

Type Approval Certificate

Certificate Nº TAC-1266-309-2201-ISO

Issue Date: 21st March 2022

Valid Until 20th March 2032

Manufacturer S-Advanced materials CO., LTD

Manufacturer's Mark

Address 53, Buan 3nonggingdanji-gil, Haengan-myeon,
Buan-gun, Jeollabuk-do, 56303



Country Korea

Regulation[s]: Not Applicable

Design Specification: ISO 11119-3:2013

Cylinder Type: Fully wrapped carbon fibre composite cylinder with non-metallic liner

Drawing Nº: 103201-000100 (Model TA350TM190S)

Revision: 0

Test Pressure:	525	bar	Service Pressure:	350	bar
Minimum Burst Pressure:	1,050	bar	Outside Diameter:	472	mm
Overall Length:	1,540	mm	Volume:	190	L

Design Material: HDPE Liner and Composite Overwrap Material Carbon with Epoxy Resin

Contents: Hydrogen (UN 1049), Compressed Natural Gas (UN 1971), Nitrogen (UN 1066) & Compressed Air (UN 1002)

Additional Information: Model has been designed and tested in accordance with the requirements of ISO 11119-3:2013 for 20-year service life
Prototype tested with 1 1/8-12 UNF 2B threadform
Bonfire tested without PRDs fitted

Revision Nº	Revision History

Details of the results of the examination of the cylinder for type approval and the main features of the type are attached. The undersigned certifies that the cylinder type described above conforms to the requirements of ISO 11119-3:2013.

Beatriz Campos
Certifying Inspector

Signature

Arrowhead Industrial Services Limited
Meadow Drove Business Centre, Bourne, Lincolnshire, PE10 0BP, UK

ADR Inspection Body: Xa (Type A)

Inspector's Mark





List of Technical Documents For Type Approval

Type Approval Number TAC-1266-309-2201-ISO – Supporting Technical Documents

Nº	Documents	References
1	Application for Type Approval	Application dated 10 th March 2022
2	Cylinder Drawings	103201-000100 Rev 0
3	Liner Drawing	302300-000100 Rev 0
4	Stamp Mark Drawing	800102-050100
5	Stage 2 Test Review	TA350TM190S Stage 2 Test Review ISO 11119-3
6	Liner Material Tests	SAM-TA350-01 Page 6
7	Resin Shear Test	SAM-TA350-01 Pages 11-12
8	Boss Hardness Tests	SAM-TA350-01 Page 10
9	Hydraulic Pressure Test	SAM-TA350-01 Pages 16-20
10	Cylinder Burst	SAM-TA350-01 Pages 21-29
11	Liner Burst	SAM-TA350-01 Pages 153-159
12	Ambient Cycle	SAM-TA350-01 Pages 30-42
13	Vacuum test	Not performed – warning applied to label
14	Environmental cycle	SAM-TA350-01 Pages 43-51
15	Stress rupture test	N/A – No glass/aramid fibre load sharing
16	Flaw test	SAM-TA350-01 Pages 52-69
17	Drop test	SAM-TA350-01 Pages 70-86
18	High velocity impact test	SAM-TA350-01 Pages 87-90
19	Fire resistance test	SAM-TA350-01 Pages 91-98
20	Permeability test	SAM-TA350-01 Pages 99-103
21	Torque test	SAM-TA350-01 Pages 104-114
22	Salt water test	N/A – Not underwater application
23	Leak test	SAM-TA350-01 Pages 115-121
24	Pneumatic cycle test	SAM-TA350-01 Pages 122-152 & 20220207_Report No 1527_v3+Appendix (Unabridged & Cal Records)
25	Water boil test	N/A – Not Type 5 linerless construction