



Dansk Byggekomponent ApS
Farum Gydevej 67
3520 Farum

TEST REPORT

Report Number: 916769-2 Rev. 1
Date: January 4, 2021

Client: Dansk Byggekomponent ApS
Farum Gydevej 67
DK-3520 Farum

Subject: Suspension system consisting of rods, strap holder with locking mechanism, and straps made of PA6-30GF and PA6

Sample Reception: Samples received on December 17, 2020

Test Period: Test conducted on December 17, 2020

Procedure: See page 2

Test Performed by: Anders Ask Carton, Consultant

Storage: According to the general terms for contracted assignments at the Danish Technological Institute

Remarks: Samples tested as received and installed according to client's instructions
Rev.: Correction of dimensions

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Department: Plastics and Packaging

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TEST PROCEDURE

Three pull tests were conducted to evaluate critical subcomponents of the suspension system, described below as Test 1, Test 2, and Test 3.

All tests were conducted at a pull rate of 5 mm/min under conditions of 23 °C and 50% RH.

All tensile tests were performed by pulling a screw connected to the rod element via the strap holder.

Test 1: Strap test with small and large diameter pipes

The strap was placed around pipes of Ø110 mm and Ø160 mm and connected to the strap holder. A rod element was mounted in continuation of the strap holder to simulate a suspended pipe section.

Test 2: Rod connection test

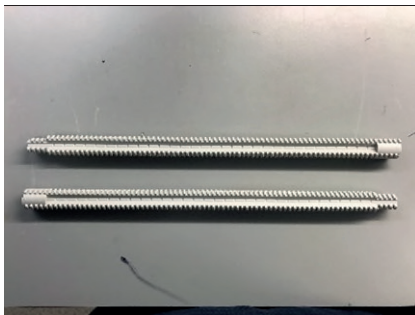
Two rods were connected via male/female threading and clamped in the tensile testing machine at both ends.

Test 3: Rod embedded in concrete

A rod was embedded in concrete to a depth of approx. 5 cm (provided by the client).

The concrete block was fixed while the rod was pulled perpendicularly.

Beispielkomponenten:



Rods



Strap holder with lock



Straps

Test Equipment:

Instron tensile testing machine with related fixtures.



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TEST RESULTS

Test 1:

Observed that upper locking tabs disengaged from the strap holder at 45–60 kg. In some tests, both tabs popped simultaneously; in others, they disengaged sequentially. These points appear as small drops in the force-displacement graph in Appendix 1, marked as “Release of Locking Tab 1” and “2”. The safety tabs remained engaged until higher forces caused them to release, as shown in the table below.

Test 1: Strap and Strap Holder

Test #	Maximum load, Newton	Maximum load, kg
Ø110 mm rør		
1	1484	151
2	1510	154
3	1481	151
Ø160 mm rør		
1	1262	129
2	1238	126
3	1142	116

See Appendix 1 for detailed results.

Test 2:

All tests of rods joined by thread failed at the threaded connection. The table below reports maximum forces at break.

Test 2: Two Rods Connected

Test #	Maximum load, Newton	Maximum load, kg
1	1886	192
2	1927	196
3	2059	210

See Appendix 1 for detailed results.

Test 3:

No rod pull-out observed from the concrete. In all tests, thread stripping occurred at the joint between the rod and the strap holder. The table shows the force at which this occurred.

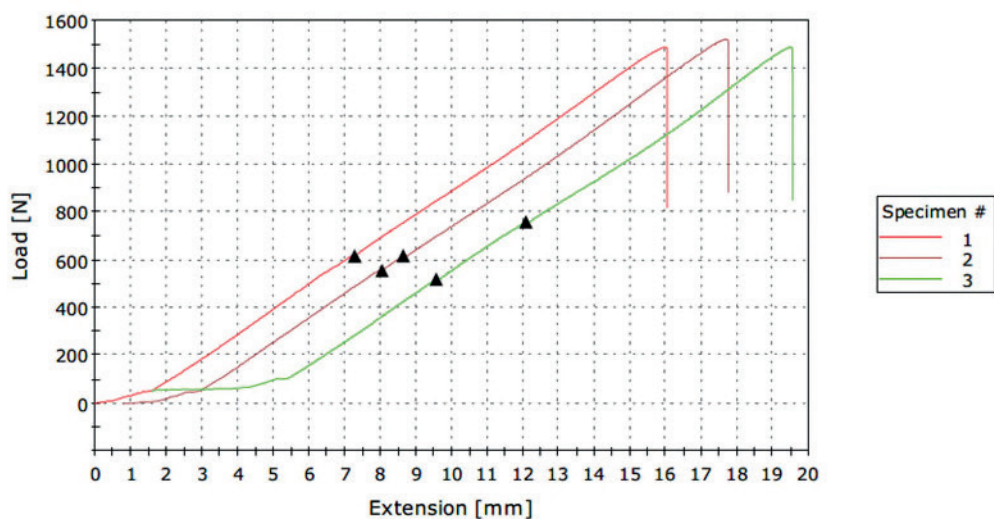
Test 3: Rod Cast in Concrete

Test #	Maximum load, Newton	Maximum load, kg
1	1471	150
2	1539	157
3	1668	170

See Appendix 1 for detailed results.

Test 1:

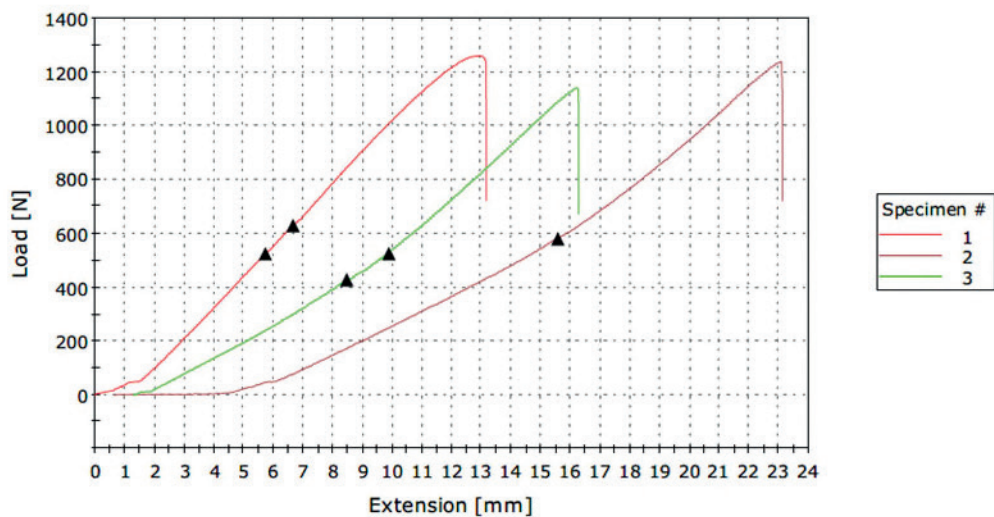
Tensile testing of straps, 5 mm/min, small



Results table 1

	Load at Slip af låsetapper 1 [N]	Load at Slip af låsetapper 2 [N]	Load at Break (Standard) [N]
1	616	-----	1484
2	555	616	1510
3	519	759	1481

Tensile testing of straps, 5 mm/min, large

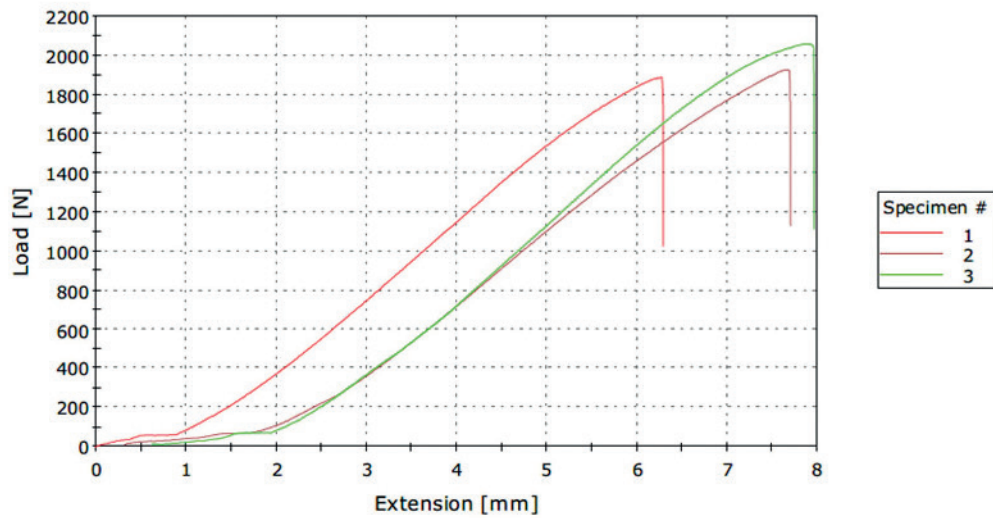


Results table 1

	Load at Slip af låsetapper [N]	Load at Slip af låsetapper 2 [N]	Maximum Load [N]
1	524	630	1262
2	579	-----	1238
3	428	526	1142

Test 2:

Tensile testing of rods, 5 mm/min

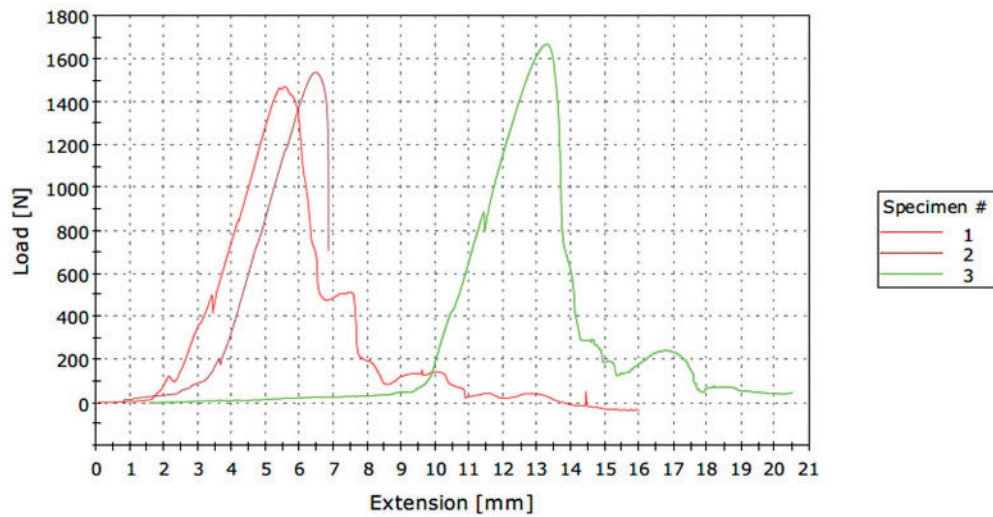


Results table 1

	Maximum Load [N]
1	1886
2	1927
3	2059

Test 3:

Tensile strength of steel embedded in concrete, 5 mm/min



Results table 1

	Maximum Load [N]
1	1471
2	1539
3	1668

Translated from Danish test report conducted by the Danish Technological Institute

Side 2 af 3
4. januar 2021
Rapport nr. 916769-2 rev. 1

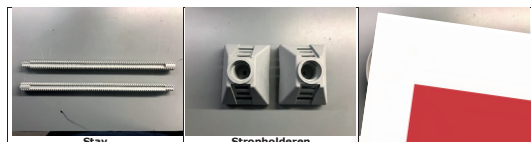
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Prøvning

Det er udført tre prøvninger, med henblik på at teste de forskellige kritiske delkomponenter af ophængningssystemet, disse beskrives nedenfor som test 1, test 2 og test 3.
Ved alle test trækkes der med en hastighed på 5 mm / min. Alle trækprøvninger udført ved 23 °C og 50% RH.

- Test 1: Test af stropper forbundet til stav med lille og stor diameter rør.
Stroppen blev sat om et rør i passende diameter, Ø110 og Ø160, og forbundet til stropholderen. Heri blev et stav-ømne monteret i forlængelse af stropholderen for at efterligne et ophængt rørstykke.
- Test 2: Test af stave forbundet til hinanden.
To stave forbundet til hinanden ved han/hun gevindet, fastgjort i trækprøvmaskinen i hver ende.
- Test 3: Test af stav indstøbt i beton.
Stav indstøbt i beton i ca. 5 cm dybde (oplyst af kunden), betonklods fikseret og stavemnet forsøgt trukket vinkelret ud af betonen.

Prøveemner



Figur 1: Stav (tv.), Stropholder m. lås (m.) og stropper (th.)

Udstyr

Instron trækprøvmaskine med tilhørende hjælpestyr.

Side 3 af 3
4. januar 2021
Rapport nr. 916769-2 rev. 1

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Prøvningsresultater

Test 1:
Det blev observeret, at de øverste låsemekanismer hoppede ud af stropholderen ved en belastning på mellem 45-60 kg. I nogle tilfælde hoppede de små tapperne ud samtidig på begge sider af røret, i andre var der forskydning imellem afhopningen. Dette punkt er fundet som et lille knæk i kraft-vej kurven vedhæftet i bilag 1, punktet er navngivet "Slip af låsetapper 1" og "Slip af låsetapper 2". De store sikkerhedstapper blev siddende i stropholderen og hoppede ud ved kraften rapporteret i tabellen nedenfor

Test 1: Test af stropper og stropholder		
Test #	Maksimal belastning, Newton	Maksimal belastning, kg
Ø110 mm rør		
1	1484	151
2	1510	154
3	1481	151
Ø160 mm rør		
1	1262	129
2	1238	126
3	1142	116

Se bilag 1 for detaljeresultater

Test 2:
Ved trækprøvning af 2 stave skruet sammen blev der ved alle prøvninger observeret brud i gevindsamlingen mellem de 2 stave, tabellen nedenfor rapporterer den maksimale målte kraft, hvorved bruddet opstod.

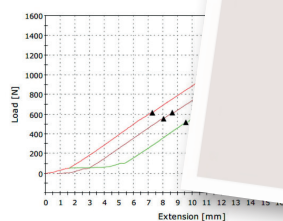
Test 2: Test af to stave i forlængelse	
Test #	Maksimal belastning, kg
1	1886
2	1927
3	2059



Bilag 1, side 1 af 2
4. januar 2021
Rapport nr. 916769-2 rev. 1

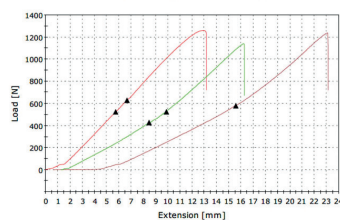
Test 1:

Trækprøvning af Stroppe, 5



Results table 1		
	Load at Slip of låsetapper 1 [N]	Load at Slip of låsetapper 2 [N]
1	616	1484
2	555	1510
3	519	759

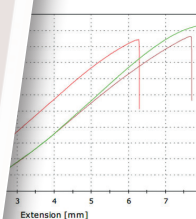
Trækprøvning af Stroppe, 5 mm / min, Stor



Results table 1		
	Load at Slip of låsetapper 1 [N]	Load at Slip of låsetapper 2 [N]
1	524	630
2	579	526
3	428	1142

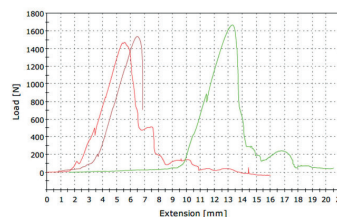
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Træk af Stav indstøbt i Beton, 5 mm / min



Test 3:

Træk af Stav indstøbt i Beton, 5 mm / min



Results table 1	
	Maximum Load [N]
1	1471
2	1539
3	1668