Materials Specification

PRINT ISSUED	TITLE	PART NO.
7-9-71	HEX BAR, ALUMINUM 2024	48-00301
LAST CHG LTR. A		SHEET 1 OF 1

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	RLR	6-18-71	Added Note 2

SCOPE

This specification identifies 2024 aluminum hex bar.

APPLICATION

Used for high strength structural applications. Forming operations are limited. Fair corrosion resistance.

SKETCH



SPECIFICATION NUMBERS

SIZE DIAMETER	TEMPER	FREIGHTLINER SPECIFICATION NUMBERS
1/4	T-4	48-00301-000
5/16	T-4	-001
3/8	T-4	-002
7/16	T-4	-003
1/2	T-4	-004
9/16	T-4	-005
5/8	T-4	-006
11/16	T-4	-007
3/4	T-4	-008
13/16	T-4	-009
7/8	T-4	-010

SIZE DIAMETER	TEMPER	FREIGHTLINER SPECIFICATION NUMBER
1	T-351	48-00301-011
1-1/8	T-351	-012
1-1/4	T-351	-013
1-3/8	T-351	-014
1-1/2	T-351	-015
1-5/8	T-351	-016
1-3/4	T-351	-017
1-7/8	T-351	-018
2	T-351	-019

SPECIFICATIONS

1. Bars herein described shall meet applicable provisions of ASTM B211-68.
2. Mechanical Properties:

TEMPER	MINIMUM PROPERTIES		
	TENSILE ULT. K.S.I.	YIELD K.S.I.	ELONGATION % IN 2 INCHES
T-4	57 - 70*	42-52*	8 - 12*
T-351	57 - 70*	42-52*	8 - 12*

*Varies with Thickness

ns

COMPILED	RLR	DATE DRAWN			UNIT OF MEASURE
APPROVED		4-22-71			FT.

Portland FREIGHTLINER CORPORATION Oregon 97208

Materials Specification

PRINT ISSUED	TITLE	PART NO.
9-23-71	HEX BAR, ALUMINUM 6061	48-00302
PAST CHG LTR		SHEET 1 OF 1

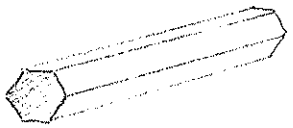
SCOPE

This specification identifies 6061 aluminum hex bar.

APPLICATION

Good formability, weldability, and corrosion resistance. One of the most versatile of the heat treatable alloys. Superior anodizing characteristics and is used extensively for screw machine stock and forging applications.

SKETCH



SPECIFICATION NUMBERS

SIZE DIAMETER	TEMPER	FREIGHTLINER SPECIFICATION NUMBER
1	T651	48-00302-000
1-3/4	T651	-001

SPECIFICATIONS

1. Bars herein described shall meet all applicable provisions of ASTM B211-68.
2. Mechanical Properties:

TEMPER	MINIMUM PROPERTIES		
	TENSILE ULT. K.S.I.	YIELD K.S.I.	ELONGATION % IN 2 INCHES
T 651	38	35	8 - 10*

*Varies with Diameter

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	RLR	6-18-71	Added Note 2
B	RWG	9-10-71	Added -001

COMPILED	RLR	DATE DRAWN			UNIT OF MEASURE
APPROVED		4-22-71			FT.

Portland FREIGHTLINER CORPORATION Oregon 97208

ns

8-00326

0A133

Materials Specification

PRINT ISSUED	TITLE	PART NO
7-9-71	ROUND BAR, ALUMINUM 2024	48-00326
LAST CHG LTR C		SHEET 1 OF 2

SCOPE

This specification identifies 2024 aluminum rolled or cold finished round bar.

APPLICATION

Used for high strength structural applications or as screw machine stock. Forming operations are limited. Fair corrosion resistance.

SKETCH



SPECIFICATION NUMBERS

SIZE DIAMETER	TEMPER	FREIGHTLINER SPECIFICATION NUMBERS
1/8	T-4	48-00326-
3/16	T-4	-
1/4	T-4	-
5/16	T-4	-003
3/8	T-4	-
7/16	T-4	-
1/2	T-4	-006
9/16	T-4	-
5/8	T-4	-
11/16	T-4	-
3/4	T-351	-
13/16	T-351	-
7/8	T-351	-
15/16	T-351	-
1	T-351	-014
1- 1/16	T-351	-
1- 1/8	T-351	-
1- 3/16	T-351	-
1- 1/4	T-351	8 -018
1- 5/16	T-351	-
1- 3/8	T-351	-020
1- 7/16	T-351	-
1- 1/2	T-351	7 -022
1- 9/16	T-351	-
1- 5/8	T-351	-
1- 3/4	T-351	-
1- 7/8	T-351	-

SIZE DIAMETER	TEMPER	FREIGHTLINER SPECIFICATION NUMBERS
2	T-351	48-00326-
2-1/8	T-351	-
2-1/4	T-351	-
2-3/8	T-351	-
2-1/2	T-351	-
2-5/8	T-351	-
2-3/4	T-351	-
2-7/8	T-351	-
3	T-351	-
3-1/8	T-351	-
3-1/4	T-351	-
3-3/8	T-351	-
3-1/2	T-351	-
3-3/4	T-351	-
4	T-351	-
4-1/4	T-351	-
4-1/2	T-351	-
4-3/4	T-851	-044
5	T-351	-
5-1/4	T-351	-
5-1/2	T-351	-
6	T-351	-
6-1/2	T-351	-
6-3/4	T-351	-
7	T-351	-
8	T-4	-

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	RLR	6-18-71	Added Note 2 and sheet 2
B	FHF	3-04-87	See Sht. 2 #4279C
C	ERK	09/23/88	DWG UPDATED - P*A078-59

ns

COMPILED	RLR	DATE DRAWN			UNIT OF MEASURE
APPROVED	[signature]	4-22-71			

Portland FREIGHTLINER CORPORATION Oregon 97208

E-183

B 1

ORIGINAL JOB NO.	TITLE	PART NO.
7-9-71	ROUND BAR, ALUMINUM 2024	48-00326
LAST CHG LTR C		SHEET 2 OF 2

SPECIFICATIONS

1. Bars herein described shall meet applicable provisions of ASTM B211.

2. Mechanical Properties:

TEMPER	THICKNESS, IN.	MINIMUM PROPERTIES		
		TENSILE ULT. K.S.I.	YIELD K.S.I.	ELONGATION % IN 2 INCHES
T-4	UP THRU 0.499	62	45	10
	0.500 - 4.500	62	42	10
	4.501 - 6.500	62	40	10
	6.501 - 8.000	58	38	10
T-351	0.500 - 6.500	62	45	10

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
A		PLR	6-18-71	ADD -20 TEMPER
B		FHF	3-04-87	Rev. Mech. Prop. #4279C SEE SHEET 1
C				

COMPILED	TJW	DATE DRAWN			
APPROVED	TJW	6-18-71			

FREIGHTLINER CORPORATION Portland Oregon 97208 B

E-183A Litho in USA

Materials Specification

PRINT ISSUED	TITLE	PART NO.
9-23-71	ROUND BAR, ALUMINUM 6061	48-00327
LAST CHG. LTR B		SHEET 1 OF 2

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	RLR	6-21-71	Added Note 2 & Sht. 2
B	RWG	9-10-71	Added -036

SCOPE

This specification identifies 6061 aluminum round bar.

APPLICATION

Good formability, weldability, and corrosion resistance. One of the most versatile of the heat treatable alloys. Superior anodizing characteristics and is used extensively for screw machine stock and forging applications.

SKETCH



SPECIFICATION NUMBERS

SIZE DIAMETER	TEMPER	FREIGHTLINER SPECIFICATION NUMBERS
3/16	T-6	48-00327-000
1/4	T-6	-001
5/16	T-6	-002
3/8	T-6	-003
7/16	T-6	-004
1/2	T-6	-005
5/8	T-6	-006
3/4	T-6	-007
7/8	T-6	-008
1	T-651	-009
1-1/16	T-651	-010
1-1/8	T-651	-011
1-1/4	T-651	-012
1-5/16	T-651	-013
1-3/8	T-651	-014
1-1/2	T-651	-015
1-5/8	T-651	-016
1-3/4	T-651	-017

SIZE DIAMETER	TEMPER	FREIGHTLINER SPECIFICATION NUMBERS
1-7/8	T-651	48-00327-018
2	T-651	-019
2-1/8	T-651	-020
2-1/4	T-651	-021
2-1/2	T-651	-022
2-3/4	T-651	-023
3	T-651	-024
3-1/4	T-651	-025
3-1/2	T-651	-026
3-3/4	T-651	-027
4	T-651	-028
4-1/2	T-651	-029
5-1/2	T-6	-030
6	T-6	-031
6-1/2	T-6	-032
7	T-6	-033
7-1/2	T-6	-034
8	T-6	-035
5	T6	-036

		DATE DRAWN			UNIT OF MEASURE
COMPILED	RLR	4-22-71			FT.
APPROVED					

ns

Portland FREIGHTLINER CORPORATION Oregon 97208

B

48-00327

Materials Specification

PRINT ISSUED	TITLE	PART NO
9-22-71	ROUND BAR, ALUMINUM 6061	48-00327
LAST CHG LTR: B		SHEET 2 OF 2

SPECIFICATIONS

1. Bars herein described shall meet all applicable provisions of ASTM B211-68.

2. Mechanical Properties:

TEMPER	MINIMUM PROPERTIES		
	TENSILE ULT. K.S.I.	YIELD K.S.I.	ELONGATION % IN 2 INCHES
T-6	42	35	10
T-651	42	35	10

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	RLR	6-21-71	Added Note 2 & Sht. 2
B	RWG	9-10-71	Added -036

ns

COMPILED	RLR	DATE DRAWN			UNIT OF MEASURE
APPROVED		6-21-71			FT.

Portland FREIGHTLINER CORPORATION Oregon 97208

B

48-00328

Materials Specification

PRINT ISSUED	TITLE	PART NO.
7-9-71	ROUND BAR, ALUMINUM 6063	48-00328
LAST CHG LTR: A		SHEET 1 OF 1

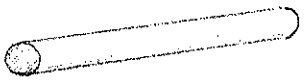
SCOPE

This specification identifies 6063 aluminum round bar.

APPLICATION

Architectural extrusions, pipe railing.

SKETCH



SPECIFICATION NUMBERS

SIZE DIAMETER	TEMPER	FREIGHTLINER SPECIFICATION NUMBERS
1/2	T-52	48-00328-000
3/4	T-52	-001
1	T-52	-002

SPECIFICATIONS

1. Bars herein described must meet applicable provisions of ASTM B221-68.
2. Mechanical Properties:

TEMPER	MINIMUM PROPERTIES		
	TENSILE ULT. K.S.I.	YIELD K.S.I.	ELONGATION % IN 2 INCHES
T-52	22	16	8

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

CHG	BY	DATE	WAS

ns

COMPILED	RLR	DATE DRAWN			UNIT OF MEASURE
APPROVED		4-22-71			FT.

Portland FREIGHTLINER CORPORATION Oregon 97208

A

E-183

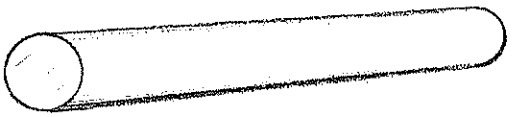
Materials Specification

PRINT ISSUED	TITLE	PART NO.
7/9/71	ROUND BAR, ALUMINUM 2011	48-00329
LAST CHG. LTR.		SHEET 1 OF 1

SCOPE This specification identifies 2011 aluminum round bar in various tempers.

APPLICATION Typically used for Screw Machine Products. General resistance to corrosion is poor, but there are no known failures in service or laboratory tests of the T8 temper by stress corrosion cracking. Workability is fair to poor, but machinability is excellent in all tempers.

SKETCH



SPECIFICATION NUMBERS

DIAMETER NOM.	DIAMETER BASIC	DIAMETER TOL.±	WT. * LB/FT	F/L SPEC NO. 48-00329 T3	F/L SPEC NO. 48-00329 T8
			TEMPER	T3	T8
1/8	.1250	.0015	.0156	-304	-804
3/16	.1875		.0333	-306	-806
7/32	.21875		.0458	-307	-807
1/4	.2500		.0603	-308	-808
9/32	.28125		.0759	-309	-809
5/16	.3125		.0936	-310	-810
11/32	.34375		.1134	-311	-811
3/8	.3750		.135	-312	-812
7/16	.4375		.184	-314	-814
15/32	.46875		.211	-315	-815
1/2	.5000		.240	-316	-816
9/16	.5625		.304	-318	-818
5/8	.6250		.374	-320	-820
11/16	.6875		.453	-322	-822
3/4	.7500	.002	.540	-324	-824
25/32	.78125		.586	-325	-825
13/16	.8125		.633	-326	-826
7/8	.8750		.734	-328	-828
29/32	.90625		.787	-329	-829
15/16	.9375		.843	-330	-830
1	1.000		.960	-332	-832
1- 1/16	1.0625	.0025	1.08	-334	-834
1- 1/8	1.1250		1.22	-336	-836
1- 3/16	1.1875		1.35	-338	-838
1- 1/4	1.2500		1.50	-340	-840
1- 5/16	1.3125		1.65	-342	-842
1- 3/8	1.3750		1.81	-344	-844
1- 7/16	1.4375		1.99	-346	-846
1- 1/2	1.500		2.16	-348	-848
1- 9/16	1.5625		2.34	-350	-850
1- 5/8	1.6250		2.54	-352	-852
1- 3/4	1.7500	.004	2.94	-356	-856
1-13/16	1.8125		3.15	-358	-858
1- 7/8	1.8750		3.37	-360	-860
2	2.0000		3.84	-364	-864
2- 1/8	2.1250		4.34	-368	-868
2- 1/4	2.2500		4.86	-372	-872
2- 3/8	2.3750	.006	5.41	-376	-876
2- 1/2	2.5000		6.00	-380	-880
2- 3/4	2.7500		7.25	-388	-888
3	3.000		8.63	-396	-896
3- 1/4	3.2500	.008	10.15	-400	-900

*Density 2011 Alloy = 0.102 lb./in^3

NOTE: Bars herein described shall meet applicable provisions of ASTM B211-68.

SPECIFICATIONS

ALLOY & TEMPER	DIAMETER	TENSILE STRENGTH ksi (kg/mm2) ULT. MIN.	TENSILE STRENGTH ksi (kg/mm2) YIELD MIN.	ELONGATION % MIN. IN. 4 DIAMETERS
2011-T3	0.125 - 1.500	45.0 (31.6)	38.0 (26.7)	10
	1.501 - 2.000	43.0 (30.2)	34.0 (23.9)	12
	2.001 - 3.250	42.0 (29.5)	30.0 (21.1)	14
2011-T4 ** 2011-T451	Up Thru 8.000	40.0 (28.1)	18.0 (12.7)	16
2011-T8	0.125 - 3.250	54.0 (38.0)	40.0 (28.1)	10

**These tempers, not shown in Specification Number Table, are for reference only.

COMPILED	HJR	DATE DRAWN			UNIT OF MEASURE
APPROVED	[signature]	6-22-71			FT.

Portland FREIGHTLINER CORPORATION Oregon 97208

E-183

48-00329

WAS / DATE / BY / CHG

WAS / DATE / BY / CHG

48-00331

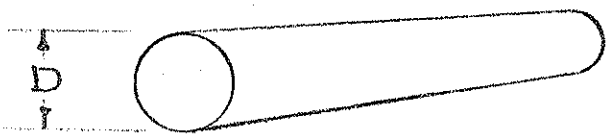
Materials Specification

PRINT ISSUED		TITLE	PART NO.
		ROUND BAR, ALUMINUM 6262	48-00331
LAST CHG. LTR.	.		SHEET 1 OF 1

SCOPE This specification identifies 6262 aluminum round bar.

APPLICATION Screw machine stock. Better machinability and higher strength than 6061 but also suitable for welding.

SKETCH:



SPECIFICATION NUMBERS

SIZE "D"	TEMPER	FREIGHTLINER SPECIFICATION NUMBER
1/8	T9	48-00331-000
5/32		-001
3/16		-002
7/32		-003
1/4		-004
9/32		-005
5/16		-006
11/32		-007
3/8		-008
7/16		-009
15/32		-010
1/2		-011
9/16		-012
5/8		-013
11/16		-014
3/4		-015

SIZE "D"	TEMPER	FREIGHTLINER SPECIFICATION NUMBER
25/32	T9	48-00331-016
13/16		-017
7/8		-018
29/32		-019
15/16		-020
1		-021
1-1/16		-022
1-1/8		-023
1-3/16		-024
1-1/4		-025

SPECIFICATIONS

1. Bar herein described shall meet applicable provisions of ASTM B211-68 or ASTM B221-68.

2. Mechanical properties:

TEMPER	TYPICAL PROPERTIES		
	TENSILE ULT. K.S.I.	YIELD K.S.I.	ELONGATION % IN 2 INCHES
T9	58	55	10

COMPILED	RLR	DATE DRAWN			UNIT OF MEASURE
APPROVED	Rollins	1-7-72			FT.

Portland FREIGHTLINER CORPORATION Oregon 97208

WAS | DATE | BY | CHG

WAS Job No. 84130 | DATE — | BY — | CHG —

ns