Materials Specification

PRINT ISSUED	TITLE	PART NO.
9-23-71	TUBE, ALUMINUM 3003 DRAWN ROUND	48-00401
LAST CHG. LTR. C		SHEET 1 OF 1

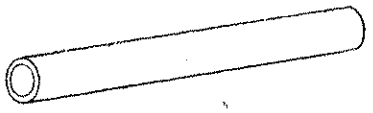
SCOPE

This specification identifies 3003 drawn round seamless aluminum tube.

APPLICATION

General hardware application where resistance to chemical attack and/or good workability and weldability is desired.

SKETCH



SPECIFICATION NUMBERS

FREIGHTLINER SPECIFICATION NUMBER	O.D.	WALL THICKNESS	TEMPER
48-00401-000	1/4	.035	H14
-001	3/8	.028	H14
-002		.035	H14
-003	1/2	.035	H14
-004		.049	H14
-005		.065	H14
-006	5/8	.035	H14
-007		.049	H14
-008	3/4	.035	H14
-009		.049	H14
-010		.065	H14
-011	7/8	.049	H14
-012		.058	H14
-013		.065	H14
-014	1	.035	H14
-015		.049	H14
-016		.065	H14

FREIGHTLINER SPECIFICATION NUMBER	O.D.	WALL THICKNESS	TEMPER
48-0401-017	1-1/4	.035	H14
-018		.065	H14
-019	1-1/2	.035	H14
-020		.049	H14
-021		.065	H14
-022	2	.035	H14
-023		.065	H14
-024	2-1/4	.049	H14
-025	2-1/2	.049	H14
-026		.065	H14
-027	3	.065	H14
-028	5.75	.081	H14
-029	1/2	.022	H14
-030	1-1/4	.250	H14
-031	1	.125	H14

SPECIFICATIONS

1. Tube herein described shall meet applicable provisions of ASTM B210-68.
2. Mechanical Properties:

TEMPER	MINIMUM PROPERTIES		
	TENSILE ULT. K.S.I.	YIELD K.S.I.	ELONGATION % IN 2 INCHES
H-14	20	17	3 - 8*

*Varies with Wall Thickness

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	RLR	6-22-71	Added Note 2
B	RWG	9-10-71	Added -028 & -029
C	RLR	6-9-72	Added -030,-031. J#85670

		DATE DRAWN			UNIT OF MEASURE
COMPILED	RWG	4-15-71			FT.
APPROVED					

Portland FREIGHTLINER CORPORATION Oregon 97208

E-183

DRAWN	LFB	TITLE	DRAWING NUMBER
APPRV	DAJ	TUBE-ALUMINUM, 6061 DRAWN ROUND	48-00402
DATE	10/21/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 2 / CHG. LTR. S
CATIA ORIGINAL			

SCOPE: THIS SPECIFICATION IDENTIFIES 6061 DRAWN ROUND ALUMINUM TUBE.

APPLICATION: HEAVY DUTY STRUCTURES REQUIRING GOOD CORROSION RESISTANCE.

O.D.	WALL THICKNESS	TEMPER *	FREIGHTLINER SPECIFICATION NUMBER
1/4	.035		48-00401-001
3/8	.049		-007
	.065		-009
7/16	.035		-010
1/2	.065		-015
	.095		-073
5/8	.058		-019
	.065		-020
	.125		-074
3/4	.058		-023
	.083		-025
	.125		-104
1	.058		-031
	.065		-032
	.083		-033
	.125		-100
	.250		-093
1 1/8	.058		-036
	.125		-034
1 1/4	.125		-099
1 3/8	.058		-043
	.083		-075
1 1/2	.049	-0-	-250
	.058		-046
	.083		-048
	.125		-049
	.250		-076
	.484		-101
1 5/8	.058		-050
	.065		-078
	.125		-201
	.049	-0-	-275

O.D.	WALL THICKNESS	TEMPER *	FREIGHTLINER SPECIFICATION NUMBER
1 3/4	.058		48-00402-051
	.125		-079
	.250		-080
2	.065		-057
	.125		-059
	.188		-081
	.250		-082
2 1/4	.083		-083
	.125		-068
	.250		-090
2 3/8	.154		-094
2 1/2	.125		-069
	.125	-0-	-200
	.188		-084
	.250		-095
	.375		-085
2 3/4	.125		-070
	.188		-086
3	.065		-063
	.083		-064
	.125		-071
	.250		-096
	.438	T6511	-300
3 1/4	.125		-097
3 1/2	.065		-065
	.125		-072
	.500		-350
4	.065		-087
	.125		-066
	.375		-400
5	.125		-500
5 1/2	.063		-089

S * T6 EXCEPT AS NOTED.

CHG	JOB NO	DATE	BY	REVISION
S	PA2042-97	10/21/99	LFB	REVISED AND REDRAWN IN CATIA. ADDED TEMPER NOTE.

DRAWN	LFB	TITLE	DRAWING NUMBER	
APPRV	DAJ	TUBE-ALUMINUM, 6061 DRAWN ROUND	48-00402	
DATE	10/21/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 2 OF 2	CHG. LTR. S
CATIA ORIGINAL				

SPECIFICATIONS:

1. TUBE HEREIN DESCRIBED SHALL MEET APPLICABLE PROVISIONS OF WW-T-700/6.
2. MECHANICAL PROPERTIES:

TEMPER	TENSILE ULT K.S.I.	YIELD K.S.I.	ELONGATION % IN 2 INCHES
0	22 MAX	14 MAX	15
T6	42 MIN	35 MIN	10-14

CHG	JOB NO	DATE	BY	REVISION
S	PA2042-97	10/21/99	LFB	REVISED AND REDRAWN IN CATIA. T6 WAS 0.

48-00403

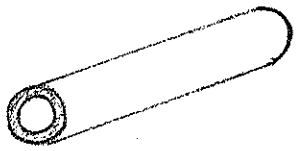
Materials Specification

PRINT ISSUED	TITLE	PART NO.
9/17/71	TUBE, ALUMINUM 2024 SEAMLESS	48-00403
LAST CHG. LTR. C		SHEET 1 OF 1

SCOPE This specification identifies 2024 aluminum tubing.

APPLICATION High strength tubing. Structural application. Heat treatable.

SKETCH



SPECIFICATION NUMBERS

O.D.	WALL THICKNESS	TEMPER	FREIGHTLINER SPECIFICATION NUMBER
3/16	.035	T3	48-00403-000
1/4	.028		-001
	.035		-002
	.049		-003
5/16	.035		-004
	.049		-005
	.058		-006
3/8	.028		-007
	.035		-008
	.049		-009
	.058		-010
	.065		-011
7/16	.035		-012
	.065		-013
1/2	.035		-014
	.049		-015
	.058		-016
	.065		-017
	.083		-018
	.090		-019

O.D.	WALL THICKNESS	TEMPER	FREIGHTLINER SPECIFICATION NUMBER
		T3	
1 1/2	.095		48-403-150
3-1/2	.250	T3511	-350
6-1/2	.250	T3511	-650

SPECIFICATIONS

1. Material: Alum. Alloy 2024
2. Mechanical Properties:

TEMPER	TENSILE STRENGTH K.S.I.	YIELD POINT K.S.I.	ELONGATION IN 2" % MIN.
T3	70	50	18

CHG	DATE	BY	WAS

CHG	DATE	BY	WAS
A	3-17-72	HJR	Add -150; add Specs: T# 94140
B	9-14-72	HJR	Add -350; J #40500
C	4-3-73	HJR	Add -650; J #A0245

COMPILED	RLR	DATE DRAWN			UNIT OF MEASURE
APPROVED		8-27-71			FT.

ns

Portland FREIGHTLINER CORPORATION Oregon 97208

E-183

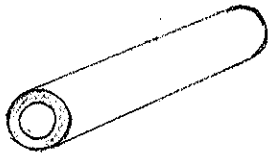
Materials Specification

PRINT ISSUED	TITLE	PART NO.
9/17/71	TUBE, ALUMINUM 5052 SEAMLESS	48-00404
LAST CHG. LTR D		SHEET 1 OF 1

SCOPE This specification identifies 5052 aluminum tubing.

APPLICATION Can be formed and has high fatigue strength. Good corrosion resistance.

SKETCH



SPECIFICATION NUMBERS

O.D.	WALL THICKNESS	TEMPER	FREIGHTLINER SPECIFICATION NUMBER
3/4	.125	H32	48-00404-000
1-1/4	.156		-001
2-1/4	.250		-002
2-1/2	.187		-003
1-1/2	.065	0	-004
1-5/8	.065	0	-005
1	.125	H32	-006

O.D.	WALL THICKNESS	TEMPER	FREIGHTLINER SPECIFICATION NUMBER
1-1/4	.125	H32	48-00404-010

SPECIFICATIONS

1. Mechanical Properties:

TEMPER	MINIMUM PROPERTIES		
	TENSILE ULT. K.S.I.	YIELD K.S.I.	ELONGATION % IN 2 INCHES
0	25	9.5	19 - 20
H32	31	23.0	4 - 12

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
B	HJR	1-28-72	Add -4,-5; J #84850
C	HJR	10-10-72	Add -010; J #60220
D	HJR	8-31-73	Add -006; J #A0518

COMPILED	RLR	DATE DRAWN			UNIT OF MEASURE
APPROVED		8-27-71			FT.

Portland FREIGHTLINER CORPORATION Oregon 97208

E-183

48-00405

Materials Specification

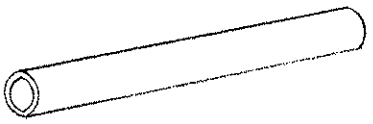
PRINT ISSUED	TITLE	PART NO.
9-23-71	TUBING, ALUMINUM, EXTRUDED 6063; ROUND	48-00405
LAST CHG. LTR.		SHEET 1 OF 1

WAS | DATE | BY | CHG

SCOPE This specification identifies 6063 round extruded aluminum tubing.

APPLICATION Highly corrosion resistant with good weldability. May be anodized and is primarily used in architectural applications.

SKETCH



SPECIFICATION NUMBERS

O.D.	WALL	TEMPER	FREIGHTLINER SPECIFICATION NUMBER
1-1/2	.125	T6	48-00405-001
	.250		-002
1-5/8	.125		-003
	.250		-004
2	.125		-005
	.250		-006
	.500		-007

WAS | DATE | BY | CHG

SPECIFICATIONS

1. Tube herein described shall meet applicable provisions of ASTM B241-68.

2. Mechanical Properties:

TEMPER	TYPICAL PROPERTIES		
	TENSILE ULT. K.S.I.	YIELD K.S.I.	ELONGATION % IN 2 INCHES
T6	30	25	10

					UNIT OF MEASURE
COMPILED	RWG	DATE DRAWN			FT.
APPROVED		9-10-71			

ns

Portland FREIGHTLINER CORPORATION Oregon 97208

48-00406

CHG	BY	DATE	WAS
B	HJR	7/27/73	Hot Rolled; I#A0509

CHG	BY	DATE	WAS
—	—	—	Job No. 84060
A	HJR	2-7-72	Tol:O.D. ±.006, Wall = —, I.D. -.006
			J #84980.

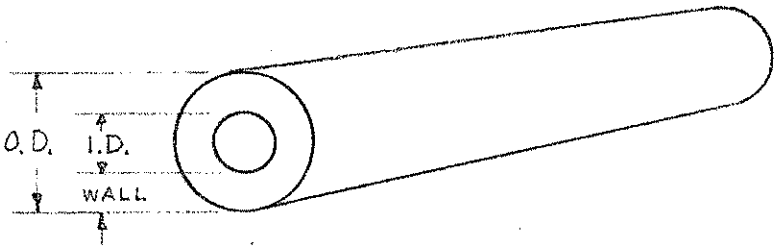
Materials Specification

PRINT ISSUED	TITLE	PART NO.
	TUBE, SEAMLESS COLD DRAWN MED. CARBON STEEL (1040)	48-00406
LAST CHG. LTR B		SHEET 1 OF 1

SCOPE This specification describes seamless cold drawn AISI 1040 carbon steel tube in the normalized state for forming and machining before heat treat.

APPLICATION Equalizer shaft, etc.

SKETCH



SPECIFICATION NUMBERS

O.D. ± .017	WALL ±.059	I.D. (REF) ±.135		MANUFACTURER/SUPPLIER		FREIGHTLINER SPECIFICATION NUMBER
2.043	.590	.862		*		48-00406-200

* Order by description and dimensions

SPECIFICATIONS

1. Material: SAE 1040 Steel cold drawn, normalized, seamless steel tubing.

2. Mechanical Properties, Typical:

CONDITION	YIELD STRENGTH p.s.i.	TENSILE STRENGTH p.s.i.	ELONG. IN 2 in. %, min.
Normalized	52,000	75,000	25

COMPILED	HJR	DATE DRAWN			UNIT OF MEASURE
APPROVED	Rollins	12-30-71			FT.

Portland FREIGHTLINER CORPORATION Oregon 97208

ns

E-183

F

AURIENNE CHILBERG

DRAWN	DAJ	TITLE	DRAWING NUMBER	
APPRV	DAJ	TUBE-ALUMINUM, 6061 T6511 ROUND, EXTRUDED	48-00407	
DATE	12/12/97			
CATIA ORIGINAL		FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. H

SCOPE: THIS SPECIFICATION IDENTIFIES 6061 T6511 EXTRUDED ROUND ALUMINUM TUBING.

APPLICATION: HEAVY DUTY STRUCTURE REQUIRING GOOD CORROSION RESISTANCE.

O.D.	WALL	FREIGHTLINER SPEC NO
5/8	.065	48-00407-053*
1	.065	48-00407-103*
	.125	48-00407-106*
	.250	48-00407-
1 1/8	.058	48-00407-112*
1 1/4	.083	48-00407-124*
1 1/2	.058	48-00407-142*
	.125	48-00407-146
	.250	48-00407-
1 3/4	.125	48-00407-
	.250	48-00407-
2	.125	48-00407-
	.188	48-00407-
	.250	48-00407-208
	.500	48-00407-209
2 1/4	.083	48-00407-
	.125	48-00407-226
	.250	48-00407-
2 1/2	.125	48-00407-
	.188	48-00407-
	.250	48-00407-
	.375	48-00407-

O.D.	WALL	FREIGHTLINER SPEC NO	
2 3/4	.125	48-00407-	
	.250	48-00407-	
	.375	48-00407-269	
	.625	48-00407-260	H
3	.065	48-00407-303*	
	.125	48-00407-	
	.250	48-00407-	
	.375	48-00407-	
3 1/2	.065	48-00407-	
	.125	48-00407-	
	.500	48-00407-	
3 3/4	.125	48-00407-366*	
	1.000	48-00407-368	
4	.125	48-00407-406	
	.250	48-00407-	
	.375	48-00407-	
4 1/4	.125	48-00407-	
4 1/2	.125	48-00407-	
5	.125	48-00407-506	
6	.125	48-00407-601	
	.188	48-00407-600	
	.250	48-00407-602	

* NOT FOR NEW DESIGN APPLICATIONS. REFER TO 48-00402.

SPECIFICATIONS:

1. MATERIAL: ALUMINUM 6061 T6511
2. TUBING SHALL CONFORM WITH APPLICABLE PROVISIONS OF ASTM B221, INCLUDING REFERENCED PARTS OF ASTM B241.
3. MINIMUM MECHANICAL PROPERTIES:

TENSILE (ksi)	YIELD (ksi)	ELONG % IN 2"
38	35	8

CHG	JOB NO	DATE	BY	REVISION
H	P02211-10	12/12/97	DAJ	REVISED AND REDRAWN, ADDED 260.

48-00426

768

Materials Specification

PRINT ISSUED	TITLE	PART NO
7-9-71	PIPE, ALUMINUM 6061, ROUND	48-00426
LAST CHG LTR D		SHEET 1 OF 2

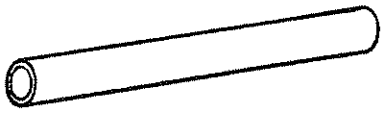
SCOPE

This specification identifies 6061 round A.S.A. standard aluminum pipe.

APPLICATION

Heavy duty structures requiring good corrosion resistance.

SKETCH



SPECIFICATION NUMBERS

A.S.A. SCHEDULE NUMBER	NOM. SIZE	O.D.	I.D.	TEMPER	FREIGHTLINER SPECIFICATION NUMBER
40	1/8	.405	.269	T-6	48-00426-000
	1/4	.540	.364	T-6	-001
	3/8	.675	.493	T-6	-002
	1/2	.840	.622	T-6	-003
	3/4	1.050	.824	T-6	-004
	1	1.315	1.049	T-6	-005
	1-1/4	1.660	1.380	T-6	-006
	1-1/2	1.900	1.610	T-6	-007
	2	2.375	2.067	T-6	-008
	2-1/2	2.875	2.469	T-6	-009
	3	3.500	3.068	T-6	-010
	3-1/2	4.000	3.548	T-6	-
	4	4.500	4.026	T-6	-
	5	5.563	5.047	T-6	-
	6	6.625	6.065	T-6	-
	8	8.625	7.981	T-6	-
	10	10.750	10.020	T-6	-
	12	12.750	11.438	T-6	-
80	1	1.315	.957	T-6	-
	1-1/4	1.660	1.278	T-6	-
	2	2.375	1.439	T-6	-020
	2-1/2	2.875	2.323	T-6	-021
	3	3.500	2.900	T-6	-
	4	4.500	3.826	T-6	-
	7	7.000	5.000	T-6511	-030
	7½	7.500	6.500	T-6511	-031

(-005)
768.0000
1.315
.0

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	RLR	6-22-71	Added note 2 and sheet 2
B	RLR	6-5-72	Added -30,-31. J#30260
C	LVD	8.6.79	443 TO 493 J#76050
D	ERK	11/29/88	Inactive #'s Rmvd. P*A078-90

COMPILED	RWG	DATE DRAWN			UNIT OF MEASURE
APPROVED		4-23-71			IN.

ns

Portland FREIGHTLINER CORPORATION Oregon 97208

E-183

48-00427

Materials Specification

PRINT ISSUED	TITLE	PART NO.
7-9-71	PIPE, ALUMINUM 6063, ROUND	48-00427
LAST CHG LTR A		SHEET 1 OF 1

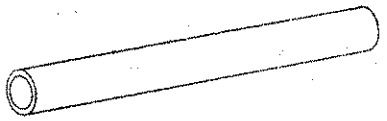
SCOPE

This specification identifies 6063 round aluminum pipe.

APPLICATION

General utility pipe

SKETCH



SPECIFICATION NUMBERS

SCHEDULE	NOM. SIZE	O.D.	I.D.	TEMPER	FREIGHTLINER SPECIFICATION NUMBER
10	2	2.375	2.157	T-6	48-00427-000
	2-1/2	2.875	2.635	T-6	-001
	3	3.500	3.260	T-6	-002
	4	4.500	4.260	T-6	-003
	5	5.563	5.299	T-6	-004
	6	6.625	6.361	T-6	-005
	8	8.625	8.329	T-6	-006

SPECIFICATIONS

1. Pipe herein described shall meet applicable provisions of ASTM B241-68.
2. Mechanical Properties:

TEMPER	TYPICAL PROPERTIES		
	TENSILE ULT. K.S.I.	YIELD K.S.I.	ELONGATION % IN 2 INCHES
T-6	30	25	8

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	RLR	6-22-71	Added Note 2

		DATE DRAWN			UNIT OF MEASURE
COMPILED	RWG	4-23-71			FT.
APPROVED					

ns

48-00428

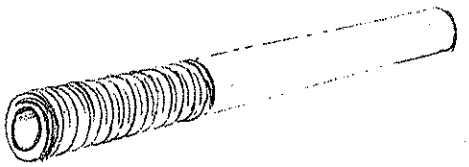
Materials Specification

PRINT ISSUED		TITLE	PART NO.
		PIPE, ALL-THREAD STEEL	48-00428
LAST CHG. LTR.	—		SHEET 1 OF 1

SCOPE This specification identifies all-thread schedule 40 ASA standard steel pipe.

APPLICATION Miscellaneous piping and structural uses.

SKETCH



SPECIFICATION NUMBERS

PIPE THREAD	I.D. PIPE SCHED 40	O.D. PIPE (REF.)	FREIGHTLINER SPECIFICATION NUMBER
1/8 - 27	.269	.405	48-00428-002
1/4 - 18	.364	.540	-003
3/8 - 18	.493	.675	-004
1/2 - 14	.622	.840	-005
3/4 - 14	.824	1.050	-006
1 - 11-1/2	1.049	1.315	-007
1-1/4 - 11-1/2	1.380	1.660	-008
1-1/2 - 11-1/2	1.610	1.900	-009
2 - 11-1/2	2.067	2.375	-010

SPECIFICATIONS

1. Schedule 40 ASA standard welded or seamless steel pipe for ordinary uses (Ref. 48-00023).

WAS	CHG	BY	DATE

WAS	CHG	BY	DATE
J #A0603	—	—	———

COMPILED	HJR	DATE DRAWN			UNIT OF MEASURE
APPROVED	[illegible]	4-11-74			FT.

Portland FREIGHTLINER CORPORATION Oregon 97208 M/F

DRAWN	DAJ	TITLE	DRAWING NUMBER	
APPRV	DAJ	TUBE-ALUMINUM 6063	48-00451	
DATE	11/25/98	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. E
CATIA ORIGINAL				

SCOPE: THIS SPECIFICATION IDENTIFIES THIN WALL EXTRUDED ALUMINUM TUBING.

APPLICATION: TYPICALLY USED FOR AIR INTAKE DUCTING.

O.D.	WALL	TEMPER	FREIGHTLINER SPEC NO
3	.050	6	48-00451-001
4	.050	6	48-00451-002
5	.052	6	48-00451-003
	.078	0	48-00451-013
5 1/2	.049-.063	6	48-00451-008
		0	48-00451-014
6	.058	6	48-00451-004
	.078	0	48-00451-015
7	.064	6	48-00451-005
	.078	0	48-00451-016
8	.072	0	48-00451-017
10	.094	6	48-00451-007

E

SPECIFICATIONS:

1. MATERIAL: ALUMINUM 6063
2. TUBING SHALL CONFORM WITH APPLICABLE PROVISIONS OF ANSI H35.1
3. MINIMUM MECHANICAL PROPERTIES:

TEMPER	TENSILE (ksi)	YIELD (ksi)	ELONG % IN 2"
0	19 max	-	18
6	30 min	25 min	8

CHG	JOB NO	DATE	BY	REVISION
E	PA2103-M8	11/25/98	DAJ	REVISED AND REDRAWN, ADDED -017.

48-00452

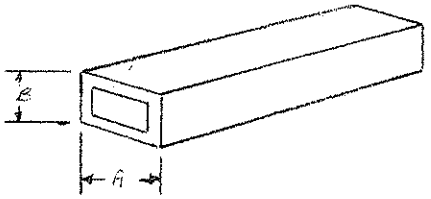
Materials Specification

PRINT ISSUED	TITLE	PART NO.
9-23-71	TUBE, ALUMINUM, EXTRUDED RECTANGULAR, 6063	48-00452
LAST CHG. LTR		SHEET 1 OF 1

SCOPE This specification identifies 6063 extruded rectangular aluminum tubing.

APPLICATION Highly corrosion resistant with good weldability and formability.

SKETCH



SPECIFICATION NUMBERS

A	B	WALL	TEMPER	FREIGHTLINER SPECIFICATION NUMBERS
1-1/4	2-1/2	.125	T52	48-00452-001
1-3/4	2-1/4			-002
	3			-003
	4			-004
	4-1/2			-005
	5			-006
2	3			-007
	5			-008

SPECIFICATIONS

1. Tube herein described shall meet applicable provisions of ASTM 241-68.

2. Mechanical Properties:

TEMPER	MIN. TYPICAL PROPERTIES		
	TENSILE ULT. K.S.I.	YIELD K.S.I.	ELONGATION % IN 2 INCHES
T52	22	16	8

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS

ns

COMPILED	RWG	DATE DRAWN			UNIT OF MEASURE
APPROVED		9-10-71			FT.

Portland FREIGHTLINER CORPORATION Oregon 97208

DRAWN	DAJ	TITLE	DRAWING NUMBER
APPRV	DAJ	TUBE-ALUMINUM, EXTRUDED SQUARE, 6063-T52	48-00453
DATE	04/15/98		
CATIA ORIGINAL		FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. C

UNLESS OTHERWISE NOTED, DIMENSIONS ARE IN INCHES

SCOPE: THIS SPECIFICATION IDENTIFIES SQUARE ALUMINUM TUBING, 6063-T52 ALLOY.

APPLICATION: HIGHLY CORROSION RESISTANT WITH GOOD FORMABILITY AND WELDABILITY.

SIZE IN INCHES	WALL	LBS/FT	FREIGHTLINER PART NUMBER
1 X 1	.125	.509	48-00453-001
1 1/4 X 1 1/4	.125	.655	48-00453-002
1 1/2 X 1 1/2	.125	.800	48-00453-003
2 X 2	.125	1.091	48-00453-005
3 X 3	.250	1.673	48-00453-008
4 X 4	.250	4.410	48-00453-009

C

SPECIFICATIONS:

1. MATERIAL: ALUMINUM 6063 T52
2. TUBING SHALL MEET APPLICABLE PROVISIONS OF QQ-A-200/9.
3. MINIMUM MECHANICAL PROPERTIES:

TENSILE (KSI)	YIELD (KSI)	ELONG. % IN 2"
22	16	8

CHG	JOB NO	DATE	BY	REVISION
C	A10281-01	04/15/98	DAJ	REVISED AND REDRAWN IN CATIA, ADDED -009.