

RM27 Accumulator Manufacturing 2024

Author: Sean Trimper - EV Lead/ESO
(603)204-0353 - strimper13@gmail.com

Manufacturing Timeline:

- Accumulator One RTD (4/15/24)
 - System level testing
 - Insulation installed
 - Wiring complete (GLV & TS)
 - Components in accumulator (3/25/24)
 - Segments ready for install (3/11/24)
 - BMS voltage taps connected
 - Segments spot-welded (2/12/24)
 - Material list by (1/15)
 - BMS thermistors installed
 - MT Plugs installed
 - Precharge installed + wired
 - Discharge installed + wired
 - IMD installed + wired
 - Accu Indicator installed + wired
 - TSAL installed + wired
 - AIRs installed + wired to main fuse
 - Main fuse installed + wired to AIRs and MT Plugs
 - External plugs installed + wired to AIRs
 - HVD installed + wired to external plugs
 - Energy meter installed + wired
- Accumulator two (4/29/24)
 - Parallel

Cell Prep:

- Prior to spot welding
- Inspect cells for physical damage
- Measure cell and ensure it is in voltage range of 3.5-3.7V



- If any cells are not good (damage or out of voltage range): set aside, note issue, and tell ESO
- Label boxes of measured and inspected cells with: name & date measured
- Stick insulative rings on positive terminals of each cell

Segment Manufacturing:

Making the segment skeletons (segment without any cells)

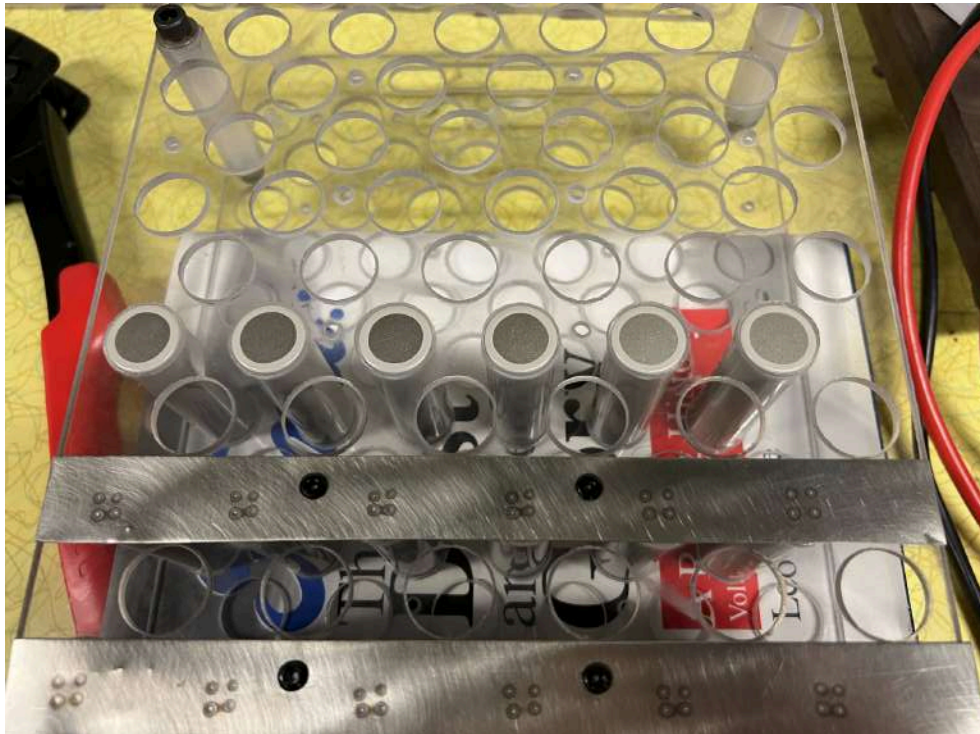
- Waterjet cell holders
- Assemble cell holder (two sheets (+ & -) using hex nylon standoff and specific bolts)
 - Ensure that the - and + sheets are on the correct side when assembled (verify with CAD)
 - If bolts are misplaced, check the McMaster order to verify which bolts are needed

Setting up the segment and welder

- Place a thin nonconductive sheet under the segment being welded. This allows the inserted cells to rest at the correct height (if no sheet was there, the cells would be too low due to the standoff bolts)
- Turn on the power supply connected to the spot welder
 - It will do some checks, turn on the fans, then start clicking as the capacitors charge. This is normal.
- When done, turn off power supply, unplug from wall, and set welder to 0.0J

Nickel busbars

- Insert cells sticker side down across the segment (6 cells)
 - Try to align all cell wrapper labels the same direction



- Place nickel busbar overtop the cells
 - Ensure that the bus bars do not extend past the polycarb. If they do, trim them lightly with tin snips and sand to get a smooth edge (aim for within 1mm to edge of polycarb)
- Insert rivets into holes of nickel strips on one side (2 holes)



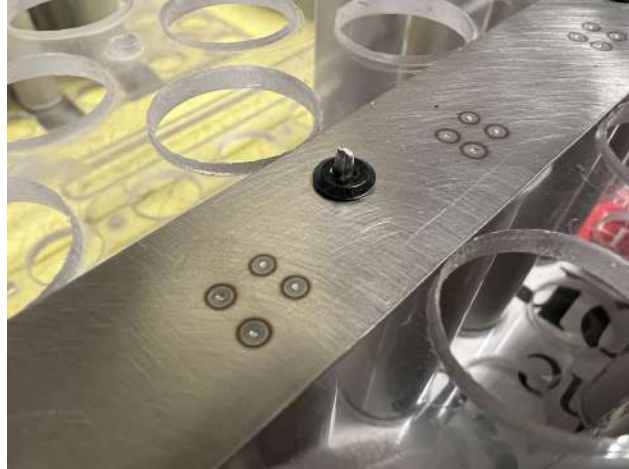
- Spot weld negative ends with nickel bus bars (2 welds per cell), 75.1J setting
 - Line up busbar in between the cells on either side of it (sticker side cells, next row over)
 - Apply decent pressure downwards with probes
 - If a bad weld occurs (welder will make an different beeping noise), do an additional weld (3 total)





- Rivet bus bars onto polycarb sheet (usually takes 2 pumps)
 - If rivet breaks, as long as it is still holding tight, snip the end of it with flush cutters





- Continue this process until all negative bus bars are welded on side 1
- Flip over and do the same on the other side of the segment

Copper collectors

- **Negative pole**
 - Insert rivets into copper bus bar slots through nickel strip
 - Spot weld nickel strip onto negative sides of cells
 - Remove rivets, insert through copper and nickel bus bar, and rivet copper and nickel to cell holder
- **Positive pole**
 - Insert rivets into copper bus bar slots through nickel strip
 - Spot weld nickel strip onto POSITIVE side of cells
 - Remove rivets, insert through copper and nickel bus bars, and rivet copper and nickel to cell holder

You should now have all negative connections made, copper bus bars placed onto negative AND positive sides of the segment, and all of those riveted and spot welded down

- Scary fuse things next!