



Instytut Techniki Budowlanej
 BUILDING RESEARCH INSTITUTE
GROUP OF TESTING LABORATORIES
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 N° AB 023



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BUILDING STRUCTURES DEPARTMENT
BUILDING STRUCTURES LABORATORY LK

TEST REPORT N° LK00-06052/15/R27NK

Client: Selena Labs Sp. z o.o.
Client address: ul. Polna 14-18, 55-011 Siechnice, Polska

Information about test item

Test item: Walls made of blocks of autoclaved aerated concrete joined with Tytan Teo/1KPU thin bed polyurethane mortar
Date of receipt: 2.11.2015r.
N° of receipt protocol LK00-06052/15/R27NK
Receipt procedure PZ ZLB nr 18
Further information about test item: Polyurethane mortar and pallets with AAC blocks have been supplied by Customer

Information about tests:

Test commencement date: 5.11.2015r.
Test completion date: 11.12.2015r.

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1. TEST METHOD

- PN-EN 1052-1:2000 "Metody badań murów. Określenie wytrzymałości na ściskanie".
- PN-EN 772-1:2011 "Metody badań elementów murowych - Część 1: Określenie wytrzymałości na ściskanie"

Symbols used in accordance with 1052-1:

A	cross section area of test specimen, [mm ²]
E	elasticity modulus of masonry wall [N/mm ²]
E _i	elasticity modulus value obtained for given test specimen [N/mm ²]
1/3σ	1/3 value of maximum compressive stress [N/mm ²]
F _{i,max}	maximum load value obtained for given test specimen [kN]
f _{zarzys.}	load at the moment of observation of first crack during the test [kN]
f	compressive strength of masonry wall [N/mm ²]
f _i	compressive strength value obtained for given test specimen [N/mm ²]
f _{i,min}	lowest value of compressive strength obtained from the test series [N/mm ²]
f _k	characteristic value of compressive strength of masonry wall [N/mm ²]
l _u	length of test specimen [mm]
t _u	thickness of test specimen [mm]
U	expanded uncertainty of single measurement at 95% confidence level (k=2)

Symbols used in accordance with 772-1:

f _b	normalized compressive strength of masonry unit [N/mm ²]
f _B	mean compressive strength of masonry unit [N/mm ²]
l	length of test specimen [mm]
t	thickness of test specimen [mm]
h	height of test specimen [mm]

2. TEST SPECIMENS

Customer provided following materials for the tests:

- YTONG autoclaved aerated concrete blocks of $575 \pm 25 \text{ kg/m}^3$ density and with tongue & groove ends
- polyurethane mortar in form of Tytan Teo/1KPU foam.

Test specimens (walls) have been erected by ITB personnel.

6 test specimens have been prepared for the purpose of the compression tests acc. to PN-EN 1052-1. Each single leaf stretcher bonded wall consisted of 5 AAC blocks layers and its length was equivalent to length of 2 blocks.

Mortar has been laid with dedicated gun tool in two strips, each approx. 3cm wide. Specimens have been erected at 5.11.2015r. (photo 1).

Walls have being stored in laboratory conditions (air temperature $18,4 \div 20,9^\circ\text{C}$ and humidity $25,6 \div 64,1\%$) for more than 28 days. Temperature and humidity of air have been constantly monitored and recorded in 2 hours interval.



Photo 1: Test specimen during erection

3. TEST RESULTS

3.1. Compressive strength of masonry walls acc. to PN-EN 1052-1:2000

Compression tests have been performed with Amsler hydraulic machine with 5000kN load capacity. For the purpose of strain measurements four LVDT transducers have been attached to each test specimen.

Table 1. Compressive strength of masonry walls

Specimen №	$F_{i,max}$	$f_{zarys.}$	t_u	l_u	A	f_i	E_i
	kN	kN	mm	mm	mm ²	N/mm ²	N/mm ²
1	759	141	240	1195	286800	2,6	640
2	754	35	240	1200	288000	2,6	275
3	769	141	240	1197	287280	2,7	415
4	691	106	240	1194	286560	2,4	367
5	850	120	240	1196	287040	3,0	482
6	830	68	240	1197	287280	2,9	482
Mean value $f_i; E_i$						2,7	443
Standard deviation						0,2	124
Variability coefficient [%]						7	28
$f_{i,min}$						2,4	
f_k						2,3	
U						±0,04	

3.2. Compressive strength of masonry elements

Results of compression tests made acc. to PN-EN 772-1:2011 are given in table 2.

Table 2. Compressive strength of autoclaved aerated concrete blocks

Specimen №	Dimensions			F_m	$f_{B,i}$
	l	t	h		
	mm	mm	mm	kN	N/mm ²
1	598,5	239,6	199,2	675	4,7
2	598,9	240,0	199,0	680	4,7
3	598,3	240,5	199,1	678	4,7
4	598,9	240,1	199,5	625	4,3
5	598,9	240,2	199,5	632	4,4
6	599,1	240,2	199,6	620	4,3
Lowest value					4,3
Highest value					4,7
Mean value f_B					4,5
Standard deviation					0,2
Variability coefficient [%]					4%
f_b					4,0
U					±0,1

4. PHOTOGRAPHIC DOCUMENTATION

The failure modes of selected specimens are show on photo 2÷6.



Photo 2: Specimen № 1



Photo 3: Specimen № 2



Photo 4: Specimen № 2



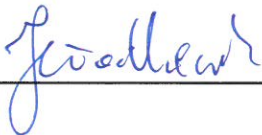
Photo 5: Specimen № 4



Photo 6: Specimen No 4

Responsible for the test

mgr inż. Jacek Głodkiewicz



Authorizing person

dr inż. Artur Piekarczyk



Warsaw, 18 GRU. 2015

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