Industrial Process Spectroscopy

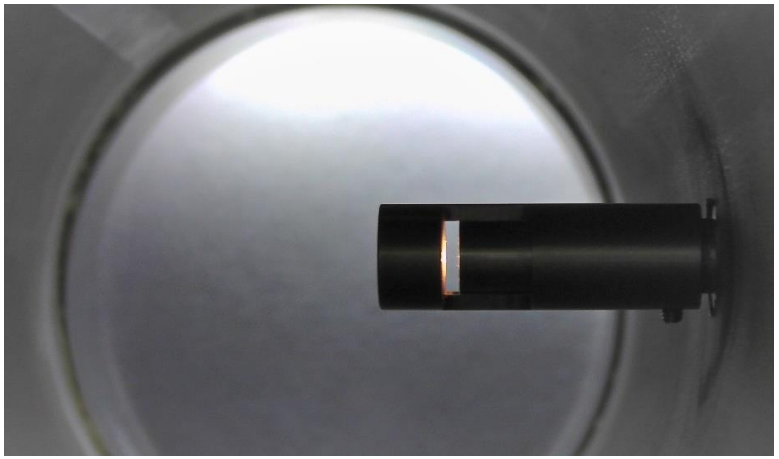
APOS GlueNIR - Save Glue!

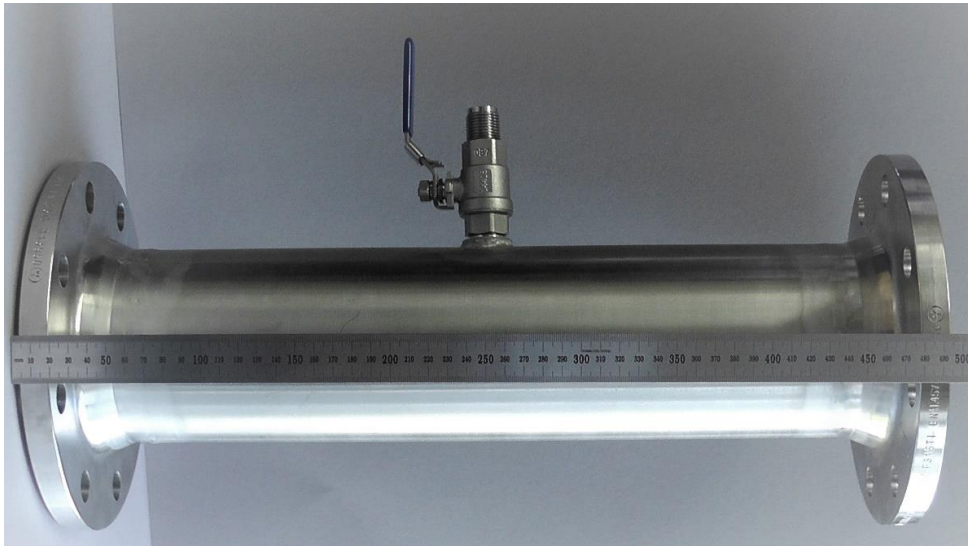
NIR measurement for resin / glue specification in board production

Wedel 14.01.2021

Potential with APOS GlueNIR

- **Continuous online/inline measurement** just before use
- **Saving of glue quantities**
  - Recording of the **solids content**
  - Reaction to fluctuating solids content
  - Exact glue dosage
- **Optimization of the production**
  - Monitoring of the **molar ratio**
  - Information about the reactivity of the glue
  - Adapting the process
    - Control of emission
    - Increase production speed
- **Laboratory analysis are not required**
  - Saves time
  - Reduces the use of materials and personnel





PAST: Individual analysis for glue / resin specification

Background:

- In the wood industry, amino plastic resin systems (melamine-urea-formaldehyde (MUF) or urea-formaldehyde (UF) resins) are used
- Properties of these resins / glues influence the process and the quality of the products
- Products are manufactured in smaller batches in resin / glue plants
- Specification takes place on individual samples after production
  - Sampling hardly representative, so impractical to use for process management in board plant
  - In addition, there is a mixing with old glue in the storage tank
- Molar ratio, viscosity, solids content, gel time are important glue / resin parameters

APOS

Savings potentials using APOS GlueNIR

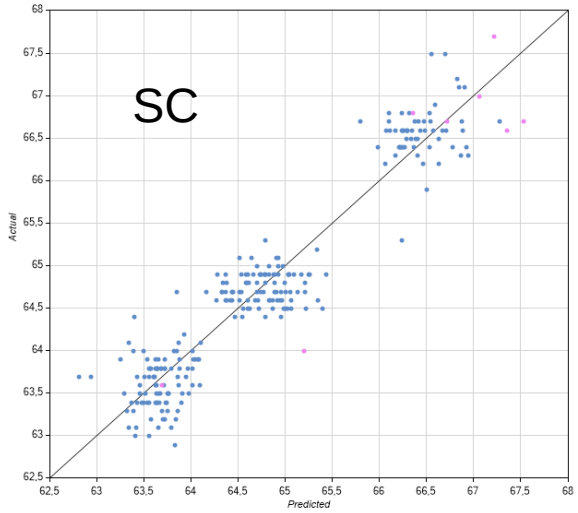
Example calculation for line using 25t wood bone dry /h

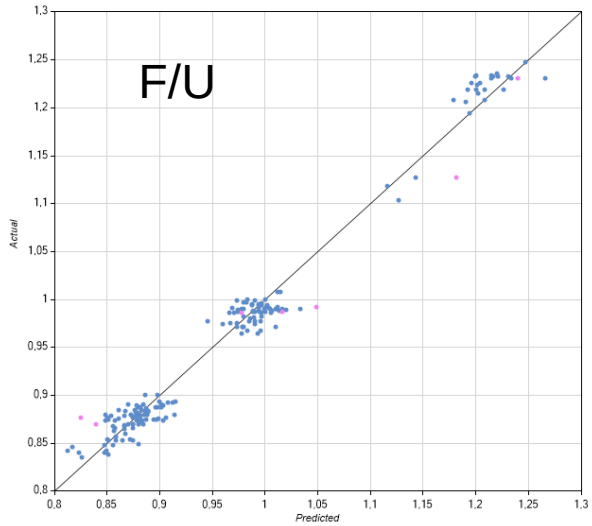
- If the solids content is monitored and managed online, a glue quantity of approx. 440t/a glue can be saved
  - Savings potential of approx EUR 170.000 /a possible
  - No lab analyses anymore
    - Saves time
    - Reduces material and staff costs
  - Reduced customer complaints and superior quality. Fewer complaints enable further savings and improve customer satisfaction
- By monitoring and managing the molar ratio
  - Formaldehyde emissions can be managed and
  - Production speed can be increased

Product	MDF, SPAN		
Application	GlueNIR: glue measurement solid conten	Input	
	Material, wood fiber	50	t/h
	Water content, wood fiber during gluing	50	%
	Wood fiber solids content	25	t/h
	Glue content	10	%
	Glue solids content related to dry wood	2,5	t/h
	Glue solids content average	65,5	%
	Glue solids content min	64,5	%
	Glue solids content max	66,5	%
	Consumption of glue	3,82	t/h
	Consumption of glue amount min	3,88	t/h
	Consumption of glue amount max	3,76	t/h
	Consumption of glue amount Delta Max-Min	0,12	t/h
	Potential glue saving [Delta / 2]	0,06	t/h
	Production time	7600	h/a
	Potential glue savings	443,0	t/a
	Glue costs	400	€/t
Saving		177.187	€/a

APOS GlueNIR / Results Calibration

- NIR – Device with APOS transmission probe
- Very good correlations between system and laboratory values
  - Solid Content R = 0,95 / R^2 = 0,91
  - Molar Ratio R = 0,98 / R^2 = 0,96
- Calibrations with a low mean square error:
  - Solid Content 0,3 (bandwidth 62,9 – 67,7)
  - Molar Ratio 0,03 (bandwidth 0,836 – 1,248)
- Moving average over 4 individual samples (<4 sec):
  - Solid Content 0,2
  - Molar Ratio 0,02
- Further parameters (gel time, viscosity) doable





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