



**REPORT NUMBER: 101391048COQ-001**  
ORIGINAL ISSUE DATE: October 23, 2013  
REVISION DATE: September 22, 2014

**EVALUATION CENTER**

INTERTEK TESTING SERVICES NA LTD.  
1500 BRIGANTINE DRIVE  
COQUITLAM, BC V3K 7C1  
CANADA

**RENDERED TO**

ARMSTRONGS MULTI-POSITIONAL HANDHOLD INC.  
19050 94 AVE.  
SURREY, BC V4N 4X8

PRODUCT EVALUATED: Modified Manhole Frames  
EVALUATION PROPERTY: Proof Load

**Report of Modified Manhole Frames tested in accordance with  
AASHTO M306-10, *Drainage, Sewer, Utility, and Related Castings*  
with reference to H-25 loading requirements**

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**TEST REPORT**

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## 2 Introduction

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Intertek Testing Services NA Ltd. (Intertek) has conducted proof load testing for Armstrongs Multi-positional Handhold Inc. on three modified manhole frame products. Testing was conducted in accordance with AASHTO M306-10, *Drainage, Sewer, Utility, and Related Castings* with reference to H-25 loading requirements. This evaluation was completed in the month of October 2013.

## 3 Test Samples

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### 3.1. SAMPLE SELECTION

The client submitted three (3) manhole frames and one (1) manhole cover to the Evaluation Center on October 10, 2013 (Coquitlam ID# VAN1310221433-001). Samples were not independently selected for testing. Three (3) similar types of frames, were randomly selected by Armstrongs Multi-positional Handhold Inc.

### 3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The specimens were identified as Modified Manhole Frames and were submitted for testing. Frames were marked as #1, #2, and #3.

Frame #1:

- One (1) 5/8 in. diameter coarse threaded hole in cover support flange with 2 in. long, 1/4 in. deep, countersink slot – set at 12:00
- One (1) 1/2 in. diameter coarse threaded hole into side wall of frame at 2-1/2 in. center from under side of frame base – set at 3:00
- Two (2) 5/8 in. diameter non threaded holes. Set horizontally at 4-1/2 in. centers. Centers from underside of frame base 2-1/2 in. – set at 6:00
- Four (4) 7/8 in. non threaded holes in base of frame set at 12:00, 3:00, 6:00, & 9:00 by casting manufacturer so that the frames can be stacked and bolted together for shipping process.

Frame #2:

- Three (3) 3/4 in. diameter coarse threaded holes in cover support flange, set at 12:00, 3:00, and 6:00 locations. At 12:00, drilled hole edge 2/8 in. from inner most edge of cover support flange. At 3:00, drilled hole edge 1/8 in. from inner most edge of cover support flange. At 6:00, drilled hole edge 3/8 in. from inner most edge of cover support flange.
- Four (4) 7/8 in. diameter non threaded holes in base of frame set at 12:00, 3:00, 6:00, & 9:00 by casting manufacturer so that the frames can be stacked and bolted together for shipping process.

Frame #3:

#### 1 - Holes In Base Of Frame At 12:00, 3:00, 6:00, 9:00

4 – 7/8 in. diameter non-threaded holes in base of frame by manufacturer so that the frames can be stacked together for shipping purposes.

## **2 – Holes Drilled Into Sidewall Of Frame At 12:00, 3:00, 6:00, 9:00**

4 sets of 2 holes 7/8 in. diameter non-threaded. Set horizontally at 5 1/2 in. center to center hole, centers from underside of frame base 2 in..

## **3 – Holes Drilled Into Cover Support Flange At Following Positions**

12:00 – (1) 5/8 in. diameter threaded hole with 3 in. long + 1/4 in. deep counter sink slot

12:30 – (1) 3/4 in. diameter non threaded hole

1:00 – (1) 5/8 in. diameter threaded hole with 2 in. long + 1/4 in. deep counter sink slot

2:00 – (1) 5/8 in. diameter threaded hole with 3 1/2 in. + 1/4 in. deep horizontal crescent shaped counter sink

3:00 – (1) 5/8 in. diameter threaded hole with 3 in. long + 1/4 in. deep counter sink slot

3:30 – (1) 3/4 in. diameter non threaded hole

4:00 – (1) 5/8 in. diameter threaded hole with 2 1/2 in. + 1/4 in. deep counter sink slot

4:30 – (1) 7/8 in. diameter threaded hole

6:00 – (1) 5/8 in. diameter threaded hole with 3 in. long + 1/4 in. deep counter sink slot

6:30 – (1) 5/8 in. diameter non threaded hole

8:30 – (1) 1/2 in. diameter threaded hole

9:00 – (1) 5/8 in. diameter threaded hole with 4 1/2 in. + 1/4 in. deep horizontal crescent shaped counter sink

10:00 – (1) 5/8 in. diameter non-threaded hole

10:30 – (1) 5/8 in. diameter threaded hole with 4 1/2 in. + 1/4 in. deep horizontal crescent shaped counter sink

11:00 – (1) 7/8 in. diameter non threaded hole

## 4 Testing and Evaluation Methods

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### 4.1. CONDITIONING

Before testing, the test components were held in room conditions for at least 24 hours at a temperature of  $23 \pm 2^{\circ}\text{C}$  and relative humidity of  $50 \pm 5\%$ .

### 4.2. PROOF LOAD

Proof load tests were conducted in accordance with AASHTO M306-10 with reference to H-25 loading requirements. Each sample was placed into a universal reaction frame and loaded vertically with a hydraulic ram through a 9 in. x 9 in. (229 mm x 229 mm) steel loading plate with ½ in. rubber padding. Load was applied through a manhole cover that was submitted along with the manhole frames. The manhole cover was not part of the evaluation and is beyond the scope of the report. Each manhole assembly was subjected to a compressive load at a rate of 100-1000 lbs/sec (45-454 kg/sec) until a proof load of 50000 lbs (222 kN) was reached; this loading results in an applied compressive load of 494 psi (3.39 Mpa). The load was measured using a 50k lbs capacity load cell. This proof load was maintained for one minute before being released. Upon release of the load, a visual examination was then performed to evaluate any apparent changes.

## 5 Testing and Evaluation Results

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### 5.1. RESULTS AND OBSERVATIONS

The product test results are shown in Table 1 below. A copy of the test data is located in Appendix A.


Table 1. Load Requirements		
Sample ID	50 000 lb Proof (1 min)	Observations
Frame #1	Pass	No visual sign of any change
Frame #2	Pass	No visual sign of any change
Frame #3	Pass	No visual sign of any change

## 6 Conclusion

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The Armstrongs Multi-positional Handhold Inc. Modified Manhole Frames identified in this report were evaluated in accordance with AASHTO M306-10, *Drainage, Sewer, Utility, and Related Castings* with reference to H-25 loading requirements. The product test results are presented in Section 5 of this report.

### INTERTEK TESTING SERVICES NA LTD.

Reported by:   
Chris Chang, P.Eng.  
Engineer, Building Products

Reviewed by:   
Riccardo DeSantis  
Manager, Building Products

## **APPENDIX A: Test Data (2 pages)**

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Company	Armstrongs Multi-positional Handhold Inc.	Technician(s)	Kevin Penner <i>KP</i>
Project No.	G101391048	Reviewer	Riccardo DeSantis <i>R.D.</i>
Models	Modified Manhole Frames	Start/End Date	October 22, 2013
Product Name	Type #1, #2, and #3	Sample ID	VAN1310221433-001
Standard	<b>AASHTO M 306-10 Standard Specification for Drainage, Sewer, Utility, and Related Castings</b>		

**Test Data Package**

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Standard	<b>AASHTO M 306-10 Standard Specification for Drainage, Sewer, Utility, and Related Castings</b>		

Instruments Used in Evaluation	Intertek ID	Calibration Due Date
Artech 50k lb Capacity Load Cell	D2735	May-14
Vaisala HMI146 / HMP46 Humidity and Temperature Indicator	9-0176	Jul-14
Stopwatch	P60332	Jan-14

<b>Conditioning</b>
As Received

<b>Method</b>
As per H-25; Apply a 1 min. proof load of 222 kN (50,000 lb) at a rate of 100 to 1000 lb/s distributed over a 229 mm x 229 mm (9 in x 9 in) steel loading plate with ½ in rubber between the plate and test specimen.

<b>Time</b>	12:30 p.m.	<b>Temperature</b>	22.2°C	<b>Relative Humidity</b>	49%
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Specimen	Proof Load	Duration	Result	Observations
Frame #1	50000 lb	1 min	<b>Pass</b>	No sign of any damage
Frame #2	50000 lb	1 min	<b>Pass</b>	No sign of any damage
Frame #3	50000 lb	1 min	<b>Pass</b>	No sign of any damage

## REVISION SUMMARY

DATE	SECTION		SUMMARY	INTERTEK INITIALS	
				TECHNICIAN	REVIEWER
22-Sept-14	All	Throughout	Company name change	