



Spunlace & PM 2,5... the right Alternative?

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Introduction

- Possibilities with this Media
 - ✓ Presentation of the special performance Criteria from Spunlace Media and the influence in filtration. Hypothesis about the physical processes within the Spunlace

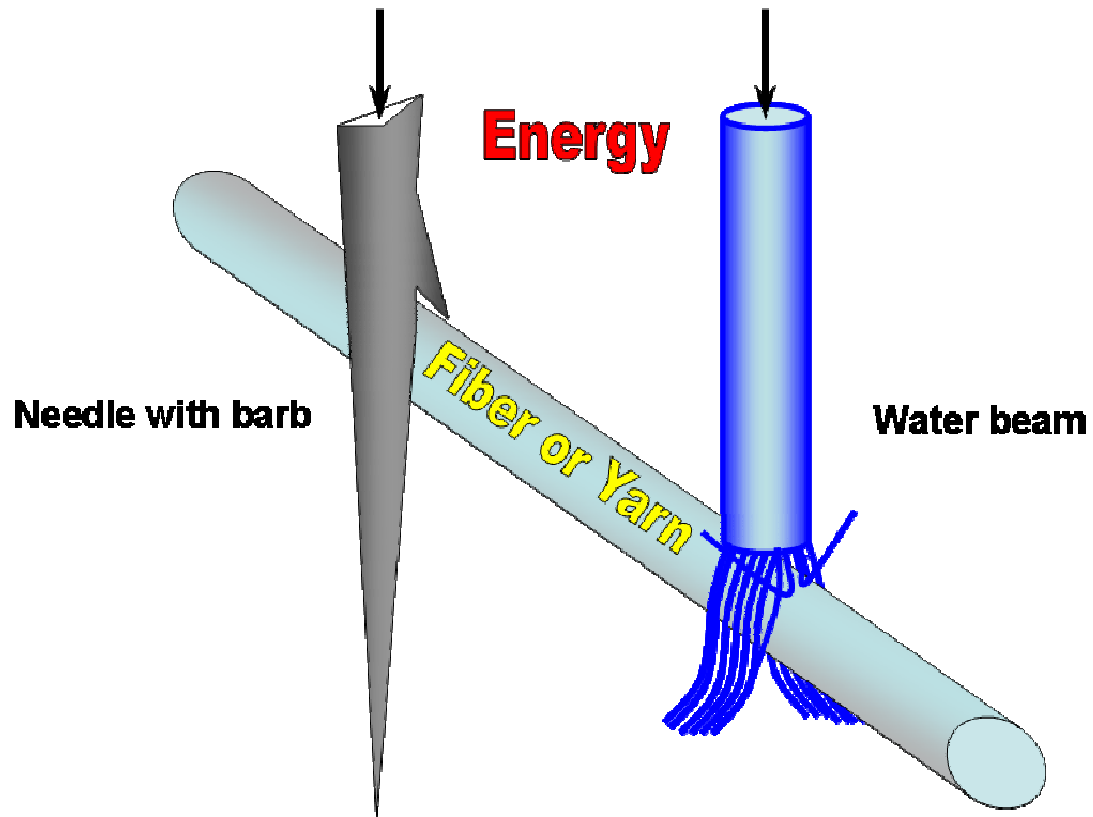
- Values out of a practical use
 - ✓ Collection of different industrial cases and results.
 - ✓ Window of PM 2.5

- Spunlace and PTFE it's not a contradiction ... first knowledge base
 - ✓ First bag investigations show a proven performance. Next steps for the Development and how to put this in praxis.

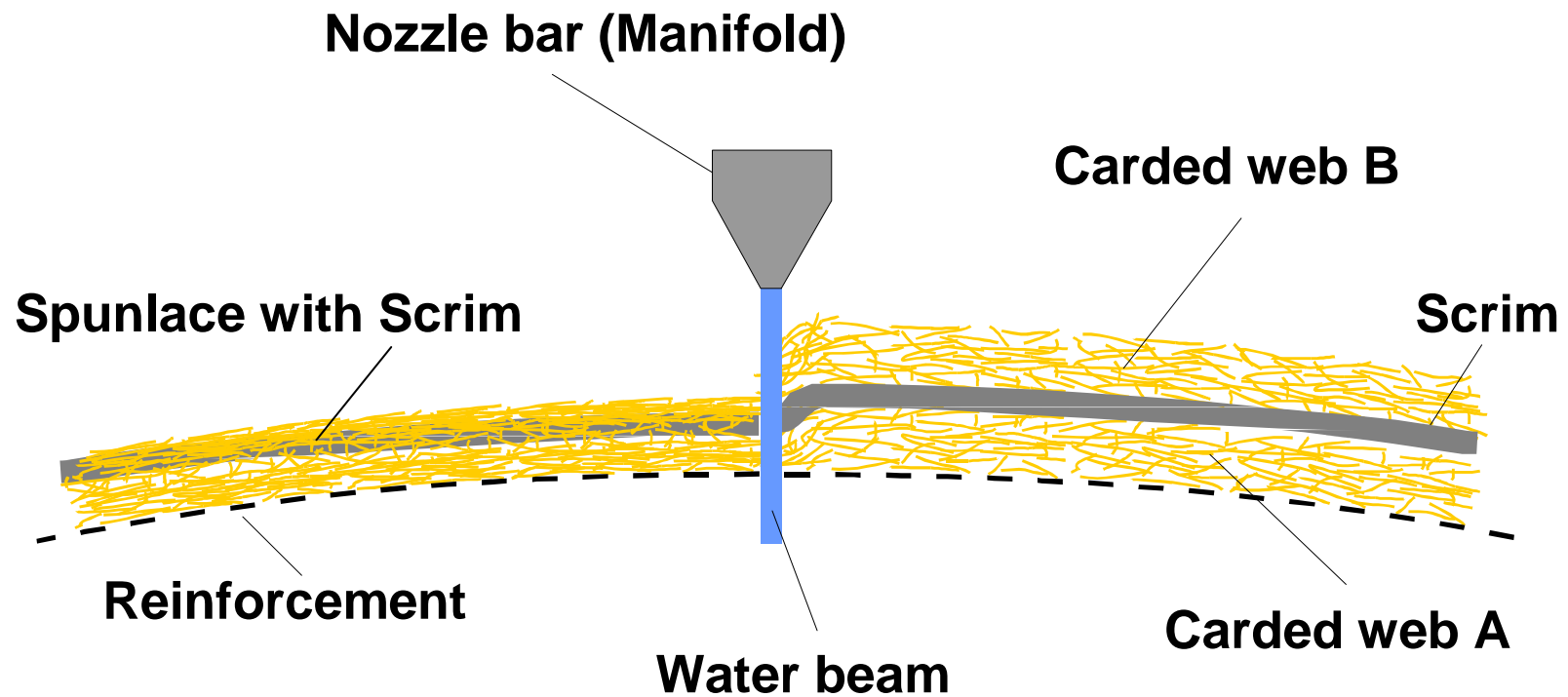
Hypothesis of Entangling

- Fibers and Scrim will not be scratched or destroyed
- The Fibers are pushed or pulled from the water – always in the direction of the water flow and following the easiest way
- open areas withstand less and will be filled up with fibers
- Fibers are three-dimensional entangled (Effects of pushing and reflecting)
- no pressure spots or formed channels with fibers

Hypothesis of Entangling



Entangling with Scrim



Filtration as an Example



homogeneous Spunlace Layer with a scrim in the middle

Hypothesis of Filtration

- homogeneity and naturally entangled fibers (three-dimensional entangled) leads to a better surface and a more homogenizes cross section
- open areas and holes will be closed due to the „intelligent“ water, witch leads to more and smaller pores
- vertical Channels are not mechanically prepared (more effective Labyrinth)

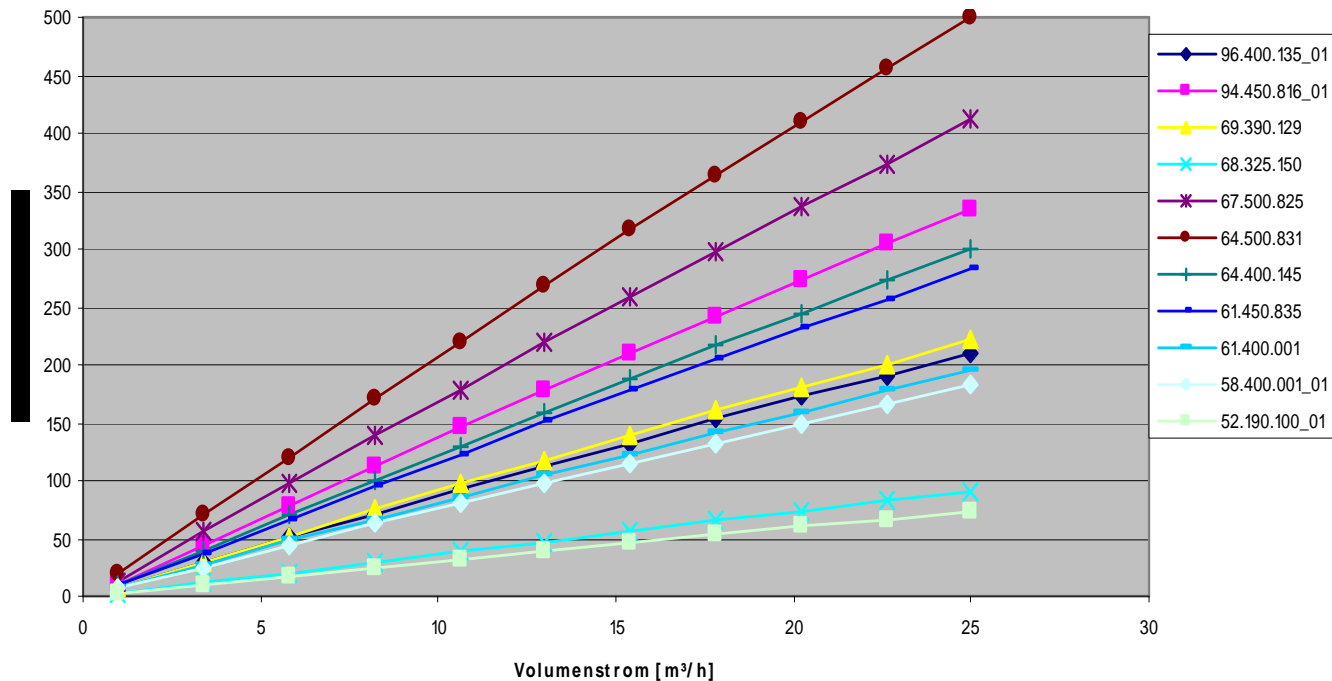
Result: higher Air permeability with less used rough material with the same or a better filtration performance

Hypothesis of Filtration

Pressure difference

Filter area: 0,0180m²

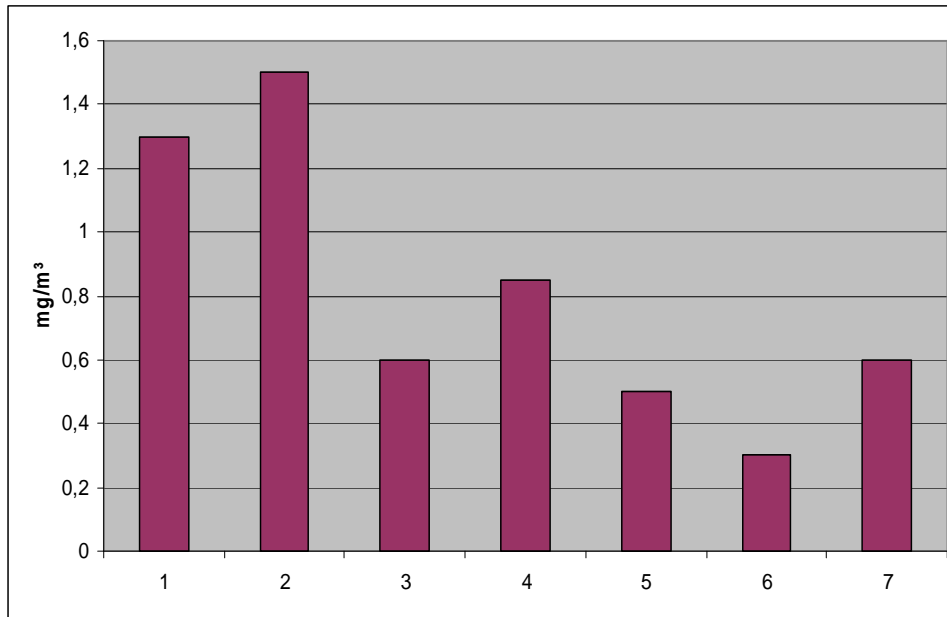
Differenzdruck Test



all Products are homogeneous with one fiber type (2.2 or 3.3 dtex) and the same scrim

Hypothesis of Filtration

Clean gas dust concentration VDI 3926



- 1 Needle felt 1 540 g/m²
PPS/PPS LD 116
- 2 Needle felt 2 480 g/m²
PPS/PPS LD 244
- 3 Needle felt 3 580 g/m²
PPS/PPS LD 60
- 4 Needle felt 4 600 g/m²
PPS/PPS LD 60
- 5 Needle felt 5 600 g/m²
PPS/PPS LD 60
- 6 Membrane on Nonwoven
540 g/m² LD 22
- 7 Spunlace 490 g/m² PPS/glass
LD 110

Conclusion



- Spunlace-web with an easy construction and with fiber savings for about 10-15%, achieve a good Filtration performance
- for some applications it is possible to work without a scrim
- Aftertreatment leads to the same performance increase like with a Needle felt; but it has to be adapted
- there is a big development potential with the material for tasks or opportunities like PM 2.5 or PM 1
...
- Spunlace production will be done now and in the future in just one step
- high level of process safety

Industry Data

- Municipal Waste Incinerator
- France: Tignes
- 2 Lines
- 40 bags for trail
- Filter type: Genevet
- Temperature: 150°C
- Quality: P84/Glas , 330 g/m²

- Gas Volume: 25 000 Nm³
- Pressure: 6 bar
- Emission: < 10 mg/Nm³
- Start up: June 2004



Industry Data

Spunlace

- lower thickness
- good cake
- no dust emission

Manche 1 dans l'état



Image : **B155-0506_1**

Date : 05/07/2005

Vue : Coupe transversale

Nappe : P84

TdB : Tissu de verre

Needle felt

- higher thickness
- P84 Scrim
- maybe fine fibers



Date : 05/07/2005

Vue : Coupe transversale

Nappe : P84

TdB : P84

Industry Data

Data's	P84/glass	P84/glass (new)
Air permeability (l/dm ² /min) DIN 53887 -with dust -cleaned	36 169	172
Weight g/m ² DIN 53854 -with dust -cleaned	430 341	336
Mechanical strength daN/5cm -MD -CD	72 58	73 56
Elongation % -MD -CD	34,9 50,4	30 45
Lifetime due to the testing	12 month	

next analysis April 2006

- **Germany: Schweinfurth Line 1 + 2**
- **finished, converted and installed by FOS Germany**
 - ✓ Filter area: 2 x 1700 m² Temperature: 70 - 100°C
 - ✓ Quality: PAN/PES 500 g/m² with scrim, PAN/PES 400 g/m² without scrim
 - ✓ Pressure loss: 180 mm CE Gas volume: 75 000 Nm³
 - ✓ Air pressure: 3- 4 bar Clean gas: < 2 mg/Nm³
 - ✓ Line 1: start up July 2003 Line 2: Start up July 2004

before

PET/PAN Needle punch bags
550gr/m²with PTFE treatment

Lifetime 2 years, pressure difference
and clean gas concentration have been too high

after

Spunlace PAN/PES
500 g/m² with scrim
400 g/m² without scrim

the amount on cleaning cycles have been
reduced by 50 %

Statement



- Spunlace-web with an easy construction and reduced weight fulfills the industrial filtration demand and offers an ideal Base for all the upcoming challenges and tasks
- with the additional use of fine- Micro- und Nano fibers; the media will go in a strong future
- with the introduction of more exhaust gas regulations like PM 2.5 the acceptance for this relatively new product or technology is being necessary and supported



Spunlace & PTFE – it's not a contradiction First Data

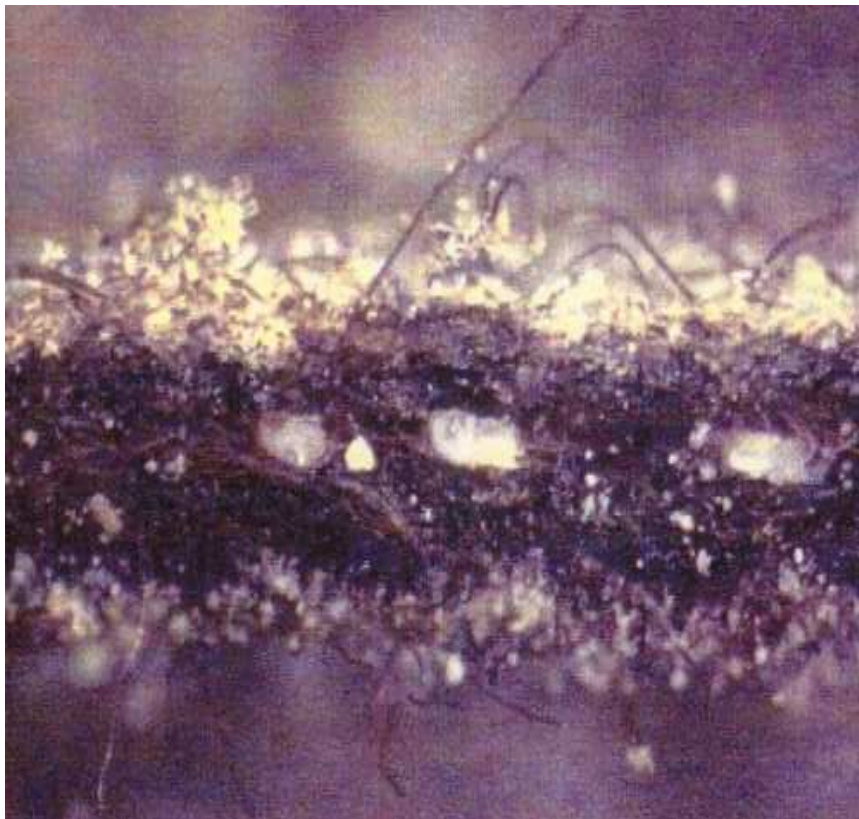
First Installation



- Germany: Coburg MHKW installed by FOS
 - ✓ Air pressure: 3- 4 bar
 - ✓ Dust emission: < 10 mg/Nm³
 - ✓ Start up 2004

- PTFE with PTFE Scrim
 - ✓ slightly pre needled (duple sided)
 - ✓ from the roller in the Spunlace

First Bag Testing after 3 Months



bag data's:

weight: new 650 g/m²

with dust: 832 g/m²

cleaned: 767 g/m²

Strength: MD/CD 37/64 daN/5cm

elongation: MD/CD 2/23 %

Air perm.: new 150 l/dm²min

with dust: 22 l/dm²min

cleaned: 63 l/dm²min

The next Generation

PTFE-web 650 g/m²
produced in one step
includes 100 g/m² of scrim
100% Profilen-Fibers on Profilen-scrim
testing dust: Pural NF

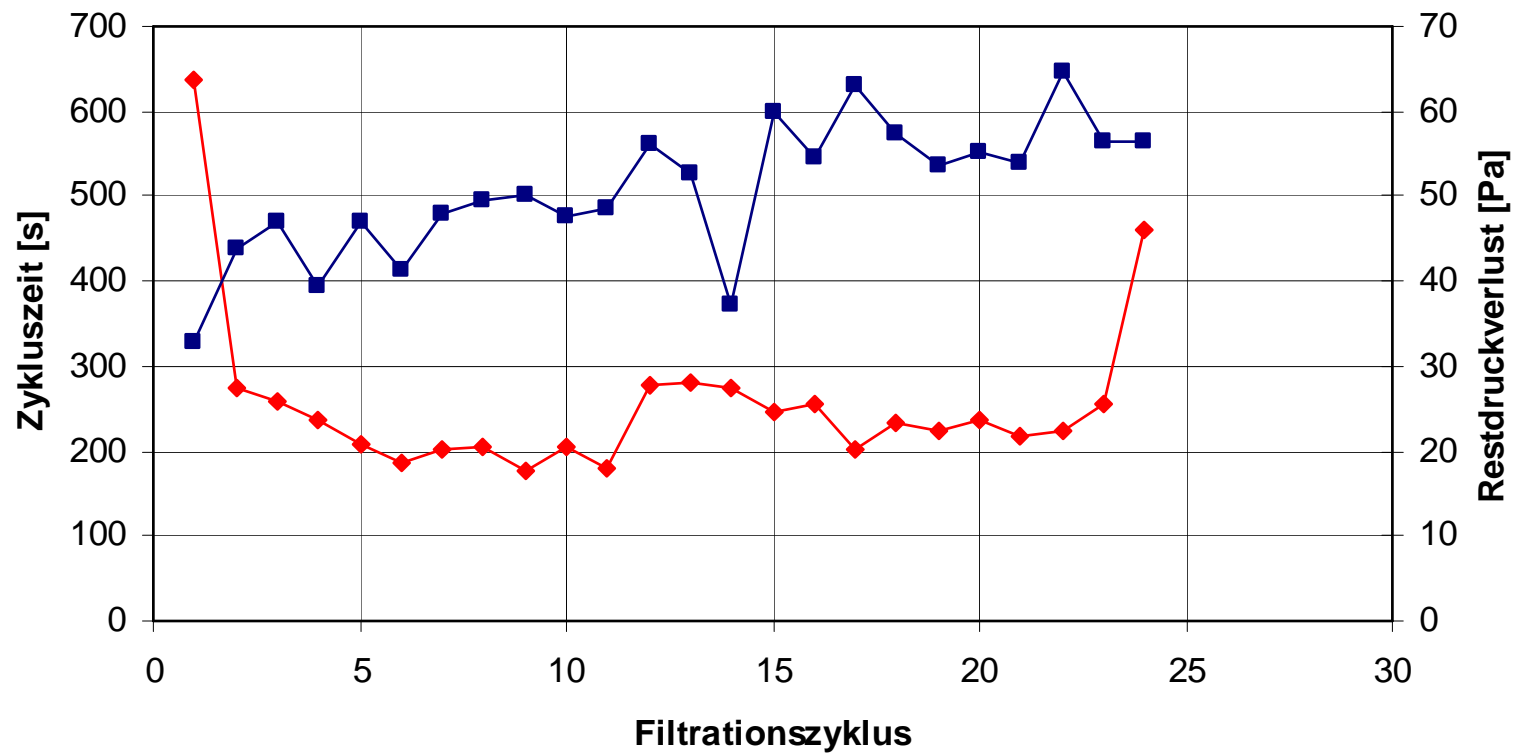


First Time

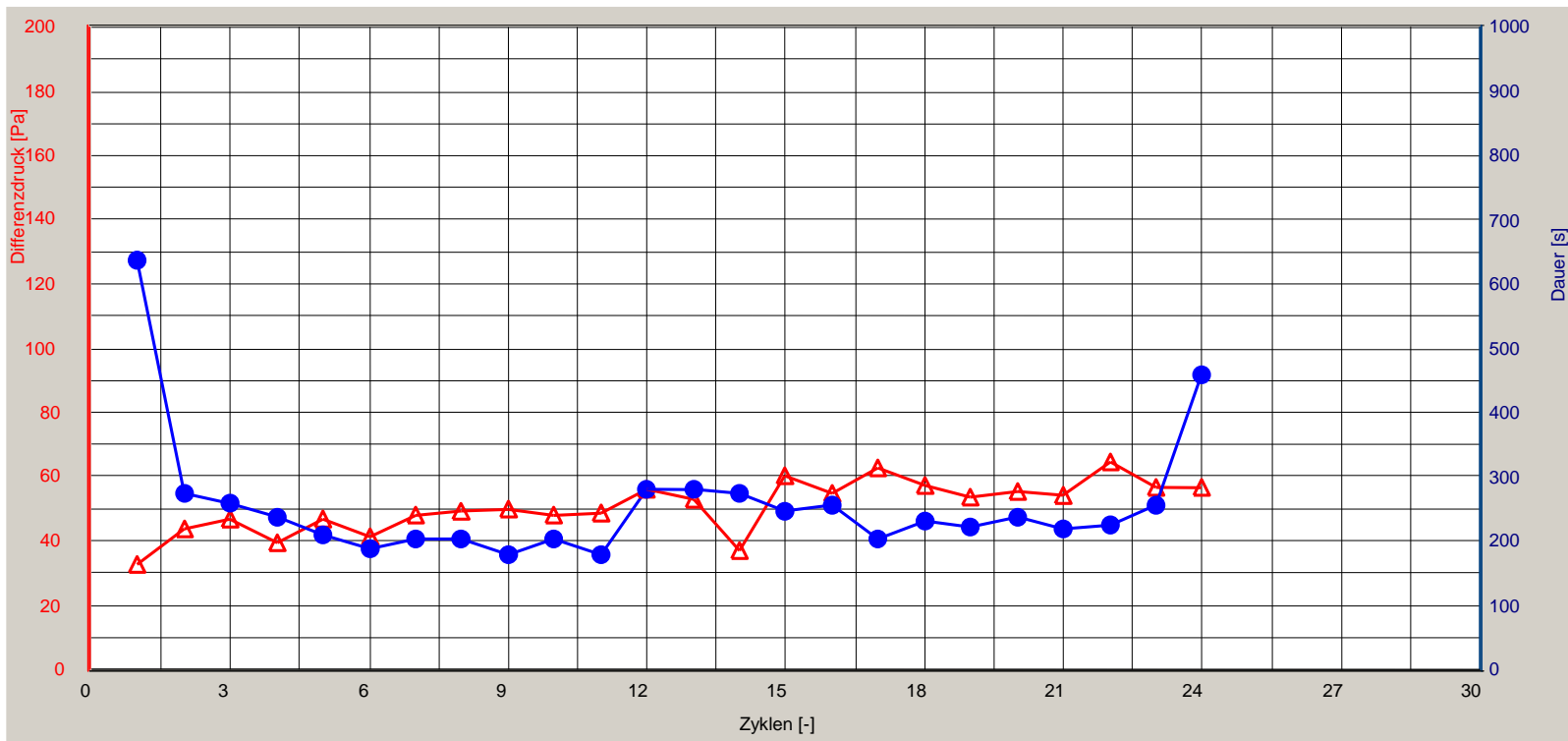
Neuzustand

◆ Zykluszeit

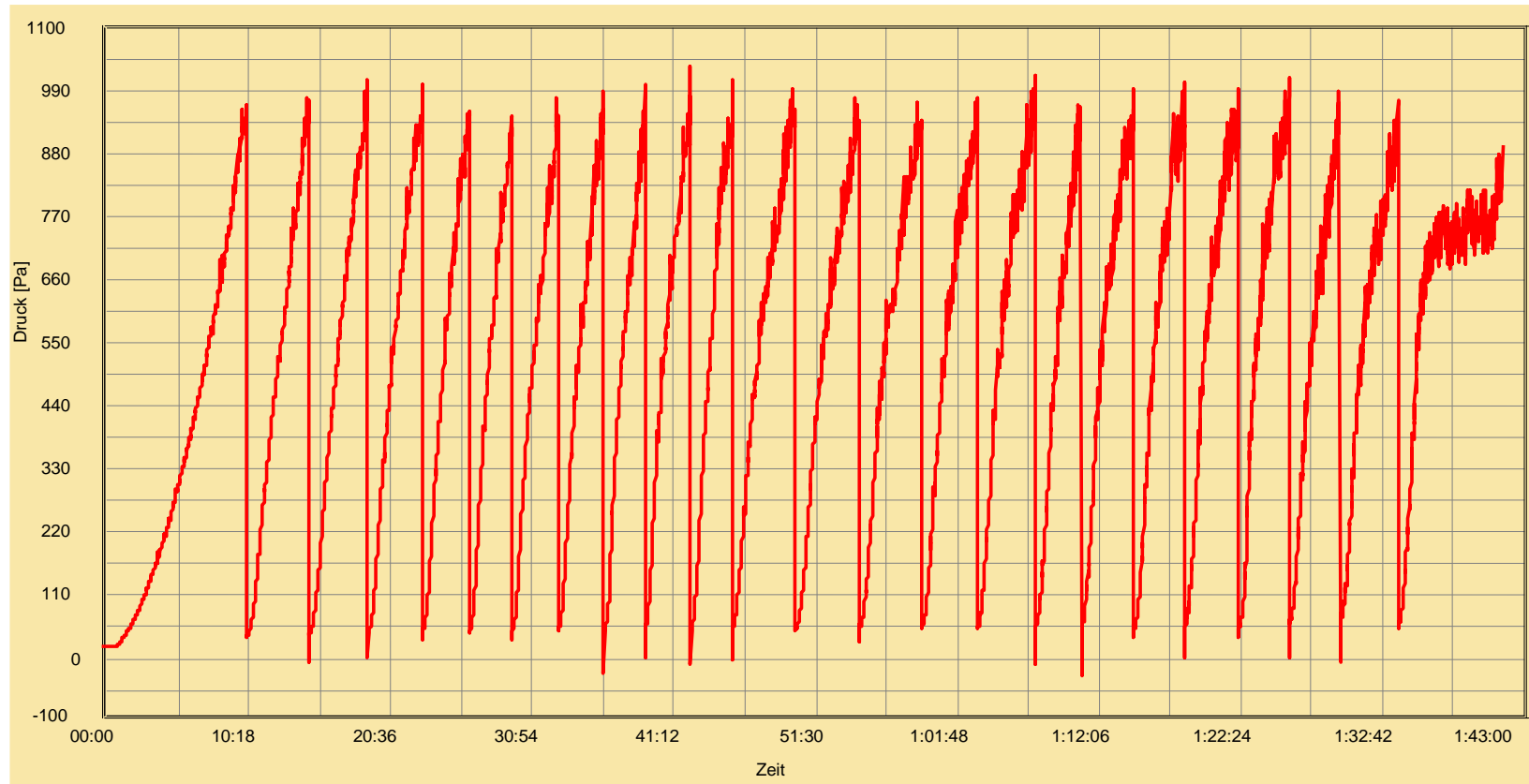
■ Restdruckverlust



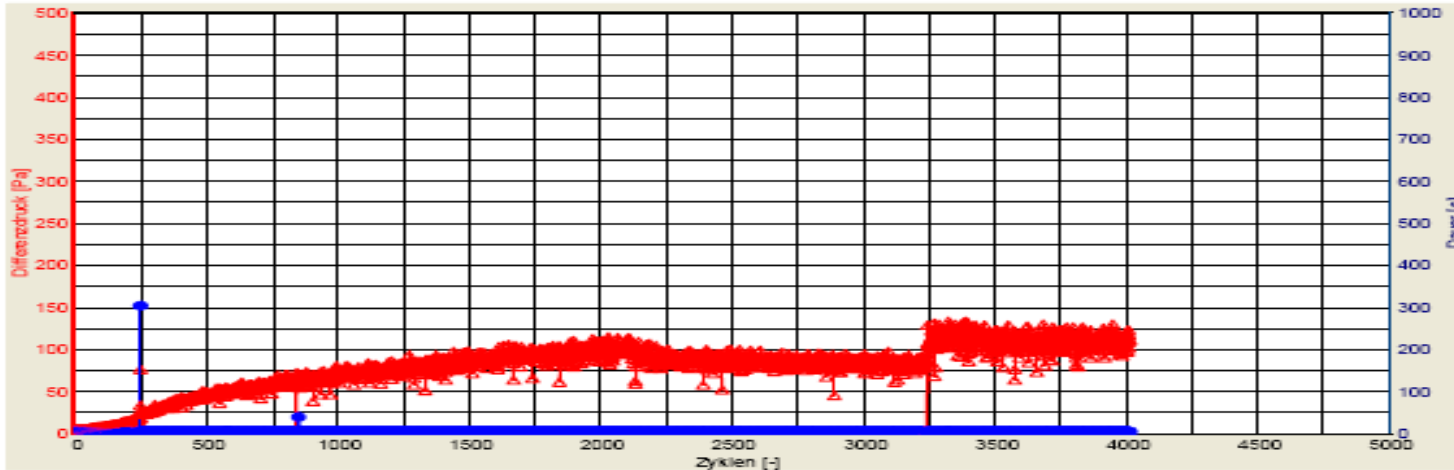
Pressure Difference – Cycle Time



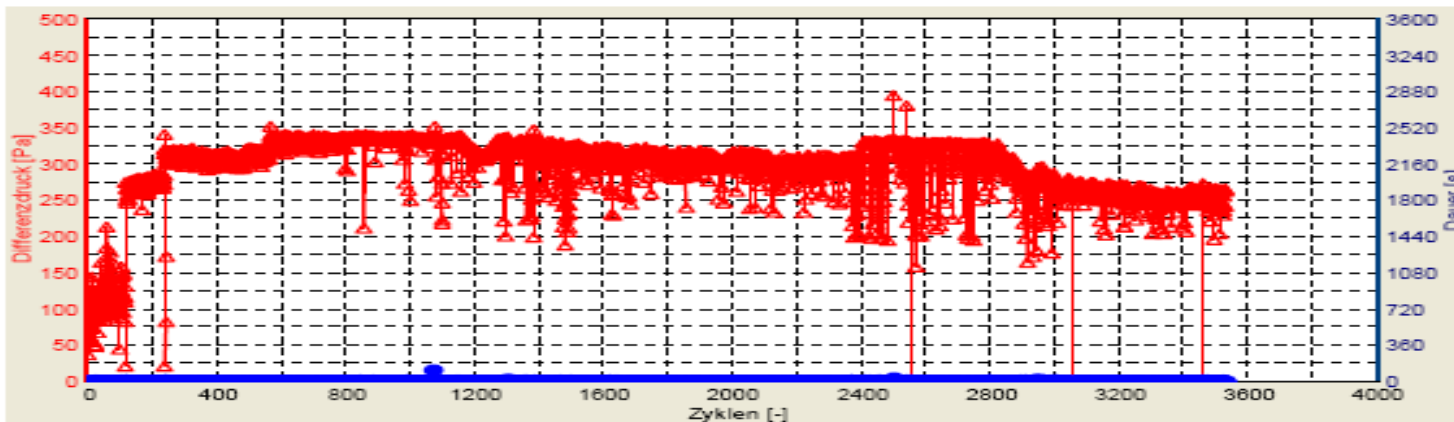
Pressure Graph for first 25 Cycles



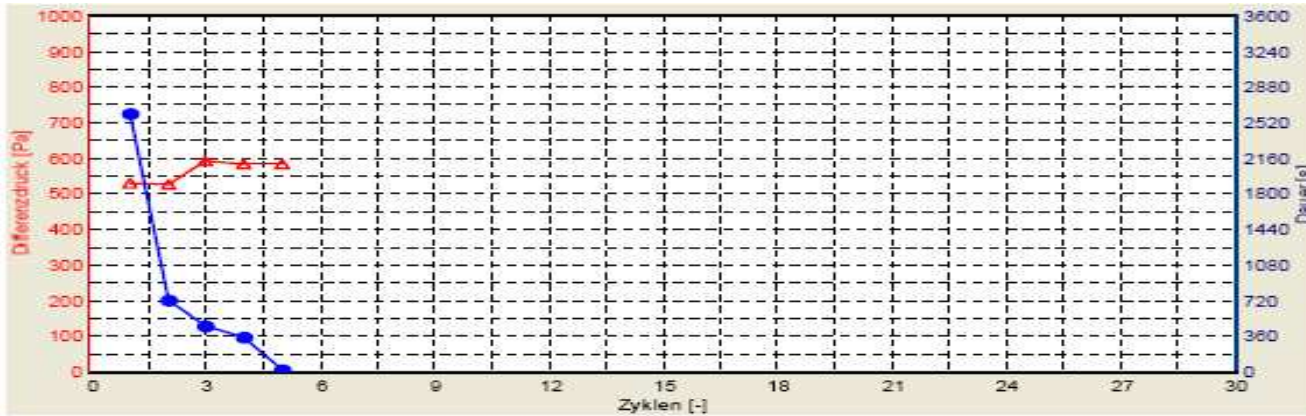
Alterng



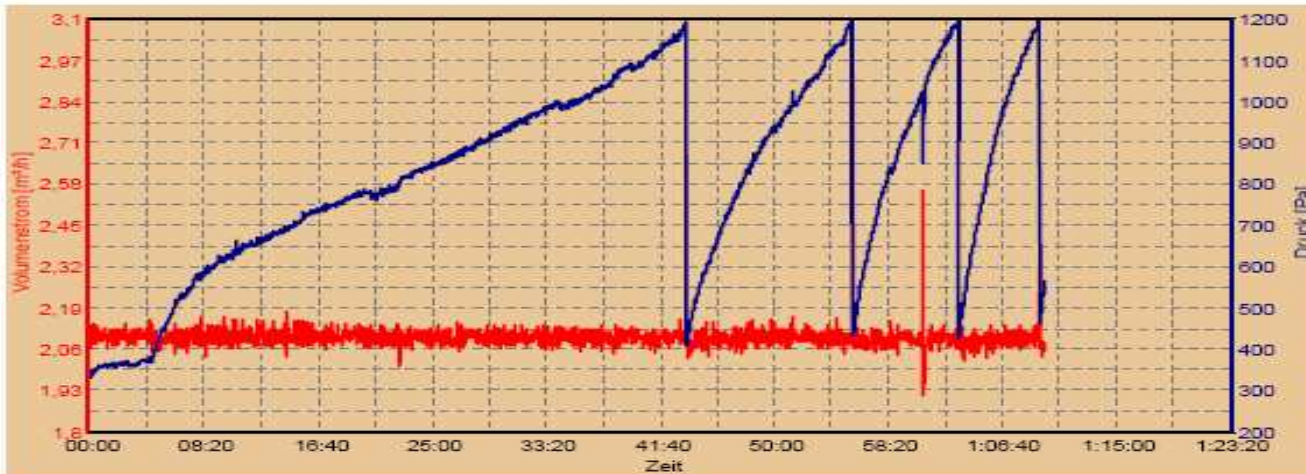
Die Alterung musste zuerst nach 4000Zyklen abgebrochen werden und wurde später mit weiteren 3533Zyklen fortgesetzt.



Final Cycles



Der Endzustand wurde gestartet und vorzeitig abgebrochen.



thank you for your attention

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