mecc alte

POWER FROM WITHIN

G

GREY
Insulation System

G+

GREY+
Insulation System

T+

TOTAL+
Insulation System

VT+

V-TYPE
Insulation System

INSULATION PROTECTION SYSTEMS

TECHNICAL GUIDE

GUIDA TECNICA
SISTEMI DI PROTEZIONE DEGLI AVVOLGIMENTI

CONTENTS

01 INSULATION PROTECTION SYSTEMS

Mecc Alte is using only premium class H insulation material. Impregnation processes are achieved with the latest impregnation technologies, like Vacuum Pressure Impregnation (VPI) or with the use of dedicated roll and dip or trickle machines.

The impregnation process is undertaken twice in the main stator, which assures the best quality for the final customer.

This premium impregnation quality process is perfect for the vast majority of applications, however in order to achieve the same results in insulation reliability when environmental or operating conditions are demanding, it is possible to consider one of the additional protection systems offered by Mecc Alte.

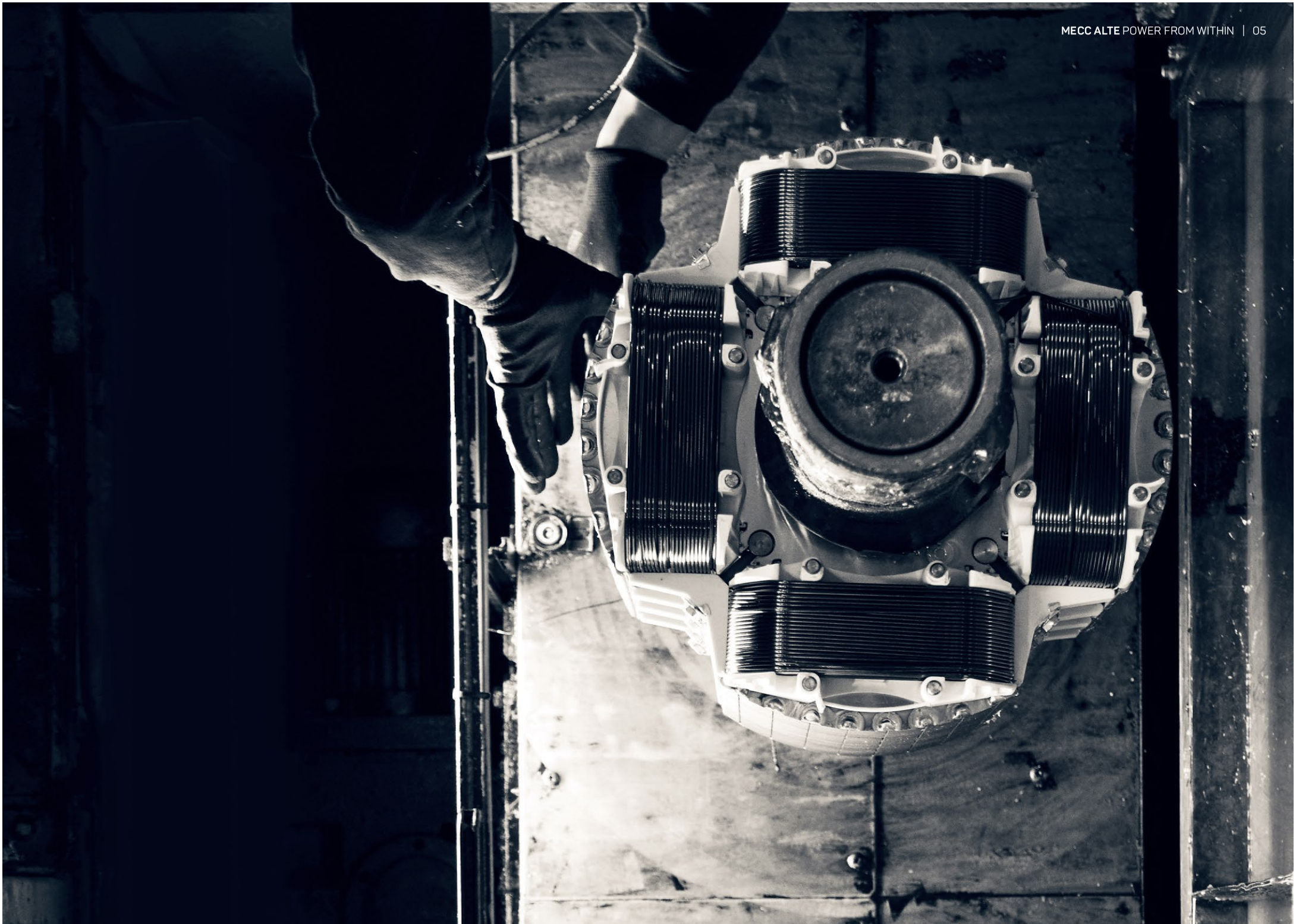
Demanding environmental condition should be considered where:

There is a high humidity [>95%]
There is salty atmosphere [marine applications]
Atmosphere is polluted with some abrasive elements [dust, solid particles]
Atmosphere is polluted with some chemical aggressive elements [incombustible diesel particles, acids]

Demanding usage applications are those such as:

Rental
Automotive/Truck
Rail
24/7 ground or marine
Power converters reflecting high voltage spikes to the generators

The bigger the size in kVA of the alternator, the bigger the importance of the environmental and the usage conditions with the related protection system on the generator. Please contact a Mecc Alte representative to be guided in the right protection system selection to suit your application.



02 INSULATION RESINS AND PROTECTION VARNISHES

Mecc Alte is using the same high quality polyester resin for the impregnation of all the relevant active electrical components. Main stators are impregnated twice on machines above 180kVA. After the impregnation process is completed, a further protective varnish layer can be applied by dip or by spraying: the two varnishes that can be used are the grey EG43 or the black severe environment protection.

INSULATION RESIN

The high quality bi-component insulation resin used from Mecc Alte, is a polyester specially developed to be used in vacuum impregnation or dip/ and trickle machines. It does have superior bond strength characteristics, high chemical and moisture resistance and is suitable for uses up to 212° C.

GREY VARNISH EG43

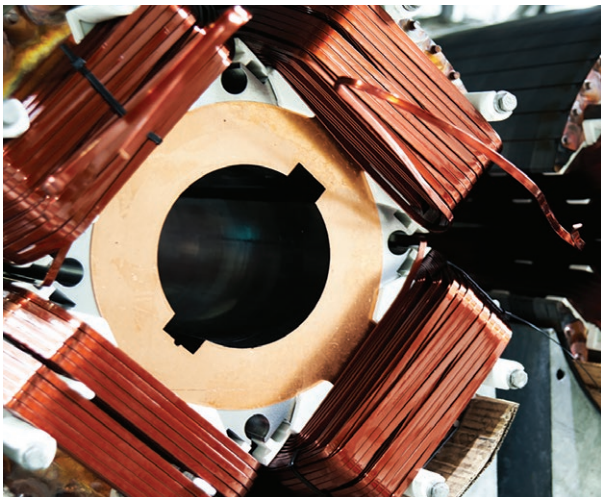
The EG43 grey varnish, is an high temperature insulating enamel that forms a tough and flexible film, with excellent moisture and chemical protection. It is water and oil proof, and also protects windings from abrasion. It is applied spraying an over coating layer over the impregnated winding, or dipping the stator in a varnish barrel for superior treatments.

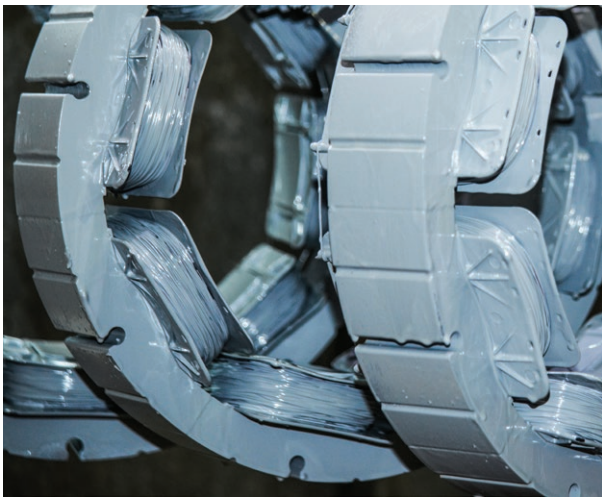
BLACK SEVERE ENVIRONMENT PROTECTION

The black severe environment protection is a system that makes Mecc Alte special. It is the ultimate winding treatment that offers truly superior performances when the environment is severe, or the application very demanding. It is a protection treatment used to replace epoxies and silicones winding encapsulation.

The black protection cures to a tough, resilient, black coating that seals the copper against moisture and chemical attacks. Due to its encapsulation capability and durability, is also extremely resistant to the particle abrasion as it adsorbs the impacts. Moreover, this leads to a longtrouble less life protection, as the protection layer follows elastically the thermal expansion cycles of the windings from the cold to the hot condition and vice versa without forming any cracks.

03 PROTECTION SYSTEMS





PROTECTION LEVEL
STANDARD

The Standard protection level is referred to a generator which has the sole impregnation resin applied to all the active parts. It should be noted that this level is standard on the Mecc Alte ECP3 & ECP4 generator series: voltages from turn to turn in this series are never dangerous for the insulation life, resulting in no need to apply any additional protection varnish.

PROTECTION LEVEL
STANDARD+

With the Standard + protection system in addiction to the usual impregnation resin, the stator exciter is protected with a further layer of grey varnish EG43. Stator exciter is protected because it is the first active part that is cooled from the air cooling flux. The ECP 28, ECP 30 and ECP 32 series are built with this protection level as a standard.

PROTECTION LEVEL
GREY

With the grey protection level, not only the exciter stator is coated with the EG43 but also the main power stator. This protection level, which is available as an option on some families and as a standard on some others, is the basic for the marine and nearly all the most demanding application. Main and exciter stator grey EG43 coating is usually sufficient to protect the windings, as all the rotating machine parts are subjected to much lower voltages and are cleaned centrifugally from the moisture and contaminating particles that could corrode the copper enamel. This level is the Mecc Alte standard for NPE32, NPE34, LT3, HCP3, ECP 34, ECO 38, ECO 40, ECO 43, ECO46, and ECO 47LV.

PROTECTION LEVEL
GREY+

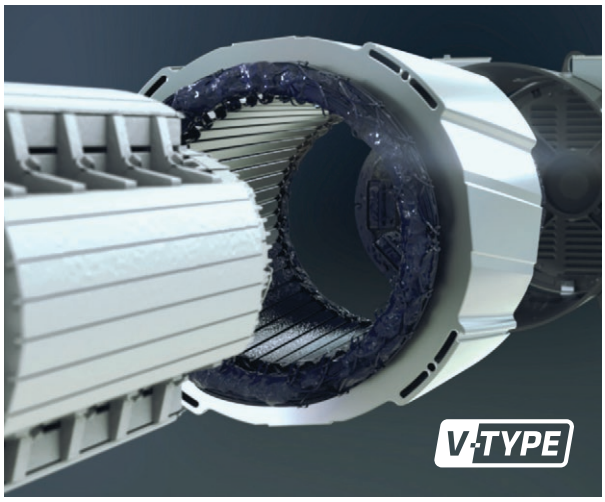
The Grey+ protection level is available as an option on the whole industrial range. With this protection level, the main stator is coated with the grey EG43 varnish and the exciter stator is upgraded to have the black severe environment protection. This acts as a physical barrier to moisture particles and chemical substances on this part.

PROTECTION LEVEL

TOTAL+

The Total+ protection level is available as an option on the whole industrial range. It is the ultimate solution to be used when the application or the environment is abusing the insulation of the generator. With this protection level, the grey EG43 varnish on main and exciter stator is upgraded to a black severe environment protection. In addition all the active rotating components have an overcoat of the grey varnish EG43. The black protection acts as a physical barrier to moisture particles and chemical substances.

Before selecting this protection level, please be in contact with a Mecc Alte representative as most likely the Grey or the Grey+ protection levels are going to be adequate for the vast majority of applications.



PROTECTION LEVEL

V-TYPE

The main and exciter stator are double impregnated including advance VPI treatment to ensure uniform resin distribution through the active part. The main stator is made from a special corona resistant wire that has enhanced insulation properties. The exciter stator has additional insulation papers binding each coil to further enhance its resistance to harsh environments. Following the winding insulation a further post treatment of double layered black superior coating is added to the main and exciter stator serving as a physical barrier against moisture and chemical contaminates. Significantly an internal layer of black impermeable coating is applied to cover the lower internal stator bore providing additional protection against water and humidity deposits. The Main rotor and exciter rotor have grey overprotection.

This V-Type protection system is guaranteed by an optional extended warranty.

04 CORROSION - APPLICATION MATRIX

		Humidity level	Salinity	Chemical corrosion / Abrasiveness	Typical applications
NORMAL ENVIRONMENT					
Standard		● below 60%	○	● fine dust	· Industries · Hospitals · Commercial buildings · Residences · Farms · Telecom
TROPICAL ENVIRONMENT					
Humid	(Tropical)	●● from 60% to 95% with possible condensation	● salt presence	●● dust	· Events in coastal areas · Marine engine rooms
MARINE ENVIRONMENT					
Onshore	(Coastal)	●●● from 95% to 100% with condensation	●●● salt fog	●●●● sand presence	· Vessel Internal · Ports · Habours · Rainforests
Offshore	(Open sea)	●●●● from 95% to 100% projection of water particles	●●●● sea spray	●●● sand presence	· Vessel external · Oil rigs · Floodplains and island with extreme sea air · Work boats
HARSH ENVIRONMENT					
Chemical contaminations such as: · Ammonia (NH3) · Sulfure Oxide and Trioxide (S02, S03) · Sufuric acid (H2S04) · Hydrogen Sulfide (H2S)	(Chemical agents)	●●	●●	●●●● very aggressive chemical	· Rental · Mining and quarrying · Crushers · Construction site · Outboard vehicle mount · Chemical industries · Military · Desertic · Rail traction outboard
Physical contaminations such as: · Concrete · Sand · Road spray	(Physical agents)	●●●	●●●	●●●● sand presence	

LEGEND

○	No presence
●	Limited presence
●●	Presence
●●●	High presence
●●●●	Extremelly high presence

05 PROTECTION LEVEL SCHEMATICS

The following schematics describes the protection level offered as a standard versus the Mecc Alte generator family.

	Protection Level					
MODEL	**STANDARD**	**STANDARD+**	**GREY**	**GREY+**	**TOTAL +**	**V-TYPE**
S15-16-20,T16-20,ET-ET	**STANDARD**		**ON REQUEST**		**ON SPECIFIC MODELS ONLY**	
LT3			**STANDARD**			
ECP 3C	**STANDARD**	**ON REQUEST**	**ON REQUEST**	**ON REQUEST**	**ON REQUEST**	
ECP 4C						
ECP28C		**STANDARD**				**ON REQUEST**
ECP 30C						
ECP32C/ECSP32						
NPE 32C			**STANDARD**			
ECP 34C						
NPE 34						
ECO 38C						
ECO 40C						
ECO 43						
ECO 46						
ECO47 LV						
HCP 3			**STANDARD**	**ON REQUEST**	**ON REQUEST**	
HCP 32					**STANDARD**	
HCP 34						
HCO 38						

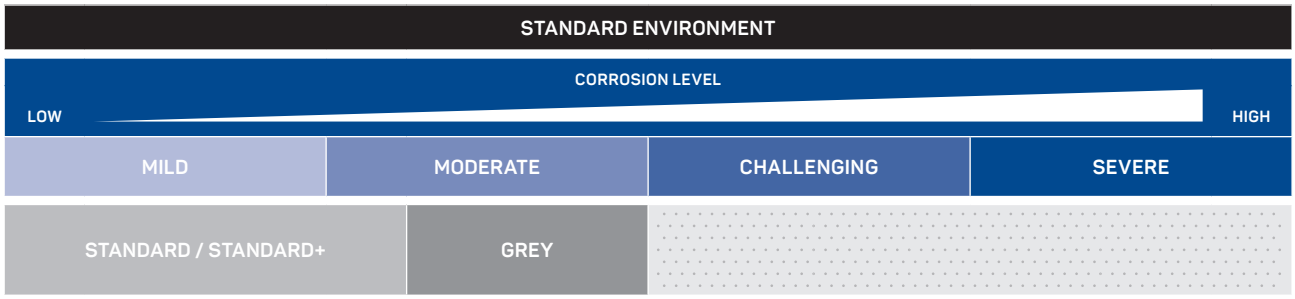
The presence of IP23+, Air Inlet Filters and/or IP43 & IP45 protection available from the Mecc Alte option list, will also influence the protection level necessary for the application requirement or environmental condition.

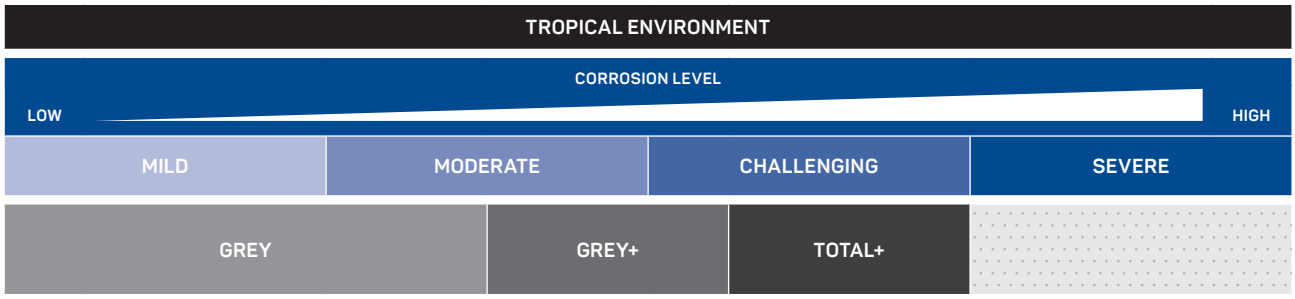
Please contact a Mecc Alte representative to be guided in the right protection system selection that suits your application.

06 GUIDELINE CHART

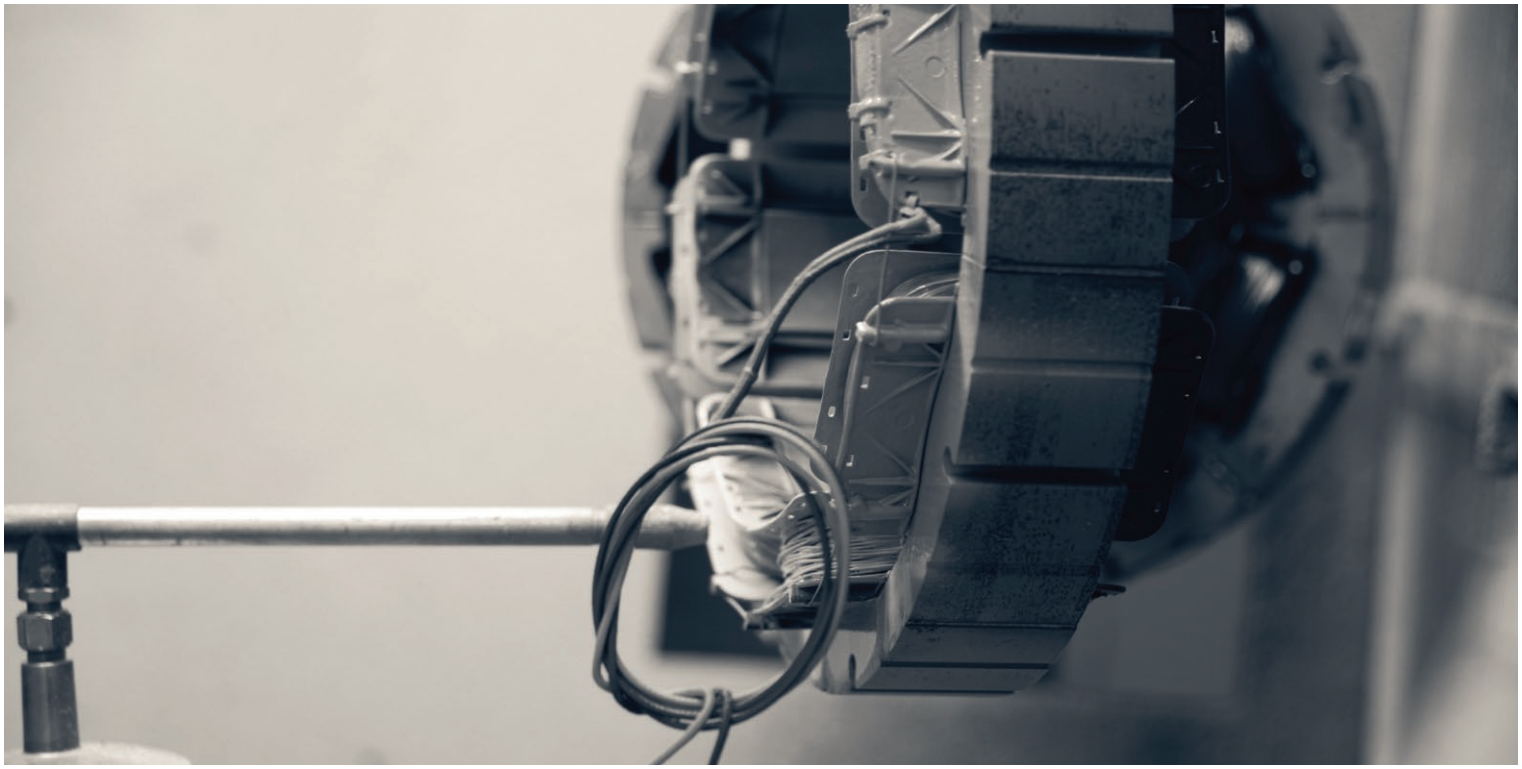
Products typically operating outside of the conditions in which they were designed to work such as in an aggressive environment will face harsh operational challenges such as humidity, and water ingress. This can cause premature failure of alternators. Alternators need to be correctly sized and aligned to the power requirements and the consideration of optional accessories or upgrades in IP ratings may better equip the alternator to work in these conditions.

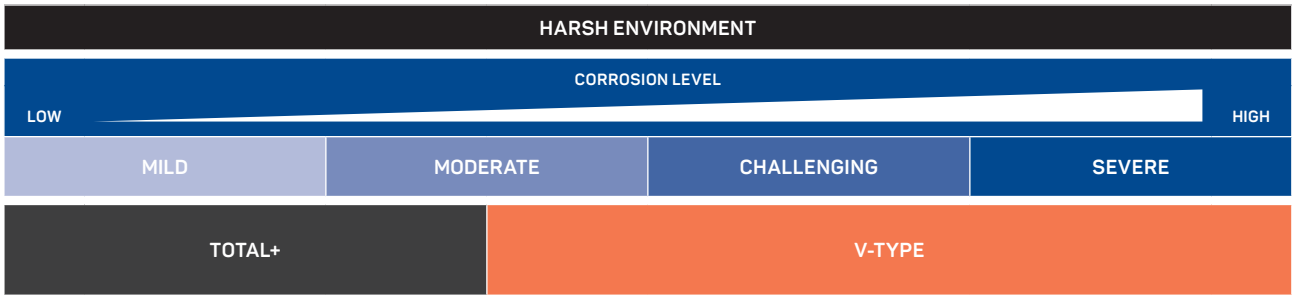
In the absence of finite control over how a generator is used, operated and in which application/environment it is working. Then the primary objective is to minimise these increased risks of premature alternator failure by utilising enhanced protection systems to increase product lifespan in its end application. The chart below acts as a simplified guideline to help best equip an alternator for the requirements where it will operate.

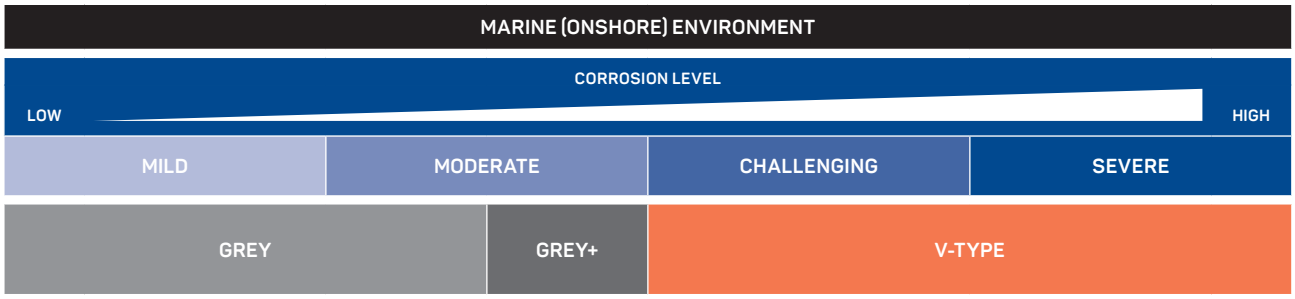


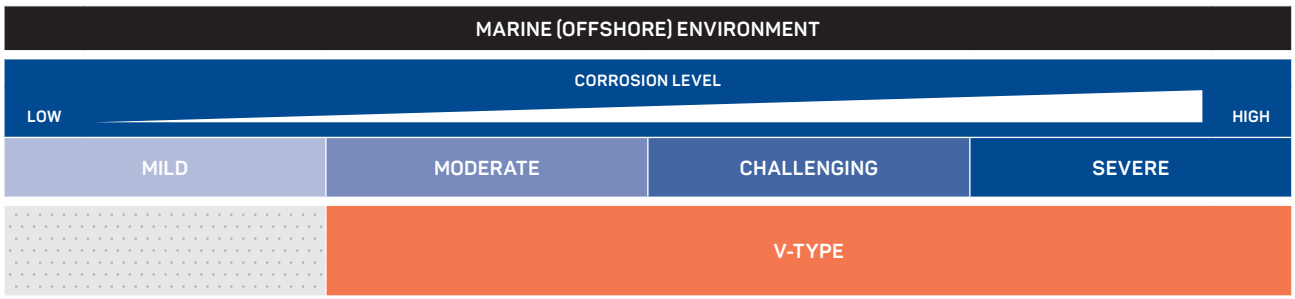


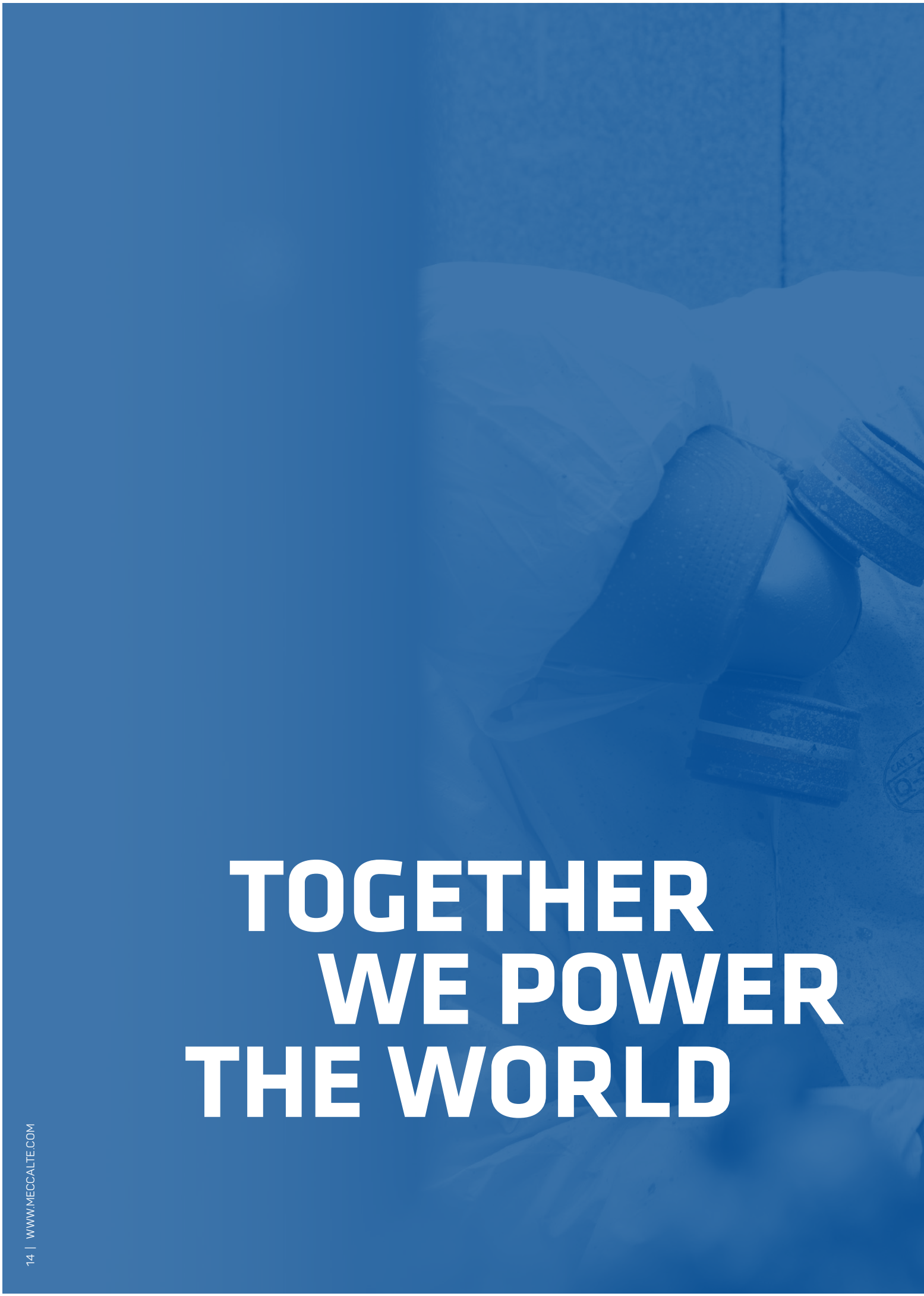
Disclaimer: This chart is for guidance only. There are many complex dynamics that can effect alternator performance. For applications and environments known on any specific projects please contact your local technical sales teams for further guidance.



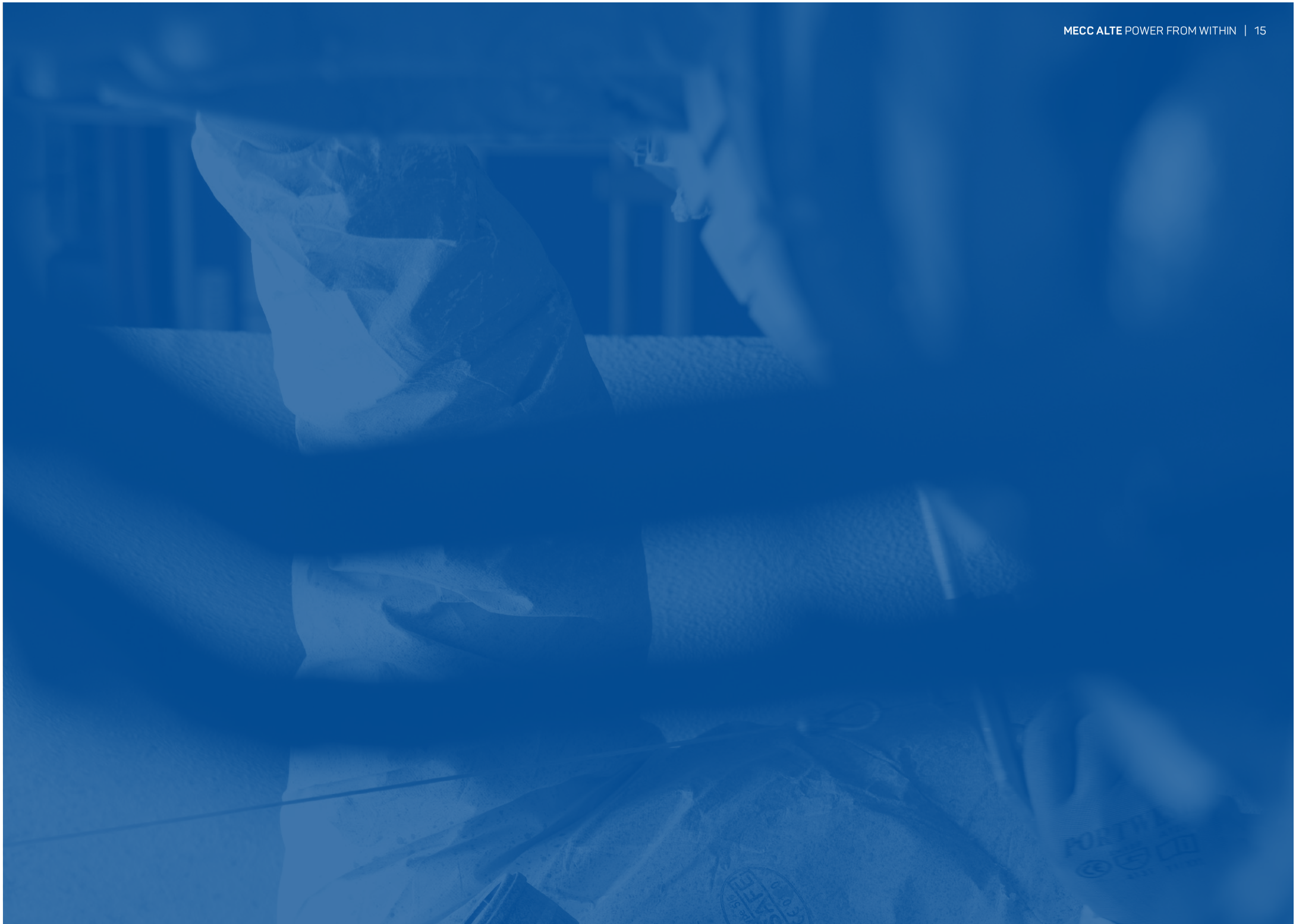

HARSH ENVIRONMENT
CORROSION LEVEL
LOW
HIGH
MILD
MODERATE
CHALLENGING
SEVERE
TOTAL+
V-TYPE


MARINE (ONSHORE) ENVIRONMENT
CORROSION LEVEL
LOW
HIGH
MILD
MODERATE
CHALLENGING
SEVERE
GREY
GREY+
V-TYPE


MARINE (OFFSHORE) ENVIRONMENT
CORROSION LEVEL
LOW
HIGH
MILD
MODERATE
CHALLENGING
SEVERE
V-TYPE



TOGETHER WE POWER THE WORLD



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INSULATION SYSTEM

LISTED

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