

Readme – Supplementary data

Data set title: Supplementary material to publication with title: *Metallic Bipolar Plate Production Through Additive Manufacturing: Contrasting MEX/M and PBF-LB/M Approaches*

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Context: This dataset is supplementary material to the publication with the title "*Metallic Bipolar Plate Production Through Additive Manufacturing: Contrasting MEX/M and PBF-LB/M Approaches*".

The corresponding paper investigates the production of metallic bipolar plates using MEX/M and PBF-LB/M additive manufacturing technologies. Six design variations were fabricated, and the geometric accuracy of both methods was evaluated using 3D scanning technology. To account for dimensional deviations, the shrinkage of MEX/M samples was measured and compensated in the digital models before the comparison. A comparative analysis was conducted based on 20 measurement points per sample, calculating mean values and standard deviations. The results indicate that PBF-LB/M is well-suited for manufacturing complex structures with intricate geometric details, while MEX/M provides a balanced trade-off between accuracy and production efficiency for simpler bipolar plate designs. Consequently, PBF-LB/M is recommended for prototyping and experimental validation of complex geometries, whereas MEX/M is more suitable for prototype production as a preparatory step for mass manufacturing via the MIM process.

Content of this data set:

The content of the data set is listed below in the same order as the files are stored in the folder *Supplementary_Data.zip*. Files are highlighted with bold font and a short description is given.

- **Supplementary_Data_README.pdf**: This readme file
- **Supplementary_Data.zip**: ZIP-Folder containing supplementary data
 - **Location_MeasurementPoints**
 - **MEX**
 - **LocationReferencePoints_RibGrooves_MEX.png**: Screenshot of 3D CAD comparison of the MEX/M Rib grooves BPP with all measurement points
 - **LocationReferencePoints_Serpentine_MEX.png**: Screenshot of 3D CAD comparison of the MEX/M Serpentine BPP with all measurement points
 - **LocationReferencePoints_SerpentineNarrowing_MEX.png**: Screenshot of 3D CAD comparison of the MEX/M Serpentine (narrowing) BPP with all measurement points
 - **LocationReferencePoints_TriangularBaffles_MEX.png**: Screenshot of 3D CAD comparison of the MEX/M Triangular baffles BPP with all measurement points
 - **LocationReferencePoints_WaveStructure_MEX.png**: Screenshot of 3D CAD comparison of the MEX/M Wave structure BPP with all measurement points
 - **LocationReferencePoints_WavyBottom_MEX.png**: Screenshot of 3D CAD comparison of the MEX/M Wavy bottom BPP with all measurement points
 - **PBF**
 - **LocationReferencePoints_RibGrooves_PBF.png**: Screenshot of 3D CAD comparison of the PBF-LB/M Rib grooves BPP with all measurement points
 - **LocationReferencePoints_Serpentine_PBF.png**: Screenshot of 3D CAD comparison of the PBF-LB/M Serpentine BPP with all measurement points
 - **LocationReferencePoints_SerpentineNarrowing_PBF.png**: Screenshot of 3D CAD comparison of the PBF-LB/M Serpentine (narrowing) BPP with all measurement points
 - **LocationReferencePoints_TriangularBaffles_PBF.png**: Screenshot of 3D CAD comparison of the PBF-LB/M Triangular baffles BPP with all measurement points
 - **LocationReferencePoints_WaveStructure_PBF.png**: Screenshot of 3D CAD comparison of the PBF-LB/M Wave structure BPP with all measurement points
 - **LocationReferencePoints_WavyBottom_PBF.png**: Screenshot of 3D CAD comparison of the PBF-LB/M Wavy bottom BPP with all measurement points
 - **ScanningData**
 - **MEX**
 - **RibGroovesMEXM.vld2**: 3D Scanning data of the MEX/M Rib grooves BPP
 - **SerpentineMEXM.vld2**: 3D Scanning data of the MEX/M Serpentine BPP
 - **SerpentineNarrowingMEXM.vld2**: 3D Scanning data of the MEX/M Serpentine Narrowing BPP
 - **SerpentineTriangularBafflesMEXM.vld2**: 3D Scanning data of the MEX/M Triangular baffles BPP
 - **WaveStructureMEXM.vld2**: 3D Scanning data of the MEX/M Wave structure BPP
 - **WavyBottomsMEXM.vld2**: 3D Scanning data of the MEX/M Wavy bottom BPP
 - **PBF-LB**
 - **RibGroovesMEXM.vld2**: 3D Scanning data of the PBF-LB/M Rib grooves BPP
 - **SerpentineNarrowingMEXM.vld2**: 3D Scanning data of the PBF-LB/M Serpentine (narrowing) BPP
 - **SerpentineMEXM.vld2**: 3D Scanning data of the PBF-LB/M Serpentine BPP
 - **SerpentineTriangularBafflesMEXM.vld2**: 3D Scanning data of the PBF-LB/M Triangular baffles BPP

- **WaveStructureMEXM.vld2:** 3D Scanning data of the PBF-LB/M Wave structure BPP
 - **WavyBottomMEXM.vld2:** 3D Scanning data of the PBF-LB/M Wavy bottom BPP
 - STL_Files
 - Original_Size
 - **RibGrooves.stl:** Original STL-File of the Rib grooves BPP
 - **Serpentine(double_sided).stl:** Original STL-File of the Serpentine BPP (Double-sided model)
 - **Serpentine(narrowing).stl:** Original STL-File of the Serpentine (narrowing) BPP
 - **TriangularBaffles.stl:** Original STL-File of the Triangular baffles BPP
 - **WaveStructure.stl:** Original STL-File of the Wave structure BPP
 - **WavyBottom.stl:** Original STL-File of the Wavy bottom BPP
 - Scaled
 - **RibGrooves_scaled.stl:** Scaled STL-File of the Rib grooves BPP
 - **Serpentine(double_sided)_scaled.stl:** Scaled STL-File of the Serpentine BPP (Double-sided model)
 - **Serpentine(narrowing)_scaled.stl:** Scaled STL-File of the Serpentine (narrowing) BPP
 - **TriangularBaffles_scaled.stl:** Scaled STL-File of the Triangular baffles BPP
 - **WaveStructure_scaled.stl:** Scaled STL-File of the Wave structure BPP
 - **WavyBottom_scaled.stl:** Scaled STL-File of the Wavy bottom BPP

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