

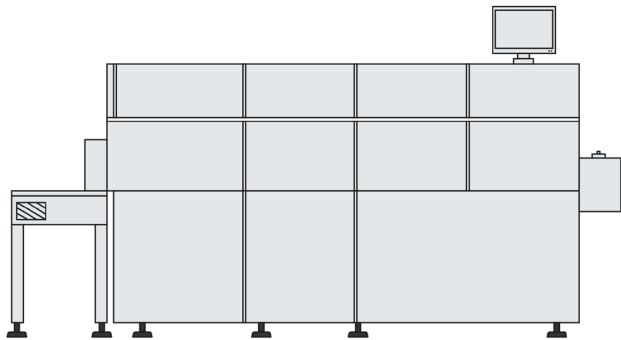


60 Years of Excellence, and Still Growing Strong

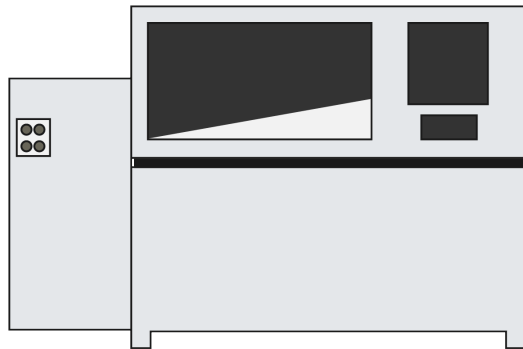
60
YEARS



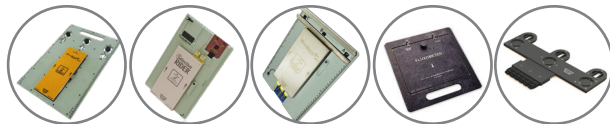
ECD PRODUCT CATALOG

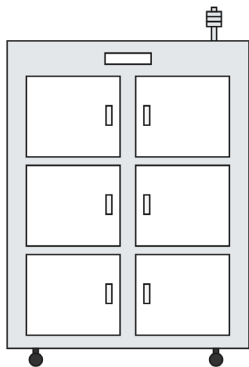


PROCESS DEVELOPMENT & VALIDATION

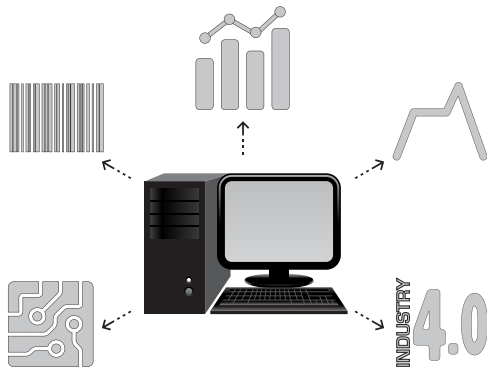


MACHINE QUALITY MANAGEMENT





COMPONENT DRY STORAGE



USER INTERFACE ANALYSIS & OPTIMIZATION



M.O.L.E.™ EV6

Thermal Profiler



- On-screen instrument status display:
 - » Live temperature readings
 - » Thermal profile
 - » KPI table
- Built-in calibration reminders
- Battery life/charge indicators
- Memory status indicator
- 6 thermocouple inputs
- Supports multiple thermocouple types
- Sampling at up to 100 samples per second
- USB-C communications and charging
- Two-button control (on/off and record)
- Wireless operation with Class 1 Bluetooth® RF 5.1 LE



PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

MACHINE QUALITY MANAGEMENT
[REFLOW, WAVE & SELECTIVE SOLDERING]

➔ <http://ecdusa.co/mev6>



M.O.L.E.™ EV6



- On-screen instrument status display:
 - » Live temperature readings
 - » Thermal profile
 - » KPI table
- Built-in calibration reminders
- Battery life/charge indicators
- Memory status indicator
- 12 thermocouple inputs organized into two groups of five channels
- Supports multiple thermocouple types
- Sampling at up to 50 samples per second
- USB-C communications and charging
- Two-button control (on/off and record)
- Wireless operation with Class 1 Bluetooth® RF 5.1 LE



PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

<http://ecdusa.co/mev12>



M.O.L.E.™ EV12



- On-screen instrument status display:
 - » Live temperature readings
 - » Thermal profile
 - » KPI table
- Built-in calibration reminders
- Battery life/charge indicators
- Memory status indicator
- 20 thermocouple inputs organized into four groups of five channels with standard mini-connectors
- Supports multiple thermocouple types
- Sampling at up to 20 samples per second
- USB-C communications and charging
- Two-button control (on/off and record)
- Wireless operation with Class 1 Bluetooth® RF 5.1 LE



PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

➔ <http://ecdusa.co/mev20>



M.O.L.E.™ EV20



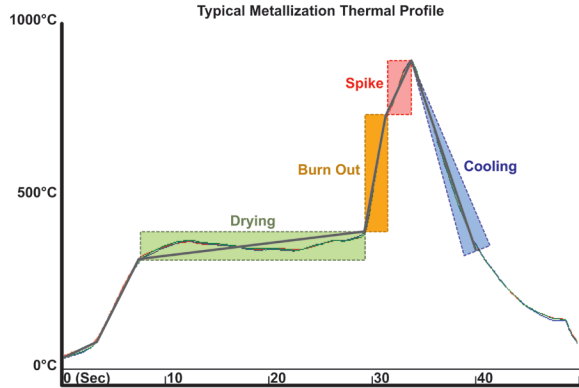
- 3-channel profiling solution that enables quality assurance measurement during Metallization and Lamination Press Photo Voltaic processes
- 17mm [0.7"] reflective stainless steel thermal barrier
- Stainless steel-sheathed, Type K mini thermocouples
- M.O.L.E.™ MAP 3's Solar Metallization Environment enables V-M.O.L.E.™ Solar's "OK" button with Soak, Peak and TAL specifications
- 96-run memory and 70 hours of logging at 0.1 sec rate
- M.O.L.E.™ Readiness Indicators show battery and internal temperature are run-ready
- Optional compression shell for reflective barrier available



SOLAR CELL METALLIZATION

<http://ecdusa.co/vmsolar>

Solar Cell Metallization Process



The typical process in short time (40-60 seconds); ramping quickly to Peak.



V-M.O.L.E.™ SOLAR



- Full-Featured Traceability: Local and remote database support
- Continuous Quality Monitoring: Precise PASS/FAIL for every board
- Dynamic Measurement Capabilities: Open architecture that is integration-ready for future measurement needs
- OvenSENTINEL™ Software: Trusted traceability with patent-pending TrueProfile™ technology
- Industry 4.0+: Easy integration and full-featured reporting delivers actionable data and deep analytics
- OvenSENTINEL™ Software
- 24-hour oven monitoring
- Process Data Archiving and Playback

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING]

OvenSENTINEL™ - TrueProfile™

- Automatic Statistical Process Control Charting
- Out-of-Specification Alarm
- The TrueProfile™ process tracks the PCB through the oven and records the temperatures that the board actually experiences. These temperatures are used to generate a single dynamic profile from which KPI measurements are taken. This method is superior because it records the actual zone temperatures at the time the board was in each zone, versus a single view or group of snapshots at of single moments in time. TrueProfile™ also enables identification of specific board(s) that failed specification, rather than scrapping all boards in the oven during a certain time.



OvenRIDER® NL 2+



- Industry standard 6-channel convection reflow oven verification platform
- Provides SPC-driven Go/No-Go oven readiness to process engineers, operators and maintenance technicians
- Verifies heat flow, temperatures and conveyor speed across the oven
- Superior alternative to 'Golden Board' as a first-off (thousands of runs).
- Available in 168mm [6.6"], 305mm [12"], & 458mm [18"] as well as custom widths
- Powered by the 6-channel M.O.L.E.™ EV6 or SuperM.O.L.E.™ Gold 2 & M.O.L.E.™ MAP 3

MACHINE QUALITY MANAGEMENT
[REFLOW SOLDERING]

➔ <http://ecdusa.co/or>

OvenRIDER™ Data Table:

- Table is specialized for reflow oven applications. Group parameters are color-coded, so views on other page tabs can be easily associated with label parameters.

Features:

1. Oven Summary Data
2. M.O.L.E.™ Status
3. Individual Temperature and Process Delta Zone Data





**Selective
RIDER®**

- Dynamic X/Y Sensor measures both X and Y position from target center in addition to fountain diameter while touching the bottom of the pallet.
- Height Sensor measures fountain height as referenced from the bottom of the pallet.
- Mini Fluxometer™ included with the kit are two test mesh types; V-Gauge (Vernier) and UP (Uniformity & Penetration) along with three types of test paper.
- Powered by the 6-channel M.O.L.E.™ EV6 or SuperM.O.L.E.™ Gold 2 & M.O.L.E.™ MAP 3

MACHINE QUALITY MANAGEMENT
[SELECTIVE SOLDERING]

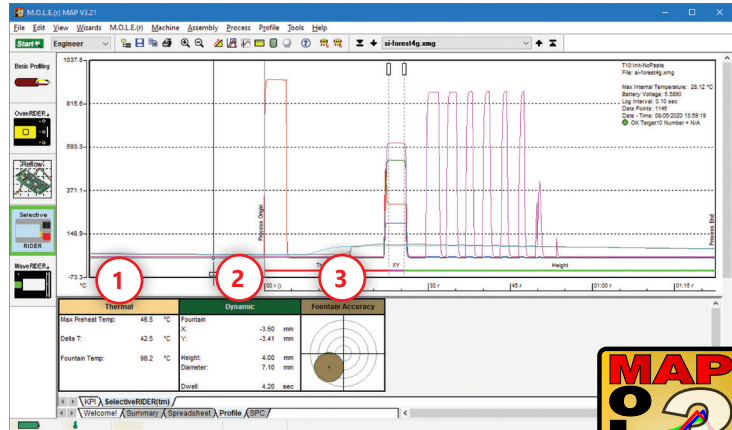
<http://ecdusa.co/sr>

SelectiveRIDER™ Data Table:

- All meaningful measurements are presented on the "Summary" sheet
- Pictorial fountain accuracy display
- No need to look at "Profile"
- All runs are stored in "Spreadsheet" as normal
- Out of specification measurements highlighted blue or red
- SPC of all parameters as usual

Features:

1. Thermal
2. Dynamic
3. Fountain Accuracy





- Daily confirmation of product recipe performance on the wave soldering system
- Use as a physically stable alternative to a "Golden Board" as a as verification at the beginning of every shift (Go/No-Go readiness)
- Process sensors quantify parallelism, dwell time in wave(s) immersion depth and conveyor speed
- Replaceable Test Coupon measures solder, top and bottom-side temperatures
- Powered by the 6-channel M.O.L.E.™ EV6 or SuperM.O.L.E.™ Gold 2 & M.O.L.E.™ MAP 3

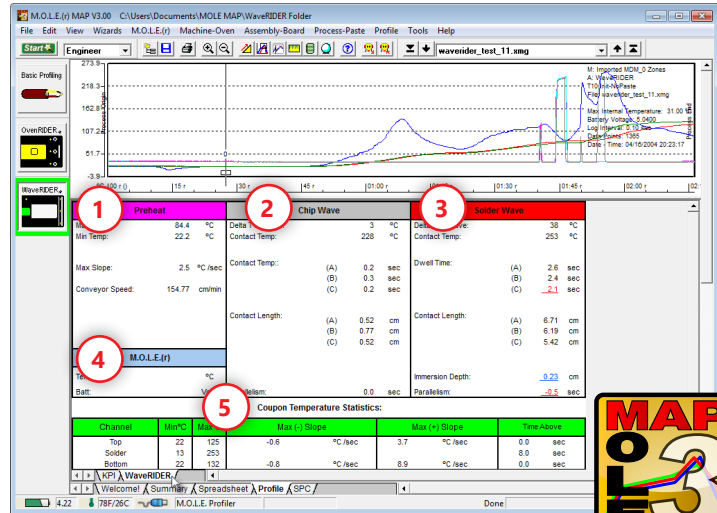
MACHINE QUALITY MANAGEMENT
[WAVE SOLDERING]

WaveRIDER™ Data Table:

- Specialized for wave soldering machine applications. Group parameters on the data sheet are color-coded for easy label parameter association within other page tabs.

Features:

- Pre-heat Parameters and Conveyor Speed
- Chip Wave Parameters (Blank column if there is no chip wave)
- Solder Wave Parameters
- M.O.L.E.™ Internal Status
- Overall Coupon Parameters



FLUXOMETER®



FLUXOMETER®

- Quickly displays spray flux top side penetration and pattern uniformity to ensure proper setup and maintenance
- Sprayed flux through a sandwiched through-hole mesh reveals an easy to read and comparable signature on the test paper to enable machine adjustments
- Ensure proper deoxidation and wetting throughout the width and length of wave soldered products
- Place on to conveyor similar to a product run and retrieve prior to preheater if a product recipe is active

MACHINE QUALITY MANAGEMENT
[WAVE SOLDERING - FLUX]

➔ <http://ecdusa.co/fom>

- Verifies true oven performance through ambient and process temperature monitoring
- Profiles ovens without thermocouple attachments – potential Golden Board substitute
- Easy profile verification through Target 10 – Ramp/Soak/TAL and Peak temperatures
- Uncovers problematic areas in ovens, abnormal ambient and process temperatures, differentials across processing width, heat transfer/convection abnormalities
- Customizable data collection and profile analysis (M.O.L.E.™ MAP software) including average ambient zone temperatures, convection changes through in zone delta temperature monitoring
- Automatically provides SPC data charts with Cp/CpK
- Profile overlay function, magnification, slope/distance, conveyor speed estimation & oven setup (initial oven recipe generation)

MACHINE QUALITY MANAGEMENT [REFLOW SOLDERING]

➔ <http://ecdusa.co/rv>

ReflowValidator



6-Channel
(used with SuperM.O.L.E.® Gold 2)



3-Channel
(used with V-M.O.L.E.®)

REFLOW VALIDATOR™

SmartDRY®
Intelligent Dry Storage



SD-10



SD-30



SD-48F



- Market-leading recovery time of <3 minutes provides constant access to stored parts
- Immediate visual confirmation of dry storage status
 - » OK = Green
 - » Working = Yellow
 - » Alert = Red
- J-STD Performance: Achieves more than just compliance with innovative regeneration
- Selection of volume sizes to suit your needs
- Industry 4.0 Ready: Integrated network tracks events from all SmartDRY™ cabinets for access to data on connected devices.

COMPONENT DRY STORAGE

➔ <http://ecdusa.co/sdry>

INTUITIVE NETWORK DASHBOARD



OK

WORKING

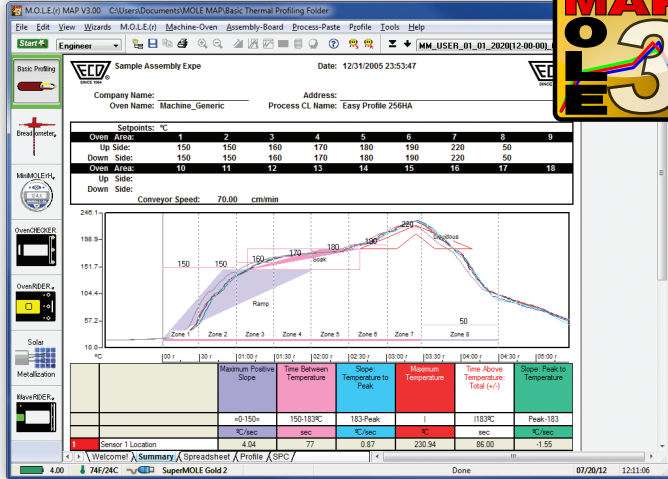
ALERT

READINESS LIGHT STATUS

ADAPTABLE SHELVING

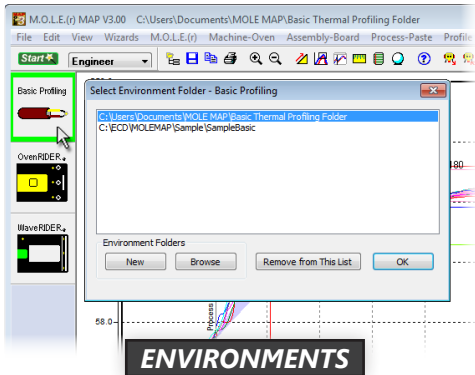
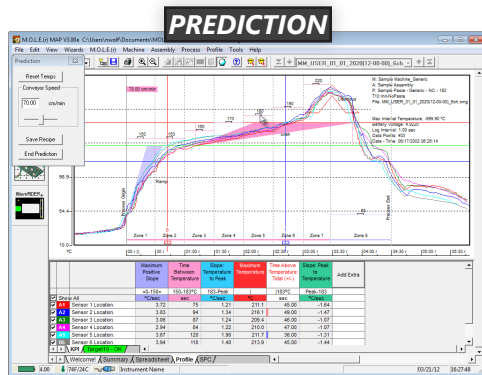
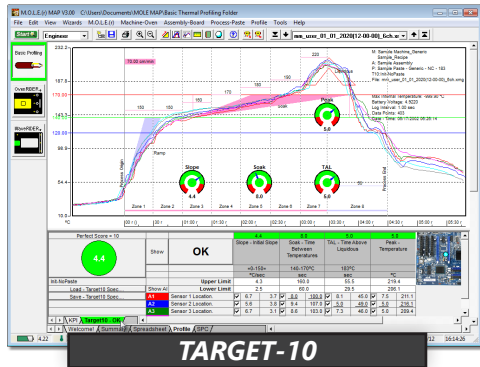


SmartDRY®



- With MAP 3 any ECD sensor package input to any ECD M.O.L.E.™ operates within a unique 'Environment' attuned to the profiling job at hand – all within the same program!
- WaveRIDER™ NL2, OvenRIDER™ NL2+, SelectiveRIDER™ and other platforms all operate within a unique M.O.L.E.™ MAP Environment
- Special Profile Tab sets up the M.O.L.E.s patented "OK" button for Target-10, Bake-S, and Relative Humidity, etc.
- Flexible: Interactive Prediction is a great assist for recipe development. You can make quick adjustments to a profile just made or any run in any MAP Directory
- Robust: Process documentation complete with Oven and Solder Paste Databases you can easily add to, Preferences can be set once or customized to various product and production lines.

USER INTERFACE ANALYSIS & OPTIMIZATION
[REFLOW, WAVE & SELECTIVE SOLDERING]



M.O.L.E.™ MAP

PFA



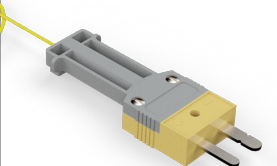
GLASS



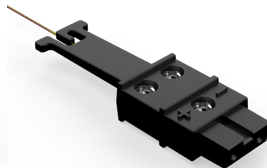
OVERBRAID



MINI



MICRO



NANO



- Available in a wide variety of insulation types and temperature ratings to suit application requirements
- Wide availability of stock and offer a full range of K-type thermocouples with PFA (Teflon®), glass, glass with overbraid and stainless/inconel sheath in various lengths and wire diameters
- Micro, Nano and Mini connector styles available
- ECD sells only special-limits-of-error grade thermocouple wire
- Maintain measurement integrity of measurements by replacing thermocouples at the first sign of nicks, kinks or severed junction
- Easy ordering through ECD's SuperStore

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

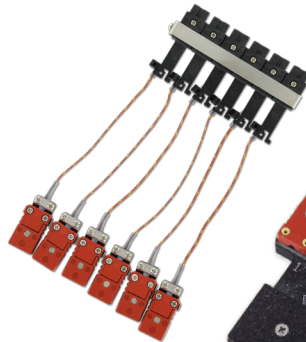
➔ <http://ecdusa.co/tc>

- Adapts mini-terminated K-Type thermocouples to ECD Micro Gold & Nano styles
- One-piece and individual channel adaptors
- Available in Teflon® and glass wire insulations for high-temperature lead-free work. The glass wire and high-temperature mini connectors are rated to 482°C [900°F]

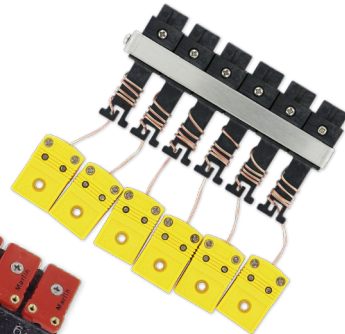
PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

➔ <https://ecdusa.co/tcadaptors>

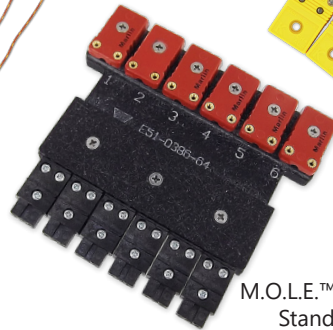
M.O.L.E.™ EV6/SuperM.O.L.E.™ Gold 2
Standard Mini Adaptor (Glass)



M.O.L.E.™ EV6/SuperM.O.L.E.™ Gold 2
Standard Mini Adaptor (Teflon®)



M.O.L.E.™ EV6/SuperM.O.L.E.™ Gold 2
Standard Mini Adaptor (Rigid)





- High-Temperature Solder Sample (Sn05Pb93)
- Aluminum T/C Tape:
 - » Roll & 12.7mm [0.5"] x 25.4mm [1"] pieces
- Polyamide (Kapton) T/C Tape:
 - » Roll & 12.7mm [0.5"] x 25.4mm [1"] pieces
- Instant Adhesive
- Takpak Spray Accelerator
- T/C Fiberglass Sleeving Organizer

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

- Expand M.O.L.E.™ use to multiple process heating applications in your plant (curing, coating, treating)
- Barriers provide profiler longevity by offering maximum protection. Barriers enable in-transit profiling and we've got a wide range of models for uses you may not have thought of.
- Upgrade to keep the M.O.L.E.™ cooler for longer or hotter process specs
- Time at Temperature and vertical above belt clearance drive the thermal barrier selection for the specific application
- A different thermal barrier and thermocouples extend profiler value
- Replace an old kit barrier

PROCESS DEVELOPMENT & VALIDATION

[REFLOW SOLDERING & IN-LINE CURING]

➔ <http://ecdusa.co/tb>



Reflective



260L | 395L | 460L
Barriers



BB-45

	Reflective 18mm [0.7"]	260L 395L 460L 25mm [1"]	BB-45 46mm [1.8"]
150°C/302°F	6 min	27 min	35 min
250°C/482°F	5 min	13 min	17 min



BOARD CARRIER™

- All BOARD CARRIERS feature four adjustable arms. Two of the arms can be pivoted and locked to position the board in the middle of the frame. The two opposing arms are spring loaded to grip the board firmly and to permit quick board replacement.
- Standard and Large size BOARD CARRIER™ are available for reflow and wave solder applications.
- Large BOARD CARRIER™s have two additional long arms to support the leading and trailing board edges.
- All BOARD CARRIER™ arms can be repositioned along the side rails to adapt to the length of the circuit board.
- For save solder machines, BOARD CARRIERS are manufactured of clear, hard anodized aluminum for resistance to flux.

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

Reflow Profiling

- SIDE RIDER™: Can be used alone for narrow rail widths or with an outrigger, an expandable rugged, metal frame with scissors action extension.
- REFLOW RIDER™: Built of high quality materials for reliable operation and long life. The side rails, arms and support deck are hard-anodized aluminum. All fasteners are stainless steel.

Wave Soldering

- E-Z RIDER™: Designed to carry your profiler safely through wave solder machines. E-Z Rider's titanium side rails are gripped by the finger conveyors, and support the profiler well above the solder wave.

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

➔ <https://ecdusa.co/pc>

REFLOW RIDER™



E-Z RIDER™



SIDE RIDER™



PROFILER RIDERS

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Patents: M.O.L.E.™ EV6, M.O.L.E.™ EV12, M.O.L.E.™ EV20, V-M.O.L.E.™ & M.O.L.E.™ MAP 3 #7,653,502, OvenSENTINEL™ #11,774,174;



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