

CONFIDENTIAL TECHNICAL REPORT

BS EN 681-1:1996 AUDIT TESTING OF L-RING (R50) CLASS 50 MATERIAL

Prepared for:

Umm Al Quwain Rubber Industries Ltd
PO Box 79
Umm Al Quwain
Falaz Al Moalla Road
United Arab Emirates

For the attention of:	Vikas Singh
Email:	vikas@uril.ae
CTR Number:	65302
Version:	1
Project No:	GE0073
Proposal:	168852HG
Date:	14 April 2022

Author	Technical Review
Helen Amos Senior Test Engineer Materials Testing	Ivan Legge Senior Test Engineer Materials Testing

BS EN 681-1:1996 AUDIT TESTING OF L-RING (R50) CLASS 50 MATERIAL

1. INTRODUCTION

Details of the samples supplied and the tests requested are as follows:-

Sample Designations:	L-RING (R50) Nominal Hardness: 50
Description of Materials Received:	Material in sheet and button form was supplied and allocated the Smithers receipt sample number SR18100
Date Received:	08 March 2022
Supplied under Order Number:	AJAY 01/2022

Tests Requested:	BS EN 681-1: 1996 Table 2 Requirements:	
	Hardness (Micro)	BS ISO 48-2
	Tensile Strength	BS ISO 37
	Elongation at Break	BS ISO 37
	Compression Set (72 hrs @ 23°C)	BS ISO 815-1
	Compression Set (24 hrs @ 70°C)	BS ISO 815-1
	Compression Set (72 hrs @ -10°C)	BS ISO 815-2
	Tensile strength, elongation at break and Hardness after accelerated heat ageing	BS ISO 188
	Stress Relaxation (7 Days @ 23°C)	BS ISO 3384-1
	Volume change in water	BS ISO 1817
	Ozone resistance	BS ISO 1431-1

2. LIMITATIONS

Smithers is a UKAS accredited testing laboratory number 0067. Note that any opinions or interpretations expressed herein are outside the scope of our UKAS accreditation.



The results reported herein relate solely to the samples as received, the materials tested and the methods described.

The report shall not be reproduced except in full without approval of Smithers.

Smithers will destroy all the supplied material(s) relating to this contract six months after the work is completed unless a written request is received within that time that the client wishes to have the material returned.

3. EXPERIMENTAL DETAILS

The supplied material was tested in accordance with BS EN 681-1: 1996 table 2 requirements for audit testing, except as otherwise noted. All testing was carried out at the Shawbury test site. Ambient temperature was maintained at 23°C ± 2°C and all equipment used was calibrated to the accuracy required in the appropriate standard.

3.1 Hardness

3.1.1 Micro Hardness Unaged (BS EN 681-1 Section 4.2.3)

A sample was obtained from a flat section of the supplied sample and slit to the required test thickness where required. The hardness measurements were taken on the un-slitted outer surface of the sample if applicable, using the following parameters:

Test Method:	BS ISO 48-2: 2018 Method M
Equipment:	Wallace Micro-hardness Tester
Conditioning Period:	≥3hrs @ 23±2°C after sample preparation.
Test Conditions:	23±2°C
Number of Measurements:	5 readings

3.1.2 Hardness Heat Aged (BS EN 681-1 Section 4.2.6)

The measured test piece detailed in section 3.1.1 was then heat aged to the following parameters before the hardness was re-measured:

Test Method: BS ISO 188: 2011
Equipment: Air Circulating Oven
Temperature: 70±1°C
Ageing Duration: 168 hours
Post Aged Conditioning Period: ≥16hrs @ 23±2°C after sample preparation.

Dates of tests: 21-Mar-2022 through 01-Apr-2022

3.2 Tensile Strength and Elongation at Break

3.2.1 Unaged Tensile Strength and Elongation at Break (BS EN 681-1 Section 4.2.4)

The tensile strength and elongation at break was measurements on five type 2 dumb-bells that were die stamped from the supplied material in the longitudinal direction of the grain. The following test parameters were used:

Test Method: BS ISO 37: 2017
Equipment: Hounsfield Tensile Tester, Laser Extensometer.
Conditioning Period: ≥16hrs @ 23±2°C after sample preparation.
Test Conditions: 23±2°C
Test Speed: 500mm/min
Gauge Length: 20mm

3.2.2 Heat Aged Tensile Strength and Elongation at Break (BS EN 681-1 Section 4.2.6)

An additional five type 2 dumb-bells were stamped and tested as detailed in section 3.2.1 after undergoing heat ageing to the following parameters:

Test Method: BS ISO 188: 2011
Equipment: Air Circulating Oven
Temperature: 70±1°C
Ageing Duration: 168 hours
Post Aged Conditioning Period: ≥16hrs @ 23±2°C after sample preparation.

Dates of tests: 31-Mar-2022 through 31-Mar-2022

3.3 Compression Set (BS EN 681-1 Section 4.2.5)

Triplicate moulded type B test buttons supplied by the client, were prepared for each of the required test conditions and the compression sets measured using the tests parameters listed below:

Test Method: BS ISO 815-1 & 2: 2019
Compression: 25%
Lubricant Type: Silicone based oil
Test Conditions
1. 72 hours at 23 ± 2°C
2. 24 hours at 70 ± 1°C
3. 72 hours at -10 ± 1°C
Post Aged Conditioning Period: 30 minutes @ 23±2°C after release from compression for test condition 1 & 2.
30 minutes @ -10±1°C after release from compression for test condition 3.

Dates of tests: 25-Mar-2022 through 11-Apr-2022

3.4 Stress Relaxation (BS EN 681-1 Section 4.2.7)

The stress relaxation was measured on triplicate test buttons 13±0.5mm by 6.3±0.3mm supplied by the client using the following test parameters:

Test Method: BS ISO 3384-1: 2019 Method B
Procedure: Discontinuous
Test Environment: Air
Conditioning: Thermal (3 hours @ 70±1°C) & Mechanical
Test Temperature: 23±2°C
Compression: 25±2%
Lubrication: Silicone based oil
Measurement Time Intervals: 30mins 3hrs 24hrs 5 Days 7 days
Total Duration of Test: 7 Days

Dates of tests: 05-Apr-2022 through 13-Apr-2022

3.5 Volume Change in Water (BS EN 681-1 Section 4.2.8)

Triplicate test pieces 25 to 30mm square were cut from the supplied material and the volume change was measured using the following parameters:

Test Method: BS ISO 1817: 2015 (volumetric method)
 Test Conditions: 168hrs at 70±1°C in distilled water
 Post Aged Conditioning Period: >10 <30 minutes @ 23±2°C in fresh distilled water.

Dates of tests: 21-Mar-2022 through 30-Mar-2022

3.6 Ozone Resistance (BS EN 681-1 Section 4.2.9)

Triplicate test pieces approximately 12mm wide by 100mm long were cut from the supplied material and the ozone resistance measured using the following test parameters:

Test Method: BS ISO 1431-1: 2012
 Strain: 20% - All cut surfaces and clamped sections were painted with an ozone resistance paint.
 Conditioning after Straining: 72 hours @ 23±2°C
 Test Temperature: 40±2°C
 Ozone Concentration: 50±5 pphm
 Relative Humidity: 55±10 %RH
 Cabinet Fan: On
 Rotational Carrier: Yes
 Exposure Period: 48 Hours

Dates of tests: 21-Mar-2022 through 23-Mar-2022

4. RESULTS

4.1 Hardness

Sample Designation	Micro IRHD		
	Unaged	Aged	
L-Ring (R50)	53	54	
	52	54	
	53	54	
	53	53	
	53	53	
Median	53	54	
Unaged Specification Limit	45 to 55		
Status (Pass/Fail)	Pass		
Aged Hardness Change from Original		1	
Δ Aged Hardness Specification limits		-5 to +8	
Δ Aged Hardness Status (Pass/Fail)		Pass	
Expanded Uncertainty ku (k=2)	-	-	
TUR			
Conditions	Tolerance	Unc.	TUR
Temp (°C)	2	0.5	4
Hardness (IRHD)	5	1.02	5

Note Δ = "Change in"

4.2 Tensile Strength and Elongation at Break

Sample Designation	Tensile Strength (MPa)		Elongation at Break (%)		
	Unaged	Aged	Unaged	Aged	
L-Ring (R50)	22.5	22.9	465	470	
	23.5	20.4	480	442	
	26.1	23.8	517	495	
	26.3	21.7	513	457	
	25.2	23.8	499	514	
	25.2	22.9	499	470	
	9		375		
	Unaged Status (Pass/Fail)	Pass	Pass		
	Aged % Change from original (inclusive of ± uncertainty)	Minimum	Maximum	Minimum	Maximum
	Aged Specification Limits	21.1	24.7	-11	-1
Aged Status (Pass/Fail)	Maximum -20%	Pass	-30 to 10%	Pass	
Expanded Uncertainty (k=2)	2.0	1.8	20	26	

4.3 Compression Set

Sample Designation	Compression Set (%)		
	23°C	70°C	-10°C
L-Ring (R50)	6.9	14.4	16.5
	7.5	14.3	17.0
	6.3	14.3	18.6
Median	6.9	14.3	17.0
Specification Maximum	12	20	40
Status (Pass/Fail)	Pass	Pass	Pass
Expanded Uncertainty ku (k=2)	1.6	1.4	1.9

4.4 Stress Relaxation

Sample Designation	Stress Relaxation (%)
	7 Days
L-Ring (R50)	7.46
	3.64
	8.05
Median	7.46
Specification Maximum	14
Status (Pass/Fail)	Pass
Expanded Uncertainty ku (k=2)	2.8

4.5 Volume Change in Water

Sample Designation	Volume Change (%)
L-Ring (R50)	6.4
	6.4
	6.2
Mean	6.3
Specification Limit	-1 to 8
Status (Pass/Fail)	Pass
Expanded Uncertainty ku (k=2)	0.1

4.6 Ozone Resistance

Sample Designation	Ozone Observations			
L-Ring (R50)	No Cracking			
	No Cracking			
	No Cracking			
Specification	No Cracking when viewed without Magnification			
Status (Pass/Fail)	Pass			
Test Uncertainty Ratio (TUR) of the test Conditions	Conditions	Tolerance	Unc.	TUR
	Strain (%)	2	0.016	125
	Ozone (pphm)	5	2	2.5
	Temp (°C)	2	0.6	3.3
	Humidity (%)	10	1.6	6.3
	Duration (hrs)	-	N/A	-

5. SUMMARY AND CONCLUSIONS

L-Ring (R50)

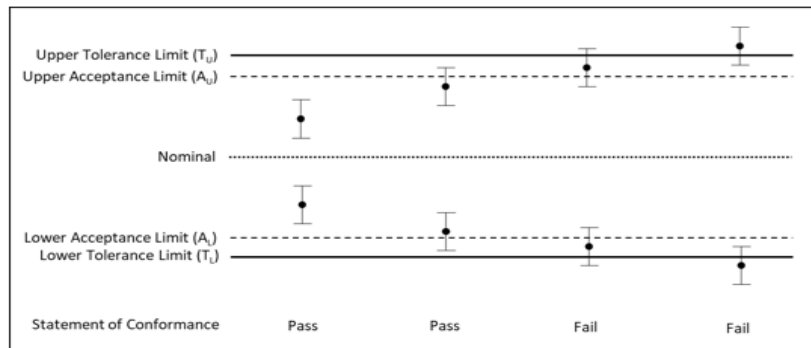
Property	Method	Unit	Specification		Result (Including uncertainty where applicable)		Pass/Fail
			Minimum	Maximum	Minimum	Maximum	
Unaged Hardness (Micro IRHD)	BS ISO 48	IRHD	45	55	53	53	Pass
Tensile Strength	BS ISO 37	MPa	9.0		23.2		Pass
Elongation at Break	BS ISO 37	%	375		479		Pass
Heat Aged - Hardness Change	BS ISO 48	IRHD	-5	8	0	2	Pass
Heat Aged - Tensile % Change	BS ISO 37	%	-20		-16	-2	Pass
Heat Aged - Elongation % Change	BS ISO 37	%	-30	10	-11	-1	Pass
Compression Set at 23°C	BS ISO 815-1	%		12		8	Pass
Compression Set at 70°C	BS ISO 815-1	%		20		16	Pass
Compression Set at -10°C	BS ISO 815-2	%		40		19	Pass
Stress Relaxation - 7 Days	BS ISO 3384	%		14		10	Pass
Volume Change in Water	BS ISO 1817	%	-1	8	6.3	6.4	Pass
Ozone Resistance	BS ISO 1431-1	-	No Cracking		No Cracking		Pass

The supplied material has PASSED the annual type test requirements when tested in accordance with BS EN 681-1: 1996: Section 7.3 Table 2, to which it was tested.

5.1 Decision Rule

Smithers have taken a 'binary acceptance' approach to the application of measurement uncertainty (with the exclusion of Ozone and Hardness testing), when determining whether the test result conforms to the Tolerance Limit (i.e. Passed or Failed), as defined in ILAC G8:09/2019 Guidelines on Decision Rules and Statements of Conformity. Acceptance Limits were used in place of Tolerance Limits where $AL = TL \pm U$.

Example below:



When determining if the Ozone Resistance test conformed to the specification requirements, Smithers have reported either "cracking" or "no cracking" provided that the test conditions conformed to simple acceptance criteria for ozone concentration, duration of exposure, temperature, exposure humidity and strain applied, and that the Test Uncertainty Ratio (TUR) of the test conditions was $\geq 2.5:1$.

For the hardness testing, a 'simple acceptance' approach to the application of measurement uncertainty when determining conformity to the specification limit was applied, providing that the Test Uncertainty Ratio (TUR) is $\geq 3:1$.

Version Number	Submission Date	Description	Reason For Changes	Author or Originator
01	14 April 2022	Original Document	N/A	Helen Amos

End of Report

Smithers MSE Limited
CONDITIONS OF BUSINESS (Conditions)**DEFINITIONS;**

- “**Client**” means the person(s), firm or company who purchases the Goods and/or Services from Company;
- “**Company**” means Smithers MSE Limited (Registration Number: 05761324 and whose registered office is at Shrewsbury Road, Shawbury, Shropshire, SY4 4NR), trading as Smithers;
- “**Conditions**” means the terms and conditions set out in this document as amended from time to time;
- “**Contract**” means any contract between Company and the Client for the sale and purchase of Goods and/or provision of Services, incorporating these Conditions;
- “**Deliverables**” means the report produced in connection with the Services or the deliverables set out in the Order;
- “**Force Majeure Event**” has the meaning given to it in Condition 13;
- “**Goods**” means any goods agreed in the Contract to be supplied to the Client by Company (including any parts of them);
- “**Intellectual Property Rights**” means any patent, registered design, copyright (including rights in software), design right, database right, moral right, trade mark, service mark, domain name, rights in confidential information and all similar property rights anywhere in the world in each case whether registered or not and including any application for registration of the foregoing;
- “**Order**” means the Client’s order for the supply of Goods and/or Services as set out in the Client’s purchase order form, the Client’s written acceptance of Company’s quotation or overleaf, as the case may be;
- “**Services**” means any services including the Deliverables agreed in the Contract to be supplied to the Client by Company;
- “**Specification**” means the specification for the Work, including any relevant plans, drawings or samples that is agreed in writing by the Client and Company;
- “**Testing Intellectual Property Rights**” means all Intellectual Property Rights in or arising out of or in connection with the Services or the production of the Goods in the testing methods, consultative methodologies or any other services provided by Company;
- “**Work**” means Goods and/or Services;
- “**Working Day**” means a day (other than a Saturday or Sunday) on which the banks are ordinarily open for business in the City of London.

1 FORMATION OF CONTRACT

- 1.1 Each Order for Work by the Client from Company shall be deemed to be an offer by the Client to purchase Work in accordance with these Conditions. Company hereby objects to any additional, contradictory or different terms contained in any initial or subsequent order or communication from the Client pertaining to the Work. Any notice by the Client objecting to these Conditions must be in writing separate from any form purchase order. Company’s failure to object specifically to provisions contained in any communication from the Client shall not be deemed a waiver of the provisions contained in these Conditions.
- 1.2 No Order placed by the Client shall be deemed accepted by Company until a written or electronic acknowledgement of order is issued by Company following the Company’s receipt of the Order that covers the full cost of the Work.
- 1.3 The Contract constitutes the entire agreement between the parties. The Client acknowledges that it has not relied on any statement, promise, representation, assurance or warranty made or given on behalf of Company which is not set out in the Contract.
- 1.4 All other terms, conditions or warranties whatsoever (including any terms or conditions which the Client purports to apply under any purchase order, confirmation, specification or other document whatsoever and whenever) are excluded from any contract between the parties unless expressly accepted by Company in writing.
- 1.5 Without prejudice to Company’s right not to accept an order, quotations shall be available for acceptance for a maximum period of 20 Working Days from the dates thereof.
- 1.6 All of the Conditions shall apply to supply of both Goods and Services except where applicability to one or the other is specified.

2 PRICES

- 2.1 The price for the Goods is, unless otherwise stated, quoted exclusive of all costs or charges in relation to packaging, labelling, loading, unloading, carriage, freight and insurance which shall be paid by the Client when it pays for the Work.

- 2.2 The price for the Work is exclusive of amounts in respect of value added tax (VAT) or other similar taxes or levies. The Client shall, on receipt of a valid VAT invoice from Company, pay to Company such additional amounts in respect of VAT as are chargeable on the supply of the Work.
- 2.3 All requests for variations or addition to the Work must be made by the Client in writing. In the event of any variation or addition being so requested and agreed to by Company, Company shall be entitled to make an adjustment to the price of the Work fairly reflecting such variation or addition.
- 2.4 Company may, by giving notice to the Client at any time before delivery, increase the price of the Works to reflect any increase in the cost of the Work that is due to:
- (a) any factor beyond Company's control (including foreign exchange fluctuations, increases in taxes and duties, and increases in labour, materials and other manufacturing costs);
 - (b) any request by the Client to change the delivery dates, quantities or types of Goods ordered or scope of the Services; or
 - (c) any delay caused by any instructions of the Client or failure of the Client to give Company adequate or accurate information or instructions.
- 2.5 The price for the Work prior to any adjustments described above in this Condition 2 shall be the price set out in the Order.

3 DELIVERY AND ACCEPTANCE OF GOODS

- 3.1 Unless otherwise agreed in writing by Company delivery of the Goods shall take place at the location set out in the Order or such other location as the parties may agree (Delivery Location) at any time after Company notifies the Client that the Goods are ready.
- 3.2 Any dates specified by Company for delivery of the Work are intended to be an estimate only and time for delivery shall not be of the essence. Company shall not be liable for any delay occurred by a Force Majeure Event or the Client's failure to supply Company with adequate delivery instructions or any other instructions that are relevant to the delivery of the Work. Delivery of the Goods shall be completed on the Goods' arrival at the Delivery Location.
- 3.3 If for any reason the Client does not accept delivery of any of the Goods within five Working Days of Company giving the Client notice that the Goods are ready then:
- (a) the Goods shall be deemed to have been delivered at 9.00am on the fifth Working Day following the day on which Company notified the Client that the Goods were ready;
 - (b) risk in the Goods passes to the Client (including for loss or damage caused by the Client's negligence); and
 - (c) Company shall store the Goods until actual delivery takes place and charge the Client for all related costs and expenses (including without limitations storage and insurance).
- 3.4 If ten Working Days after Company notified the Client that the Goods were ready for delivery the Client has not accepted delivery of them, Company may sell or otherwise dispose of part or all of the Goods and, after deducting reasonable storage and selling costs, account to the Client for any excess over than the price of the Goods or charge for any shortfall below the price of the Goods.
- 3.5 Where applicable, the Client will provide at its expense at the place of delivery adequate and appropriate equipment and manual labour for loading the Goods.
- 3.6 If Company delivers to the Client a quantity of Goods of up to 5% more or less than the quantity ordered by the Client, the Client shall not be entitled to object to or reject the Goods or any of them by reason of the surplus or shortfall and shall pay for the Goods delivered at the pro rata Contract rate.
- 3.7 Company shall be entitled at its discretion to make delivery of the Goods by instalments and to invoice the Client for each instalment individually. Where the Goods are to be delivered in instalments, each delivery shall constitute a separate contract and any delay, failure to deliver or defect on an instalment shall not entitle the Client to treat the Contract as a whole as repudiated or to refuse to accept subsequent instalments
- 3.8 Company shall only be liable for the non-delivery of Goods (even if caused by Company's negligence) if the Client gives written notice to Company within 10 Working Days of the date when the Goods would, in the ordinary course of events, have been delivered.
- 3.9 If the Client gives notice to Company in accordance with Condition 3.8 Company's liability shall be limited to the costs and expenses incurred by the Client in obtaining replacement Work of similar description and quality in the cheapest market available, less the price of the Work.

4 PASSING OF RISK AND LEGAL TITLE

- 4.1 The Goods shall be at the risk of the Client on completion of delivery.
- 4.2 Full legal, beneficial and equitable title to and property in the Goods shall remain vested in Company (even though it has been delivered and risk has passed to the Client) until the earlier of:
- (a) payment in full, in cash or cleared funds, for all of the Goods has been received by Company and all other money payable by the Client to Company on any other account or under the Contract or any other contract has been received by Company; or

- (b) the Client resells the Goods, in which case title to the Goods shall pass to the Client at a time specified in clause 4.4.
- 4.3 Until title to the Goods has passed to the Client, the Client shall:
 - (a) store the Goods separately from all other goods held by the Client so that they remain readily identifiable as Company's property;
 - (b) not remove, deface or obscure any identifying mark or packaging on or relating to the Goods;
 - (c) maintain the Goods in satisfactory condition and keep them insured against all risks for their full price on Company's behalf from the date of delivery;
 - (d) notify Company immediately if it becomes subject to any of the events listed in clause 12.1; and
 - (e) give Company such information relating to the Goods as Company may require from time to time.
- 4.4 Subject to clause 4.5, the Client may resell or use the Goods in the ordinary course of its business (but not otherwise) before Company receives payment for the Goods. However, if the Client resells the Goods before that time:
 - (a) it does so as principal and not as Company's agent; and
 - (b) title to the Goods shall pass from Company to the Client immediately before the time at which resale by the Client occurs.
- 4.5 If before title to the Goods passes to the Client the Client becomes subject to any of the events listed in clause 12.1, then, without limiting any other right or remedy Company may have:
 - (a) The Client's right to resell Goods or use them in the ordinary course of its business ceases immediately; and
 - (b) Company may at any time:
 - (i) require the Client to deliver up all Goods in its possession which have not been resold, or irrevocably incorporated into another product; and
 - (ii) if the Client fails to do so promptly, enter any premises of the Client or of any third party where the Goods are stored in order to recover them.

5 PROVISION OF SERVICES

- 5.1 Company shall provide the Services to the Client and shall use all reasonable endeavours to meet any performance dates for the Services specified in the Order, but any such dates shall be estimates only and time shall not be of the essence for the performance of the Services.
- 5.2 Where Company is to perform Services at the Client's premises, the Client shall procure safe access to the premises and the provision of adequate power, lighting, heating and other such facilities or supplies for Company's employees or agents in accordance with the demands of any applicable legislation and as Company shall reasonably require.
- 5.3 Company shall have the right to make any changes to the Services which are necessary to comply with any applicable law or safety requirement, or which do not materially affect the nature or quality of the Services, and Company shall notify the Client in any such event.
- 5.4 Company warrants to the Client that the Services will be provided using reasonable care and skill. If the Services do not comply with the warranty set out in this Condition 5.4, Company shall, at its option, re-perform the defective services, or refund the price of the defective Services in full.
- 5.5 The Services are addressed solely to the Client unless otherwise agreed in writing by Company. The information contained within the Deliverables shall be confidential and shall not be disclosed or relied upon for any purpose without Company's prior written consent.

6 PAYMENT

- 6.1 Subject to these Conditions, Company may invoice the Client for the Goods on or at any time after the completion of delivery. In respect of Services Company may submit interim invoices in respect of each stage of Work completed for the Client.
- 6.2 The Client shall pay each invoice submitted by Company:
 - (a) within 30 days of the date of the invoice; and
 - (b) in full and in clear funds to a bank account nominated in writing by Company; and
 - (c) time for payment shall be of the essence of the Contract.
- 6.3 Notwithstanding any other provision, all payments payable to Company under the Contract shall become due immediately upon termination of the Contract for whatever reason.
- 6.4 The Client shall make all payments due under the Contract without any deduction whether by way of set-off, withholding, counterclaim, discount, abatement or otherwise unless the Client has a valid court order requiring an amount equal to such deduction to be paid by Company to the Client.
- 6.5 If payments received from the Client are not stated to refer to a particular invoice, Company may appropriate such payment to any outstanding invoice addressed to the Client from Company.
- 6.6 No indulgence granted by Company to the Client concerning the Client's obligations under this Clause 6 shall be or be deemed to be a credit facility but if any such facility is granted to the Client by Company, Company may withdraw it at its sole discretion at any time.

- 6.7 Company reserves the right to vary the payment terms of this Contract in the event that it considers payment in advance (in part or whole) is necessary.
- 6.8 No disputes arising under the Contract nor delays beyond the reasonable control of Company shall interfere with prompt payment in full by the Client.
- 6.9 In the event of default in payment by the Client, Company shall be entitled at its option to treat the whole Contract as repudiated by the Client or to suspend all further Work on any contract or contracts between Company and the Client without notice and to charge interest on any amount outstanding at the rate of 8% per annum above the base rate of National Westminster Bank plc in force at the time when payment was due. Such interest shall accrue on a daily basis from the due date to the actual payment of the overdue amount, whether before or after judgment. The Client shall pay the interest together with the overdue amount.
- 6.10 The Client shall also pay Company's cost of collection (including legal fees and disbursements). Payments received may be applied by Company against any obligation owed by the Client to Company. Company may refuse or delay further Services if the Client fails to pay promptly any amounts due to Company.

7 CUSTOMER OBLIGATIONS

- 7.1 The Client shall;
 - (a) ensure that the terms of the order and (if submitted) the Specification is complete and accurate;
 - (b) Co-operate with in all matters relating to the Work;
 - (c) provide Company, its employees, agents, consultants and subcontractors, if required access to the Client's premises, office accommodation and other facilities as reasonably required by Company to provide the Work;
 - (d) provide Company with such information and materials as Company may reasonably require to supply the Work, and ensure that such information is accurate in all material respects;
 - (e) obtain and maintain all necessary licences, permissions and consents which may be required for the Work before the date on which the Work is to start;
 - (f) Keep and maintain all materials, equipment, documents and other property of Company (Company Materials) at the Client's premises in safe custody at its own risk, maintain Company Materials in good condition until returned to Company, and not dispose of or use Company Materials other than in accordance with Company's written instructions or authorisation; and
- 7.2 If Company's performance of any of its obligations in respect of the Work is prevented or delayed by any act or omission by the Client or failure by the Client to perform any relevant obligation (Client Default):
 - (a) Company shall without limiting its other rights or remedies have the right to suspend performance of the Work until the Client remedies the Client Default, and to rely on the Client Default to relieve it from the performance of any of its obligations to the extent the Client Default prevents or delays Company's performance of any of its obligations;
 - (b) Company shall not be liable for any costs or losses sustained or incurred by the Client arising directly or indirectly from Company's failure or delay to perform any of its obligations as set out in this Condition 7.2; and
 - (c) The Client shall reimburse Company on written demand for any costs or losses sustained or incurred by Company arising directly or indirectly from the Client Default.

8 WARRANTY AND WARRANTY LIMITATIONS

- 8.1 Company warrants that on delivery the Goods shall;
 - (a) conform in all material respects with their description and any applicable specification; and
 - (b) be free from material defects in design, material and workmanship.
- 8.2 Subject to Condition 8.3, if:
 - (a) the Client gives notice in writing to Company within a reasonable time of discovery that some or all of the Goods do not comply with the warranty set out in Condition 8.1;
 - (b) Company is given a reasonable opportunity of examining such Goods; and
 - (c) the Client (if asked to do so by Company) returns such Goods to Company's place of business at the Client's cost; and
 - (d) Company in its reasonable opinion having examined the Goods finds that the Goods do not comply with the warranty set out at Condition 8.1; Company shall, at its option, repair or replace the defective Goods, or refund the price of the defective Goods in full.
- 8.3 Company shall not be liable for the failure of Goods to comply with the warranty set out in Condition 8.1, if:
 - (a) the Client makes any further use of such Goods after giving notice in accordance with Condition 8.2; or
 - (b) the defect arises because the Client failed to follow Company's oral or written instructions as to the storage, commissioning, installation, use and maintenance of the Goods or (if there are none) good trade practice; or
 - (c) the defect arises as a result of Company following any drawing, design or the Specification supplied by the Client; or
 - (d) the Client alters or repairs such Goods without Company's written consent; or
 - (e) the defect arises as a result of fair wear and tear, wilful damage, negligence, or abnormal storage or working conditions; or

- (f) the Goods differ from the description as a result of changes made to ensure they comply with applicable statutory or regulatory standards.
- 8.4 Except as provided in this Condition 8, Company shall have no liability to the Client in respect of the failure of Goods to comply with the warranty set out in Condition 8.1.
- 8.5 These Conditions shall apply to any repaired or replacement Goods supplied by Company.
- 8.6 Except as provided in this Condition 8 and Condition 5.4, all warranties, conditions or other terms implied by statute or common law, whether written or oral, are to the fullest extent permitted by law excluded from the Contract.

9 LIABILITY/INDEMNIFICATION

- 9.1 This Condition 9 together with Condition 3, Condition 5.4 and Condition 8 set out the entire liability of Company (including any liability for the acts or omissions of its subcontractors and any member of its group) in respect of any breach of these Conditions or the Contract and any representation, statement or tortious act or omission including negligence arising under or in connection with the Contract.
- 9.2 Nothing in these Conditions shall exclude or limit Company's liability for:
 - (a) death or personal injury caused by Company's negligence, or the negligence of its employees, agents or subcontractors (as applicable);
 - (b) fraud or fraudulent misrepresentation;
 - (c) breach of the terms implied by section 12 of the Sale of Goods Act 1979;
 - (d) breach of the terms implied by section 2 of the Supply of Goods and Services Act 1982 (title and quiet position);
 - (e) defective products under the Consumer Protection Act 1987.
- 9.3 Company is not responsible for the performance, adequacy, or safety of any material, product, or process of the Client being tested or evaluated by Company. Company is not responsible for the Client's use of the information or concepts generated as part of the Services, and shall not be liable for any loss or damage resulting from such use.
- 9.4 Subject to Condition 9.2:
 - (a) Company shall not be liable to the Client, whether in contract, tort (including negligence), breach of statutory duty, or otherwise, for any loss of profit or indirect or consequential loss arising under or in connection with the Contract.
 - (b) Company's total aggregate liability to the Client arising out of, or in connection with the performance or contemplated performance of this Contract and any other agreements between the Client and Company whether in contract, tort (including negligence), breach of statutory duty or otherwise shall in no event exceed the price of the Work to which the claim relates.
- 9.5 The Client agrees to indemnify Company and each of its affiliates and their respective shareholders, directors, members, managers, officers, employees, and agents (collectively the Indemnified Parties) against all liabilities, damages, costs and expenses, including, without limitation, legal fees, consultant's fees, costs of investigation and disbursements, incurred by any Indemnified Party as a result of or in connection with any third party claim involving any product, service, operation or activity of Client.

10 CONFIDENTIAL INFORMATION AND INTELLECTUAL PROPERTY RIGHTS

- 10.1 All data, information and reports are produced for the benefit of the Client only. Company accepts no liability arising from unauthorised use of such information or reports by a third party.
- 10.2 All Intellectual Property Rights belonging to or otherwise in the control of either party prior to entering into the Contract shall remain the property of the party owning such Intellectual Property Rights.
- 10.3 All Testing Intellectual Property Rights shall be owned by the Company.
- 10.4 Save for the Testing Intellectual Property Rights, all Intellectual Property Rights in or arising out of or in connection with the Services shall be owned by the Client.
- 10.5 The Client acknowledges that, in respect of any third party Intellectual Property Rights, the Client's use of any such Intellectual Property Rights is conditional on the Company obtaining a written licence from the relevant licensor on such terms as will entitle the Company to license such rights to the Client. Unless expressly agreed in writing by Company and set out in the Order:
 - (a) the Client shall not reproduce or abstract for the purpose of advertising or otherwise any Deliverable or other information from the Work or use the name of Company either expressly or by implication in any of its advertising or sales promotional material;
 - (b) all drawings, documents, records, computer software and other information supplied by Company (Documents) are vested in and shall remain the property of Company;
 - (c) nothing in the Contract shall be deemed to have given the Client a licence or any other right to use any of Company's Intellectual Property Rights;
 - (d) the Client will not give away, loan, exhibit, sell or in any way use any Documents or extracts therefrom or copies thereof.

- 10.6 For the avoidance of any doubt if Company agrees to an assignment of any of the Intellectual Property Rights owned by Company, Company shall be granted a royalty-free, irrevocable, non-exclusive, worldwide right to use such Intellectual Property Rights assigned under this Condition 10.6 to the Client.
- 10.7 Company's confidential and sensitive information including, but not limited to, information contained in any proposal, order acknowledgment, or invoice provided by Company to the Client and the terms or existence of the Contract shall be kept confidential and shall not be disclosed by the Client to any third party or otherwise made public without Company's prior written consent, except as may be required by law in which case the Client shall notify Company of such disclosure, if legally possible, in good time prior to making the disclosure.
- 10.8 The Client shall indemnify Company against all indebtedness, costs, expenses, damages and loss (including any direct, indirect or consequential losses, loss of profit, loss of reputation and all interest, penalties and legal cost (calculated on a full indemnity basis) and other professional costs and expenses) suffered by Company arising out of or in connection with any claim by a third party against Company for the use of any material supplied by the Client or for following the Specification for an infringement of the third party's intellectual property.

11 CLIENT'S INFORMATION/SAMPLES

- 11.1 The Client shall be solely responsible for ensuring that all drawings, information, advice and recommendations given to Company, either directly or indirectly by the Client or by the Client's agents, servants, consultants or advisers, are accurate and sufficient for completion of the Work. Examination or consideration by Company of such drawings, information, advice or recommendations shall in no way limit the Client's responsibility hereunder unless Company specifically agrees in writing to accept responsibility.
- 11.2 Company shall not disclose to any third party any knowledge or information relating to the Work which is, on receipt by Company, marked 'confidential' by the Client for a period of five (5) years, or unless and until such information becomes public knowledge, whichever is earlier.
- 11.3 Company retains the right to return or dispose of the samples at the Client's cost after a period of 6 months unless otherwise agreed with the Client. Storage of the samples beyond the initial 6 month period will be charged for, invoiced in advance for the agreed period (minimum additional 6 months).

12 TERMINATION

- 12.1 Company may, as it thinks fit, (without prejudice to any other rights or remedies it may have against the Client) immediately suspend further performance of the Contract or cancel any outstanding provision of the Work or any other contract between the Client and Company by notice in writing to the Client without incurring any liability to the Client and all outstanding sums in respect of the Work delivered to the Client shall become immediately due if:
 - (a) the Client suspends, or threatens to suspend, payment of its debts or is unable to pay its debts as they fall due or admits inability to pay its debts or (being a company) is deemed unable to pay its debts within the meaning of section 123 of the Insolvency Act 1986, or (being a partnership) has any partner to whom any of the foregoing apply;
 - (b) the Client commences negotiations with all or any class of its creditors with a view to rescheduling any of its debts, or makes a proposal for or enters into any compromise or arrangement with its creditors other than (where the Client is a company) these events take place for the sole purpose of a scheme for a solvent amalgamation of the Client with one or more other companies or the solvent reconstruction of the Client;
 - (c) a creditor or encumbrancer of the Client attaches or takes possession of, or a distress, execution, sequestration or other such process is levied or enforced on or sued against, the whole or any part of its assets and such attachment or process is not discharged within 14 days;
 - (d) an application is made to court, or an order is made, for the appointment of an administrator or if a notice of intention to appoint an administrator is given or if an administrator is appointed over the Client;
 - (e) a floating charge holder over the assets of the Client has become entitled to appoint or has appointed an administrative receiver;
 - (f) a person becomes entitled to appoint a receiver over the assets of the Client or a receiver is appointed over the assets of the Client;
 - (g) any event occurs, or proceeding is taken, with respect to the Client in any jurisdiction to which it is subject that has an effect equivalent or similar to any of the events mentioned in Condition 12(a) to 12(f) (inclusive);
 - (h) the Client suspends, threatens to suspend, ceases or threatens to cease to carry on all or substantially the whole of its business;
 - (i) the Client commits a material breach of any of its obligations under the Contract which is incapable of remedy;
 - (j) any sum payable under the Contract is not paid within 7 days of its due date for payment in accordance with this Contract;
 - (k) the Client fails to remedy a breach of its obligations under the Contract (except as to payment) which is capable of remedy, or persists in any breach of any of its obligations under the Contract after having been requested in writing by Company to remedy or desist from such breach within a period of 14 days.

13 FORCE MAJEURE

Company shall not be in breach of this Contract or liable for delay in performing, or failing to perform any obligation under this Contract arising from or attributable to acts, events, omissions or accidents beyond its reasonable control, including but not being limited to any of the following: by direction of government, war, industrial dispute, strike, breakdown of machinery or plant, acts of God, terrorism, riot, flood, storms, earthquakes, extreme adverse weather conditions, lock-outs, accident, fire (any one a Force Majeure Event). If the Force Majeure Event prevails for a continuous period of more than 2 months, Company may terminate this Contract by giving 14 days' written notice to all the other parties. On the expiry of this notice period, the Contract will terminate. Such termination shall be without prejudice to the rights of the parties in respect of any breach of this Contract occurring prior to such termination. Company shall be entitled to recover all sums owing to it in respect of the Work provided and costs incurred prior to the date of termination.

14 OBLIGATION ON TERMINATION

- 14.1 On termination of the Contract for any reason;
- (a) the Client shall immediately pay to Company all of Company's outstanding unpaid invoices and interest and, in respect of Work supplied but for which no invoice has yet been submitted, Company shall submit an invoice, which shall be payable by the Client immediately on receipt;
 - (b) the Client shall return all of Company Materials and any deliverables which have not been fully paid for. If the Client fails to do so, then Company may enter the Client's premises and take possession of them. Until they have been returned, the Client shall be solely responsible for their safe keeping and will not use them for any purpose not connected with the Contract;
 - (c) the accrued rights and remedies of the parties as at termination shall not be affected, including the right to claim damages in respect of any breach of the Contract which existed at or before the date of termination or expiry; and
 - (d) Conditions which expressly or by implication have effect after termination shall continue in full force and effect

15 GENERAL/LEGAL

- 15.1 All agreements contained herein shall apply to and bind the assignees and successors in interest of Company and the Client. Facsimile signatures or other reliable means of authentication by which the Client signifies its assent to this Agreement shall be effective to bind the Client to this Contract.
- 15.2 The waiver by Company of any right or remedy under the Contract is only effective if given in writing and shall not be deemed to be a waiver of any later breach or default. No failure or delay by Company to exercise any right or remedy provided under the Contract or by law shall constitute a waiver of that or any other right or remedy, nor shall it preclude or restrict the further exercise of that or any right or remedy. No single or partial exercise of such right or remedy shall preclude or restrict the further exercise of that or any other right or remedy.
- 15.3 If any court or competent authority finds that any provision or part provision of this Contract is invalid, illegal or unenforceable, that provision or part provision shall to the extent required, be deemed to be deleted, and the validity and enforceability of the other provisions of the Contract shall not be affected. If any invalid, unenforceable or illegal provision of the Contract would be valid, enforceable and legal if some part of it were deleted, the provision shall apply with the minimum modification necessary to make it legal, valid and enforceable.
- 15.4 The headings are used for the convenience of the parties only and shall not affect the construction or interpretation of this Contract. Any clerical errors are subject to correction.
- 15.5 The Contract and any dispute or claim arising out of or in connection with it shall be governed and interpreted exclusively according to the Law of England and shall be subject to the exclusive jurisdiction of the English Courts to which the parties irrevocably submit.
- 15.6 Notwithstanding any different or additional terms or conditions contained in the Client's purchase order or other communication, Company accepts the Client's order only on the condition that the Client expressly accepts and assents to the terms and conditions contained in this Contract. The Client's acceptance of any Work shall be deemed to be acceptance of these Conditions.
- 15.7 Company may at any time assign, charge, subcontract, transfer or deal in any other manner with all or any of its rights or obligations under the Contract or any part of it to any person. The Client may not assign, charge, subcontract, transfer or deal in any other manner with all or any of its rights or obligations under the Contract without the prior written consent of Company.
- 15.8 A person who is not a party to the Contract (including without limitation any employee, officer, agent, representative or subcontractor or either party) shall not have any right to enforce any term of the Contract which expressly or by implication confers a benefit on that person without the express prior written agreement of Company and the Client.
- 15.9 All notices between the parties relating to this Contract must be in writing and sent pre-paid first class or sent by facsimile or email to:

- (a) in the case of the Client the registered office of the addressee (if it is a company) or (in any other case) to any address, facsimile number or email address of the Client set out in any document which forms part of the Contract or such other address as shall be notified to Company by the Client in writing; and
- (b) in the case of Company, the address set out below:

Smithers MSE Limited
Shawbury
Shrewsbury
Shropshire SY4 4NR
UK
Telephone: +44 (0)1939 250383
Email Address: SHWReception@smithers.com

- or other such address, facsimile number or email address as shall be notified to the Client by Company in writing.
- 15.10 Notices shall be deemed to have been received: in the case of first class post, 2 days after posting (exclusive of the day of posting) and if sent by facsimile or email transmission, at 10:00 am local time on the first usual Working Day in the country of receipt following transmission, subject to being able to show that the notice was sent to the correct facsimile number or email address.
 - 15.11 Nothing in this Contract is intended to, or shall be deemed to, establish any partnership or joint venture between any of the parties, constitute any party the agent of another party, nor authorise any party to make or enter into any commitments for or on behalf of any other party.
 - 15.12 The Contract constitutes the entire agreement between the parties. The Client acknowledges that it has not relied on any statement, promise or representation made or given by or on behalf of Company which is not set out in the Contract. Any samples, drawings, descriptive matter or advertising issued by Company and any descriptions or illustrations contained in Company's catalogues or brochures are issued or published for the sole purpose of giving an approximate idea of the Services described in them. They shall not form part of the Contract or any other contract between Company and the Client for the sale of the Goods or the provision of Services.
 - 15.13 In performing the Services, Company shall operate as, and have the status of, an independent contractor and shall not operate or have the status of agent, employee or representative of the Client.
 - 15.14 Solicitation of Employees. During the performance of the Contract and for a period of one year thereafter, the Client shall not, directly or indirectly, solicit the services of or hire any of the employees of The Smithers Group, Inc. or its affiliated companies for the direct or indirect benefit of client or any third party. Client understands and acknowledges that this obligation regarding solicitation is necessary and reasonable to protect legitimate business interests.

16 ANTI-BRIBERY

- 16.1 The Client shall:
 - (a) comply with all applicable laws, statutes, regulations and codes relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010 (Relevant Requirements);
 - (b) not engage in any activity, practice or conduct which would constitute an offence under sections 1, 2 or 6 of the Bribery Act 2010 if such activity, practice or conduct had been carried out in the UK;
 - (c) comply with any Anti-Bribery Policy as Company may provide to it from time to time (Relevant Policy);
 - (d) have and shall maintain in place throughout the term of this Agreement its own policies and procedures, including adequate procedures under the Bribery Act 2010, to ensure compliance with the Relevant Requirements, the Relevant Policy and Condition 16.1(b) and will enforce them where appropriate;
 - (e) promptly report to Company any request or demand for any undue financial or other advantage of any kind received by the Client in connection with the performance of this Agreement;
 - (f) immediately notify Company in writing if a foreign public official becomes an officer or employee of the Client or acquires a direct or indirect interest in the Client, and the Client warrants that it has no foreign public officials as officers, employees or direct or indirect owners at the date of this Agreement;
 - (g) the Client shall provide such supporting evidence of compliance as Company may reasonably request.
- 16.2 The Client shall ensure that any person associated with it who is performing Services or providing Goods in connection with this Agreement does so only on the basis of a written contract which imposes on and secures from such person terms equivalent to those imposed on the Client in this Condition 16 (Relevant Terms). The Client shall be responsible for the observance and performance by such persons of the Relevant Terms, and shall be directly liable to Company for any breach by such persons of any of the Relevant Terms.
- 16.3 For the purpose of this Condition 16, the meaning of adequate procedures and foreign public official and whether a person is associated with another person shall be determined in accordance with section 7(2) of the Bribery Act 2010 (and any guidance issued under section 9 of that Act), sections 6(5) and 6(6) of that Act and section 8 of that Act respectively. For the purpose of this Condition 16, a person associated with the Client includes but is not limited to any Sub-Contractor.

17 DATA PROTECTION

- 17.1 To the extent a Client provides Personal Data (as hereafter defined) to the Company in connection with Company's Work on behalf of the Client, both parties will comply with the following conditions and all applicable requirements of the Data Protection Legislation (as hereafter defined). This Clause 17 is in addition to, and does not relieve, remove or replace, a party's obligations under the Data Protection Legislation, or other similar laws to which the party is subject. "Personal Data" means any information relating to an identified or identifiable natural person living within the European Economic Area.
- 17.2 The parties acknowledge that for the purposes of the Data Protection Legislation, where the Client transfers the Personal Data of a third party to the Company for processing as part of the provision of Company's Goods or Services to the Client, the Client is the Data Controller and the Company is the Data Processor (where "*Data Controller*" and "*Data Processor*" have the meanings defined in the Data Protection Legislation).
- 17.3 Without prejudice to the generality of the foregoing clauses, the Client will ensure that it has all necessary appropriate consents and notices in place to enable lawful transfer of the Personal Data to the Company for the duration and purposes of this Contract.
- 17.4 As used herein, "Data Protection Legislation" shall mean the General Data Protection Regulation (GDPR) and any applicable national implementing laws, regulations and secondary legislation, and subsequent successor legislation.