

Sandwich PIR



BRAND

NP
NORDIC PANELS

Fire safety

Fire safety of buildings is an essential element which determines the choice of suitable building materials.

Roof and wall panels with polyurethane core PIR on base of fire tests have been classified as a reaction to fire, flame propagation and fire resistance.

The test model for checking the reaction to fire was prepared in accordance with PN - EN 14509: 2012-13 standard.

Panel type	Panel thickness [mm]	Flame propagation PN – B – 02867:1990 + Az1:2001	Class reaction to fire PN - EN 13501-1+A1:2010
PWS-PIR-ST	40-80	NRO	B-s2, d0
	100	NRO	B-s1, d0
	120	NRO	B-s1, d0
PWS-PIR-PL	60-120	NRO	B-s2, d0
PWS-PIR-CH	120-220	NRO	B-s1, d0

Panel type	Panel thickness [mm]	External exposure to fire PN – EN 13501 – 5:2006	Class reaction to fire PN - EN 13501-1+A1:2010
PWD-PIR	40-100	B _{roof} (t1) (t2) (t3)	B-s2, d0
PWD-PIR	120-160	B _{roof} (t1) (t2) (t3)	B-s1, d0

Explanations to the table:

NRO – non flame propagation

B_{roof}(t1) (t2) (t3) – external exposure to fire - non-spreading fire

B-s1, d0; B-s2, d0, – no flammable, no smoky, no dropping; according to ITB 401/2004, the product does not spread fire inside buildings provided the panels are fastened directly to the elements of class A1 or A2 reaction to fire (except gypsum plasterboards) or at any distance from them

Fire resistance roof panels

Class of fire resistance of loaded roofs of multi-span panels PWD - PIR with polyurethane foam core type PIR thicknesses from 100 mm to 160 mm according to EN 13501-2 + A 1: 2010 - REI30 /RE60 is subject to the following conditions:

- use of a fire resistance structure – the class at least R30 or R60,
- the outer lining are joined together in a longitudinal contact (high fold) self-drilling fasteners or steel rivets tight at max. 300 mm,
- sheet metal machining is fastened to the plates with self-drilling fasteners or rivets Steel tight in a spacing of max. 300 mm,

Sandwich panels are not loaded with concentrated forces, eg from suspended installations, ventilation ducts, etc. Span torque from uniformly distributed load (including load snow) cannot exceed $M_{pr} = 0.12$ kNm / m (per meter width disc). Support torque from uniformly distributed load (including load snow) cannot exceed $M_{pd} = -0.14$ kNm / m (per meter width disc). It is necessary in calculations to accept snow loads of $0.2 \times S_k$ - where S_k is a characteristic snow load in Poland according to the PN - EN 1991-1-3: 2005 in a given zone (according to the location of the facility) or according to the country recommendations in this regard.

Panel type	Panel thickness [mm]	Fire resistance PN – EN 13501-2+A1:2010	Class fire resistance of construction	Pitch of the roof
PWD-PIR	40 - 80	Not tested	-	-
PWD-PIR	100-160	REI30 RE60	≤ R30 ≤ R60	From 0° to 15° From 0° to 15°

Fire resistance Wall panels

Class of fire resistance and stage of spreading fire on division walls should be adjusted to building class of fire resistance. In buildings class D and E division walls must be made as at least poorly spreading fire (SRO). In buildings of danger for people ZL II category (facilities for disabled people e. g. hospitals) division walls are required to be NRO – non flame propagation.

To category ZL IV of endangerment for people are qualified residential buildings.

Required class of fire resistance for the building, which is assigned to ZL category, is presented in the table below:

Division walls of Buildings of class A to C are required to be qualified as non-spreading fire, but their fire resistance class should be:

- For class C - EI 15,
- For class B - EI 30,
- For class A - EI 60.

building	ZL I	ZL II	ZL III	ZL IV	ZL V
Low (N)	"B"	"B"	"C"	"D"	"C"
Two-story (SW)	"B"	"B"	"B"	"C"	"B"
High (W)	"B"	"B"	"B"	"B"	"B"
High-rise (WW)	"A"	"A"	"A"	"B"	"A"

Elements of the building, according to its fire resistance class, should satisfy requirements from the table below:

Plate type	Plate thickness [mm]	Class of fire resistance PN-EN 13501-2+A1:2010/ PN-EN 13501-2:2016-07	Fire activity	Class fire resistance of construction	Vertical max. span of construction	Horizontal max. span of construction
PWS-PIR-ST	40 – 80	Not tested	-	-	-	-
	100 – 120	EI15	(o↔i)	≤ R15	to 12,00 m	to 12 m
	100 – 120	EI20	-	≤ R20	to 11,36 m	to 12,00 m
	100 – 120	EI30	(o↔i)	≤ R30	to 4,00 m	to 4,00 m
	100 – 120	E30	(o↔i)	≤ R30	to 3,00 m	to 8,48 m
PWS-PIR-PL	60 - 100	Not tested	-	-	-	-
	120	EI15	(o↔i)	≤ R15	to 3,00 m	to 8,73 m
	120	EI20	-	≤ R20	to 3,00 m	to 7,45 m
	120	EI30	(o↔i)	≤ R30	to 3,00 m	to 6,63 m
PWS-PIR-PL	120	EI15	(i→o)	≤ R15	to 3,00 m	to 12,00 m
	120	EI30	(i→o)	≤ R30	to 3,00 m	to 10,73 m
	120	E60	(o→i)	≤ R60	to 3,00 m	to 4,00 m
PWS-PIR-CH	120 - 220	EI15	(o↔i)	≤ R15	to 3,00 m	to 12,00 m
	120 – 220	EI20	-	≤ R20	to 3,00 m	to 10,57 m
	120 - 220	EI30	(o↔i)	≤ R30	to 3,00 m	to 3,00 m

Explanation to the table:

E – fire integrity in minutes - means that on the non - heated side of panel in given time will not appear continuous flames

I – fire insulation in minutes - means that on the non-heated side of the panel in given time the temperature will not exceed 180°C or the average of all measured points will not exceed 140°C

R – fire resistance in minutes - means the ability of the test element to maintain test load without exceeding specified criterion in relation to size and speed of movement

Corrosion resistance

Due to corrosion resistance, sandwich panels with rigid foam core PIR can be used in the following environments:

PWS - PIR - ST / PWS - PIR - PL / PWD - PIR / PWS - PIR - CH with coating Zinc Z187.5 Z200 and Z275 with SP25, SP35, PVDF25, PVDF35 organic coatings

Or PUR50, can be used in environment of corrosivity atmosphere category A1, A2, A3, A4, according to table A.1 of the standard PN-EN 10169 + A1: 2012 and outside objects, In environments with corrosivity class C1, C2 and C3 according to PN-EN ISO standard 12944-2: 2001;

- PWS boards - PIR - ST / PWS - PIR - PL / PWD - PIR / PWS - PIR - CAZ185 aluminum-zinc can be used inside objects in environments atmospheric corrosivity categories A1, A2, A3, A4, according to table A.1 PNEN 10169 + A1: 2012 and outside of objects, in environments of corrosivity category C1, C2 and C3 atmospheres according to PN-EN ISO 12944-2: 2001;
- PWS boards - PIR - ST / PWS - PIR - PL / PWD - PIR / PWS - PIR - CH in stainless steel facings can be used inside objects in environments atmosphere corrosivity category A1, A2, A3, A4, A5, according to table A.1 of the PN-EN standard 10169 + A1: 2012 and outside of objects, in environments of corrosivity category C1, C2, C3 and C4 atmospheres according to PN-EN ISO 12944-2: 2001;
- PWS - PIR - ST / PWS - PIR - PL / PWD - PIR / PWS - PIR - CH with coating Zinc Z200 or higher weight, with organic coating SP15, can be used Inside objects, environment of corrosivity atmosphere category A1, A2, A3, According to table A.1 of the standard PN-EN 10169 + A1: 2012;
- PWS - PIR - ST / PWS - PIR - PL / PWD - PIR / PWS - PIR - CH with coating Zinc Z200 and Z275 or aluminum-zinc coating AZ150, without additional security, can be used inside objects, in categories atmospheric corrosion A1, A2, according to table A.1 of the standard PN-EN 10169 + A1: 2012.

Corrosion categories	Corrosivity environment	Application	Examples Environments
C1	very small	inside	heated buildings with a clean atmosphere, such as offices, shops, schools, hotels
		outside	the atmosphere to a low degree of contamination; mainly rural area indoor
C2	small	inside	buildings unheated where condensation may take place - magazines, sports halls
		outside	Urban and industrial atmosphere, medium Sulfur oxide (IV) pollution; Coastal areas low salinity
C3	average	inside	Production areas with high humidity and certainty air pollution, egg foodstuffs, laundries, breweries, dairies
		outside	industrial areas and coastal areas of medium size salinity
C4	large	inside	chemical plants, swimming pools, ship repair yards and boat

Corrosion categories and examples environments according to PN-EN ISO 12944-2

Protective coatings

We offer you a wide range of products tailored to your cold storage environments and environments with controlled atmosphere. We offer full choice of suitable protective coatings on both sides of the panels according to your requirements.

Protective coatings - properties					
Type of coating	Thickness [µm]	resistance to corrosion	resistance to abrasion	resistance to scratching	resistance to dirt
Polyester gloss	25	**	*	**	**
Polyester mat	35	**	**	**	**
Coarse polyester	35	**	**	**	**
PVDF	35	***	**	***	****
Polyurethane	50	***	***	***	****
colorcoat HPS200	200	***	****	****	****
PVC film *	120/150	****	***	***	***
PET collagen*	55	****	****	****	****

Rating scale from * to **** - where **** means the highest rating
* - special coatings available on request

Protective coatings Environmental classifications inside of the building

The table below shows examples of buildings classified in six groups per increasing degree of threat (defined by the following standards). This makes it possible to choose the appropriate protective coating according to your needs. When choosing, we must take into consideration that the right selection of the coating may also be influenced by other parameters than those shown in the table: room functions, type of finish, type of mechanical impact on panels (friction, impact), external environment. That is why we recommend a thorough evaluation of environment in the cold storage building or controlled room atmosphere. We will help you in choosing the right covering, taking into consideration all specific requirements.

classification environment	resistance to cleaning	air humidity	internal temperature	Example of rooms	Polyester 25 - 35 µm	PVDF 35 µm	Polyurethane 50 µm	HPS 200 µm	film PVC 120-150 µm	55 µm PET laminate
Ai1	environment non-aggressive	current maintenance	Low	- 40°C Up to +25°C	Dry products storage in packages, freezing, storage of frozen and deep-frozen products (except for fish without packaging), clean and sterile rooms.	✓	✓	✓	✓	✓
Ai2	environment non-aggressive	Current maintenance	average	0°C Up to +25°C	Chilling, sorting, fruit and vegetable packaging, storage in a controlled atmosphere, storage and preservation of dairy or meat products in packages	✓	✓	✓	✓	✓
Ai3	environment non-aggressive	Not intense cleaning	high	0°C Up to +30°C	Storage, preparation in a humid environment (lettuce, flowers, fruits), cooling of meat products, ice cream production	✗	✓	✓	✓	✓
Ai4	low aggressive environment	nonintensive cleaning	wet environment possibility of condensation	0°C Up to +35°C	Cold stores for lettuce, ready-made meals, rooms slaughter of poultry, rabbits, wine cellars, butter production, cutting of meat, butcher production	✗	✓	✓	✓	✓
Ai5	environment aggressive	cleaning intensive	very wet environment possibility of condensation	0°C Up to +35°C	Slaughter rooms for sheep, cattle, pigs, goats, crops of mushrooms, kitchens, driers, smoke rooms, baking, removing guts, ripening cheeses, bakeries, storage and freezing fish without packaging	✗	✗	✗	✗	✓
Ai6	environment very aggressive	cleaning intensive	environment saturated with water	0°C Up to +40°C	Washbasins, showers, tricots, leather flashing, salting, pickling, Dairies for milk and cheese production, processing and seafood preparation	✗	✗	✗	✗	✗

PN-EN 10169-3: Flat steel products with continuous coating - Part 3: Products used in building interiors.
NF P 75-401 (DTU 45.1): Thermal insulation of refrigerated buildings and rooms with controlled atmosphere
XP P 34-301: Coated or coated steel sheets and tapes, coated or laminated for indoor use.