as rapidly as possible so you can get on with your other work.

### **Automatic Squaring of Material:**

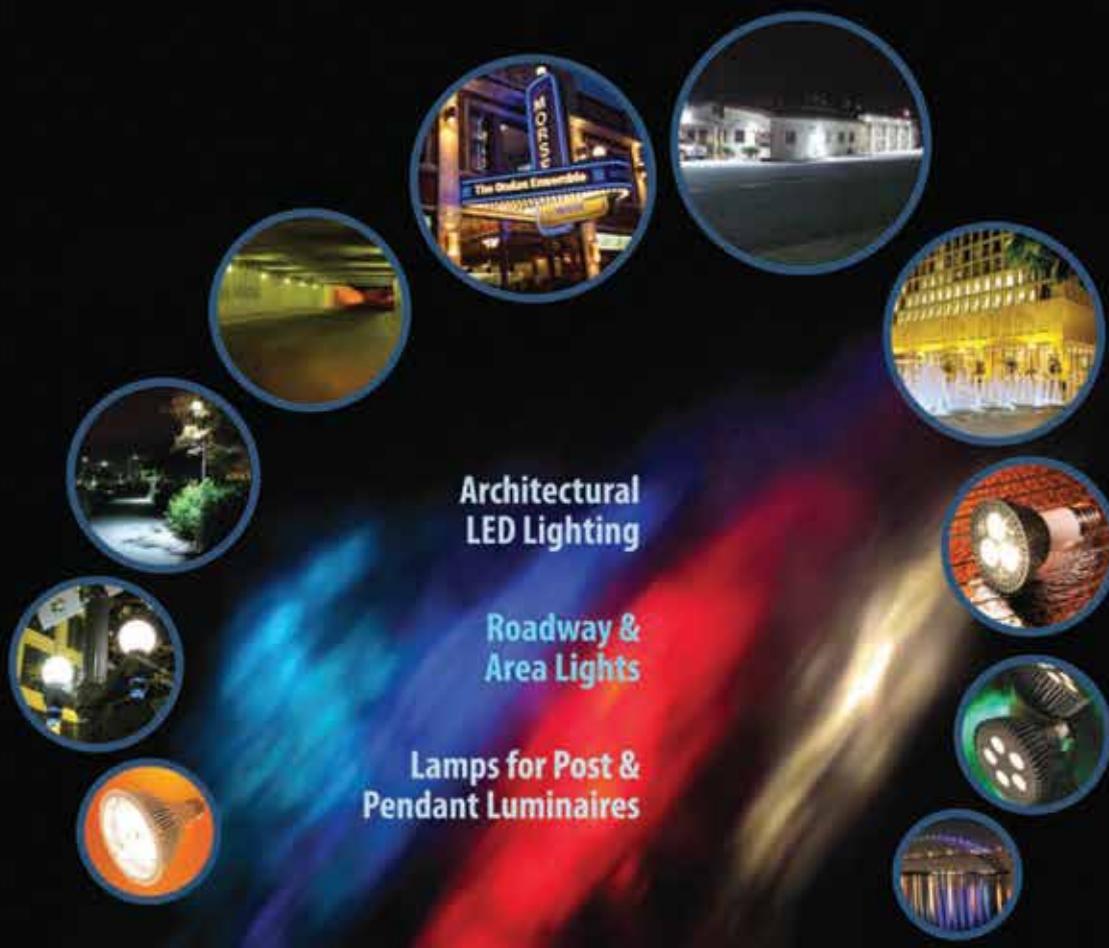
On a three-roll machine, squaring of plate is a very difficult process and one of the most important. It is extremely difficult to control the squareness of plate over a 6'-12' long piece with just one man.

Three-roll manufacturers usually put a small groove in the outboard rolls to help line plate up but even with this, it often requires two men to square plate properly. No matter how long it takes, there is no alternative; the plate has to be square or you cannot proceed. This process, on a three-roll, is time-consuming and can be very frustrating.

On a four-roll machine, the process is automatic and takes only a few seconds and, equally important, only one operator. This is done by lifting one of the independent outboard rolls and using it as a squaring gauge. Once the material is in contact all the way across, the operator simply drives the lower pinch roll up until it pinches material and, from that point, you can roll complete pipe in one pass.

### **Constantly Pinched Plate:**

One advantage of maintaining a pinched condition is that the operator has total control of all plate motion. In this condition, it's possible for one operator



Architectural  
LED Lighting

Roadway &  
Area Lights

Lamps for Post &  
Pendant Luminaires

# LEDtronics.com

The Future of Light. Today.



LED Tube Lights

LED Strip/String  
/Path Lighting

Miniature &  
Intermediate  
Based LED Bulbs



**LED**<sup>®</sup>  
**LEDTRONICS, INC.**<sup>®</sup>

800.579.4875

webmaster@LEDtronics.com

Designed in the USA

to roll parabolic curves or boxes without leaving the control and with only one squaring of the plate.

This is impossible to do on a three-roll machine. It also isn't possible to vary the pinch pressure so that you can supply strong force for big plate and less force for thin or soft material and because the plate is driven, it prevents it from slipping out of position which happens with three-roll machines.

Another disadvantage of a three-roll double pinch machine is rolling thin sheet (less than 30% capacity) because of the lack of resistance in the material. Again, this is not a problem for a four-roll which is pinching material and creating its own drive force, regardless of resistance in material.

Bottom line; a MG four-roll plate bending machine will improve your production dramatically.

#### **Rotation Speed of Rolls:**

Machines not using planetary drive system still rely on chains, gears, clutches and synchronization devices. These are items subject to maintenance. Studies have proven that most shop break-downs are due to lack of proper maintenance.

MG has for years used the Planetary Drive System that does not require synchronizing gears or any mechanical devices. It properly controls the different speeds. This is achieved by planetary drive systems which are much stronger than other drive systems and do not require synchronized gearing. More importantly it does not require any maintenance.

#### **CNC Controls:**

The four-roll machine is the only plate roll that truly utilizes a CNC control. On a three-roll machine, the CNC is basically used only to repeat side roll positioning. It cannot accurately control lateral movement. The three roll double pinch machine

does not move the plate by driving it but rather by dragging it. There is no guarantee that the roll won't spin slightly during movement and lose part zero.

On a four-roll machine, because of the pinching of the fourth roll, you do have constant control of the material and, therefore, the CNC control can totally control an entire bend floor to floor.

The advantages of a CNC control can be justified in either large production applications, small production applications or in "just in time situations".

The advantages in large production is that the computer will take care of most of the various rolling processes leaving the operator only responsible for putting the flat plate into the machine and taking the round cylinder off the machine. In cases where a vacuum feed, power feed table and parts ejector are part of the system, the control will even put the plate on the power feed table and then feed the plate in and eject the cylinder when finished.

The control also has very strong advantages when there are a lot of different parts to be rolled even in small quantities. The control gives the operator the ability to set up the machine from one part to another in literally seconds. In either one of these situations, the value of the CNC control cannot be understated.

#### **The MG Touch Command Control:**

I believe this is the strongest control in the industry. If you have to make a parabolic shape, pentagons shape, hexagon shape or an elliptical shape you would not need test material. You would only require the one part you want to roll. The control will make the part one off.

*From the desk of Cary Marshall  
C Marshall Fabrication Machinery, Inc.*



# **ROLL FORMED SHAPES IN ALL METALS**

**ANGLES • CHANNELS • TUBING • (Lock seam and Open seam)  
SPECIAL SHAPES \* RINGS • FRAMES**

Roll Formed from Plain, Prepainted, Prelaminated, Preplated, Ferrous  
and Nonferrous Metals

## **COMPLETE PRE & POSTFABRICATION OF ROLL FORMED SECTIONS**

Large Stock of Open Dies and Our Own Engineering and Tooling Departments  
Ensures Prompt Delivery and Low Prices With Guaranteed Quality

**[WWW.JOHNSONROLLFORMING.COM](http://WWW.JOHNSONROLLFORMING.COM)**

# **JOHNSON BROS. METAL FORMING CO.**

5520 McDERMOTT DRIVE BERKELEY, IL 60163

PH: 708.449.7050 FAX: 708.449.0042

# The Development of Solar Hot Water Systems

By Ben Gravely

HVAC design engineers have used pressurized glycol systems for decades to transfer heat from boilers to the load. This method is the standard for hydronic heating systems and many industrial heat transfer tasks. Naturally, they applied this design to solar systems, treating the collectors as the boiler and the tank as the receiver. If you walk into most professional engineering firms and ask them to design you a hydronic heating system or a solar system, they will grab their manuals that show how to assemble a pressurized glycol loop.

Since it's too expensive to fill the solar storage tank with a glycol solution, the heat is transferred from the collector loop into the tank through a heat exchanger. The collector fluid goes through one side of the exchanger and the tank water goes through the other side. There are two pumps, one on each side of the exchanger, and controls to turn the pumps on. Glycol loops are "charged" all the time. This is good. They remain ready to run whenever the pump kicks in. When such a system is installed, coin vents (can turn the screw with a dime) are installed at all the high points where air can accumulate and vapor lock the system. The startup procedure is to fill and pressurize the lines (maybe 15 psi) and go around to all the coin vents and burp the air out. Over the years, people have invented clever coin vents



that when dry will leak air and when wet will seal. That way you don't have to go to each one to burp it, it will do so by itself. It is like the rope caulking used in boat hulls for thousands of years. As long as the boat stays in the water, all is fine. If you take it out and let the caulking dry out, it will leak until the caulking gets soaked again. There are many other kinds of automatic air vents, some based on the float system seen in toilets. Safety also requires a pop-off valve near the boiler (i.e. collectors) to relieve pressure in case the boiler controls go haywire. A glycol-water mix is a great solvent for shingles and plastics, including tile floors. So the pop-off valves must have a pipe running to a drain to contain the liquid in the event of a failure.

Since pressure goes up and down with temperature, a clever system was devised to maintain a nominal pressure in the loop. A tank, called an expansion

tank, is installed in a tee in the line. The expansion tank has a rubber membrane running across the middle. The system fluid fills up one side and air fills the other side. The fluid in the system can expand and contract with temperature into the expansion tank, and the air bladder will keep the pressure within a specified range. The air pressure is set with an air hose and tire inflator, just like a car tire. A chart is used to determine the correct pressure according to the temperature of the system at the time. However, expansion tanks have a lifetime. The rubber (or neoprene, or whatever) bladder will someday crack from flexing as it ages and the expansion and pressure regulation benefits of the tank are lost. The system will usually vapor lock somewhere and the whole startup procedure has to be repeated.

Unfortunately, solar hot water systems don't like to play by the rules. They

# CUT COST DRAMATICALLY

*Continental*  
A DIVISION OF

HIGH-SPEED ROTARY  
PIPE & TUBE CUT-OFF MACHINES  
KIENE DIESEL ACCESSORIES, INC.

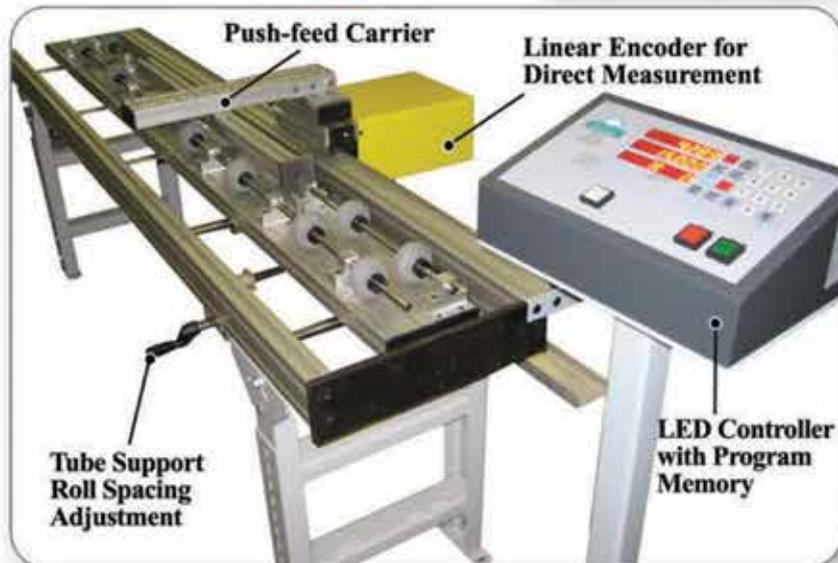


- Eliminate scrap loss
- Deliver up to 900 cuts per hour
- Handle variety of pipe and tube diameters and lengths
- Air or hand operated machines to choose from

Unique rotary cutting method eliminates waste. Machine set-up is easy and fast. Cut-off blades deliver thousands of cuts between sharpening. The easiest and most economical way to cut pipe and tube. And, *Continental* high-speed rotary cut-off machines are backed by over 90 years of proven reliability.



**Introducing the Kentucky Gauge PDS Series Programmable Feeders for Continental Pipe & Tube Cutoff Machines. Improve the quality and productivity of your cutting operations plus, free the operator for other tasks!**



**These PDS Series features will improve your pipe and tube cutting operation:**

- Provides fast, consistent cuts
- Frees operator for other tasks
- Easy to set-up, easy to program
- Fast changeover to different tube diameters

ASK US TO QUOTE ON A FEEDER FOR YOUR EXISTING MACHINE, OR QUOTE A COMPLETE FEEDER/CUTOFF MACHINE SYSTEM...

*Continental*  
A DIVISION OF

HIGH-SPEED ROTARY  
PIPE & TUBE CUT-OFF MACHINES  
KIENE DIESEL ACCESSORIES, INC.

**CONTINENTAL Pipe & Tube Cut-Off Machines**

A Division of Kiene Diesel Accessories, Inc. • 325 South Fairbanks Street • Addison, Illinois 60101

800-264-5950 • Local 630-543-7170 • Fax 630-543-5953 | info@continentalcutoff.com • www.continentalcutoff.com

COME SEE US AT  
BOOTH S3545

are not well-behaved. Typical HVAC glycol systems do not go through the extreme temperatures that solar collectors do. A boiler heating loop may have a maximum temperature of 140-160°F. It never gets colder than room temperature inside a building, so the maximum temperature swing from summer to winter may be 90°F (70-160°F).

A solar hot water system, on the other hand, has the “boiler” sitting outside in the weather. It is always off at night where there is no sun. In the winter, the temperature may go down to -40°F (Willmar, MN). Even in the mountains of NC, winter evening temperatures can go well below zero. A solar hot water system can have a maximum temperature swing as high as 260°F (-40-220), or almost three times what a typical boiler system sees. In the summer time, the solar hot water system will see its maximum temperature, which varies according to the application. The most extreme case occurs when there is a very hot day with high solar radiation, and there is little need for the hot water. This can occur randomly on weekends, or summer vacations, and especially on space heating systems that sit idle all summer. When this scenario happens, the heat from the collectors is not needed and the temperature builds up until the boiling point is reached.

This same problem can occur if there is a power

failure and the pump stops. At this point, a glycol system is in big trouble. If it gets to the boiling point, it will blow the pop-off valve. This drops the pressure in the system. The next night, there will be vacuum in the lines and the air vents will leak air in, vapor locking the system. The next day the hot glycol solution has air in it. A chemical reaction occurs with the oxygen that breaks the glycol into fatty acids, which can clog and eat the pipes if the situation is not corrected promptly. This scenario is not self-correcting. The system stops working, compounding the problem, and needs to be attended to. This is a progressive failure mode. The pump should never stop running during the day on a glycol system in warm weather. To avoid the over temperature problem, large glycol systems have additional equipment installed to dump excess heat. It usually consists of a big fan coil unit in the collector loop that kicks in when the temperature gets too high and dumps the heat to the outside world. The components include temperature controls, bypass valves, fans and pumps. The added complexity just adds more failure modes. Heat dump systems cannot overcome power

failures, unless you add a backup generator, which can have its own failure modes. At night in the winter when the collectors are cold, the cold glycol solution will try to circulate naturally down the supply line, creating a thermal convection loop. Some systems have even frozen the heat exchanger in this manner, causing rupture of the cold water line. A check valve must be installed in the collector supply line to prevent fluid from flowing backwards under cold conditions.

Whenever I think of solar glycol systems, I am reminded of the fairy tale about the little old lady who swallowed a fly.

#### The Development of Drain Back Systems

In an effort to overcome the many problems of glycol systems, early researchers turned to other methods. To overcome boiling and pressure problems with glycol, high temperature silicon oils were used. Unfortunately, they were very expensive, had poor heat transfer characteristics and tended to leak out of soldered joints. Others tried air as the heat transfer

medium. It won't boil or freeze. Blowers and ductwork to the collectors were a problem, and storing the heat from the air in a pile of rocks brought its own problems of mold and dust. You can't fab a rock pile and ship it to a site.

Others went back to plain water as





**WWW.EMERSONJACKS.COM**  
**EMERSON MANUFACTURING**  
**1-800-633-5124**



**AIR JACKS**  
**AIR HYDRAULICS**  
**AXLE JACKS**  
**WHEEL JACKS**  
**TRANNY JACKS**  
**CLUTCH JACKS**  
**RAMPS**  
**SAFETY STANDS**  
**CYLINDER LOCKS**  
**WEDGE LOCKS**  
**CADDYS AND MORE!**

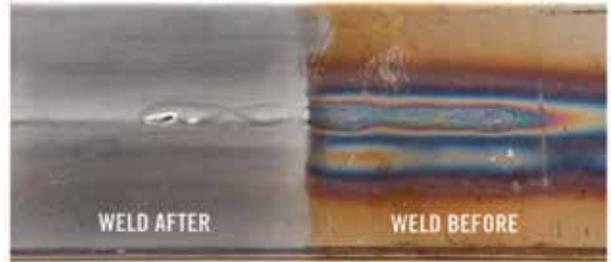


**BUY FACTORY DIRECT!**



## WONDER GEL

### Stainless Steel Pickling Gel



Achieve maximum corrosion resistance to stainless steel. Surface contamination may drastically reduce the life of stainless steel. Wonder Gel removes (pickles) stubborn impurities, cleans the toughest slag, scale and heat discoloration and restores (passivates) the protective oxide layer.



**BRADFORD DERUSTIT CORP.**  
 21660 Waterford Dr.  
 Yorba Linda, CA 92887  
 toll free 877.899.5315  
 e-mail: sales@derustit.com

[www.derustit.com](http://www.derustit.com)

## Weather Resistant

### Solid Brass Padlocks

*Made to your specifications in the U.S.A.*



**HERCULOCK**

Hercules Industries, U.S.A. ®

**HERCULES INDUSTRIES, INC.**  
 Manufacturer of HERCULOCK Padlocks  
 P.O. Box 197 • Prospect, Ohio 43342  
 Toll Free: 1-800-345-2590  
 Fax: (740) 494-2274  
[www.HERCULOCK.com](http://www.HERCULOCK.com)

## STEELMAN INDUSTRIES, INC.

*Built to last since 1957!*

### Rotary Phase Converters

- Provides 3-Phase Power When Only Single Phase Service is Available
- Single or Multi-Motor Applications
- Available in Indoor (ODP) and Outdoor (TEFC) Models



**Steelman Industries, Inc.**  
 2800 Hwy. 135 (P.O. Box 1461)  
 Kilgore, TX 75662  
 800.337.5827 • 903.984.1384 fax  
[www.steelman.com](http://www.steelman.com)

the heat transfer fluid. It has the highest heat transfer capacity of any fluid. All others are measured against water, which is rated as 100%. Glycol is about 85%; silicon oil is about 20% as good as water. Since water will freeze and boil, the idea is to drain the water from the collectors at night, or when a high temperature limit is reached, so it's not there when the extreme conditions come. The system doesn't have to be pressurized, so tanks don't have to have an ASME pressure rating, which can double or triple the price.

Non-pressurized systems don't need pressure relief valves and expansion tanks. Early designs included air vents at the high points and heat exchangers between the collectors and storage. Some thought a vacuum breaker was required at the top to make the water drain out when the pump stopped. Some even installed a pipe between the collector supply and return lines with an electric valve to guide all the water to the return line for draining. All these vestiges of glycol systems only caused problems. Air vents and vacuum breakers introduce fresh oxygen into the water, accelerating corrosion. Conventional air vents on tanks cause evaporation losses, which required periodic refilling (and fresh oxygen). Protecting against corrosion by lining the tank is cost prohibitive above a certain size, and subject to cracking during transport. Check valves only complicate draining the water from the collectors.

### The GRC Drain Back System

The way to make the drain back concept work was to rethink all the features of the system to minimize problems and maximize efficiency. This was the origin of the GRC drain

back design. The original concepts were:

- Non-pressurized operation with no expensive tanks, no code requirements, and no pressure safety devices needed.
- No heat exchangers between the tank and the collectors. Maximum heat delivered to the tank. Catch all the energy possible.
- Maximum efficiency in delivery of heat to applications. Use no heat exchangers where possible, such as some space heating loops. A domestic hot water exchanger is always required.
- Minimize evaporation losses from the non-pressurized tank. The tank vent design that emerged prevents ordinary evaporation losses while maintaining atmospheric pressure.
- Simple corrosion control. A non-toxic, food grade boiler corrosion chemical was selected that scavenges oxygen from the water, prevents galvanic corrosion and helps clean the piping.
- Unified tank system with multiple energy inputs and multiple outputs. This is referred to as "Grand Central Station", where all the energy is routed into and out of the tank storage system.
- Simplest controls, no prioritization of energy output among applications. All applications have equal access to the energy. This prevents wasting stored energy by having one application holding off another.

- Maximize thermal energy conservation. Enclose all pumps, exchangers, and controls within the thermal insulation of the system, where feasible. Use excess heat from pumps, for example, to heat the tank. Minimize line losses by including local plumbing inside the insulation shell. Some classes of pumps are water-cooled. They will work very well inside the insulating shell. Larger pumps are air-cooled and will not operate within the thermal shell of the tank.

The result is a system that is the simplest possible, the most economical to build, the highest efficiency and the most durable. Many are still running after 25 years with only routine maintenance. In operation, when the collector pump turns off, all the water drains naturally back into the tank from both the supply and return lines. If there is a power failure, the water drains back in the same fashion as a normal shutdown. Neither heat dumps nor antifreeze are needed to protect the system, since the water is not in the collectors when the pump turns off, for whatever reason. There is only one failure mode for a GRC drain back system. It occurs if the solar control activates when it should be off. Of course, this can't happen in a power failure. The "power on" failure mode has never been observed in the wild, but it is possible. A simple override control can be used to prevent the system from running when the tank is warmer than a certain temperature, or colder than a certain temperature. It simply interrupts power to the collector pump and requires human reset to start again.

# WERE ON FACEBOOK!

[HTTPS://WWW.FACEBOOK.COM/TODAYSINDUSTRIALPRODUCTSANDSOLUTIONSMAG](https://www.facebook.com/TODAYSINDUSTRIALPRODUCTSANDSOLUTIONSMAG)

A close-up photograph of a person's hand with the index finger pointing upwards. The word "Like" is written in a bold, blue, sans-serif font across the middle of the index finger. The background is a light gray gradient with several faint, white, rounded rectangular outlines scattered around, resembling a digital interface or social media theme.

**Like**

This failure mode has been observed, however, due to operator error, so its effects are well known. In one case, someone left the control in the "Manual On" mode in cold weather. In another case, the factory controls were replaced by un-authorized heat pump controls in the field. If the "power on" failure occurs at night during freezing weather, and the system runs long enough to dump the tank heat and freeze the collectors, the result is a rupture of a collector pipe and dumping of the tank contents on the roof. When the tank contents are gone, the process stops. Since the water solution is non-toxic, the run-off is no more dangerous than rain water on the roof. If the control failure turned the system on during a hot day, the collectors might boil, sending steam out of the atmospheric vent, thereby

preventing excessive pressures. If this condition lasted long enough, the tank water would be depleted and the steaming action would stop as in the freezing case. Current remote monitored controls are programmed to eliminate tampering and to report failures immediately. With only one obscure failure mode, and no dangerous results, the GRC drain back solar hot water system is far more "fail safe" than a glycol system under any climate or operating condition.

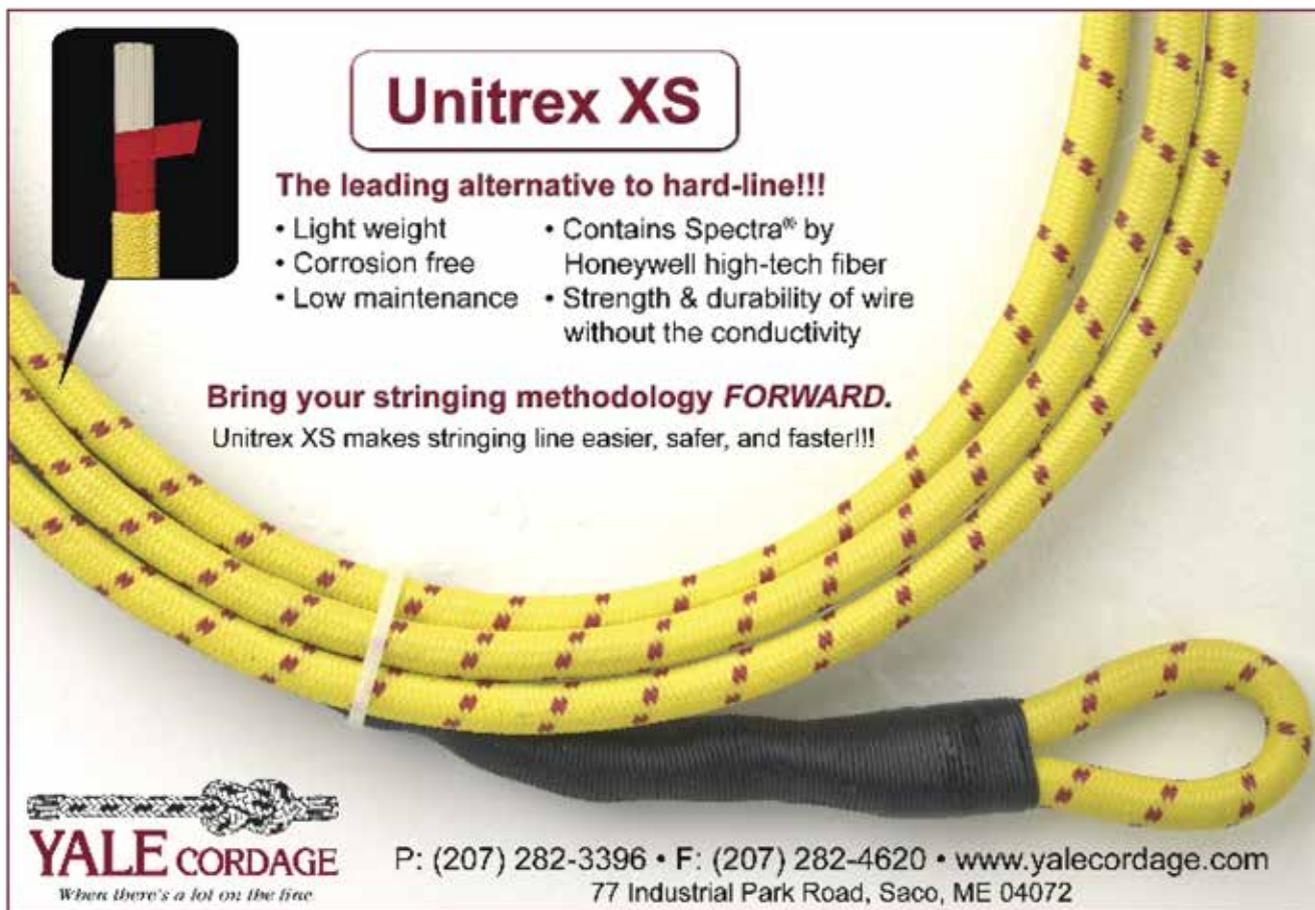
There are two elements to the GRC Drain Back design: the system concept and the resulting implementation into a family of products. The product consisted of a Fluid Handling System with all the components built in under the insulating shell. The electrical controls are mounted in a cabinet attached to

the outside of the tank. A patent was granted for the drain back product design.

*Dr. Ben Gravely*

*Ben has 35 years in solar projects and is considered one of the country's leading experts in the development of solar energy. He is a founder and past president of the North Carolina Sustainable Energy Association and received the Founders Award at the association's 25th annual meeting. He has been awarded the ASME award for Outstanding Service in solar energy development. Ben is a founder of the NC Solar Center. He has a PhD in Physics from North Carolina State University.*

*<http://www.solarhotwater-systems.com/>*



**Unitrex XS**

**The leading alternative to hard-line!!!**

- Light weight
- Corrosion free
- Low maintenance
- Contains Spectra® by Honeywell high-tech fiber
- Strength & durability of wire without the conductivity

**Bring your stringing methodology FORWARD.**  
Unitrex XS makes stringing line easier, safer, and faster!!!

**YALE CORDAGE**  
*When there's a lot on the line*

P: (207) 282-3396 • F: (207) 282-4620 • [www.yalecordage.com](http://www.yalecordage.com)  
77 Industrial Park Road, Saco, ME 04072

# WELCOME TO THE NEW AGE OF TECHNOLOGY



# wireless

## Hioki LR8410-20 Wireless Bluetooth Datalogger Station



- Up to 105 Channels
- Recording Speed as fast as 100 ms
- Easy to Use
- Multiple Measurement Types - VOLTAGE, THERMOCOUPLE, RESISTANCE, HUMIDITY
- Bluetooth® range up to 100 feet

Producing High Quality Products Since 1935

# HIOKI

6 CORPORATE DRIVE • CRANBURY, NJ  
PHONE: 609.409-9109  
FAX: 609.409-9108  
[www.hiokiusa.com](http://www.hiokiusa.com)



ISO 9001  
ISO 14001

COMPANY	Pg.	WEBSITE
AVALAN	5	WWW.AVALANWIRELESS.COM
BRADFORD DERUSTIT	23	WWW.DERUSTIT.COM
CONTINENTAL PIPE & TUBE	21	WWW.CONTINENTALCUTOFF.COM
EAGLE BENDING/ CARELL CORP	3, 27	WWW.EAGLEBENDINGMACHINES.COM
CORMET	28	WWW.COR-MET.COM
EMERSON	23	WWW.EMERSONJACKS.COM
EZ OIL DRAIN	15	WWW.EZOILDRAIN.COM
FEDERAL KNIFE	80	WWW.FEDERALKNIFE.COM
FLOWDRILL/ CULLMAN AUTOMATION	180	WWW.FLOWDRILL.COM
HERCULOCK	23	WWW.HERCULOCK.COM
HIOKI	27	WWW.HIOKIUSA.COM
IPG PHOTONICS	180	WWW.IPGPHOTONICS.COM
JOHNSON BRO ROLL FORMING	19	WWW.JOHNSONROLLFORMING.COM
LEDTRONICS	17	WWW.LEDTRONICS.COM
LIND ELECTRONICS	1, 9	WWW.LINDELECTRONICS.COM
STEELMAN	23	WWW.STEELMAN.COM
UTILITY METALS	13	WWW.UTILITYMETALS.COM
WEBB CORPORATION	7	WWW.WEBBCORPORATION.COM
YALE CORDAGE	26	WWW.YALECORDAGE.COM



**SPECIALTY CORED WIRE  
COATED WELDING ELECTRODES  
TOOL STEEL MIG & TIG**



**ASK US ABOUT  
FLOOD WELDING**

- COBALT
- NICKEL
- HARDFACE
- STAINLESS
- ALLOY STEEL
- TOOL STEEL
- MAINTENANCE
- FORGE ALLOYS
- CUSTOM ALLOYS

12500 Grand River Road  
Brighton, MI 48116  
(810) 227-3251 or  
(800) 848-2719  
[www.cor-met.com](http://www.cor-met.com)

# Flowdrill<sup>®</sup>

*partnering with*

## **Cullman Automation**



*Equals*

- Precision process
- Machinery design/build capabilities
- Clean/chipless process
- Spindles manufactured in USA
- Flowdrill sizes from 1.5mm to 67mm
- Replaces weld nuts, threaded inserts, riv nuts
- Success in any malleable material (stainless steel, steel, aluminum, copper)

[WWW.FLOWDRILL.COM](http://WWW.FLOWDRILL.COM)

[WWW.CULLMANAUTOMATION.COM](http://WWW.CULLMANAUTOMATION.COM)

# FEDERAL KNIFE, INC.

## Industrial Cutting Knives



1-800-23-KNIFE (800-235-6433) • 812-364-1418 (fax)  
P.O. Box 509 • 785 County Line Road • Palmyra, IN 47164



### REPLACEMENT SHEAR BLADES DELIVERED FROM STOCK

Shear Blades or All Equipment Makes:

- CINCINNATI • WYSONG & MILES • HTC • ACCUR-SHEAR • PACIFIC • AMERICAN HERCULES • NIAGARA • PEXTO
- AMADA • STEELWELD/CLEVELAND CRANE
- BETENBENDER • ATLANTIC / HACO
- LODGE & SHIPLEY / COLUMBIA • CENTURY • HERR-VOSS
- STANDARD • EDWARDS/ PEARSON • ADIRA • GATTI • LVD
- DI-ACRO / ELGA-HYDRA • HYDRAPOWER • STAMCO
- BERTSCH • GUIFIL • SAFAN • DARLEY • RHODES
- MORGAN • SUMMIT • DREIS & MANY OTHERS

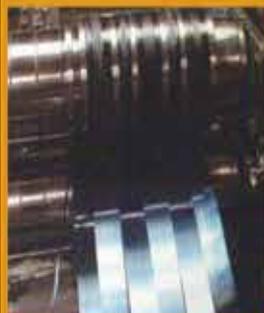
## Precision Blade Sharpening Is Our Specialty!!

*Shear blades made from high quality tool steels "performance matched" to your unique cutting application.*

*Call one of our product specialists for more information.*

[www.federalknife.com](http://www.federalknife.com)

[sales@federalknife.com](mailto:sales@federalknife.com)



## WE WILL BEAT ANY

COMPETITOR'S QUOTED PRICE  
FOR NEW REPLACEMENT SHEAR  
BLADES

BY 5% OR MORE GUARANTEED \*



\* PRESS BRAKE TOOLING \* METAL SLITTERS \* SLITTING SUPPLIES \* 1-800-23-KNIFE \*