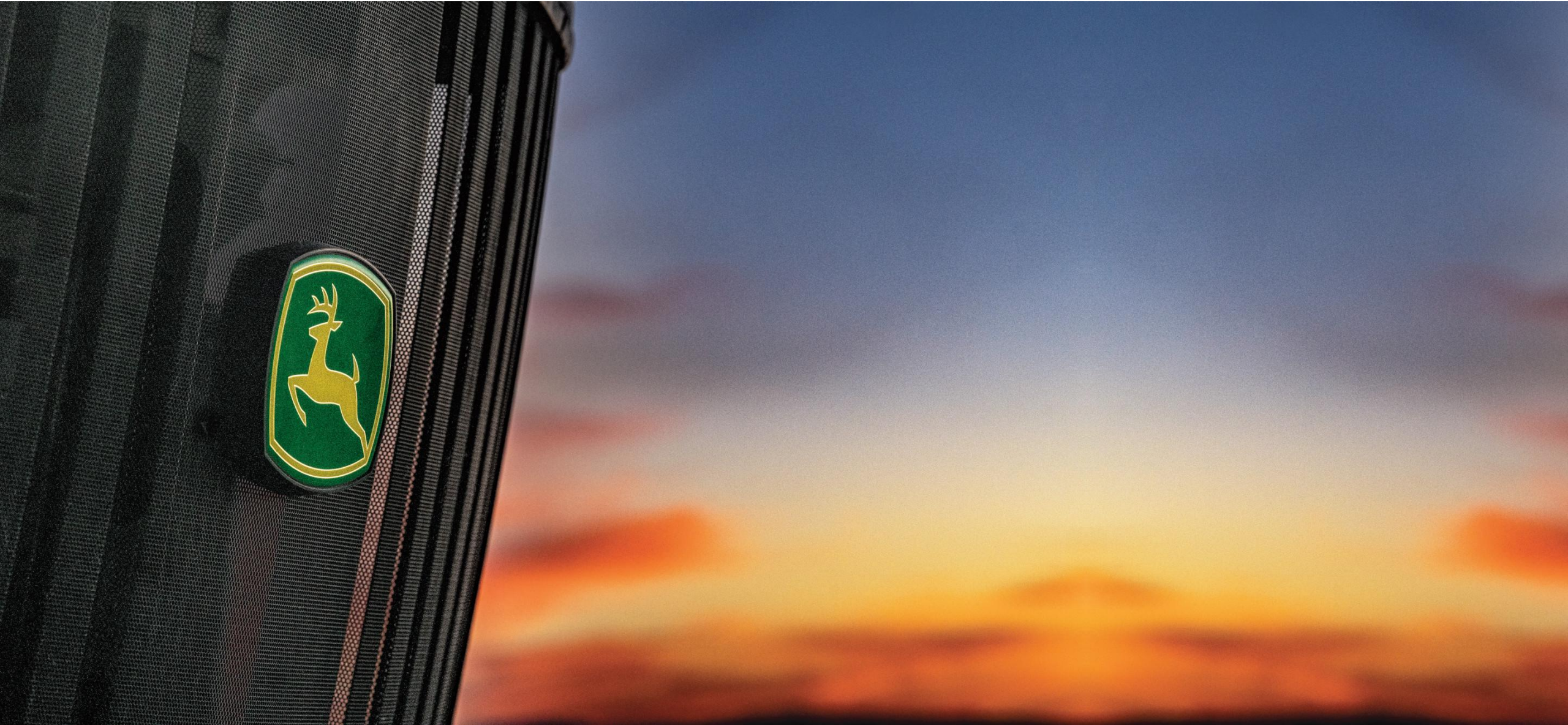


AEC Q200 Case Study

Patrick Brandt John Deere ISG Senior Quality Engineer



AEC Q200 Case Study



Introduction

Event

Call to Action

Introduction

Patrick Brandt

- Senior Quality Engineer – Product Development
- Design, Product Validation, Production



John Deere

- Intelligent Solutions Group
- GPS, Displays, Controllers, Sensors, Electrification,



**Every Drop
Counts**

**Every Seed
Counts**

**Every Grain
Counts**

Technology

Computer Vision / Sensors

AI / Machine Learning

Robotics / Actuation



Introduction

AEC-Q

- New components
- AEC-Q + Design Margin + Solder Process + PV&V = **Long Trouble-Free Life**



Introduction

- How long of a trouble-free life
- Hours to auto miles
 - 100k
 - 250k
 - 500k
 - 750k

receive a 96 month or 20,000 hours (whichever occurs first) component assurance on electric-drive generators, brake resistors, wheel motors, and inverters. *



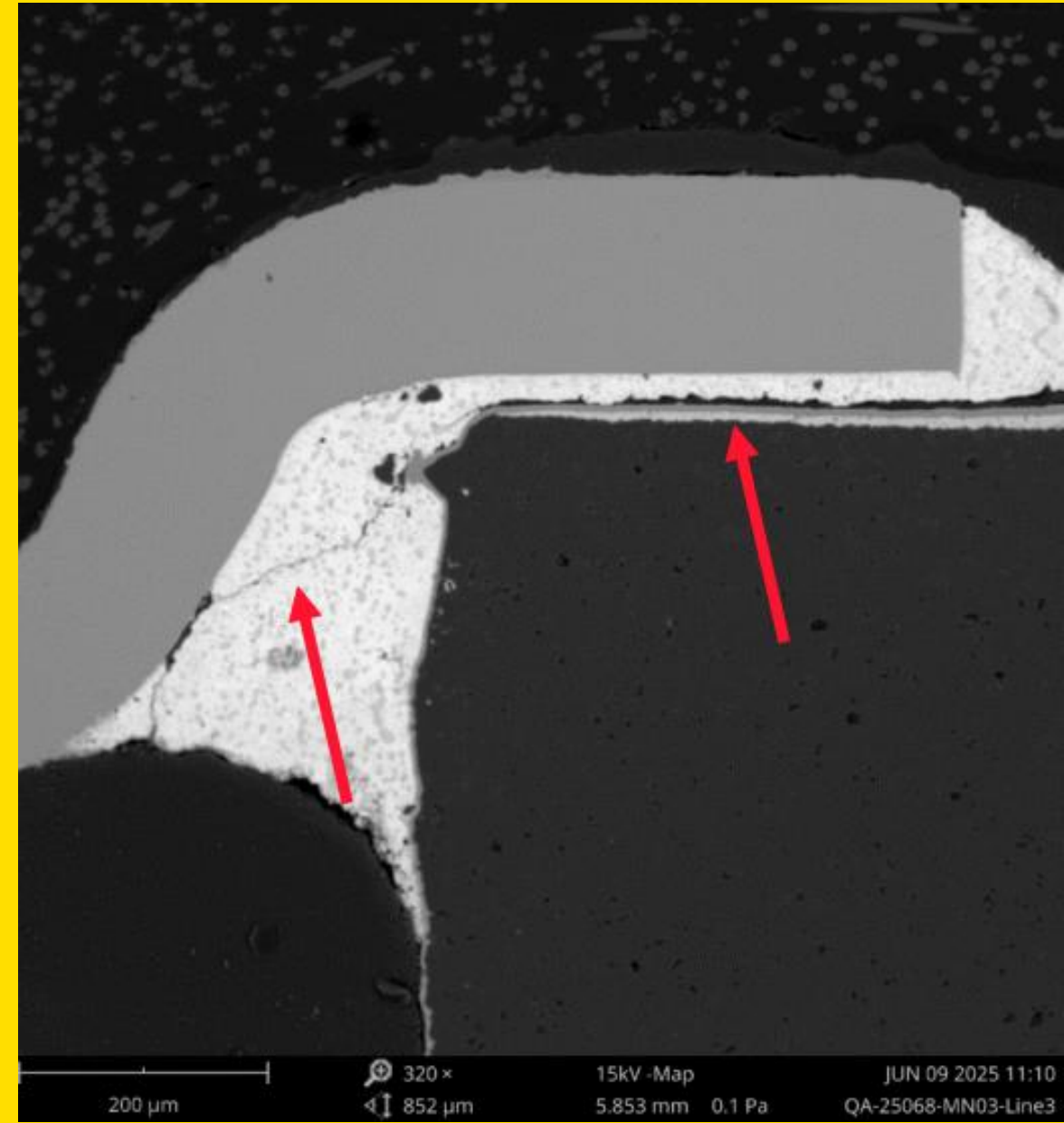
944 X-Tier Wheel Loader Hybrid-Electric Drive Warranty

Customers who purchase a new 944 X-Tier Wheel Loader between now and 31 December 2025 will receive a 96 month or 20,000 hours (whichever occurs first) component assurance on electric-drive generators, brake resistors, wheel motors, and inverters. *

[See Your Dealer Today](#)

Event Description

- Component Selection
- Thermal Cycling
- Updated parts for Durability Build
- Thermal cycle testing → FAILURE
- Engaged the supplier



Event Investigation

Engaging the supplier



Proof of AEC-Qualification



Reperform AEC-Qualification



Results...

SOMETHING

BIG

IS COMING

THE COUNTDOWN IS ON

16 04:02:23

DAYS

HOURS

MINUTES

SECONDS



Test Comparison

JD System Test

-40C to 105C

~200 Cycles

AEC Q200

-55C to 155C

1000 Cycles

Test Comparison

JD System Test

-40C to 105C

~200 Cycles

Continuous

AEC Q200

-55C to 155C

1000 Cycles

Room Temp

Check parts at elevated temp

Results...

Resolution – change the design

Multiple resistors

- **Impact to PCB layout**
- **JDQ risk**

Drop in

- **Only samples available**
- **SOP months away**

Bare component

- **Strain risk**
- **PCB Change**

Call to Action

Customer expectations

A light green downward-pointing arrow with a white outline, positioned on the right side of the first box and pointing towards the second box.

Systems expectations

A light green downward-pointing arrow with a white outline, positioned on the right side of the second box and pointing towards the third box.

Update AEC-Q tests to require monitoring over temperature

Electrification

Autonomous

Deere High HP 8R



See and Spray

944 Loader





JOHN DEERE