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BUILDING RESEARCH INSTITUTE

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Series: TECHNICAL APPROVALS

ITB TECHNICAL APPROVAL

AT-1 5-8107/2009

Under regulations of the Minister of Infrastructure dated 8. November 2004 on technical approval and entities authorized to issue technical approvals (Journal of Laws No 249/2004, item 2497), in result of approval proceeding conducted in the Building Research Institute, on application of the company:

Astroflame Fireseals Ltd.
Unit 8, The I.O. Centre, Stephenson Road, Segensworth Fareham
Btrat Britain PO 15 5RU

it is hereby certified that the set of products under the following names is suitable for building industry:

Collars ASTRO COLLAR,

bands ASTRO WRAP,

mortar ASTRO MORTAR,

sealing compound ASTRO INTU MASTIC

for fire-proof sealing

of plastic pipe passages

through building partitions

in scope and on conditions specified in Enclosure, which is a integral part of this ITB Technical Approval Validity date:

29. July 2014

Red round stamp with Polish national emblem in center and inscription „Building Research Institute" on perimeter

Stamp: DIRECTOR, vicariously Deputy Director for Cooperation with Business, Jan Bobrowicz

[signature illegible]

Enclosure

General and technical provisions

Warsaw, 29. July 2009

ENCLOSURE

GENERAL AND TECHNICAL CONDITIONS

Table of contents

1. SUBJECT OF THIS APPROVAL

This ITB Technical Approval covers a set of products, including:

1) collars ASTRO COLLAR,

2) bands ASTRO WRAP,

3) fire-proof mortar ASRTO MORTAR,

4) sealing compound ASTRO INTU MASTIC,

manufactured by Astroflame Fireseals Ltd. company, Unit 8, The I.O. Centre, Stephenson Road, Segensworth Fareham, Great Britain PO 15 5RU.

This products are intended for fire-proof sealing of plastic pipes through building partitions in scope provided in point 2.

The ASTRO COLLAR collars consist of outside jacket, formed in stainless steel, nominal thickness 1 mm, protected against corrosion with red painting coating, and one, two or more elastic inserts formed in thermoplastic materials, including the dispersed graphite with addition of fillers and technical oils, expanding in temperature exceeding 140 $^{\circ}$C. The normal density of inserts: 1,29 g/cm^3.

The oval profiled cut-outs, which – when bended by 90^0 – supports the expanding insert, are made on metal sheet rim.

The steel jacket of this collar is provided with special lock designed to connect the collar ends and to stabilize it on the pipe, and it is provided with assembly holders with holes (in number adapted to collar size), through which the expansion connectors are passed, which fasten the collar with building partition.

The ASTRO COLLARS shapes and sizes are demonstrated in drawing 1 and table A.

The ASTRO WRAP bands consist of outside layer – red, closed PVC foil bag, thickness 0,05 mm, and filling – one or two flexible inserts, expanding under temperature exceeding 140 $^{\circ}$C, the same as for ASTRO COLLAR collars.

The ASTRO WRAP bands shapes and sizes are demonstrated in drawing 2 and table B.

The dry mortar compound ASRTO MORTAR, manufactured in plant, includes the quick-setting calcium sulfate, calcium hydroxide, pearlite aggregate and calcium dust with modifying additives. When the dry compound is mixed with batch water, added depending on necessary consistence, in (weight) proportion: 2 : 1 for manual mortar application or 3: 1 for mortar application by machine, the ready-for-use mortar is obtained.

The ASTRO INTU MASTIC is a acrylic-vinyl-acetate compound with chemically neutral fillers and stabilizers.

The technical and operational properties for collars ASTRO COLLAR, bands ASTRO WRAP, mortar ASRTO MORTAR and sealing compound ASTRO INTU MASTIC are provided in point 3.

The conditions for sealing the plastic pipe passages through building partitions with these products are provided in point 2.

2. INTENDED USE, SCOPE AND CONDITIONS OF USAGE

2.1. Intended use and scope of usage

2.1.1. Intended use and scope of usage of collars ASTRO COLLAR. The ASTRO COLLAR collars are designed for fire—proof sealing, according to table 1, of single plastic (PVC, PP, HDPE, ABS and U PVC) pipe passages in walls and ceilings.

The thickness of partitions, through which plastic pipes sealed with ASTRO COLLAR collars may be passed, shall be not lower than:

- 100 mm – for concrete and reinforced concrete walls,
- 125 mm – for walls with gypsum-board cladding with proper fire resistance class,
- 250 mm – for solid brick and cellular concrete walls,
- 150 mm – for reinforced dense and cellular concrete ceilings. The fire resistance classes for pipe passages sealed with ASTRO COLLAR collars, according to conditions provided in point 2.2.2, are provided in table 1.

Table 1.

Fire classification for plastic pipe passages sealed with ASTRO COLLAR collars

Item	Partition type	Pipe material type	Pipe diameter, mm	Expanding insert size; height x thickness, mm	Passage sealing method	Passage fire resistance classification by PN-B-02851 -1:1997 and PN-EN 13501-2:2008
1	*2*	*3*	*4*	*5*	*6*	*7*
1	Walls	PP, PVC, MUPVC, UPVC, ABS, HDPE	≤ 55	60 x 8	p. 2.2.2 and drawing 3 and 4	EI 120
2			> 55 ÷ ≤ 168	60 x (7 x 3) or 60 x 22		EI 120
3	Ceilings	PP, PVC, MUPVC, UPVC	≤ 55	60 x 4	p. 2.2.2 and drawing 5	EI 240
4		ABS	≤ 55	60 x 8		EI 120

Table 1, continued

Item	Partition type	Pipe material type	Pipe diameter D, mm	Expanding insert size; height x thickness, mm	Passage sealing method	Passage fire resistance classification by PN-B-02851 -1:1997 and PN-EN 13501-2:2008
1	*2*	*3*	*4*	*5*	*6*	*7*
5	Ceilings	PP, PVC, MUPVC, UPVC	> 55 ÷ ≤ 82	60 x 8	p. 2.2.2 and drawing 5	EI 240
6			> 82 ÷ ≤110	60 x 12		EI 180
7			> 110 ÷ ≤160	60 x 20		EI 240
8		HDPE	≤ 55	60 x (2 x 3,8)		EI 240
9			200	60 x (2 x 3,8)		EI 240

2.1.2. Intended use and scope of usage of bands ASTRO WRAP. The ASTRO WRAP, designed for fire-proof sealing, according to table 2, of single plastic (PVC, PP, HDPE, ABS and UPVC) pipes passages in concrete walls, solid ceramic walls and cellular concrete walls, and in dense and cellular reinforced concrete ceilings.

The thickness of partitions, through which plastic pipes sealed with ASTRO WRAP band may be passed, shall be not lower than:

- 100 mm – for concrete and reinforced concrete walls,
- 250 mm – for solid brick and cellular concrete walls,
- 150 mm – for reinforced dense and cellular concrete ceilings. The fire resistance classes for pipe passages sealed with ASTRO WRAP bands, according to conditions provided in point 2.2.3, are provided in table 2.

Table 2.

Fire classification for plastic pipe passages sealed with ASTRO WRAP bands

Item	Partition type	Pipe material type	Pipe diameter D, mm	Expanding insert size; height x thickness, mm	Passage sealing method	Passage fire resistance classification by PN-B-02851-1:1997 and PN-EN 13501-2:2008
1	*2*	*3*	*4*	*5*	*6*	*7*
1	Walls	PVC	> 32 ÷ ≤110	by drawing 2 and table B	p. 2.2.3 and drawing 6 and 8	EI 180
2		MDPE	> 32 ÷ ≤ 110	60 x 6		EI 240
3		HDPE	> 32 ÷ ≤ 110	60 x 3,5		EI 240
4	Ceilings	PVC	> 32 ÷ ≤ 110	by drawing 2 and table B	p. 2.2.3 and drawing 7 and 8	EI 240
5		UPVC, HDPE, ABS	~ 55	60 x 8		EI 240
6		UPVC	> 110 ÷ ≤ 160	60 x 12		EI 60
7		HDPE	> 55 ÷ ≤110	60 x 8		EI 240
8			> 110 ÷ ≤ 160	60 x 16		EI 90
9		ABS	> 32 ÷ ≤ 160	by drawing 2 and table B		EI 240

2.2. The usage conditions

2.2.1. General provisions. The plastic pipe passages, fire-proof sealed with ASTRO COLLAR collars or ASTRO WRAP bands shall be made according to technical documentation prepared for the specific object, taking into account building regulations and this ITB Technical Approval.

The fire-proof sealing of pipe passages shall be made by companies trained by the Approval Applicant or its authorized representative in passage conditions and technologies, technical properties of products and work control.

Information on the pipe fire-proof passage shall be displayed on pipe or entered to the building log. This information shall include, at least:

– sealing name by this ITB Technical Approval,
– passage fire resistance class,
– company name, which made the fire-proof sealing,
– fire-proof sealing making date.

2.2.2. Conditions of usage of ASTRO COLLAR collars. The sealing of plastic pipe passages with ASTRO COLLAR collars according to table 1 may be made:

1) in solid brick, dense or cellular concrete walls and in walls with gypsum board cladding - both side outside the wall, according to drawing: 3 and 4, or

2) in ceilings – on one side, outside, from ceiling bottom, according to drawing 5.

The collar is assembled on pipe and fastened to the partition:

- solid – with steel expansion connectors M 8x 60 and M 8 x 80 for collars with diameter above 110 mm,

- light partition – gypsum boards – with steel expansion bolts M8 for gypsum boards, length depending on cladding thickness.

The diameter of hole in partition (D1) shall be higher than outside diameter of the sealed pipe (D) by not more than 20 mm.

The gaps between hole in wall or ceiling and pipe, with width not exceeding 5 mm, shall be filled with acrylic sealing compound ASTRO INTU MASTIC. The gaps with width higher than 5 mm (but not exceeding 10 mm) shall be filled with fire-proof mortar ASTRO MORTAR.

2.2.3. Conditions of use of bands ASTRO WRAP. The ASTRO WRAP bands shall be used:

1) in walls:

a) one in wall axis, seal the passage, in h = 10 mm depth from the partition face, with fire-proof mortar ASTRO MORTAR (drawing 6), or

b) one in wall axis, seal the passage, in 5 mm from partition face, with sealing compound ASTRO INTU MASTIC (drawing 8),

2) in ceilings:

a) one inside ceiling, in 10 mm distance from the bottom ceiling surface and seal passage on both ceiling sides, in 10 mm depth from partition face, with fire-proof mortar ASTRO MORTAR (drawing 7),

b) one in ceiling axis, seal passage on both ceiling sides, in depth

5 mm from partition face, with sealing compound ASTRO INTU MASTIC (drawing 8).

The required dimensions of holes in walls and ceilings, through which plastic pipes sealed with ASTRO WRAP will be passed, are provided in table 3.

Table 3.

The required dimensions of holes in walls and ceilings, depending on diameter of plastic pipe sealed with ASTRO WRAP bands

Nominal outside diameter of the sealed pipe D, mm	Nominal diameter of hole D1 for ASTRO WRAP band, mm	Type of ASTRO WRAP band
1	*2*	*3*
32	45	PW 32
40	55	PW 40
55	70	PW 55
63	80	PW 63
75	95	PW 75
82	100	PW 82
110	125	PW 110
125	155	PW 125
160	190	PW 160

The band is fastened by wrapping the sealed pipe and sticking its ends with self-adhesive tape, provided on one end of band, left without filling with expanding insert. The self-adhesive tape is secured against gluing by anti-adhesive separator. When the band is installed, the remaining free areas between pipe and a rim of hole in partition shall be sealed with fire-proof mortar ASTRO MORTAR or sealing compound ASTRO INTU MASTIC, as described above.

Each band is provided with self-adhesive identification label, attached separately to the band. This label shall be stuck prior assembly in visible location on pipe, in distance not higher than 25 cm from wall surface or bottom ceiling surface.

The band insert may be cut off to the required length, higher or equal to the outside perimeter of the protected pipe. It is not possible to connect (lengthen) inserts.

3. TECHNICAL PROPERTIES. REQUIREMENTS

3.1. Expanding inserts

3.1.1. Outside appearance. The inserts shall have a uniform shape, without foreign inclusions, cracks, losses and other damages. The appearance shall be assessed according to point 5.6.1.

3.1.2. Shapes and dimensions. The inserts shall be rectangular. Dimensions of inserts, determined according to point 5.6.2, shall be consistent with:

- drawing 1 and table A – in case of inserts used in collars ASTRO COLLAR,
- drawing 2 and table B – for inserts used in ASTRO WRAP bands. The acceptable deviations of insert dimensions from nominal dimensions:
- length - ± 5 mm,
- width - ± 3 mm,
- thickness - ± 0,5 mm.

3.1.3. Insert density. The insert density determined according to point 5.6.3 shall be 1,29 kg/cm^3 ± 5%.

3.1.4. Relative expansion height. The average insert expansion height – multiplicity of insert expansion on thickness in relation to thickness prior heating – after test according to point 5.6.4, shall be at least 7.

3.1.5. Maximum expansion pressure. The maximum insert expansion pressure, after test according to point 5.6.5, shall be 648 N/mm^2 ± 15%.

3.2. Fire-proof collars ASTRO COLLAR

3.2.1. Outside appearance. The appearance of collars, assessed according to point 5.6.1, shall be consistent with description provided in point 1 and drawing 1. The expanding inserts shall fill the whole inside space of the metal sheet collar ring. The expanding insert shall meet requirements provided in point 3.1.

3.2.2. Shapes and dimensions. The shapes and dimensions of collars, determined according to point 5.6.2, shall be consistent with drawing 1 and table A.

3.2.3. The ASTRO COLLAR collars fire resistance efficiency. The plastic pipe passages, sealed with ASTRO COLLAR collars according to conditions specified in the approval, after test according to point 5.6.7, shall meet fire resistance criteria by standards PN-B-02851-1: 1997 and PN-EN 13501-2: 2007, for classes specified in table 1 in point 2.1.1.

3.3. Fire-proof bands ASTRO WRAP

3.3.1. Outside appearance. The appearance of bands, assessed according to point 5.6.1, shall be consistent with description provided in point 1. The foil bag guarding the expanding insert shall not demonstrate any defects and damages. The expanding insert shall meet requirements provided in point 3.1.

3.2.2. Shapes and dimensions. The shapes and dimensions of bands, determined according to point 5.6.2, shall be consistent with drawing 2 and table A.**3.3.3. The fire resistance efficiency of ASTRO WRAP bands.** The plastic pipe passages, sealed with ASTRO WRAP bands according to conditions specified in the approval, after test according to point 5.6.7, meet fire resistance criteria by standards PN-B-02851-1:1997 and PNEN 13501-2: 2007, for classes specified in table 2 in point 2.1.2.

3.4. Fire-proof mortar ASTRO MORTAR

3.4.1. Technical properties The ASTRO MORTAR technical properties shall be consistent with requirements provided in table 4.

Table 4

The required technical properties for ASTRO MORTAR.

Item	Properties	Requirements	Tests according to
1	*2*	*3*	*4*
Dry mortar mix ASTRO MORTAR			
1	Outside appearance	light grey powder without cakes and impurities, with light, fine grain, white filler	p. 5.6.1
2	Bulk density, kg/m^3	830 ± 5%	PN-EN 1097-3:2000
ASTRO MORTAR mortar after mixing the dry mix with water in ratio (weight): 2 : 1			
3	Outside appearance	cream-white, uniform substance with fine, visible filler grain, without cakes and stratification	p. 5.6.1
4	Consistence, cm	≥ 15	PN-B-04500:1985
The hardened mortar ASTRO MORTAR			
5	Outside appearance	light-grey, uniform in texture and color, without stains, cracks and blisters	PN-B-04500:1985
6	Volume density in dry condition, g/cm^3	1,01 ± 5%	
7	Bending strength, MPa	≥ 1,0	
8	Compression strength, MPa	≥ 2,5	

Table 4, continued

Item	Properties	Requirements	Tests according to
1	*2*	*3*	*4*
9	Adherence to substrate, MPa: a) concrete: • dry • wet b) bricks: • dry • wet	 ≥ 0,7 (break in mortar) ≥ 0,07 (break in mortar) ≥ 0,20 (break in mortar) ≥ 0,05 (break in mortar)	PN-B-04500:1 985
10	Linear contraction after 28 days, %	≤0,1	
11	Fire classification for reaction on fire	A1*	PN-EN ISO 171 6:2004 PN-EN ISO 1182:2004 PN-EN 13501-1:2008
* by regulation of Minister of Infrastructure on technical conditions which shall be met by buildings and their locations and ITB Instruction No 401/2004 — inflammable product, not falling off under fire			

3.4.2. Service life – usage period. The usage period for ASTRO MORTAR dry mix shall be specified on packaging. The manufacturer guarantees that product shall keep in this period its properties, according to requirements provided in point 3.4.1.

3.5. Acrylic sealing compound ASTRO INTU MASTIC

The technical properties of acrylic, sealing compound ASTRO INTU MASTIC, shall be consistent with requirements provided in table 5.

Table 5

Technical properties of acrylic compound ASTRO INTU MASTIC

Item	Properties	Requirements	Test method by
1	*2*	*3*	*4*
1	Outside appearance	uniform white substance, without cakes and impurities	PN-B-30150:1997
2	Working consistence	semi-thick, compound can be easily spread on the base with spatula	PN-B-30150:1997
3	Volume density in temperature (23 ± 2) °C (after cross-linking), g/cm^3	1,83 ± 5%	PN ISO 1183-1:2005, method A (without air lift correction), sample conditioning by PN-EN ISO 8339:2005, method A
4	Shore's hardness in temperature (23 ± 2) °C, scale A (measurement after 15 s)	8,8 ± 10%	PN-EN ISO 868:2005 single layer samples, thickness 10 mm, sample conditioning by PN-EN ISO 8339:2005, method A
5	Working time, minutes	≥ 30	PN-B-30151:1997
6	Total setting time, days	≤ 1,5	p. 5.6.6.

Table 5, continued

Item	Properties	Requirements	Test method by
1	*2*	*3*	*4*
7	Flaw resistance (within 24 h in temperature 70 ± 2 °C, aluminum profile, not anodized), mm	≤ 1	PN-EN ISO 7390:2004, method A (vertically) method B (horizontally)
8	Elastic return, %, (at elongation 25%, concrete base)	≥ 22	PN-EN ISO 7389:2004, sample conditioning by method A, not primed base
9	Mechanical properties at stretching in temperature 23 ± 2 °C: 1) concrete base: • transverse tensile modulus at elongation 25%, N/mm^2 • relative elongation at maximum force, % 2) steel base: • transverse tensile modulus at elongation 25%, N/mm2 • relative elongation at maximum stress, %	 ≥ 0,10 ≥ 16 ≥ 0,10 ≥ 16	PN-EN 8339:2005
10	Mechanical properties at fixed stretching - elongation 25%, concrete base, temperature (23 ± 2) °C	without damages	PN-EN ISO 8340:2004, sample conditioning by method A
11	Adhesive – cohesive properties after water action, concrete base, temperature (23 ± 2) °C	without damages	PN-EN ISO 10591:2007, sample conditioning by method A
12	Volume change, %	≤ 25	PN-EN ISO 10563:2007
11	Relative expansion height (insert expansion multiplicity on thickness in relation to thickness before heating)	≥~ 0,7	p. 5.6.3

3.5.2. Service life – usage period. The usage period for acrylic, sealing compound ASTRO INTU MASTIC shall be specified on packaging. The manufacturer guarantees that product shall keep in this period its properties, according to requirements provided in point 3.5.1.

4. PACKING, STORAGE AND TRANSPORT

4.1. Packing

Products covered by this ITB Technical Approval shall be delivered in original Manufacturer's packaging, protecting them against damages or changes in technical properties.

Information shall be attached to each packaging, including at least the following data:

- name and type of product according to this ITB Technical Approval,

– name and address of Manufacturer,
– intended use and storage conditions,
– usage expiration date,
– ITB Technical Approval number AT-15-8107/2009,
– number and date of issue of the national declaration of conformity,
– name of certifying unit, which participated in assessment of conformity,
– building mark.

The method of marking with building mark shall be consistent with regulation of the Minister of Infrastructure dated 11. August 2004 on method of declaring conformity of building products and method for their marking with building mark (Journal of Laws No 198/2004, item 2041).

4.2. Storage

The products covered by this ITB Technical Approval shall be stored in a manner protecting them against damages and changes in their technical properties, specified in instruction prepared by the Manufacturer.

4.3. Transport

The products covered by this ITB Technical Approval shall be transported in a manner protecting them against damages and changes in their technical properties, specified in transport instruction prepared by the Manufacturer.

5. ASSESSMENT OF CONFORMITY

5.1. General provisions

According to art. 4, art. 5 paragraph 1 point 3 and art. 8 paragraph 1 of Act dated 16. April 2004 on building products (Journal of Laws No 92/2004, item 881) products covered by this Technical Approval can be introduced on the market and used in building works in scope corresponding to their working properties and intended use, if manufacturer conducted assessment of conformity, issued the national declaration of conformity with ITB Technical Approval No AT-1 5-8107/2009 and marked products with building mark according to provisions of law n force.

According to regulation of the Minister of Infrastructure dated 11. August 2004 on method of declaring conformity of building products and method for their marking with building mark (Journal of Laws No 198/2004, item 2041), assessment of conformity of set of products: ASTRO COLLAR collars, ASTRO WRAP bands, ASTRO MORTAR fire-proof mortar and ASTRO INTU MASTIC sealing compound, with ITB Technical Approval AT-15-8107/2009 is conducted by the Manufacturer, (or its authorized representative which have its seat within territory of Republic of Poland), applying system 1.

In case of system 1 of assessment the Manufacturer can issue declaration of conformity with ITB Technical Approval ITB AT-15-8107/2009, if the accredited certifying unit issued certificate of conformity on the base of:

a) obligations of Manufacturer:

– company's production control,

– supplementing tests of the finished products (samples), taken in production plant, conducted by the Manufacturer, according to the determined testing program, including tests specified in point 5.4.3.

b) obligations of the accredited unit:

– preliminary type tests,

– preliminary inspection of production plant and company's production control,

– supervision, assessment and acceptance of the company's production control on continuous basis.

5.2. Preliminary type test

The preliminary type test is a test confirming the required technical and operation properties, conducted prior product introduction on the market and operation.

The preliminary type test includes:

- for ASTRO COLLAR collars:

a) relative expansion height of expanding inserts,

b) maximum insert expansion pressure,

- for ASTRO WRAP bands – relative expansion height of expanding inserts,

- for fire-proof mortar ASRTO MORTAR:

a) mortar compression strength and bending strength,

b) mortar linear contraction,

c) class of reaction on fire,

- for sealing compound ASTRO INTU MASTIC:

a) flow resistance,

b) elastic return,

c) mechanical properties in stretching,

d) mechanical properties in fixed elongation,

e) elastic and cohesive properties after action of water,

f) volume change,

g) expansion properties,

- for set of products for plastic pipe passage sealing using ASTRO COLLAR collars and ASTRO WRAP bands – passage fire resistance class.

Tests which served to determine the technical and operation properties in approval proceeding, constitute the preliminary type test in assessment of conformity.

5.3. Company's production control

The company's production control includes:

1) specification and control of raw materials and components,

2) control and tests of products in production process and control of finished products (point 5.4.2.), conducted by the Manufacturer according to the determined testing plan and according to conditions and procedures specified in the company's production control documentation, adapted to production technology and aimed to obtain the set of products with the required technical and operation properties.

The production control must secure that products meet this ITB Technical Approval AT-15-8107/2009. The results of production control shall be recorded on the regular basis. The enters to register shall confirm that products meet criteria of assessment of conformity. Each lot of products shall be uniquely identified in test register and commercial documents.

5.4. Finished products tests

5.4.1. Testing program. The testing program includes:

a) current tests,

b) supplementing tests.

5.4.2. Current tests. The current tests include:

- for ASTRO COLLAR collars and ASTRO WRAP bands, checks of:

a) outside appearance of inserts,
b) shape and dimensions of inserts,
c) insert density.
d) outside appearance of fire-proof collars ASTRO COLLAR and fire-proof bands ASTRO WRAP,

- for fire-proof mortar ASRTO MORTAR, checks of:

a) outside appearance of dry mix and mortar,

b) bulk density of dry mortar,

c) consistence of mortar after mixing the dry mix with water,

- for sealing compound ASTRO INTU MASTIC, checks of:

a) outside appearance,

b) volume density,

c) working time.

5.4.3. Supplementing tests. The supplementing tests include:

- for ASTRO COLLAR collars and ASTRO WRAP bands, checks of:

a) relative height of insert expansion,

b) insert expansion pressure,

- for fire-proof mortar ASRTO MORTAR, checks of:

a) mortar compression strength and bending strength,

b) mortar linear contraction,

- for sealing compound ASTRO INTU MASTIC, checks of:

a) Shore's A hardness,

b) elastic return,

c) mechanical properties in stretching,

d) volume change,

e) expansion properties,

5.5. Testing frequency

The current tests shall be conducted according to preset test plan, but at least for each lot of products. The size of lot of products shall be determined in the plant's production control documentation.

The supplementing tests shall be conducted at least once in three years.

5.6. Test methods

5.6.1. Tests of outside appearance. The outside appearance shall be assessed visually in daylight and obtained results shall be compared with requirements provided in point 3.

5.6.2. Tests of dimensions. Dimensions shall be checked with measuring instruments, allowing to check dimensions with the proper accuracy. The result of tests, constituting the arithmetic average from at least five measurements, shall be compared with requirements provided in point 3.

5.6.3. Tests of density. The random sample of at least 3 expanding inserts shall be taken for test; they shall be weighted with accuracy 1 g by measuring instruments allowing measurements with proper accuracy and determine weight of 1 cm2. The result of test, constituting arithmetic average, shall be compared with requirements provided in point 3.

5.6.4. Test of relative expansion height. The tests of relative expansion height shall be conducted according to ITB Approval Determinations GS VII.10/2002, subject samples of inserts for 30 minutes to temperature:

- 450°C for expanding inserts,

• 150 °C for sealing compound.

5.6.5. Test of maximum pressure of insert expansion. The maximum expansion pressure shall be determined according to ITB Approval Determinations GS VII.10/2002, subject insert samples to temperature 450°C.

5.6.6. Test of total setting time. Apply the compound sample – cylinder with 5 mm diameter – on the glass plate. Cut off cylinder section with 5 mm length each 24 hours and check the compound setting condition in sample cross-section. The result of tests is time (in days) which passed from sample forming moment to its setting on the whole thickness.

5.6.7. Test of fire resistance efficiency of fire-proof collars and fire-proof bands. The fire resistance of passages (in walls and ceilings) of plastic pipes, sealed with ASTRO COLLAR colars and ASTRO WRAP bands, using the fire-proof mortar ASTRO MORTAR or sealing compound ASTRO INTU MASTIC by this approval, is determined according to standard PN-EN 1366-3:2006.

5.7. Sampling for tests

Samples for tests shall be taken randomly according to standard PN-83/N-03010.

5.8. Assessment of test results

The manufactured products shall be recognized as conformable with requirements of this ITB Technical Approval, if results of all tests are positive.

6. LEGAL CONCLUSIONS

6.1. The ITB Technical Approval AT- 15-8107/2009 is document certifying suitability of set of products: ASTRO COLLAR collars, ASTRO WRAP bands, ASRTO MORTAR fire-proof mortar, ASTRO INTU MASTIC sealing compound for usage in building industry in scope resulting from provisions of this Approval.

According to art. 4, art. 5 paragraph 1 point 3 and art. 8 paragraph 1 of Act dated 16. April 2004 on building products (Journal of Laws No 92/2004, item 881) products covered by this Technical Approval can be introduced on the market and used in building works in scope corresponding to their working properties and intended use, if manufacturer conducted assessment of conformity, issued the national declaration of conformity with ITB Technical Approval No AT-15 8107/2009 and marked products with building mark according to provisions of law in force.

6.2. This Technical Approval does not breach rights resulting from provisions on protection of industrial property, and in particular announcement of the Speaker of Parliament of Republic of Poland dated 13. June 2003 on the unified text of Act dated 30. June 2000 (The Industrial Property Act), (Journal of Laws No 119, item 1117). The entities using this Technical Approval are obliged to secure these rights.

6.3. ITB, issuing the Technical Approval, does not accept liability for possibility breach of exclusive and acquired rights.

6.4. The ITB Technical Approval does not release the Manufacturer of products covered by this approval from liability for their adequate quality and contractors of building works from liability for proper application of these products and correct fulfillment of works.

6.5. In text of the issued prospectus and announcements and other documents related to application in building industry the set of products: ASTRO COLLAR collars, ASTRO WRAP bands, ASRTO MORTAR fire-proof mortar and ASTRO INTU MASTIC sealing compound, information on the issued ITB Technical Approval AT-15-8107/2009 shall be included.

7. TERM OF VALIDITY

This ITB Technical Approval AT-15-8107/2009 is valid till 29. July 2014.

The validity of this ITB Technical Approval may be prolonged by successive periods if its Applicant, or formal successor, apply in this purpose to the Building Research Institute (Instytut Techniki Budowlanej) with relevant application, not later than 3 months prior expiration of validity of this document.

The End

ADDITIONAL INFORMATION

Related standards and documents

PN-B-02851-1 :1997 *The fire protection of buildings. Tests of fire resistance of building elements. General requirements and classification.*

PN-B-04500: 1985 *Building mortars. Tests of physical and resistance properties.*

PN-B-30150:1997 *Permanently plastic building putties.*

PN-B-30151 :1997 *Thiorubber putty.*

PN-83/N-0301 0 *Statistical quality control. Random selection of production units for test.*

PN-EN 1097-3:2000 *Tests of mechanical and physical of properties of aggregates. Determination of loose bulk density and voids.*

PN-EN 1363-1:2001 *Fire resistance tests. Part 1: General requirements.*

PN-EN 1366-3:2006 *Fire resistance tests for service installations. Part 3: Penetration seals.*

PN-EN 13501-2: 2008 *Fire classification of construction products and building elements. Part 2: Classification using data from fire resistance tests, excluding ventilation services.*

PN-EN ISO 868:2005 *Plastics and ebonite. Determination of indentation hardness by means of durometer (Shore hardness)*

PN-EN ISO 1182:2004 *Reaction to fire tests for building products. Non-combustibility tests.*

PN-EN ISO 1716:2004 *Reaction to fire tests for building products. Determination of the heat of combustion.*

PN-EN ISO 7389:2004 *Building construction. Jointing products. Determination of elastic recovery of sealants.*

PN-EN ISO 7390:2004 *Building construction. Jointing products. Determination of resistance to flow of sealants.*

PN-EN ISO 8339:2005 *Building construction. Jointing products. Sealants. Determination of tensile properties.*

PN-EN ISO 8340:2005 *Building construction. Jointing products. Sealants. Determination of tensile properties at maintained extension.*

PN-EN ISO 10563:2000 *Building construction. Sealants. Determination of change in mass and volume.*

PN-EN ISO 10591:2007 *Building construction. Sealants. Determination of adhesion/cohesion properties of sealants after immersion in water.*

PN-EN ISO 1183-1:2006 *Plastics. Methods for determining the density of non-cellular plastics. Part 1: Immersion method, liquid pyknometer method and titration method.*

GS VII. 10/2002 *Approval Determinations concerning the required properties and testing methods for thermally activated sealing products used for fire protection. Building Research Institute, Warsaw*

Instruction ITB No 401/2004 *The assignment of definitions appearing in technical and building provisions to reaction on fire classes by PN-EN*

ZUAT-15/IV.16/2007 *Recommendations for Issuing Technical Recommendation ITB. Sealing and filling putties for gaps in walls, floors, ceilings, roof covering, doors and windows.*

KAT-0 1/2001 *Approval Determinations concerning approval procedure and conditions for assessment of conformity of set of products.*

Reports, reports from tests, classifications and assessments

1. NP-1381/A/08/ZL. Classification regarding the fire resistance of sealing of plastic pipe passages using the fire resistant collars ASTRO COLLAR and bands ASTRO WRAP. Building Research Institute, Fire Test Department, Warsaw

2. Report from test No 224287 from test of fire resistance of sealing of plastic pipe passages using the ASTRO COLLAR collars, through gypsum board wall, conducted by BRE laboratory

3. Report from test No 219511 from test of fire resistance of sealing of plastic pipe passages using the ASTRO COLLAR collars, through cellular reinforced concrete ceiling, conducted by BRE laboratory

4. Report from test No 227592 from test of fire resistance of sealing of plastic pipe passages using the ASTRO COLLAR collars, through cellular reinforced concrete ceiling, conducted by BRE laboratory

5. Report from test No 163146 from test of fire resistance of sealing of plastic pipe passages using the ASTRO WRAP bands collars, through cellular reinforced concrete wall and ceiling, conducted by laboratory in Warringtonfire

6. Report from test No 219813 from test of fire resistance of sealing of plastic pipe passages using the ASTRO WRAP bands, through cellular reinforced concrete ceiling, conducted by BRE laboratory

7. NP-708/09/ZM. Classification report concerning reaction on fire by EN 13501-1:2007 (ASRTO MORTAR mortars) with Reports from tests No LP-708.3/6.1-38/09 and No LPK-708.2/1-14/09. Building Research Institute, Fire Test Department, Warsaw

8. Report from tests No LP-708. 1/36-2/09. Test of expansion height of ASTRO INTU MASTIC sealing compound. Building Research Institute, Fire Test Department, Warsaw

9. Report from tests No LP-1484.1/36-1/08. Test of expansion height of ASTRO WRAP bands. Building Research Institute, Fire Test Department, Warsaw

10. Report from tests No LP-1484.2/38-1/08. Test of maximum expansion pressure of ASTRO WRAP bands inserts. Building Research Institute, Fire Test Department, Warsaw

11. NM/0586/A/09/1. The laboratory tests of fire-proof sealing mortar ASRTO MORTAR and acrylic compound ASTRO INTU MASTIC – for purpose technical approval. Building Research Institute, Building Materials Department, Warsaw

12. NM/0586/A/09. The laboratory tests of fire-proof sealing mortar ASRTO MORTAR and acrylic compound ASTRO INTU MASTIC – for purpose technical approval. Building Research Institute, Building Materials Department, Warsaw

DRAWINGS

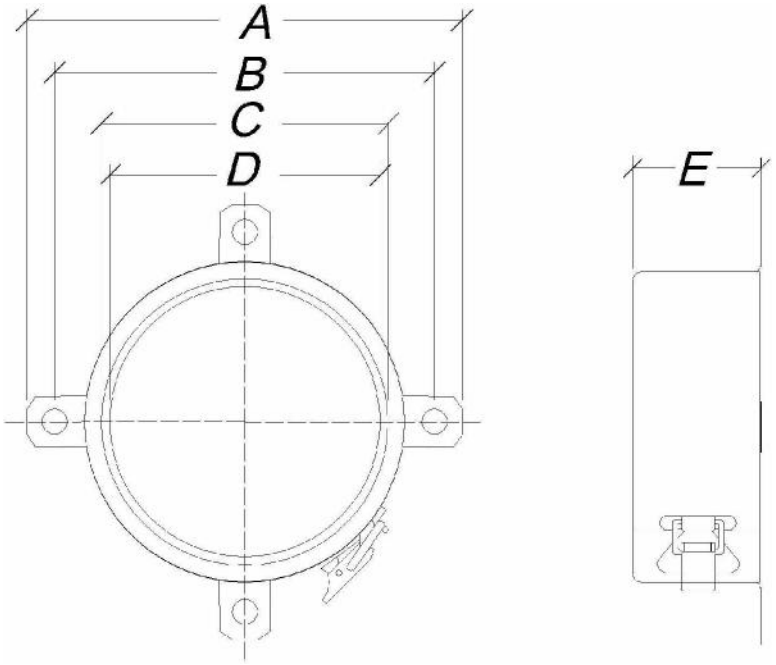


Table A

Technical specification of fire resistant collars ASTRO COLLAR

Item	Collar type	Dimensions					Thickness of insert, mm	Number of fastenings, mm
		A, mm	B, mm	C, mm	D, mm	E, mm		
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1	32	92	78	42	31	60	4	2
2	40	102	88	52	41	60	4	2
3	55	126	112	76	56	60	8	2
4	63	132	120	82	64	60	8	2
5	75	142	132	92	76	60	8	2
6	82	151	137	101	83	60	8	2
7	90	159	145	109	91	60	8	4
8	110	170	156	120	112	60	12	4
9	125	230	216	180	127	60	16	4
10	160	252	238	202	162	60	20	6
11	200	294	280	244	202	60	20	8

Drawing 1. The fire-proof collars ASTRO COLLAR

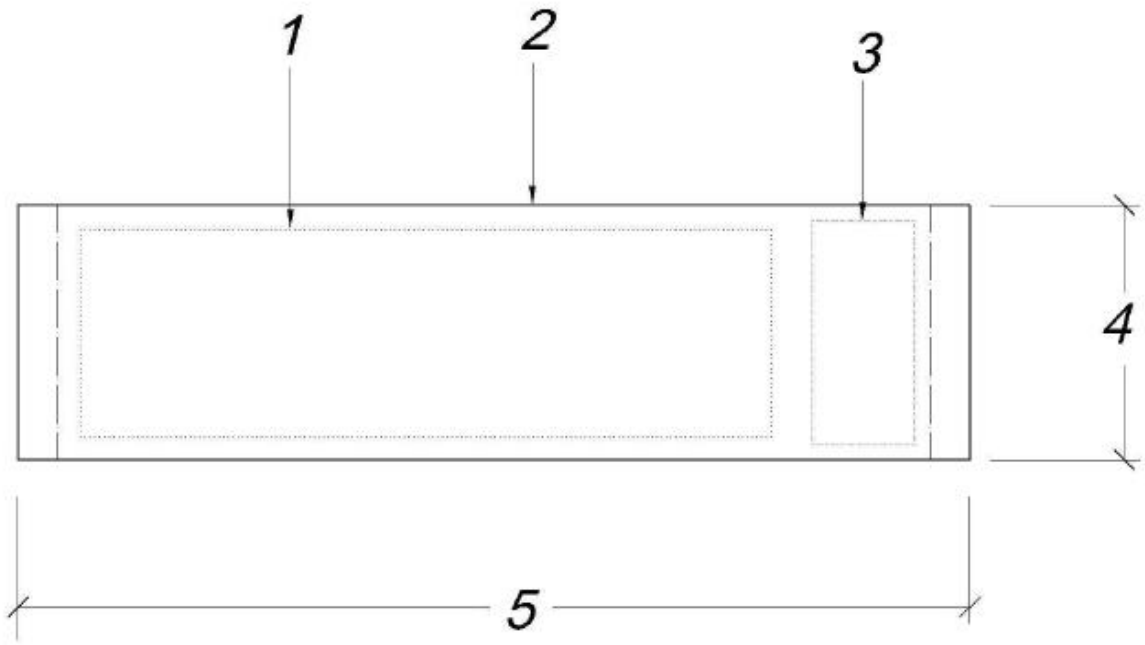


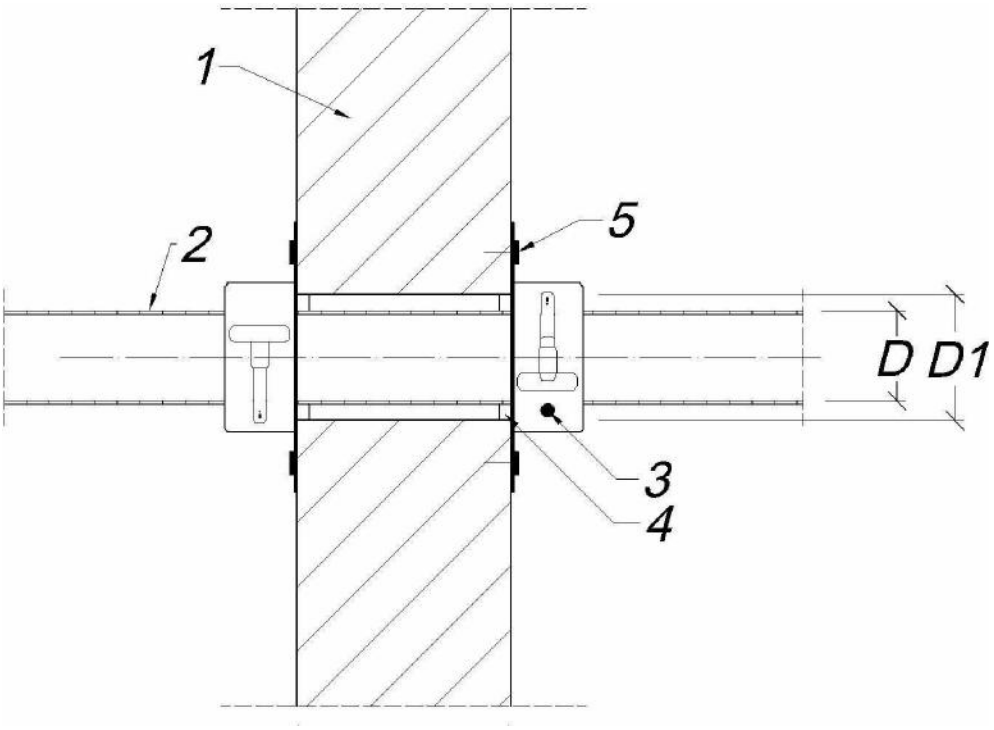
Table B

Dimensions and number of inserts in ASTRO WRAP band

Item	Band type	Number of inserts in band, units	Dimensions of expanding inserts		
			thickness, mm	width, mm	length, mm
1	*2*	*3*	*4*	*5*	*6*
1	PW 32	1	3,5	60	116
2	PW 40	1	3,5	60	136
3	PW 55	1	3,5	60	183
4	PW 63	1	3,5	60	211
5	PW 75	1	3,5	60	250
6	PW 82	1	3,5	60	274
7	PW 110	1	6,0	60	368
8	PW 125	2	3,5 + 6,0	60	416 — I layer 437 — II layer
9	PW 160	2	3,5 + 6,0	60	559 — I layer 624 — II layer

Drawing 2. The fire-proof bands ASTRO WRAP

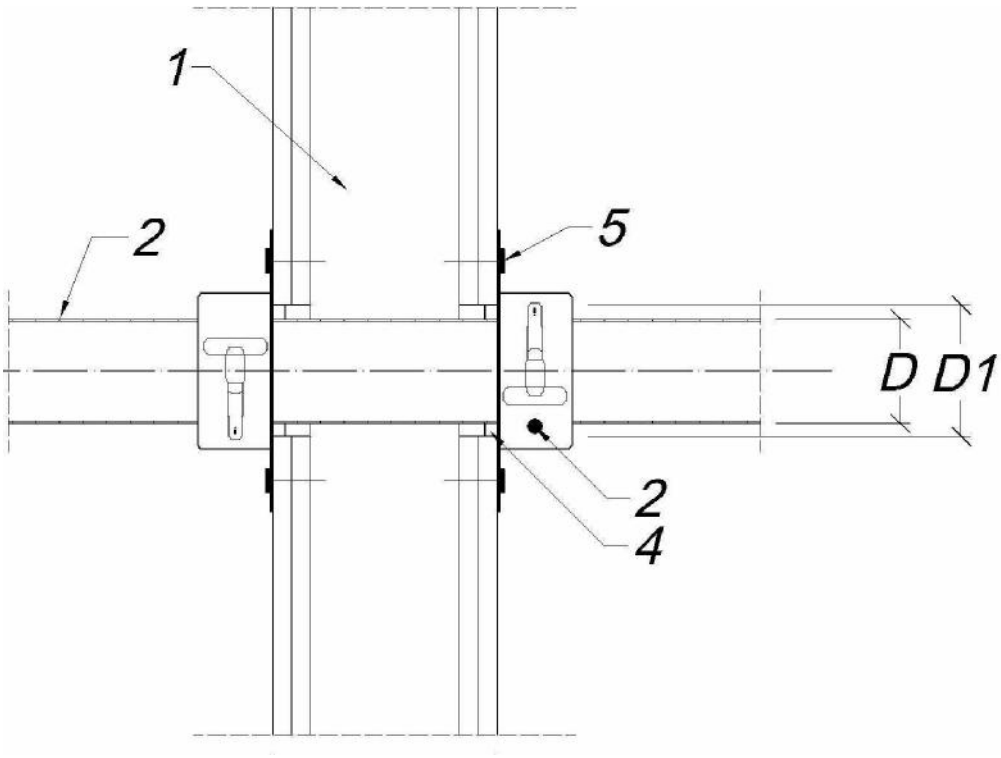
1 – expanding insert; 2 – PE, PP foil bag; 3 – self-adhesive tape; 4 – band width; 5 – band length



D – pipe diameter; D1 – diameter of hole in wall; H – wall thickness

Drawing 3. The passage of plastic pipe through solid brick, dense or cellular concrete wall, sealed with fire resistant collars ASTRO COLLAR

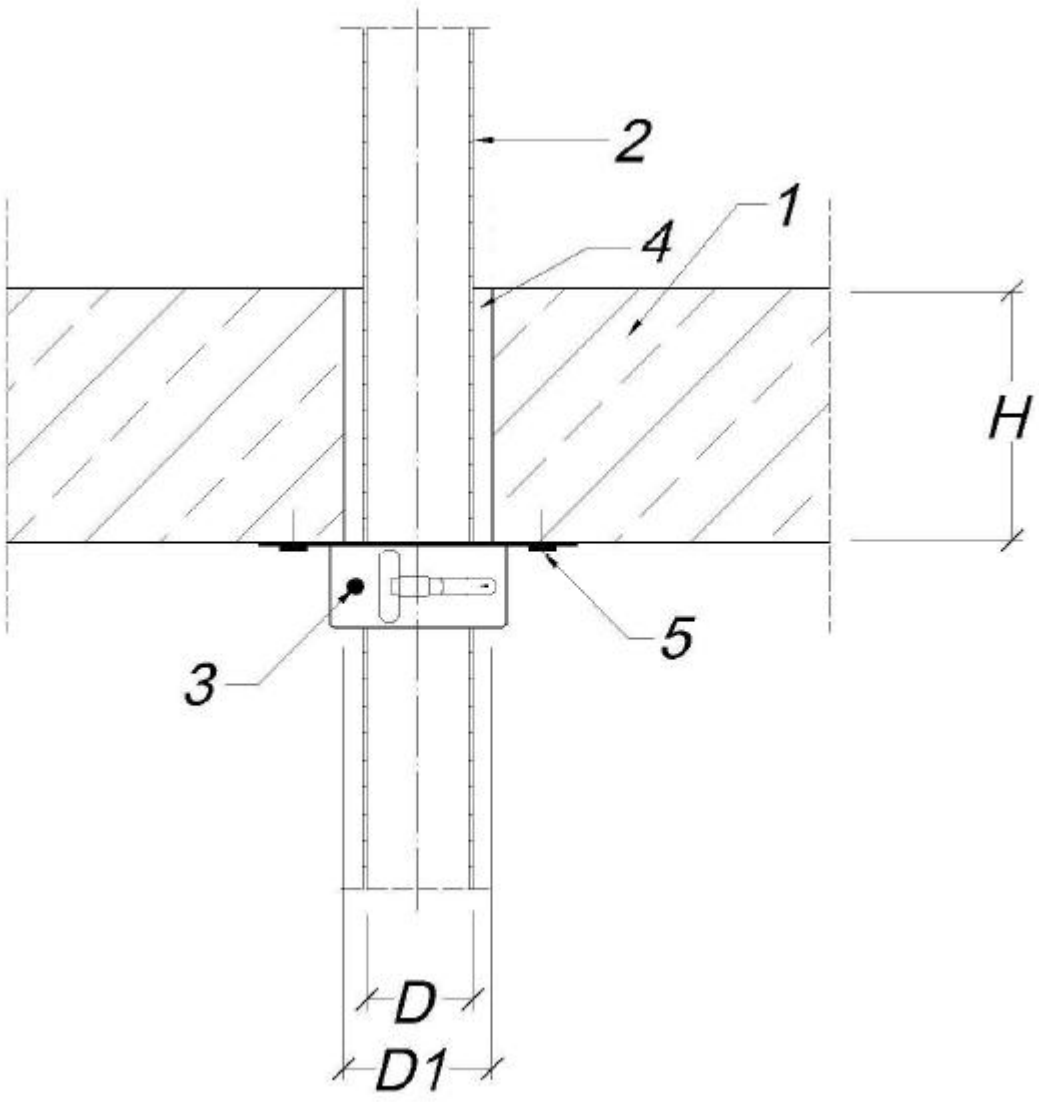
1 – solid brick wall (b = 250 mm), dense concrete wall (b = 100 mm) or cellular concrete wall (b = 250 mm); **2** – plastic pipe with diameter D by table 1; **3** – collar ASTRO COLLAR, 2 units, installed on both sides outside the wall; **4** – free spaces with width up to 5 mm filled with acrylic sealing compound ASTRO INTU MASTIC, and with width higher than 5 mm, but not higher than 10 mm, filled with fire-proof mortar ASRTO MORTAR; **5** – steel expansion connector to concrete M8 x 60 or M8 x 80, and in case of collars with diameter above 110 mm bolt M8 x 80 and nut and steel washer



D – pipe diameter; D1 – diameter of hole in wall; H – wall thickness

Drawing 4. The passage of plastic pipe through light wall (gypsum board cladding), sealed with fire-proof collars ASTRO COLLAR

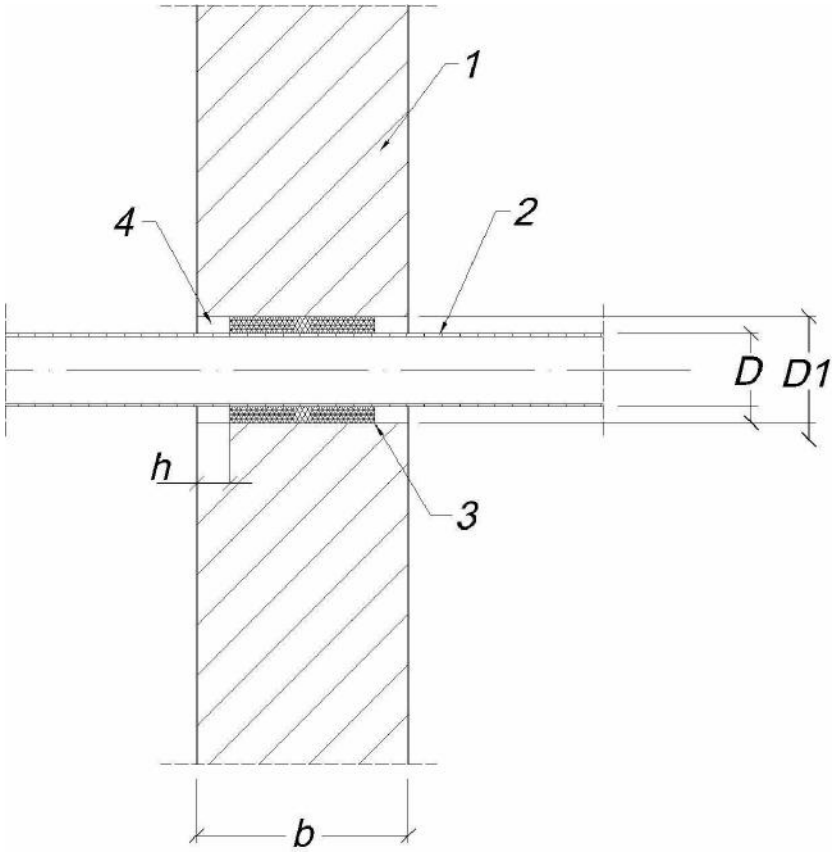
1 – gypsum board wall, b = 125 mm (EI 120 fire resistance class); **2** – plastic pipe, diameter by table 1; **3** – collar ASTRO COLLAR, 2 units, installed on both sides outside the wall; **4** – free spaces with width up to 5 mm filled with acrylic sealing compound ASTRO INTU MASTIC, and with width higher than 5 mm, but not higher than 10 mm, filled with fire resistant mortar ASRTO MORTAR; **5** – steel expansion connector M8 for gypsum board, with length depending on cladding thickness



D – pipe diameter; D1 – diameter of hole in wall; H – ceiling thickness

Drawing 5. The passage of plastic pipe through reinforced concrete ceiling, sealed with fire resistant collars ASTRO COLLAR

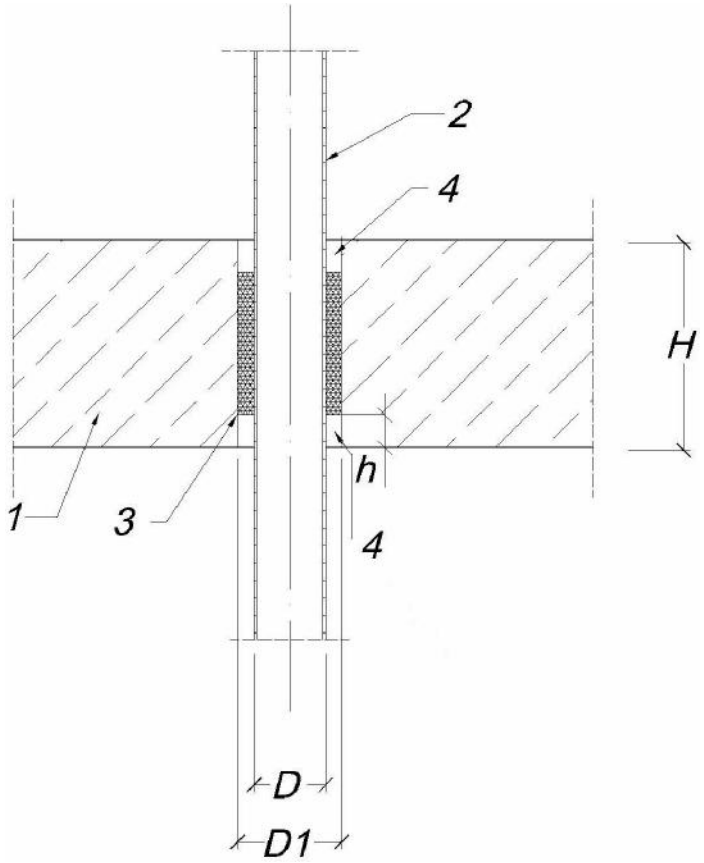
1 – reinforced concrete wall H = 150 mm; 2 – plastic pipe with diameter D by table 1; 3 – collar ASTRO COLLAR, 1 unit, installed from bottom outside the ceiling; 4 – free spaces with width up to 5 mm filled with acrylic sealing compound ASTRO INTU MASTIC, and with width higher than 5 mm, but not higher than 10 mm, filled with fire-proof mortar ASRTO MORTAR; 5 – steel expansion connector to concrete M8 x 60 or M8 x 80, and in case of collars with diameter above 110 mm bolt M8 x 80 and nut and steel washer



D – pipe diameter; D1 – diameter of hole in wall by table 3; b – wall thickness

Drawing 6. The passage of plastic pipe through solid brick, dense or cellular concrete wall, sealed with fire resistant band ASTRO WRAP

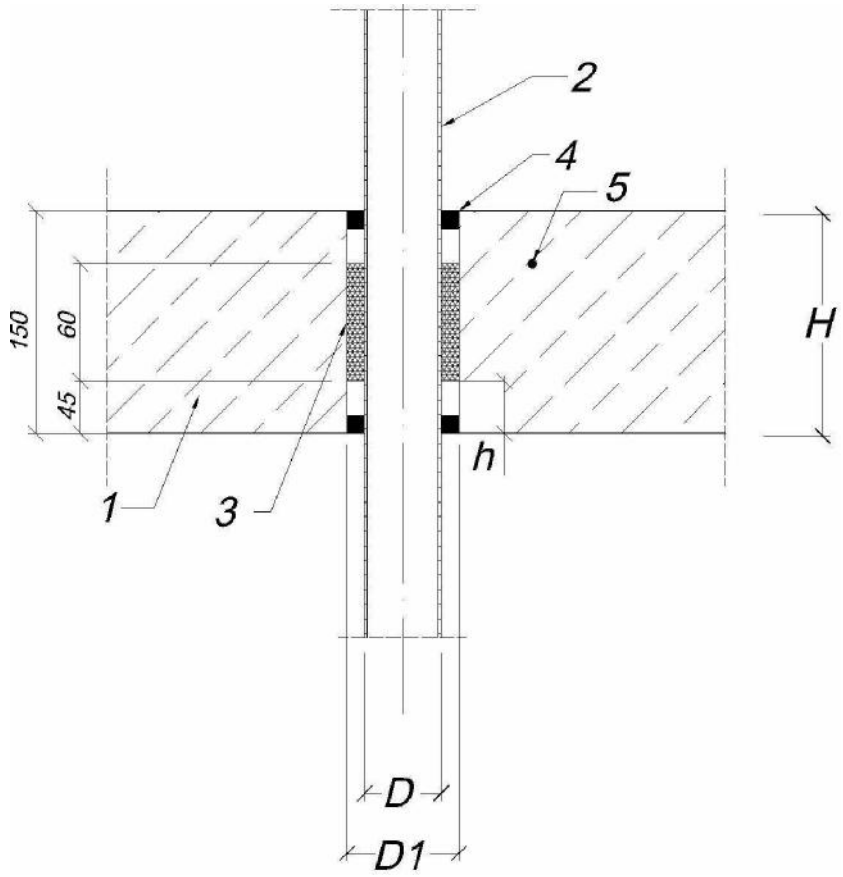
1 – solid brick wall (b = 250 mm), dense concrete wall (b = 100 mm) or cellular concrete wall (b = 250 mm); **2** – plastic pipe with diameter D by table 2; **3** – band ASTRO WRAP, installed in wall axis; **4** – gap around the band, on both partition sides, filled with fire-proof mortar ASRTO MORTAR



D – pipe diameter; D1 – diameter of hole in wall by table 3; H – ceiling thickness

Drawing 7. The passage of plastic pipe through reinforced concrete ceiling, sealed with fire resistant band ASTRO WRAP – variant I

1 – reinforced concrete ceiling, H = 150 mm; **2** – plastic pipe with diameter D by table 2; **3** – band, 1 unit, installed in distance h = 10 mm from ceiling bottom; **4** – gap on depth h = 10 mm filled with fire-proof mortar ASRTO MORTAR



D – pipe diameter; D1 – diameter of hole in wall by table 3; H – ceiling thickness

Drawing 8. The passage of plastic pipe through reinforced concrete ceiling or solid brick, dense or cellular concrete wall, sealed with fire resistant band ASTRO WRAP – variant II

1 – reinforced concrete ceiling H = 150 mm or solid brick wall (b = 250 mm), dense concrete wall (b = 100 mm) or cellular concrete wall (b = 250 mm); **2** – plastic pipe with diameter D by table 2; **3** – band, 1 unit, installed in ceiling or wall axis; **4** – gap filled on both ceiling or wall sides, on depth 5 mm from partition face, with sealing compound ASTRO INTU MASTIC

I, the undersigned,Wojciech Szlakowski, sworn translator of English entered to the list of sworn translators kept by the Ministry of Justice of the Republic of Poland under no. TP/1623/05, certify that this is true and complete translation of the original document presented to me.
Warsaw September 23, 2009; Repertory No. 441/2009