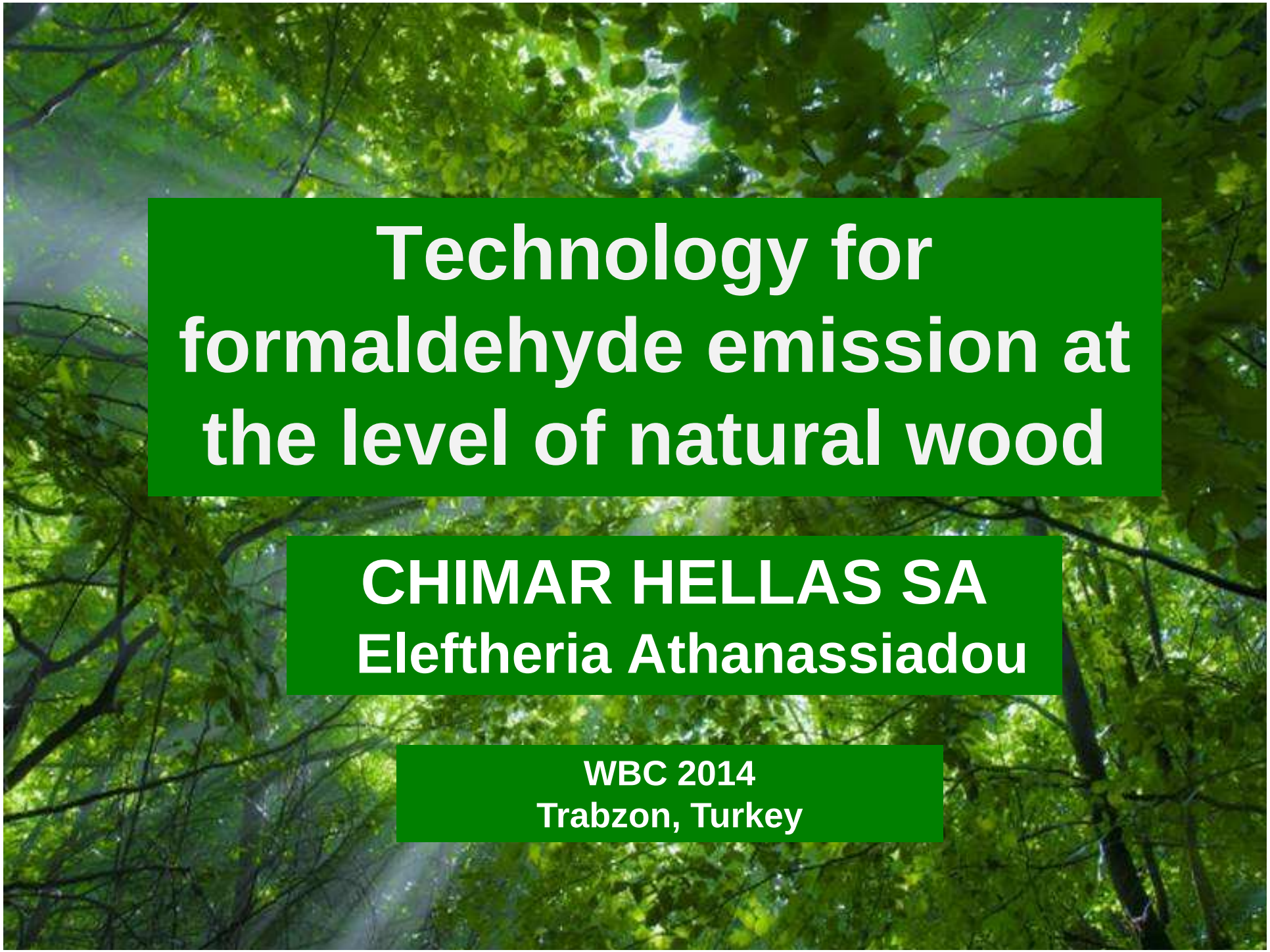

Technology for formaldehyde emission at the level of natural wood

CHIMAR HELLAS SA

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WBC 2014

Trabzon, Turkey

Global Technology Provider: Resin & Wood Panel Industries

Chimar Hellas S.A.

Activities

- ✓ Developer and supplier of industrial technology and services in the field of adhesive systems for wood based panels.
- ✓ Pioneer in the reduction of formaldehyde emission (technology for emission at the level of natural wood).
- ✓ Focus on safe, environmentally friendly products and technologies. Technology for bio-based adhesive systems.
- ✓ Engineering & procurement services for formaldehyde and resin plants
- ✓ Versatility of services: R&D for third parties, Testing and evaluation, Technical support for field industries (remotely and on-site), Consulting and Training, Chemicals production on demand, Accredited formaldehyde testing (EN ISO/IEC 17025), Patent services, Quality Management Systems, Industrial Equipment Representation.
- ✓ Acting globally, helping locally

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Solutions for Formaldehyde emission reduction

- **Innovative systems** of F-based adhesives and chemical additives, the synergistic action between them providing successful gluing performance and desirable emission properties

- **Advanced resin synthesis technology,** F-based, enabling optimum use of production conditions to obtain resins with target gluing and emission performance

- **Bio-derived adhesives from natural products/materials** (e.g. lignin, tannin, starch) combining the utilisation of renewable raw materials with high bonding performance and reduced formaldehyde emission at the same time.

“E0” PB, 16mm (1/2)

E0 PB, UMF + FS	
Press Factor, s/mm	4.2
Resin Factor, % core/surface	8 / 10
Scavenger level, % s/s on resin	10
Board Density, kg/m^3	630
IB, N/mm^2	0.42 – 0.45
MOR, N/mm^2	13-15
Formaldehyde content, EN 120, mg/100g	2.5 – 3.0
Cost Vs E1, €/m^3	**+3**

“E0” PB, 16mm (2/2)

E0 PB, UMF	
Press Factor, s/mm	4.8
Resin Factor, % core/surface	9 / 9
Scavenger level, % s/s on resin	-
Board Density, kg/m^3	650
IB, N/mm^2	0.45 – 0.48
MOR, N/mm^2	14-16
Formaldehyde content, EN 120, mg/100g	2.5 – 3.0
Cost Vs E1, €/m^3	**+3**

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“E0” thin HDF, 3mm

E0 HDF, UMF	
Press Factor, s/mm	6.5
Resin Factor, % core/surface	13
Scavenger level, % s/s on resin	15
Board Density, kg/m^3	880
IB, N/mm^2	0.8 – 1.2
MOR, N/mm^2	35 – 40
Formaldehyde content, EN 120, mg/100g	3.0 – 3.5
Cost Vs E1, €/m^3	**+6**

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Technology for Bio-based resin systems

❖Resin systems based on renewable resources (e.g. biomass products, by-products and wastes)

❖Achievements at the laboratory, pilot and industrial scale

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	Natural raw materials	Production scale			Type of wood panel
		Industrial	Pilot	Lab	
		Phenol substitution level, %			
1	Liquefied Olive stone	50		75	Plywood
2	Wood pyrolysis liquid (Bio-oil)	20			Plywood
		40	50		OSB
3	Torrefaction Condensates			40	Plywood
4	Lignin	50	50	80	Plywood
5	Tannin, quebracho	30			Plywood
6	Tannin, pine	~50% resin replacement			PB
7	Tannin, mix			Totally natural binder	PB
8	Soy Protein			25	Plywood
9	CNSL			10	Plywood/PB

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Industrial MDF with biopolymers

Panel size, mm x mm x mm	610 x 610 x 19.5
Panel density, kg/m^3	700 – 720
Base glue system	UF, 11% O.D.W., $(NH_4)_2SO_4$, 1.5%
Mat moisture, %	9
Press temperature, ^oC	240 – 220 – 210 –190
Press cycle, s	193.5
Wood mix: Scots pine (80%) and white poplar (20%)	

	Ex. #1	Ex. #2	Control
% replacement	20	30	0
I.B., N/mm^2	0.68	0.67	0.68
M.O.R., N/mm^2	26.6	28.3	27.2
Moisture content, %	4.4	4.4	4.6
Formaldehyde release, EN 717-2, mg·m^{-2}·h^{-1}	4.2	4.1	3.3
Formaldehyde content, EN 120, mg/100g O.D.B.	7.9	8.7	7.4

Concluding remark

The current stringent formaldehyde emission limits for composite panel products can be satisfied with the use of properly formulated adhesive systems at no sacrifice of the desirable panel properties and no need for significant modification of the operating conditions of the panel industry

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Thank you!