AsWood Resin Systems

Far Beyond F**** on Formaldehyde Emissions

José Gomez Bueso

2008 EWPAA AGM

- Time for Change
- Formaldehyde
- Protein Modified PF Resol Resin
- Future

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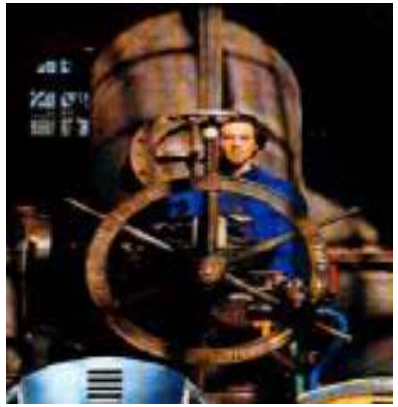
Changing Society – Green (Phillips)



- We are in the transition
  - From “Industrial Age” to the “Peoples Age”
- Success is redefined
  - Not as an accumulation of material values
  - But as a successful life style
- Consequences :
  - “win - lose” replaced by “agree”
  - hierarchies replaced by networks
  - The personal relations gains significance
-

Josephine Green, Phillips
http://crosstalks.vub.ac.be/past_events/2006_bravenewinterfaces/Josephinegreen.pdf

Who decides the future?

24% of the American population are **"Cultural Creatives (CCs)"**

- **Of it 50% (→12%) are "Core CCs"**
  - Lastingness and sense of life are important
  - **Visionist**
  - Psychology is important
  - Upper middle class , 66% Women

- **The other 50% (→12%) are "Green CCs"**
  - **"Greens of values", environmental referred**
  - **Espiritual**
  - **Middle class, 55% Women**

These two groups will substantially contribute to our future and are to be observed

Paul Ray, www.culturalcreatives.org

Topics in the wood-based industry

Adhesives based on reneable raw material

Emission

Formaldehyde

VOCs

- Forestry management

- Time for Change
- **Formaldehyde**
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Why do we still speak about formaldehyde emissions?

- IARC classified formaldehyde as carcinogenic
  - In a re-evaluation of existing data in June 2004, the IARC reclassified formaldehyde as a known human carcinogen
  - The publication has been postponed with unclear future
- NCI has stated in a study the connection between NPC and formaldehyde
  - It has been heavily criticized on scientific basis
- The European Chemical Bureau has removed the topic formaldehyde several times from the agenda
  - Discussions most likely in scope of REACH

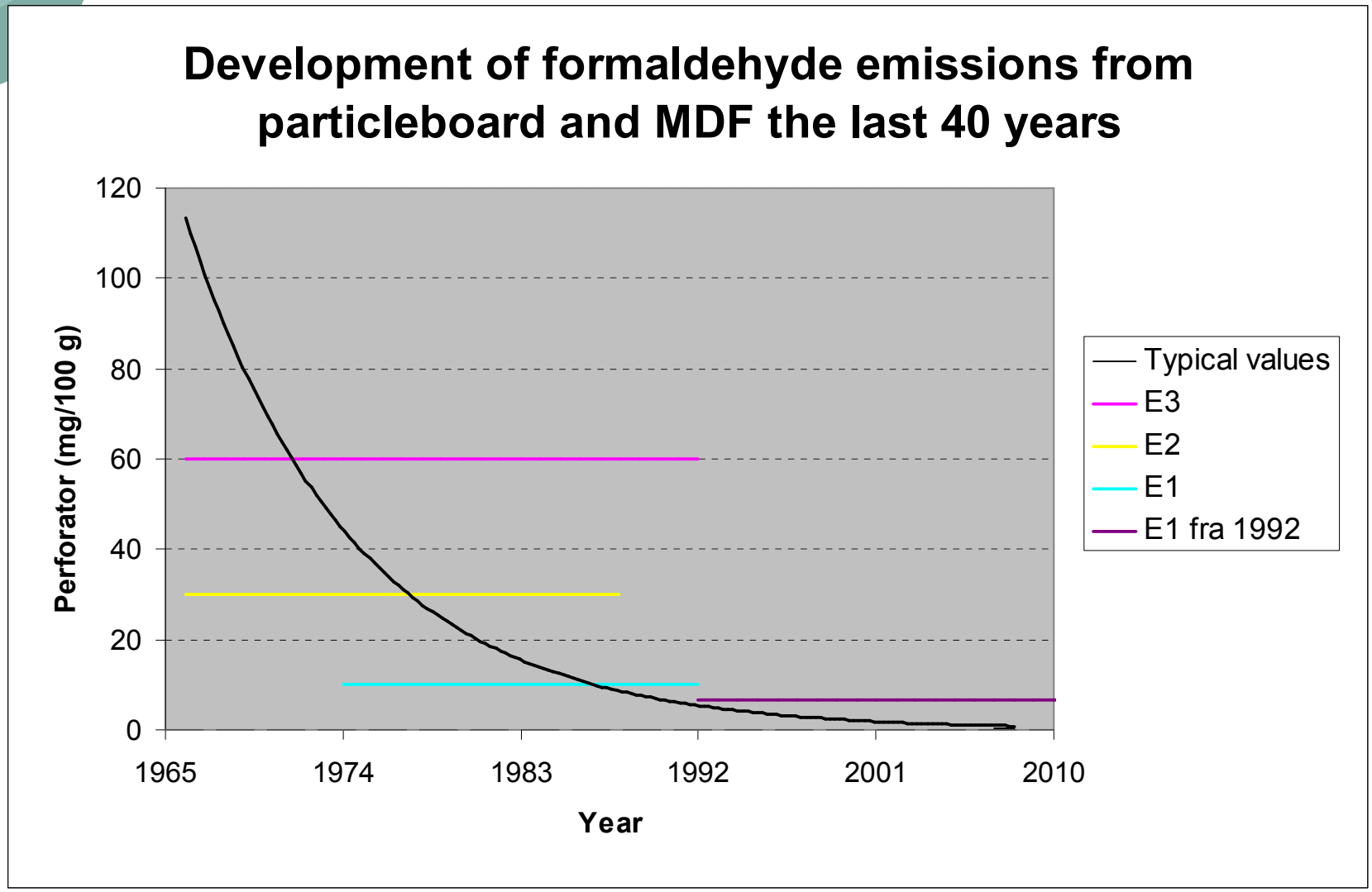
Emission classification, existing and on discussion

Class \ Method	Perforator Value (mg/100g)	Climate Chamber (ppb)	Desiccator test (mg/l)
E1	< 6,5 (8)	< 100	~< 1,1
EPF-S (>8-mm)	<4 (5)		
CARB1		180 (210)	
CARB2		90(110/130)	
F****	< 1,5	~< 30/50	< 0,3
Dynea AsWood™	0.25-0.5		0,08
Natural Pine*	~ 0,3	~ 3	0,08

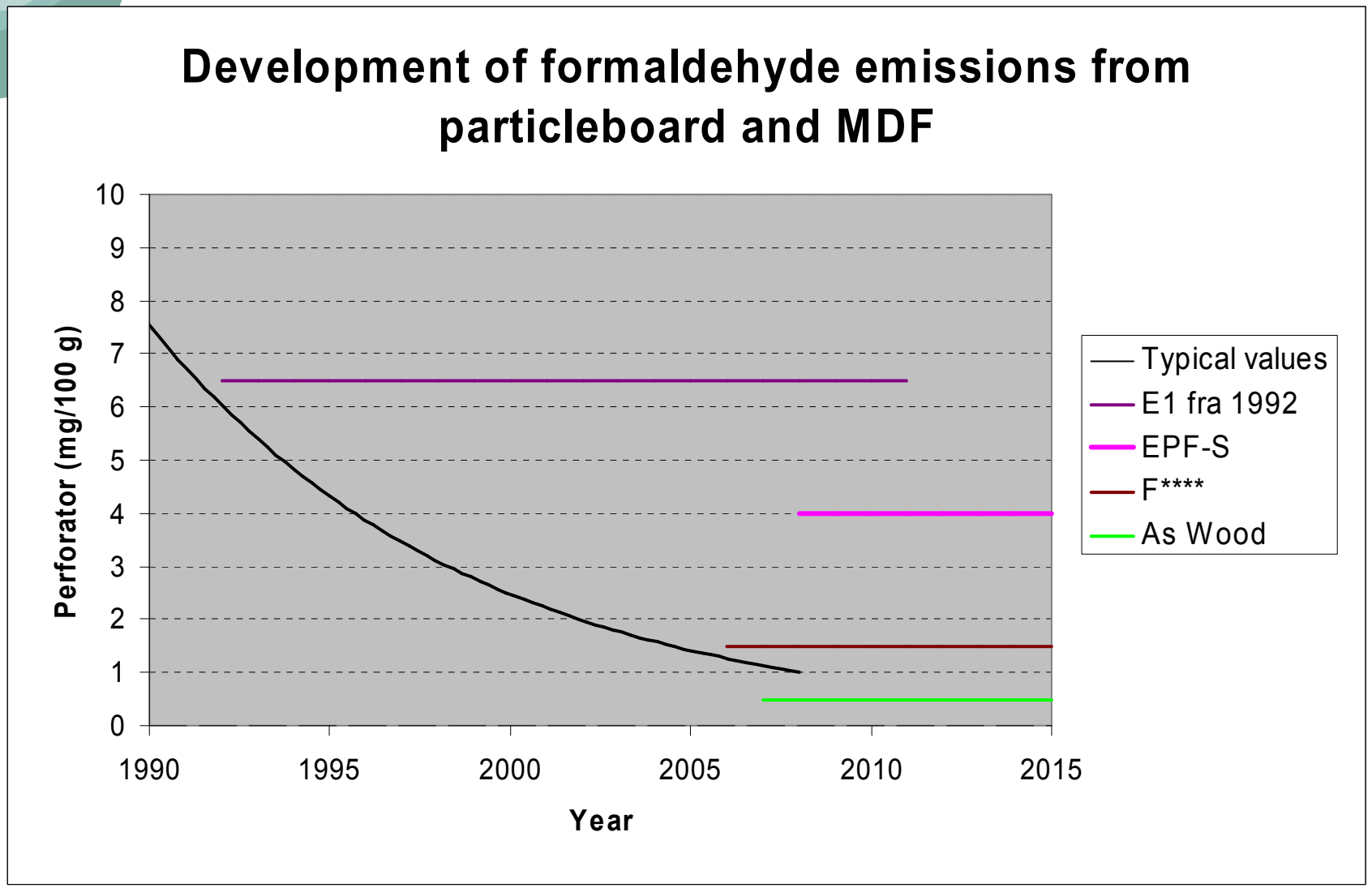
*Pine samples taken directly from sawmill in Norway.

Definition Value

Formaldehyde Emission Development



Formaldehyde Emission Development



Methods for emission control

- Pretreatment of wood and fibres
- Chemistry of the resin and the chemistry of the curing process
- Protection, as with coating

- Time for Change
- Formaldehyde
- **Protein Modified PF Resol Resins**
- Future

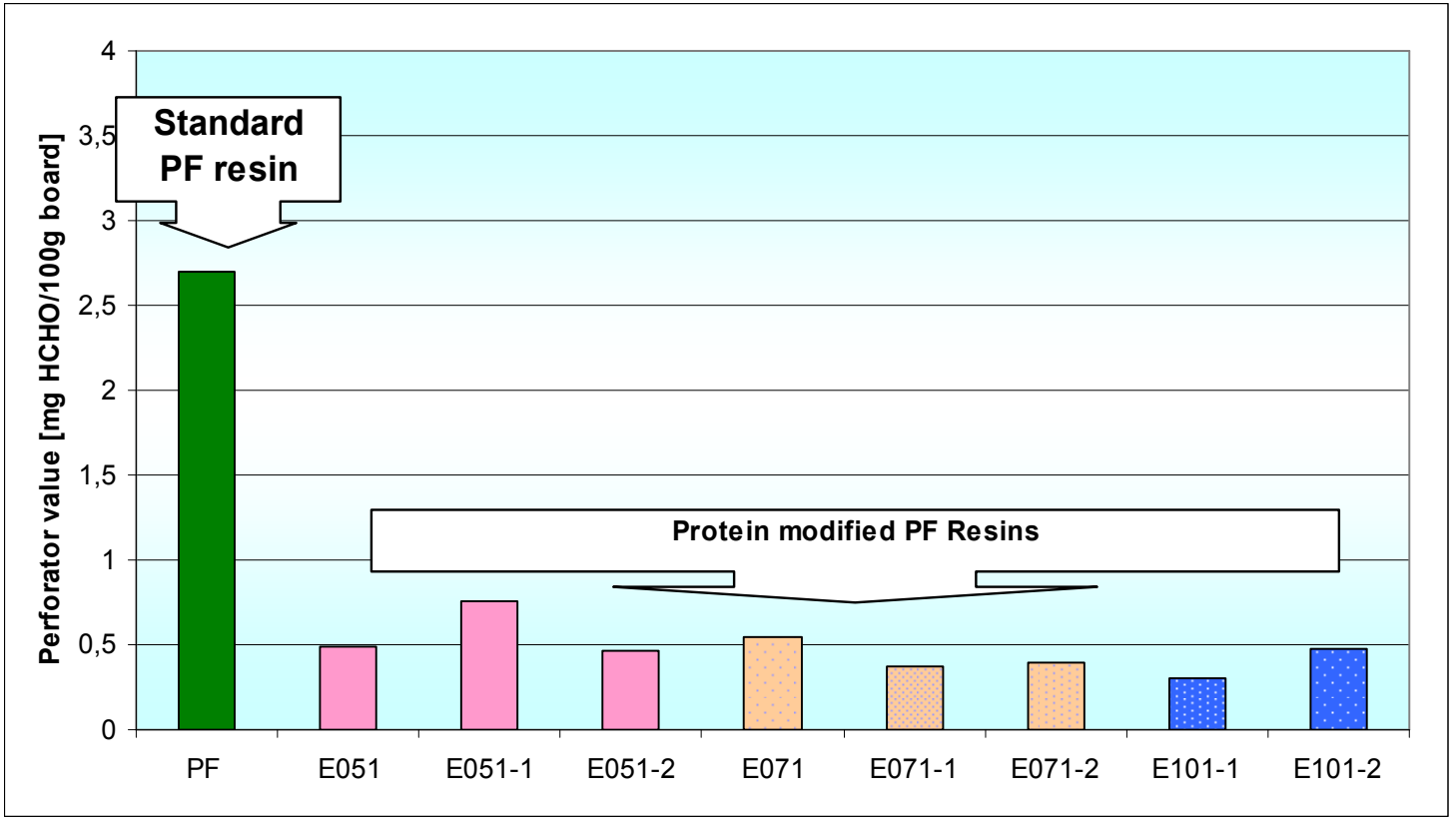
Protein modified PF resin

- Protein modified phenol-formaldehyde resin
- Co-condensation of protein rich wheat- and/or corn natural and soluble components in phenol-formaldehyde resin
- Similar physical properties to the phenol based resins.
- Patent EP1318000

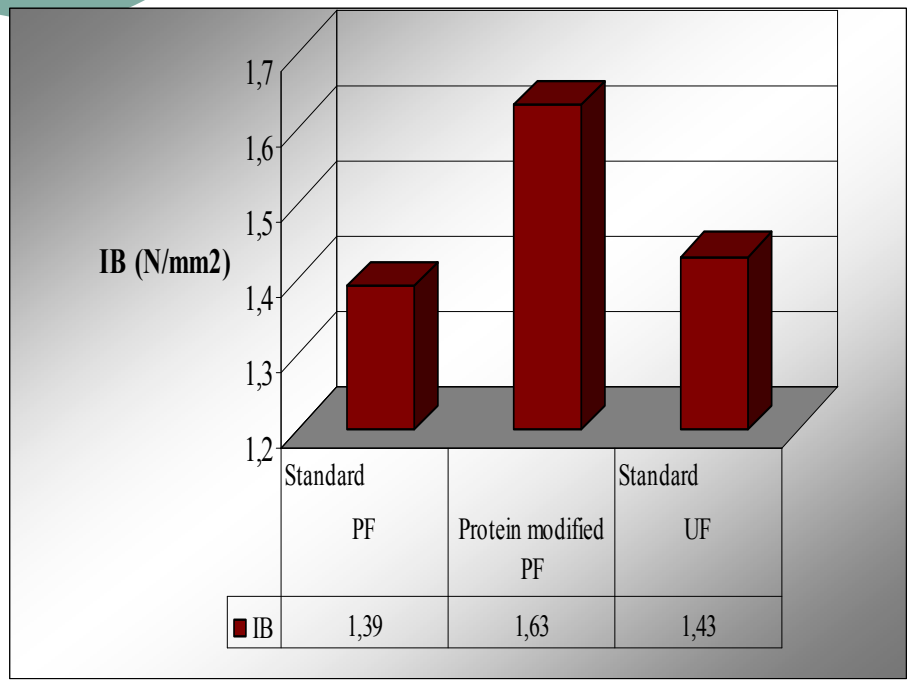
Protein modified PF resins

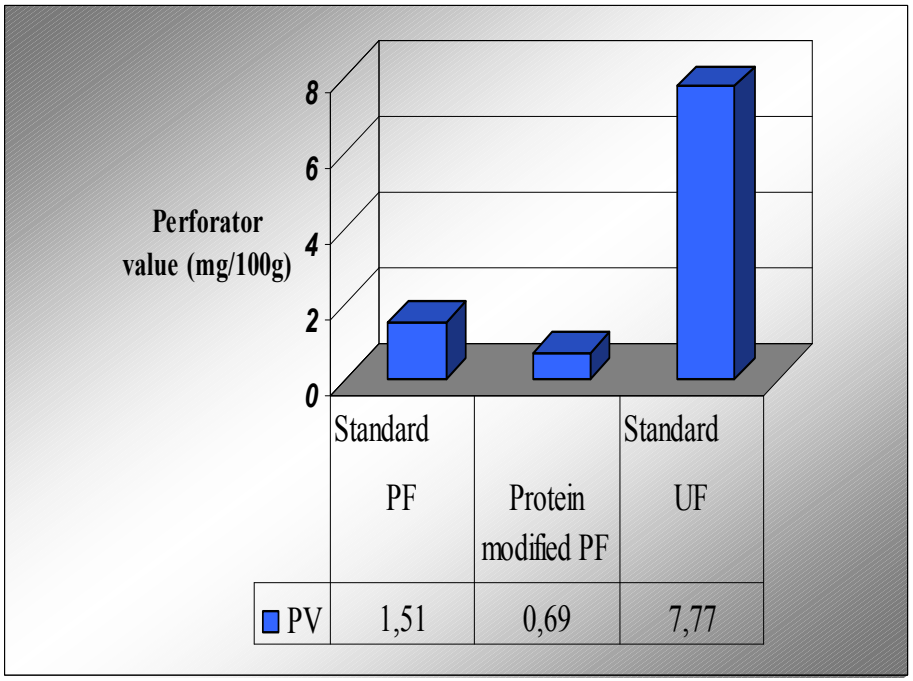
- Formaldehyde bonds are stable
- The protein modifed resins, will also have a better distribution of the methylol groups
- The protein modified resins have another flow behavior and penetration behaviour on the fiber (molecular structure)

Laboratory Results

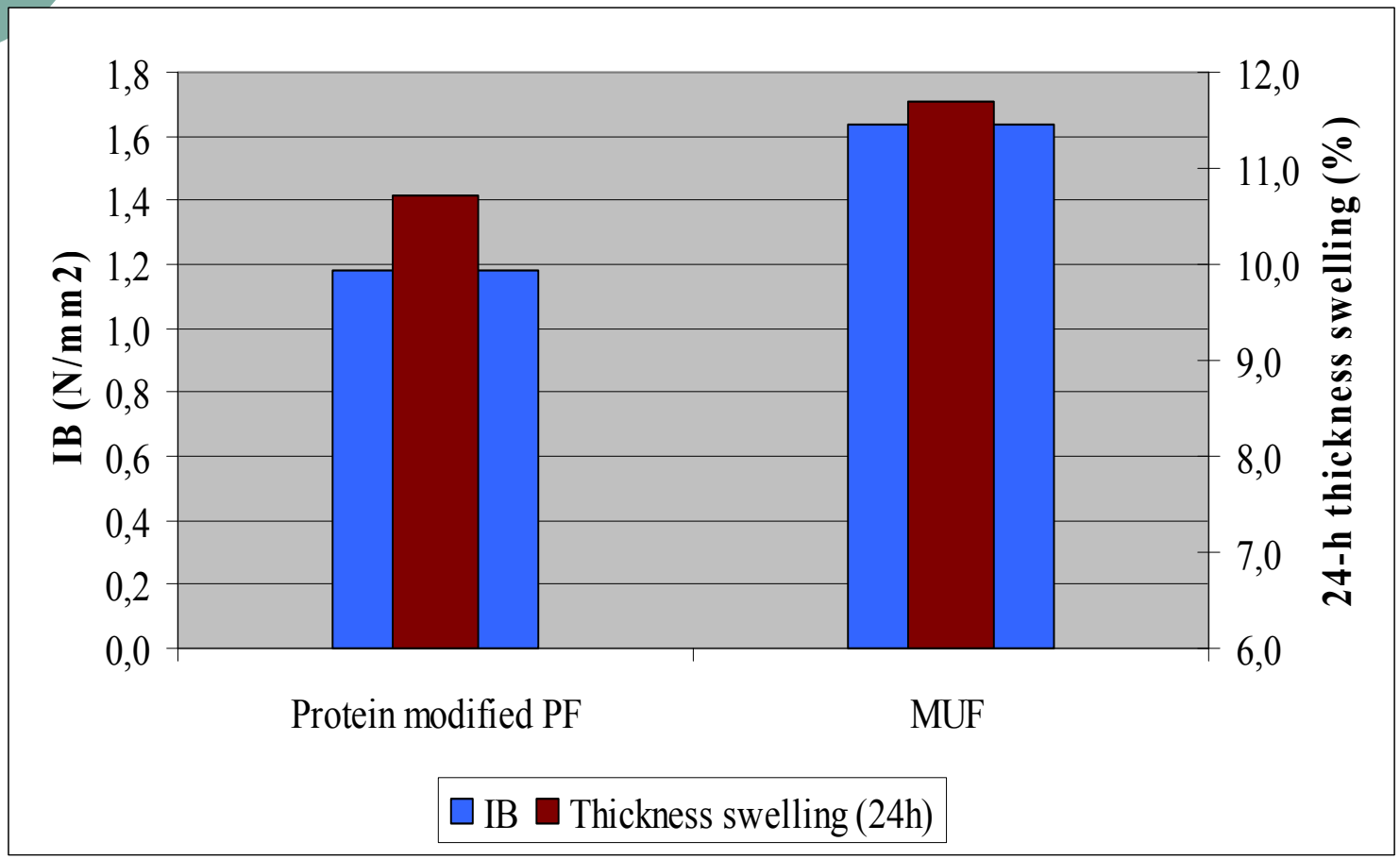


Industrial Results
IB and emissions on 3-mm HDF

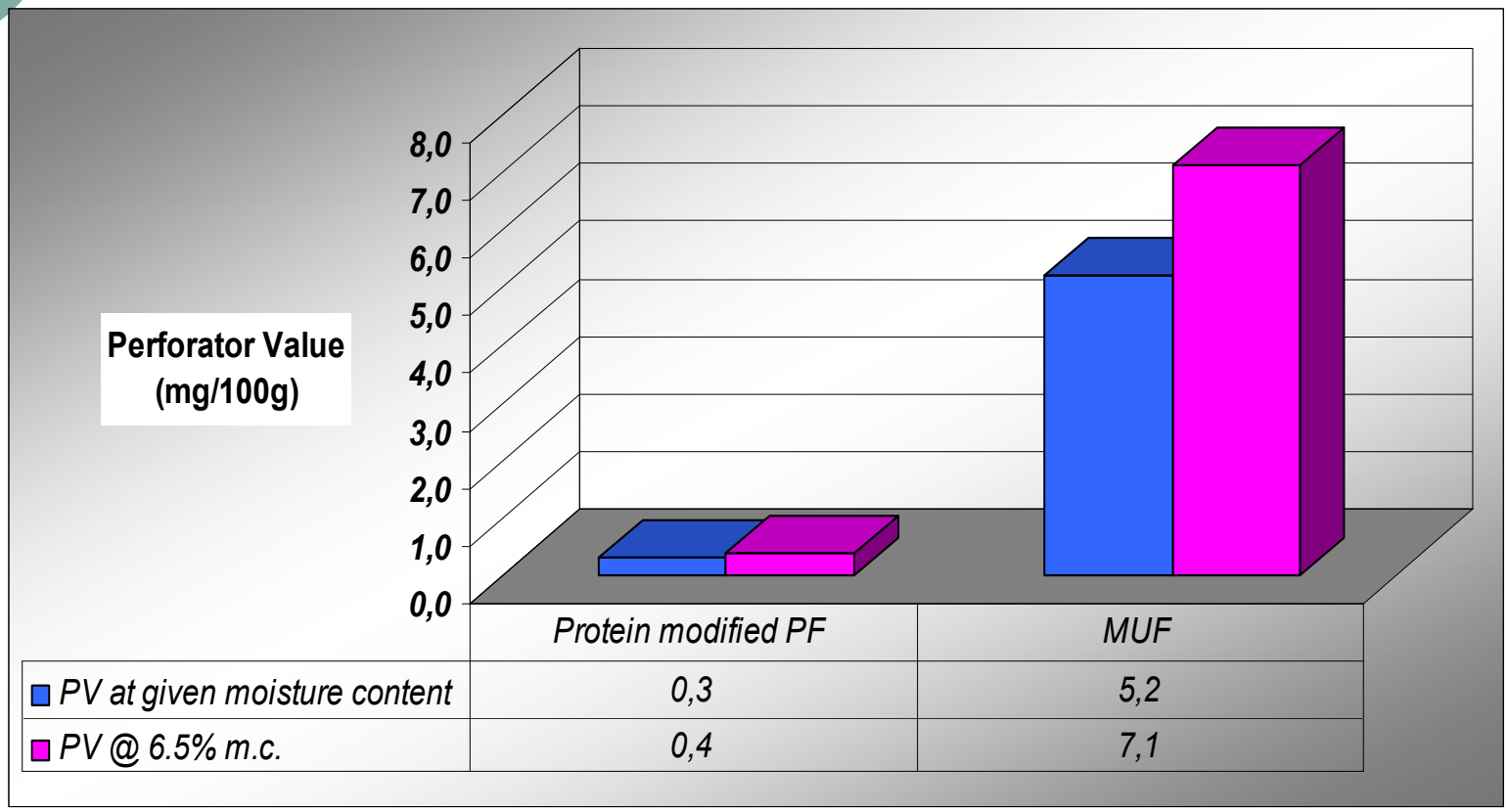




Industrial Results
Mechanical properties for flooring panels



Industrial Results
Formaldehyde emission of flooring panels



	Protein modified PF	MUF
PV at given moisture content	0,3	5,2
PV @ 6.5% m.c.	0,4	7,1

Dessicator test result for panels made with protein modified PF was lower than the detection limit

Protein modified PF in the MDF process

Advantages

- Emission
  - In the range of the natural wood are possible
- Closed surface
  - Improves lacquer finishing
- Possibilities for special applications
  - Powder coating by improving conductivity of panels made with this type of resin

- Time for Chanage
- Formaldehyde
- Protein Modified PF Resol Resin
- **Future**

Further Development

- Industrial systems for thin MDF boards exist commercially
- Tailored-made protein modified resins for different MDF application are in the pipe line.
- The learning process will lead to optimized systems with modified phenolic resins

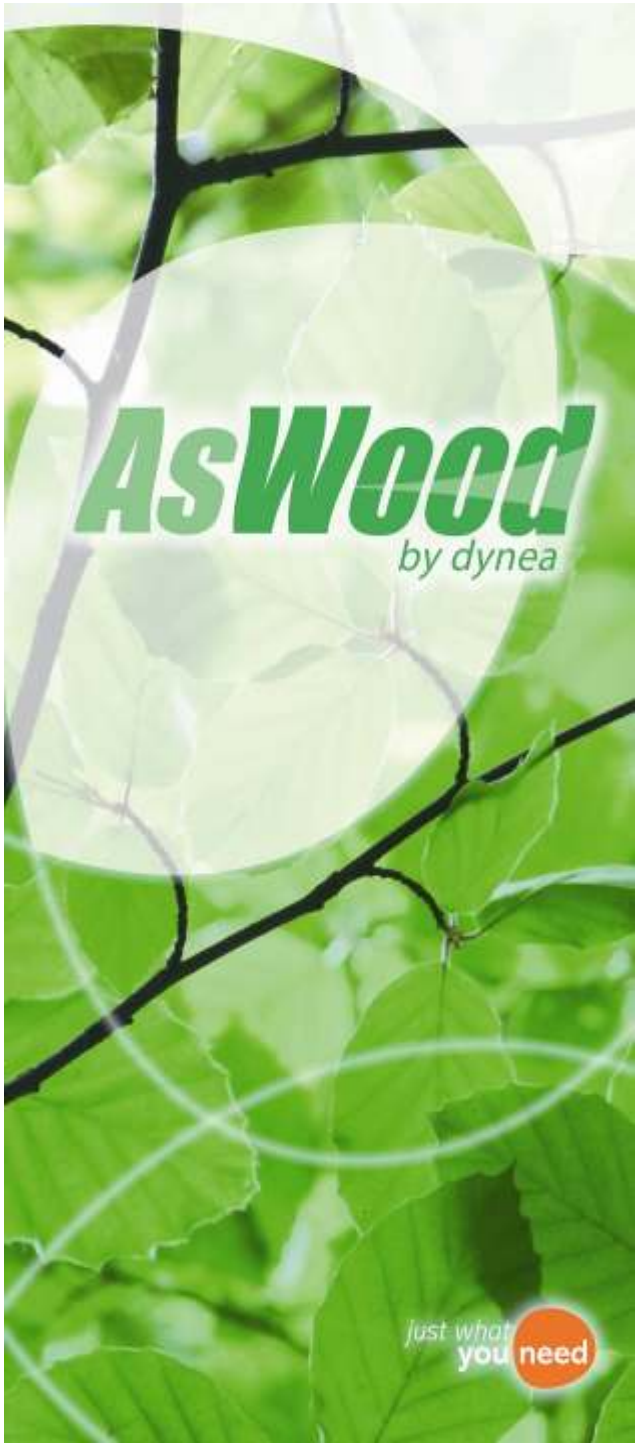
Future

- The development of technologies with low emissions in the final products will continue,
  - the dynamics is difficult to estimate
- Formaldehyde resins will continue to be the technology of choice in the future
  - Efficiency
  - Availability
- The end point for the development of new systems will be when we reach emissions comparable with natural wood.
- Systems preferred will be those, which contain at least partially renewable raw materials.

Our Vision

Technology based on formaldehyde based resins for wood-based materials

with formaldehyde emissions comparable to natural wood




AsWood
by dynea
Thank you for your attention