

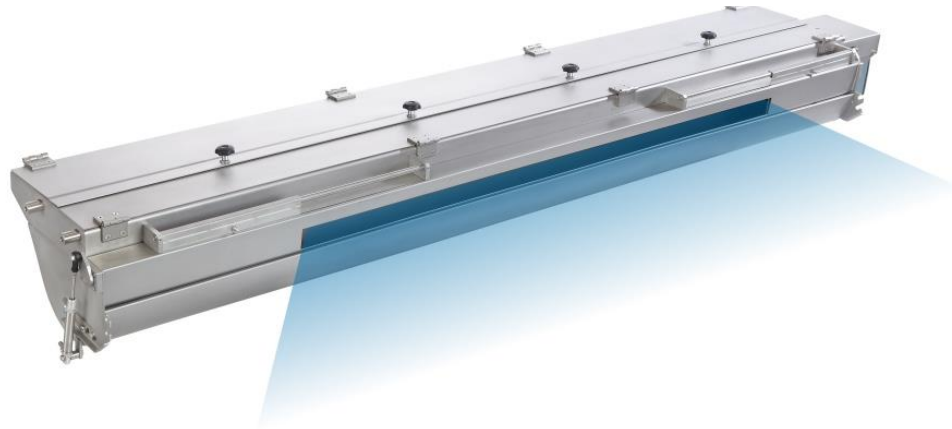
Effiziente Veredelung von Vliesstoffen mit Plasma- und Sprühsystemen

Efficient finishing of nonwovens with plasma- and spray-systems

Products



Corona treater



Spray coaters



Hot air dryers

Web Process Line

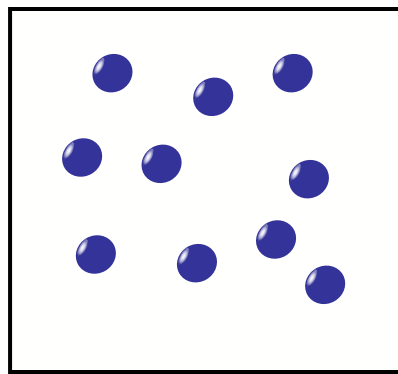


Corona Treatment of PP-Nonwoven



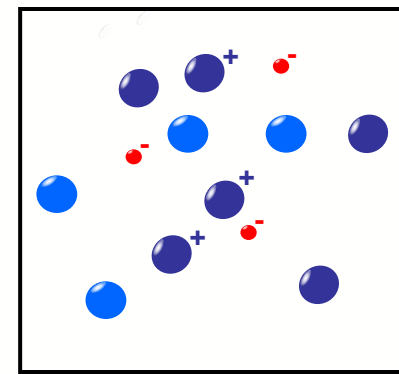
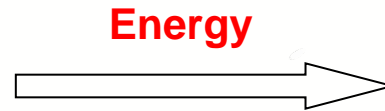
What is a Plasma ?

Plasma is a gaseous mixture of ions, electrons, and atoms or molecules



Gas

● Atoms



Plasma

● Atoms electronically activated

● Atoms

●⁺ Ions

●⁻ electrons

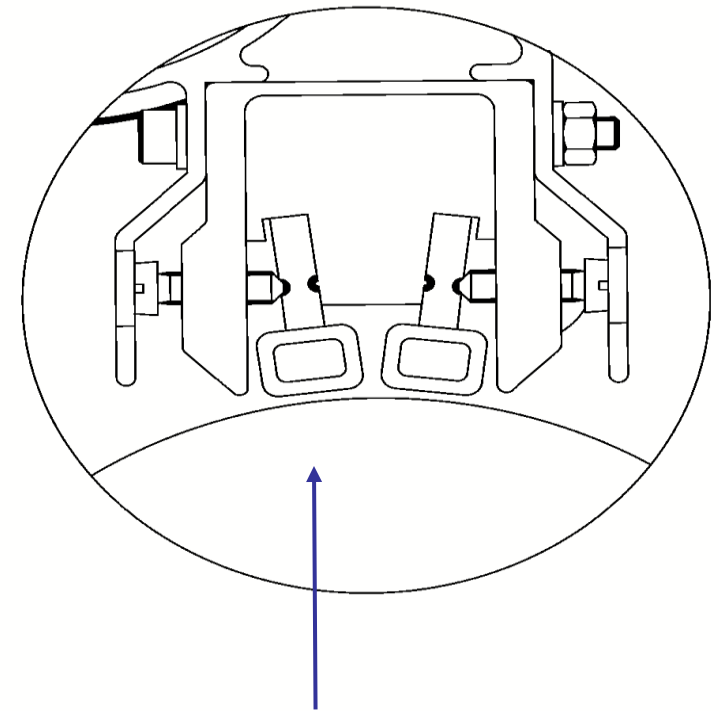
Corona = air-DBD

Working Principle



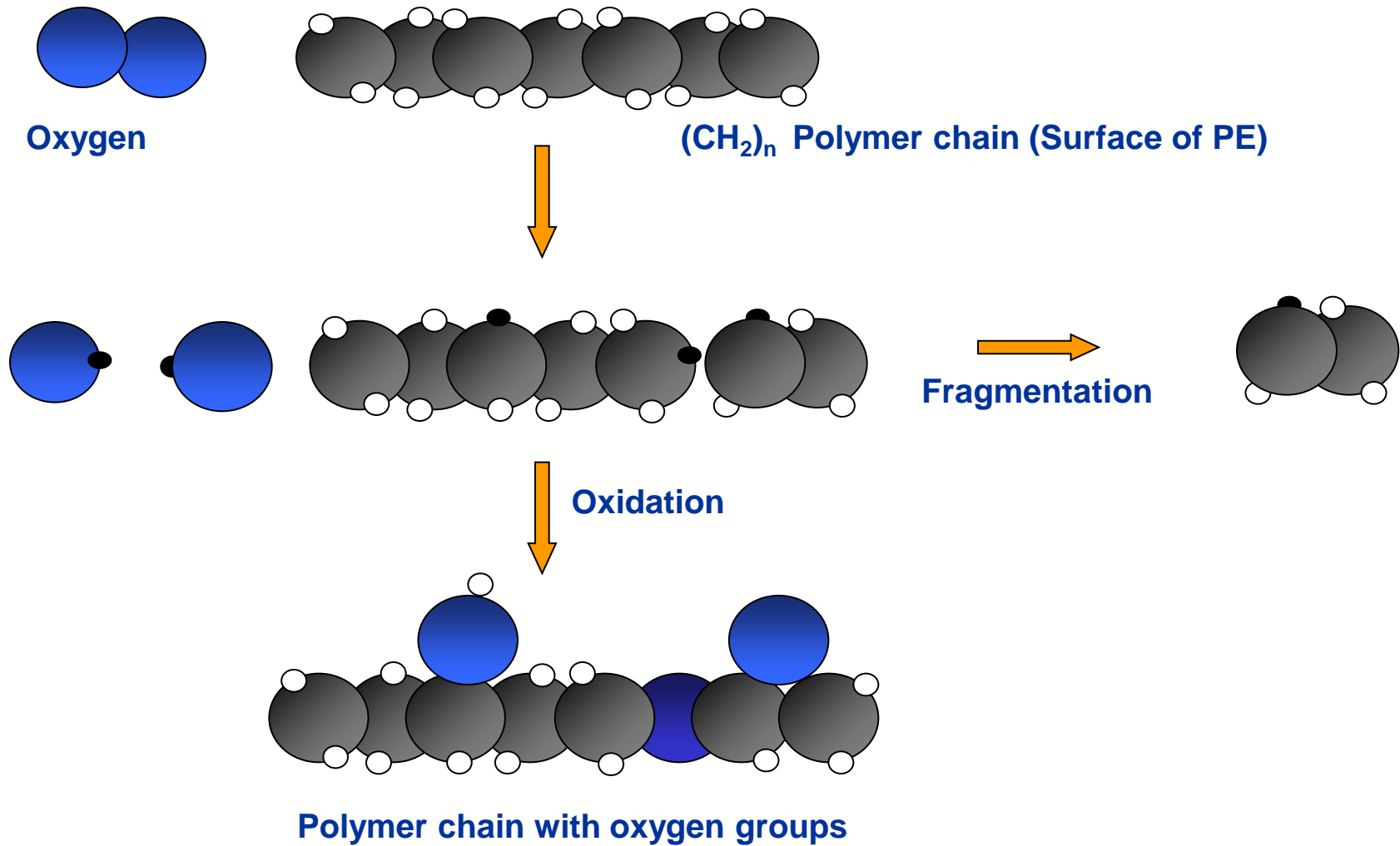
„Corona-Light“ in the discharge gap
8 ceramic electrodes / roller with ceramic coating

High Voltage Electrodes



Grounded Counter Electrode

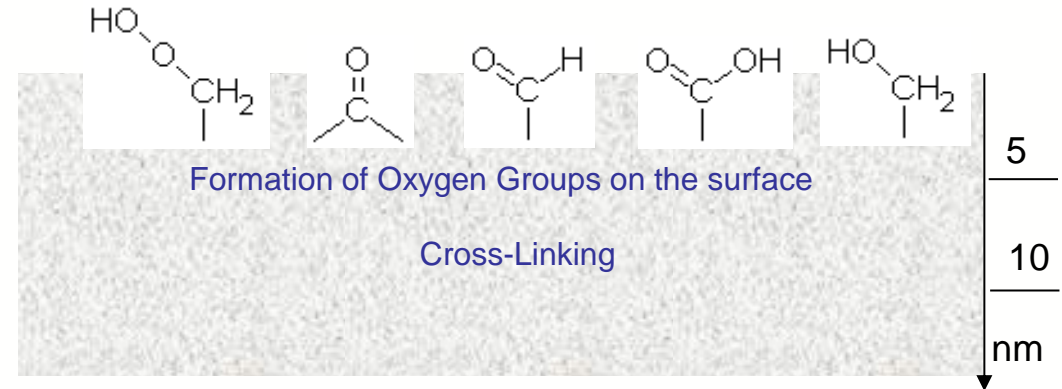
Air-DBD on PE Oxidation & Fragmentation



Effect of air-DBD on Plastic Film

Oxygen groups linked to the surface result:
Improvement of wetting and adhesion properties

Crosslinking of polymer chains result:
increase of melting point and weaker sealing properties



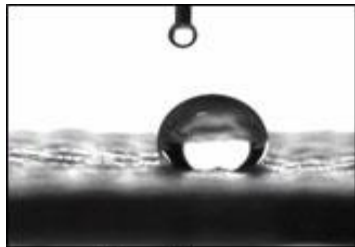
Number of oxygen atoms on the surface

PP without corona	No oxygen
PP corona treated	max. 30 O-Atoms per 100 C-Atoms
Formation of OH groups	1 – 5 %

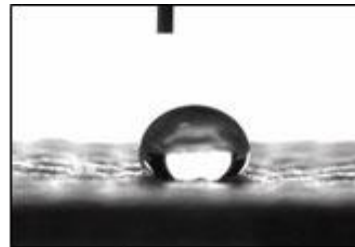
Types of oxygen groups	
Hydroxy	-OH
Acid	-COOH
Keto	-C=O
Aldehyd	-CH=O
Peroxide	-OOH

Absorption of Water on PET Nonwoven

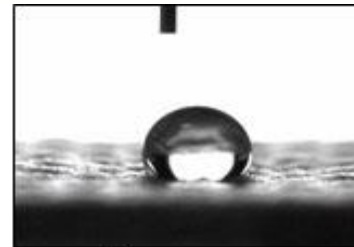
without Corona-Treatment



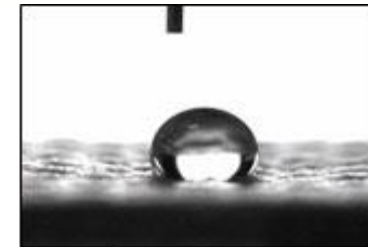
0, 5 sec



1 sec

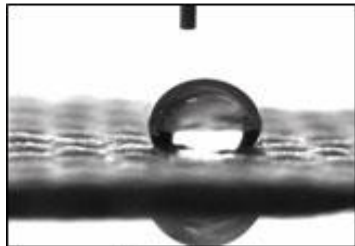


3 sec

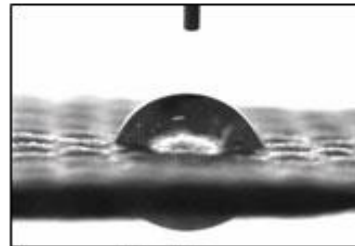


5 sec

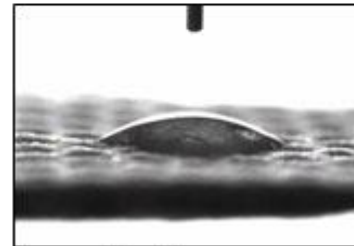
with Corona-Treatment



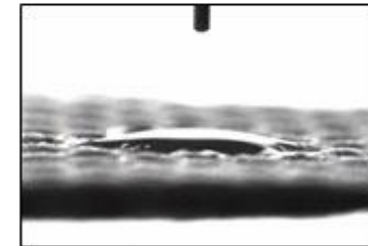
0, 1 sec



0,5 sec



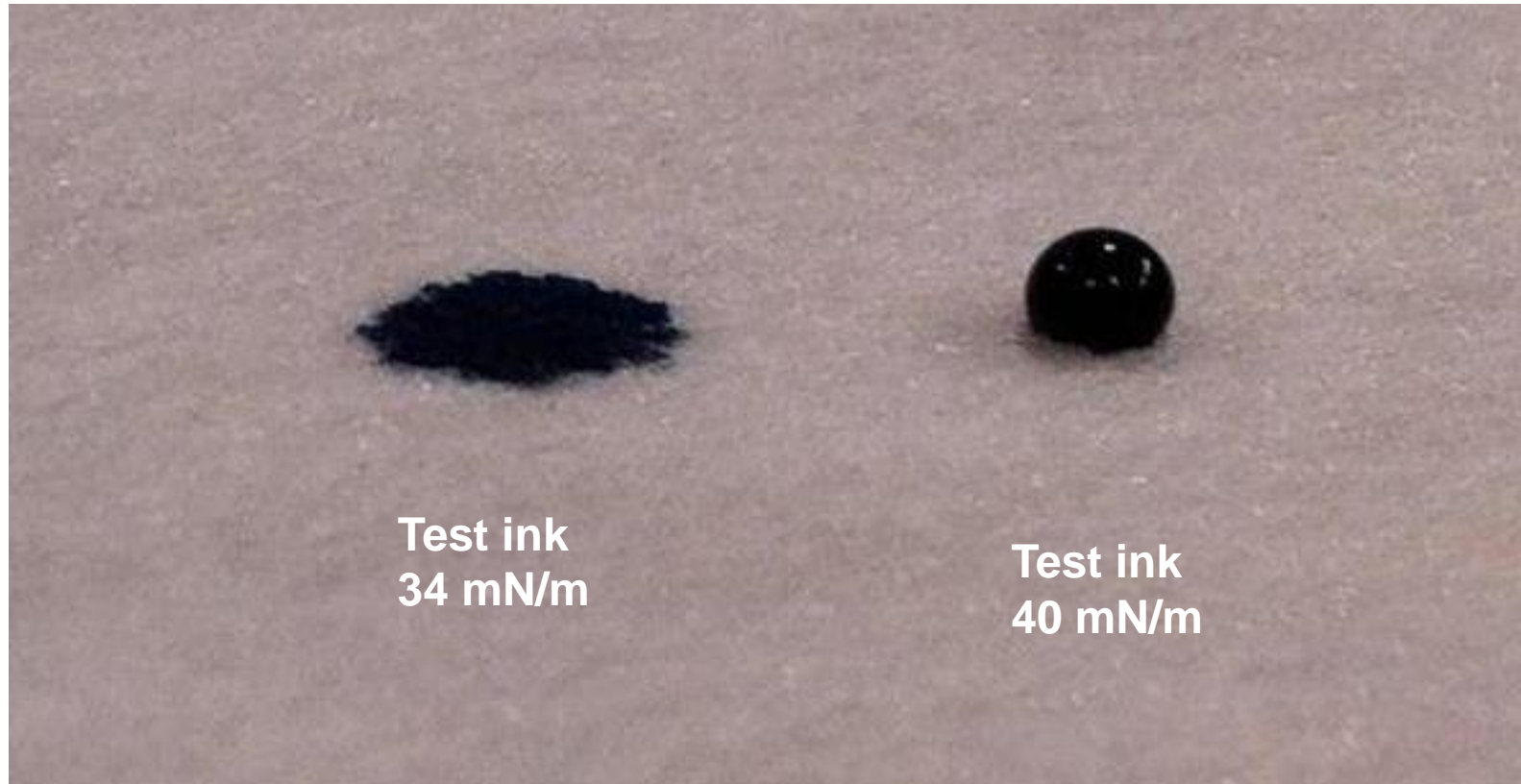
0,7 sec



1 sec

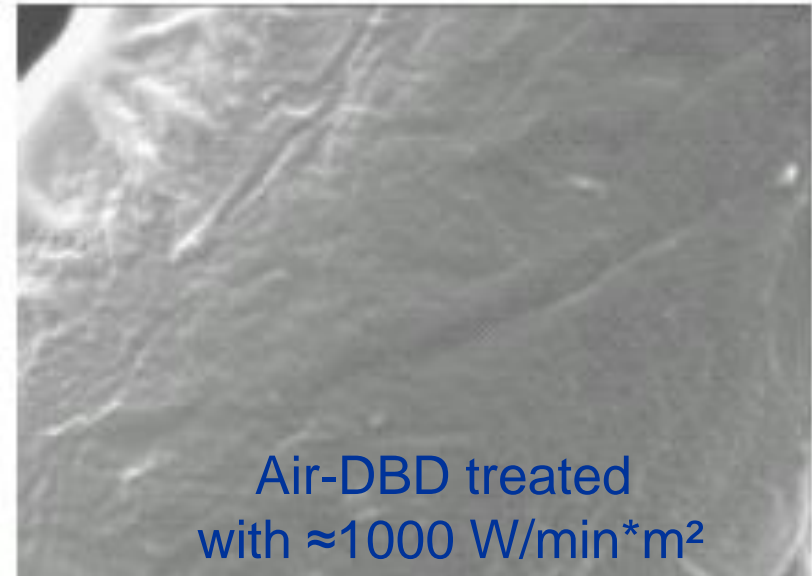
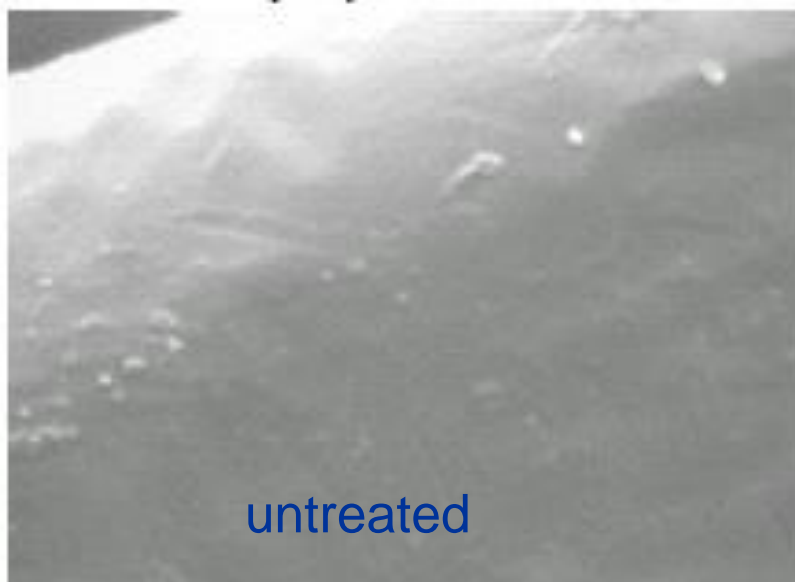
Test inks on non woven

Polyolefin non woven 60 g/m²
without corona treatment



Air-DBD with high intensity on PP-Fibre

Increase of roughness due to fragmentation reactions



The Unit of Treatment Corona and Plasma Dose

The corona /plasma dose represents the proportion of energy applied to a certain surface area.

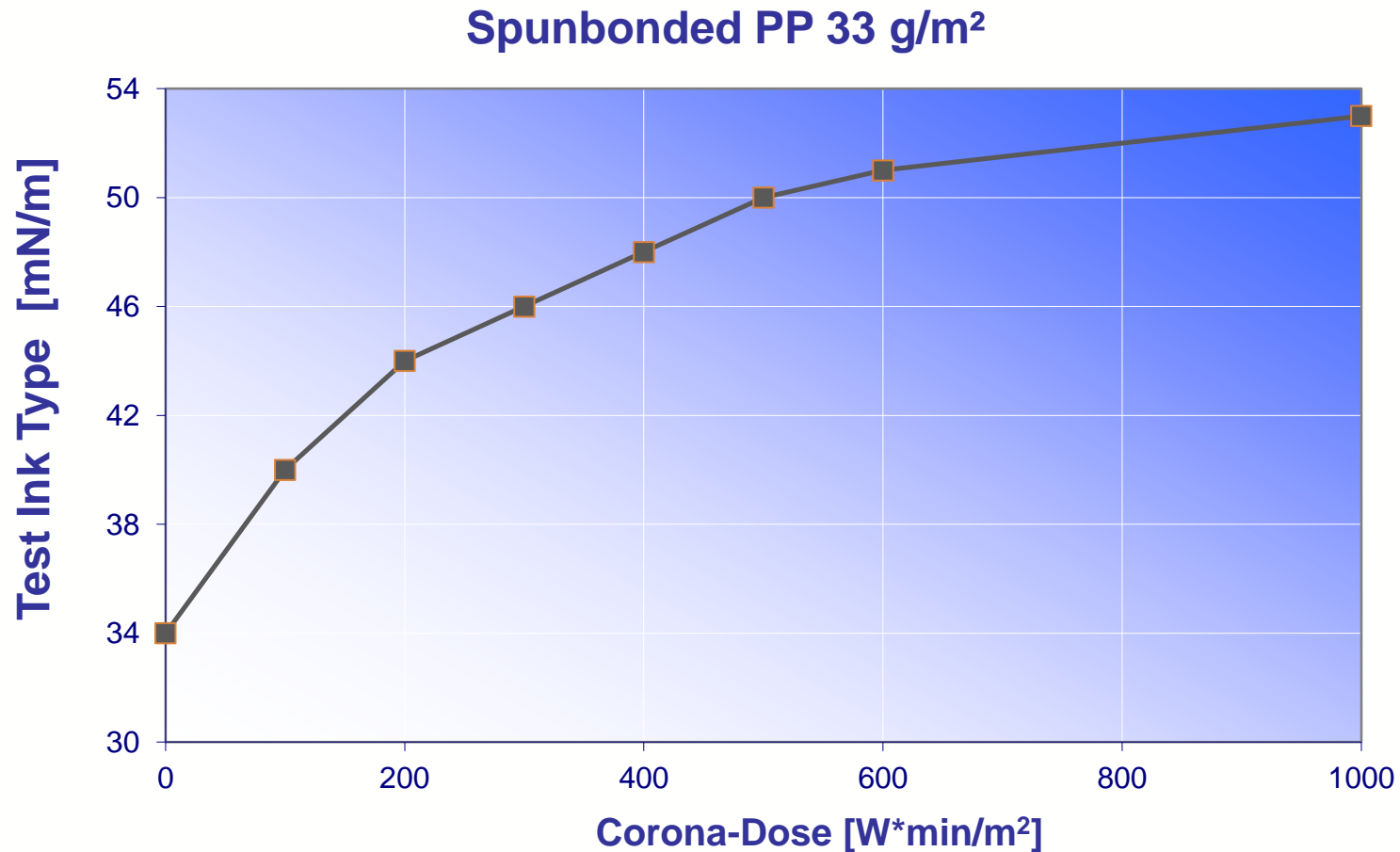
$$D = \frac{P}{ww \cdot v}$$

Term	Formula Symbol	Unit
Corona Dose	D	Wmin/m ²
Power	P	W
Working Width	ww	m
Speed	v	m/min

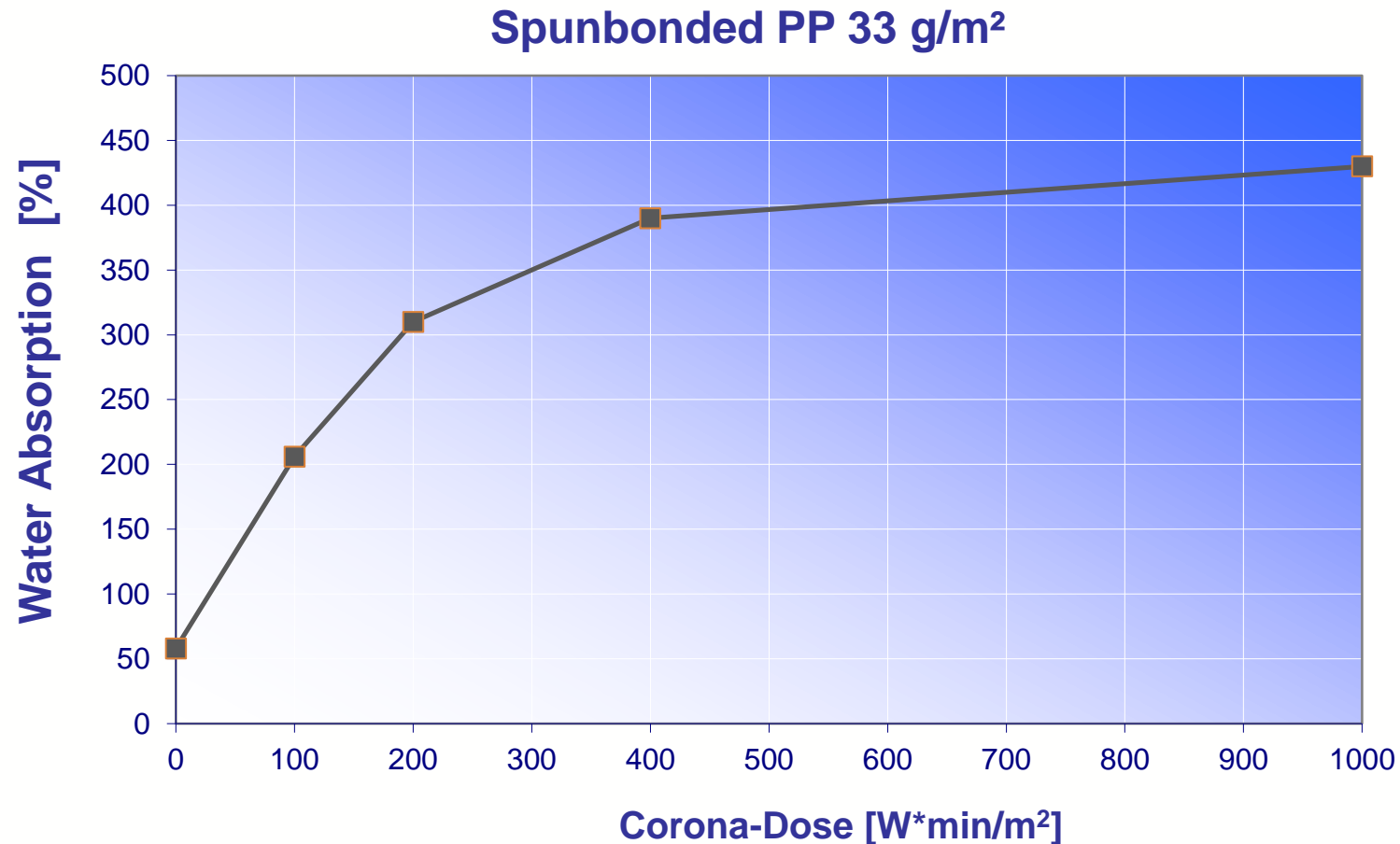
Example:

$$3000 \text{ W} / (1,5 \text{ m} \times 50 \text{ m/min}) = 40,0 \text{ Wmin/m}^2$$

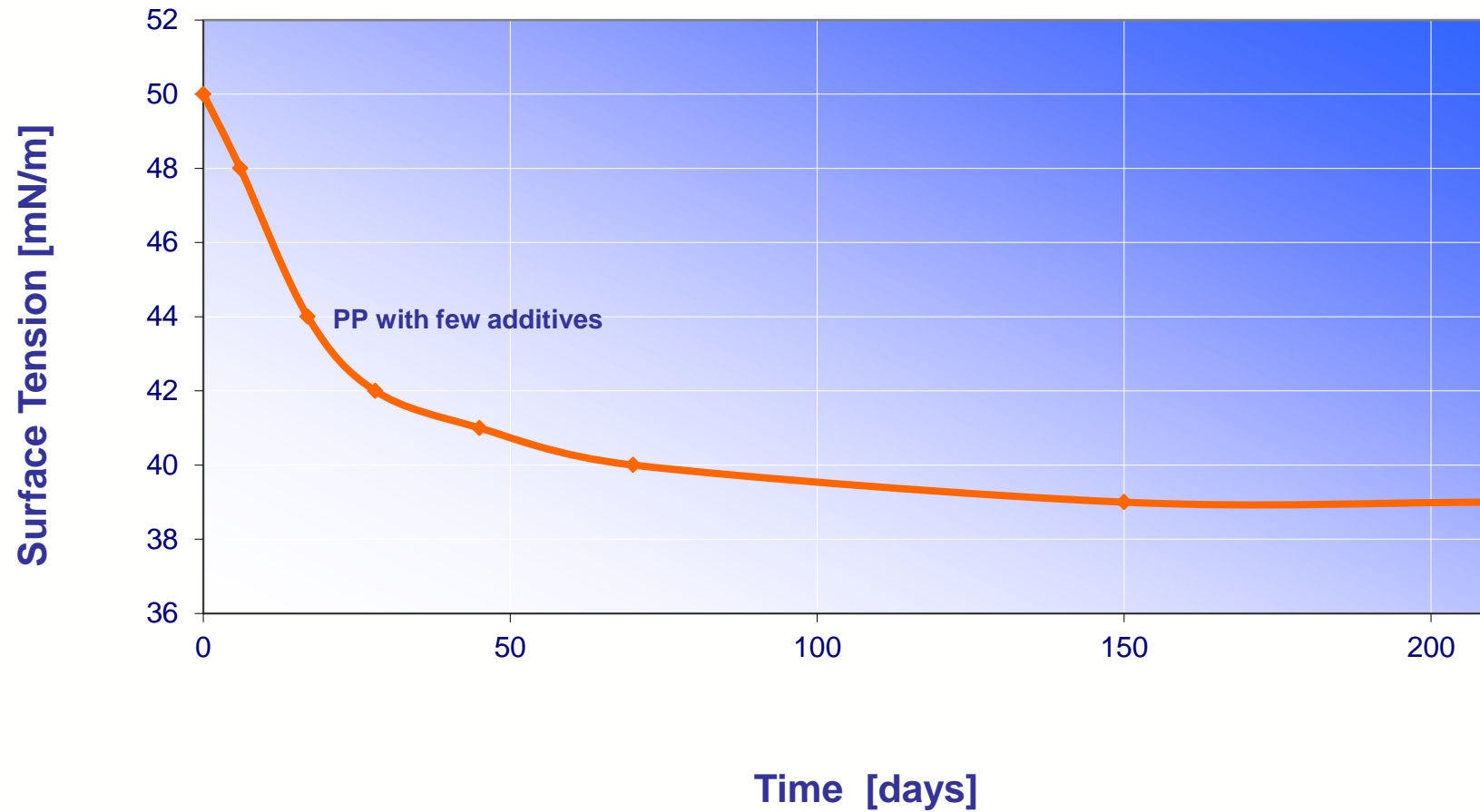
Influence of corona dose on absorption of test inks



Influence of corona dose on water absorption after dipping

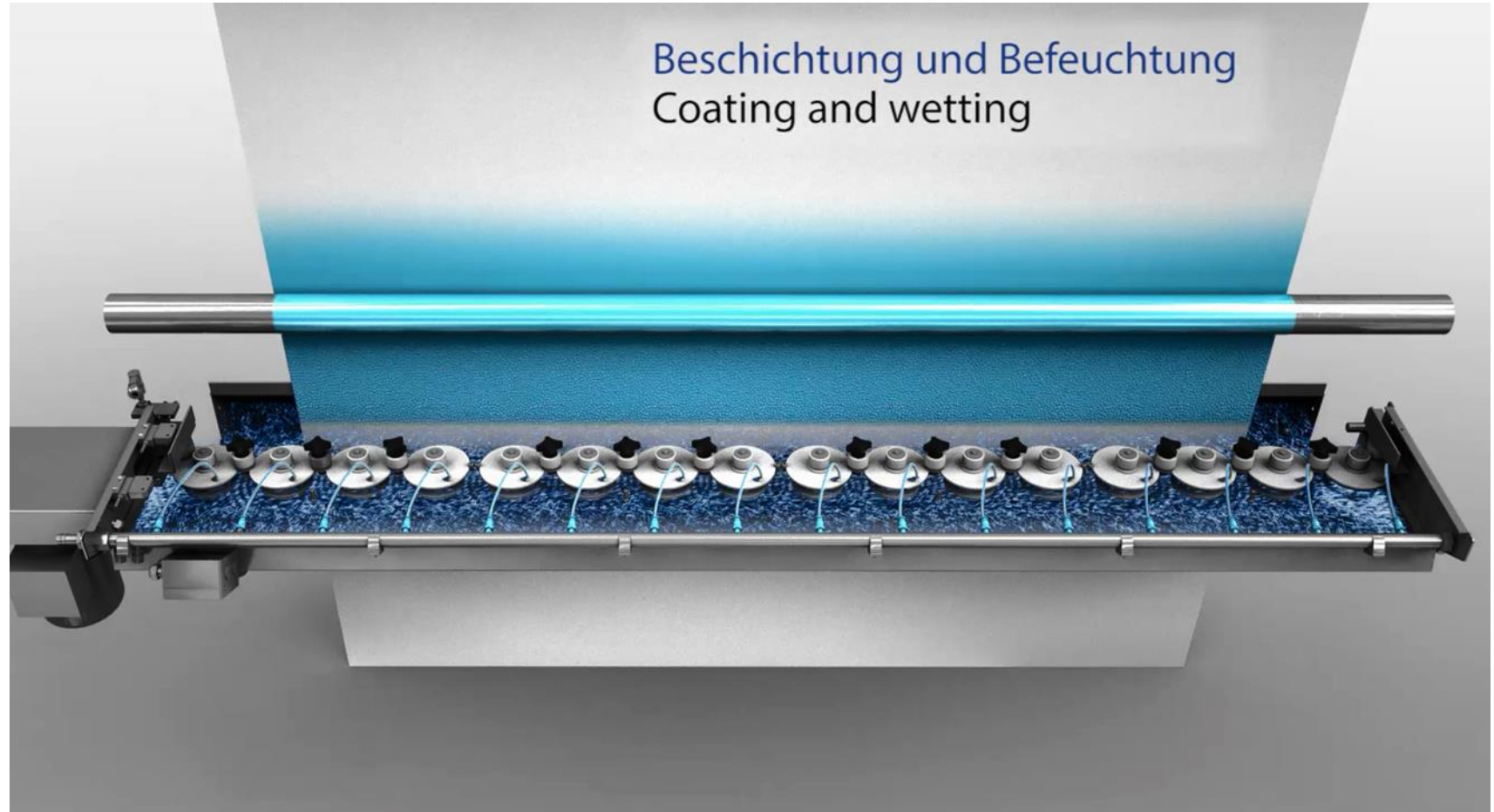


Decay of surface tension with time



Decay depends on additives and polymer type

Rotor Spray System



Video Rotor Spray System

Hydrophilic Finishing of PP-Nonwoven

Hydrophilic Finishing of PP-Nonwoven



Material: Spunbonded PP 33 g/m²

Process steps

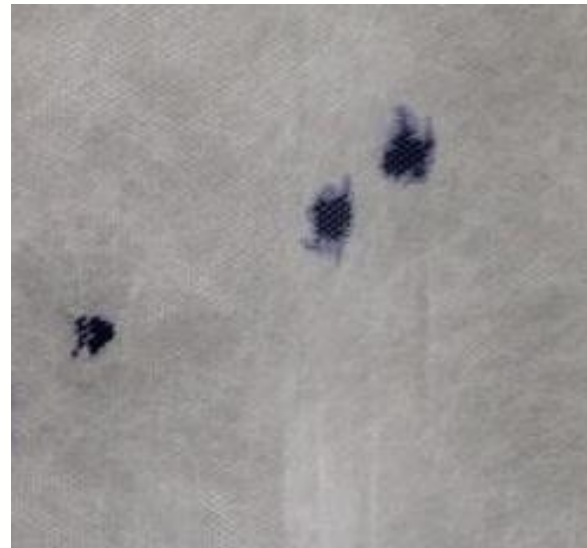
- 1) One sided air-DBD (on and off)
- 2) One sided spray of hydrophilic agent
0,15 - 3 % wt % ingredient
6 - 15 wt% wet
- 3) Hot air drying (> 10 % wet)

Influence of air-DBD on absorption of blue water

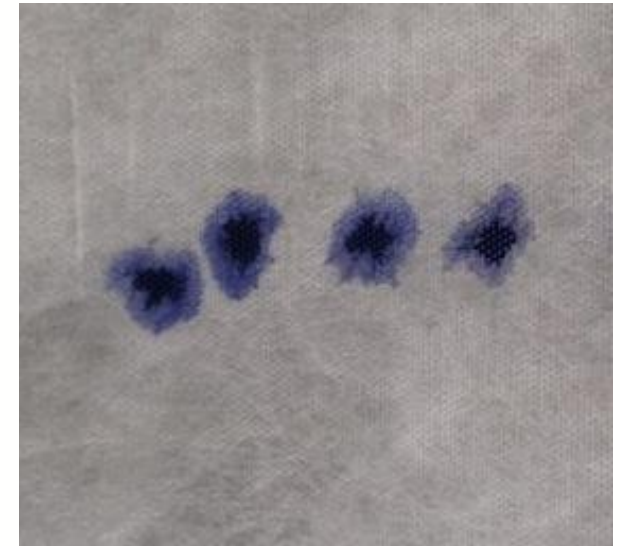
Spunbonded PP 33 g/m²



Without finishing



0,4 wt% hydrophilic agent



**One sided air-DBD +
0,4 wt% hydrophilic agent**

Influence of corona treatment on absorption of water

Spunbonded PP 33 g/m²



Without finishing

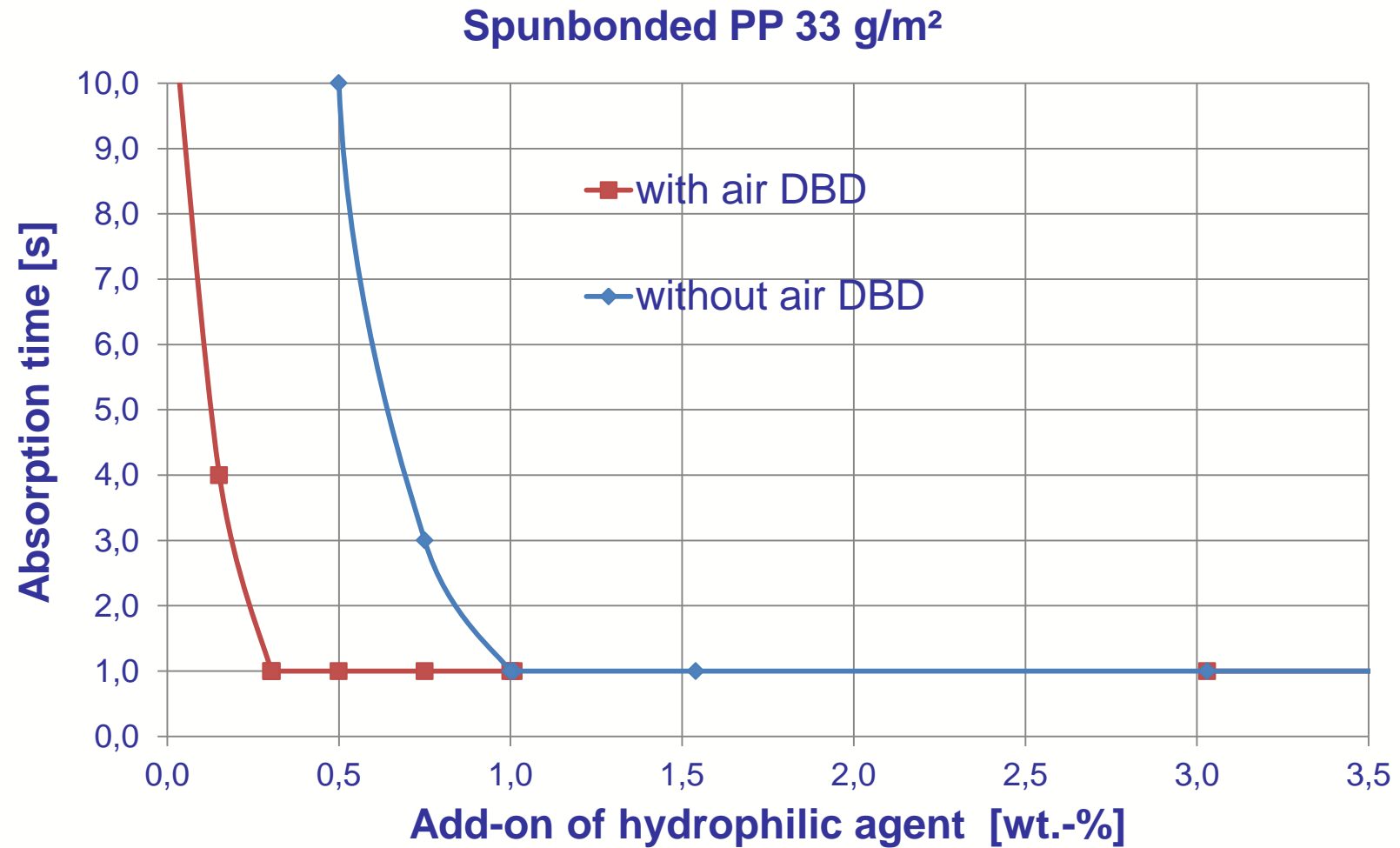


0,4 wt% hydrophilic agent



**One sided air DBD +
0,4 wt% hydrophilic agent**

Less hydrophilic agent with corona treatment



Hydrophobic Finishing of Glass-Fibre Fleece

Hydrophobic finishing of GF-Fibre Material

Process steps

- 1) Two sided corona treatment (air DBD)
- 2) One sided application of sol solution with rotor spray (≥ 100 wt %)
- 3) One sided smoothing with driven roll (add on side)
- 4) Hot air drying



Hydrophobic finishing of GF Process Steps



Two sided
corona treatment (air DBD)



Hot Air Drying

One sided
smoothing

One sided
spraying

Influence of smoothing roll Spray of red colour on paper



Bifunctional finishing



Spray Side

Backside view
of add on

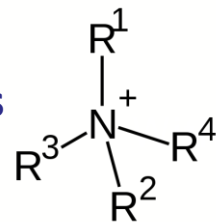
PET non-woven 68 g/m²
One side spray application with blue agents

What can be sprayed

- Water based liquids with low viscosity
- Solutions, emulsions, dispersions (< 5 μ)
- Low and middle viscous oils

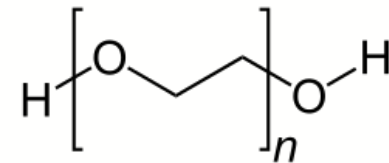
Examples

Antimicrobials



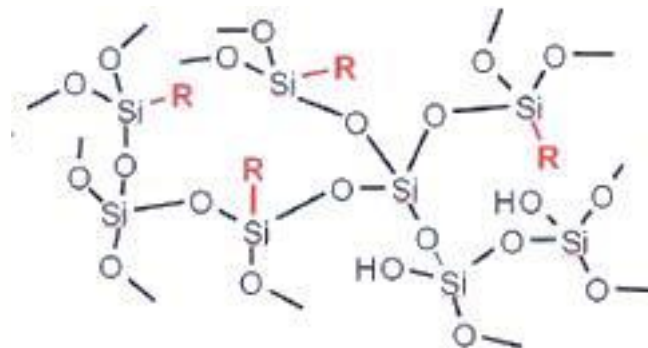
Ammoniumsalts

Hydrophilic

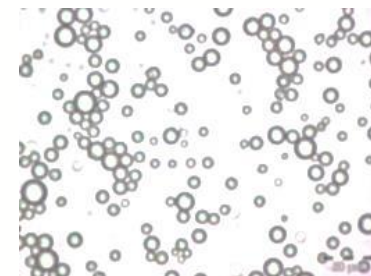


Glycols

Antimicrobials &
Hydrophobic



Sol/Gel-Systems



Microcapsules

Pilot Plant in Lauterbach /Hessen



Test your material

**Come to
Lauterbach!**



**Thank you for listening
At your disposal
for any Questions**