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	<b>D1.4 - Compilation of High Level Stack Specifications</b>	
	Dissemination level: PU	

## Deliverable D1.4

### Compilation of High Level Stack Specifications Public Summary

Grant Agreement number: 245142  
 Project acronym: Autostack  
 Project title: Automotive Fuel Cell Stack Cluster Initiative for Europe  
 Funding Scheme: Support Action  
 Project start: 01/01/2010  
 Project duration: 18 months

Period covered: from January 2010  
 to September 2011

Project co-funded by the Fuel Cells and Hydrogen Joint Undertaking within the Seventh Framework Programme		
Dissemination Level		
<b>PU</b>	Public	<b>X</b>
<b>PP</b>	Restricted to other programme participants (including the FCH JU)	
<b>RE</b>	Restricted to a group specified by the consortium (including the FCH JU)	
<b>CO</b>	Confidential, only for members of the consortium (including the FCH JU)	
<b>EU restricted</b>	Classified with the mention of the classification level restricted "EU Restricted"	
<b>EU confidential</b>	Classified with the mention of the classification level confidential "EU Confidential"	
<b>EU secret</b>	Classified with the mention of the classification level secret "EU Secret "	

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## 1 Objective of this deliverable

The objective of this deliverable is to generate a set of commonly accepted technical specification for the next generation full size automotive fuel cell stack and to determine technical targets and requirements for the stack platform being the main electric power in an automotive fuel cell propulsion system. In this document the high level specifications set out and agreed upon by the partners shall be presented.

## 2 High Level Stack Specification


In order to determine a consistent scope of activity, the term “stack” was defined comprising the following components:

- Bipolar plates, MEA, sealing
- Current collectors + end plates
- Stack compression kit
- Casing / Housing (also for the purpose of electromagnetic compatibility)
- Flanges and (quick) connectors
- HV-contactors + interlock
- Vehicle mounts (brackets)
- End cell heaters (PTCs)
- Sensors.

Other components such as hydrogen leakage sensors, stack box ventilation (active or passive), hydrogen shut-off valve and air shut-off valves for electrode protection (optional) are considered part of the fuel cell power system. The stack shall have a self supporting structure and not require structural support of or to the vehicle.

Reflecting the system requirements, the following high level stack specification was developed and agreed:

- Power density
  - High operating point: 1,5 A/cm<sup>2</sup>@ 0,675 V/cell
  - Low operating point: 0,2 A/cm<sup>2</sup> @ 0,8 V/cell
- Stack efficiency
  - High power: 51 %
  - Low power: 61 %
- Pt – Loading
  - Low risk approach: < 0.6 mg/cm<sup>2</sup>
  - Medium risk approach: 0.4 mg/cm<sup>2</sup>
- Stack-power 95 kW, scalable 10 – 95 kW or multiples
- Operating Temperature < 95° C
- Operating pressure < 2 bar<sub>a</sub>
- Voltage 220 - 430 V
- Power density (95 kW stack) < 60 l / 75 kg
- Cost 101 €/kW @ 10,000 \*95 kW stacks
- Durability beyond > 5000 h.
- Stack EoL-criterion: power loss at high operating point of 10% @ constant heat release

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The definition of the specification targets was based on the assessment of component availability and specification properties until 2020.