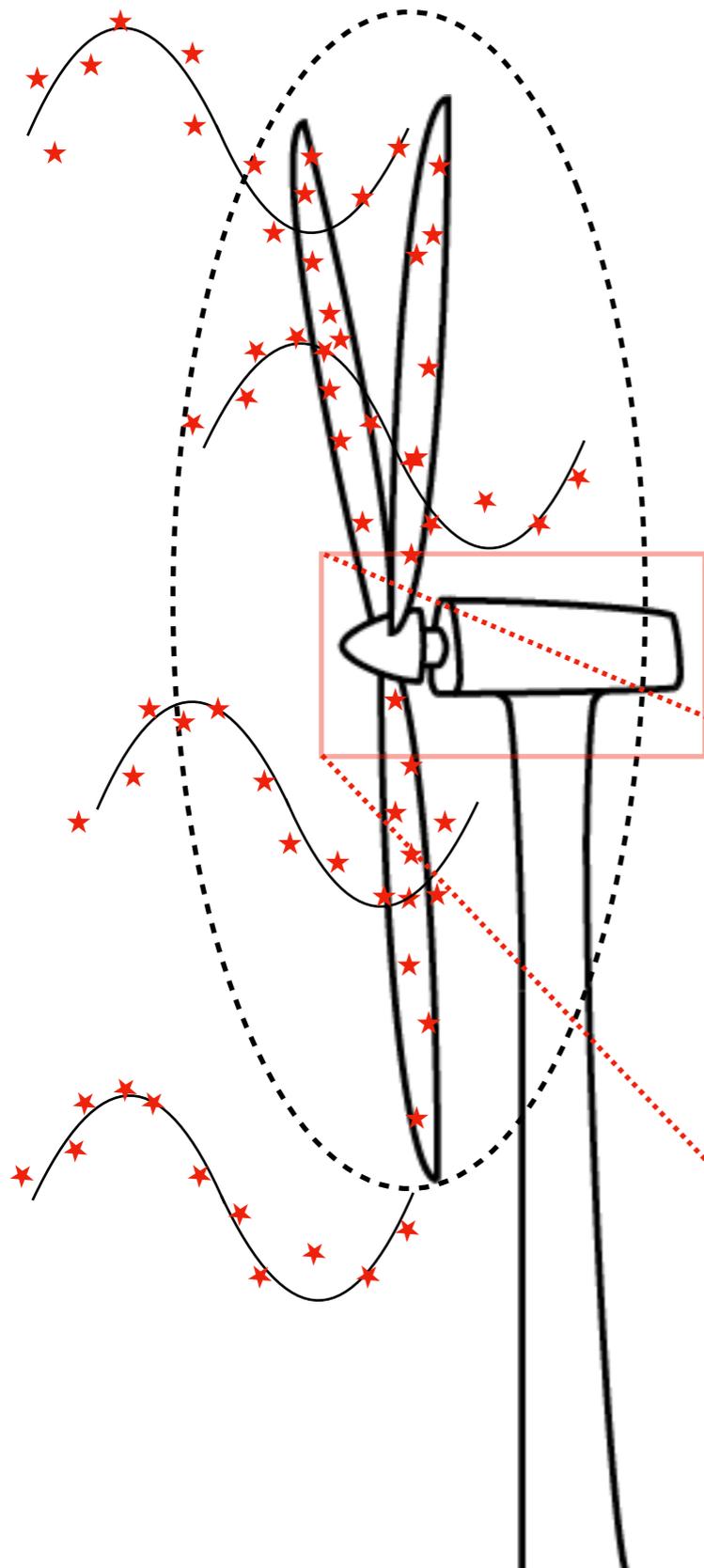




APPLIED
PHILOSOPHY

STATIC DISCHARGER

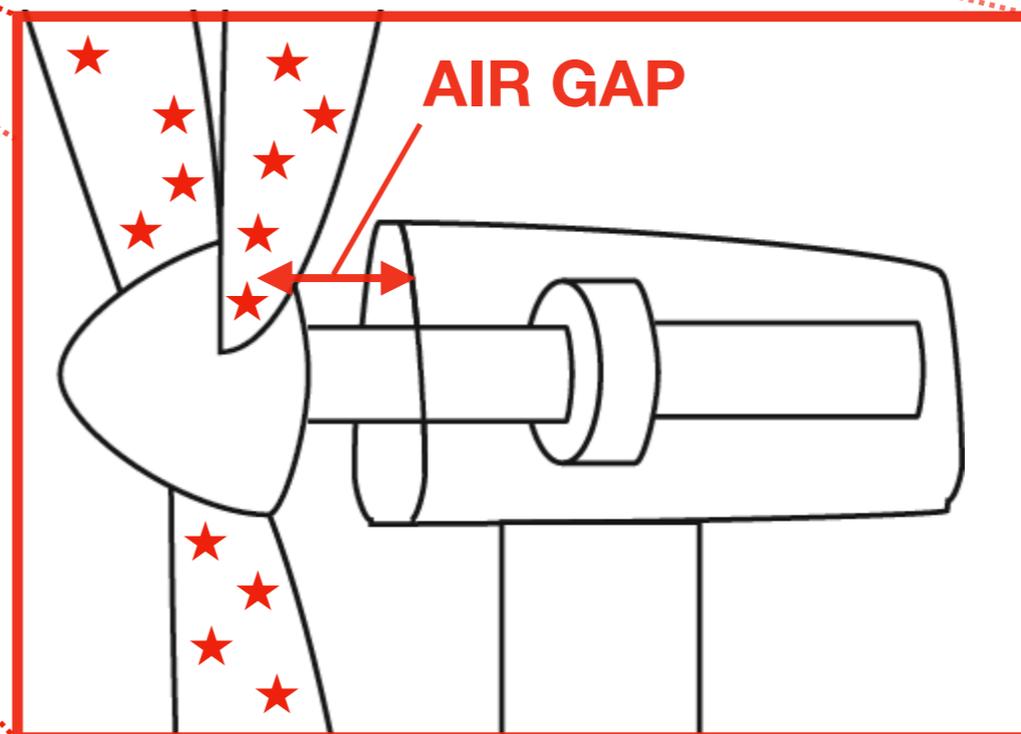
For Gamesa G8x/G9x



Static electricity does not easily discharge through varying air gap (5-10cm) between blades and nacelle frame, causing high-voltage arcing.

High voltage arcing: 1) *arrests production*; 2) *stresses PLC components resulting in premature failures*; 3) *increases labour costs for repairs and Local Resets*; 4) *puts human operators at risk of electrocution*.

Susceptible Turbines lose more than \$10,000 USD annually.



AP STATIC DISCHARGER



STANDARDS

- + NFPA 780 Compliant
- + UL94 V-0 Compliant
- + OEM LPS Type Cert

Redundant Copper Conductor

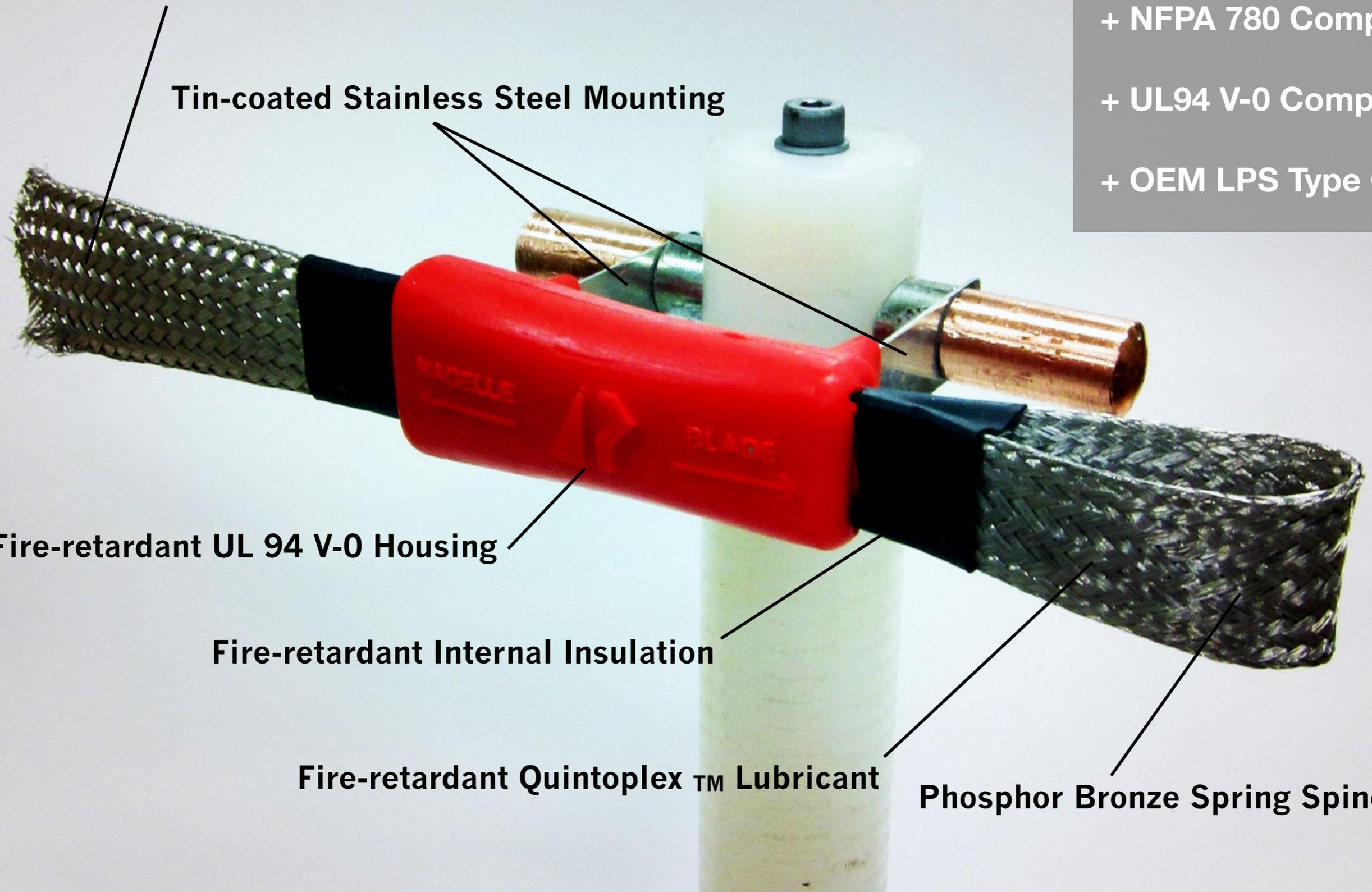
Tin-coated Stainless Steel Mounting

Fire-retardant UL 94 V-0 Housing

Fire-retardant Internal Insulation

Fire-retardant Quintoplex™ Lubricant

Phosphor Bronze Spring Spine



COMPREHENSIVE DESIGN

- Designed for easy installation
- No modification to existing LPS, OEM certification remains intact
- AP Direct Frame Grounding completely bypasses Mainbearings
- Fire-retardant Construction (UV 94 V-0)
- Biodegradable Fire-retardant Quintoplex™ Lubricant
- Designed & Manufactured in Canada, held to highest production standards

PROVEN PERFORMANCE

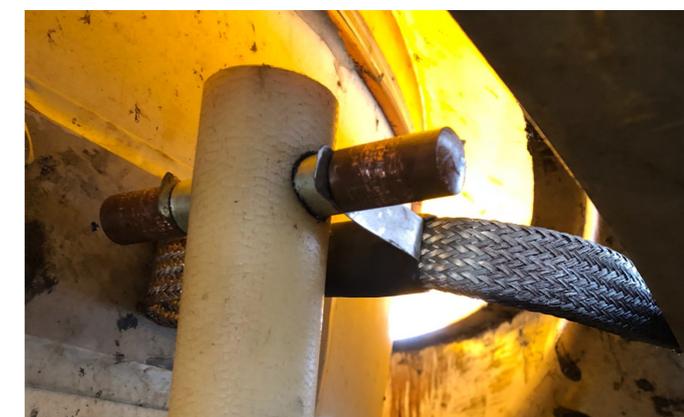
- Proven in G8x and G9x
- Trusted by major Owner/Operators in multiple countries
- Validated in different climates
- Increases Turbine Availability by up to 2%
- Increases PLC component life, increases operator safety, decreases repairs
- Ensures continuous discharge of blades while also enhancing OEM LPS



Installed in G97



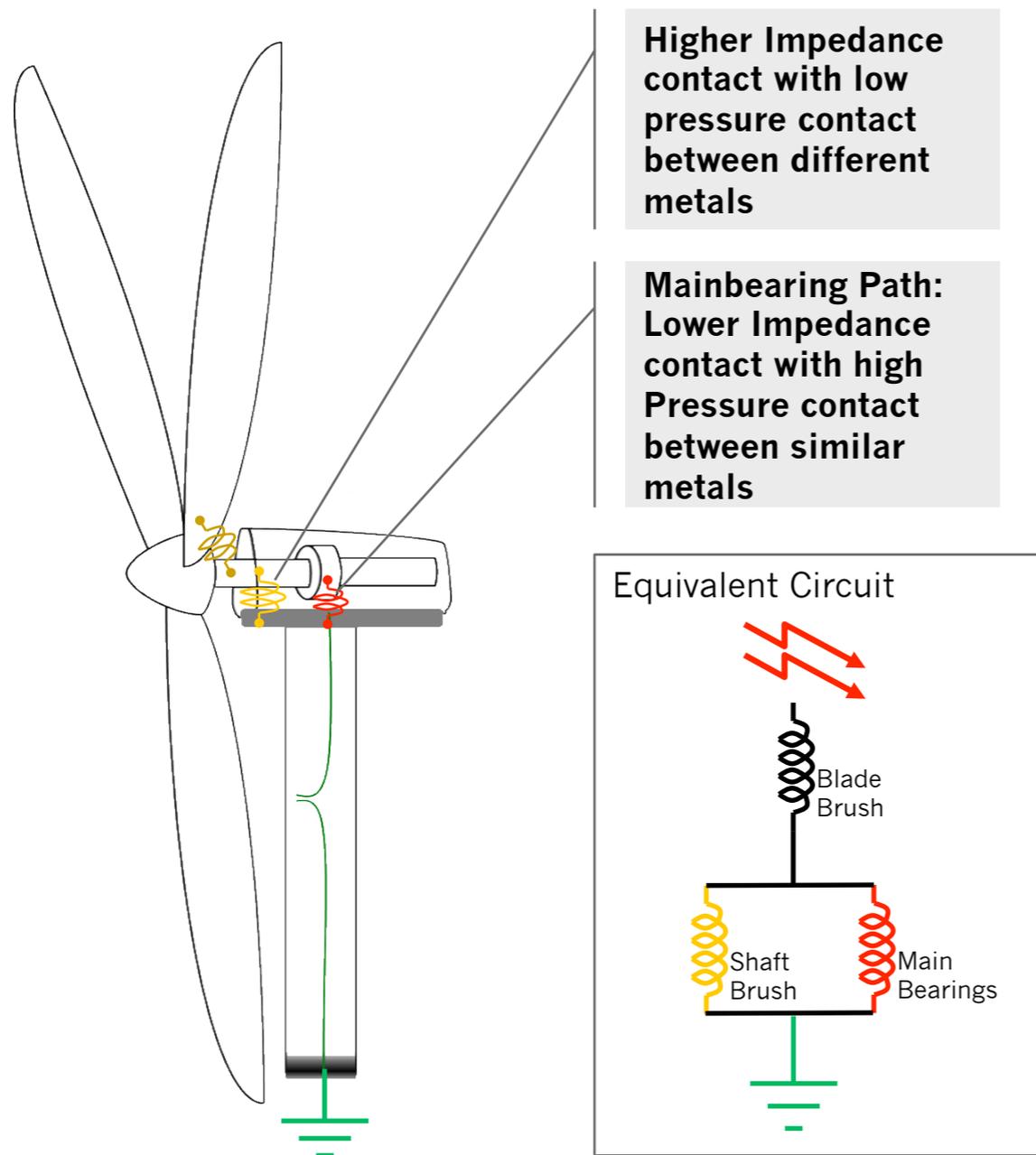
Installed in G80



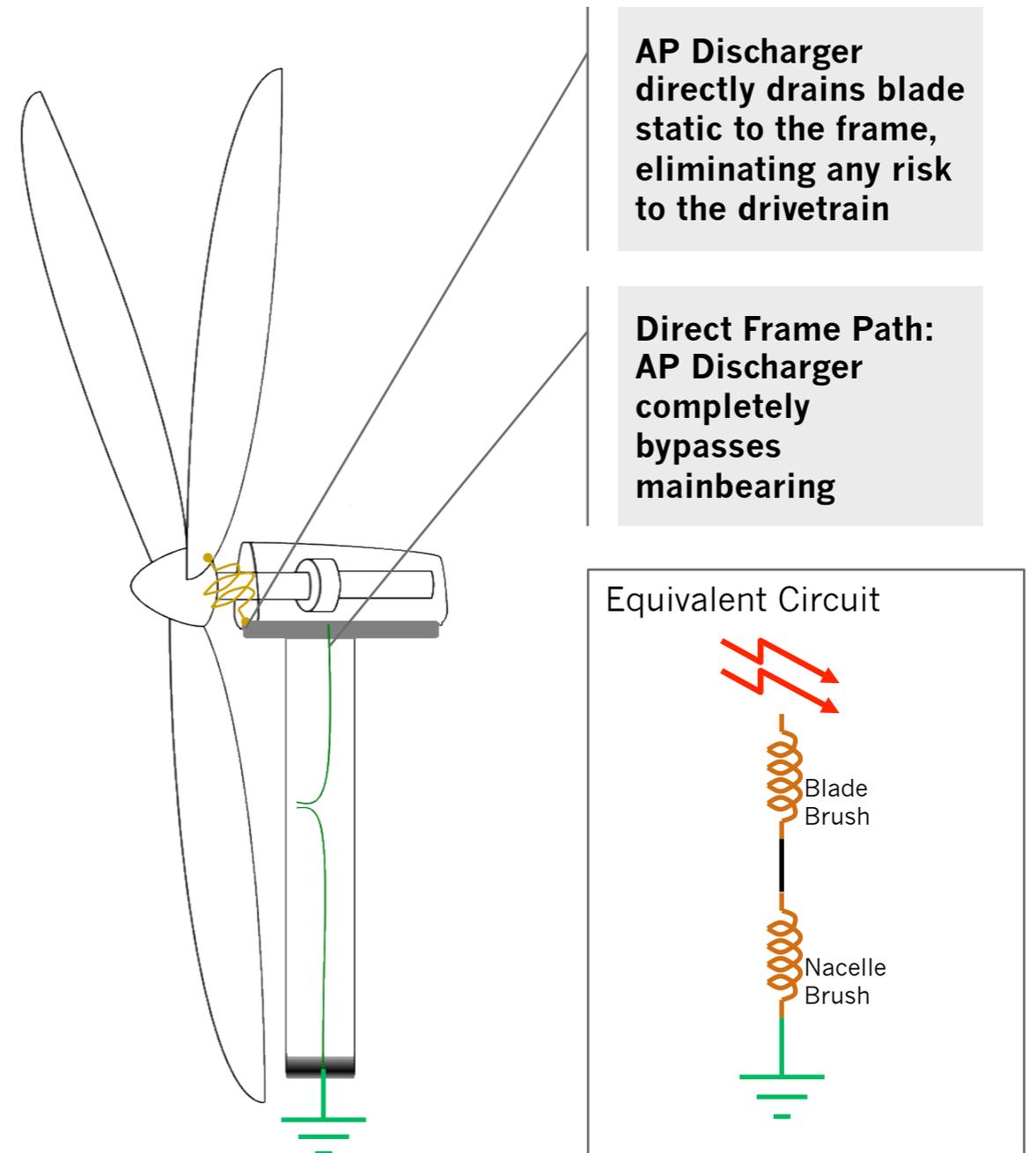
Installed in G90

AP's *DIRECT FRAME* TECHNOLOGY VS. MAINSHAFT GROUNDING

MAINSHAFT GROUNDING



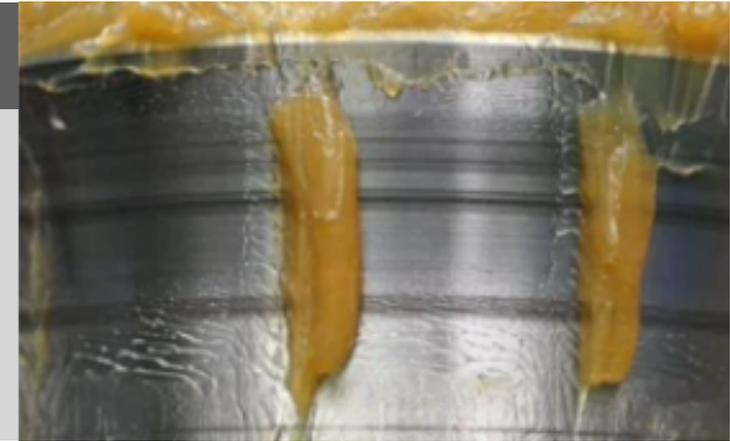
AP *DIRECT FRAME* GROUNDING



MAINBEARING LUBRICANT DEGRADATION

Stray electrical currents passing through Mainbearings degrade grease, creating lubricant deposits.

Credit SKF



RACEWAY FLUTING

Constant passing of grounding current through Mainshaft system leads to tracks on raceway, substantially reducing Mainbearing service life.

Credit FAG



MAINBEARING PITTING RISK

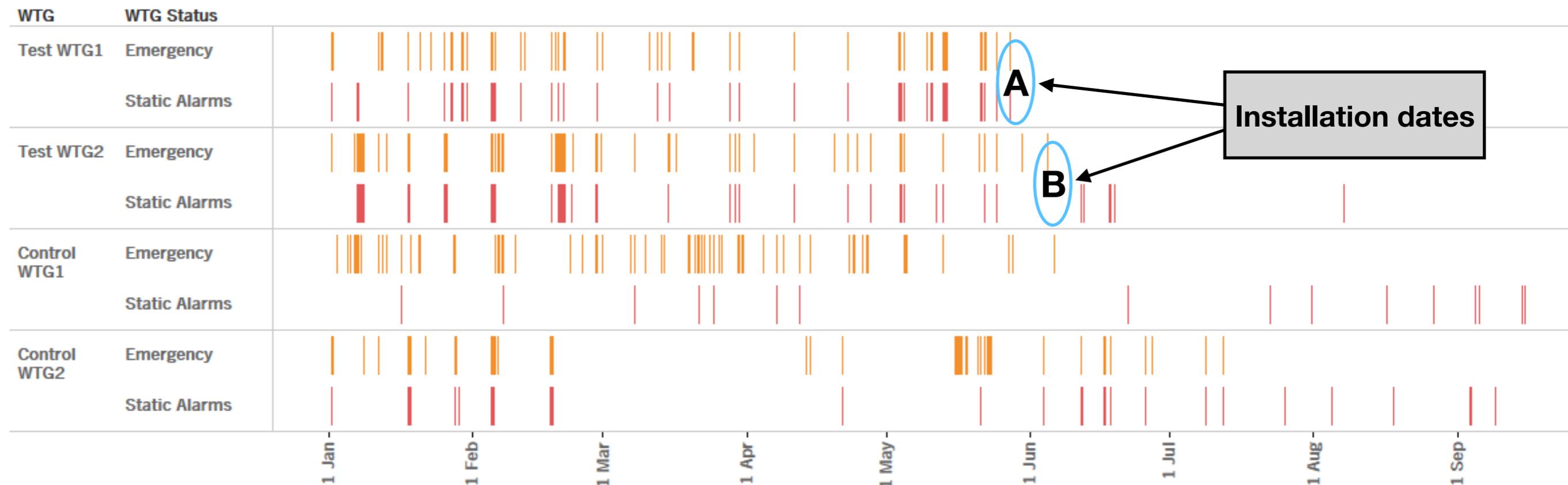
Compromised lubricant may result in particle accretion and ensuing reciprocal exponential microabrasion.

Credit PCS Instruments



SKF: “...damaging effects of stray bearing currents include increased noise and heat levels, reduced effectiveness of the lubricant, excessive vibration and eventually, premature bearing failure.”

BEFORE & AFTER AP STATIC DISCHARGER INSTALLATION



Real turbine performance timeline after installation of the AP Static Discharger

- A) Alarm-free after installation (May 28th)
- B) Dramatically reduced static alarms after installation (June 15th)

SUMMARY OF IMPROVEMENTS

	OEM	Mainshaft Grounding	AP Static Discharger
Charge build up in blade	Yes	No	No
High voltage arcing in LPS	Yes	No	No
EHS Risk from Static Electrocutation	Yes	No	No
Blade permanently grounded	No	Yes	Yes
Mainbearing Grease Decomposition	No	Yes	No
Mainbearing Race Electrical Damage Risk	No	Yes	No
Pitch Bearing Electrical Damage Risk	Yes	No	No
Turbine grounding system load	Repetitive current spikes	Continuous residual discharge	Continuous residual discharge
Reset Type	Local Reset, Hardware Lockup, Remote Reset	Eventual Bearing Heating	No Faults

SPECIFICATIONS

Platforms	G8x, G9x
Rotor Sizes*	80, 87, 90, 97
Blade Manufacturer	LM, Gamesa
Technology	DTC, DFM
Primary Conductor	Copper
Friction Surface (To Blade)	Lubricated Copper on Stainless Steel
Friction Surface (Nacelle-side)	Lubricated Copper on Galvanized Steel
Installation Time	1/2 hour from rotor lock
Spring Material	Phosphor Bronze
Corrosion Resistance	Water, Snow, Mild Salinity**
Standards	NFPA 780, UV 94 V-0
Lubrication	Quaker Quintoplex™

**Salinity higher than 50 mg/m² deposition per day increases wear rate.

ORDER AND PURCHASING INFORMATION

MSRP	US\$850 / Turbine
Lead Time	3 weeks
Minimum Order Quantity	5
Recommended Spares	For orders >10, %10 of order; For orders <10, at least 1 extra
Turbine Model	Part Number
G80, G87, G90	D0080
G83	D0081
G97	D0082
G114	D0083

PURCHASING: Contact admin@appliedphilo.com for Purchase Order submission



Open innovation and co-creation network, designing common sense solutions to everyday problems.



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