

Sealant Test

Air Leakage Test

Carried out for
Hodgson Sealants (Holdings) Limited

Report 101052/1

Compiled by Andrew Freeth

6 December 2019



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Sealant Test

Air Leakage Test

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QUALITY ASSURANCE

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CONTENTS

- 1 INTRODUCTION.....5
- 2 TEST ITEM.....5
 - 2.1 Test Equipment5
- 3 TEST METHOD6
- 4 RESULTS7
- 5 CONCLUSION.....9

FIGURES

- Figure 1 Test item..... 5
- Figure 2 Test rig schematic..... 6
- Figure 3 Comparison of baseline leakage and actual leakage..... 7
- Figure 4 Comparison of actual leakage and maximum permitted leakage for Class D Ducting 7

TABLES

- Table 1 Baseline leakage (no sealant) 8
- Table 2 Leakage with sealant applied 8
- Table 3 Summary table of results from test 8

APPENDICES

- APPENDIX A: Manufacturer’s data sheets 10

1 INTRODUCTION

This report concerns tests carried out on HY-SPEC - HygieneSeal sealant to determine the air leakage characteristics, following the test procedures of HVCA 'Specification for Sheet Metal Ductwork DW/144 Third Edition 2016. The work was commissioned by Hodgson Sealants (Holdings) Limited and was carried out on 5 – 13 November 2019 at the BSRIA laboratory, Bracknell.

DW/144 specifies leakage limits for complete duct systems, in the form of a permitted leakage rate for a given surface area – l/s/m². It does not specify any specific limits for sealant materials, which will typically be applied linearly along seams and joints.

BS EN 15727:2010 "Ventilation for buildings. Ducts and ductwork components, leakage classification and testing" introduces the concept of a virtual product surface area, where the total joint length of the component connections is multiplied by 0.5 m, in order to calculate a surface area against which leakage can be assessed.

This methodology has been adopted in this report. The sealant test drum provides joint length of 1.4 metres to which sealant is applied. This gives a virtual surface area of 0.7 m² which has been used to calculate a leakage rate that can be compared to the relevant leakage class in DW/144.

This report refers to the item tested and no others.

2 TEST ITEM

The test item was HY-SPEC - HygieneSeal Sealant. See Appendix A for manufacturer's data sheet.

Figure 1 Test item



Note: Cartridge design subject to change

2.1 TEST EQUIPMENT

The test was carried out on a drum shaped test rig with two controlled leaks. The leaks occurred where the end plates meet the main drum. The end plates were held in place by the action of a spring giving control over the leaks. The spring was set such that at 1500 Pa the leak measured was approximately 10 litres per second.

Instrument	Identifier	Calibration expiry date
Furness FCO510 micromanometer	5	27-2-20
DPM TT570 micromanometer	0300 202843	29-10-20
Duct leakage tester (ALF 150)	1587	25-7-20
LFE 2 ltr/min (Laminar Flow Element)	ZZ/LAM/02	12-6-20

3 TEST METHOD

The sealant rig was set up as shown below (Figure 1) after the drum seals were cleaned. The rig was then pressurised up to approximately 1500 Pa and the leak rates noted to determine the base leakage rate. The sealant was then applied as directed by the manufacturer.

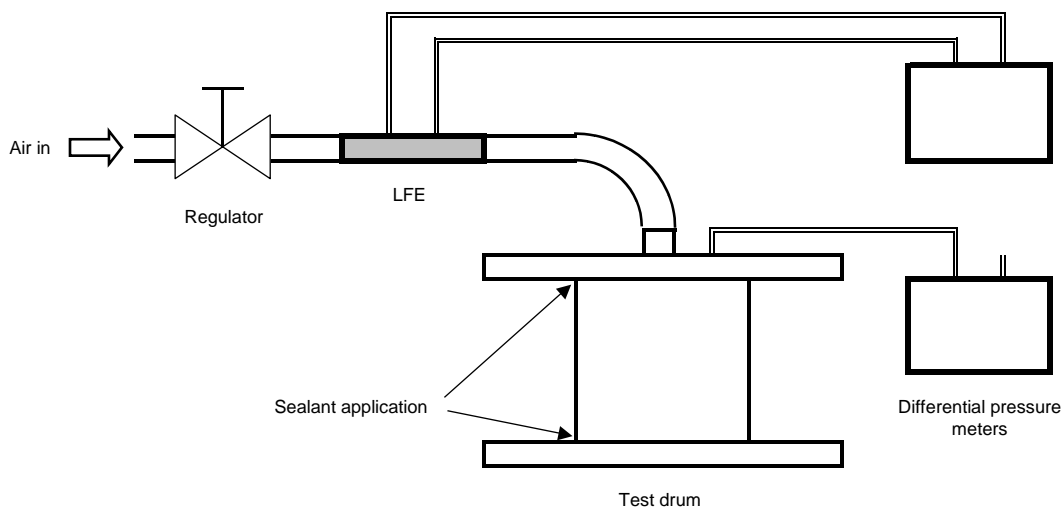
The sealant was applied in a 3 mm bead (approx.) to be compatible with other tests.

The sealant was allowed to cure for 7 days, as advised by a Hodgson Sealants representative.

The rig was then tested again up to approximately 2000 Pa in increments and the leakage rates noted.

The leakage rate was plotted against pressure and was compared with the DW/144 leakage rate for the required class.

Figure 2 Test rig schematic



4 RESULTS

Figure 3 Comparison of baseline leakage and actual leakage

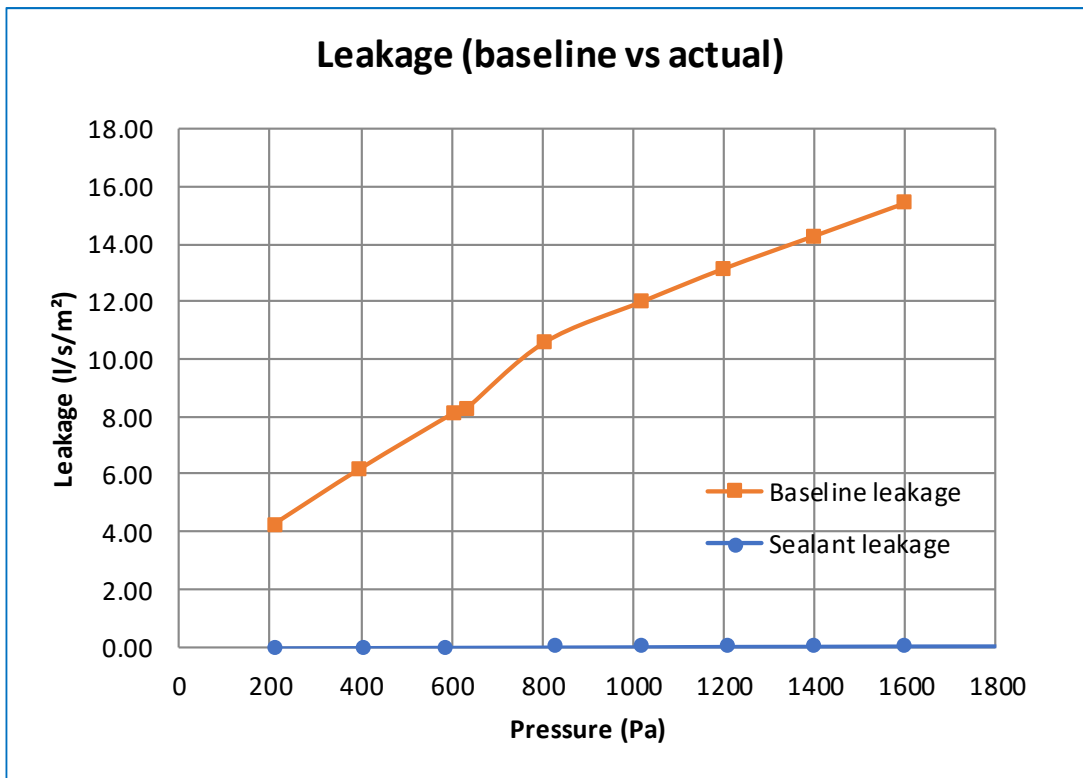


Figure 4 Comparison of actual leakage and maximum permitted leakage for Class D Ducting

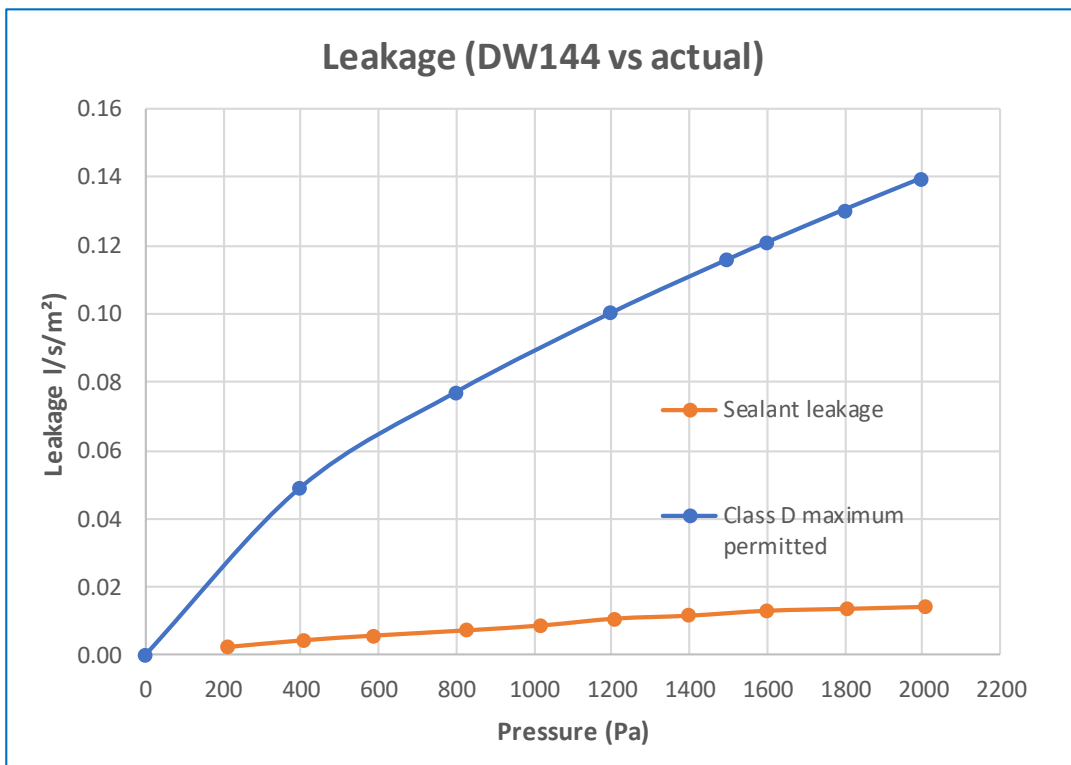


Table 1 Baseline leakage (no sealant)

Static Pressure	Leakage	Baseline leakage
Pa	l/s	l/s/m ²
210	3.0	4.27
397	4.3	6.17
607	5.7	8.14
633	5.8	8.29
804	7.4	10.57
1020	8.4	12.00
1200	9.2	13.14
1400	10.0	14.29
1600	10.8	15.43

The 'trendline' for the baseline leakage would follow $y = 0.0901x^{0.651}$
 Using this equation, at 2000Pa the calculated leakage would be 18.1363 l/s/m².

Table 2 Leakage with sealant applied

Static Pressure	Leakage	l/s/m ²
Pa	l/s	Sealant leakage
212	0.0018	0.0026
406	0.0032	0.0045
587	0.0041	0.0059
827	0.0052	0.0075
1020	0.0062	0.0089
1210	0.0076	0.0109
1400	0.0082	0.0118
1600	0.0092	0.0132
1810	0.0096	0.0138
2010	0.0100	0.0143

The 'trendline' for the sealant leakage would follow $y = 0.00004x^{0.7762}$
 Using this equation, at 2000Pa the calculated leakage would be 0.0146 l/s/m².


Table 3 Summary table of results from test


Sealant	Rig leakage (l/s)	Test area (m ²)	Sealant leakage (l/s/m ²)	DW144 limit (Class D) (l/s/m ²)
HY-SPEC - HygieneSeal Sealant	10.6 @ 1500 Pa	0.700	0.0146 @ 2000 Pa	0.1399 @ 2000 Pa

5 CONCLUSION

The sealing compound was effective in reducing the leakage of the test joints to meet the requirements for DW 144 Class D high-pressure ductwork up to 2000Pa.

APPENDIX A: MANUFACTURER’S DATA SHEETS

PRODUCT DATA SHEET		Hodgson SEALANTS 	
HY-SPEC - HygieneSeal		Version No. 1	Revision Date: 10/12/2018
		Page 1 of 3	
DESCRIPTION			
HygieneSeal is a high modulus, single component, moisture-curing, adhesive and sealant based on Hy-Spec Hybrid Polymer Technology with anti-pick properties. In addition HygieneSeal is protected by Biocote Antimicrobial technology to create a surface upon which bacteria/microbes cannot survive making it easier to maintain a hygienic surface. This is superior to traditional fungicidal materials used in sealants which degrade over time and are not as effective against bacteria and viruses.			
KEY FEATURES			
Premium quality high modulus adhesive and sealant with integral antimicrobial protection.	Excellent adhesion to PVC-U, coated metals, brickwork, polycarbonate, coated timber and glass.		
Neutral cure system, free from isocyanates and silicones, product is therefore paintable. (Prior testing is recommended).	Anti-Pick formulation – more resistant to being picked in communal areas relative to traditional sealants.		
Non staining, solvent free, odour free and bubble free curing.	Highly resistant to ageing, life cycle testing shows Biocote is proven to offer antibacterial protection for the expected lifetime of the product.		
Resistant to water, salt water, grease oils, fuels, defrosting liquids, detergents, aliphatic fats, mildew, weak acids and alkali.	Biocote protected HygieneSeal has been proven to reduce bacteria/microbes by up to 99.99%, based on MOD ISO22196: 2011.		
Robust material once cured.	Suitable for Internal or external use.		
USES			
HygieneSeal is an antimicrobial sealant that has been specifically formulated to seal typical joints where a strong bond and movement accommodation is required.	Ideal for the sealing of joints in refrigerated vehicle sections for food or pharmaceutical transportation.		
Ideal for use where long term visual appearance of the sealant is to be maintained. Biocote is proven effective against microbes that may negatively impact aesthetic finishes.	Jointing sections in the manufacture of cold storage areas and food preparation areas.		
Adhesive sealing and jointing to most substrates especially where superior antimicrobial performance is required.	Suitable for use in secure environments where enhanced resistance to finger picking is required		
Permanent elastic sealing with high adhesive strength to a wide variety of substrates including wood, concrete, tiles, steel, aluminium, zinc, copper, brass, stainless steel, glass, polyester. Superior to traditional biocidal additives used in sealants which degrade over time and are not as effective against many microbes (bacteria, viruses and mould) including; MRSA, E. coli, Campylobacter, Staphylococcus aureus, Salmonella, Listeria, Legionella, Pseudomonas, Shigilla, H1N1 virus and Aspergillus Niger.			
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PRODUCT DATA SHEET		Hodgson SEALANTS 	
HY-SPEC - HygieneSeal		Version No. 1	Revision Date: 27/11/2017
		Page 2 of 3	
PERFORMANCE			
<p>Adhesion: Excellent unprimed adhesion to materials including: glass or glazed surfaces, coated metals, brick, PVC-U and timber.</p> <p>Base technology: Hy-Spec Hybrid Polymer.</p> <p>Chemical resistance: Excellent to dilute acids and alkalis.</p> <p>Curing system: Neutral cure.</p> <p>Mould resistance: Good.</p> <p>Movement accommodation: $\pm 20\%$.</p> <p>Service life (predicted): 20+ years.</p>		<p>Service temperature range: -30°C to +80°C.</p> <p>Shore A hardness: 60 ± 5.</p> <p>Slump: None.</p> <p>Specific gravity: 1.60 g/cm³.</p> <p>Staining: Nil.</p> <p>Elongation at break: >250%.</p> <p>Tensile (100% elongation): 3.0 MPa.</p> <p>UV resistance: Excellent.</p>	
APPLICATION			
PROPERTIES			
<p>Application temperature range: +5°C to +30°C.</p> <p>Curing rate: Cures at a rate of 2 - 3mm in 24 hours at 23°C @ 50% RH. Lower temperatures and drier conditions will result in a slower rate of cure.</p> <p>Shelf life: 18 months in original unopened packaging in cool, dry condition with temperatures of +5°C to +25°C.</p> <p>Skinning time: Skin forms after approximately 25 minutes.</p> <p>Tack free time: Approximately 40 minutes (23°C & 65% RH).</p> <p>Working time: Approximately <25 minutes depending on conditions.</p>			
INSTRUCTIONS			
<p>Joint design: Please consult the Technical Information Sheet entitled 'Joint design for cartridge based products' prior to application.</p> <p>Surface preparation: All surfaces must be clean, dry and free from frost, grease and loose materials. Apply primer if required. Install bond breaker to prevent bond at base of joint where necessary. Most substrates only require priming if testing indicates a need to. Cut the top of the screw thread off the cartridge and screw on the nozzle. Cut nozzle to correct diameter for joint size. Apply using a skeleton or powered gun into the joint ensuring good contact with surfaces. In deep joints, the use of backing rod is essential to ensure good joint formation.</p> <p>In situations where an especially neat finish is required, use masking tape to cover the face edges of the joint and remove immediately once tooling has been completed.</p> <p>Tooling: Tool immediately after sealant has been applied within the working time for the product.</p>			
EQUIPMENT			
A selection of hand & air operated guns is available for sausage application including a high power type especially suitable for filling deep voids.			
PACKAGING			
Available in 290ml cartridges – 12 per case.		Colour range: White.	
ESTIMATING QUANTITIES			
<p>Number of cartridges / sausages required = $\frac{\text{Joint depth (mm)} \times \text{Joint width (mm)} \times \text{Length (M)}}{\text{Volume of sachet (ml)}}$ This calculation does not allow for wastage.</p>			
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PRODUCT DATA SHEET



HY-SPEC - HygieneSeal

Version No. 1

Revision Date:
27/11/2017

Page 3 of 3

HEALTH AND SAFETY

Non-flammable.

There are no known health hazards associated with HygieneSeal.

Wash hands immediately after use.

See Product Safety Data Sheet for further information.

LIMITATIONS

Not suitable for glazing applications.

Do not use in contact with surfaces bleeding oil, plasticisers and solvents.

Not for use with bitumen, marble or natural stone.

Do not use for aquaria construction

Do not use with plastics such as; PP, PE, PTFE or other low surface energy materials. HS10 Primer can be considered to improve adhesion to non-porous substrates.

GENERAL

HygieneSeal is part of a full range of speciality sealants and tapes designed for the professional user. For further information please contact our Customer Care Team or visit our Website.

The information given in this product data sheet is based on laboratory tests and experience which we believe to be correct. Properties quoted are typical and do not therefore constitute a specification. In view of the wide range and variability of substrates, we would advise that our product should be tested by the user to establish suitability for its intended application. E &OE.