Fire protection

Petr Ptáček

Protection of wood and wood-based products

L Why is required protect of wood?

abiotic agencies

- temperature, low – freeze, high – radiation
- water – rain, snow, ice
- sun shine – degrease of temperature of surface of wood
- UV radiation – color change of wood – graying.

Protection of wood and wood-based products

L Why is required protect of wood?

biotic agencies

- wood destroying fungi
- wood destroying insects
- sapstain fungi
- moulds

Protection of wood and wood-based products

L It is necessary to protect the wood?

- increase the durability by additional element section, an additional coating or impregnation is appropriate:
  - elements will be used as a carrier
  - elements are difficult replaceable or repairable
  - requirement of longer durability
  - position of the building element is a special risk (horizontal surface from which water flows slowly)
  - there is an increased risk of local infection by certain organisms (marine pests, termites)
  - exposure to the adverse climatic conditions (direct rain)

Protection of wood and wood-based products

L It is necessary to protect the wood?

Protection methods can be divided into:
- constructional wood protection (water, high humidity)
- chemical protection:
  - against the weather (no biocide paints)
  - against biotic factors (wooden preservative and paints containing biocides)
  - against fire (decrease of reaction to fire, fire resistance)
- another way of protection:
  - heat treatment of wood - „thermowood"
  - drying of wood (liquidation of biotic factors)
  - radiation protection (microwave radiation, radioisotopes).

Protection of wood and wood-based products

L Fire protection

- Reaction to fire (by EN 13501-1)
  "The response of the product to fire, which is subjected to certain conditions, caused by its own decomposition," therefore expresses the behavior of fire to the material surface (previously flammability), simply - whether surface burns, or no burns.

  NO FIRE RESISTANCE !!!
  Products based in H_3BO_3 is possible to use only to class C

Protection of wood and wood-based products

L Fire protection – reaction to fire EN 13501-1

- ADINA - B-s1, d0
- Pyroguma - B-s2, d0
- wood and wooden based-panel D-s2,d0

SBI - test

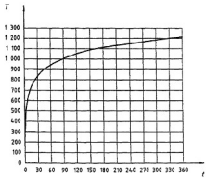
Protection of wood and wood-based products

L Fire protection – fire resistance

- Fire resistace is time as they are able to building construction or fire shutters resist temperatures arising in a fire without failure the structure. The EN 13 501-2+A1 are given characteristics in minutes 10, 15, 20, 30, 45, 60, 90, 120, 180, 240, 360
- REI
- R – loadbearing capacity
- E - intergrity
- I - insulation

Protection of wood and wood-based products

L Fire protection – fire resistance



Protection of wood and wood-based products

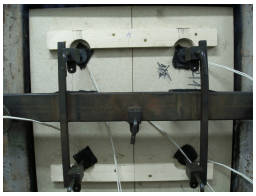
L Fire protection – fire resistance

- with painting with ADINA, Pyroguma, Aquaizol wood is possible descrease fire resistace about 10-40 min

test of fire resistance

Protection of wood and wood-based products

L Fire protection – fire resistance – ADINA



particleboard 18 mm brushed before application fire retardant, retention 1,5 kg/m2 of fire retardant ADINA (Pyrochem, s.r.o.), with vertical joint width 5 mm - Pyroguma (Pyrochem, s.r.o.) and interior coating HET

test of fire resistance

Protection of wood and wood-based products

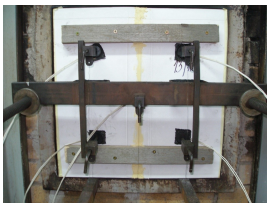
L Fire protection – fire resistance – ADINA

particleboard 18 mm brushed before application fire retardant, retention 1,5 kg/m2 of fire retardant ADINA (Pyrochem, s.r.o.), with vertical joint width 5 mm - Pyroguma (Pyrochem, s.r.o.) and interior coating HET

test of fire resistance

Protection of wood and wood-based products

L Fire protection – fire resistance – strawboard



EKOPANEL VP 01 60 mm – strawboard, with vertical joint width 7 mm - Pyroguma (Pyrochem, s.r.o.)

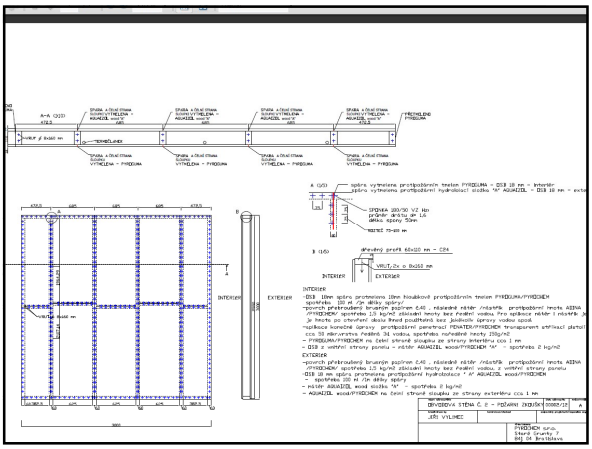
test of fire resistance

Protection of wood and wood-based products

L Fire protection – fire resistance – strawboard

EKOPANEL VP 01 60 mm – strawboard, with vertical joint width 7 mm - Pyroguma (Pyrochem, s.r.o.)

test of fire resistance



Protection of wood and wood-based products

L Fire protection – fire resistance

5/12/04 – sample 9
5/12/06 – sample 8
5/12/07 – sample 12-12-1-1
5/12/08 – sample 12-12-2-1
5/12/09 – sample 13-12
49/11 – sample 120/11/1,2,3

- modified fire resistance test by TP VVÚD 4.23.001, issued by ČIA accredited test laboratory 1031
- test protocols FIRES-FR-103-12-AUNS, EN 1365-1, issued by SNAS accredited test laboratory 041/S-159

Protection of wood and wood-based products

L Fire protection – fire resistance

5/12/04 – sample 9
5/12/06 – sample 8
5/12/07 – sample 12-12-1-1
5/12/08 – sample 12-12-2-1
5/12/09 – sample 13-12
49/11 – sample 120/11/1,2,3

- modified fire resistance test by TP VVÚD 4.23.001, issued by ČIA accredited test laboratory 1031
- test protocols FIRES-FR-103-12-AUNS, EN 1365-1, issued by SNAS accredited test laboratory 041/S-159

Protection of wood and wood-based products

L Fire protection – fire resistance

sample 9 - OSB plate NORDBOARD 18 mm brushed before application fire retardant, retention 1,5 kg/m^2 of fire retardant ADINA (Pyrochem, s.r.o.)

sample 8 - OSB plate NORDBOARD 18 mm brushed before application fire retardant, retention 1,5 kg/m^2 of fire retardant Pyroguma (Pyrochem, s.r.o.)

sample 12-12-1-1 particleboard 18 mm brushed before application fire retardant, retention 1,5 kg/m^2 of fire retardant ADINA (Pyrochem, s.r.o.), with vertical joint width 5 mm - Pyroguma (Pyrochem, s.r.o.) and interior coating HET

Protection of wood and wood-based products

Fire protection – fire resistance

sample 12-12-2-1 particleboard 18 mm brushed before application fire retardant, retention 1,5 kg/m^2 of fire retardant ADINA (Pyrochem, s.r.o.), with vertical joint width 1,4 mm - Pyroguma (Pyrochem, s.r.o.) and interior coating HET

sample 13-12 EKOPANEL VP 01 60 mm – strawboard, with vertical joint width 7 mm - Pyroguma (Pyrochem, s.r.o.)

sample 120/11/1 OSB plate NORDBOARD 18 mm brushed before application fire retardant, retention 1 kg/m^2 of fire retardant ADINA (Pyrochem, s.r.o.)

Protection of wood and wood-based products

Fire protection – fire resistance

sample 120/11/2 OSB plate NORDBOARD 18 mm brushed before application fire retardant, retention 1 kg/m^2 of fire retardant ADINA (Pyrochem, s.r.o.)

sample 120/11/3 OSB plate NORDBOARD 18 mm brushed

Protection of wood and wood-based products

Fire protection – fire resistance

sample REI 30/A OSB plate NORDBOARD 18 mm (interior) brushed before application fire retardant, retention 2 kg/m^2 of fire retardant ADINA (Pyrochem, s.r.o.), + PENATER transparent (Pyrochem, s.r.o.), hydroizolation AQUAIZOL wood (Pyrochem, s.r.o.) 2 kg/m^2 (inside of panel), connected to wood frame 110 x 60 mm with steel clamp 180/5, wire thickness 1,6, length 50 mm, timber frame under OSB end joint of OSB – PYROGUMA (Pyrochem, s.r.o.), OSB plate NORDBOARD 12 mm (inside of panel) brushed before application fire retardant, connected to wood frame 110 x 60 mm with steel clamp 180/5, wire thickness 1,6, length 50 mm, joint of OSB – AQUAIZOL wood (Pyrochem, s.r.o.) hydroizolation AQUAIZOL B (Pyrochem, s.r.o.) 0,7 kg/m^2 (exterior)

Protection of wood and wood-based products

Fire protection – fire resistance

sample REI 30/B OSB plate NORDBOARD 18 mm (interior) brushed before application fire retardant, retention 1,5 kg/m^2 of fire etardant ADINA (Pyrochem, s.r.o.), + PENATER transparent (Pyrochem, s.r.o.), hydroizolation AQUAIZOL wood (Pyrochem, s.r.o.) 2 kg/m^2 (inside of panel), connected to wood frame 110 x 60 mm with steel clamp 180/5, wire thickness 1,6, length 50 mm, timber frame under OSB end joint of OSB – PYROGUMA (Pyrochem, s.r.o.)

Protection of wood and wood-based products

Fire protection – fire resistance

sample REI 30/C OSB plate NORDBOARD 18 mm (interior) brushed before application fire retardant, retention 1,5 kg/m^2 of fire retardant ADINA (Pyrochem, s.r.o.), + PENATER transparent (Pyrochem, s.r.o.), hydroizolation AQUAIZOL A (Pyrochem, s.r.o.) 2 kg/m^2 (inside of panel), connected to wood frame 110 x 60 mm with steel clamp 180/5, wire thickness 1,6, length 50 mm, timber frame under OSB end joint of OSB – PYROGUMA (Pyrochem, s.r.o.)

Protection of wood and wood-based products

Fire protection – fire resistance

sample REI 45/A OSB plate NORDBOARD 18 mm (interior) brushed before application fire retardant, retention 1,5 kg/m^2 of fire retardant ADINA (Pyrochem, s.r.o.), + PENATER transparent (Pyrochem, s.r.o.), hydroizolation AQUAIZOL A (Pyrochem, s.r.o.) 2 kg/m^2 (inside of panel), connected to wood frame 110 x 60 mm with steel clamp 180/5, wire thickness 1,6, length 50 mm, timber frame under OSB end joint of OSB – PYROGUMA (Pyrochem, s.r.o.), OSB plate NORDBOARD 12 mm (inside of panel) brushed before application fire retardant, retention 1,5 kg/m^2 of fire retardant ADINA (Pyrochem, s.r.o.), connected to wood frame 110 x 60 mm with steel clamp 180/5, wire thickness 1,6, length 50 mm, timber frame under OSB end joint of OSB – AQUAIZOL wood (Pyrochem, s.r.o.), hydroizolation AQUAIZOL A (Pyrochem, s.r.o.) 2 kg/m^2 (exterior)

Protection of wood and wood-based products

- Fire protection – fire resistance

sample	ϕ 140°C max 180 °C (min)	burned (min) ϕ °C, max °C	classification
9	51 max 158°C	54 min ϕ *168* °C, max. 215 °C	EI 45 (51)
8	45 max 180°C	52 min ϕ *229* °C, max. 272 °C	EI 45
12-12-1-1	53 max 178°C	61 min ϕ *237* °C, max. 290 °C	EI 45 (53)
12-12-2-1	49 max 179°C	54 min ϕ*184* °C, max. 371 °C	EI 45 (49)
13-12	90 max 113°C	90 min ϕ *89* °C, max. 113 °C test was terminate	90
120-11-1	43 max 171°C	45 min ϕ*170* °C, max. 233 °C	EI 30 (43)
120-11-2	45 max 122°C	57 min ϕ*249* °C, max. 372 °C	EI 45
120-11-3	19 max 148°C	20 min ϕ *177* °C, max. 236 °C	EI 15 (19)
REI 30/A	42 max 68,6°C	42 min ϕ *55,8* °C, max. 68,6 °C	REI 30 (42)
REI 30/B			REI 30 (32)
REI 30/C			REI 30 (32)
REI 45/A			REI 45 (56)

Ochrana dřeva

Thank you