Mechanical and Aerospace Engineering
University of California, Davis

NIST AM Bench AMB2018-01-625-CBM-B2-P3: Measurement Summary

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Christopher D'Elia, PhD student
crdelia@ucdavis.edu

Professor Michael R Hill
mrhill@ucdavis.edu

Adrian T. DeWald
atdewald@hill-engineering.com

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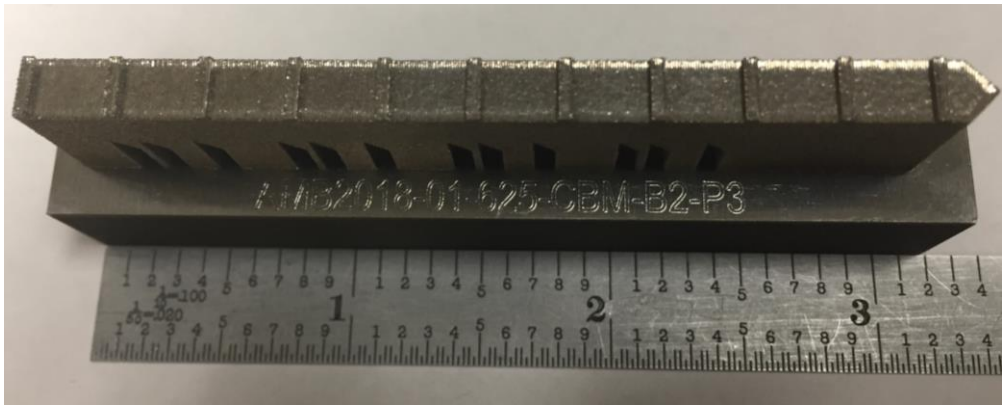
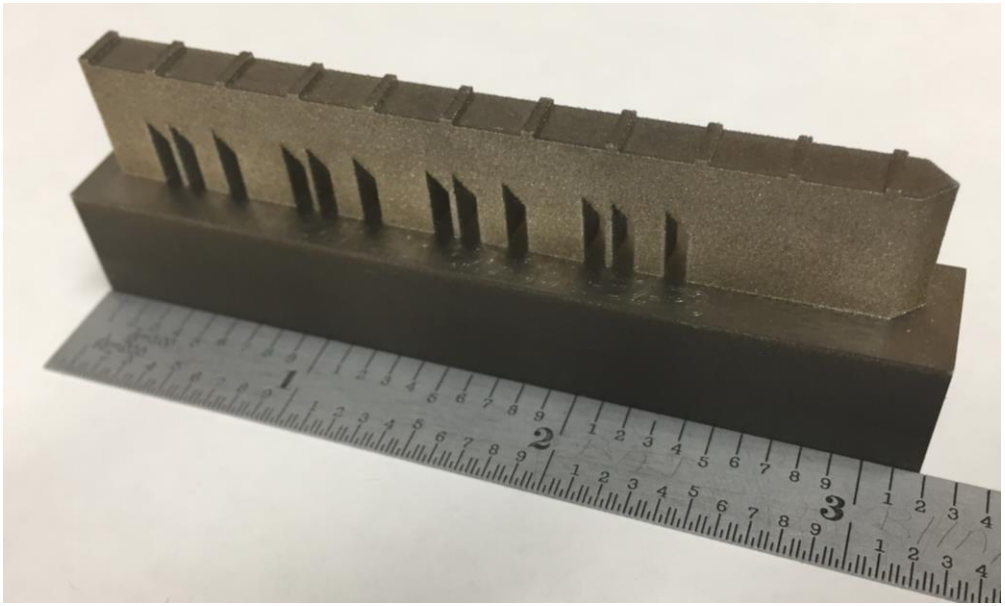
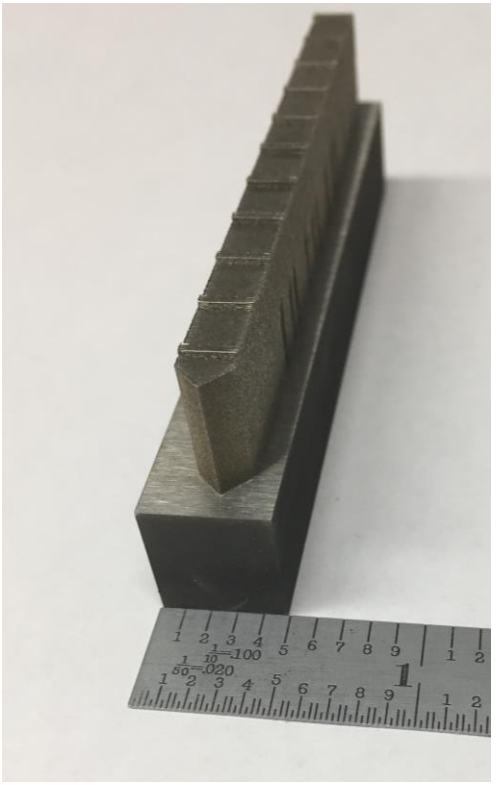
Sample AMB2018-01-625-CBM-B2-P3







Overall dimensions:

H	25.35mm
L	80.72mm
W	12.19mm

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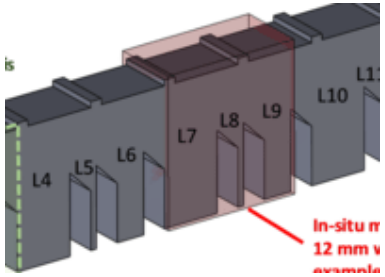
AMB2018-01-625-CBM-B2-P3 Measurement Objectives

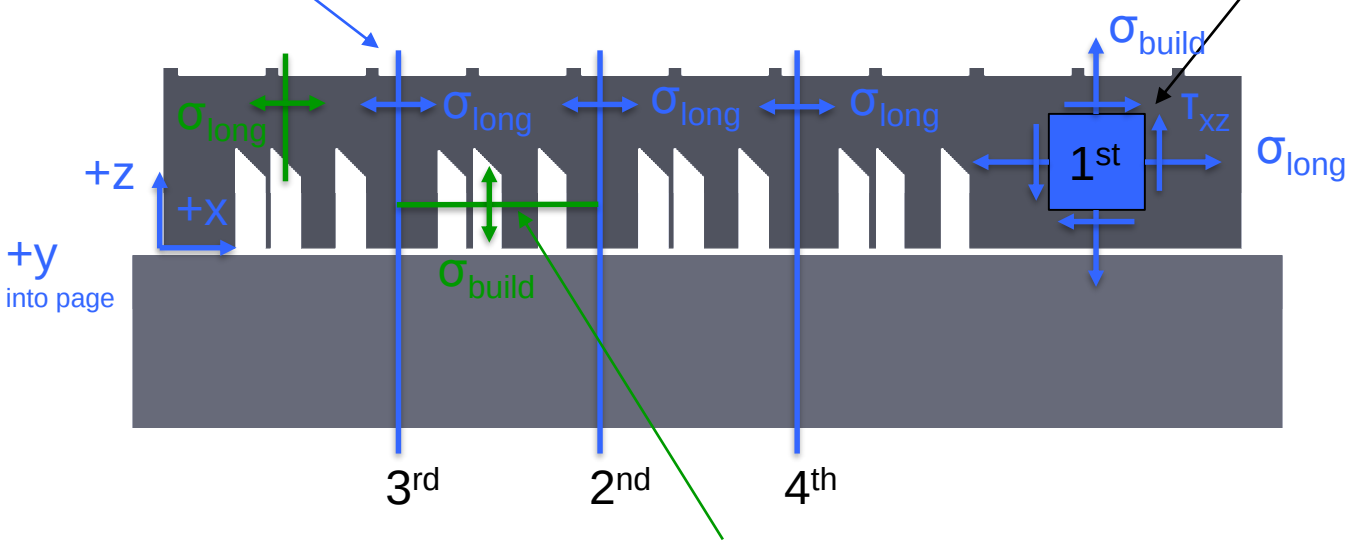
- Develop mechanical measurement data to complement diffraction measurements
  - Axial stress in recoat direction
- Develop mechanical measurement data to supplement diffraction measurements
  - Near surface measurement

AMB2018-01-625-CBM-B2-P3 Mechanical Measurements



Contour measurements through L4, L7, L10 for σ(y, z)

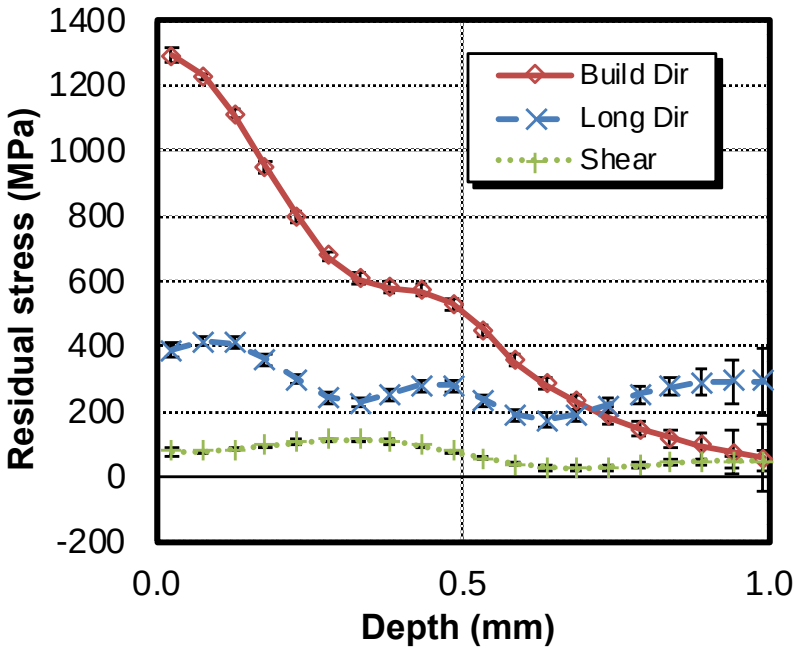
Hole drilling near surface measurement σ(y)



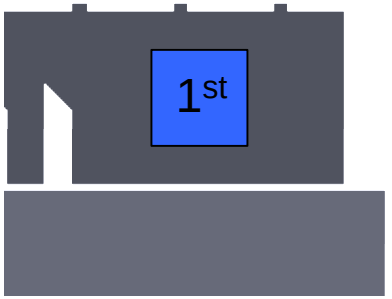
Optional contour measurements

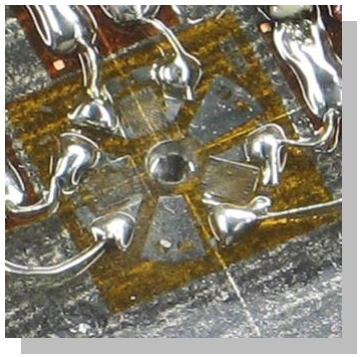
AMB2018-01-625-CBM-B2-P3 results

- Hole drilling measurement
  - Location: (x, y, z) = (64, 0, 7.5) mm
  - Tensile residual stress in both build and transverse directions
    - Build direction stress near/beyond yield
      - Plasticity error likely, beware specific values
    - These results consistent with prior observations



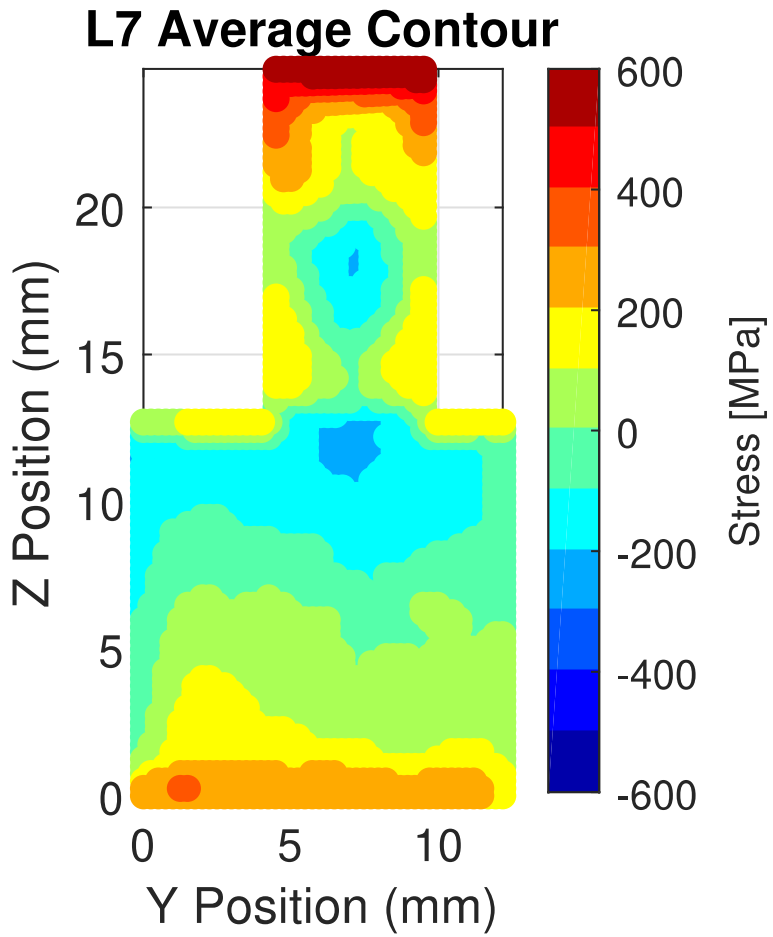
Hole drilling near surface measurement

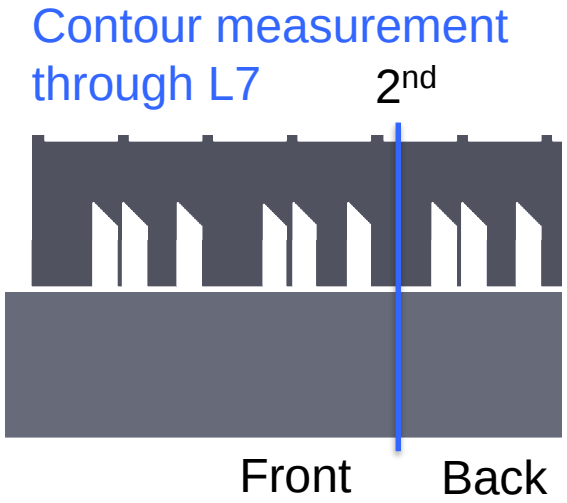




Representative Image

AMB2018-01-625-CBM-B2-P3 results





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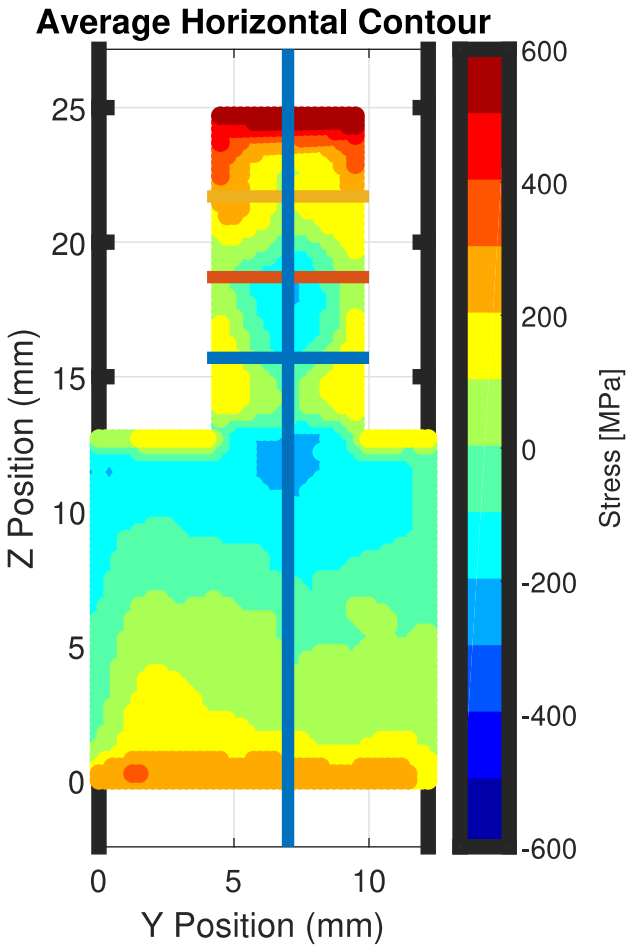

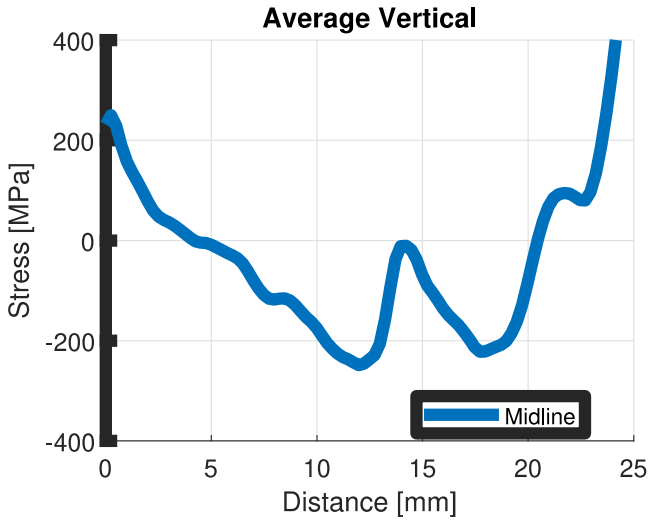

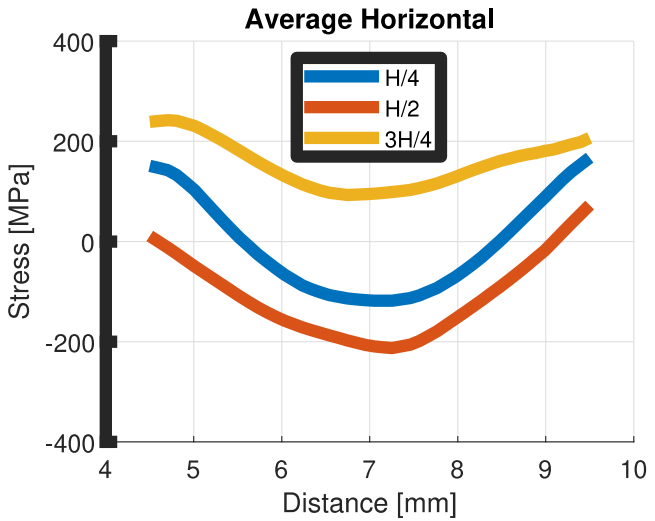

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Contact information

Christopher D'Elia
crdelia@ucdavis.edu
650-208-6703 (m)

Michael R. Hill
mrhill@ucdavis.edu
530-304-7296 (m)

Adrian T. DeWald
atdewald@hill-engineering.com
916-635-5706, 101# (w)

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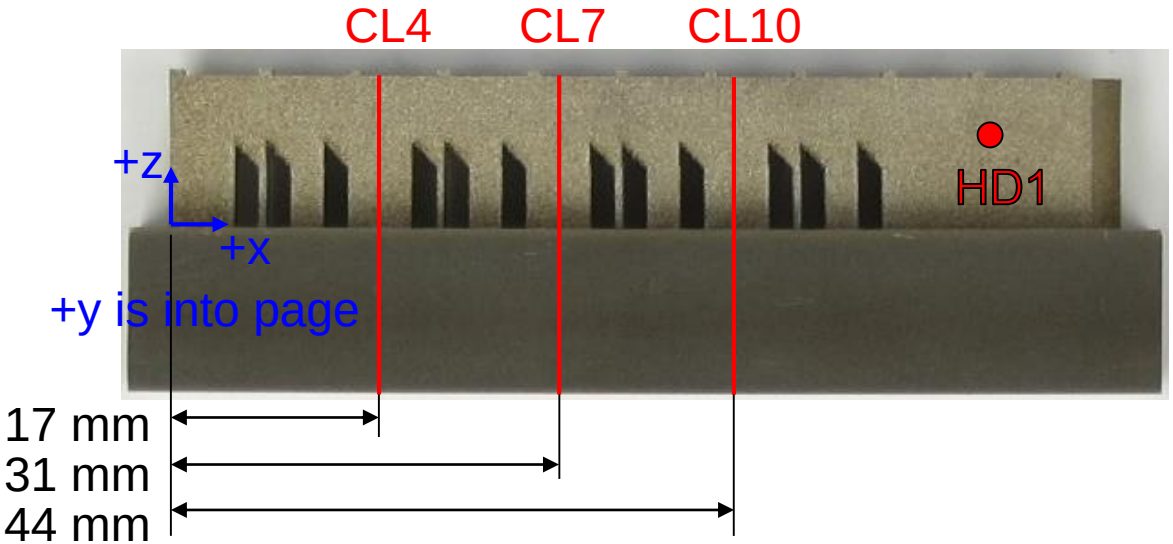
Specimen description

- 625-CBM-B2-P3
- Assumed material properties:
  - Material type: INCONEL alloy 625
  - E = 207 GPa
  - ν = 0.278
  - Sy = 700 to 800 MPa (typical)

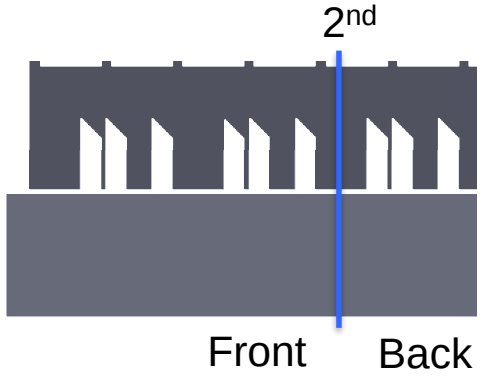
Contour measurements

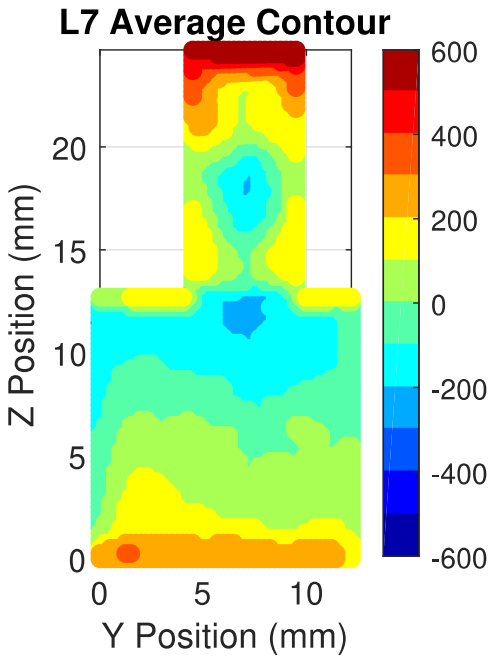
- Three contour method measurements
  - Oriented to measure stress in x direction
  - Round 1
    - To be completed before Round 2 measurements start
    - CL7: located at x = 31 mm
  - Round 2
    - CL4: located at x = 17 mm
    - CL10: located at x = 44 mm

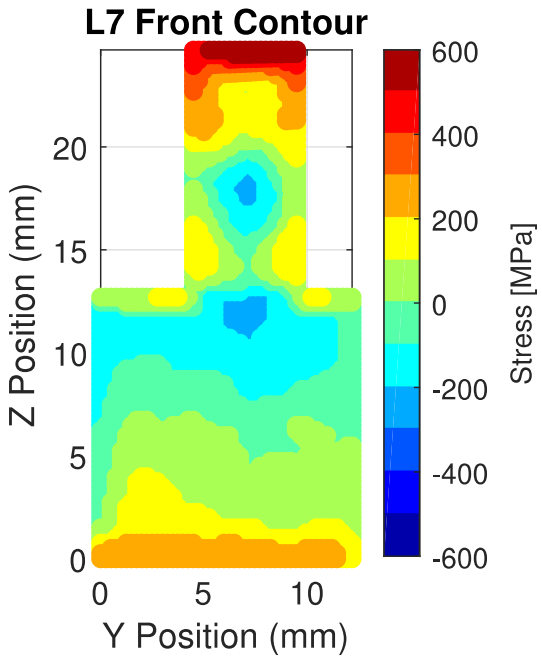


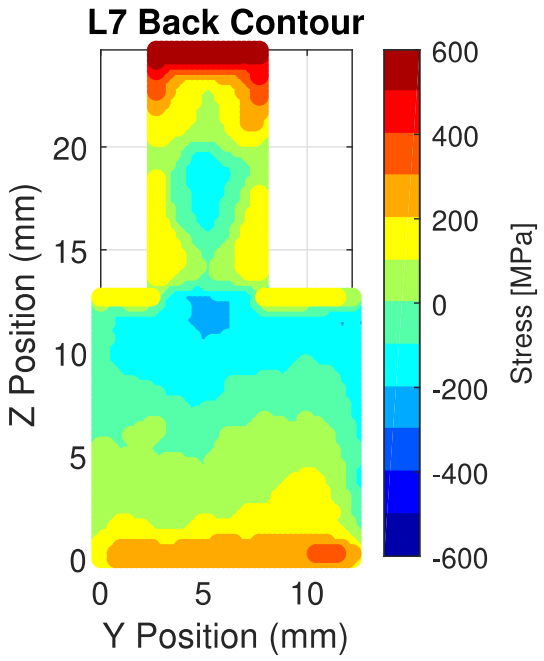
AMB2018-01-625-CBM-B2-P3 results

Contour measurement @ L7









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