



# WINEGARD

Engineering Capabilities



# FACILITIES

## Winegard South Facility

*Metal Fabrication & Coating*

**180,000 sq ft**

3000 Kirkwood St, Burlington, IA 52601



## Winegard North Facility

*Plastic Injection Molding & Electronics Production*

**180,000 sq ft**

2736 Mt. Pleasant St., Burlington, IA 52601





# RESOURCES

**RF (DC to 40Ghz)** – Cellular, WiFi, Bluetooth, NFC, RFID, AM/FM, VHF, UHF, etc.

**Antenna (DC to 7Ghz)** – HFSS, FEKO

**FPGA design** – Xilinx, Altera, Lattice

**EE – Analog / High Speed Data** – Altium, PADS, SPICE

**PCB Layout** – Altium, PADS

**Measurement / Reverse Engineering** – Calypso, PolyWorks, Geomagic, Spatial Analyzer

**Control Systems** – Matlab, Octave

**SW (Linux)** – Yocto, OpenWRT, Ubuntu

**SW (RTOS)** – FreeRTOS, Zephyr, MQX

**Mobile Applications** – Swift, Android Studio

**Amazon Web Services Cloud Applications**

**Web Applications**

**ME** – Creo, SolidWorks, Mastercam

**Industrial Design** – SolidWorks, KeyShot, Adobe

**Packaging**

**MFG Test** – LabView, TestStand





# SKILLS

## RF Design

- Antenna
- Cellular
- WiFi
- Bluetooth

## Motor Control

- Stepper
- Brushed & Brushless
- Linear Actuator
- Gear & Gearbox

## Mechanical Design

- Injection Molded Plastic
- Aluminum Sand Casting
- Sheet Metal
- Metal Stamping
- Thermoforming
- Diecast
- CNC Fixture
- Cable Harness

## Certification

- FCC
- Cellular Carrier
- Bluetooth SIG
- EMI / EMC Mitigation
- ISTA Packaging

## Product Design

- Industrial
- Artwork
- Packaging

## Quality

- ISO 9001
- DFMEA
- PFMEA
- SFMEA

## Design for Excellence

- Design For Manufacturability (DFM)
- Design For Assembly (DFA)
- Design For Test (DFT)

## Manufacturing

- Test Fixture / Station Design
- Tool / Die Repair
- Mold Repair







# EQUIPMENT

## Plastic Injection Mold

- 7 Machines (150T to 720T)
- Master Unit Die (MUD) mold
- Fabrication & Production

## CNC

- Multiple Vertical Machining Centers with 4th Axis Capability
- Prototyping & Production

## Metal Stamping

- 800T Transfer Press
- Two 400T Stamping Presses
- Multi-Stage Progressive Tools
- Other Presses (10T to 60T)

## Tube Bending & Cutting

- High-Speed Tube Shear with Finishing/Deburr
- CNC Rotary Draw Bender

## NSI Compact Spherical Range

- 1GHz – 40GHz

## NSI Planar Range

- 1GHz – 20GHz

## E-Coat Paint

- Cathodic Acrylic Wet Dip System
- 13 Stage Pre-Treat (Zinc Phosphate)
- High Capacity & Efficient

## Powder Coat Paint

- Three Stage Pre-Treat
- Rapid Color Change
- Cyclone Reclaim
- Up to 26' per minute

## Laser

- 10kW Bystronic Fiber Laser with Automated Sheet Loading and Unloading
- 80T Electric Press Brake
- 160T Hydraulic Press Brake





# EQUIPMENT

## SMT

- Two Panasonic Lines
- .4mm BGA

## Wave Solder

## Robotic Solder

## PCBA Inspection

- Automated Optical Inspection (AOI)
- PCBA Test & Repair
- X-Ray Inspection

## Wire-Cutting EDM

- Charmilles, Sodick

## Die-Sinking EDM

- Charmilles

## 3D Printing

- Stratasys 450MC

## Potting / Encapsulation

## Pad Print

## Coordinate Measurement Machine (CMM)

## Welding

- MIG
- TIG
- Carbon
- Stainless
- Aluminum
- Galvanized





# ENVIRONMENTAL TEST

## UV

- 2 QUV Accelerated Weather Tester

## Salt / Fog

- 1 Q-FOG Cyclic Corrosion Tester

## Temperature

- Multiple Thermotron Chambers.
- 1 Thermotron with Walk-In Chamber 12'x12'

## Humidity

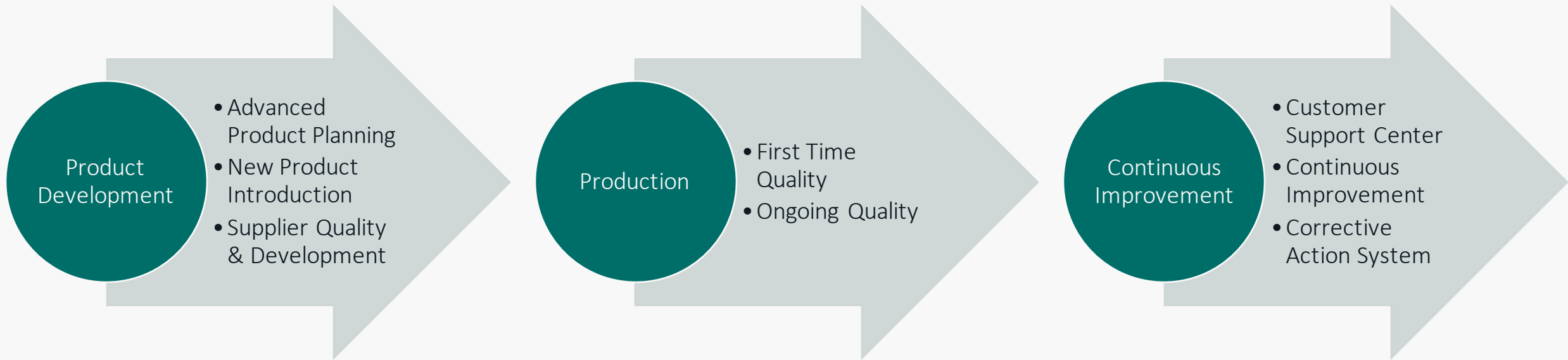
## Shock / Vibration

## Wind Load





# QUALITY SYSTEMS







# QUALITY SYSTEMS – PRODUCT DEVELOPMENT

## Advanced Product Planning

- Product Design Specifications
- Design for Mfg & Asm
- Internal Design Reviews
- Supplier Print Acceptance
- Design FMEA

## New Product Introduction

- System & Process FMEA
- Design Verification Testing
- First Article Approval
- Capability Studies
- Pilot Run Approval

## Supplier Quality & Development

- Part / Material Evaluation
- Supplier Assessment
- Supplier Monitoring
- Incoming Inspection



# QUALITY SYSTEMS – PRODUCTION

## First Time Quality

- Functional Testing
- Live Testing
- Throughput Yield (TPY)
- Dock Audits
- First Piece / Last Piece
- SPC
- DOE

## Ongoing Quality

- Daily Production Meeting
- Standard Work Instructions for Each Model
- Process Control Plans for Each Part and Model
- Product Change Order Process



# QUALITY SYSTEMS – CONTINUOUS IMPROVEMENT

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## **Customer Support Center**

- Technical Service
- Warranty Support

## **Continuous Improvement**

- Internal Feedback
- Customer Feedback

## **Corrective Action System**



**WINEGARD**