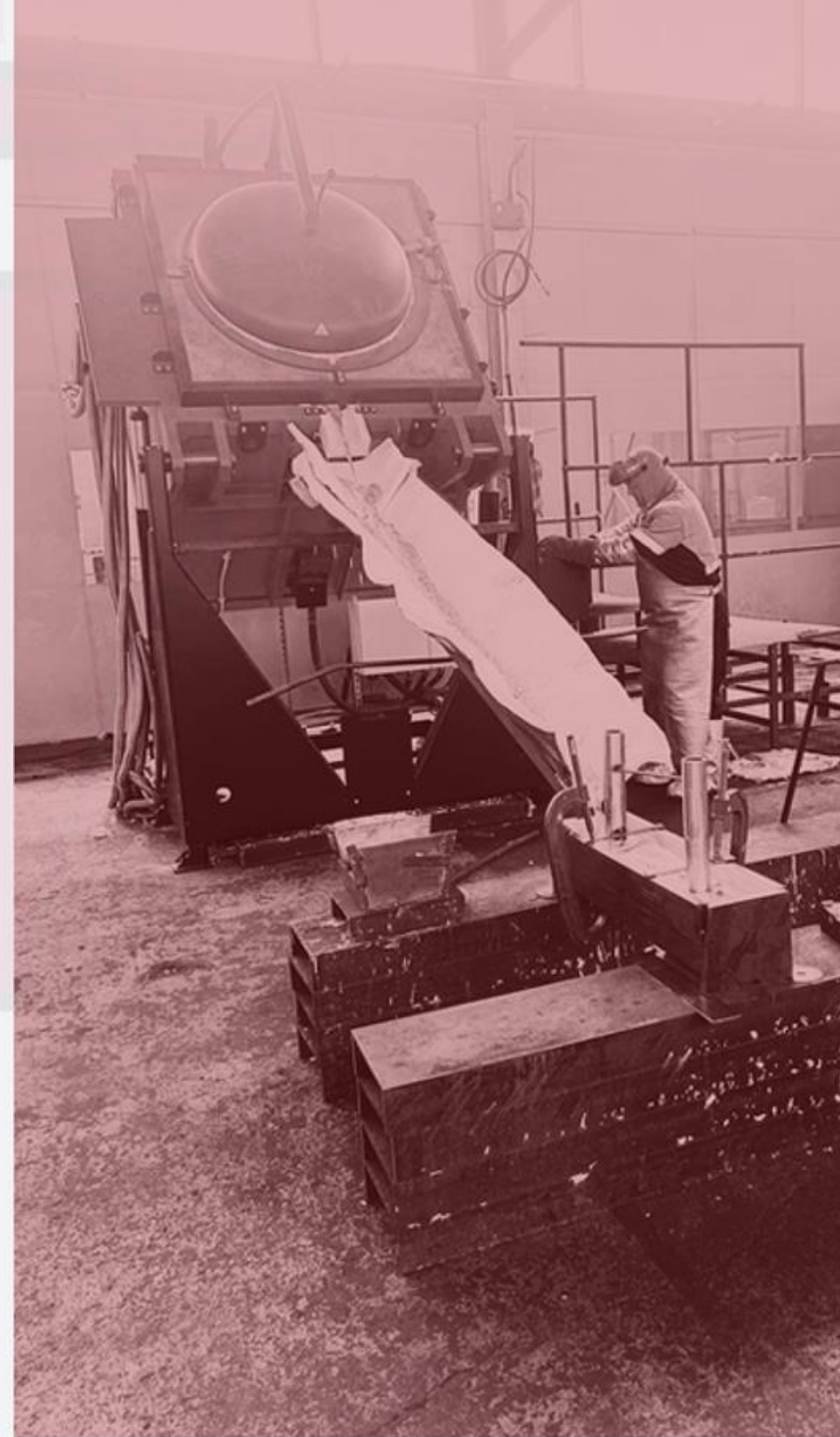




**WRS**  
Cathodic protection

# COMPANY INTRODUCTION



# WRS Cathodic

*'More than protection...'*



**WRS Cathodic protection** has more than two decades experience in corrosion prevention.

Founded in 1994, WRS Cathodic Protection has over two decades of experience in corrosion prevention, serving the oil & gas, marine, infrastructure, and utility sectors. As a global specialist in the marine and offshore industries, the company delivers tailored solutions such as:

- **Sacrificial anodes** (zinc, aluminum, magnesium)
- Impressed current cathodic protection systems and services (**ICCP**)
- Marine growth Prevention Systems and services (**MGPS**) to prevent fouling by using copper anodes
- **Potential Measurements**
- Cathodic protection **services** like anode mapping and calculation, pre-dock inspections, ICCP/MGPS services and installation, log sheet analysis.



# Material Data Sheet: Aluminium Alloy MSDS-001



Composition and Information on Elements						
Aluminium Alloy Elements %	A-Guard®	G3	MIL-DTL- 24779A(SH)	DNV-RP-B401	ISO 15589-2	NORSOK M-503
Zinc	4.000% - 5.000%	2.500% - 0.500%	4.000% - 6.500%	2.500% - 5.750%	2.500% - 5.750%	2.500% - 5.750%
Indium	0.015% - 0.020%	0.010% - 0.020%	0.014% - 0.020%	0.015% - 0.040%	0.016% - 0.040%	0.015% - 0.040%
Silicon	0.080% - 0.120%	0.080% - 0.150%	0.080% - 0.200%	max. 0.120%	max. 0.120%	max. 0.100%
Iron	max. 0.090%	max. 0.120%	max. 0.090%	max. 0.090%	max. 0.090%	max. 0.090%
Copper	max. 0.003%	max. 0.006%	max. 0.004%	max. 0.003%	max. 0.003%	max. 0.003%
Mercury	-	-	max. 0.001%	-	-	-
Tin	-	-	max. 0.001%	-	-	-
Cadmium	-	-	-	max. 0.002%	max. 0.002%	-
Others	max. 0.100%	max. 0.020% (ea.)	max. 0.100%	-	max. 0.020% (ea.)	max. 0.020% (ea.)
Aluminium	Remainder	Remainder	Remainder	Remainder	Remainder	Remainder

Physical and Chemical Properties	
<b>Physical state and appearance:</b> Solid. <b>Odour:</b> Odourless. <b>Taste:</b> Not available. <b>Molecular Weight:</b> 2700 - 2750 kg/m <sup>3</sup> <b>Colour:</b> Silver-white <b>pH (1% soln/water):</b> Not applicable. <b>Boiling Point:</b> 2327°C (4220.6°F) <b>Melting Point:</b> 660°C (1220°F) <b>Critical Temperature:</b> Not available.	<b>Specific Gravity:</b> Density: 2.7 (Water = 1) <b>Vapour Pressure:</b> Not applicable. <b>Vapour Density:</b> Not available. <b>Volatility:</b> Not available. <b>Odour Threshold:</b> Not available. <b>Water/Oil Dist. Coeff.:</b> Not available. <b>Ionicity (in Water):</b> Not available. <b>Dispersion Properties:</b> Not available. <b>Solubility:</b> Insoluble in cold water, hot water. Soluble in alkalis, Sulphuric acid, Hydrochloric acid. Insoluble in concentrated Nitric Acid, hot Acetic acid.



Program: AL-01  
 Comment: Al-alloys global AL-114176  
 Single spark (s)

01/02/2018

Elements: Concentration

Cast No: A09181 & A10181  
 Sample id: PO-1850001

No	Si %	Fe %	Cu %	Mn %	Mg %	Zn %	Ni %	Cr %
1	0.028	0.078	0.001	0.001	0.001	3.68	<0.002	<0.001
2	0.028	0.075	0.001	0.001	0.000	3.58	<0.002	<0.001
3	0.026	0.073	0.001	0.001	0.000	3.69	<0.002	<0.001
No	Pb %	Sn %	Ti %	Ag %	B %	Be %	Bi %	Ca %
1	<0.002	<0.002	0.002	0.000	0.001	0.000	<0.002	0.002
2	<0.002	<0.002	0.002	0.000	0.000	0.000	<0.002	0.003
3	<0.002	<0.002	0.002	0.000	0.000	0.000	<0.002	0.002
No	Cd %	Na %	Sr %	Li %	Zr %	Co %	V %	Ga %
1	0.001	0.001	0.000	0.000	0.000	<0.001	0.001	0.001
2	0.001	0.000	0.000	0.000	0.000	<0.001	0.001	0.001
3	0.001	0.000	0.000	0.000	0.000	<0.001	0.001	0.001
No	Al %	In %	P %					
1	96.154	0.024	0.002					
2	96.177	0.022	0.002					
3	96.185	0.023	0.002					

# Office and warehouse in the Netherlands

*Services all over the world...*



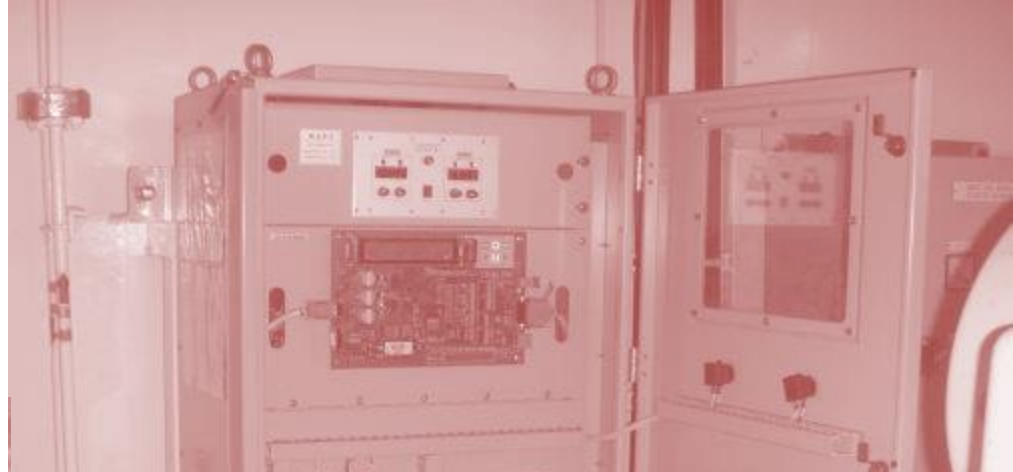
**WRS CATHODIC PROTECTION BV**

Fortunaweg 11

3113 AN Schiedam

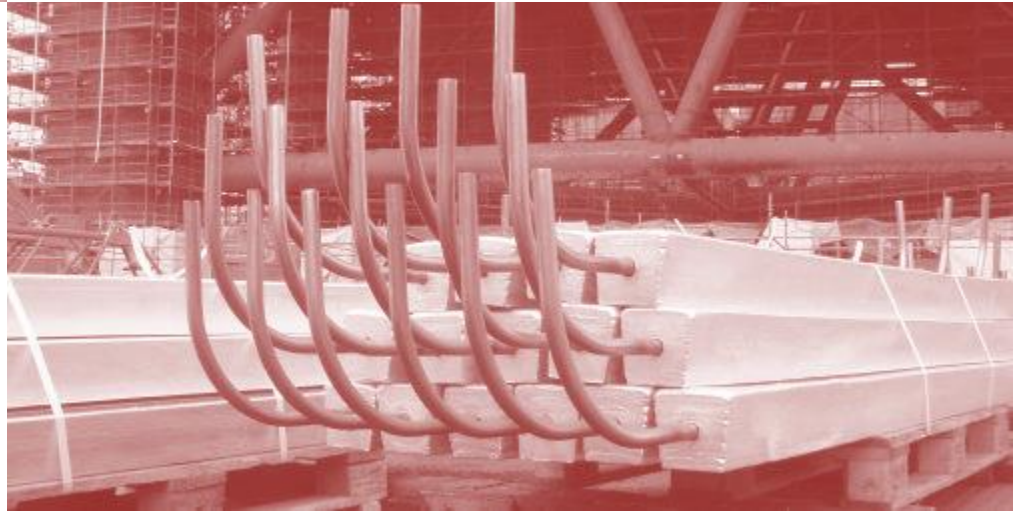
**NETHERLANDS**

# ICCP



# MGPS

# SACRIFICIAL ANODES



# Impressed current cathodic protection

*ICCP*



Impressed current cathodic protection systems are since many years a perfect solution to control corrosion issues at hulls.

The ICCP system can be easily installed on any type of vessel. A complete installation consist a number of ICCP anodes, reference electrodes and a power unit to control the system. An optimum and controlled balance of DC currents which will be send trough the water leads to the prevention of galvanic corrosion.

WRS is able to deliver impressed current systems and services **all over the world**.



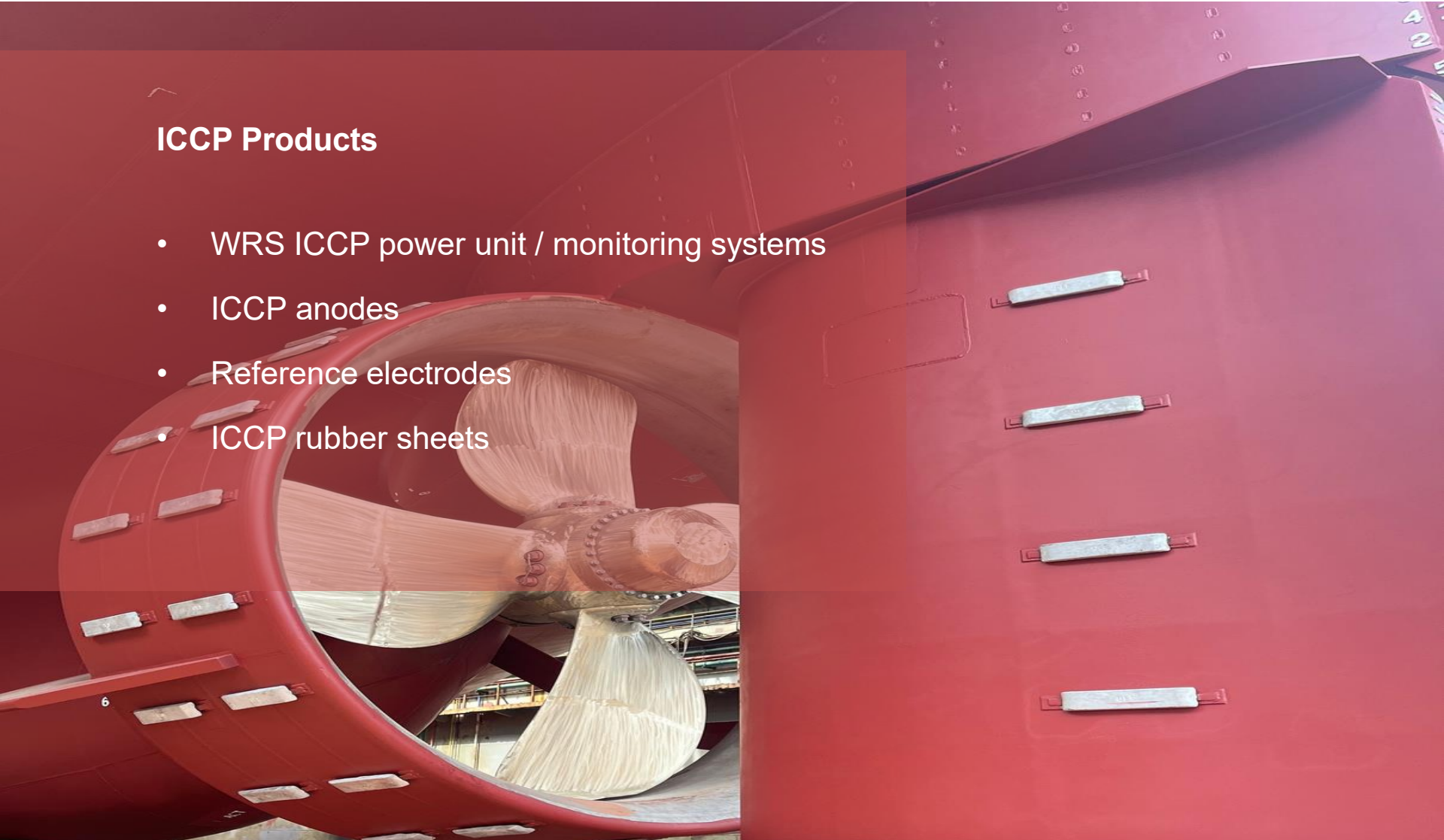
# Impressed current cathodic protection

## ICCP



### ICCP Products

- WRS ICCP power unit / monitoring systems
- ICCP anodes
- Reference electrodes
- ICCP rubber sheets



# Impressed current cathodic protection

*ICCP*



## Cathodic protection surveys

During dry-docking or afloat our services engineers can assist in:

- Visual inspection of hull structure (corrosion, pitting, structure)
- Inspection of spareparts and/or anodes (ICCP/Sacrificials)
- Impressed Current system inspection, installation and calibration
- Supervision and assistance in installation process

# Marine growth prevention systems

*MGPS*



Fouling in seawater cooling systems is a major problem. To avoid and reduce fouling a Marine growth Prevention Systems (MGPS) is very common technique in the maritime industry.

By using specially alloyed anodes and a power supply the cooling water lines will be protected against marine growth. WRS can provide all types of Copper and Aluminum anodes for installation in the sea chests, strainers and box coolers.



# Sacrificial Anodes

*Zinc, Aluminum, Magnesium*



WRS Cathodic protection offers a wide range of sacrificial anodes which are manufactured in a high end and qualified production facility.

WRS warehouse is located close to Rotterdam, which means a fast delivery option towards Rotterdam, Amsterdam and Antwerp.



# Sacrificial Anodes

*Zinc, Aluminum, Magnesium*



- Sacrificial hull Anodes  
For external use
- Sacrificial tank Anodes  
For internal use/ballast tanks
- Sacrificial offshore Anodes  
For protection of offshore structures, platforms, rigs, pipelines, jetties
- Magnesium Anodes Magnesium anodes  
For onshore use and fresh water cathodic protection applications
- Mounting Material (e.g. M-Clamps)





# Quality control



## Quality

All Anodes are spectrographically tested and individually marked with a heat number. Certificates of conformity and chemical composition are available on request.

## Anode plans

WRS Cathodic protection is having a strong reputation to provide tailor made anode plans for a variety of applications. These anode plans consist the required amount of anodes including the installation positions for a long term protection.

## Management system

ISO 9001:2015



# References

*Since 1994...*



**DAMEN**



**CHANTIERS  
DE L'ATLANTIQUE**



# Contact Us

+31 (0)78 3030 334



info@wrscathodic.com



www.wrscathodic.com



WRS CATHODIC PROTECTION BV  
Fortunaweg 11, 3113 AN Schiedam  
The Netherlands

CC ROTTERDAM 61331716 – VAT NL 8543.00.090.B.01 –  
IBAN NL68 RABO 0301 1981 87 - BIC RABO NL 2U

