

APOS CureKT - NIR measurement of curing degree after short cycle (,KT') press

Wedel, 06/23

APOS – the Company

- Founded in 2010
- Initial focus on biomass CHP's, since 2012 products for the panel board industry, flooring...
- System integrator for robust industry spectroscopy solutions
- APOS is part of **Nynomic AG Group**, 10 companies, 500+ team
- All optical hardware components are manufactured within the group in Europe
- Software and system integration developed by APOS

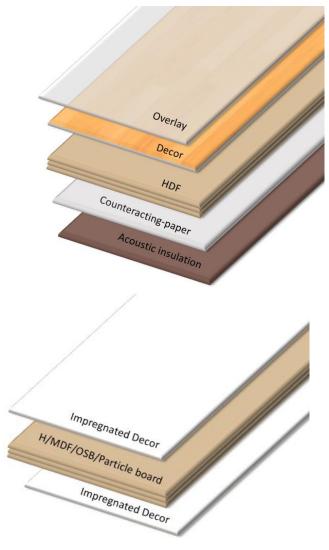




PAST: Acid Test to determine curing degree

Background:

- In production of floor, furniture or wall panels, the pressing (short cycle press) of (several) resinimpregnated papers is carried out on (woodbased) panels
- Curing degree is routinely determined on a production line using a so-called acid test
- The curing degree of the hardened resin determines the surface quality
- The laboratory analysis is time and material consuming
- The laboratory analysis can be replaced by an online spectroscopic measurement





NOW: CureKT online measurement of curing degree

Online measurement has many advantages:

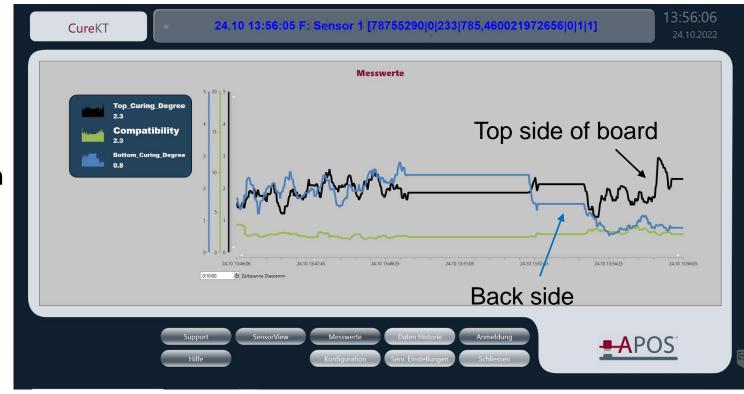
- Permanent online control of production process and ad-hoc reaction to changes – reduce misproduction
- Production speed can be increased get closer to the max by online monitoring of quality
- Time-consuming laboratory procedures are replaced by online measurements
 - No chemicals
 - Continuous monitoring
 - Reduction of material loss
- Product quality is improved
- Material waste can be reduced
- Based on the reference method of acid test and visual assessment
- Reference methods that show similar results, e.g. photometer assessment, are also covered





Process Visualisation

- Visualisation can be for one or multiple sensors per line
- Physical systems of e.g. two lines can be shown in one visualisation
- Can be classical line chart or other displays
- Target curing corridors can be defined per sensor
- System shows whether production is in corridor
- Alarms can be set
- Integration to SCADAs easily possible





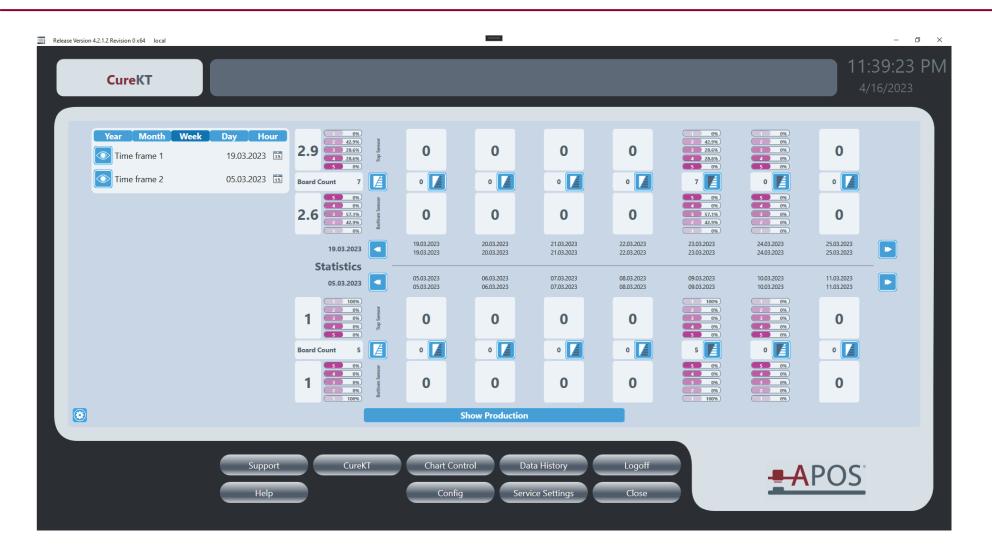
Visualisation CureKT as Batch prozess



 Display of the degree of curing for individual panels according to production sequence



History of the CureKT





Savings with APOS CureKT

Sample calculation for savings potential:

- Savings potential of >EUR 100,000 per year possible
- Online measurement replace Lab
 - No destroyed boards/no boards with test marks
 - Reduced Lab costs
- Reduced customer complains
 - Typical complains ratio in the industry between 0,3-0,5%
 - Reduction of complains ratio possible as defects are recognized by the system IMMEDIATELY

Product APOS CureKT for coated surfaces, furniture			
Application	Curing degree after short cycle ('KT') press, as a r	replacement for	acid test
Assumptions	SC Press speed	180	Pressungen/h
	Working width	2,07	m
	Working length	5,2	m
	Production per h	1.938	m²/h
	Production days	290	/a
	equals operating hours	6.960	h/a
	Price coated board	3	EUR/m²
	Production volume m ² / year	13.485.139	m²/a
	Acid testing curing degree every	8	h
	Curing test (example: 180 boards every hour. When testing every 1.5 hours, one of 270 boards (180 * 1.5) is tested, corresponding to $100 / (180 * 1.5) = 0.37\%$)	0,07	%
	Square meters of board with test/inspection marks	9.365	m²/a
	Price of boards with inspection marks	1	EUR/m²
	Revenue lost with boards with inspection marks	18.729	EUR/a
Effort quality control	Time used per board/test (sawing, transport of sample, acid treatment, cleaning, comparison, storing/documenting)	20	Min
	Total costs employee per h	50	EUR/h
	Costs per day	50	EUR
	Costs per annum	14.500	EUR
Savings (revenue not lost due to boards not damaged, saved QC effort)		42.594	EUR/a
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Further Savings potentia			
Material, complains reductoin	Percentage quality claims without CureKT	0,3	%
	Percentage quality claims with CureKT	0,15	%
	Avoided claims	20.228	m²/a
	equals number of truck loads	4,5	trucks
	avoided damage by improved quality	60.683	EUR/a
Savings	per annum	60.683	EUR/a
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	Total improvement	103.277	EUR/a



APOS GmbH

