

Project memo

NEXPEL Deliverable D6.4

Laboratory PEM electrolysis stacks ready for WP 07

VERSION

1

DATE

2012-11-23

AUTHOR(S)

Magnus Skinlo Thomassen - SINTEF
Emile Tabu Ojong – Fraunhofer ISE

CLIENT(S)

FCH-JU

CLIENTS REF.

Ms Eveline Weidner

PROJECT NO.

80607800

NO. OF PAGES AND APPENDICES:

10 + appendices

ABSTRACT

This memo is a documentation of the shipment of a 10 cell electrolyser stack from Fraunhofer ISE to Statoil for field testing. It includes performance data from initial conditioning of the stack

PREPARED BY

Emile Tabu Ojong

SIGNATURE

APPROVED BY

Project responsible

SIGNATURE

PROJECT MEMO NO.

Project Memo No.

CLASSIFICATION

Restricted

Document history

VERSION	DATE	VERSION DESCRIPTION
Version	Date	"[Version description. Use TAB for new line]"

Table of contents

**Table of contents will be automatically generated based on the Heading-styles.
Press F9 (Update Fields) here when styles are used.**

APPENDICES

"[List appendices here]"

1 E-mail communication

Below are two e-mails from Fraunhofer and from Statoil documenting the shipment of a 10-cell electrolyser stack (21.11.2012) and arrival of the stack (06.12.2012). A picture and performance data from the conditioning of the stack is enclosed.

> -----Original Message-----
> From: Emile Tabu Ojong [<mailto:emile.tabu.ojong@ise.fraunhofer.de>]
> Sent: 21. november 2012 17:13
> To: Stein Trygve Briskeby; Magnus Thomassen
> Subject: Re: Shipment of 10 cells stack
>
> Dear Stein
> Dear Magnus,
>
> I shipped the stack yesterday. Information from our technical department is that it will be air freighted, so I will get the details about expected delivery date tomorrow. I'll inform you about that as soon as possible.
>
> Information about tests that have been performed and reference conditions are enclosed in the package, as well as operating conditions and other necessary documentations.
>

From: [Stein Trygve Briskeby](#)
To: [Klicpera](#); [Magnus Thomassen](#); ["Wayne C. Hayes"](#); ["BEILLE Florent"](#); ["Nicolas Guillet"](#); [tom.smolinka@ise.fraunhofer.de](#); [Tommy Mokkelbost](#); ["Emile Tabu Ojong"](#); ["Eric Mayousse"](#); ["Diddier Vannucci"](#); [Børre Tore Børresen](#)
Cc: ["H. Colquhoun"](#); ["Daniel Smith"](#)
Subject: NEXPEL Field test
Date: 6. desember 2012 13:30:08

Dear all

For information, the NEXPEL stack arrived at the test site in Porsgrunn today. First visual inspection revealed no damages during transport. Hopefully we can start installing the stack tomorrow.

Best Regards

Stein Trygve Briskeby

The information contained in this message may be CONFIDENTIAL and is intended for the addressee only. Any unauthorised use, dissemination of the information or copying of this message is prohibited. If you are not the addressee, please notify the sender immediately by return e-mail and delete this message.
Thank you

2 Picture of 10 cell stack



3 Performance data

Tests performed on 10 cells NEXPEL stack for field testing at Statoil

I. Stack specifications and preliminary tests

# Cells	10	
Current collectors	Anode	Ti mesh (CEA), 2.1 mm
	Cathode	Spectracarb + GDL (CEA), 3,1 mm
MEA	Standard CCM EF-40 (FuT)	
Water tightness	Up to 30 bar completely tight	
Gas tightness	Up to 30 bar completely tight (with N ₂ gas)	
Differential pressure	Internally tight at 500 mbar and 1000 mbar differential pressure, anode to cathode and cathode to anode	
Peak power	6 kW _{el} (280 A and 21,9 V)	

II. Conditioning

- Conditioning was performed under potentiostatic mode with the voltage cycling from 1,9 V and 2,1 V @ 1 bar (abs) and 80° C. Voltage was held at each stage for one hour.
- At least 75 hours of conditioning was targeted
- Only 56 hours (20 hours intermittently and 36 hours continuously) altogether was achieved due to time constraint (stack had to be shipped to Statoil A.S.A.P)
- Conditioning plot after 56 hours of conditioning (during the 36 hours of continuous testing)

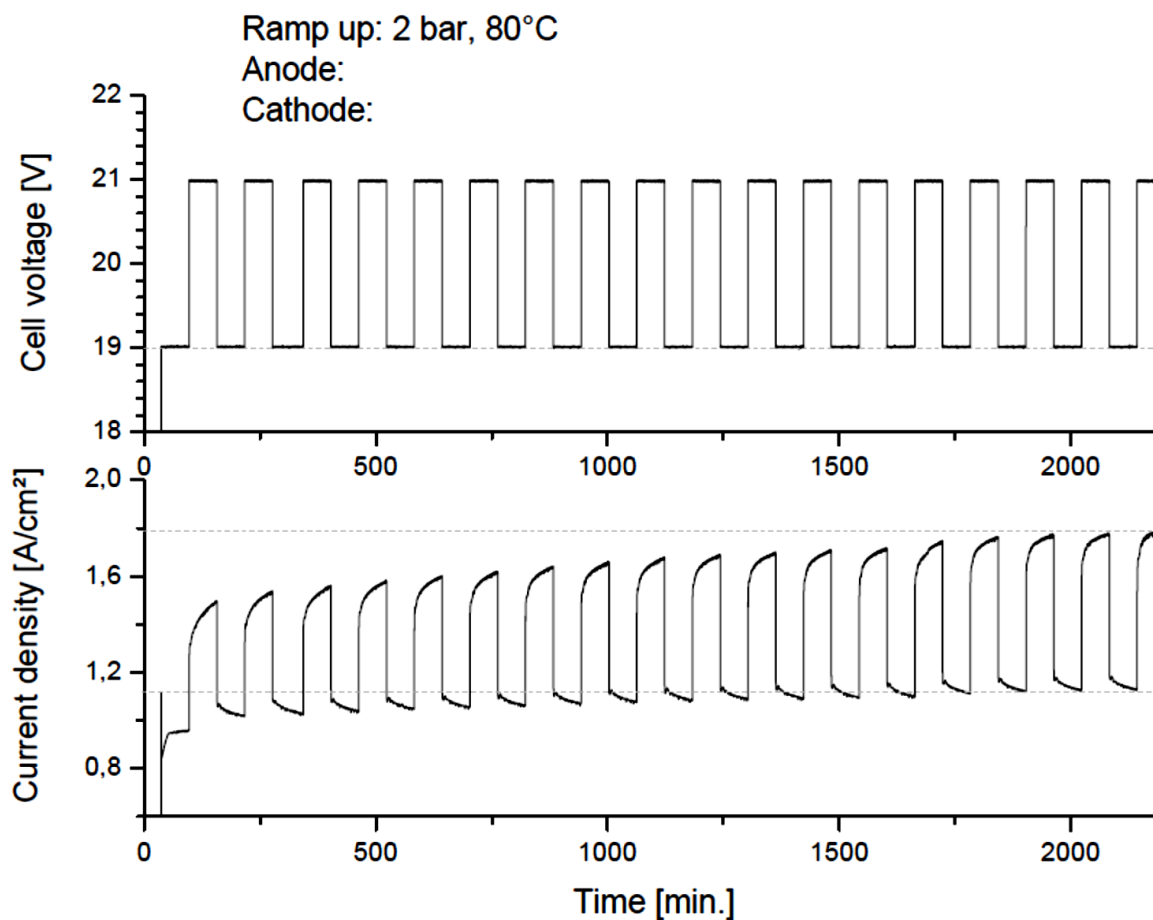


Figure 1: 20 – 56 hours of conditioning

- Can be seen that the current was increasing and still not stabilized. It is recommended that Statoil continue with the conditioning for at least 20 hours.

III. Polarisation curves

- Before conditioning (stack)

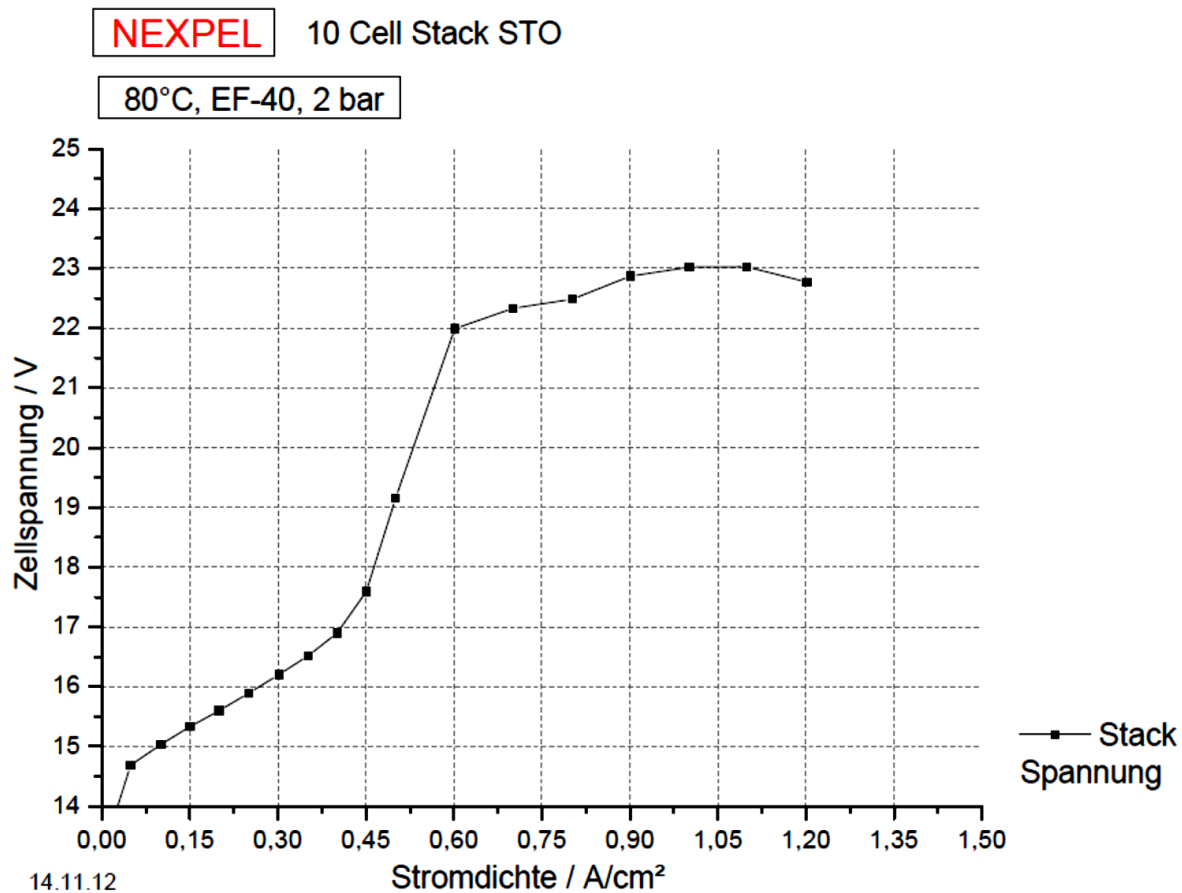


Figure 2: Stack polarisation curve before start of conditioning process

- After 20 hours of conditioning (single cells)

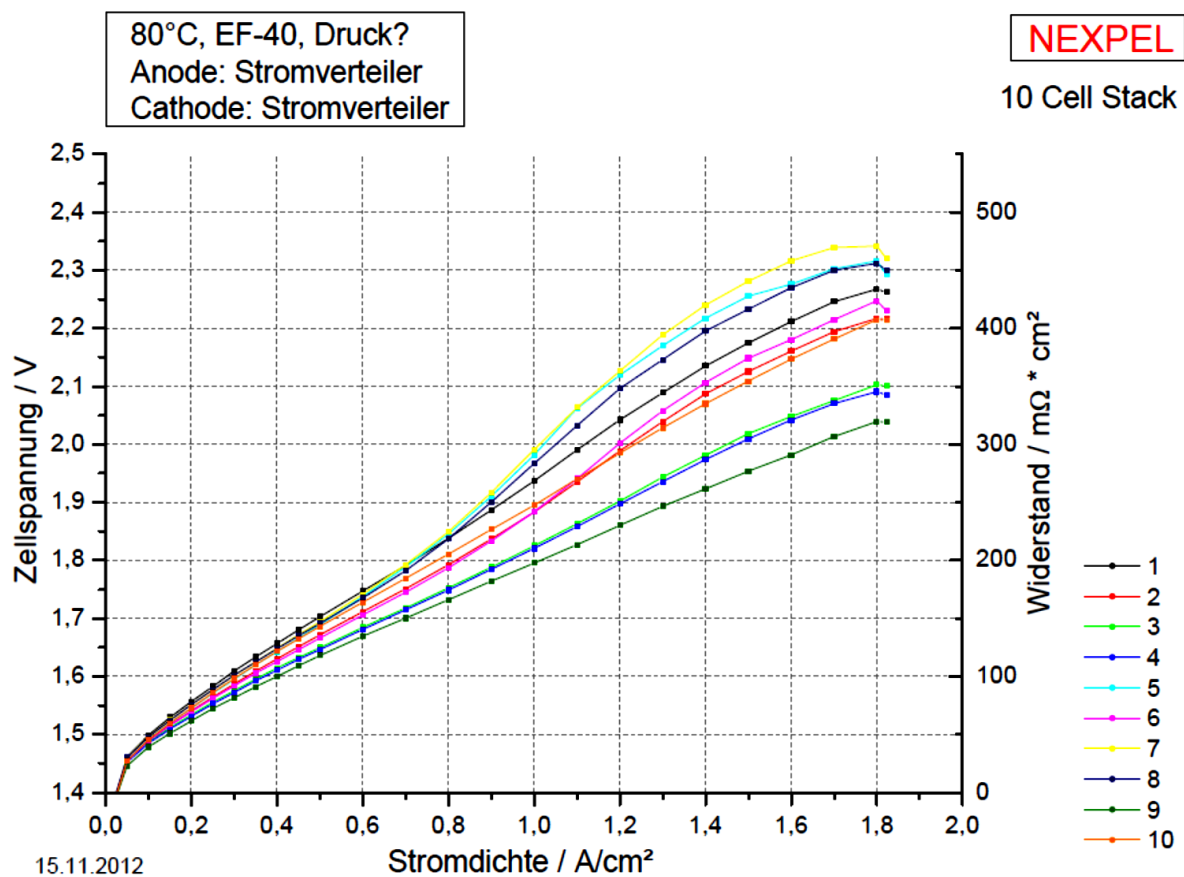


Figure 3: Single cells performance after 20 hours of conditioning

- After 56 hours of conditioning (single cells)

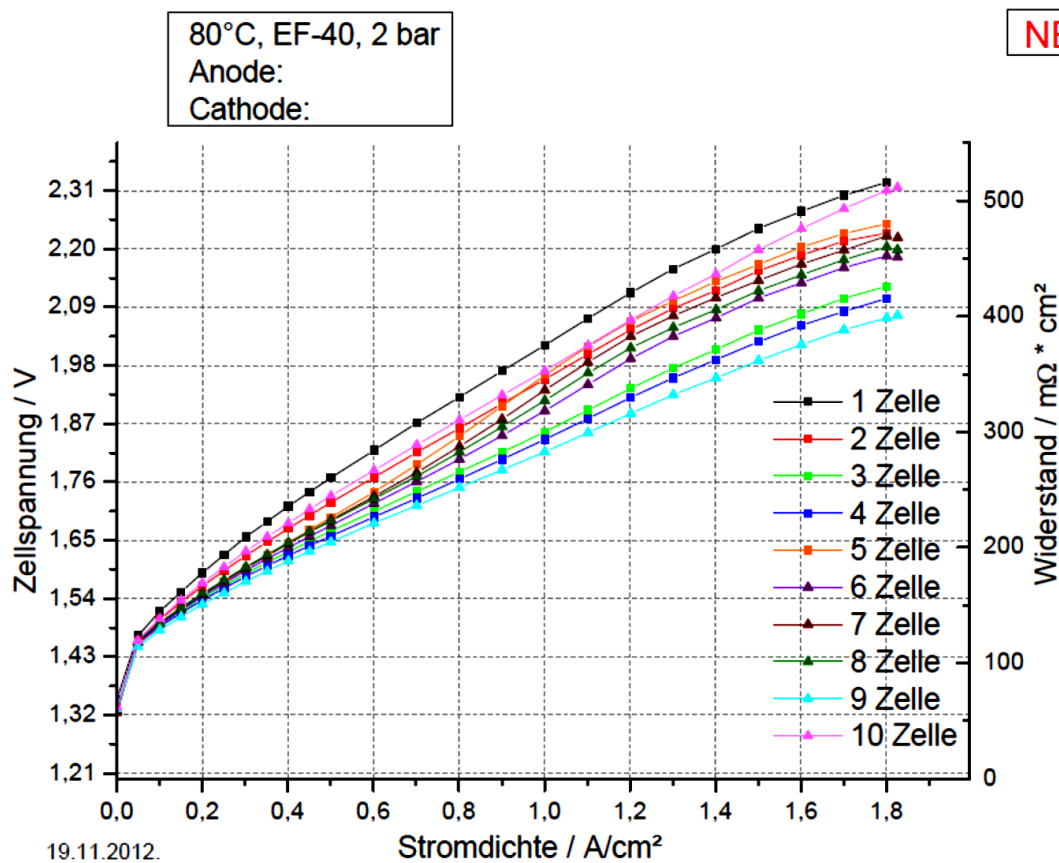


Figure 4: Single cells performance after 56 hours of conditioning

- After 56 hours of conditioning (stack)

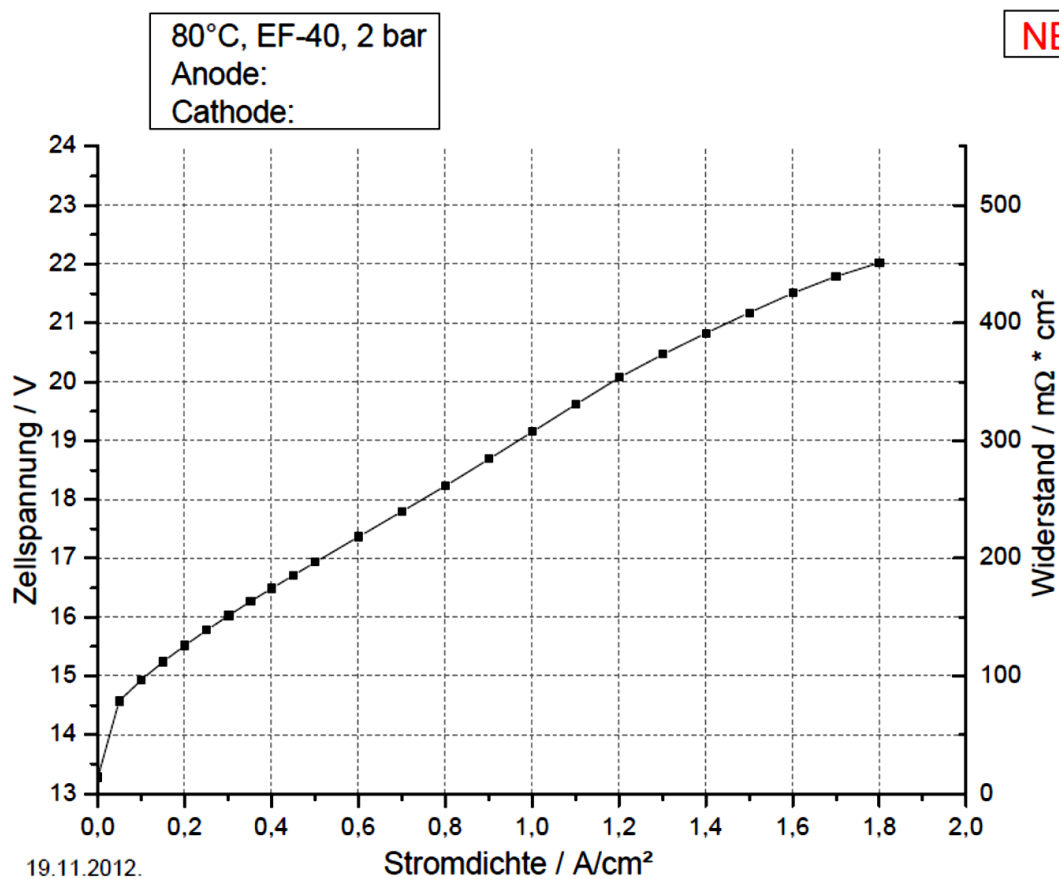


Figure 5: Stack performance after 56 hours of conditioning



Technology for a better society

www.sintef.no