

ARROWHEAD INDUSTRIAL SERVICES USA, INC.
COMPRESSED GAS CONTAINER SPECIALIST
3537 South 119, P.O. BOX 1000
GRAHAM, N.C. 27253
USA

REPORT OF INSPECTION OF GAS CONTAINERS

Nov 27, 2019

Manufactured for Luxfer Gas Cylinders, Divn. of Luxfer, Inc.
Location at Graham, North Carolina 27253

Manufactured by Luxfer Gas Cylinders, Divn. of Luxfer, Inc.
Location at Graham, North Carolina 27253

Consigned to Luxfer Gas Cylinders, Divn. of Luxfer, Inc.
Location at Graham, North Carolina 27253

Quantity 60 Size 5.25 inches(133.35mm) outside diameter by 14.24 inches(361.696mm) long.
VOLUME: 205.0 CU.IN.(3.36 Liter)

Marks stamped into the shoulder of the cylinders.

Specifications: TC-3ALM 124
DOT-3AL 1800

Serial Numbers X760294 to X760353 inclusive

Inspector's Mark



Identifying Symbol (registered) M4141

Test Date 11  19

Tare Weights (yes or no) YES

Other Marks (if any) T3.5KG, TW7.60, LUXFER
5#C02

These containers were made by process of backwards extrusion, induction heating and closing. These cylinders were heat treated by the process of solution heat treat and aging. The material used was identified by the following alloy numbers: 6061 authorized in Table 1 in DOT Specification 3AL (10-1-19 edition) and/or Table 7.1 in TC Specification 3ALM (B339-18). The material used was verified as to chemical analysis and record thereof is attached hereto. The heat codes were marked on the material. See hydrostatic test sheets.

All billets were inspected and each container was inspected both before and after closing in the ends; all that was accepted was found free from seams, cracks, laminations, and other defects which might prove injurious to the strength of the container. The process of manufacture and heat treatment of containers were supervised and found to be effective and satisfactory.

The container walls were measured and the minimum thickness noted was 0.209 inch(5.309mm). The outside diameter was determined by a close approximation to be 5.25 inches(133.35mm). The wall stress was calculated to be 32156 pounds per square inch (221.708 MPa) under an internal pressure of 3000 pounds per square inch (20.684 MPa).

Hydrostatic test, flattening tests, tensile tests of material, and other tests as prescribed in specification No. DOT-3AL and/or TC-3ALM were made in the presence of the inspector and all material and containers accepted were found to be in compliance with the requirements of that specification. Records thereof are attached hereto.

I hereby certify that all of these containers proved satisfactory in every way and comply with the requirements of Department of Transportation Specification No. 3AL and Transport Canada Specification No.3ALM except as follows:
Exceptions:

Conversions: PSI / 145.0377 = MPa; PSI X 0.06895 = Bar; Lbs X 0.45359 = Kg;
Cu In X .01639 = Liters

ARROWHEAD INDUSTRIAL SERVICES USA, INC.

Inspector: Brandon P. Ashe

Certifying Inspector

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Form 100-1C

ARROWHEAD INDUSTRIAL SERVICES, INC.
RECORD OF CHEMICAL ANALYSIS IN WEIGHT PERCENT FOR ALUMINUM COMPRESSED GAS CYLINDERS

MANUFACTURED BY Luxfer Gas Cylinders, Divn. of Luxfer, Inc.
FOR Luxfer Gas Cylinders, Divn. of Luxfer, Inc.
NUMBERED X760294 TO X760353 INCLUSIVE

REPORT DATE: November 27, 2019
SYMBOL LUXFER
ALUMINUM ALLOY 6061

MILL HEAT CODE*	HEAT NO.	CHECK ANALYSIS NUMBER	CU	SI	FE	MN	MG	ZN	TI	GA	NI	PB	SN	BI	V	CR
290 (S)	19658401		0.25	0.63	0.17	0.02	0.91	0.00	0.02	0.01		0.001	0.000	0.000		0.082

ALUMINUM WAS MANUFACTURED AND MILL ANALYSIS MADE BY:

(A) ALUMAX OF SOUTH CAROLINA INC., GOOSE CREEK, SC.

(K) KAISER ALUMINUM, HEATH, OH.

(SA) SAPA EXTRUSIONS INC., THE DALLES, OR.

(S) SHAWINAGAN ALUMINUM INC., CANADA

THE ORIGINALS OF CERTIFIED MILL ANALYSIS AND CHECK ANALYSIS REPORTS ARE IN THE FILES OF THE MANUFACTURERS.

** CHECK ANALYSIS MADE BY CENTURY ALUMINUM SEBREE, KENTUCKY

* APPLICABLE CODES ARE STAMPED INTO EACH CYLINDER

WPS Global 6061-001 issue 02, 12th October 2007

Brendan P. Ashe 

ARROWHEAD INDUSTRIAL SERVICES USA, INC.
GRAHAM, NC

ARROWHEAD INDUSTRIAL SERVICES, INC.
RECORD OF PHYSICAL ANALYSIS FOR COMPLETED CYLINDERS

MANUFACTURED BY Luxfer Gas Cylinders, Divn. of Luxfer, Inc.
FOR Luxfer Gas Cylinders, Divn. of Luxfer, Inc.
NUMBERED X760294 TO X760353 INCLUSIVE

REPORT DATE: November 27, 2019
SYMBOL LUXFER

LOT CODE*	CYLINDERS REPRESENTED SERIAL NOS.	YIELD STRENGTH AT 0.2% OFFSET (POUNDS/SQ.IN.)	TENSILE STRENGTH (POUNDS/SQ.IN.)	ELONGATION % IN 2.0"***	7/8" RADIUS FLATTENING TEST
U049	X760294 THRU X760353	45448 44420	52144 51989	19.0 20.5	PASSED 9T FLAT TEST

* APPLICABLE CODES ARE STAMPED INTO EACH CYLINDER
** TENSILE TESTS MADE ON 0.5" WIDTH BY 2.0" GAUGE LENGTH. ASTM B557

Specimen Type Gauge Length Width Thickness
Type A 50mm 37 mm max full wall thickness

Brian P. Ashe 

ARROWHEAD INDUSTRIAL SERVICES USA, INC.
GRAHAM, NC

ARROWHEAD INDUSTRIAL SERVICES, INC.
RECORD OF HYDROSTATIC TESTS OF ALUMINUM COMPRESSED GAS CYLINDERS

HYDROSTATIC TEST PRESSURE MAINTAINED FOR MINIMUM 30 SECONDS
MANUFACTURED BY Luxfer Gas Cylinders, Divn. of Luxfer, Inc.
FOR Luxfer Gas Cylinders, Divn. of Luxfer, Inc.

TEST PRESSURE: 207 BAR

NUMBERED X760294 TO X760353 INCLUSIVE

CYLINDER S/N	CAST CODE	HEAT LOT	TARE WEIGHT (KG)	WATER CAPACITY (KG)	TOTAL EXPANSION (CC)	PERMANENT EXPANSION (CC)	ELASTIC EXPANSION (CC)	RATIO %	CODE	HYDRO TEST DATE
X760294	290	U049	2.90	3.48	21.00	1.10	19.90	5.24	0	27 Nov 2019
X760295	290	U049	2.90	3.49	21.20	1.00	20.20	4.72	0	27 Nov 2019
X760296	290	U049	2.90	3.49	20.50	0.10	20.40	0.49	0	27 Nov 2019
X760297	290	U049	2.90	3.55	21.10	0.90	20.20	4.27	0	27 Nov 2019
X760298	290	U049	2.90	3.52	21.50	0.90	20.60	4.19	0	27 Nov 2019
X760299	290	U049	2.90	3.50	21.20	0.50	20.70	2.36	0	27 Nov 2019
X760300	290	U049	2.90	3.50	21.70	0.10	21.60	0.46	0	27 Nov 2019
X760301	290	U049	2.90	3.51	21.10	0.50	20.60	2.37	0	27 Nov 2019
X760302	290	U049	2.93	3.46	20.90	0.50	20.40	2.39	0	27 Nov 2019
X760303	290	U049	2.90	3.50	20.80	0.40	20.40	1.92	0	27 Nov 2019
X760304	290	U049	2.91	3.50	21.00	0.90	20.10	4.29	0	27 Nov 2019
X760305	290	U049	2.91	3.49	20.60	0.40	20.20	1.94	0	27 Nov 2019
X760306	290	U049	2.92	3.48	20.50	0.50	20.00	2.44	0	27 Nov 2019
X760307	290	U049	2.88	3.48	20.60	0.40	20.20	1.94	0	27 Nov 2019
X760308	290	U049	2.88	3.50	20.50	1.00	19.50	4.88	0	27 Nov 2019
X760309	290	U049	2.88	3.50	20.80	0.50	20.30	2.40	0	27 Nov 2019
X760310	290	U049	2.88	3.51	20.60	0.20	20.40	0.97	0	27 Nov 2019
X760311	290	U049	2.90	3.49	20.60	0.60	20.00	2.91	0	27 Nov 2019
X760312	290	U049	2.90	3.51	20.80	0.90	19.90	4.33	0	27 Nov 2019
X760313	290	U049	2.90	3.50	21.10	0.80	20.30	3.79	0	27 Nov 2019
X760314	290	U049	2.91	3.49	20.90	0.60	20.30	2.87	0	27 Nov 2019
X760315	290	U049	2.94	3.44	20.70	0.10	20.60	0.48	0	27 Nov 2019
X760316	290	U049	2.94	3.46	20.70	0.40	20.30	1.93	0	27 Nov 2019
X760317	290	U049	2.91	3.49	20.80	0.50	20.30	2.40	0	27 Nov 2019
X760318	290	U049	2.90	3.49	20.70	0.10	20.60	0.48	0	27 Nov 2019
X760319	290	U049	2.93	3.46	21.20	0.10	21.10	0.47	0	27 Nov 2019
X760320	290	U049	2.90	3.48	21.00	0.50	20.50	2.38	0	27 Nov 2019
X760321	290	U049	2.91	3.48	21.30	0.60	20.70	2.82	0	27 Nov 2019
X760322	290	U049	2.88	3.45	21.10	0.50	20.60	2.37	0	27 Nov 2019
X760323	290	U049	2.91	3.49	21.40	0.10	21.30	0.47	0	27 Nov 2019
X760324	290	U049	2.90	3.48	20.80	0.50	20.30	2.40	0	27 Nov 2019
X760325	290	U049	2.90	3.49	20.60	0.80	19.80	3.88	0	27 Nov 2019
X760326	290	U049	2.91	3.49	20.80	0.10	20.70	0.48	0	27 Nov 2019
X760327	290	U049	2.90	3.48	20.60	0.70	19.90	3.40	0	27 Nov 2019
X760328	290	U049	2.90	3.50	20.80	0.40	20.40	1.92	0	27 Nov 2019
X760329	290	U049	2.90	3.45	21.60	0.10	21.50	0.46	0	27 Nov 2019
X760330	290	U049	2.91	3.49	21.20	0.00	21.20	0.00	0	27 Nov 2019
X760331	290	U049	2.89	3.52	21.40	0.90	20.50	4.21	0	27 Nov 2019
X760332	290	U049	2.91	3.49	20.90	0.50	20.40	2.39	0	27 Nov 2019
X760333	290	U049	2.90	3.48	20.70	0.70	20.00	3.38	0	27 Nov 2019
X760334	290	U049	2.91	3.48	20.70	0.60	20.10	2.90	0	27 Nov 2019
X760335	290	U049	2.91	3.47	20.70	0.20	20.50	0.97	0	27 Nov 2019
X760336	290	U049	2.91	3.47	20.60	0.30	20.30	1.46	0	27 Nov 2019
X760337	290	U049	2.90	3.48	20.60	0.50	20.10	2.43	0	27 Nov 2019
X760338	290	U049	2.91	3.49	21.00	1.00	20.00	4.76	0	27 Nov 2019
X760339	290	U049	2.91	3.50	21.40	0.80	20.60	3.74	0	27 Nov 2019
X760340	290	U049	2.91	3.50	20.90	0.50	20.40	2.39	0	27 Nov 2019
X760341	290	U049	2.91	3.49	21.50	0.10	21.40	0.47	0	27 Nov 2019
X760342	290	U049	2.91	3.49	21.00	0.80	20.20	3.81	0	27 Nov 2019
X760343	290	U049	2.90	3.46	20.70	1.10	19.60	5.31	0	27 Nov 2019
X760344	290	U049	2.90	3.52	21.10	1.10	20.00	5.21	0	27 Nov 2019
X760345	290	U049	2.90	3.53	21.20	1.00	20.20	4.72	0	27 Nov 2019
X760346	290	U049	2.91	3.49	21.80	0.60	21.20	2.75	0	27 Nov 2019
X760347	290	U049	2.90	3.51	20.90	0.50	20.40	2.39	0	27 Nov 2019
X760348	290	U049	2.90	3.50	21.10	1.10	20.00	5.21	0	27 Nov 2019
X760349	290	U049	2.90	3.51	21.50	1.00	20.50	4.65	0	27 Nov 2019
X760350	290	U049	2.91	3.49	20.70	0.90	19.80	4.35	0	27 Nov 2019
X760351	290	U049	2.91	3.49	20.90	0.80	20.10	3.83	0	27 Nov 2019
X760352	290	U049	2.91	3.50	20.90	0.50	20.40	2.39	0	27 Nov 2019
X760353	290	U049	2.91	3.49	20.80	0.80	20.00	3.85	0	27 Nov 2019

CODES

- 0 FOR CYLINDERS WEIGHED WITHOUT VALVES
- 1 FOR CYLINDERS WEIGHED WITH VALVES
- 2 FOR CYLINDERS WEIGHED WITH VALVES AND HANDLES
- 3 FOR CYLINDERS WEIGHED WITH PERMANENT NECK RINGS
- 4 FOR CYLINDERS WEIGHED WITH VALVES AND COLLARS

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<END REPORT>