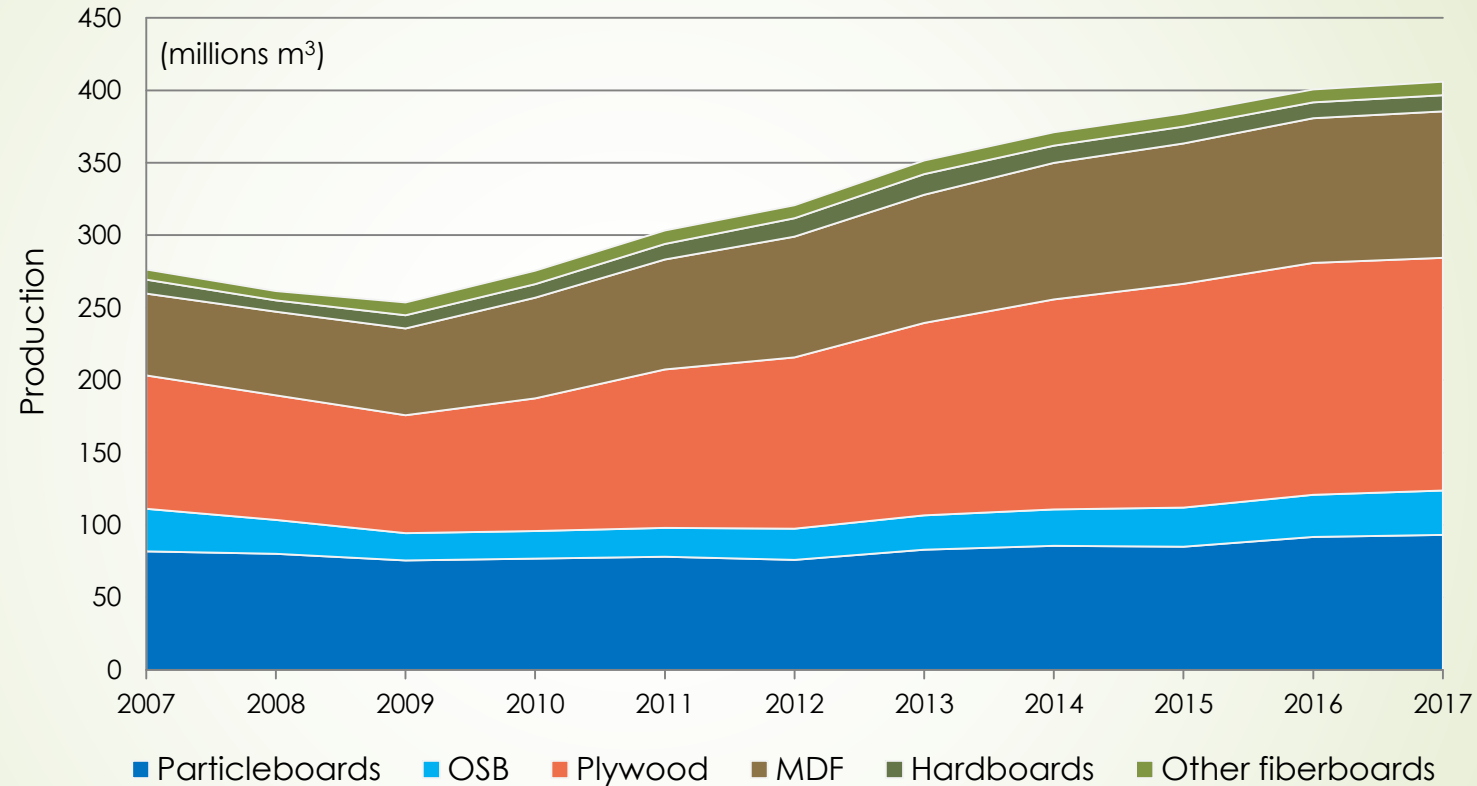


# FORMALDEHYDE EMISSION STANDARDS FOR WOOD-BASED PANELS AND TESTING CAPACITIES IN SERBIA

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# Wood based panels



Global wood based panels production

(FAOSTAT)

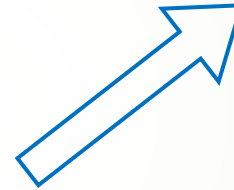
# Wood based panels

Plywood

Oriented Strand Board (OSB)

Particleboard

Medium Density Fiberboard (MDF)



Urea-formaldehyde (UF) resins !!!

Urea-melamine-formaldehyde (UMF) resins

Phenol-formaldehyde (PF) resins



#### Latest News: EPF Chairman, Mr Fantoni meets President of the EU Parliament, Mr Tajani

On 20 June 2018, EPF President Dr Paolo Fantoni and Federlegno President, Mr Emanuele Orsini met Mr Antonio Tajani, President of the European Parliament.

The meeting was especially focused on major topics of interest for both Federations, such as the contingencies on the application of Carb 2 in the US, the implementation of E1 compulsory in Europe and the consequences of the Revision of the Renewable Energy Directive.

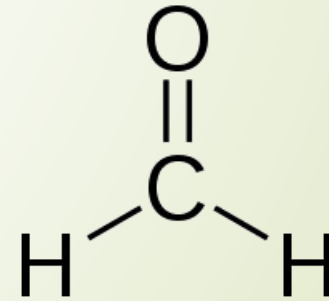


<http://europanels.org/>



# Formaldehyde health issues

- ▶ Formaldehyde concentrations in the surrounding air exceeding 0.1 ppm can cause various harmful effects on human health:
  - ▶ irritation of eyes, nose, throat and skin,
  - ▶ in more severe cases - asthma and allergic reactions.
- ▶ The International Agency for Research on Cancer (IARC) classifies formaldehyde as a human carcinogen.



# FA emission standards and regulations

- USA:
  - HUD
  - CARB regulation (ATCM 93120 - The Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products)
  - EPA (Formaldehyde Standards for Composite Wood Products Act - TSCA Title VI)
- Europe:
  - EN 636, EN 312, EN 622-1, EN 300, EN 13986
- Japan:
  - BSL, JIS A 5908, JIS A 5905, JAS 233

# Differences in FA emission standards and regulations

- ▶ Testing methods (type and characteristics of the equipment, sample preparation procedure, sample dimensions, testing conditions).
- ▶ Units of measure of the formaldehyde emission.
- ▶ Certification (procedures, responsibilities, approval/accreditation procedures).

# Test methods for determining FA emission

- CARB regulation ATCM 93120
  - **Primary method:** Large chamber (ASTM E1333)
  - **Secondary method:** Small scale chamber (ASTM D6007)
  - Alternative small scale tests:
    - ISO 12460-3 (Gas Analysis) and ISO 12460-5 (Perforator)
    - EN 717-2 (Gas Analysis) and EN 120 (Perforator)
    - GP™ Dynamic Microchamber
    - DMC (Dynamic Micro Chamber)
    - JIS A 1460 (24-hr Dessicator)

Equivalence with the primary method must be established.



# Test methods for determining FA emission

- EN 13986
  - **Initial type testing:** Chamber method (EN 717-1)
  - **Factory production control:**
    - Perforator method (EN 120 → EN/ISO 12460-5)
    - Gas analysis (EN 717-2 → EN/ISO 12460-3)

# Emission limits

| Europe<br>EN 13986 | Emission value<br>(mg/m <sup>3</sup> of air) | Perforator value <sup>a</sup><br>(mg/100g of dry board) |
|--------------------|--|---|
| E1                 | ≤ 0.124                                      | ≤ 8   |
| E2                 | > 0.124                                      | > 8 ≤ 30  |

| USA<br>CARB regulation            | HWPW <sup>a</sup> | PB <sup>b</sup> | MDF <sup>c</sup> | Thin MDF <sup>d</sup> | Period of<br>implementation |
|-----------------------------------|-------------------|-----------------|------------------|-----------------------|-----------------------------|
| <b>Upper emission limit (ppm)</b> |                   |                 |                  |                       |                             |
| Phase 1                           | 0.08              | 0.18            | 0.21             | 0.21                  | 2009                        |
| Phase 2                           | 0.05              | 0.09            | 0.11             | 0.13                  | 2010-2012                   |

0.1 ppm = 0.123 mg/m<sup>3</sup>

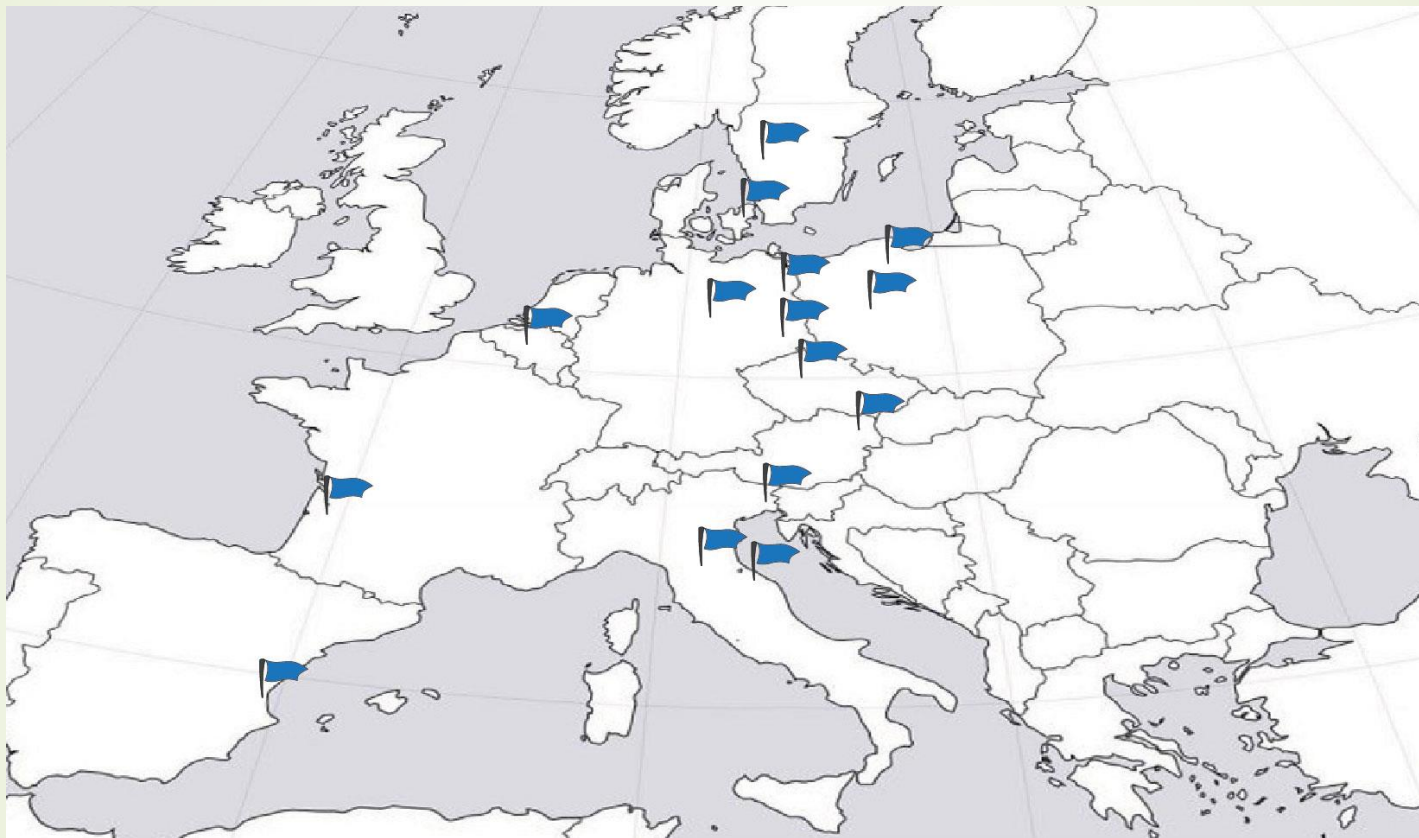
| Japan | Mean value of<br>emission <sup>a</sup><br>(mg/L) | Maximum value of<br>emission <sup>a</sup><br>(mg/L) | Panel type <sup>b</sup> |
|-------|--|---|-------------------------|
| F*    | > 1.5 ≤ 5.0                                      | > 2.1 ≤ 7.0   | only for PW             |
| F**   | > 0.5 ≤ 1.5                                      | > 0.7 ≤ 2.1   | PB, FB, PW              |
| F***  | > 0.3 ≤ 0.5                                      | > 0.4 ≤ 0.7   | PB, FB, PW              |
| F**** | ≤ 0.3  | ≤ 0.4   | PB, FB, PW              |

$$C = \frac{D - 0.0463}{6.8561} \quad [\text{mg/m}^3]$$

(Risholm-Sundman et al., 2007)

0.095 mg/m<sup>3</sup>  
(EN 717-1 calculated)

# CARB approved Third Party Certifiers in Europe



<https://www.arb.ca.gov/toxics/compwood/listoftpcs.htm>

# FA emission - regulations in Serbia

- ▶ Since the early 1980s in former Yugoslavia, the FA emission classes for wood based panels are defined in the standards (i.e. JUS D.C5.031).
- ▶ Regulation for Mandatory Attesting of Particleboards for general purpose and construction (1983).
- ▶ Since 2010, the Serbia has accepted the EN standards concerning the wood based panels (SRPS EN).
- ▶ Rule on the Requirements for Particleboards (2016).
- ▶ There are currently two testing facilities in Serbia capable to determine the formaldehyde release from wood based panels. However, both of them are using the extraction method.

# Conclusions

- ▶ The European Union, USA and Japan present the major driving forces in reducing the formaldehyde emission from wood based panels and finished wood products.
- ▶ It is difficult to compare the FA emission values with enough certainty, since there are much differences in testing methods proposed by different regulations.
- ▶ In terms of product certification on formaldehyde release, the Final Regulation of Californian Air Resource Board (CARB) has defined the most thorough procedures for testing and certification of wood based panels and products.
- ▶ The influence of the USA regulations is evident in the Europe by the number of testing institutions certified according to the CARB regulation.



# THANK YOU