Test Report No:
LAB-VELOX-001-01

PREPARED BY	REVIEWED BY	APPROVED BY
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1.0 – Customer details

Trade name:	Velox Systems UK
Account no:	No account no. on system
Purchase Order no:	Non chargeable work instruction (Auth: RM)
Address:	Velox Systems UK 3000 Cathedral Hill Guildford Surry GU2 7YB
Contact:	Marek Simoncic (Managing Director)

2.0 – Laboratory details

Laboratory:	Evolution Fasteners (U.K.) Ltd trading as: Evolution Testing & Analytical Services
UKAS accreditation:	ISO 17025 accredited Testing Laboratory UKAS Accreditation Certificate No. 7485
Address:	Evolution Testing & Analytical Services Units 2A & 2B Clyde Gateway Trade Park Dalmarnock Road Glasgow G73 1AE
Contact:	Mr. Ryan Murphy (Associate Director)

3.0 – Scope

The purpose of this test is to determine the ultimate withdrawal failure of either the threaded product, or the provided substrate.

This report provides data obtained by empirical testing.

4.0 – <u>Methodology</u>

Control: ISO 17025

Quality: ISO 17025

Procedure: EN 14566: 2008 & A1: 2009,
Withdrawal force test method,
Loading rate controlled at constant 450 N/min (Newtons per minute).

NOTE: This is an accredited test.

Equipment: Shimadzu AG-X universal testing machine,
Class 0.2 load cell (calibrated – UKAS traceable),
Testing rig.

Materials: Screws provided by Evolution Fasteners (U.K.) Ltd of sizes:

DWSZ150	4.8 mm x 150.0 mm	(Sharp Point - Fine threaded),
ETKR180	4.8 mm x 180.0 mm	(Sharp Point - Coarse threaded),
TSBW6.3-100-GP	6.3 mm x 100.0 mm	(Cutter Point – Coarse threaded),
SDSFHC200	6.3 mm x 200.0 mm	(Type 17 Point – Coarse threaded),
SS-DS-63	4.2 mm x 63.0 mm	(Type 17 Point – Coarse threaded),
WHX100	4.8 mm x 100.0 mm	(Drilling Point – Hi-Lo threaded),

Cementitious bound wood substrate provided by Velox Systems UK.

5.0 - Results

Withdrawal Force Results (Table 01 of 03)					
Part No.	**Test No.**	**Embedment Depth (mm)**	**Thread Type**	**Major Diameter (mm)**	**Maximum Recorded Load (N)**
DWSZ150	01	Full thread engagement	Fine	4.8	2.08
	02				2.05
	03				2.07
	04				2.66
	05				2.07
	06				2.37
	07				2.21
	08				2.09
	09				2.35
	10				2.16
ETKR180	11		Coarse	4.8	2.69
	12				1.59
	13				2.08
	14				2.50
	15				3.12
	16				2.23
	17				2.43
	18				2.10
	19				2.33
	20				2.37

Withdrawal Force Results (Table 02 of 03)					
Part No.	**Test No.**	**Embedment Depth (mm)**	**Thread Type**	**Major Diameter (mm)**	**Maximum Recorded Load (N)**
TSBW6.3-100-GP	21	Full thread engagement	Coarse	6.3	2.02
	22				2.69
	23				2.04
	24				3.03
	25				1.89
	26				2.65
	27				3.01
	28				2.60
	29				2.10
	30				2.15
SDSFHC200	31				2.80
	32				2.50
	33				2.64
	34				1.92
	35				2.61
	36				1.99
	37				2.06
	38				2.03
	39				2.41
	40				2.38

Withdrawal Force Results (Table 03 of 03)					
Part No.	**Test No.**	**Embedment Depth (mm)**	**Thread Type**	**Major Diameter (mm)**	**Maximum Recorded Load (N)**
SS-DS-63	41	Full thread engagement	Coarse	4.2	1.91
	42				1.90
	43				1.87
	44				1.56
	45				1.64
	46				2.09
	47				1.65
	48				1.56
	49				1.87
	50				2.05
WHX100	51		Hi-Lo	4.8	3.13
	52				2.70
	53				2.55
	54				2.67
	55				3.00
	56				2.96
	57				2.88
	58				2.72
	59				2.54
	60				2.38

6.0 – Discussion and conclusion(s)

From the results derived from testing and shown in section 5.0 of this report, the following table can be drawn to aid in comparison between different screw dimensions, thread types and withdrawal forces.

Compiled Results including Measurement of Uncertainty in kilo Newtons (kN)				
Part No.	**Diameter (mm)**	**Thread Pitch**	**Withdrawal Force (kN)**	**Note(s)**
DWSZ150	4.8	Fine	2.21 ± 0.39	None.
ETKR180	4.8	Coarse	2.34 ± 0.81	
TSBW6.3-100-GP	6.3	Coarse	2.42 ± 0.85	
SDSFHC200	6.3	Coarse	2.33 ± 0.63	
SS-DS-63	4.2	Coarse	1.81 ± 0.39	
WHX100	4.8	Hi-Lo	2.75 ± 0.47	
NOTE: The reported expanded uncertainty for all measurements is based on a standard uncertainty multiplied by a coverage factor (k = 2), providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS (United Kingdom Accreditation Service) document M3003 “The Expression of Uncertainty and Confidence in Measurement”.				

From the table above it can be concluded that there is little difference in ultimate withdrawal forces obtained from screws of differing thread pitches. However it can be said that the uncertainty is reduced when using a fine or hi-lo threaded product compared to a coarse threaded product.

It can also be concluded that there is little difference in the ultimate withdrawal forces when increasing the diameter of the screw. Indeed in all cases the failure was in rupture of the substrate.

This report is authorised to be published by Mr. Ryan Murphy (Associate Director).

Ryan Murphy
Associate Director

[END OF REPORT]

7.0 – Revision History

Revision Number	Changes Made By	Details of Changes
01	RM	Original issue.

[END OF DOCUMENT]