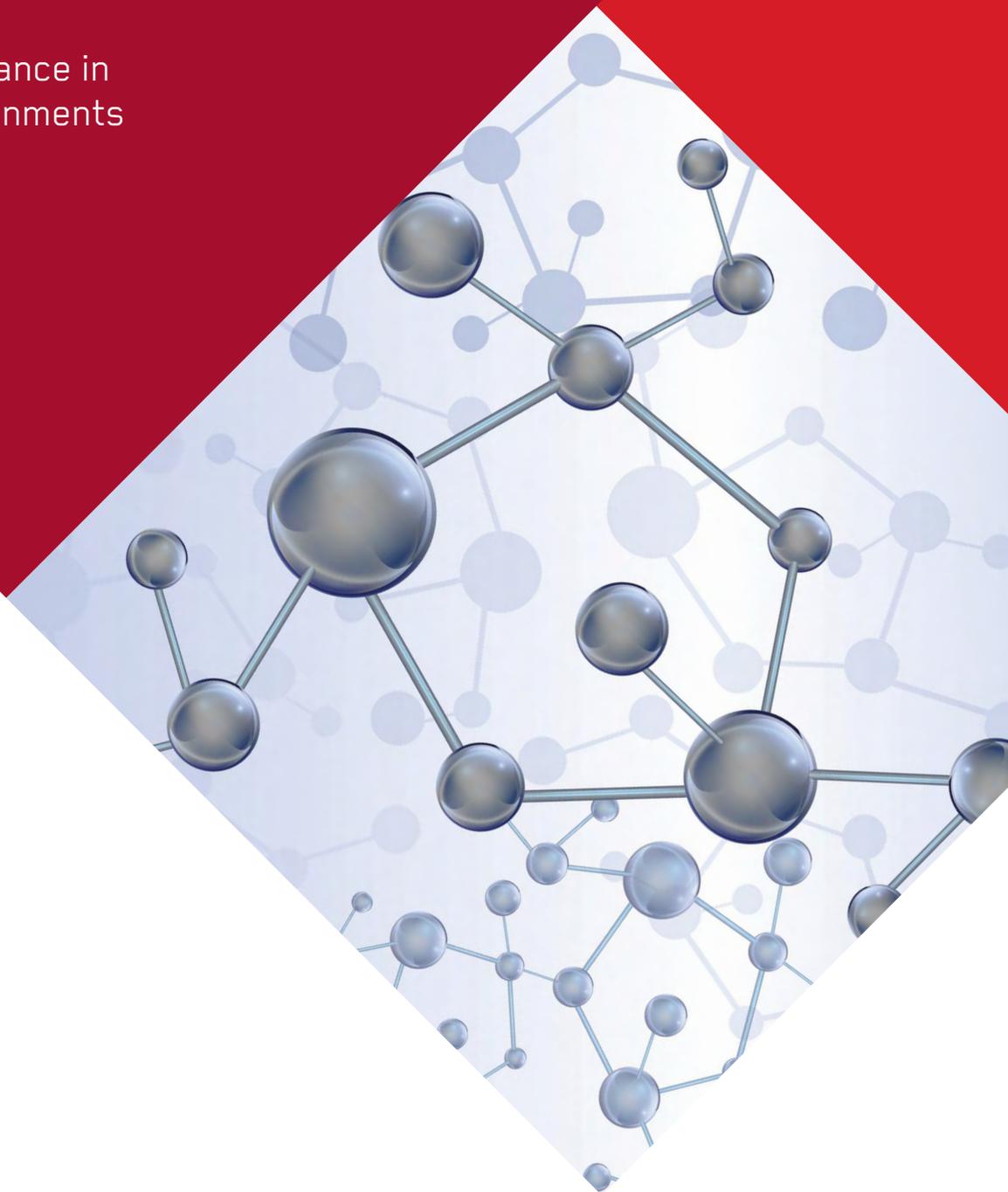


veam cannon

# Plating Selection Guide

Optimizing Performance in  
the Harshest Environments



**ITT**

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# Safe, sustainable & durable plating solutions that enhance connector performance and reliability, even in the harshest environments

ITT Interconnect Solutions' Cannon and Veam brands offer sustainable and cost-effective plating alternatives that reduce the use of Cadmium and other toxic substances while enhancing the durability, conductivity and performance of a broad range of interconnect solutions.

From our industry-leading and proprietary Blue Generation® plating for high-speed rail and industrial applications, to our innovative Black Zinc Nickel plating treatment for the Aerospace & Defense market, our high-performance plating treatments are both RoHS and REACH SVHC compliant. They also add an extra layer of protection, making Cannon and Veam connectors more robust, corrosion resistant and sustainable.

Driven by environmental trends, customer needs and regulatory mandates, our breadth and depth of environmental plating options is designed to meet the needs of an evolving and dynamic marketplace. Our new plating treatments offer alternatives that help reduce or eliminate substances restricted by RoHS and REACH regulations, without sacrificing quality and performance.

This comprehensive Plating Selection Guide was designed to help our customers sort through the wider range of plating choices and materials to get the best plating treatments possible. It includes:

- An overview of our most popular plating treatments, along with recommended uses and applications
- Key features and benefits of our innovative RoHS & REACH compliant plating treatment
- A full list of available plating options and properties for ITT's European metal circular products
- A listing of MIL Spec RoHS compliant plating options for U.S. product lines



## Proprietary Blue Generation® Plating for Hi-Speed Rail Applications

Engineers at ITT Interconnect Solutions developed Blue Generation® zinc nickel plating, which delivers both RoHS and REACH compliance and outstanding performance. Blue Generation® plating protects against the severe environments of high speed rail applications, providing resistance to 500 hours of salt spray and withstanding temperatures from -55°C to +125°C.



Veam VBN Connector with Blue Generation® Plating

# Plating solutions for when it matters most

## Why surface plating is used

Aluminum is the market standard material used to manufacture metal connectors because of its low cost and processability. To achieve required mechanical robustness and corrosion resistance, connector platings are applied. For added dimension and visual appearance, ITT Cannon and Veam brand plating treatments also come in a variety of color options.

## How plating performance is defined

Plating performance is defined by two criteria:

### 1 The level of salt spray resistance measured in "hours"

- During testing, our connectors are exposed to a concentrated salt atmosphere. Criteria is the corrosion of the base aluminium material.

### 2 Shielding effectiveness measured in attenuation tests and defined in "decibels"

- Because this measurement is complex, shell-to-shell conductivity in mOhm is used as an indication of shielding performance.

## Environmental & sustainability trends

For many decades, industry relied on Cadmium product finishes because of its superior electrical performance, as well as the protection it provides in harsh environments. But growing concerns about Cadmium's toxicity and carcinogenic effects have prompted mass reductions, bans and/or regulation of its use.

Since 2003, RoHS regulations throughout Europe have limited the use of Cadmium, Chrome VI and other hazardous substances. While most consumer industries are banned from using these toxic substances altogether, some exemptions are allowed, e.g., military, heavy industry and heavy off-road vehicle markets.

REACH addresses the use of chemicals in production and products. Chrome VI, an essential component of Cadmium and other platings, will be banned for production of connector finishes in Europe by September 2017. Exemptions for markets as in RoHS will not be granted. Recent European legislation recommends replacing Chrome VI in any product used in the European Union. A continued use of products containing CrVI to a defined percentage shall be possible beyond 2017, but many companies have already adopted a zero tolerance strategy and will not allow continued usage.

## ITT's Cannon & Veam brands:

ITT Interconnect Solutions' Cannon and Veam brands are world leaders in the design and manufacture of highly engineered connector solutions and sustainable plating alternatives for multiple end markets.

We bring more than a century of innovation and expertise to every customer engagement and are committed to offering a wide range of RoHS and REACH compliant plating solutions that contribute to a more sustainable world.

## Why ITT plating solutions:

- We offer customers one of the widest ranges of RoHS and REACH compliant plating alternatives available, including our proprietary Blue Generation® plating
- We offer environmental plating and surfacing options, as well as unique customization capabilities
- We are committed to developing plating options that are safe, sustainable and reliable



# Military standards & plating performance

Plating performance is defined by two main criteria:  
salt spray resistance and shielding effectiveness

Measurement of these two criteria is based on test procedures and evaluation criteria defined in standards. For military use, there are two worldwide basic standards:

- MIL standards (origin USA)
- VG standards (origin Europe)

As a rule of thumb the VG test results will show:

- Lower corrosion resistance values with the same plating chemistry due to design\* and test procedure differences
- Lower shielding performance with the same plating chemistry due to test procedure differences

As a result, it cannot be concluded that a plating chemistry providing 500h salt spray resistance on e.g. a MIL-DTL-38999 connector will provide the same values tested on a VG product according to the VG test procedures. Typically the values will be significantly lower for VG for the reasons indicated above.

\* In case of the same design as e.g., with MIL-DTL-26482 and VG95328 only test procedure differences contribute to lower corrosion resistance values



## Cannon Nemesis Space Saver Connector Features Black Zinc Nickel Plating for Soldier Worn Applications

ITT Cannon's Black Zinc Nickel is a RoHS-compliant, cost-effective and sustainable plating alternative to Cadmium. It offers the same level of harsh environment protection, temperature ranges and electrical performance as Cadmium finishes. ITT Cannon's Black Zinc Nickel plating is non-reflective and remains functional for up to 500 hours of salt spray exposure.



Cannon Nemesis Space Saver with  
Black Zinc Nickel Plating



# ITT recommended environmental platings

## ZnNi Blue Generation A240/T240

Best technical alternative to Cadmium 500h salt spray, excellent shielding

Recommended usage:   



## ZnCo Black A239

Fully approved and listed to VG95234

Recommended usage: 



## ZnCo Black A232/T108

Outdoor solution for harsh environments, black 200h salt spray, shielded

Recommended usage:   



## Epoxyurethanic Varnish Black T39

Unshielded outdoor applications with high corrosion requirements, 500h salt spray

Recommended usage: 



## Nickel

Industrial standard for indoor applications with excellent shielding performance

Recommended usage: 



# Plating matrix

The matrix below provides an overview of all ITT European metal circular product lines. Each product line includes a list of available platings and properties.

**IMPORTANT:** All product lines have been tested based on VG standards and related procedures.

Product line	Plating type**	RoHS	Salt spray resistance	Available for shielded versions	Shell to shell conductivity *	Colour	Military approvals
CA Bayonet	Cadmium	no	500h	yes	< 5 mOhm	olive drab green	VG95234
	Zn Cobalt Black (A232)	yes	200h	yes	undefined	black	-
	Zn Cobalt Green (A233)	yes	200h	yes	< 5 mOhm	olive drab green	-
	Zn Cobalt Black (A239)	yes	48h	yes	< 5 mOhm	black	VG95234
	Zn Nickel Blue (A240)	yes	500h	yes	< 10 mOhm	grey-blue	-
CA Com	Nickel	yes	< 48h	yes	< 5 mOhm	silver	-
CGE (VG96929)	Cadmium	no	500h	yes	< 5 mOhm	olive drab green	VG96929
	Zn Cobalt Black (A239)	yes	48h	yes	< 5 mOhm	black	-
	Zn Nickel Blue (A240)	yes	500h	yes	< 10mOhm	grey-blue	-
CGF	Zn Cobalt Green (A233)	yes	200h	yes	< 5 mOhm	olive drab green	-
CGL	Nickel	yes	< 48h	yes	< 5 mOhm	silver	-
	Zn Nickel Blue (A240)	yes	500h	yes	< 10 mOhm	grey-blue	-
CGK (VG96912)	Cadmium	no	500h	yes	< 5 mOhm	olive drab green	VG96912
KPSE (VG95328)	Cadmium	no	500h	yes	< 5 mOhm	olive drab green	VG95328
	Nickel	yes	< 48h	yes	< 5mOhm	silver	
	Zn Cobalt Black (A232)	yes	200h	yes	undefined	black	
	Zn Cobalt Green (A233)	yes	200h	yes	< 5 mOhm	olive drab green	
	Zn Nickel Blue (A240)	yes	500h	no	-	grey-blue	
KPT	Cadmium	no	500h	yes	< 5 mOhm	olive drab green	VG95328
	Nickel	yes	< 48h	yes	< 5mOhm	silver	
	Zn Cobalt Black (A232)	yes	200h	yes	undefined	black	
	Zn Cobalt Green (A233)	yes	200h	yes	< 5 mOhm	olive drab green	
	Zn Nickel Blue (A240)	yes	500h	no	-	grey-blue	
KPTC	Cadmium	no	500h	yes	< 5 mOhm	olive drab green	
	Nickel	yes	< 48h	yes	< 5mOhm	silver	
	Zn Cobalt Black (A232)	yes	200h	yes	undefined	black	
	Zn Cobalt Green (A233)	yes	200h	yes	< 5 mOhm	olive drab green	
	Zn Nickel Blue (A240)	yes	500h	no	-	grey-blue	
KPTC NG	Nickel	yes	< 48h	yes	< 5mOhm	silver	
CIR/FRCIR	T3 - Cadmium	no	500h	yes	< 5 mOhm	olive drab green	MIL/VG
VE-VS	T108 - Zn Cobalt Black (A232)	yes	200h	yes	undefined	black	
VPT	T100 - Zn Cobalt Green (A233)	no	200h	yes	< 5 mOhm	olive drab green	
DS-DSH	T39 - Epoxyurethanic varnish	yes	500h	no	-	black	
Others Veam	T240 - Zn Nickel Blue (A240)	yes	500h	yes	< 10 mOhm	grey-blue	
	T89 - Black Hard anodize coating	yes	> 1000h	no	-	black	
	T29 - Nickel	yes	< 48h	yes	< 5mOhm	silver	
	Stainless steel	yes	> 1000h	yes	undefined		
	Marine Bronze	yes	> 1000h	yes	undefined		
VBN	T108 - Zn Cobalt Black (A232)	yes	200h	yes	undefined	black	
	T39 - Epoxyurethanic varnish	yes	500h	no	-	black	
	T240 - Zn Nickel Blue (A240)	yes	500h	yes	< 10 mOhm	grey-blue	

\* "undefined" indicates that due to varying conductivity values a max shell to shell conductivity cannot be clearly defined

\*\* all platings are cross compatible / backwards compatible with Cadmium platings (except for T89 & T39)

# RoHS Compliant MIL-Spec plating

The matrix below provides an overview of key U.S. metal product lines. Each product line includes a list of available platings and properties.

**IMPORTANT:** All product lines have been tested based on MIL standards and related procedures.

Product line	Plating type	RoHS	Salt spray resistance	Available for shielded versions	Shell to shell conductivity	Colour	Approvals
MIL-DTL-38999	PTFE-Ni	Yes	1000 hours	Yes	2,5 mOhm	Gray	MIL-PRF-38999
	Black Zi-Ni	Yes	500 hours	Yes	2,5 mOhm	black	MIL-PRF-38999
	Black Zi-Co (A296)	Yes	96 hours	No	5 mOhm	black	MIL-PRF-38999
	Electroless Black Nickel (A298)	Yes	500 hours	Yes	2,5 mOhm	black	MIL-PRF-38999
Arinc 600	Clear Trivalent Chromate (A297)	Yes	168 hours	No	5 mOhm	Silver	ARINC 600

## CA-COM Series Connectors Feature RoHS-Compliant Electroless Nickel Plating

Heavy equipment requires heavy duty connectors that take on harsh conditions and extreme weather. This nickel plated, cost-effective circular series delivers exceptional ruggedness and vibration protection. In addition to heavy equipment, CA-Com connectors are used for a range of applications in the industrial, transportation and medical markets. CA-COM circular connector series feature Nickel plating for RoHS compliance.



CA-COM Series Connectors with RoHS Electroless Nickel Plating



Connect with your ITT Interconnect Solutions representative today or visit us at [www.ittcannon.com](http://www.ittcannon.com)

## Connect with the experts

ITT Interconnect Solutions' Cannon and Veam brands are world leaders in the design and manufacture of highly engineered connector solutions for multiple end markets.



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