P/N-C-C005 Report No: L 53265

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 97 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 X760196 to X760292 inclusive

Inspector's Mark 

Identifying Symbol (registered) M4141

Test Date 11  19

Tare Weights (yes or no) YES

Other Marks (if any) T3.46KG, TW7.61
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

Digitally signed by Brandon P. Ashe
Date: 2019.11.27 12:56:43 -05'00'

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 X760196 TO X760292 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

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 X760196 TO X760292 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	X760196	THRU X760292	45448	52144	19.0	PASSED
			44420	51989	20.5	9T FLAT TEST

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

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

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 X760196 TO X760292 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
*X760196	290	U049	2.89	3.50	21.80	0.50	21.30	2.29	0	26 Nov 2019
X760197	290	U049	2.89	3.51	21.40	0.80	20.60	3.74	0	26 Nov 2019
X760198	290	U049	2.91	3.51	20.70	0.40	20.30	1.93	0	26 Nov 2019
X760199	290	U049	2.91	3.51	21.10	0.80	20.30	3.79	0	26 Nov 2019
*X760200	290	U049	2.90	3.49	21.90	1.00	20.90	4.57	0	26 Nov 2019
*X760201	290	U049	2.89	3.48	22.20	1.10	21.10	4.95	0	26 Nov 2019
X760202	290	U049	2.92	3.50	20.90	0.50	20.40	2.39	0	26 Nov 2019
X760203	290	U049	2.91	3.51	20.80	0.30	20.50	1.44	0	26 Nov 2019
X760204	290	U049	2.91	3.52	21.00	1.00	20.00	4.76	0	26 Nov 2019
X760205	290	U049	2.91	3.52	21.30	1.10	20.20	5.16	0	26 Nov 2019
X760206	290	U049	2.92	3.49	19.60	0.80	18.80	4.08	0	26 Nov 2019
X760207	290	U049	2.92	3.50	21.20	1.00	20.20	4.72	0	26 Nov 2019
X760208	290	U049	2.91	3.52	20.70	1.00	19.70	4.83	0	26 Nov 2019
X760209	290	U049	2.92	3.51	21.00	1.00	20.00	4.76	0	26 Nov 2019
X760210	290	U049	2.91	3.51	21.10	1.10	20.00	5.21	0	26 Nov 2019
X760211	290	U049	2.91	3.51	19.40	1.00	18.40	5.15	0	26 Nov 2019
X760212	290	U049	2.91	3.52	21.20	1.10	20.10	5.19	0	26 Nov 2019
X760213	290	U049	2.90	3.52	21.00	1.10	19.90	5.24	0	26 Nov 2019
X760214	290	U049	2.87	3.52	21.30	1.00	20.30	4.69	0	26 Nov 2019
X760215	290	U049	2.91	3.52	20.90	1.10	19.80	5.26	0	26 Nov 2019
X760216	290	U049	2.92	3.50	19.80	1.10	18.70	5.56	0	26 Nov 2019
X760217	290	U049	2.91	3.49	21.30	1.10	20.20	5.16	0	26 Nov 2019
X760218	290	U049	2.91	3.52	20.70	1.00	19.70	4.83	0	26 Nov 2019
X760219	290	U049	2.92	3.52	21.00	1.10	19.90	5.24	0	26 Nov 2019
X760220	290	U049	2.91	3.52	19.60	0.90	18.70	4.59	0	26 Nov 2019
X760221	290	U049	2.91	3.52	20.10	1.10	19.00	5.47	0	26 Nov 2019
X760222	290	U049	2.91	3.52	21.20	1.10	20.10	5.19	0	26 Nov 2019
X760223	290	U049	2.91	3.52	20.90	1.00	19.90	4.78	0	26 Nov 2019
X760224	290	U049	2.91	3.51	21.00	1.00	20.00	4.76	0	26 Nov 2019
X760225	290	U049	2.91	3.52	21.00	1.10	19.90	5.24	0	26 Nov 2019
X760226	290	U049	2.91	3.52	19.40	0.80	18.60	4.12	0	26 Nov 2019
X760227	290	U049	2.91	3.52	21.20	1.00	20.20	4.72	0	26 Nov 2019
X760228	290	U049	2.91	3.52	21.00	1.00	20.00	4.76	0	26 Nov 2019
X760229	290	U049	2.91	3.52	21.20	1.00	20.20	4.72	0	26 Nov 2019
X760230	290	U049	2.92	3.52	21.40	1.00	20.40	4.67	0	26 Nov 2019
X760231	290	U049	2.91	3.51	19.90	0.80	19.10	4.02	0	26 Nov 2019
X760232	290	U049	2.92	3.50	21.10	1.10	20.00	5.21	0	26 Nov 2019
X760233	290	U049	2.86	3.52	21.30	1.00	20.30	4.69	0	26 Nov 2019
X760234	290	U049	2.91	3.52	20.90	1.00	19.90	4.78	0	26 Nov 2019
X760235	290	U049	2.91	3.52	21.20	1.10	20.10	5.19	0	26 Nov 2019
X760236	290	U049	2.90	3.52	19.50	1.00	18.50	5.13	0	26 Nov 2019
X760237	290	U049	2.91	3.52	21.10	1.00	20.10	4.74	0	26 Nov 2019
X760238	290	U049	2.91	3.51	20.80	1.00	19.80	4.81	0	26 Nov 2019
X760239	290	U049	2.91	3.52	20.90	1.10	19.80	5.26	0	26 Nov 2019
X760240	290	U049	2.91	3.52	21.00	0.80	20.20	3.81	0	26 Nov 2019
X760241	290	U049	2.91	3.53	19.60	1.10	18.50	5.61	0	26 Nov 2019
X760242	290	U049	2.92	3.48	21.20	1.00	20.20	4.72	0	26 Nov 2019
X760243	290	U049	2.91	3.51	20.50	1.00	19.50	4.88	0	26 Nov 2019
X760244	290	U049	2.92	3.52	21.30	1.10	20.20	5.16	0	26 Nov 2019
X760245	290	U049	2.91	3.52	21.20	1.10	20.10	5.19	0	26 Nov 2019
X760246	290	U049	2.91	3.52	19.60	0.80	18.80	4.08	0	26 Nov 2019
X760247	290	U049	2.92	3.50	21.00	1.10	19.90	5.24	0	26 Nov 2019
X760248	290	U049	2.91	3.52	20.80	1.10	19.70	5.29	0	26 Nov 2019
X760249	290	U049	2.90	3.51	20.90	1.10	19.80	5.26	0	26 Nov 2019
X760250	290	U049	2.91	3.53	21.10	1.00	20.10	4.74	0	26 Nov 2019
X760251	290	U049	2.91	3.52	19.80	1.00	18.80	5.05	0	26 Nov 2019
X760252	290	U049	2.91	3.52	21.30	1.00	20.30	4.69	0	26 Nov 2019
X760253	290	U049	2.91	3.52	20.90	1.00	19.90	4.78	0	26 Nov 2019
X760254	290	U049	2.92	3.50	21.00	1.00	20.00	4.76	0	26 Nov 2019
X760255	290	U049	2.90	3.53	20.90	0.80	20.10	3.83	0	26 Nov 2019
X760256	290	U049	2.91	3.52	20.20	1.10	19.10	5.45	0	26 Nov 2019
X760257	290	U049	2.91	3.52	21.20	1.00	20.20	4.72	0	26 Nov 2019
X760258	290	U049	2.91	3.52	20.90	1.10	19.80	5.26	0	26 Nov 2019
X760259	290	U049	2.90	3.53	21.00	1.10	19.90	5.24	0	26 Nov 2019
X760260	290	U049	2.91	3.51	21.20	1.10	20.10	5.19	0	26 Nov 2019
X760261	290	U049	2.91	3.52	19.90	1.00	18.90	5.03	0	26 Nov 2019
X760262	290	U049	2.91	3.52	21.30	1.00	20.30	4.69	0	26 Nov 2019
X760263	290	U049	2.91	3.52	21.10	1.10	20.00	5.21	0	26 Nov 2019
X760264	290	U049	2.91	3.52	21.00	1.00	20.00	4.76	0	26 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
* CYLINDER RETESTED AT 214 BAR

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 X760196 TO X760292 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
X760265	290	U049	2.91	3.51	21.30	1.00	20.30	4.69	0	26 Nov 2019
X760266	290	U049	2.91	3.53	20.20	1.00	19.20	4.95	0	26 Nov 2019
X760267	290	U049	2.91	3.52	21.30	1.00	20.30	4.69	0	26 Nov 2019
X760268	290	U049	2.91	3.50	20.80	1.10	19.70	5.29	0	26 Nov 2019
X760269	290	U049	2.91	3.52	21.10	1.10	20.00	5.21	0	26 Nov 2019
X760270	290	U049	2.91	3.50	21.00	1.00	20.00	4.76	0	26 Nov 2019
X760271	290	U049	2.91	3.51	20.20	1.00	19.20	4.95	0	26 Nov 2019
X760272	290	U049	2.91	3.51	21.30	1.00	20.30	4.69	0	26 Nov 2019
X760273	290	U049	2.90	3.53	20.80	1.00	19.80	4.81	0	26 Nov 2019
X760274	290	U049	2.90	3.52	20.80	1.00	19.80	4.81	0	26 Nov 2019
X760275	290	U049	2.91	3.52	21.20	1.10	20.10	5.19	0	26 Nov 2019
X760276	290	U049	2.91	3.52	20.10	1.00	19.10	4.98	0	26 Nov 2019
X760277	290	U049	2.91	3.52	20.90	1.10	19.80	5.26	0	26 Nov 2019
X760278	290	U049	2.91	3.52	21.00	1.00	20.00	4.76	0	26 Nov 2019
X760279	290	U049	2.91	3.51	20.70	1.10	19.60	5.31	0	26 Nov 2019
X760280	290	U049	2.91	3.52	21.10	1.00	20.10	4.74	0	26 Nov 2019
X760281	290	U049	2.91	3.52	19.90	1.10	18.80	5.53	0	26 Nov 2019
X760282	290	U049	2.91	3.52	20.80	1.00	19.80	4.81	0	26 Nov 2019
X760283	290	U049	2.91	3.51	20.70	1.00	19.70	4.83	0	26 Nov 2019
X760284	290	U049	2.90	3.52	20.70	1.10	19.60	5.31	0	26 Nov 2019
X760285	290	U049	2.91	3.52	20.80	0.90	19.90	4.33	0	26 Nov 2019
X760286	290	U049	2.91	3.52	20.30	0.90	19.40	4.43	0	26 Nov 2019
X760287	290	U049	2.91	3.52	21.30	1.10	20.20	5.16	0	26 Nov 2019
X760288	290	U049	2.90	3.49	20.50	1.10	19.40	5.37	0	26 Nov 2019
X760289	290	U049	2.91	3.52	21.00	1.10	19.90	5.24	0	26 Nov 2019
X760290	290	U049	2.91	3.52	20.90	1.10	19.80	5.26	0	26 Nov 2019
X760291	290	U049	2.91	3.52	20.30	1.10	19.20	5.42	0	26 Nov 2019
X760292	290	U049	2.91	3.51	21.10	1.00	20.10	4.74	0	26 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

ARROWHEAD INDUSTRIAL SERVICES USA, INC.
GRAHAM, NC

<END REPORT>