

Disruptive pemfc stack with nOvel materiaLs, P
Processes, archHitecture and optimized INterfaces

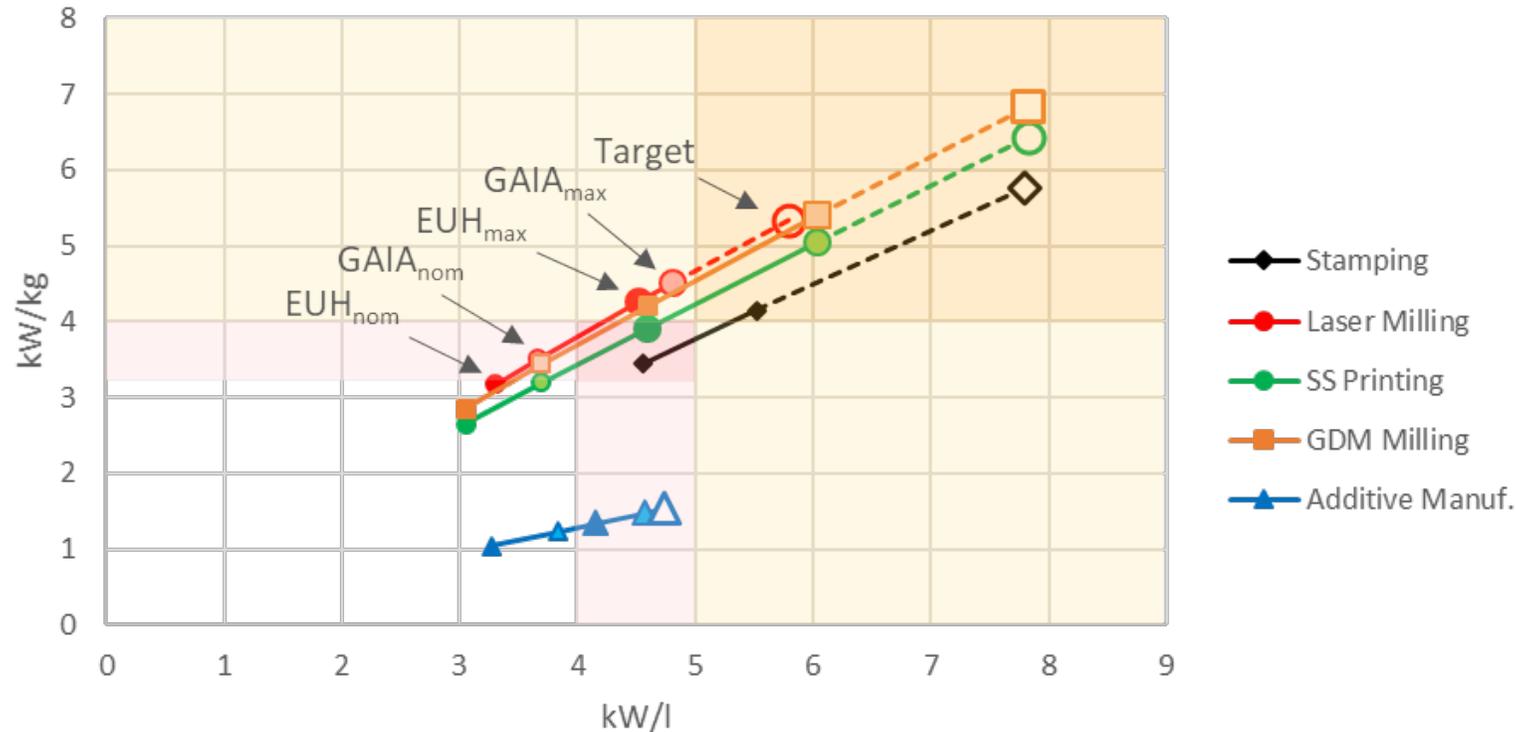
DOLPHIN Workshop, Ulm June 16th 2023

Choice of Two TP4 Designs

J. Pauchet, all



TP4 stacks (5 kW)

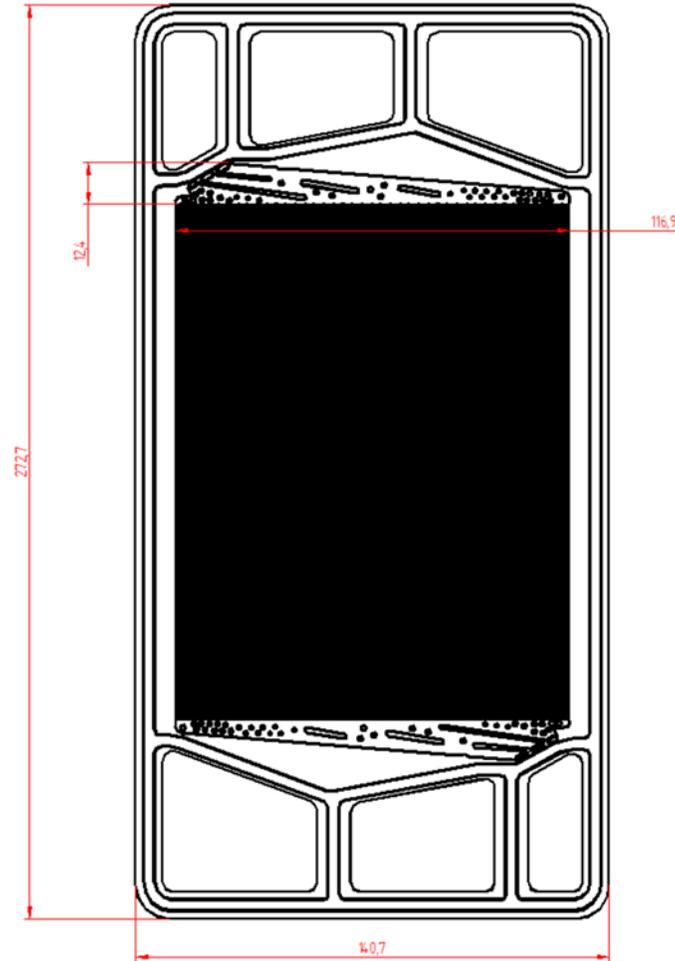


TP4-1

- Active area: 170 cm²
- Dolphin CCM: Chemours membrane + ionomer; CEA formulation + process; 0.1+0.4 mgPt/cm²
- Additive manufacturing (DMG-MORI)
- No GDM on one-side (ZSW, CEA)
- Composite Terminal Plate (Hexcel)
- **Objective : high performance (1.8-2.0 W/cm²)**

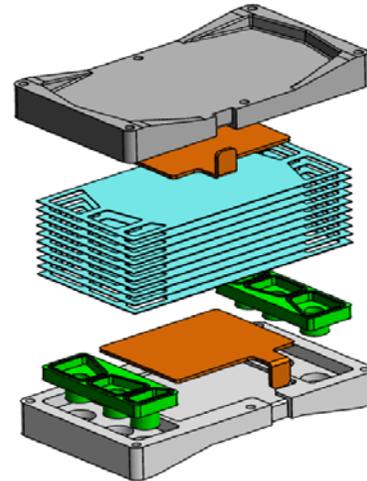
TP4-2

- Active area: 90 cm²
- Dolphin CCM: Chemours membrane + ionomer; CEA formulation + process; 0.1+0.4 mgPt/cm²
- FF machined in GDL (CEA, ZSW)
- Homogeneization: printing (CEA)
- **Objective : high kW/kg, kW/l; 1.4-1.6 W/cm²**



Setup:

- DOLPHIN ITP (HEXCEL)
- AMv1 EFC with thin GDL (with MPL) / stand-alone MPL (DMG MORI, ZSW)
- DOLPHIN advanced EC including Chemours NDP8011 membrane (same as TP4-2, CEA, CHEMOURS)

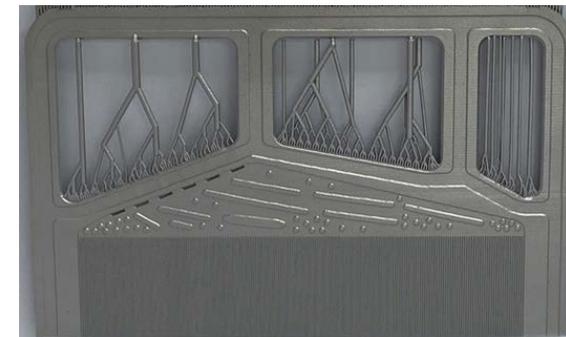


Derived from original DOLPHIN 100 / 5 kW stack specification, EFC design adapted to AM technology, active area: 175 cm²

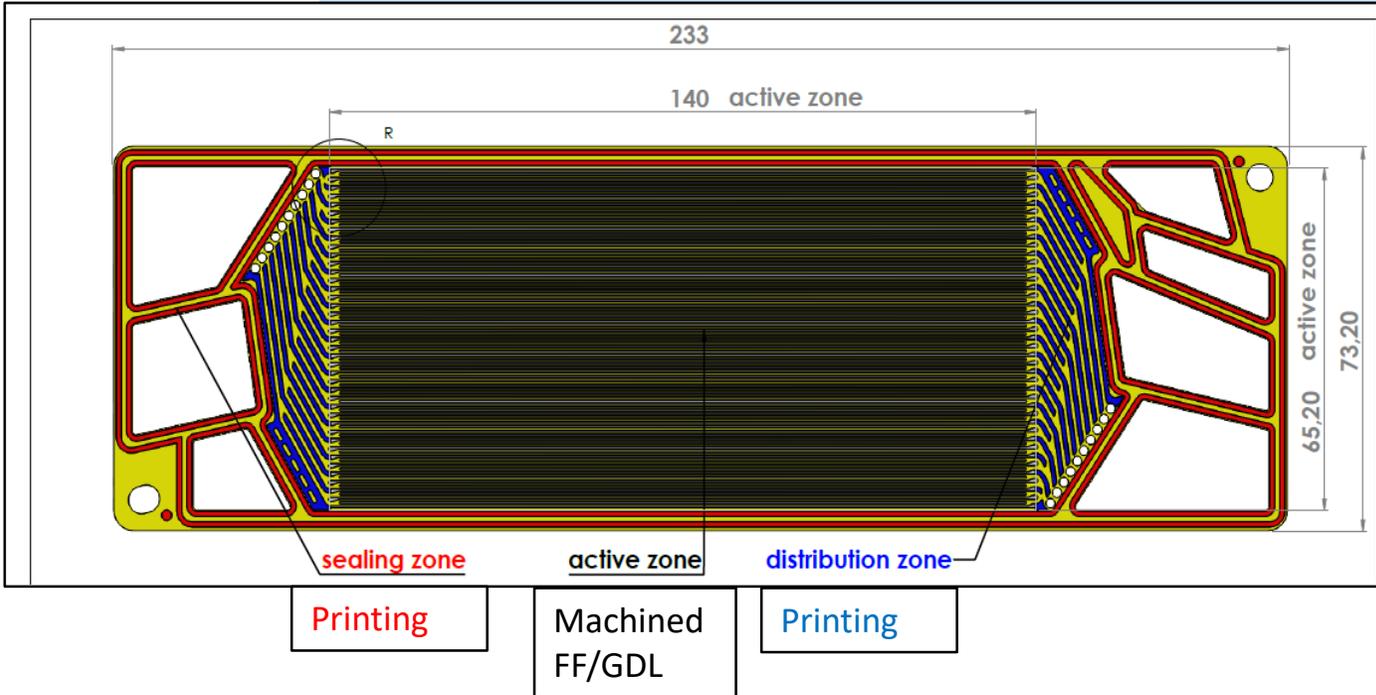
Expected kW/l, kW/kg: lower than with TP4-2
Still improvement expected by EFC design optimization (plate thickness, weight)

Expected W/cm²: higher than with TP4-2

Assembly of approx. 15 cells for 5 kW stack



TP4-2



Derived from a design for full printing (CEA)
Active area: 90 cm²

DOLPHIN advanced EC including Chemours
NDP8011 membrane (same as TP4-1, CEA,
CHEMOURS)

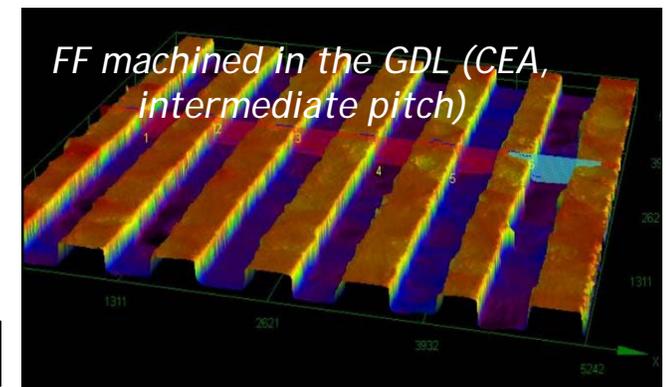
Expected kW/l, kW/kg: higher than with TP4-1
Expected W/cm²: lower than with TP4-1

Assembly of 30-40 cells



Dolphin EC

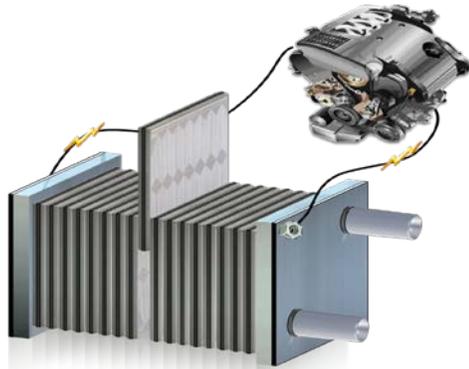
Metallic sheet



Thank you for your attention!



Disruptive pemfc stack with novel materials,
Processes, architecture and optimized interfaces



The DOLPHIN project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No. 826204. This Joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation programme, Hydrogen Europe and Hydrogen Europe Research.

