DRAWN	ERK	TITLE	ITEM NUMBER
APPRV	KCB	PLATE-STEEL, LOW CARBON HOT ROLLED	48-00004
DATE	05/18/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1

SCOPE: THIS SPECIFICATION IDENTIFIES HOT ROLLED LOW CARBON STEEL PLATE.

APPLICATION: STRUCTURAL USES, FLAT OR BENT, WELDABLE.

SPECIFICATION NUMBERS:

T THICKNESS	WT LB/FT^2		FREIGHTLINER SPECIFICATION NUMBER	
			PICKLED & OILED	AS RECEIVED (5)
3/16	7.65		48-00004-103	48-00004-003
1/4	10.20		-104	-004
5/16	12.75		-105	-005
3/8	15.30		-106	-006
7/16	17.85		-107	-007
1/2	20.40		-108	-008
9/16	22.95		-109	-009
5/8	25.50		-110	-010
3/4	30.60		-112	-012
7/8	35.70		-114	-014
1	40.80		-116	-016
1 1/8	45.90		-118	-018
1 1/4	51.00		-120	-020
1 3/8	56.10		-122	-022
1 1/2	61.20		-124	-024
1 5/8	66.30		-126	—
1 3/4	71.40		-128	-028
2	81.60		-132	-032
2 1/4	91.80		-136	-036
2 1/2	102.00		-140	-040
2 3/4	112.20		-144	—
3	122.40		-148	-048
3 1/4	132.60		-152	-
3 1/2	142.80		-156	-
3 3/4	153.00		-160	-
4	163.20		-164	-064

SPECIFICATIONS

1. MUST CONFORM TO REQUIREMENTS OF ASTM A36
2. MINIMUM PROPERTIES
3. DESCALED AND OILED IS AN ACCEPTABLE ALTERNATE FOR PICKLED & OILED PLATE GREATER THAN .250".
4. MINIMUM PROPERTIES:

TENSILE STRENGTH KSI	YIELD POINT KSI	ELONGATION	
		IN 8 INCHES %	IN 2 INCHES %
58-80	36	20	23

5. PICKLED AND OILED IS AN ACCEPTABLE ALTERNATE FOR AS RECEIVED.

K

CHG	JOB/RLSE NO	DATE	BY	REVISION
J	PA2006-49	05/18/89	ERK	REVISED & REDRAWN, ADDED NOTE 3.
K	PA2024-38	08/07/90	ERK	ADDED SPECIFICATION NOTE #5.

Materials Specification

PRINT ISSUED	TITLE	PART NO.
8/20/71	PLATE, LOW CARBON STEEL HOT ROLLED	48-00004
LAST CHG LTR C		SHEET 2 OF 2

SPECIFICATIONS

1. Must conform to pertinent provisions of ASTM A36 (C).

2. Tensile Requirements:

TENSILE STRENGTH KSI	YIELD POINT KSI (MIN)	ELONGATION IN 8" % (MIN)	ELONGATION IN 2" % (MIN)
58 - 80	32-36	20	23

(C)

CHG	BY	DATE	WAS
A	EER	8-19-71	Revised Spec's. #71089
B	SK	11-9-78	DELETED GRADES, #77928 FROM 36,42,32-36
C	FF	2-7-79	

CHG	BY	DATE	WAS

ns

COMPILED	HJR	DATE DRAWN			UNIT OF MEASURE
APPROVED		8-10-71			LB.

Portland FREIGHTLINER CORPORATION Oregon 97208

B C

E-183

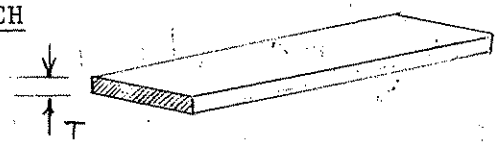
Materials Specification

PRINT ISSUED	TITLE	PART NO.
8/20/71	PLATE, LOW CARBON STEEL HOT ROLLED	48-00004
LAST CHG. LTR. B		SHEET 1 OF 2

SCOPE This specification identifies hot rolled low carbon steel plate.

APPLICATION Structural uses, flat or bent, weldable.

SKETCH



SPECIFICATION NUMBERS

THICKNESS NOM. (IN)	WEIGHT LB/FT^2	WEIGHT LB/IN^2	FREIGHTLINER SPECIFICATION NUMBER *
1/4	10.20	.0708	48-00004-004
5/16	12.75	.0885	-005
3/8	15.30	.1063	-006
7/16	17.85	.1240	-007
1/2	20.40	.1417	-008
9/16	22.95	.1594	-009
5/8	25.50	.1771	-010
3/4	30.60	.2125	-012
13/16	33.15	.2302	-013
7/8	35.70	.2479	-014
1	40.80	.2833	-016
1- 1/8	45.90	.3188	-018
1- 1/4	51.00	.3542	-020
1- 3/8	56.10	.3896	-022
1- 1/2	61.20	.4250	-024
1- 5/8	66.30	.4604	-026
1- 3/4	7..40	.4958	-028
2	81.60	.5667	-032
2- 1/4	91.8	.6375	-036
2- 1/2	102.0	.7083	-040
2- 3/4	112.2	.7792	-044
3	122.4	.8500	-048
3- 1/4	132.6	.9208	-052
3- 1/2	142.8	.9917	-056
3- 3/4	153.0	1.0625	-060
4	163.2	1.1333	-064

*Dash Number = Thickness in Sixteenths of an Inch

					UNIT OF MEASURE
COMPILED	HJR	DATE DRAWN			LB.
APPROVED		8-10-71			

Portland FREIGHTLINER CORPORATION Oregon 97208 B

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	HJR	8-10-71	Revised & Redrawn
B	SK	11-9-78	See Sheet 2; #71089

ns

Materials Specification

PRINT ISSUED	TITLE	PART NO.
8/20/71	PLATE, LOW CARBON STEEL HOT ROLLED	48-00004
LAST CHG. LTR. B		SHEET 2 OF 2

SPECIFICATIONS

1. Must conform to pertinent provisions of ASTM A36 GRADE C.

2. Tensile Requirements:

TENSILE STRENGTH KSI	YIELD POINT KSI (MIN)	ELONGATION IN 8" % (MIN)	ELONGATION IN 2" % (MIN)
58 - 80	36	20	23

CHG	BY	DATE	WAS
			B

CHG	BY	DATE	WAS
A	HJR	8-10-71	Revised & Redrawn
B	SK	11-9-78	Revised Spec's. #71089

ns

COMPILED	HJR	DATE DRAWN			UNIT OF MEASURE
APPROVED		8-10-71			LB.

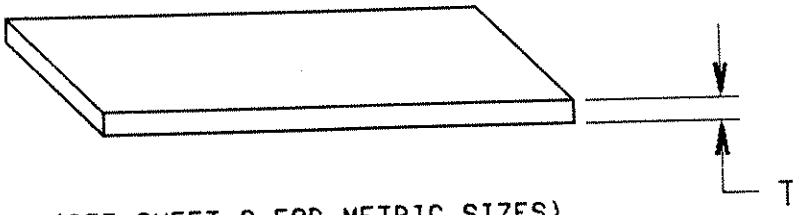
Portland FREIGHTLINER CORPORATION Oregon 97208 B

ORIGINAL JOB NO.	TITLE	PART NO.
5404B	SHEET, LOW CARBON STEEL, HOT ROLLED, COMMERCIAL QUALITY	48-00005
LAST CHG LTR: K		SHEET 1 OF 3

SCOPE: THIS SPECIFICATION IDENTIFIES HOT ROLLED LOW CARBON STEEL SHEET IN CUT LENGTHS OR COILS.

APPLICATION: FOR BENDING, MODERATE FORMING, AND WELDING WHERE MINIMUM MECHANICAL PROPERTIES ARE NOT REQUIRED.

SKETCH



SPECIFICATION NUMBERS: (SEE SHEET 2 FOR METRIC SIZES)

T			FREIGHTLINER SPECIFICATION NUMBERS 48-00005	
GAGE NO.	INCH EQUIV	WT LB/FT^2	AS RECEIVED	PICKLED AND OILED
4	.2242	9.375	-004	-704
5	.2092	8.750	-005	-705
6*	.1943	8.125	-006	-706
7**	.1793	7.500	-007	-707
8	.1644	6.875	-008	-708
9	.1495	6.250	-009	-709
10	.1345	5.625	-010	-710
11	.1196	5.000	-011	-711
12	.1046	4.375	-012	-712
13	.0897	3.750	-013	-713
14	.0747	3.125	-014	-714
15	.0673	2.813	-015	-715
16	.0598	2.500	-016	-716
17	.0538	2.250	-017	-717
18	.0478	2.000	-018	-718
19	.0418	1.750	-019	-719
20	.0359	1.500	-020	-720
21	.0329	1.375	-021	-721
22	.0299	1.250	-022	-722
23	.0269	1.125	-023	-723
24	.0239	1.000	-024	-724

* USE 7 GAGE (NOT 6) FOR 3/16 INCH MATERIAL THICKNESS.
**ALTERNATIVE THICKNESS FOR 7 GAGE IS 3/16 (.1875) INCHES.

SPECIFICATIONS

1. CHEMICAL COMPOSITION SHALL MEET LIMITS FOR SAE 1008-1012 STEEL PER PROVISIONS OF SAE J403 AND ASTM A569.

2. ASTM A569 DOES NOT LIMIT MECHANICAL PROPERTIES. TYPICAL PROPERTIES ARE SHOWN BELOW FOR REFERENCE ONLY.

TENSILE STRENGTH (KSI)	YEILD STRENGTH (KSI)	ELONGATION (% IN 2 INCHES)	HARDNESS (R_B)	BEND RADIUS
52 TYP	38 TYP	30 TYP	50-75	0T

COMPILED	FEF	DATE DRAWN	CADAM ORIGINAL	UNIT OF MEASURE	MASTER NUMBER	
APPROVED	DJL	10-21-83		LB	00001	000D1

CHANGE INFORMATION	DATE	BY	JOB NO.	LTR

CHANGE INFORMATION	DATE	BY	JOB NO.	LTR
REVISED & REDRAWN	10-21-83	FEF	5404B	K

ORIGINAL JOB NO.	TITLE	PART NO.
5404B	SHEET, LOW CARBON STEEL, HOT ROLLED, COMMERCIAL QUALITY	48-00005
LAST CHG LTR: K		SHEET 2 OF 3

SPECIFICATION NUMBERS: (METRIC SIZES)

T				FREIGHTLINER SPECIFICATION NUMBERS 48-00005		
MM	INCH EQUIV	WT KG/M^2			AS RECEIVED	PICKLED AND OILED
6.0	.2362	47.100			-055	-855
5.0	.1969	39.250			-057	-857
4.5	.1772	35.325			-059	-859
4.0	.1575	31.400			-061	-861
3.0	.1181	23.550			-067	-867
2.5	.0984	19.625			-070	-870

SPECIFICATION NUMBERS-PART STATUS

FREIGHTLINER SPECIFICATION NUMBER	PART STATUS
48-00005-056	NU
48-00005-058	
48-00005-060	NU
48-00005-061	NU
48-00005-062	NU
48-00005-063	NU
48-00005-064	NU
48-00005-065	NU
48-00005-066	NU
48-00005-068	NU
48-00005-069	NU

FREIGHTLINER SPECIFICATION NUMBER	PART STATUS
48-00005-071	NU
48-00005-072	NU
48-00005-073	NU
48-00005-074	NU
48-00005-075	NU
48-00005-076	NU
48-00005-077	NU
48-00005-078	NU
48-00005-079	NU
48-00005-080	NU
48-00005-081	NU

FREIGHTLINER SPECIFICATION NUMBER	PART STATUS
48-00005-082	NU
48-00005-083	NU
48-00005-084	NU
48-00005-085	NU
48-00005-086	NU
48-00005-087	NU
48-00005-088	NU
48-00005-089	NU
48-00005-090	NU
48-00005-091	NU
48-00005-092	NU
48-00005-093	NU

CHANGE INFORMATION

LTR	JOB NO.	BY	DATE	
K	5404B	FEF	10-21-83	REVISED & REDRAWN

					MASTER NUMBER	
COMPILED	FEF	DATE DRAWN	CADAM ORIGINAL		00001	000D1
APPROVED	DJL	10-21-83				

PORTLAND FREIGHTLINER CORPORATION K OREGON 97208

AC-826

ORIGINAL JOB NO.	TITLE	PART NO.
5404B	SHEET, LOW CARBON STEEL, HOT ROLLED, COMMERCIAL QUALITY	48-00005
LAST CHG LTR: K		SHEET 3 OF 3

SPECIFICATION NUMBERS-PART STATUS

FREIGHTLINER SPECIFICATION NUMBER	PART STATUS	REPLACED BY
48-00005-204	OBS	48-00701-104
48-00005-205	OBS	48-00701-105
48-00005-206	OBS	48-00701-106
48-00005-207	OBS	48-00701-107
48-00005-208	OBS	48-00701-108
48-00005-209	OBS	48-00701-109
48-00005-210	OBS	48-00701-110
48-00005-211	OBS	48-00701-111
48-00005-212	OBS	48-00701-112
48-00005-213	OBS	48-00701-113
48-00005-214	OBS	48-00701-114
48-00005-215	OBS	48-00701-115
48-00005-216	OBS	48-00701-116
48-00005-217	OBS	48-00701-117
48-00005-218	OBS	48-00701-118
48-00005-219	OBS	48-00701-119
48-00005-220	OBS	48-00701-120
48-00005-221	OBS	48-00701-121
48-00005-222	OBS	48-00701-122
48-00005-223	OBS	48-00701-123
48-00005-224	OBS	48-00701-124
48-00005-304	OBS	48-00701-304
48-00005-305	OBS	48-00701-305
48-00005-306	OBS	48-00701-306
48-00005-307	OBS	48-00701-307
48-00005-308	OBS	48-00701-308
48-00005-309	OBS	48-00701-309
48-00005-310	OBS	48-00701-310
48-00005-311	OBS	48-00701-311
48-00005-312	OBS	48-00701-312
48-00005-313	OBS	48-00701-313
48-00005-314	OBS	48-00701-314
48-00005-315	OBS	48-00701-315
48-00005-316	OBS	48-00701-316
48-00005-317	OBS	48-00701-317
48-00005-318	OBS	48-00701-318
48-00005-319	OBS	48-00701-319
48-00005-320	OBS	48-00701-320
48-00005-321	OBS	48-00701-321
48-00005-322	OBS	48-00701-322
48-00005-323	OBS	48-00701-323
48-00005-324	OBS	48-00701-324
48-00005-404	OBS	48-00701-404
48-00005-405	OBS	48-00701-405
48-00005-406	OBS	48-00701-406
48-00005-407	OBS	48-00701-407
48-00005-408	OBS	48-00701-408
48-00005-409	OBS	48-00701-409
48-00005-410	OBS	48-00701-410
48-00005-411	OBS	48-00701-411
48-00005-412	OBS	48-00701-412
48-00005-413	OBS	48-00701-413
48-00005-414	OBS	48-00701-414
48-00005-415	OBS	48-00701-415
48-00005-416	OBS	48-00701-416
48-00005-417	OBS	48-00701-417
48-00005-418	OBS	48-00701-418
48-00005-419	OBS	48-00701-419
48-00005-420	OBS	48-00701-420
48-00005-421	OBS	48-00701-421
48-00005-422	OBS	48-00701-422
48-00005-423	OBS	48-00701-423
48-00005-424	OBS	48-00701-424
48-00005-504	OBS	48-00701-504
48-00005-505	OBS	48-00701-505
48-00005-506	OBS	48-00701-506
48-00005-507	OBS	48-00701-507
48-00005-508	OBS	48-00701-508
48-00005-509	OBS	48-00701-509
48-00005-510	OBS	48-00701-510
48-00005-511	OBS	48-00701-511
48-00005-512	OBS	48-00701-512
48-00005-513	OBS	48-00701-513
48-00005-514	OBS	48-00701-514
48-00005-515	OBS	48-00701-515
48-00005-516	OBS	48-00701-516
48-00005-517	OBS	48-00701-517
48-00005-518	OBS	48-00701-518
48-00005-519	OBS	48-00701-519
48-00005-520	OBS	48-00701-520
48-00005-521	OBS	48-00701-521
48-00005-522	OBS	48-00701-522
48-00005-523	OBS	48-00701-523
48-00005-524	OBS	48-00701-524
48-00005-604	OBS	48-00701-604
48-00005-605	OBS	48-00701-605
48-00005-606	OBS	48-00701-606
48-00005-607	OBS	48-00701-607
48-00005-608	OBS	48-00701-608
48-00005-609	OBS	48-00701-609
48-00005-610	OBS	48-00701-610
48-00005-611	OBS	48-00701-611
48-00005-612	OBS	48-00701-612
48-00005-613	OBS	48-00701-613
48-00005-614	OBS	48-00701-614
48-00005-615	OBS	48-00701-615
48-00005-616	OBS	48-00701-616
48-00005-617	OBS	48-00701-617
48-00005-618	OBS	48-00701-618
48-00005-619	OBS	48-00701-619
48-00005-620	OBS	48-00701-620
48-00005-621	OBS	48-00701-621
48-00005-622	OBS	48-00701-622
48-00005-623	OBS	48-00701-623
48-00005-624	OBS	48-00701-624

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
K	5404B	FEF	10-21-83	REVISED & REDRAWN

COMPILED	FEF	DATE DRAWN	CADAM ORIGINAL		MASTER NUMBER	
APPROVED		10-21-83			00001	000D1

PORTLAND FREIGHTLINER CORPORATION K OREGON 97208

LC-826

DRAWN	D L	TITLE	DRAWING NUMBER
APPRV	GEBO	SHEET-PLASTIC ABS	48-00006
DATE	05/09/79	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. S
CATIA ORIGINAL			

UNLESS OTHERWISE NOTED, DIMENSIONS ARE IN INCHES

SCOPE: THIS SPECIFICATION IDENTIFIES EXTRUDED ACRYLONITRILE-BUTADIENE-STYRENE (ABS) PLASTIC SHEET.

APPLICATION: THERMOFORMED PARTS.

T THICKNESS INCHES	COLOR	FREIGHTLINER PART NUMBER
.047	BLACK	48-00006-005
.060		48-00006-006
.080		48-00006-008
.090		48-00006-009
.125		48-00006-012
.140		48-00006-014
.160		48-00006-016
.187		48-00006-019
.200		48-00006-020
.250		48-00006-025
.047	BROWN	48-00006-505
.047	PEWTER	48-00006-705
.047	LT. OAK	48-00006-805

*DASH NUMBER: 1ST DIGIT=COLOR CODE;
LAST 2 DIGITS=THICKNESS IN 1/100'S IN.

ENGINEERING NOTES:

1. PHYSICAL PROPERTIES:

TENSILE STRENGTH @ 73°F (PSI)	3700-5000
FLEXURAL MODULUS @ 73°F (PSI X 10^5)	2.3-2.6
HARDNESS @ 73°F, ROCKWELL (R SCALE), MIN.	78-85
HEAT DEFLECTION TEMP @ 264 PSI (ANNEALED) F°	200
NOTCHED IZOD @ 73°F (FT-LB/IN)	5.0-8.0
NOTCHED IZOD @ -40°F (FT-LB/IN)	1.4-1.8

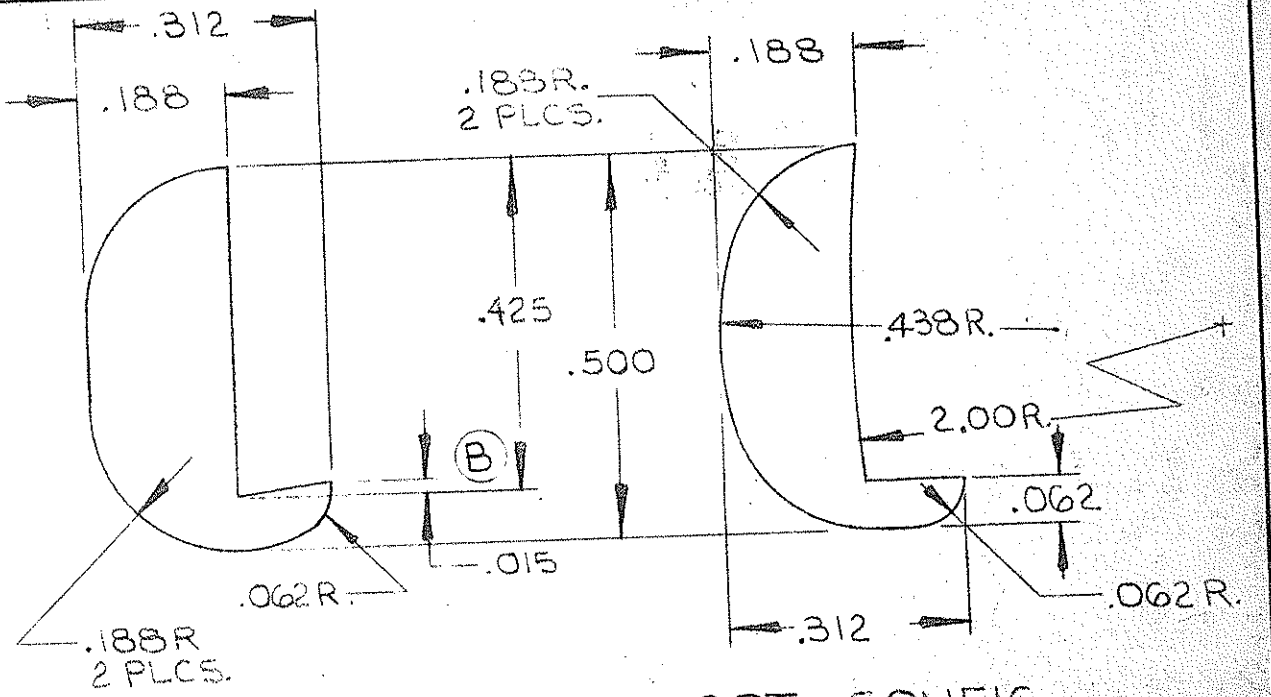
2. SURFACE TEXTURE: ROE PATTERN NO.5 RE51.2

3. MUST PASS FEDERAL MOTOR VEHICLE SAFETY STANDARD NO.302, FLAMMABILITY OF INTERIOR MATERIALS.

4. SUPPLIER: BWC (MARBON CYCOLAC TYPE CGA 4108 X THICKNESS;
AAL (ABS 135 OR ABS 191 AND SPECIFY COLOR)

CHG	JOB NO	DATE	BY	REVISION
R	PA2042-78	08/15/97	DAJ	REVISED AND REDRAWN IN CATIA. NOTE 1 200 WAS 220.
S	P04666-01	02/04/98	DAJ	ADDED -009.

PRINT ISSUED	TITLE	PART NO.
2-23-70	TRIM NOSE BEAM	48-00010
LAST CHG LTR B		SHEET 1 OF 1



STD. CONFIG. OPT. CONFIG.

FL PART NUMBER	TEMP	MINIMUM PLATE PROP. ULTIMATE (PSI)	YIELD (PSI)	ELONG % in 2"	SHEAR STRGTH ULTIMATE (PSI)	FATIGUE LIMIT (PSI) (3)	WELD JOINT PROP. (4) FILLER ALLOY	TS (PSI)	VS (PSI)	ELONG % in 2"
-0	-0	19,000	7,000	18,000	10,000	8,000	4043	21,500	12,000	10.8
-4	T4	19,000	10,000	14,000	16,000	-	4043	24,000	-	12.7
	T4						4043 (5)	30,000	-	13.1
	T4						5356	29,300	-	10.0
-5	T5	22,000	16,000	8	17,000	10,000	5356	17,000	11,000	-
-6	T6	30,000	25,000	8	22,000	10,000	4043	19,800	11,900	7.8

(1) MATERIAL: 6063 Conforms To The Aluminum Association Standards

(2) NEXT ASSEMBLY: VEHICLE and 18-11064

3. Based on 500,000,000 cycles of completely reversed stress using the R.R. Moore type of speciman and machine.

4. Transverse tensile properties of mig weldments

5. Postweld heat treatment was used. T6 is a solution heat treat and artificial aging

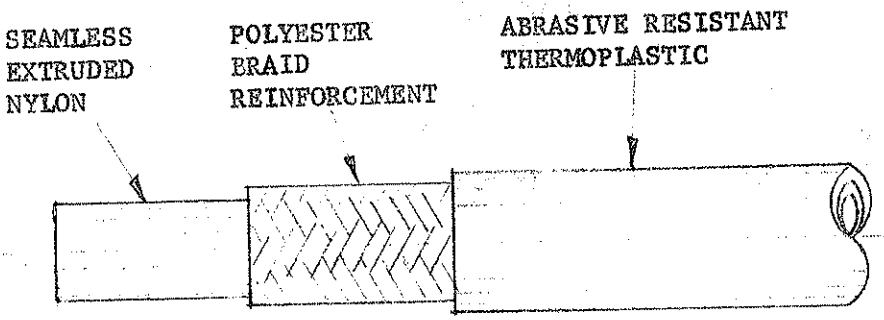
		DATE DRAWN		MATERIAL	NEXT ASSY. NO.
COMPILED	NLK	12-12-69		(1)	(2)
APPROVED	K.J.A.				

Portland FREIGHTLINER CORPORATION Oregon 97208

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	NK	12-12-69	REDREW W/OPT. CONFIG.
B	NK	2-3-70	RELOCATED .425 DIM.

PRINT ISSUED	TITLE	PART NO.
	HOSE FREON	48-00021
LAST CHG. LTR.		SHEET OF



HOSE SIZE I.D. IN.	HOSE SIZE O.D. IN.	PRESSURE MAX. PRES. PSI	PRESSURE MIN BURST PRES. PSI	MIN BEND RADIUS IN.	NET WEIGHT PER 100' LBS.	FREIGHTLINER PART NUMBER
1/8	.312	400	1600	1/2	3.0	48-00021-001
3/16	.368	400	1600	1	4.0	-002
1/4	.508	400	1600	1-1/2	7.6	-003
5/16	.555	400	1600	2	9.2	-004
3/8	.665	400	1600	3	11.8	-005
1/2	.825	400	1600	4	17.2	-006
5/8	.980	350	1400	5	18.0	-007
3/4	1.045	350	1200	6	20.0	-008

① Tube: Imperial-Eastman Nylon 11
Reinforcement: 1 Polyester Braid
Cover: Flame Retardant Thermoplastic
Per SAE Spec. J40
Temperature Range: -40° to +200°F

COMPLIED	PRJ	DATE DRAWN		MATERIAL	NEXT ASSY. NO.
APPROVED	[illegible]	12-10-68		①	VEHICLE

Portland FREIGHTLINER CORPORATION Oregon 97208

12-16-68

E-183

WAS | DATE | BY | CHG

WAS | DATE | BY | CHG

48-00023 SHT 1 of 3

Materials Specification

PRINT ISSUED	TITLE	NO.
3-1-71	PIPE, ANSI STD.	48-00023
LAST CHG. LTR. D	BLACK STEEL	SHEET 1 OF 3

SCOPE

This specification identifies seamless or welded black steel pipe in nominal sizes.

APPLICATION

For structural and certain fluid duct purposes - suitable for welding and forming operations involving coiling, bending and flanging.

SKETCH



SPECIFICATION NUMBERS

1. AISI STD. PIPE (Sched. 40)

NOM SIZE (IN)	O.D. (IN)	I.D. (IN)	WALL THICKNESS (IN)	WEIGHT (LB/FT)	PROPERTIES A IN.^{2}	PROPERTIES e* %	FREIGHTLINER SPECIFICATION NUMBER
1/8	.405	.269	.068	.24	.072	24	48-00023-001
1/4	.540	.364	.088	.42	.125	27	-002
3/8	.675	.493	.091	.57	.167	28	-003
1/2	.840	.622	.109	.85	.250	31	-004
3/4	1.050	.824	.113	1.13	.333	33	-006
1	1.315	1.049	.133	1.68	.494	35	-008
1-1/4	1.660	1.380	.140	2.27	.669	37	-010
1-1/2	1.900	1.610	.145	2.72	.799	38	-012
2	2.375	2.067	.154	3.65	1.075	33	-020
2-1/2	2.875	2.469	.203	5.79	1.704	38	-025
3	3.500	3.068	.216	7.58	2.228	38	-030
3-1/2	4.000	3.548	.226	9.11	2.680	38	-035
4	4.500	4.026	.237	10.79	3.174	38	-040
5	5.563	5.047	.258	14.62	4.300	38	-050
6	6.625	6.065	.280	18.97	5.581	38	-060
8	8.625	7.981	.322	28.55	8.399	38	-080
10	10.750	10.020	.365	40.48	11.91	38	-100
12	12.750	12.000	.375	49.56	14.58	38	-120

* Minimum elongation in 2 inches.

(See ENGINEERING NOTES on Sheet 3)

COMPILED	H.J.R.	DATE DRAWN			UNIT OF MEASURE
APPROVED		11/4/70			INCH

Portland FREIGHTLINER CORPORATION Oregon 97208

CHG	BY	DATE	WAS
A	HJR	11-4-70	Revised & Redrawn
B	TD	7-19-79	SEE M/F HISTORY
C	TA	9-15-82	See M/F History
D	JRP	1/6/84	Add Alt Mtl. A120

92287 N0009 H0129

E-183

Materials Specification

PRINT ISSUED	TITLE	NO.
3-1-71	PIPE, ANSI STD. BLACK STEEL	48-00023
LAST CHG. LTR. D		SHEET 2 OF 3

2. ANSI EXTRA STRONG PIPE (SCHED 80, except 10" pipe, which is SCHED 60, and 12" pipe which has no schedule number).

NOM SIZE (IN)	O.D. (IN)	I.D. (IN)	WALL THICKNESS (IN)	WEIGHT (LB/FT)	PROPERTIES A IN.^{2}	PROPERTIES e* %	FREIGHTLINER SPECIFICATION NUMBER
1/8	.405	.215	.095	.31	.093	25	48-00023-201
1/4	.540	.302	.119	.54	.157	28	-202
3/8	.675	.423	.126	.74	.217	30	-203
1/2	.840	.546	.147	1.09	.320	32	-204
3/4	1.050	.742	.154	1.47	.433	34	-206
1	1.315	.957	.179	2.17	.639	37	-208
1-1/4	1.660	1.279	.191	3.00	.881	38	-210
1-1/2	1.900	1.500	.200	3.63	1.068	38	-212
2	2.375	1.939	.218	5.02	1.477	38	-220
2-1/2	2.875	2.323	.276	7.66	2.254	38	-225
3	3.500	2.900	.300	10.25	3.016	38	-230
3-1/2	4.000	3.364	.318	12.51	3.678	38	-235
4	4.500	3.826	.337	14.98	4.407	38	-240
5	5.563	4.813	.375	20.78	6.112	38	-250
6	6.625	5.761	.432	28.57	8.405	38	-260
8	8.625	7.625	.500	43.39	12.76	38	-280
10	10.750	9.750	.500	54.74	16.10	38	-300
12	12.750	11.750	.500	65.42	19.24	38	-320

(See ENGINEERING NOTES on Sheet 3)

3. ANSI DOUBLE EXTRA STRONG PIPE (No schedule numbers except 10" pipe which is SCHED 140, and 12" pipe, which is SCHED 120).

NOM SIZE (IN)	O.D. (IN)	I.D. (IN)	WALL THICKNESS (IN)	WEIGHT (LB/FT)	PROPERTIES A IN.^{2}	PROPERTIES e* %	FREIGHTLINER SPECIFICATION NUMBER
1/2	.840	.252	.294	1.71	.504	35	48-00023-404
3/4	1.050	.434	.308	2.44	.718	38	-406
1	1.315	.599	.358	3.66	1.076	38	-408
1-1/4	1.660	.896	.382	5.21	1.534	38	-410
1-1/2	1.900	1.100	.400	6.41	1.885	38	-412
2	2.375	1.503	.436	9.03	2.656	38	-420
2-1/2	2.875	1.771	.552	13.70	4.028	38	-425
3	3.500	2.300	.600	18.58	5.466	38	-430
4	4.500	3.152	.674	27.54	8.101	38	-440
5	5.563	4.063	.750	38.55	11.34	38	-450
6	6.625	4.897	.864	53.16	15.64	38	-460
8	8.625	6.875	.875	72.42	21.30	38	-480
10	10.750	8.750	1.000	104.13	30.63	38	-500
12	12.750	10.750	1.000	125.49	36.91	38	-520

* Min. elongation in 2". (See ENGINEERING NOTES on Sheet 3)

COMPILED	H.J.R.	DATE DRAWN			UNIT OF MEASURE
APPROVED		11/4/70			(See Sheet 1)

Portland FREIGHTLINER CORPORATION Oregon 97208

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	--	--	See Sheet 1
B	TD	7-19-79	SEE M/F HISTORY
C	TA	9-15-82	See M/F History
D	JRP	1/6/84	Add Alt Matl. A120

92987 N0009 H0129

ORIGINAL JOB NO.	TITLE	PART NO.
N0009	PIPE, ANSI STD. BLACK STEEL	48-00023
LAST CHG LTR D		SHEET 3 OF 3

CHANGE INFORMATION	DATE	BY	JOB NO.	LTR

CHANGE INFORMATION	DATE	BY	JOB NO.	LTR
SEE M/F HISTORY	9-15-82	TA	N0009	C
Add Alt Mtl. A120	1/6/84	JRP	H0129	D

SPECIFICATIONS

1. PIPE HEREIN DESCRIBED SHALL MEET APPLICABLE PROVISIONS OF THE FOLLOWING STANDARD SPECIFICATIONS:

DESIGNATION		TYPE	DESCRIPTION
ANSI	ASTM		
B36.10	A53*	F	FURNACE - BUTT WELDED, CONTINUOUS WELD
		S	SEAMLESS, GRADES A & B
		E	ELECTRIC - RESISTANCE WELDED, GRADES A & B

2. CHEMICAL REQUIREMENTS

TYPE	COMPOSITION MAX %			
	CARBON	MANGANESE	PHOSPHORUS	SULFUR
TYPE F			0.08	0.06
TYPE S GRADE A	0.25	0.95	0.05	0.06
TYPE S GRADE B	0.30	1.20	0.05	0.06
TYPE E GRADE A	0.25	0.95	0.05	0.06
TYPE E GRADE B	0.30	1.20	0.05	0.06

3. TENSILE REQUIREMENTS

TYPE	TENSILE STRENGTH MIN, PSI (MPa)	YIELD STRENGTH MIN, PSI (MPa)
TYPE F	45000 (310)	25000 (172)
TYPE S & E GRADE A	48000 (331)	30000 (207)
TYPE S & E GRADE B	60000 (413)	35000 (241)

4. TYPE F IS NOT INTENDED FOR FLANGING.

5. WHEN TYPES S AND E ARE REQUIRED FOR CLOSE COILING OR COLD BENDING, GRADE A SHOULD BE SPECIFIED.

* ALTERNATE MATERIAL: ASTM A120

COMPILED	TCA	DATE DRAWN			UNIT OF MEASURE
APPROVED		9/09/82			(See Sheet 1)

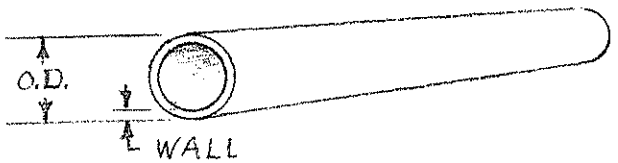
Materials Specification

PRINT ISSUED	TITLE	PART NO.
7/28/71	TUBING, COPPER	48-00024
LAST CHG. LTR A		SHEET 1 OF 4

SCOPE This specification describes minimum requirements for annealed seamless copper tube for automotive use.

APPLICATION Automotive uses as noted by headings: A. General Use, B. Air Brake, C. Water Tube.

SKETCH



SPECIFICATION NUMBERS

A. General use soft annealed seamless copper tube, per SAE Std. J528:

Nom. SIZE	O.D. (IN)	WALL (IN)	I.D. Ref.	TEST PRES (a)	WT. LB/FT	FREIGHTLINER SPECIFICATION NUMBERS
1/8	.125	.030	.065	3500	0.035	48-00024-002
3/16	.188	.030	.128	2200	0.058	-003
1/4	.250	.030	.190	1600	0.080	-004
5/16	.312	.032	.248	1300	0.109	-005
3/8	.375	.032	.311	1100	0.134	-006
1/2	.500	.032	.436	800	0.182	-008
5/8	.625	.035	.555	700	0.251	-010
3/4	.750	.035	.680	550	0.305	-012

(a) $P=2St/(D-0.8t)$ where P= test pressure (psi), S=6000 (psi) allowable stress of material, t= minimum wall thickness (in.), D= outside diameter of tube(in).

B. Air brake copper tubing per SAE Std. J844 (annealed):

Nom. SIZE	O.D. (IN)	WALL (IN)	I.D. Ref.	TEST PRES (b)	WT. LB/FT	FREIGHTLINER SPECIFICATION NUMBERS
1/4	.250	.0295	.191	2100	0.079	48-00024-104
5/16	.312	.0295	.253	1700	0.102	-105
3/8	.375	.0295	.316	1400	0.124	-106
7/16	.437	.0455	.346	1800	0.217	-107
1/2	.500	.0455	.409	1600	0.252	-108
5/8	.625	.0455	.534	1300	0.321	-110
3/4	.750	.0455	.659	1000	0.390	-112
1	1.000	.0455	.909	800	0.529	-116

(b) $P=2St/D$, where P= test pressure, S=9000 (psi) allowable stress of material, t= minimum wall thickness; D= outside diameter of tube.

continued.....

CHG	BY	DATE	
			WAS

CHG	BY	DATE	
A	HJR	3-23-72	Add Sht 3; J #85280

COMPILED	HJR	DATE DRAWN			UNIT OF MEASURE
APPROVED		7-28-71			FT.

Materials Specification

PRINT ISSUED	TITLE	PART NO
8/20/71	TUBING, COPPER	48-00024
LAST CHG. LTR. A		SHEET 2 OF 4

SPECIFICATION NUMBERS (cont'd)

C. Standard copper water tube, per ASTM B88 (Annealed):

(1.) TYPE K wall thickness

STD. SIZE	NOM. O.D. (IN)	WALL (IN)	TOL. ±	I.D. (REF)	TEST PRES (c)	WT LB/FT	FREIGHTLINER SPECIFICATION NUMBER
1/4	.375	.035	.004	.305	1900	.145	48-00024-204
3/8	.500	.049	.004	.402	1750	.269	-206
1/2	.625	.049	.004	.527	1250	.344	-208
5/8	.750	.049	.004	.652	1000	.418	-210
3/4	.875	.065	.0045	.745	1100	.641	-212
1	1.125	.065	.0045	.995	800	.839	-216
1-1/4	1.375	.065	.0045	1.245	550	1.040	-220

(2.) TYPE L wall thickness

1/4	.375	.030	.0035	.315	1600	.126	48-00024-304
3/8	.500	.035	.0035	.430	1200	.198	-306
1/2	.625	.040	.0035	.545	1000	.285	-308
5/8	.750	.042	.0035	.666	850	.362	-310
3/4	.875	.045	.004	.785	750	.455	-312
1	1.125	.050	.004	1.025	600	.655	-316
1-1/4	1.375	.055	.0045	1.265	550	.884	-320

(3.) TYPE M wall thickness

3/8	.500	.025	.0025	.450	850	.145	48-00024-406
1/2	.625	.028	.0025	.569	700	.204	-408
3/4	.875	.032	.003	.811	500	.328	-412
1	1.125	.035	.0035	1.055	430	.465	-416
1-1/4	1.375	.042	.0035	1.291	400	.682	-420

(c) $P=2St/(D-0.8t)$ where P= test pressure (psi), S=6000 (psi) allowable stress of material, t= minimum wall thickness (in.), D= outside diameter of tube(in).

continued.....

CHG	BY	DATE	
			WAS

CHG	BY	DATE	
A	HJR	3-23-72	Add Sht 3: J #85280

					UNIT OF MEASURE
COMPILED	HJR	DATE DRAWN			FT.
APPROVED		7-28-71			

SPECIFICATION NUMBERS (cont'd)

D. Standard copper water tube, per ASTM B88 (Hard Drawn):

(1.) TYPE K wall thickness

STD. SIZE	NOM. O.D. (IN)	WALL (IN)	TOL. ±	I.D. (REF)	TEST PRES (c)		WT LB/FT	FREIGHTLINER SPECIFICATION NUMBER
1/4	.375	.035	.004	.305	1900		.145	48-00024-504
5/16	.438	.035	.004	.368	1575		.171	-505
3/8	.500	.049	.004	.402	1750		.269	-506
1/2	.625	.049	.004	.527	1250		.344	-508
5/8	.750	.049	.004	.652	1000		.418	-510
3/4	.875	.065	.0045	.745	1100		.641	-512
1	1.125	.065	.0045	.995	800		.839	-516
1-1/4	1.375	.065	.0045	1.245	550		1.040	-520

(2.) TYPE L wall thickness

1/4	.375	.030	.0035	.315	1600		.126	48-00024-604
3/8	.500	.035	.0035	.430	1200		.198	-606
1/2	.625	.040	.0035	.545	1000		.285	-608
5/8	.750	.042	.0035	.666	850		.362	-610
3/4	.875	.045	.004	.785	750		.455	-612
1	1.125	.050	.004	1.025	600		.655	-616
1-1/4	1.375	.055	.0045	1.265	550		.884	-620

(3.) TYPE M wall thickness

3/8	.500	.025	.0025	.450	850		.145	48-00024-706
1/2	.625	.028	.0025	.569	700		.204	-708
3/4	.875	.032	.003	.811	500		.328	-712
1	1.125	.035	.0035	1.055	430		.465	-716
1-1/4	1.375	.042	.0035	1.291	400		.682	-720

(c) $P=2St/(D-0.8t)$ Where P = Test Pressure (psi)
S = 6000 (psi) Allowable Stress of Material
t = Minimum Wall Thickness (in.)
D = Outside Diameter of Tube (in.)

CHG	BY	DATE	WAS
A	HJR	3-23-72	Added Sht. 3; J #85280

CHG	BY	DATE	WAS

ns

Materials Specification

PRINT ISSUED	TITLE	PART NO.
8/20/71	TUBING, COPPER	48-00024
LAST CHG LTR. A		SHEET 4 OF 4

48-00024

WAS

CHG	BY	DATE

WAS Sht 3: J #85280

CHG	BY	DATE
A	HJR	3-23-72

SPECIFICATIONS

1. Material:

	ALLOY	TEMPER	ULTIMATE STRENGTH (TENSILE) psi	YIELD STRENGTH (TENSILE) psi	ELONGATION IN 2 INCHES % MIN.	MUST COMPLY WITH
A.	SAE CA122 Alternates: CA102 CA120	Drawn Soft Annealed	30,000 min.	9,000 min.		SAE J528 ASTM 75
B.	SAE CA122	Drawn Bright Annealed	30,000 max.	9,000 min. (a)	3/4" O.D. & under: 30 over 3/4" O.D.: 40	SAE 844
C.	SAE CA122	Annealed	30,000 min.	ROCKWELL HARDNESS Coil: F 50 max. Straight Lengths: F 55 max.		ASTM B75 B88
		Drawn		30T 30 min.		

(a) At 0.5% extension under load.

2. Quality: Tubing shall be clean, smooth, round and free of internal and external mechanical imperfections, corrosion, scale, seams and cracks.

		DATE DRAWN			UNIT OF MEASURE
COMPILED	HJR	7-28-71			FT.
APPROVED					

Portland FREIGHTLINER CORPORATION Oregon 97208

48-00025

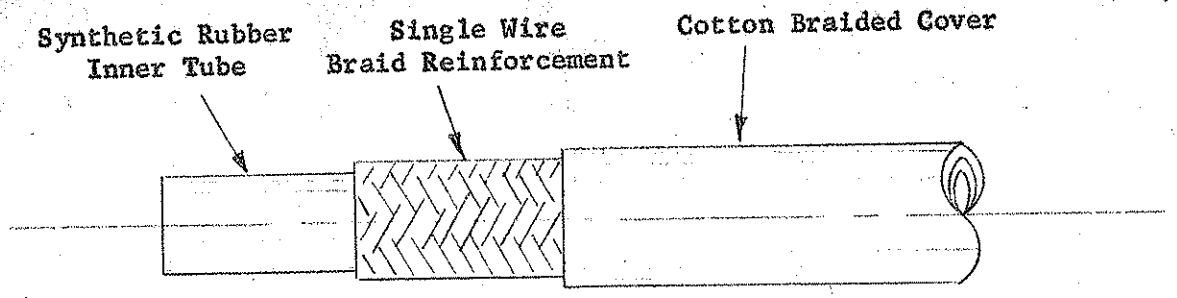
Materials Specification

PRINT ISSUED	TITLE	PART NO.
6 2 71	HOSE, MEDIUM PRESSURE REFRIGERANT	48-00025
LAST CHG. LTR. A		SHEET OF

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	HJR	5-20-71	Rev'd; New Format

SKETCH



PART NUMBERS

HOSE SIZE I.D. INCHES	HOSE SIZE O.D. INCHES	PRESSURE WORKING (MAX) PSI	PRESSURE BURST (MIN) PSI	MIN BEND RADIUS INCHES	VACUUM in/Hg	FREIGHTLINER PART NUMBER
3/16	1/2	350	2500	3.00	28	48-00025-001
1/4	37/64	350	2500	3.38	28	-002
5/16	43/64	350	2500	4.00	28	-003
13/32"	3/4	350	2500	4.62	28	-004
1/2	59/64	350	2500	5.50	28	-005
5/8	1- 1/16	350	2500	6.50	28	-006
7/8	1-15/16	350	2500	7.38	28	-007
1- 1/8	1- 1/2	350	2500	9.00	28	-008
1- 3/8	1- 3/4	350	2000	10.50	28	-009

ENGINEERING NOTES

(1) Material: Automotive Air Conditioning Hose, Type B per SAE Std J51b. (Ref. AQ #1540 Medium Pressure Hose, or equal)

2. Temperature Range: -15°F to +250°F (-27°C to +121°C)

COMPILED	KJA	DATE DRAWN		MATERIAL	UNIT OF MEASURE
APPROVED		12-18-68		(1)	INCH

ORIGINAL JOB NO.	TITLE	PART NO.
C1500	POWDER COATING TEXTURED	49-00035
LAST CHG LTR		SHEET 1 OF 1

CHANGE INFORMATION | LTR | JOB NO. | BY | DATE

CHANGE INFORMATION | LTR | JOB NO. | BY | DATE

SCOPE: This specification covers an electrostatically applied powder coating of a specific gloss equal to 5% on a 60° Gardner meter, and a specific texture, equal to Moldtech 1055.

APPLICATION: Originally used for dash and other interior panels. To be specified when a relatively durable textured coating for interior panels is desired. Generally suitable for use on exterior panels, if mild chalking is acceptable.

SPECIFICATION NUMBERS:

SUBSTRATE	PROCEDURE NUMBER	MANUFACTURER'S NUMBER POLYMER CORP.	FREIGHTLINER SPECIFICATION NO.
Aluminum	1.	(PYM) ECC 1556 FT2 05H Black 47041	49-00035-000
Steel	2.	(PYM) ECC 1556 FT2 05H Black 47041	49-00035-100

PROCEDURE:

1. Aluminum: 1) Clean and degrease, either with a detergent, such as Allied Kelite 25L, or a solvent degreaser such as trichloroethane or chlorothane DG.

   2) Apply chromate conversion coating such as Allied Kelite Iridite.

   3) Apply powder 2.5 to 3.0 mils thick, using an electrostatic sprayer.

   4) Heat cure according to the following alternative schedules

      a) 17 minutes @ 360°F. (minimum cure temperature)
      b) 15 minutes @ 375°F.
      c) 12 minutes @ 400°F.
      d) 10 minutes @ 425°F.

2. Steel: 1) Degrease as above.
   2) Apply iron phosphate coversion coating.
   3. Apply powder and cure as above.

ENGINEERING NOTES

1. ECC 1556 FT2 05H Black 47041 is an epoxy powder, trade named Corvel.

COMPILED	RDF	DATE DRAWN			
APPROVED	BEL	5/21/81			

Portland FREIGHTLINER CORPORATION Oregon 97208

M/F

ORIGINAL JOB NO.	TITLE	PART NO.
C1500	PROCESS SPECIFICATION	49-00036
LAST CHG LTR	TEXTURED PAINT FOR INTERIOR CAB PARTS	SHEET 1 OF 1

CHANGE INFORMATION	DATE	BY	JOB NO.	LTR

SCOPE: This specification covers a catalyzed polyurethane liquid coating, with texture equal to samples approved by FREIGHTLINER CORPORATE ENGINEERING DEPARTMENT and DESIGN CENTER. The coating is a Sherwin-Williams Product trade-named Polane T.

APPLICATION: Originally used for dash, door sills and ashtray. Generally suitable for interior use on foamed and plain polycarbonate and ABS, plain styrene, Genal and metal. Substrates other than these may require different preparation and priming. Exterior applications require a different catalyst, and metals may require a different primer.

SPECIFICATION NUMBERS:

Color	Procedure Number	Primer	Base/Texture	Catalyst	Freightliner Specification #
SADDLE	1	(SWP) Z99NY18 SPRA-FIL	(SWP) Z99NY17	(SWP) V66V27	49-00036-000
BLACK	1	(SWP) D61BB2 SPRA-FIL	(SWP) Z99BY4	(SWP) V66V27	49-00036-001

1)a. Wipe substrate with a 10% solution of MEK in water to remove contamination, mold release, etc.

b. Prime and sand if necessary, using specified SPRA-FIL primer, catalyzed at 10:1, reduced with a minimum amount of R7KB29 reducer.

c. Catalyze base coat at 6:1 then reduce at 3:1 with R7KB29 reducer and apply to approximately 1 mil dry. Allow at least 5 minutes to flash-off before applying texture coat.

d. Apply texture coat to match approved sample. Texture coat is reduced only if necessary and is omitted if part is textured in the mold.

CHANGE INFORMATION	DATE	BY	JOB NO.	LTR

COMPILED	KDF	DATE DRAWN			
APPROVED	BEL	5/21/81			

48-00049

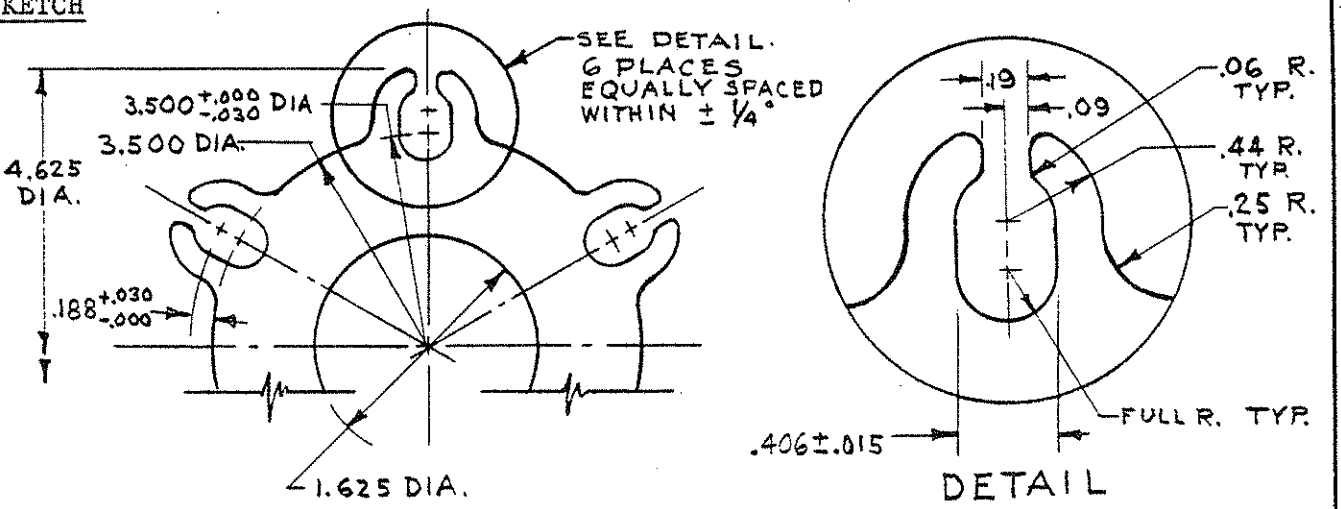
Materials Specification

PRINT ISSUED	TITLE	PART NO.
	EXTRUSION, FAN SPACER	48-00049
LAST CHG. LTR. E		SHEET 1 OF 1

SCOPE This specification identifies an extruded light metal section.

APPLICATION Spacer for engine cooling fan mounted with six 3/8" or 5/16" dia. bolts on 3.50" to 3.88" diameter bolt circle.

SKETCH



SPECIFICATION NUMBERS

MATERIAL & TEMPER	AREA OF SECTION	WEIGHT LB/FT		EXTRUSION DIE NUMBER ALU		FREIGHTLINER SPECIFICATION NUMBER
6061-T6	8.60	10.3		241045		48-00049-000

SPECIFICATIONS

(1) Material: See Table
2. Finish: As extruded

CHG	BY	DATE	WAS	JOB NO.

CHG	BY	DATE	WAS	JOB NO.
D	HJR	6-10-76	Rev'd & Redrn 2011-T3 to 6061-T6	A0820 9023
E	SK	1/30/79		

COMPILED	HJR	DATE DRAWN			UNIT OF MEASURE
APPROVED		6-10-76			FT.

Portland FREIGHTLINER CORPORATION Oregon 97208

E-183

48-0050

Materials Specification

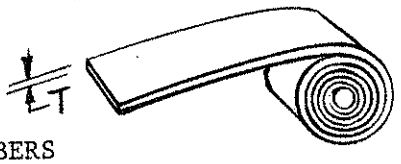
PRINT ISSUED		TITLE	PART NO.
		TAPE, VINYL FOAM SINGLE FACE 10 LB. DENSITY	48-00050
LAST CHG. LTR.	G		SHEET 1 OF 1

CHG	BY	DATE	WAS
			JOB NO

SCOPE This specification identifies pressure-sensitive closed cell vinyl foam tape, adhesive one side only.

APPLICATION Moisture and air sealant for mechanically fastened lap joints.

SKETCH



SPECIFICATION NUMBERS

T THICKNESS	MANUFACTURER'S NUMBER NTP		FREIGHTLINER SPECIFICATION NUMBERS *
1/32			48-00050-1XX
1/16	V542		-2
3/32	V543		-3
1/8	V544		-4
3/16	V546		-5
1/4	V548		-6
3/8	V5412		-7
1/2	V5416		-8

*The first digit in the dash number indicates the thickness code. The last two digits indicate width as follows: -X01 to -X64 indicates widths in 1/8" increments from 1/8" to 8" respectively; -X81 to -X99 specify assigned widths as follows: -X81 = 23" wide, -X82 = 27.75".

CHG	BY	DATE	WAS	JOB NO
D	HJR	7-13-72	Rev'd & Redrawn	72510
E	HJR	6-26-74	V541	A0635
F	HJR	11-6-75	Updated Specs	C0735
G	PD	4-10-81	FOOT WAS INCH	C1500D

SPECIFICATIONS

Force to Compress (psi) 30%	(psi) per ASTM D1667	5.0
Density (lb/cu ft)	per ASTM D1667	10
Shore 00 Hardness	per ASTM D2240	32
Elongation (% at point of break)	per PSTC 31	165
Oxidation Resistance		Excellent
Service Temperatures		
a. Minimum		-20°F
b. Maximum Continuous (Intermittent)		+180°F (up to +200°F)
Water Absorption (Compressed 30%)		2 max.
Peel Adhesion (oz/in)		16

Compressed Set (ASTM D1667)	% Loss from Original Height
Compressed 30% of Original Height	7

Compression Deflection	P.S.I.
Compressed 30% of Original Height	4
Flammability per ASTM D1692	Self-Extinguishing
K Factor (Thermal Conductivity) $\frac{(B.T.U.)(in.)}{(sq.\ ft.)(hr.)(°F)}$	.28
Color	Aluminum Gray

Norton 540 Series Tape (Polyvinyl chloride foam)

		DATE DRAWN			UNIT OF MEASURE
COMPILED	HJR	7-13-72			(G) FOOT
APPROVED	Rollins				

Portland FREIGHTLINER CORPORATION Oregon 97208

ns

48-00081

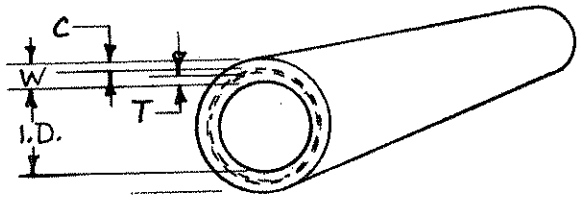
Materials Specification

PRINT ISSUED		TITLE	PART NO.
		HOSE, HEATER SAE J20R4 (D-1)	48-00081
LAST CHG. LTR.	F		SHEET 1 OF 1

SCOPE This specification identifies normal service type yarn reinforced, cracking and hardening resistant, rubber hose. Class D-1

APPLICATION Connecting hot-water heaters in the coolant circulating system.

SKETCH



	Thickness
Tube, T	.062 (min.)
Cover, C	.032 (min.)
Wall, W	.17 - .22

SPECIFICATION NUMBERS (F)

HOSE I.D.	TOLERANCE I.D.	BURST PRESSURE P.S.I.			FREIGHTLINER SPECIFICATION NUMBER *
3/8	±.03 All Diameters	180			48-00081-038
1/2		170			-050
5/8		160			-062
3/4		150			-075
1		140			-100
1-1/8					-112
1-1/4		130			-125
1-1/2		120			-150
1-3/4		110			-175
2		100			-200
2-1/4		90			-225
2-1/2		80			-250
2-3/4		-	-		-275
3		-	-		-300
3-1/2		-	-		-350

*Dash number is nominal I.D. of hose in hundredths of an inch.

SPECIFICATIONS

1. Material: Tube & Cover: Class D-1 per latest revision SAE Std J20R4., composed of ethylene propylene dienes (EPDM).
   Reinforcement: 1 or more ply of knitted or spiral wrapped braided yarn.
   Alternate: SAE Std. J20R3(D-2)

					UNIT OF MEASURE
COMPILED	HJR	DATE DRAWN			FT.
APPROVED	Rollins	4-12-72			

Portland FREIGHTLINER CORPORATION Oregon 97208

CHG	BY	DATE	WAS
E	NR	4-27-82	ADD SPIRAL WRAPPED; 641E
F	NR	10-14-82	DEL: WORKING PRESSURE 0335B

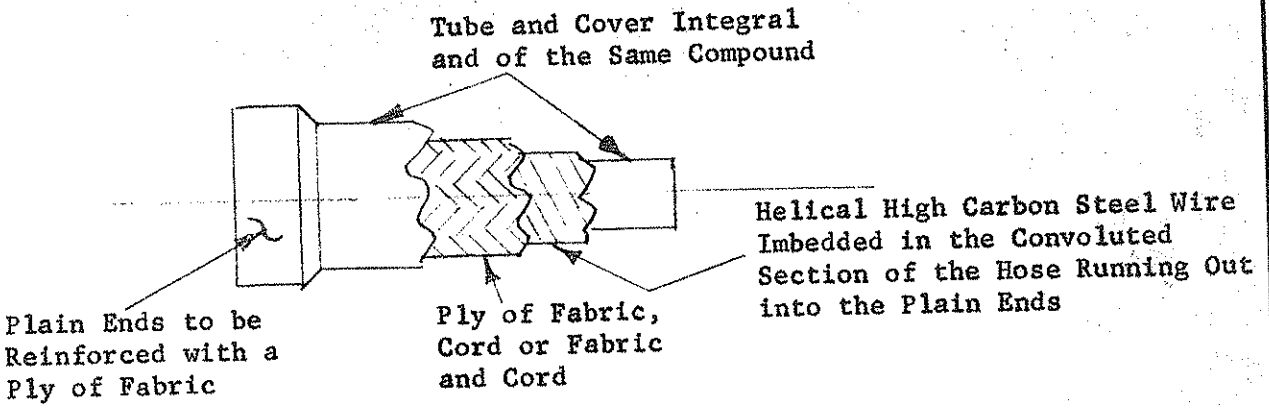
CHG	BY	DATE	WAS
A	HJR	4-12-72	Rev'd & Redrawn; J#94420
B	DL	2-23-77	Add EPDM. A0858
C	KJY	3-30-81	CHG'D BURST & WORKING PRES. 0125A 76144
D	NR	7-23-81	ADD ALT. MAT'L; R14 TO D-1

ns

E-183

FED C B A

PRINT ISSUED	TITLE	PART NO.
2-14-69	HOSE, COOLANT SYSTEM, FLEXIBLE, WIRE REINFORCED, NORMAL SERVICE TYPE - SAE 20R5 - OPTION I	48-00082
LAST CHG. LTR.		SHEET 1 OF 1



DASH NUMBER	NOM. SIZE	BURST PRESSURE (PSI)	WORKING PRESSURE (PSI)	
-001	3/8			
-002	1/2			
-003	5/8			
-004	3/4			
-005	1			
-006	1-1/8	120	90.0	
-007	1-1/4	120	90.0	
-008	1-1/2	120	90.0	
-009	1-3/4	100	75.0	
-010	2	90	67.5	
-011	2-1/4			
-012	2-1/2			
-013	2-3/4			
-014	3			

WAS | DATE | BY | CHG

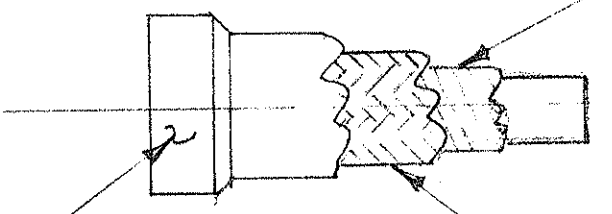
WAS | DATE | BY | CHG

COMPILED	PRJ	DATE DRAWN		MATERIAL	NEXT ASSY. NO.
APPROVED		2-11-69		SEE ABOVE	VEHICLE

Portland FREIGHTLINER CORPORATION Oregon 97208

48-00083

PRINT ISSUED	TITLE	PART NO.
2-19-9	HOSE, COOLANT SYSTEM, FLEXIBLE, WIRE REINFORCED, NORMAL SERVICE TYPE - SAE 20R5 - OPTION II	48-00083
LAST CHG. LTR.		SHEET 1 OF 1



DASH NUMBER	NOM. SIZE	BURST PRESSURE (PSI)	WORKING PRESSURE (PSI)	
-001	3/8			
-002	1/2			
-003	5/8			
-004	3/4			
-005	1			
-006	1-1/8	120	90.0	
-007	1-1/4	120	90.0	
-008	1-1/2	120	90.0	
-009	1-3/4	100	75.0	
-010	2	90	67.5	
-011	2-1/4			
-012	2-1/2			
-013	2-3/4			
-014	3			

WAS | DATE | BY | CHG

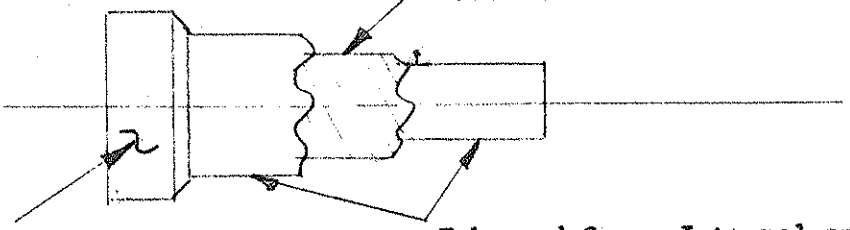
WAS | DATE | BY | CHG

COMPILED	PRJ	DATE DRAWN		MATERIAL	NEXT ASSY. NO.
APPROVED	K.JA	2-11-69		SEE ABOVE	VEHICLE

Portland FREIGHTLINER CORPORATION Oregon 97208

48-00084

PRINT ISSUED	TITLE	PART NO.
2-19-9	HOSE, COOLANT SYSTEM, FLEXIBLE, WIRE REINFORCED, NORMAL SERVICE TYPE - SAE 20R5 - OPTION III	48-00084
LAST CHG. LTR.		SHEET 1 OF 1



DASH NUMBER	NOM. SIZE	BURST PRESSURE (PSI)	WORKING PRESSURE (PSI)	
-001	3/8			
-002	1/2			
-003	5/8			
-004	3/4			
-005	1			
-006	1-1/8	120	90.0	
-007	1-1/4	120	90.0	
-008	1-1/2	120	90.0	
-009	1-3/4	100	75.0	
-010	2	90	67.5	
-011	2-1/4			
-012	2-1/2			
-013	2-3/4			
-014	3			

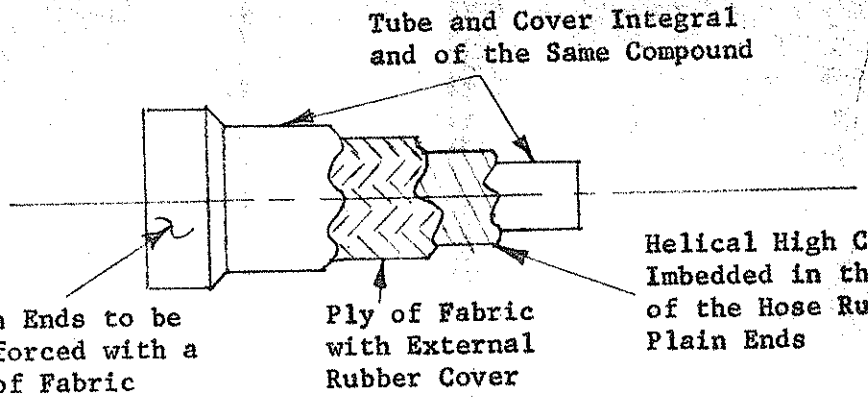
CHG	BY	DATE	WAS

CHG	BY	DATE	WAS

COMPILED	PRJ	DATE DRAWN		MATERIAL	NEXT ASSY. NO.
APPROVED	KJA	2-11-69		See Above	VEHICLE

Portland FREIGHTLINER CORPORATION Oregon 97208

PRINT ISSUED	TITLE	PART NO.
2-19-9	HOSE, COOLANT SYSTEM, FLEXIBLE, WIRE REINFORCED, NORMAL SERVICE TYPE - SAE 20R5 - OPTION IV	48-00085
LAST CHG. LTR.		SHEET 1 OF 1



DASH NUMBER	NOM. SIZE	BURST PRESSURE (PSI)	WORKING PRESSURE (PSI)	
-001	3/4			
-002	1/2			
-003	5/8			
-004	3/4			
-005	1			
-006	1-1/8	120	90.0	
-007	1-1/4	120	90.0	
-008	1-1/2	120	90.0	
-009	1-3/4	100	75.0	
-010	2	90	67.5	
-011	2-1/4			
-012	2-1/2			
-013	2-3/4			
-014	3			

CHG	BY	DATE	WAS

COMPILED	PRJ	DATE DRAWN		MATERIAL	NEXT ASSY. NO.
APPROVED		2-10-69		SEE ABOVE	VEHICLE

Portland FREIGHTLINER CORPORATION Oregon 97208

Compiled	H.J.R.	MATERIALS SPECIFICATION ELECTROLYTE, STORAGE BATTERY SULFURIC ACID	48-00093
Approved	H.J.A.		
Issued	6-23-69	FREIGHTLINER CORPORATION PORTLAND, OREGON	
Revised		Chg Ltr	

SCOPE: This specification covers lead-acid wet cell, sulfuric battery electrolyte.

GENERAL: All dry charged lead-acid batteries will be energized and/or replace electrolyte due to spillage or evaporation, with the electrolyte recommended by the battery manufacturer.

If no electrolyte is recommended or available from manufacturer, the following solution will be used:

Industrial Grade Sulfuric Acid (H_2SO_4),

Electrolytic - Cream type,

In solution of 35% Sulfuric Acid and 65% pure water (H_2O) with a specific gravity of 1.260.

CAUTION: MIXING TO REQUIRED SPECIFIC GRAVITY IS A HAZARDOUS OPERATION AND WILL NOT BE DONE ON FREIGHTLINER PREMISES.

Call out of lead-acid storage battery electrolyte will be a note specifying material spec no. and brief descriptive title as follows:

"Sulfuric Acid Battery Electrolyte 48-00093"

Form E-45 A

6-26-69

DRAWN	ERK	TITLE	ITEM NUMBER
APPRV	KCB	SEALANTS/ ADHESIVES	48-00094
DATE	01/03/84	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 3

SCOPE: THIS SPECIFICATION DESCRIBES SEALANT, THREAD LOCK, ANTI-SEIZE, CAULK, GASKET FORMING AND ADHESIVE COMPOUNDS FOR AUTOMOTIVE USE.

APPLICATION: THE MATERIALS MENTIONED ARE ACCEPTABLE FOR USE WITH FREIGHTLINER PRODUCTS IN THE AREAS DESCRIBED. UNLESS SPECIAL INSTRUCTIONS ARE GIVEN, ALL MANUFACTURERS INSTRUCTIONS ARE TO BE FOLLOWED IN THE USE OF THESE PRODUCTS.

	USAGE	F/L SPECIFICATION NUMBER 48-00094		
1.	THREAD ANTI-SEIZE COMPOUND GENERAL USE			-101
2.	THREAD SEALANTS PIPE, GENERAL USE	-105	-111	
	HYDRAULIC JOINTS HOT OIL, HOT WATER JOINTS	-105		-141
	REFRIGERANT JOINTS WITH O-RINGS	-105	-141	
	REFRIGERANT JOINTS W/O O-RINGS			-121
3.	THREAD & SPLINE LOCK COMPOUND SCREWS, NUTS UNDER VIBRATION SET SCREWS, ADJUSTABLE SCREWS	-171	-145	-141
	STUDS WITH BREAK LOOSE TORQUE GREATER THAN CLASS 5 FORCE FIT			-131
	STEERING GEAR INPUT SHAFT SPLINES			-161
4.	WINDSHIELD SEALANT GLASS TO MOLDING, MOLDING TO METAL			-401
5.	FLEXIBLE WEATHER SEALANT CLEAR SILICONE, CARTRIDGE GRADE, METAL TO METAL, WIRE ENTRY, ROOF COMPONENTS. POST PAINT ONLY.			-501
	BLACK, RAPID CURE, CARTRIDGE GRADE, TOP OF WINDOW GUIDE CHANNEL AND FLANGE BRACKET. POST PAINT ONLY.			-505
	PAINTABLE, AIR DRY SYNTHETIC RUBBER, CARTRIDGE GRADE SEALS GAPS AND HOLES TO 3/16", PRE OR POST PAINT, NOT SUITABLE FOR E-COAT PROCESSING.			-510
	PAINTABLE, AIR DRY SYNTHETIC RUBBER, CARTRIDGE GRADE OR BULK, SEALS GAPS AND HOLES TO 3/16" PRE OR POST PAINT, AIR CURED SEALANT (MIN 48 HRS) ALSO CAN BE USED AS AN ANTI-CORROSION COMPOUND BETWEEN SIMILAR OR DISSIMILAR METALS. PAINTABLE, MOISTURE CURE, POLYURETHANE CARTRIDGE GRADE ONLY. FLEXIBLY BONDS & SEALS SEAMS, GAPS, AND HOLES TO 3/16". PRE OR POST PAINT SUITABLE FOR E-COATED SURFACES AFTER E-COAT PROCESSING ONLY.			-520
	PAINTABLE, WELD-THRU, HEAT CURE VINYL PLASTISOL SEALANT, CARTRIDE OR BULK, SEALS GAPS AND HOLES TO 3/16" PRE PAINT W/E-COAT PROCESSING ONLY, MINIMUM, CURE TIME 30 MIN @ 300°F. ALSO CAN BE USED AS AN ANTI-CORROSION COMPOUND BETWEEN DISSIMILAR OR SIMILAR METALS.		-530	-531

CHG	JOB/RLSE NO	DATE	BY	REVISION
AL	P1446F-01	08/15/89	ERK	VENDOR CHANGES, PAGE #3
AM	P8057G-01	02/07/90	ERK	SEE PAGE #3
AN	P0088E-01	03/29/91	ERK	SEE PAGE #2 AND #3

DRAWN	ERK	TITLE	ITEM NUMBER
APPRV	KCB	SEALANTS/ ADHESIVES	48-00094
DATE	01/03/84	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 2 OF 3

APPLICATION:

	USAGE	F/L SPECIFICATION NUMBER 48-00094		
6.	CAULKING NON-HARDENING, GAP AND HOLE FILLER			-601
7.	GASKETS FORM IN PLACE			-701
8.	ADHESIVES INSULATION, INTERIOR ROOF SEAL			-801
	RUBBER, Z-STRIPS, BACKING PLATES			-901
	CONTACT, TUNNEL/HOOD LINERS, RUBBER DOOR SEALS			-951
	MORE AGRESSIVE TUNNEL/HOOD LINER CONTACT ADHESIVE		-952	

SPECIFICATIONS:

PRODUCT (NOTES: SEE PAGE 2)	MFR CODE	UNIT OF MEASURE (1)	FREIGHTLINER SPECIFICATION NUMBER
ARMITE LED-PLATE NO. 250 NEVER-SEEZ	ALK NSC		48-00094-101
LOCTITE 592 PERMA-LOK LH-050 -951	LOC PMB	EA EA	-105
BAKERSEAL NO. 899-2 (WHITE)	BRK		-111
LOCTITE 277	LOC	LITER	-121
LOCTITE 271 PERMA-LOK HM-128 (3)	LOC PMB	EA EA	-131
LOCTITE 242 (3) PERMA-LOK MM115	LOC PMB	LITER GAL	-141 -145
LOCTITE 680 (3)	LOC	EA	-161
LOCTITE 272 (4) PERMA-LOK HH-120	LOC PMB	OZ OZ	-171
3M NO. 5537	MMM	GAL	-401
LOCTITE 595 RPI RHODORSIL 3BC/NAT'L POLY. SEALCON II, CLR DOW CORNING NO. 732 GE IS 808 GE RTV 108 (TRANSLUCENT) CHEM-CALK 1200 (BOSTIK 9732 CLEAR) RED DEVIL 0826 OI (CLEAR)	LOC RPI/ DOW GE GE BOT RDI	EA EA EA EA EA EA EA	-501

CHG	JOB/RLSE NO	DATE	BY	REVISION
AL	P1446F-01	08/15/89	ERK	SEE PAGE #1
AM	P8057G-01	02/07/90	ERK	SEE PAGE #3
AN	P0088E-01	03/29/91	ERK	CLARIFIED -952 USAGE

DRAWN	ERK	TITLE	ITEM NUMBER
APPRV	KCB	SEALANTS/ ADHESIVES	48-00094
DATE	01/03/84	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 3 OF 3

SPECIFICATIONS:

LOCTITE 593 GE IS 803 RPI RHODORSIL 3BBL/NAT'L POLY.SEALCON II,BLK CHEM-CALK 1200 (BOSTIK 9732 BLACK)	LOC GE RPI/ BOT	EA EA EA EA	-505	
3M NO. 404 (GREY OR WHITE) DOW CORNING NO. 8644	MMM DOW	GAL GAL	-510	
DOLCHEM NO. 6060 (BULK,CARTRIDGE) (5) DOLCHEM NO. 6068 CHEM-CALK 1000 FS (AD)(AF) (2) NATIONAL POLYMER PRODUCTS, UREASEAL	DPH DPH BOT	LB	-520	AL AL
DOLCHEM NO. 6100 (BULK)	DPH	LB	-530	
DOLCHEM NO. 6102 (BRUSHABLE) (2)	DPH	LB	-531	
DOLCHEM NO. 6076 (BLACK) (2) MORTITE	DPH MJW	EA EA	-601	AL AM
PERMATEX NO. 2 FORM-A-GASKET LOCTITE 515 GASKET ELIMINATOR PERMA-LOK HH-190 FLANGE SEAL	PEX LOC PMB	EA EA EA	-701	
3M NO. 42 NF PLUS INSULATION ADHESIVE	MMM	GAL	-801	AL
3M NO. 1300 RUBBER ADHESIVE	MMM	GAL	-901	
HB FULLER SC1112 CONTACT ADHESIVE HB FULLER SC920 CONTACT ADHESIVE POLYLOK 371 CONTACT SPRAY/BRUSH ADH NATIONAL POLYMER CONTACT ADH #1169S	HBF HBF PIM	GAL GAL GAL GAL	-951	AN
NATIONAL POLYMER,LAMINATING ADH; 1167S		GAL	-952	

(1) UNIT OF MEASURE: SEE CHART.

(2) THIS SEALANT CAN BE USED AS AN ANTI-CORROSION COMPOUND BETWEEN DISSIMILAR METALS.

(3) USEABLE TEMPERATURE RANGE TO 300° F.

(4) HIGH TEMPERATURE APPLICATION: GOOD TO 450° F.

(5) SUITABLE ONLY FOR USE AS AN ANTI-CORROSION COMPOUND BETWEEN DISSIMILAR METALS. AL

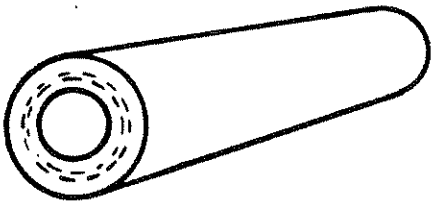
CHG	JOB/RLSE NO	DATE	BY	REVISION
AL	P1446F-01	08/15/89	ERK	SEE PAGE #1
AM	P8057G-01	02/07/90	ERK	SPECIFICATION & VENDOR CHANGE -601
AN	P0088E-01	03/29/91	ERK	ADD NAT'L POLY. 1169S TO -951

PRINT ISSUED		TITLE	PART NO.
		HOSE, COOLANT SYSTEM OIL RESISTANT HEAVY DUTY TYPE	48-00098
LAST CHG LTR	B		SHEET 1 OF 1

SCOPE This specification identifies a heavy wall oil resistant synthetic rubber hose with multiple ply cord or fabric reinforcement.

APPLICATION For severe, critical and heavy-duty diesel and gasoline truck engine cooling systems.

SKETCH



SPECIFICATION NUMBERS

I.D. NOM. (INCHES)	O.D. REF. (INCHES)	WALL THICKNESS (INCHES)	BURST PRESSURE PSI (MIN.)	MFR. NO. GT	OLD NUMBER (NOW OBS. X2)	FREIGHTLINER SPECIFICATION NUMBERS
1-1/4	1-13/16		500	4176Y x 1.25 ID	48-00098-001	48-00098-125
1-1/2	2- 1/16		450	1.50	-002	-150
1-3/4	2- 5/16	15/64 min.	400	1.75	-003	-
2	2- 9/16	9/32 max.	350	2.00	-004	-
2-1/4	2-13/16		350	2.25	-005	-225
2-1/2	3- 1/16		300	2.50	-006	-
2-3/4	3- 5/16		250	2.75	-007	-275
3	3- 9/16		250	3.00	-008	-300

SPECIFICATIONS

1. Material: To conform to provisions of SAE Std J20 (20R 1, Heavy Wall.

2. Construction: Tube: Minimum .062 thick, Class SB Material.
   Reinforcement: Multiple ply wrapped fabric, or ply or plies of braided or knitted yarn to meet minimum burst requirements.
   Cover: Minimum .032 thick, Class SC Material.

CHG	BY	DATE	WAS
C	DL	3-11-74	480098 to 48-00098 J#A0579
D	ERK	07/25/88	DWG. UPDATE: P*A078-37
B			

CHG	BY	DATE	WAS
A	HJR	7-13-72	Rev'd & Redrawn; Dash No's changed, Omit light wall hose data; J#85850
B	HJR	9-28-72	Add MFR Nos; J #60130

COMPILED	HJR	DATE DRAWN			UNIT OF MEASURE
APPROVED	Rollins	7-13-72			F1

Portland FREIGHTLINER CORPORATION Oregon 97208

ns

E-183

B M/E

APPRV	KCB	HOSE-COOLANT SYSTEM, NITRILE RUBBER SAE 20R1, STANDARD WALL	48-00099
DATE	04/23/90	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1

UNLESS OTHERWISE NOTED, ALL DIMENSIONS IN INCHES.

SCOPE: THIS SPECIFICATION IDENTIFIES A STANDARD WALL, OIL RESISTANT SYNTHETIC RUBBER HOSE WITH A REINFORCED WALL

APPLICATION: FOR COOLANT SYSTEM, OIL FILL, ETC.

SPECIFICATION NUMBERS:

I.D. NOM	I.D. TOL	O.D. REF (INCHES)	WALL THICKNESS (INCHES)	MIN* BEND RADIUS	FREIGHTLINER SPECIFICATION NUMBER
3/4	±.03	1.13	.170 TO .220	10	48-00099-075
1		1.38		12	-
1-1/8		1.50		13	-
1-1/4		1.63		14	-
1-3/8		1.13		25	-
1-1/2		1.88		30	-150
1-5/8		2.00			-
1-3/4		2.13		CONTACT VENDOR	-
2	±.06	2.38			-
2-1/4		2.63			-
2-3/8		2.75			-
2-1/2		2.88			-

SPECIFICATIONS:

1. THE HOSE SHALL MEET OR EXCEED THE REQUIREMENTS OF SAE 20R1 STANDARD WALL CLASS B TUBE, CLASS C COVER, WITH 1 OR MORE PLIES OF KNITTED OR BRAIDED YARN.

2. TEMPERATURE RANGE: -40°C TO +100°C (-40°F TO +212°F).

* DATA FROM VENDOR (GATES-4169A) CATALOG.

CHG	JOB/RLSE NO	DATE	BY	REVISION
E	PB1005-04	04/23/90	RDF	REDRAWN TO J20R1 SPECS, ADDED -150, DELETED -062