CURRENT NEWS

Don't let corrosion damage consume profits.

Corrosion damage is a $2.2 trillion problem worldwide. This costly natural phenomenon can decimate metal – damaging electrical systems, utilities, buildings and infrastructure at an alarming rate. You can't stop corrosion, but you can manage it. Educate yourself about materials that stay ahead of destructive corrosion.

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This is Del.

When he joined Westburne a few years ago, Del was new to the electrical supply business. Back then, Del could hardly tell a PVC-coated conduit from an aluminum hub. What Del did know was sales.

As a veteran sales person, Del realized he needed two things – product knowledge and customer knowledge. So he got to work. He visited his oil and gas clients, got to know their challenges and researched product solutions. Before he knew it, Del crested that steep learning curve.

One of the things he learned along the way was the importance of corrosion resistance in the oilfield. In some buildings, he says, everything in them has to be corrosion-proof.

That's why Del is happy Westburne carries top-notch, corrosion-resistant products from Thomas & Betts. It's also why he's glad he has the know-how to help his customers select the right Thomas & Betts products to guard against corrosion damage.

He's here to help.

DEL RATZLAFF
SALES MANAGER
WESTBURNE \ FORT McMURRAY

Getting the jump on corrosion damage.

WHAT

Corrosion.
It's an unstoppable, everyday force that wreaks havoc. This electrochemical reaction results in damage to electrical systems, structures, infrastructure and more and comes at an astonishing economic cost. It has been the culprit of countless disasters resulting in injury and death.

There's no way to stop corrosion, but there are ways to manage it. The first step is ensuring you're informed.

WHY

Materials react distinctly to environmental conditions and to the presence of factors like dust and moisture. It's complex. And getting it wrong can have costs. Don't gamble on materials that could rapidly succumb to corrosion. Learn more in this straightforward guide to corrosion-resistant materials.

HOW

Westburne can help.
Corrosion management is all about choosing the right material for the job. After you've reviewed this guide, call the product experts at Westburne to ensure you're on the right track. Working with the knowledgeable sales reps from Thomas & Betts, a Westburne product specialist can help you source the right material to manage corrosion and maximize product life.

CORROSION: A HUGE ISSUE. AN ATTAINABLE FIX.

The impact of corrosion is astonishing. Here's the news about this issue from two organizations in the know:

Back in 2002, the National Association of Corrosion Engineers (NACE) instigated a study on the cost of corrosion in the United States. Backed by the U.S. Federal Highway Administration, it's the most authoritative study on this subject to date.

The research measured the costs directly related to corrosion. It included expenses such as repairing a bridge compromised by corrosion, but didn't include indirect costs like labour or loss of revenue caused by work disruption.

The study determined that the direct effects of corrosion cost U.S. industry and government US $276 billion – 3.1% of the nation's GDP in 1998. Study researchers estimated that the price tag for indirect costs would be roughly equal to direct costs.

The good news: researchers concluded that using corrosion management practices could save as much as 25-30% of annual corrosion costs in the U.S.

	Annual cost of corrosion	Potential savings from established corrosion management practices
United States (NACE study, 2002)	$276 billion	$82.8 billion*
Worldwide (WCO, 2014)	$2.2 trillion	$660 billion

* Based on the WCO's projected 30% savings

The World Corrosion Organization (WCO) is an international affiliation of not-for-profit groups dedicated to raising public awareness of this problem and its cost. The WCO estimates that corrosion's impact worldwide is US $2.2 trillion annually.

The good news: The WCO says that just applying existing corrosion control technologies could save US $660 billion worldwide.

[1] No parallel study has been conducted in Canada. However, infrastructure professionals state that corrosion impacts would be similar in Canada. *Renew Canada: The Infrastructure Magazine,* "Controlling the Effects of Corrosion on Vital Infrastructure Assets," Allan Young, March 4, 2014

CORROSION 101

Corrosion is the natural breakdown of a material due to interaction with its environment. In most cases, this refers to the electrochemical oxidation of metals in reaction with an oxidant. At its most basic level, oxidation is the loss of electrons. This changes the properties of a material. For example, when iron is oxidized the result is rust: a brittle, reddish powder. Rust is the most well known of many types of corrosion.

Corrosion's rate of destruction is determined in part by environmental conditions. Dust, moisture, high relative humidity, high temperatures, salt, acids, solvents and chemicals all expedite the rate of corrosion, as does the type of material. Cast iron, for example, rapidly oxidizes and forms red rust if left in its raw state. Other metals, such as stainless steel, have an inherently higher resistance to corrosion.

Red rust

White rust

Oxidized copper

Targeting corrosion where it counts.

With a multi-trillion dollar issue, it pays to focus on changes that yield results.

Electrical systems are a prime area for an upfront investment in corrosion protection that brings cost savings and safety benefits.

In most industries, corrosion's impact on electrical systems is primarily through indirect costs, such as lost productivity and labour. A relatively inexpensive corroded electrical contact can take down equipment and quickly add up to costly lost productivity. In a worst-case scenario, corrosion that causes an electrical system failure can be a serious safety issue. That's why it's critical to invest in electrical conduits, fittings, support systems and accessories in corrosion-resistant materials.

Thomas & Betts make it easy to find corrosion-resistant electrical conduits, fittings, support systems and accessories suited to challenging environments. Because 80% of the products they sell in Canada are made in Canada, they're truly made for the Canadian workplace.

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MATERIALS THAT STAND UP TO CORROSION.

Experts say the materials you choose can be the best defense against corrosion and harsh environments. Here are some of the options:

1

Stainless steel

This is the household name for metal alloys containing at least 10.5% chromium and more than 50% iron. Stainless steel is hygienic; it resists corrosion, withstands high temperatures and is easily maintained. This metal alloy is ideal for electrical conduit systems, combining resistance with strength, durability, ease of installation and low maintenance. Depending on the alloy used, a stainless steel conduit offers up to eight times the lifespan of a standard galvanized steel conduit when in a corrosive environment.

2

PVC-coated metals

Coating metal with PVC (polyvinyl chloride) improves the corrosion resistance of aluminum and standard galvanized steel or iron. In general, PVC-coated metal provides strong resistance to most chemicals and will typically last nearly twice as long as standard galvanized steel conduit in corrosive environments.

3

Non-metallic materials

There are a number of alternative materials for electrical raceway system components and accessories. These include PVC, polycarbonate, nylon, fiberglass and others. The characteristics of non-metallic materials vary, so be sure to check that the material will work where you need it.

4

Aluminum

Aluminum provides the advantages of high strength-to-weight ratio, superior resistance to certain corrosive environments and ease of installation. Aluminum typically weighs about 50% less than steel and requires no maintenance after installation. It offers excellent resistance to solvents and fuels, but isn't recommended in environments with other types of chemicals, such as salt, bleach, acid or chlorine.

Corrosion Protection Options

Chemical Category	Chemical Examples	PVC	Urethane	*304 Stainless Steel	**316 Stainless Steel	Poly Carbonate	Cast Iron	Brass	Aluminum
Solvents (excluding alcohols and aliphatic)	Acetone, toluene, ketones, etc.	NR	NR	FSL	FSL	NR	FSL	FSL	FSL
Fuels	Jet fuel (alcohol based and aliphatic solvent based)	FSL	FSL	FSL	FSL	FSL	FSL	FSL	FSL
Plating solutions	Chrome, nickel, copper, brass, gold, zinc, etc.	FSL	F	F	F	F	NR	NR	NR
Salts and alkaline materials	Caustic soda, caustic potash, alkaline cleaners, etc.	FSL	F	FSL	FSL	F	NR	NR	NR
Mild acids	Low-concentration hydrochloric, sulfuric, fruit acids, glycolic, citric, etc.	FSL	FS	FSL	FSL	FS	NR	NR	NR
Strong or high purity acids	Nitric, hydrofluoric, etc.	FS	FS	F	F	FS	NR	NR	NR
Oxidizing agents	Bleach, chlorine, hydrogen peroxide, etc.	FSL	FS	FSL	FSL	FS	NR	NR	NR

F rated for Fumes only FS rated for Fumes and Splash FSL rated for Fumes, Splash and Liquid NR Not recommended

This chart provides a general guide for the end user to choose the most suitable material for corrosion protection. Compatibility with chemical environment should be thoroughly evaluated for each installation.

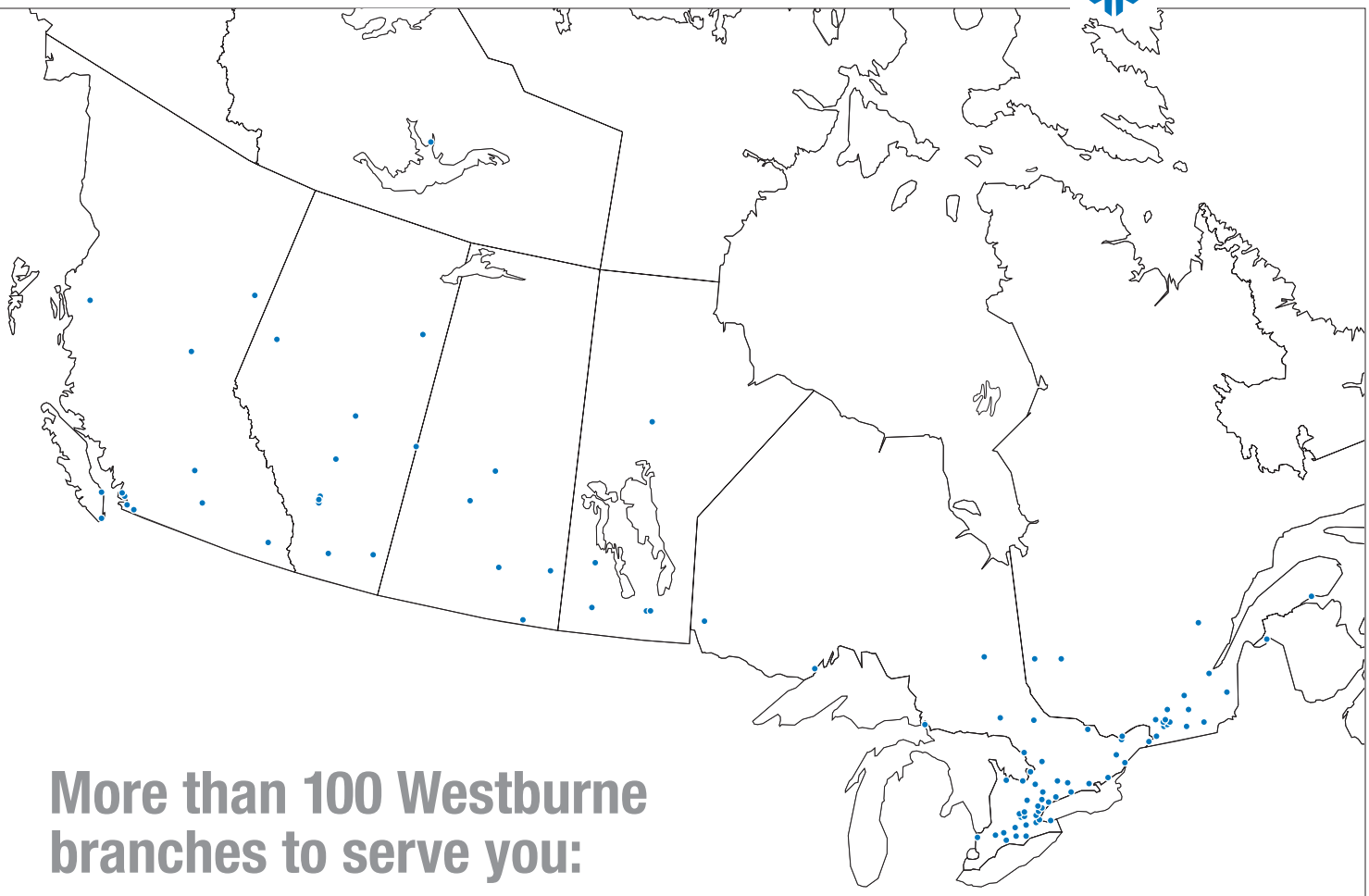
Making the Grade: Chemical Resistance Performance

Material	Overall Chemical Resistance	Phosphoric Acid (Crude)	Phosphoric Acid (>40%)	Sodium Hydroxide (50%)	Sodium Chloride	Sodium Carbonate	Sodium Metasilicate	Diethylene Glycol	Sodium Silicate	Hydrogen Peroxide (30%)	Acetic Acid (20%)	Sulfuric Acid (10-75%)	Citric Acid	Fruit Juice	Chlorine, Anhydrouse Liquid	Chlorine Water	CLOROX® Bleach
*304 Stainless	A	D	D	B	B	A	A	A	A	B	B	D	B	A	C	C	A
**316 Stainless	A	B	D	B	B	A	A	A	B	B	B	D	A	A	C	C	A
Aluminum	B	C	C	D	C	D	D	B	A	A	B	D	C	A	D	D	A
Brass	D	NA	D	D	D	B	NA	NA	D	NA	D	NA	D	D	D	D	NA
Cast Iron	D	D	D	D	D	B	A	A	B	B	D	D	D	D	D	NA	D
Nylon	B	B	B	A	A	B	NA	A	A	D	D	D	A	A	D	C	A
PVC Coated	A	B	B	A	A	A	A	C	A	A	D	A	B	A	D	A	A
Kynar®	A	A	B	A	A	A	NA	A	A	A	A	A	A	A	A	B	A
Polycarbonate	B	A	A	D	A	A	NA	B	NA	A	A	B	A	NA	C	NA	NA

A Best B Better C Good D Poor NA Not applicable

This information is to be used ONLY as a guide in selecting equipment for appropriate chemical compatibility. Westburne and Thomas & Betts do not guarantee the information on this chart. Before permanent installation, test the equipment with the chemicals and under the specific conditions of your application. Ratings of chemical behavior listed in this chart apply at a 48-hour exposure period.

* Type 304 stainless steel contains primarily iron, chromium and nickel.
** Type 316 stainless steel contains primarily iron, chromium and nickel with molybdenum for added strength



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