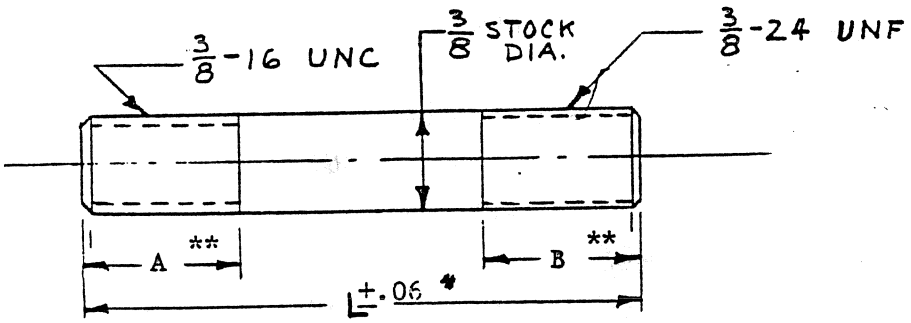
STUD
3/8 UNC - 3/8 UNF

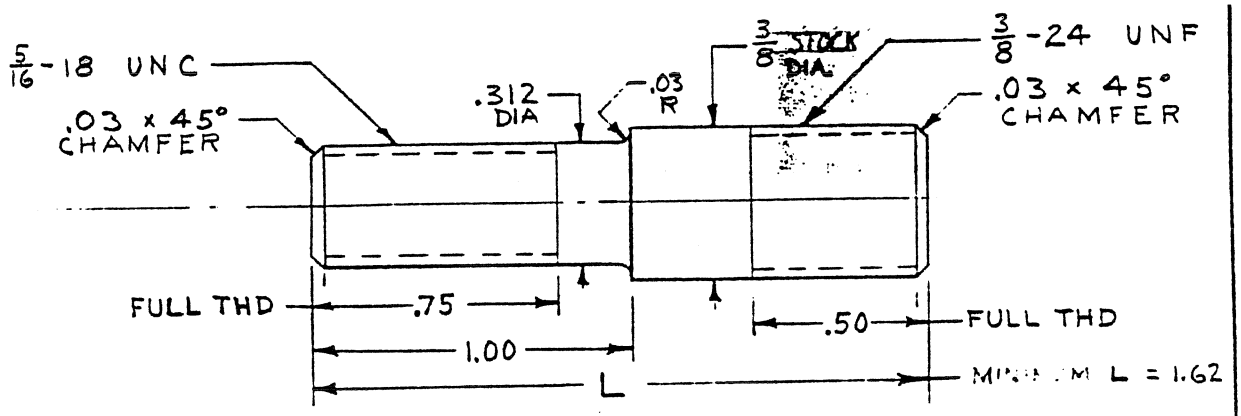


A** LENGTH	FULL THD MIN	TOTAL THD MAX	B** LENGTH	FULL THD MIN	TOTAL THD MAX	FREIGHTLINER PART NUMBER*
	.562	.750		.562	.750	23-00101-L

*Complete part number by adding 3-digit dash number expressing length, L, in inches and hundredths.

**Except that when L is less than 1.50 inches, coarse and fine threads are to be of equal length. (Total thread)

STUD
5/16-18 UNC - 3/8-24 UNF

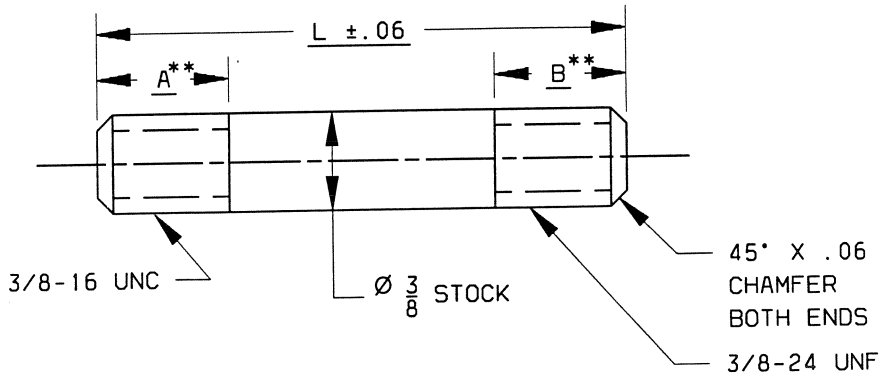


	FREIGHTLINER PART NUMBER*
	23-10850-L

*Complete part number by adding a 3-digit dash number expressing length, L, in inches and hundredths.

23-00101 , J , STUD

DRAWN	CGD	TITLE STUD 3/8 UNC - 3/8 UNF	DRAWING NUMBER 23-00101
APPRV	DAJ		
DATE	03/25/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. J
CATIA ORIGINAL			



A** LENGTH	FULL THD MIN	TOTAL THD MAX	B** LENGTH	FULL THD MIN	TOTAL THD MAX	FREIGHTLINER PART NUMBER*
	.691	.750		.691	.750	23-00101-L

* COMPLETE PART NUMBER BY ADDING 3-DIGIT DASH NUMBER EXPRESSING LENGTH, L, IN INCHES AND HUNDREDTHS.

** EXCEPT THAT WHEN L IS LESS THAN 1.50 INCHES, COARSE AND FINE THREADS ARE TO BE OF EQUAL LENGTH. (TOTAL THREAD)

ENGINEERING NOTES:

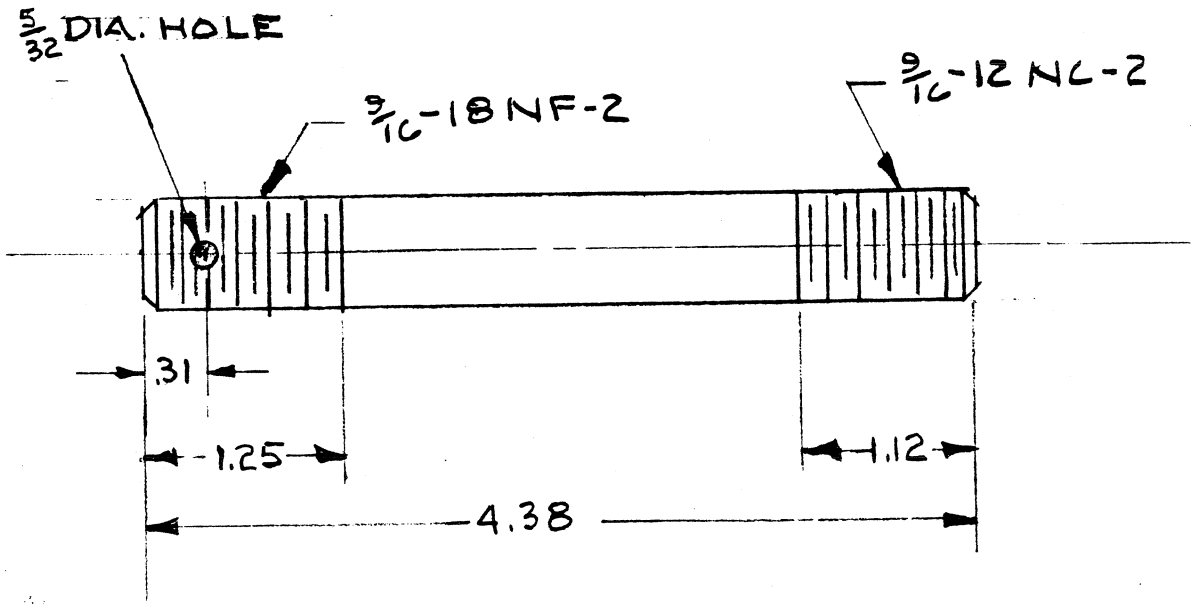
1. MATERIAL: 48-00848-006 (AISI C1141)
2. FINISH: PLAIN

CHG	JOB NO	DATE	BY	REVISION
J	PA2042-93	03/25/99	CGD	REVISED AND REDRAWN IN CATIA.

23-1012

6-16-75 X2

PRINT ISSUED	TITLE	PART NO.
12-23-68	STUD, CAP	23-1012
LAST CHG. LTR. C		SHEET OF



CHG	BY	DATE	WAS

CHG	BY	DATE	WAS	JOB NO
B	PRJ	12-16-68	B Size Drawing	-
C	HJK	6-16-75	STATUS TO X2	A0750

(1) Steel - SAE B-1112 or B-1113

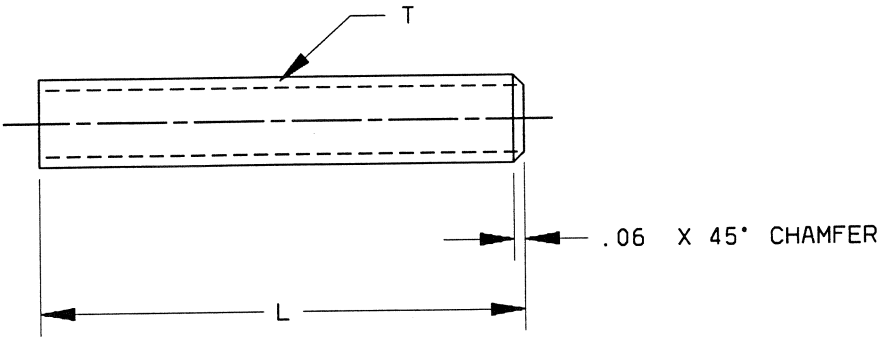
COMPLIED	PRJ	DATE DRAWN		MATERIAL	NEXT ASSY. NO.
APPROVED	KJA	12-16-68		(1)	VEHICLE

Portland FREIGHTLINER CORPORATION Oregon 97208

C

23-03678 , G , ,STUD

DRAWN	CGD	TITLE	DRAWING NUMBER	
APPRV	DAJ	STUD	23-03678	
DATE	07/15/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. G
CATIA ORIGINAL				



T THREAD	L LENGTH	FREIGHTLINER PART NUMBER
1/2-20 UNF	2.75	23-03678-000

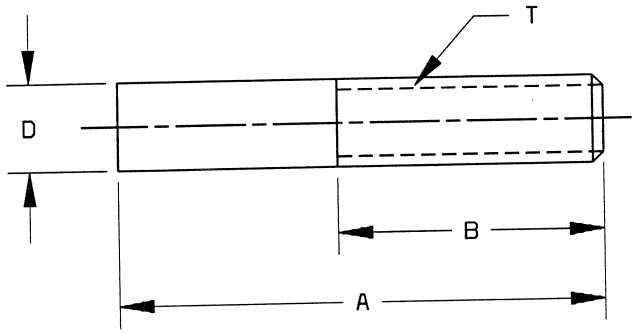
ENGINEERING NOTES:

1. MATERIAL: STEEL S.A.E. B1112-B1113

CHG	JOB NO	DATE	BY	REVISION
G	PA2042-93	07/15/99	CGD	REVISED AND REDRAWN IN CATIA.

23-03776 , C , STUD

DRAWN	CGD	TITLE STUD	DRAWING NUMBER 23-03776
APPRV	DAJ		
DATE	07/15/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. C
CATIA ORIGINAL			



DIMENSIONS				FREIGHTLINER PART NUMBER
T	A	B	D	
3/8-24 UNF	4.00	2.50	3/8	23-03776-000

ENGINEERING NOTES:

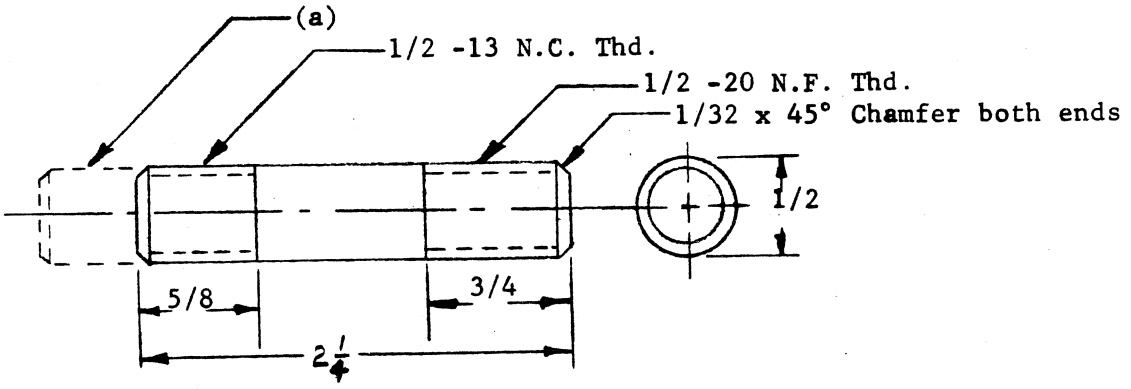
1. MATERIAL: S.A.E. 1112-1113 OR 1010-1020, STEEL
2. FINISH: PLAIN

CHG	JOB NO	DATE	BY	REVISION
C	PA2042-93	07/15/99	CGD	REVISED AND REDRAWN IN CATIA.

23-4758

6-16-75 X2

PRINT ISSUED	TITLE	PART NO.
	Stud Fuel Filter	23-4758
LAST CHG. LTR. B		SHEET 1 OF 1



(a) Remove when made from AT-3146

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS	JOB No
A	KJA	9-8-69	Redrawn & update	A0750
B	HJR	6-16-75	STATUS TO X2	

(1) SAE B-1112 or B-1113 Steel

COMPILED	KJA	DATE DRAWN		MATERIAL	~~NEXT ASSY. NO.~~
APPROVED	K. JA.	9-8-69		(1)	~~Vehicle~~

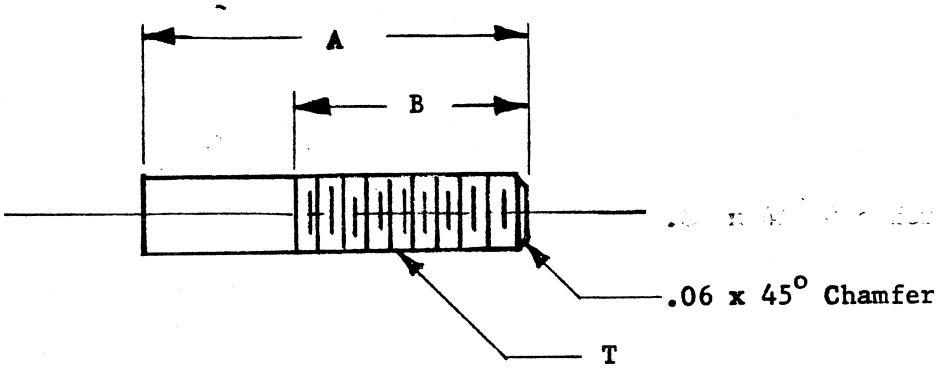
was AT-4758 Portland FREIGHTLINER CORPORATION Oregon 97208 B

6-16-75

X2

23-9001

PRINT ISSUED	TITLE	PART NO.
	STUDS	23-9001
LAST CHG. LTR. B		SHEET OF



DASH NUMBER	A	B	T	WAS
-001	2.00	1.50	3/8 -24NF	23-9001
-002	2.00	1.25	5/16-24NF	23-9027
-003	1.50	1.12	5/16-18NC	23-9005
-004	2.00	1.00	5/16-24NF	23-9111
-005	2.00	1.50	1/4 -28NF	23-9008
-006	2.00	1.25	5/16-24NF	23-9007
-007	4.00	2.50	3/8 -16NC	23-9032
-008	3.12	2.50	3/8 -16NC	23-9032
-009	4	2.50	3/8 -24NF	23-3776

Reactivated & Redrawn 6-16-75

(1) Steel SAE 1112 - 1113 or 1010 - 1020

COMPILED	PRJ	DATE DRAWN		MATERIAL	~~NEXT ASSY. NO.~~
APPROVED	L.V.A	12-17-68		(1)	~~VEHICLE~~

Portland FREIGHTLINER CORPORATION Oregon 97208 B

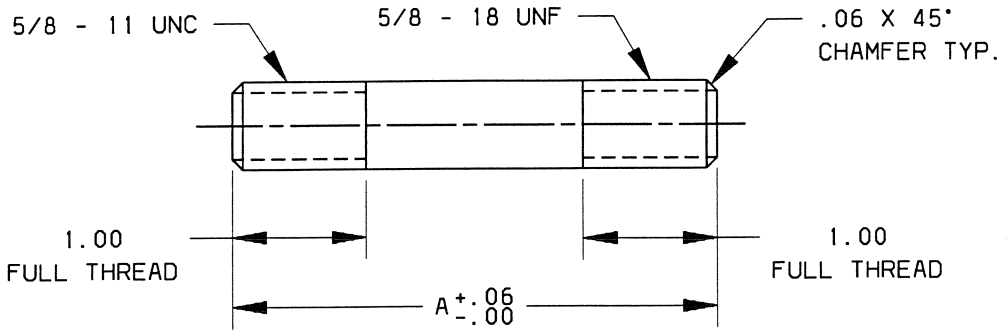
CHG	BY	DATE	WAS

CHG	BY	DATE	WAS	Job No
A	PRJ	12-17-68	B Size Drawing	A0750
B	HJR	6-16-75	STATUS TO X2	

12-28-8

23-09009 , H , STUD 5/8"

DRAWN	CGD	TITLE STUD 5/8" STEERING GEAR BRACKET	DRAWING NUMBER 23-09009
APPRV	DAJ		
DATE	07/15/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. H
CATIA ORIGINAL			



A LENGTH	FREIGHTLINER PART NUMBER
3.06	23-09009-000
3.31	23-09009-001

ENGINEERING NOTES:

1. MATERIAL: STEEL - SAE B1112 - 1113 OR SAE 1010-1020

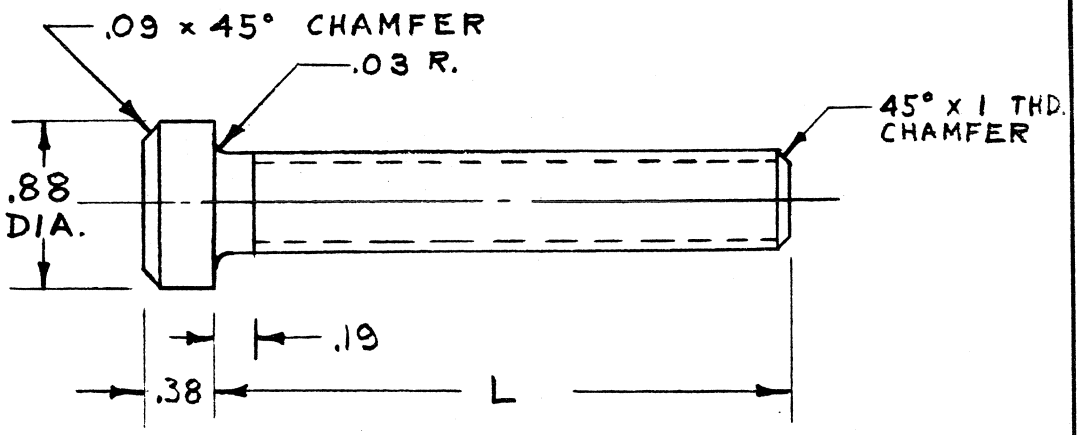
CHG	JOB NO	DATE	BY	REVISION
H	PA2042-93	07/15/99	CGD	REVISED AND REDRAWN IN CATIA.

23-09046

General Use Part

PRINT ISSUED		TITLE	PART NO.
		STUD, WELD, HEADED ½-20 UNF, STEEL	23-09046
LAST CHG LTR	F		SHEET 1 OF 1

SKETCH



PART NUMBERS

DESCRIPTION	L LENGTH	FREIGHTLINER PART NUMBER
See Dwg.	3.00	23-09046-000

ENGINEERING NOTES

1. MATERIAL: 48-833-088
2. FINISH: Plain

CHG	BY	DATE	WAS	JOB NO.
E	HJR	12-12-74	Rev'd & Redrawn	A0721
F	RG	6-1-77	SAE-B1113	63357

CHG	BY	DATE	WAS	JOB. NO

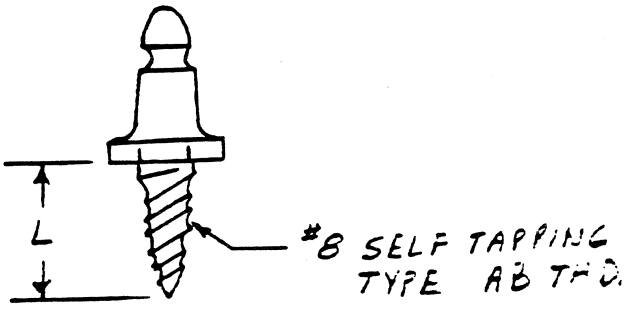
COMPILED	H.J.R.	DATE DRAWN		MATERIAL	
APPROVED		12-12-74		1	

Portland FREIGHTLINER CORPORATION Oregon 97208

General Use Part

PRINT ISSUED	TITLE	PART NO
3/29/71	STUD (LIFT DOT FASTENER)	23-9695
LAST CHG LTR		SHEET OF

SKETCH



PART NUMBERS

THREAD LENGTH	HEX FLATS		MANUFACTURER'S NUMBER UCF (DOT)		FREIGHTLINER PART NUMBER
3/8"	.354		XX-16366-12		23-9695-012
5/8"	.354		XX-16366-20		-020

ENGINEERING NOTES

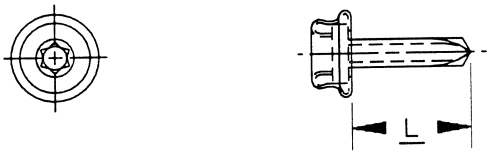
1 Material:

2 Installation Tool: No. 169B Hand Screw Driver

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED	R.H.	3-16-71		(1)	

Portland FREIGHTLINER CORPORATION Oregon 97208

DRAWN	DAJ	TITLE	DRAWING NUMBER	
APPRV	DAJ	STUD-SNAP CROSS OR TORX RECESS, CURTAIN	23-09696	
DATE	06/25/97	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. H
CATIA ORIGINAL				



TORX DRIVE TAPPING SCREW SHOWN
(BSD SELF-DRILLING DE-EMPHASIZED)

CROSS RECESS

THREAD SIZE	LENGTH "L"	POINT TYPE	VENDOR/PN DOT	FREIGHTLINER PART NUMBER
8-18	3/8	AB	XX10362-4	(1) 23-09696-012
8-18	5/8	AB	XX10362-7	(1) 23-09696-020
8-18	3/8	AB	XX10362-4 K5500	(2) 23-09696-112
8-18	1	AB	SN 705932	(1) 23-09696-100

TORX RECESS

THREAD SIZE	LENGTH "L"	POINT TYPE	VENDOR/PN DOT	FREIGHTLINER PART NUMBER
8-18	5/16	AB	-	(2) 23-09696-700
8-18	3/8	AB	-	(1) 23-09696-710
8-18	5/8	AB	XX103047-2A K1105	(1) 23-09696-720
8-18	5/8	AB	XX103047-2C	(2) 23-09696-724
8-18	7/8	AB	-	(2) 23-09696-728
8-18	5/8	(5) BSD	-	(2) 23-09696-732
8-18	1/2	AB	-	(2) 23-09696-730

ENGINEERING NOTES:

(1) MATERIAL: STEEL, BRIGHT FINISH

(2) MATERIAL: STEEL, BLACK FINISH

3. CROSS RECESS: TYPE I PER ANSI B18.6.4

4. TORX RECESS: T20 PER CAMCAR STANDARD TXH-202

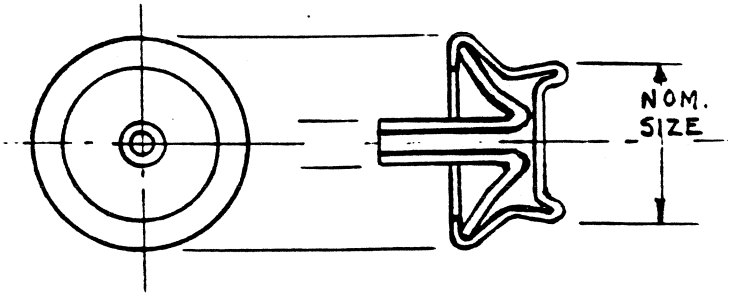
(5) BSD POINT TYPE IN ACCORDANCE WITH SAE J78

CHG	JOB NO	DATE	BY	REVISION
G	P07218-01	01/25/99	DAJ	REVISED AND REDRAWN IN CATIA, ADDED -700 & -710.
H	P09203-01	07/07/99	CGD	ADDED 23-09696-100.

General Use Part

ENGINEERING	TITLE	PART NO.
4/30/71	STUD, SNAP FASTENER RIVET TYPE	23-9699
LAST CHG LTR: A		SHEET 01

SKETCH



PART NUMBERS

FOR SIZE				MANUFACTURER'S NUMBERS			FALLOUT PART NUMBER
				STI			
3/8				D4512*			23-9699-000

*Consists of eyelet and stud as an inseparable assembly. Must specify nickel plate in addition to part number when ordering.

MATERIAL NOTES

1. Material: Brass with nickel plate.
2. For use in conjunction with Snap Fastener Socket (Medium Action) 23-9700.

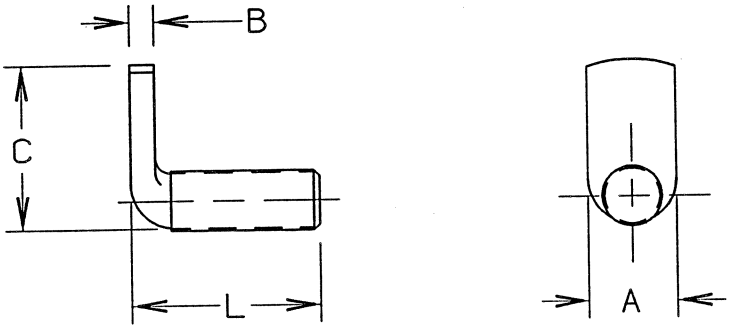
CHG	BY	DATE	WAS
A1	MS	5-24-83	REVISED NOTE 1
A2	MS	5-24-83	WAS #XS 10372 TO D4512

CHG	BY	DATE	WAS

COMPILED	MGR	DATE RELEASED		MATERIAL	
APPROVED		4-9-71		1	

Portland FREIGHTLINER CORPORATION Oregon 97209

DRAWN	HJR	TITLE STUD - WELD SPADE TYPE	ITEM NUMBER 23-09985
APPRV	LBE		
DATE	03/06/72	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE	A	B	C	L*	VENDOR			FREIGHTLINER PART NUMBER
					ONB	GR	AFJ	
1/4-20	3/8	3/32	3/4	1.50	SS 2124	LJ-1420-S-1500	05-52139	23-12238-150
3/8-24	19/32	5/32	1.0	1.25	-	LJ-3824-S-1250	-	23-09985-125

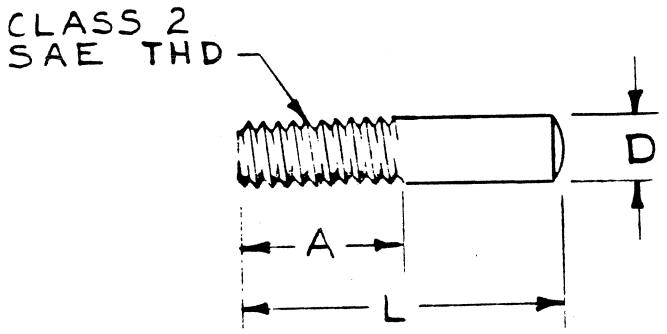
MATERIAL: LOW CARBON STEEL, AISI 1008/1010
FINISH: PLAIN
THREADS: 2A PER ANSI B1.1

CHG	JOB/RLSE NO	DATE	BY	REVISION
A	PF1046-03	11/10/95	ERK	REDRAWN: INITIAL RELEASE 23-12238-150

PRINT ISSUED	TITLE	PART NO
	STUD, WELD, THREADED TYPE NBL	23-10220
LAST CHG LTR –		SHEET 1 OF 1

JOB NO	WAS	DATE	BY	CHG

SKETCH



PART NUMBERS

SIZE & THD	A	D	L		MANUFACTURER'S NUMBER NSW		FREIGHTLINER PART NUMBER**
5/8-11	1.12	.625	3.69		*		23-10220-369

*Order by description
**Dash number is length in 1/100's of an inch.

JOB NO	WAS	DATE	BY	CHG
C0716				

ENGINEERING NOTES

(1) Material: Mild Steel SAE 1006 to 1022
2. Finish: Plain, but with solid fluxed end.
3. Minimum Physical Properties:

Ult. Tensile k.s.i.	Yield Point k.s.i.	Elong % in 2 in
60	50	20

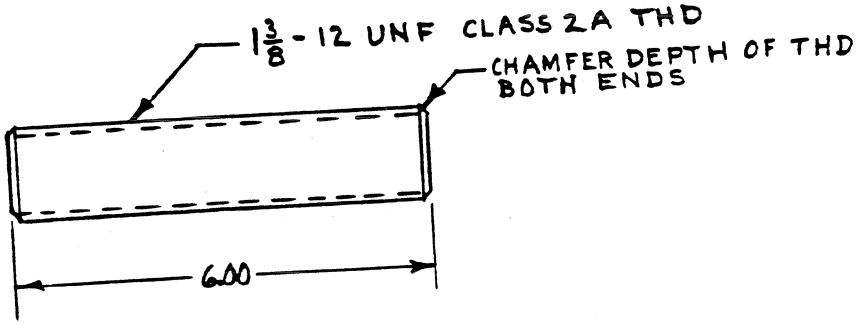
COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		11-5-75		(1)	

Portland FREIGHTLINER CORPORATION Oregon 97208

General Use Part

PRINT ISSUED	TITLE	PART NO
	STUD, ALL THREAD	23-10221
LAST CHG LTR: A		SHEET 1 OF 1

SKETCH



PART NUMBERS

	FREIGHTLINER PART NUMBER
	23-10221-000

CHG	BY	DATE	WAS	JOB NO

CHG	BY	DATE	WAS	JOB NO
—	—	—	—	B0277
A	RG	6-1-77	48-834-48	63357

ENGINEERING NOTES

A (1) MATERIAL: 48- 833-138

2. FINISH: Plain

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		12-1-75		(1)	

FREIGHTLINER CORPORATION

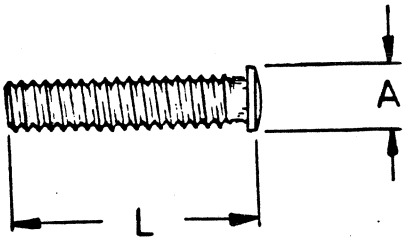
Portland Oregon 97208

PRINT ISSUED		TITLE	PART NO.
		STUD, WELD, THREADED TYPE ATC & TFTC	23-10279
LAST CHG. LTR.	A		SHEET 1 OF 1

CHG	BY	DATE	WAS

CHG	BY	DATE	WAS
A	DS	2-14-78	J#A0558 Added alt. Mgf. #

SKETCH



PART NUMBERS

SIZE & THD	A HEAD DIA.	L LENGTH		TYPE	MANUFACTURER'S NUMBER NSW	FREIGHTLINER PART NUMBER*
½-20	.280			ATC	101-226-L*	23-10279-L*
½-20		1.00		TFTC	101-208-278**	23-10279-100

*Complete part number by adding a three-digit dash number expressing length, L, in hundredths of an inch.

**Alternate manufacturer's number to be used for L = 1.00 inches and for use on the NCD 70 capacitor discharge machine only.

ENGINEERING NOTES

1. Material: Mild Steel
2. Minimum Physical Properties

Ultimate Tensile k.s.i.	Yield Point k.s.i.	Elong % in 2"
50	35	40

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		12-21-73		1	

Portland FREIGHTLINER CORPORATION Oregon 97208

23-10280

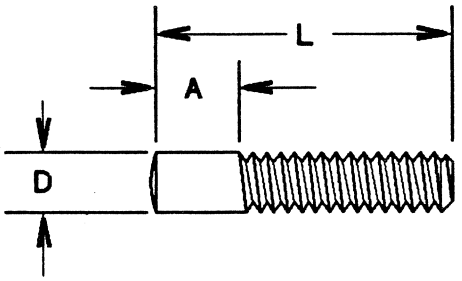
GENERAL USE PART

ORIGINAL JOB NO.	TITLE	PART NO.
8139C	WELD STUD THREADED TYPE CPL	23-10280
LAST CHG LTR: B		SHEET 1 OF 1

TR	JOB NO.	BY	DATE	CHANGE INFORMATION

TR	JOB NO.	BY	DATE	CHANGE INFORMATION
B1	8139C	DJL	11-15-84	REVISED & REDRAWN
B2	8139C	DJL	11-15-84	ADDED -625

SKETCH



PART NUMBERS:

SIZE & THREAD	A	D	L	MANUFACTURERS NUMBER		FREIGHTLINER PART NUMBER
				NSW		
3/8-16 3/8-16	.390 .390	.330 .330	2-1/8 1-1/4	101-018-314 101-017-182		23-10280-212 23-10280-125
1/2-13	.500	.448	1-1/4	101-017-308		23-10280-625

ENGINEERING NOTES:

(1) MATERIAL: MILD STEEL

2. MINIMUM PHYSICAL PROPERTIES:

ULTIMATE TENSILE (KSI)..... 60
YIELD POINT (KSI)..... 50
ELONGATION (PER CENT IN 2 INCHES)..... 20

COMPILED	DJL	DATE DRAWN	CADAM ORIGINAL	MATERIAL	MASTER NUMBER	
APPROVED	DJL	11-15-84		(1)	01290	000D1

PORTLAND FREIGHTLINER CORPORATION OREGON 97208

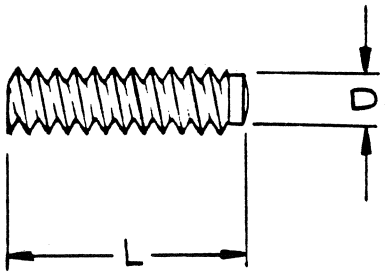
EAC-826

PRINT ISSUED	TITLE	PART NO.
	STUD, WELD, THREADED TYPE CFL	23-10299
LAST CHG. LTR.		SHEET 1 OF 1

WAS	DATE	BY	CHG

WAS	DATE	BY	CHG
J # A0592	3-22-74	DL	-

SKETCH



PART NUMBERS

SIZE & THD	D	L	MANUFACTURER'S NUMBER NSW	FREIGHTLINER PART NUMBER
5/16-18	.275	.75	101-010-062	23-10299-075
5/16-18	.275	.88	101-010-065	-088
5/16-18	.275	1.00	101-010-067	-100
5/16-18	.275	1.12	101-010-071	-112

ENGINEERING NOTES:

(1) Material: Mild Steel

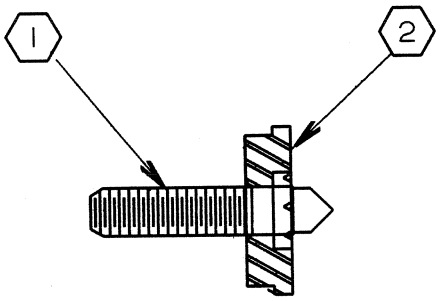
2 Minimum Physical Properties

Ultimate Tensile k.s.i.	Yield Point k.s.i.	Elong % in 2"
60	50	20

COMPILED	D. Le L.	DATE DRAWN		MATERIAL	NEXT ASSY. NO.
APPROVED	Jim S.	3-25-74		(1)	

Portland FREIGHTLINER CORPORATION Oregon 97208

DRAWN	BT	TITLE	ITEM NUMBER
APPRV	F.FREER	STUD-THREADED WELD ASSY TYPE CFL	A23-10300
DATE	09/06/83	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



PART NUMBERS:

SIZE	LENGTH (L)	STUD (1)	ARC SHIELD (2)	FREIGHTLINER PART NUMBER
1/4-20	3/4	23-11467-000	23-11468-004	A23-10300-000
	25/32	-001		-001
	7/8	-002		-002
	1	-003		-003
	1 1/8	-004		-004
	1 1/2	-005		-005

ENGINEERING NOTES:

1. MATERIAL: MILD STEEL
2. MINIMUM PHYSICAL PROPERTIES:

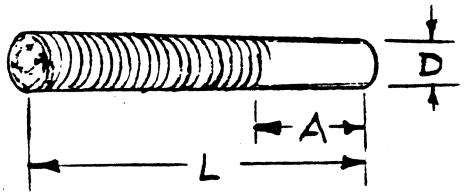
TENSILE (KSI)	YIELD (KSI)	ELONG. % IN 2 INCH
60	50	20

CHG	JOB/RLSE NO	DATE	BY	REVISION
F	PN0470-11	10/20/92	ERK	REVISED & REDRAWN: ADDED -005

General Use Part

PRINT ISSUED	TITLE	PART NO.
	STUD, WELD, THREADED TYPE CPL 1/4 - 20	23-10341
LAST CHG. LTR. A		SHEET 1 OF

SKETCH



PART NUMBERS

SIZE & THD	A	D	L	MANUFACTURER'S NUMBER NSW		F/L PART NUMBER
1/4-20	.375	.215	2.00	101-017-032		23-10341-200
1/4-20	.375	.215	1.75	101-017-028		-175
A 1/4-20	.375	.215	1.25	101-017-020		-125

ENGINEERING NOTES

(1) Material: Mild Steel

2. Minimum Physical Properties:

Ultimate Tensile k.s.i.	Yield Point k.s.i.	Elongation % in 2"
60	50	20

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		4-11-74		(1)	

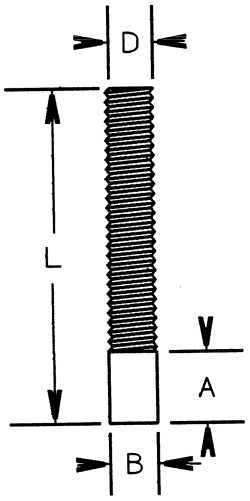
Portland FREIGHTLINER CORPORATION Oregon 97208

A

CHG	BY	DATE	WAS
A			

CHG	BY	DATE	WAS
---	--	-----	J #A0604
A	H.J.R.	8-21-74	Add -125; J#A0672

DRAWN	HJR	TITLE	ITEM NUMBER
APPRV	G S	STUD, WELD THREADED, TYPE CPL	23-10341
DATE	04/11/74	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



PART NUMBERS:

SIZE D	A	B	L	MANUFACTURER NSW	FREIGHTLINER PART NUMBER
1/4-20	.375	.215	1.25 1.75 2.00	101-017-018 101-017-028 101-017-032	23-10341-125 -175 -200

ENGINEERING NOTES:

1. MATERIAL: MILD STEEL
2. MINIMUM PHYSICAL PROPERTIES:

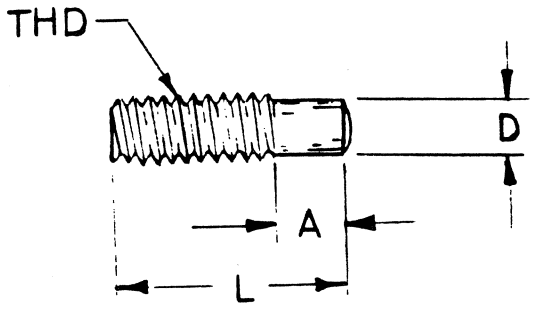
ULTIMATE TENSILE K.S.I.	YIELD POINT K.S.I.	ELONGATION % IN 2"
60	50	20

CHG	JOB/RLSE NO	DATE	BY	REVISION
B	PA2042-28	09/17/92	ERK	REVISED AND REDRAWN: CHANGED -125 VENDOR NUMBER

General Use Part

PRINT ISSUED		TITLE	PART NO.
		STUD, WELD, THREADED TYPE CPL 5/16	23-10359
LAST CHG LTR	A		SHEET 1 OF 1

SKETCH



PART NUMBERS

SIZE & THD	A	D	L	MANUFACTURER'S PART NO. NSW		FREIGHTLINER PART NUMBER
5/16-18	.375	.275	2.00	101-017-115		23-10359-200
5/16-18	.375	.275	2.125	101-017-118		23-10359-212

ENGINEERING NOTES

(1) Material: Mild Steel

2. Minimum Physical Properties:

Ult. Tensile k.s.i.	Yield Point k.s.i.	Elong. % in 2"
60	50	20

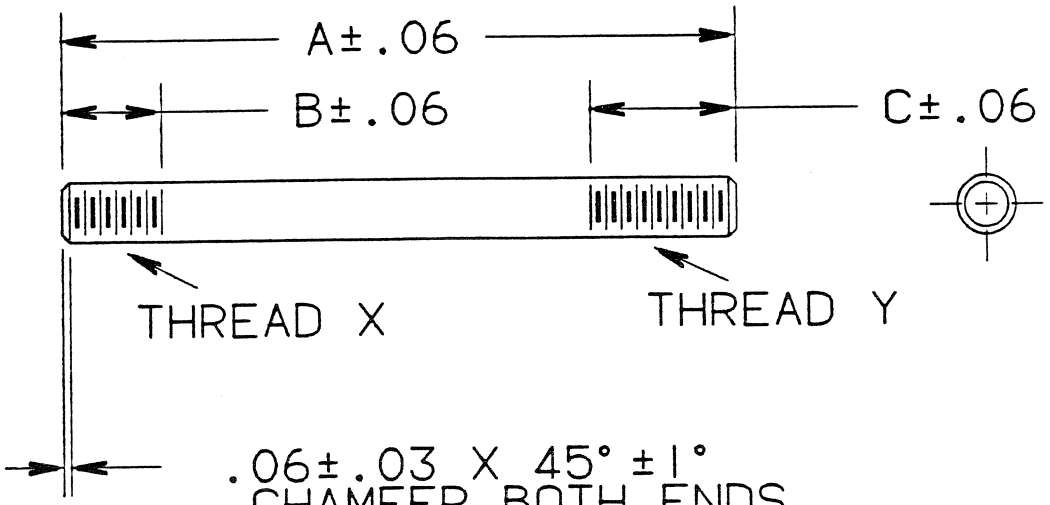
CHG	BY	DATE	WAS	JOB NO.
A	D.Lel	11-20-74	Add -212	A0711

CHG	BY	DATE	WAS	JOB NO.
A				

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		5-24-74		(1)	

Portland FREIGHTLINER CORPORATION Oregon 97208

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	STUD, GRADE 5 DOUBLE ENDED	23-10594
DATE	10/10/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD X	THREAD Y	A	B	C	FREIGHTLINER PART NUMBER
1/2-13 UNRC	1/2-20 UNRF	2.75	1.00	1.62	23-10594-000
1/2-13 UNRC	1/2-13 UNRC	3.38	1.38	1.38	23-10594-001
3/8-16 UNRC	3/8-16 UNRC	8.75	1.38	1.38	23-10594-002

MATERIAL: STEEL, GRADE 5 PER SAE J429

FINISH: PHOSPHATE AND OIL PER FREIGHTLINER SPECIFICATION NO. 49-00006-041

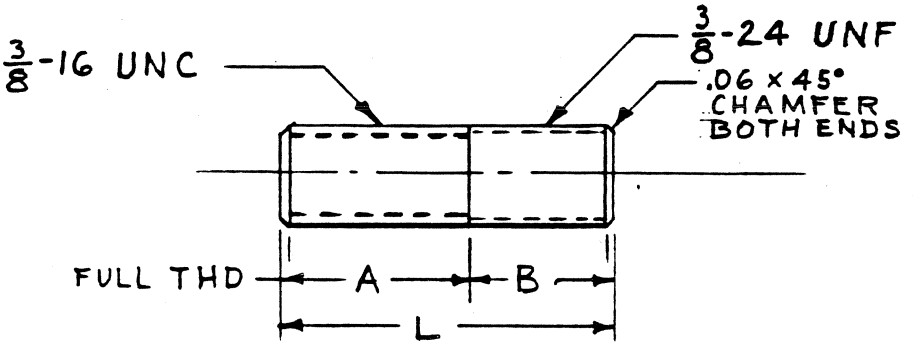
REF. STANDARD: SAME AS IFI 136, SECTION 2, TYPE 2 EXCEPT AS SHOWN ABOVE (LENGTH, TOLERANCES, AND CHAMFER)

CHG	JOB/RLSE NO	DATE	BY	REVISION
D	PX2401-04	10/10/89	PCK	REDRAWN, ADDED -002

General Use Part

ORIGINAL JOB NO.	TITLE	PART NO.
D1024	STUD, SPECIAL 3/8 UNC - 3/8 UNF	23-10599
LAST CHG LTR E		SHEET 1 OF 1

SKETCH



PART NUMBERS

A ± 1 Thd 0	B	L ± .03		FREIGHTLINER PART NUMBER
.750	Remainder	1.562		23-10599-000
.750	Remainder	2.500		23-10599-001
.750	Remainder	2.69		23-10599-002

ENGINEERING NOTES

1. MATERIAL: 48-00848-006 (AISI 1141) Steel Rod.
2. FINISH: Plain

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
E	74642	SK	6-8-78	REV. NOTE 1, REM. NOT
E1	74642	SK	6-8-78	ADDED - 2

LTR	JOB NO.	BY	DATE	CHANGE INFORMATION
A	63339	RJM	2-3-77	ADD NOTE 3
B	64093	JK	4-29-77	'C' TO 'L'
C	64547	FF	7-7-77	FROM 1.375 TO 1.562
D	D071566		10-13-77	ADDED -1

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		8-9-76		(1)	

E-183A Litho in USA Portland

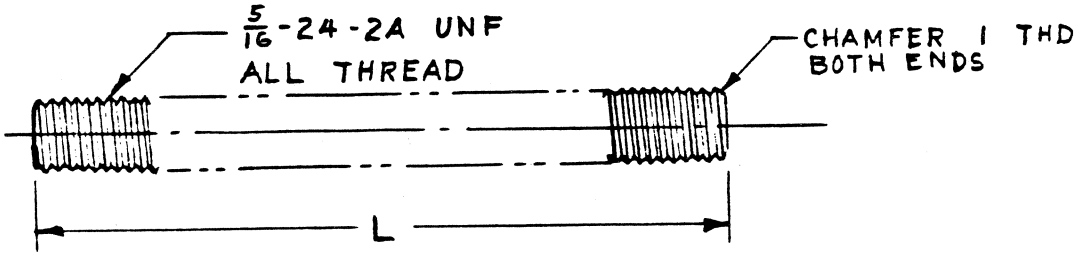
FREIGHTLINER CORPORATION Oregon 97208

E D A C M/F

General Use Part

PRINT ISSUED	TITLE	PART NO.
6-2-76	ROD, THREADED, STEEL 5/16- 24 UNF	23-10598
LAST CHG LTR: A		SHEET 1 OF 1

SKETCH



PART NUMBERS

	FREIGHTLINER PART NUMBER *
	23-10598-L

* Dash number: First two digits = number of whole inches; last digit, number of eighths of an inch. Example: 23-10598-027 is 2 - 7/8 inches long.

ENGINEERING NOTES

1. Material: 48-833-031
2. Finish: As machined.

JOB NO.	WAS	DATE	BY	CHG

JOB NO.	WAS	DATE	BY	CHG
63357	SAE-B1112	6-1-77	RG	A

		DATE DRAWN		MATERIAL	
COMPILED	HJR	5-17-75		1	
APPROVED	DRS				

Portland FREIGHTLINER CORPORATION Oregon 97208

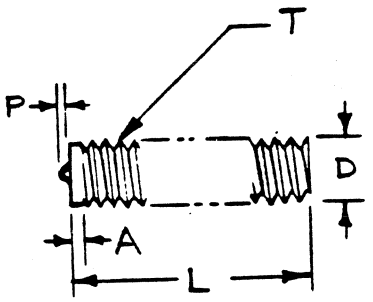
A

M/F

General Use Part

PRINT ISSUED	TITLE	PART NO.
	STUD, WELD, FULL THREAD, #10-24 ALUM	23-10631
LAST CHG. LTR.		SHEET 1 OF 1

SKETCH



PART NUMBERS

T THREAD	A	D	P		MANUFACTURER'S NUMBER			FREIGHTLINER PART NUMBER **
					NSW	KSM		
#10-24	.04	.190	.045		*	*		23-10631-#

JOB NO	WAS	DATE	BY	CHG

JOB NO	WAS	DATE	BY	CHG
A0686	-----	----	---	---

* Order by description.
** The 3 digit dash number expresses length, L, of the stud in 1/100's of an inch.

SPECIFICATIONS

1. MATERIAL: Alum 1100
2. FINISH: Plain
3. TYPE: Capacitor Discharge

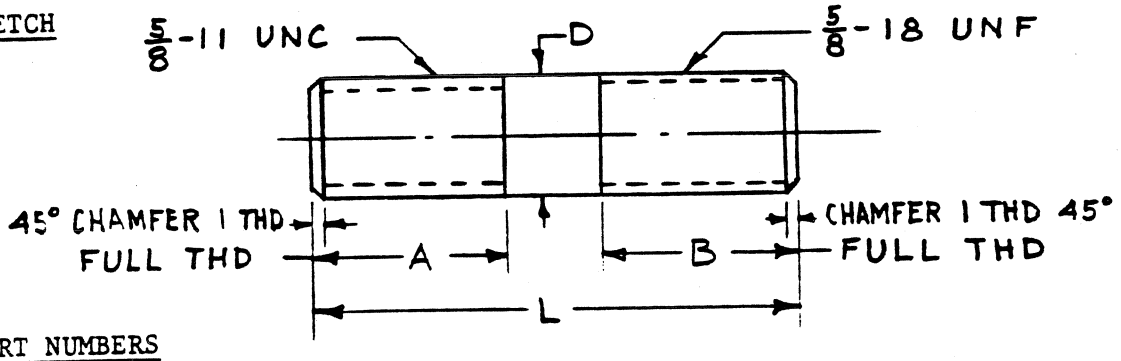
COMPILED	H.J.R	DATE DRAWN		MATERIAL	
APPROVED		10-04-74		1	

Portland FREIGHTLINER CORPORATION Oregon 97208

General Use Part

PRINT ISSUED	TITLE	PART NO.
	STUD, 5/8 UNC/5/8 UNF GR5 STL	23-10677
LAST CHG LTR		SHEET 1 OF

SKETCH



PART NUMBERS

A LENGTH COARSE THD.	B LENGTH FINE THD.	D BODY DIAM.	L LENGTH		FREIGHTLINER PART NUMBER
1.00	1.00	.625	2.50±.03		23-10677-000

ENGINEERING NOTES

(1) Material: Grade 5 Bolt Material

2 Finish: Plain

JOB NO	WAS	DATE	BY	CHG

JOB NO	WAS	DATE	BY	CHG
A0695	—	—	—	—

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		10-24-74		(1)	

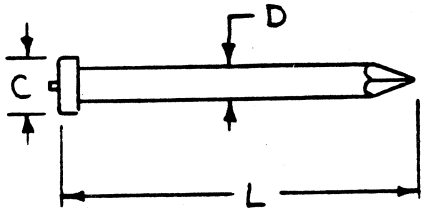
Portland FREIGHTLINER CORPORATION Oregon 97208

M/F

General Use Part

PRINT ISSUED	TITLE	PART NO.
	STUD, STORED ARC PIN TYPE TPC	23-10680
LAST CHG. LTR. A		SHEET 1 OF 1

SKETCH



PART NUMBERS

D SHANK	C DIA	L LENGTH		MANUFACTURER'S NUMBER		FREIGHTLINER PART NUMBER*
.105 (12 ga.)	.175	1-½		(A)		23-10680-125

* Dash number expresses length L, in hundredths of an inch.

ENGINEERING NOTES

(A)(1) MATERIAL: ALUM. 5086

2. FINISH: Plain

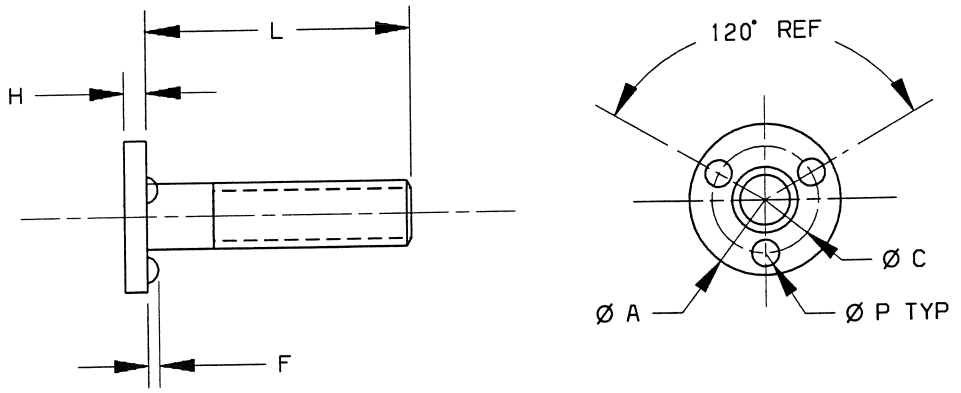
CHG	BY	DATE	WAS JOB NO.

CHG	BY	DATE	WAS JOB NO.
—	—	—	A0719
A	RG	3.25.77	STEEL, USW/2601-121, 6.27.76

COMPILED	HJR	DATE DRAWN		MATERIAL	NEXT ASSY. NO.
APPROVED	GRG	12-10-74		(1)	

Portland FREIGHTLINER CORPORATION Oregon 97208

DRAWN	LFB	TITLE	DRAWING NUMBER	
APPRV	DAJ	STUD-WELD PROJECTION, TYPE U3	23-10721	
DATE	11/29/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. B
CATIA ORIGINAL				



THREAD UNC	A HEAD DIA	H HEAD HEIGHT	P PROJECTION DIA	F PROJECTION HEIGHT	C LOCATING CIRCLE	FREIGHTLINER PART NUMBER*
1/4-20	.575 .550	.083 .073	.105 .095	.042 .038	.406	23-10721-L
10-24	.448 .428	.068 .058	.085 .075	.032 .028	.312	23-10722-L

* ADD 3-DIGIT DASH NUMBER INDICATING LENGTH IN 1/100'S OF AN INCH.

ENGINEERING NOTES:

B

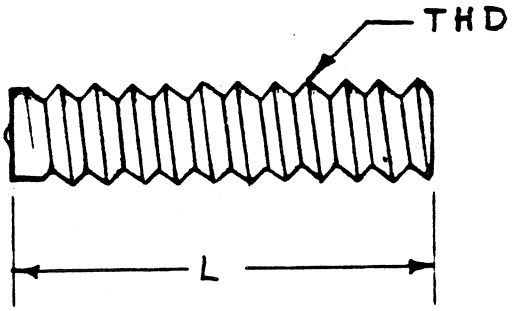
1. MATERIAL: STEEL (SAE 1010).
2. FINISH: PLAIN.

CHG	JOB NO	DATE	BY	REVISION
B	PA2042-98	11/29/99	LFB	REDRAWN IN CATIA. ADDED SOLID. ADDED SAE 1010.

General Use Part

PRINT ISSUED	TITLE	PART NO
	STUD, WELD, THREADED, #8-32 ALUM	23-10830
LAST CHG LTR: A		SHEET 1 OF 1

SKETCH



PART NUMBERS

THD	L LENGTH		MANUFACTURER'S NUMBER NSW	MANUFACTURER'S NUMBER KSM	FREIGHTLINER PART NUMBER**
# 8-32	.38		*	*	23-10830-038
# 8-32	.50		*	*	-050

* Order by description
** The 3-digit dash number expresses length, L, of the stud in 1/100's of an inch.

ENGINEERING NOTES

1. Material: 1100 Aluminum
2. Finish: Plain
3. Type: Capacitor Discharge

CHG	BY	DATE	WAS	JOB NO
—	—	—	—	A0747
A	HJR	9-19-75	10-24-31:5356	G0641

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED	CLS	6-3-74		(1)	

Portland FREIGHTLINER CORPORATION M/F Oregon 97208

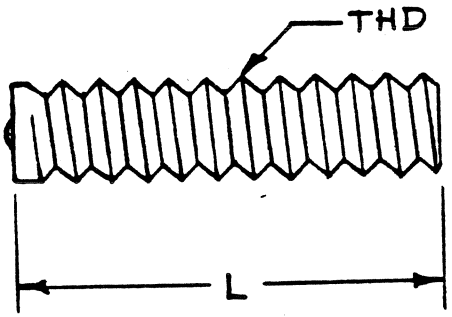
General Use Part

PRINT ISSUED	TITLE	PART NO.
	STUD, WELD, THREADED , 1/4-20 ALUM	23-10831
LAST CHG LTR A		SHEET 1 OF 1

CHG	BY	DATE	WAS	JOB NO

CHG	BY	DATE	WAS	JOB NO
—	—	—	—	A0747
A	HJR	9-22-75	5356 Alum.	C0641

SKETCH



PART NUMBERS

THD	L LENGTH	MANUFACTURER'S NUMBER NSW	MANUFACTURER'S NUMBER KSM	FREIGHTLINER PART NUMBER **
1/4-20	.50	*	*	23-10831-050
1/4-20	1.00	*	*	-100
1/4-20	1.38	*	*	-138

* Order by description

** The 3-digit dash number expresses length, L, of the stud in 1/100's of an inch.

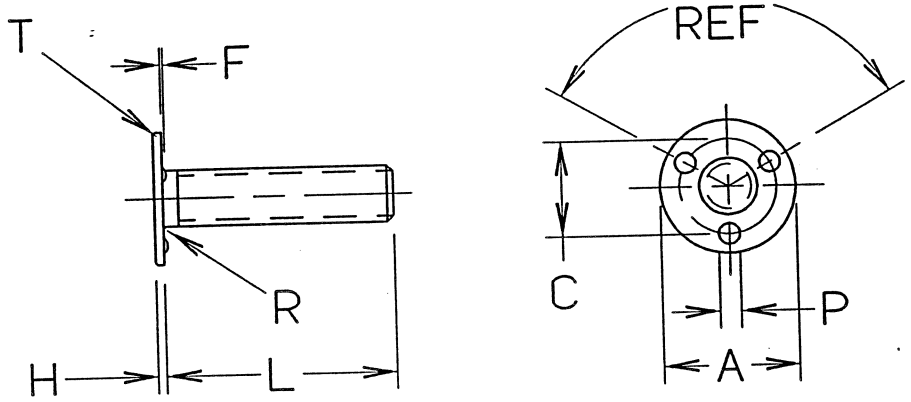
ENGINEERING NOTES

A (1) Material: 1100 Aluminum
2. Finish: Plain
3. Type: Capacitor Discharge

COMPILED	HJR	DATE DRAWN		MATERIAL	
APPROVED		6-3-74		(1)	

Portland FREIGHTLINER CORPORATION Oregon 97208

DRAWN	DAJ	TITLE	ITEM NUMBER
APPRV	ERK	STUD, PROJECTION WELD	23-11836
DATE	06/22/90	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD UNC	A HEAD DIA.	H HEAD HEIGHT	P PROJECTION DIA.	F PROJECTION HEIGHT	L LENGTH	MANUFACTURERS NUMBER ONB	FREIGHTLINER PART NUMBER
3/8-16	.880 .850	.114 .104	.135 .125	.052 .048	3/4	HW3312	23-11836-075
					1	HW3316	23-11836-100
					1-1/2	HW3324	23-11836-150
					3	OP-8480-HW	23-11836-300
1/2-13	1.005 .975	.146 .136	.155 .145	.062 .058	1	HW4416	23-12192-100
					1-1/4	HW4420	23-12192-125
					1-3/4	HW4428	23-12192-175

ENGINEERING NOTES:

1. MATERIAL: STEEL, C1008-1010 HIGH-WELDING QUALITY, LOW CARBON STEEL
2. FINISH: PLAIN

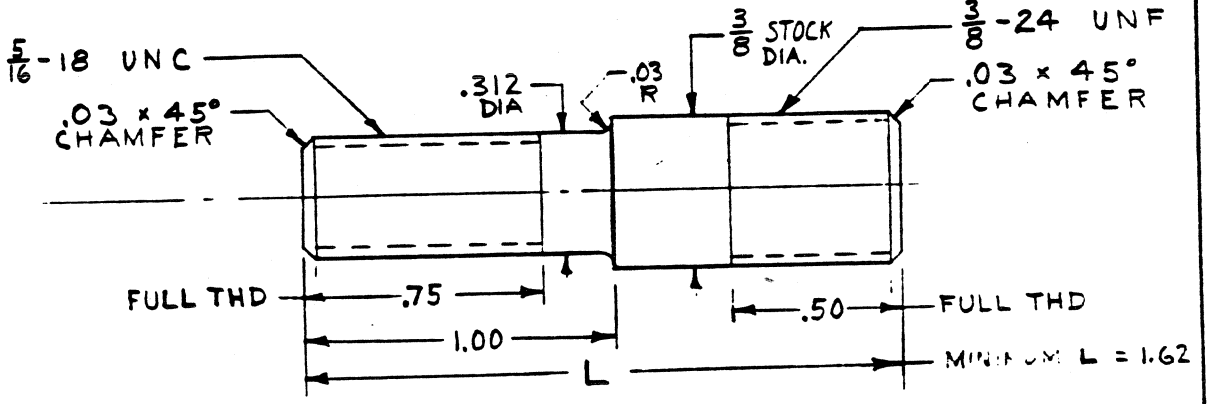
CHG	JOB/RLSE NO	DATE	BY	REVISION
A	PX0201-03	06/22/90	PCK	DOCUMENTED
B	P2A160-12	09/28/94	DAJ	ADDED 23-12192-125
C	P2A290-08	01/24/95	DAJ	ADDED 23-11836-075. ADDED DIMENSION L COLUMN.
D	P2A242-65	08/21/95	DAJ	ADDED 23-12192-175.
E	P2A062-10	10/26/95	ERK	ADDED 23-12192-100.

General Use Part

PRINT ISSUED		TITLE	PART NO
		STUD 5/16-18 UNC - 3/8-24 UNF	23-10850
LAST CHG LTR	-		SHEET 1 OF 1

JOB NO	WAS	DATE	BY	CHG

SKETCH



PART NUMBERS

	FREIGHTLINER PART NUMBER*
	23-10850-L

*Complete part number by adding a 3-digit dash number expressing length, L, in inches and hundredths.

JOB NO	WAS	DATE	BY	CHG
D0668	—	—	—	—

ENGINEERING NOTES

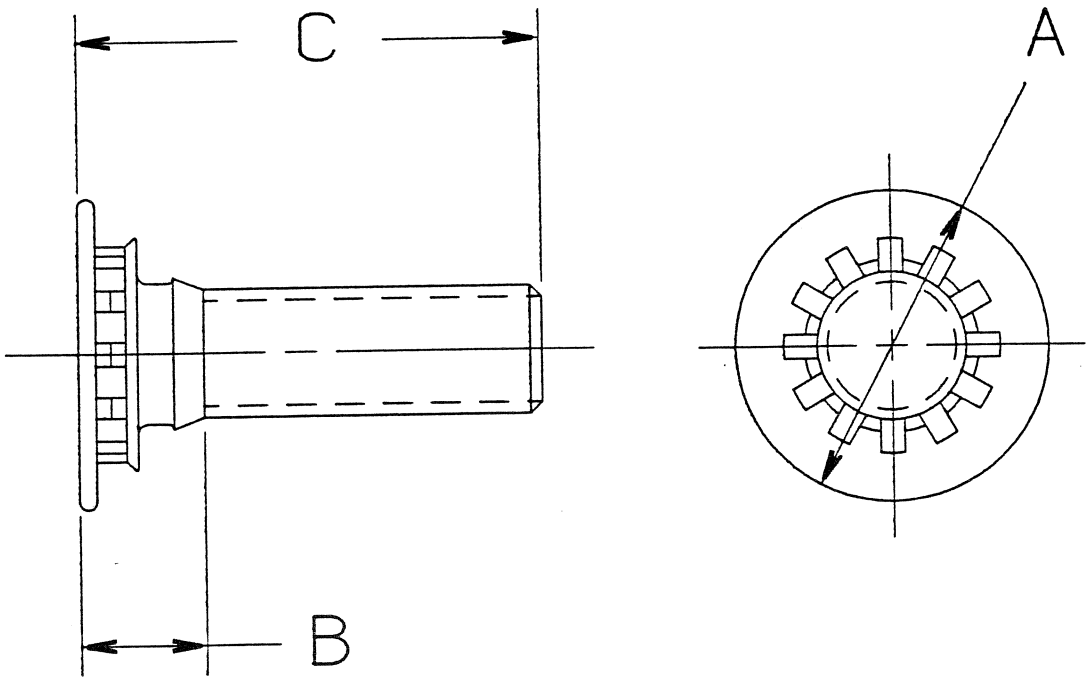
(1) MATERIAL: 48-00830-003 (AISI 1042) Steel Rod.
2. FINISH: Plain

		DATE DRAWN		MATERIAL	
COMPILED	HJR	7-28-75		(1)	
APPROVED					

kh

Portland FREIGHTLINER CORPORATION Oregon 97208

DRAWN	IDS	TITLE	ITEM NUMBER
APPRV	ANF	STUD, SELF, CLINCHING	23-11200
DATE	06/08/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD SIZE UNC	A DIA	B	C	MINIMUM SHEET THICKNESS	HOLE SIZE IN SHEET	FREIGHTLINER PART NUMBER
5/16-18 UNC	.376	.160	.75	.093	$.311^{+.003}_{-.000}$	23-11200-001

ENGINEERING NOTES:

MATERIAL: CARBON STEEL AISI 1005 THROUGH 1018
CASE HARDEN TO ROCKWELL 15N 72-88.
MIN EFFECTIVE DEPTH OF CASE TO BE .010

FINISH : ZINC PLATE PER FREIGHTLINER SPEC 49-00005-403

SUGGESTED SUPPLIER :PEM MFG. (FH-0518-12)

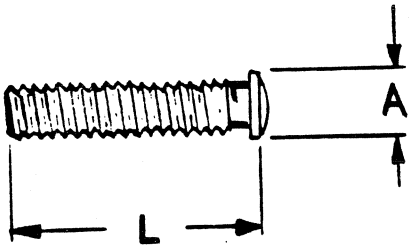
REFERENCE STD : MIL-S-63540

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PX0216-03	06/08/89	IDS	DOCUMENTED
A	PA2006-89	09/28/89	PCK	CORRECTED REV.LEVEL(RE-ISSUED AT REV.'A')

ORIGINAL JOB NO.	TITLE	PART NO.
C1500D	STUD, WELD, THREADED TYPE ATC	23-11217
LAST CHG LTR		SHEET 1 OF 1

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

SKETCH



PART NUMBERS

SIZE & THD	A HEAD DIA.	MANUFACTURER'S NUMBER NSW	FREIGHTLINER PART NUMBER*
10-24	.220	101-224-L*	23-11217-L*

*Complete part number by adding a three-digit dash number expressing length, L, in hundredths of an inch.

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

ENGINEERING NOTES

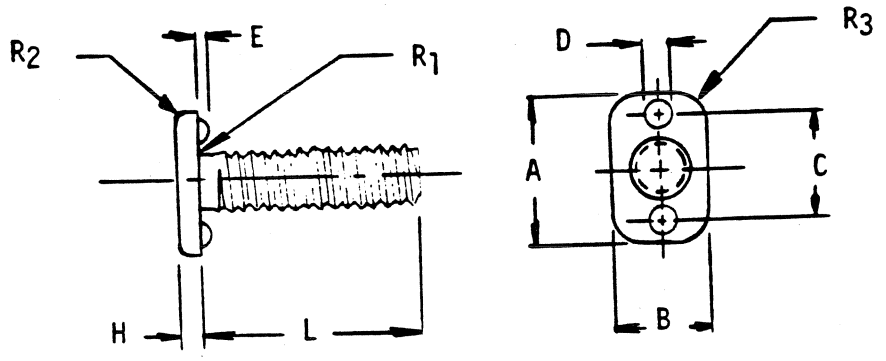
1. Material: Mild Steel
2. Minimum Physical Properties

Ultimate Tensile k.s.i.	Yield Point k.s.i.	Elong % in 2"
50	35	40

COMPILED	PWS	DATE DRAWN		MATERIAL	
APPROVED	MPL	5/29/79		(1)	

ORIGINAL JOB NO.	TITLE	PART NO.
E0613	STUD, PROJECTION WELD, T-TYPE	23-11326
LAST CHG LTR		SHEET 1 OF 1

SKETCH:



THREAD UNC	A	B	C	D	E	H	R_1	R_2	R_3	FREIGHTLINER PART NUMBER *
3/8-16	.863 .899	.502				.109				23-11326-L

* Dash number equals stud length in 1/100's of an inch. Example: 23-11326-125 equals 1.25 inches long.

ENGINEERING NOTES:

1. MATERIAL: Low Carbon Steel
2. FINISH: Plain

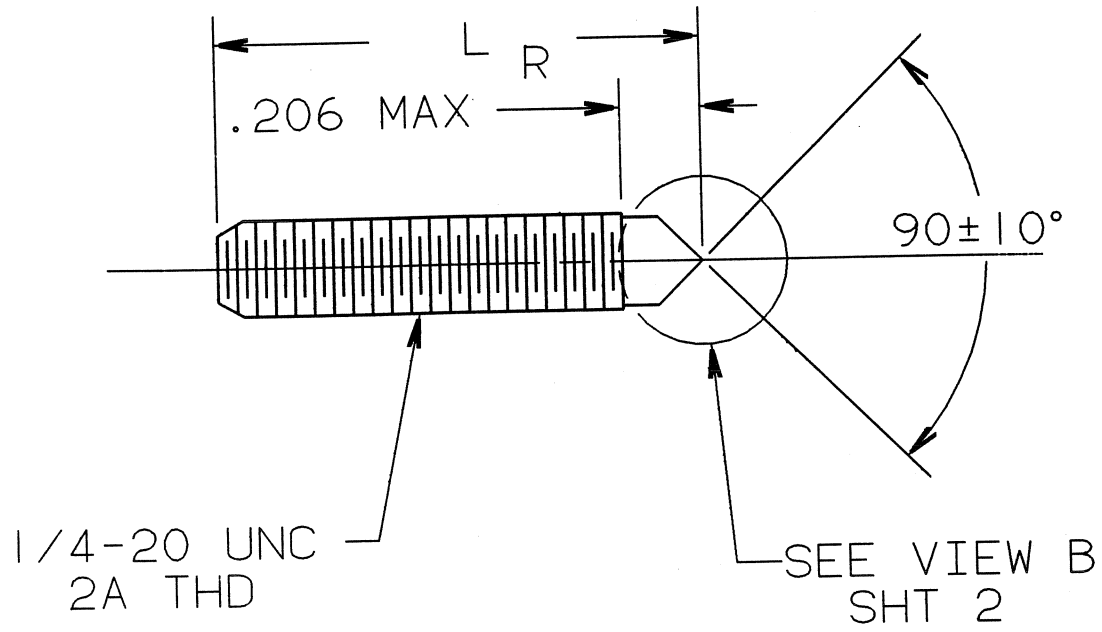
					UNIT OF MEASURE
COMPILED	Dang	DATE DRAWN			EA.
APPROVED		2/27/81			

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

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

DRAWN	DAT	TITLE	ITEM NUMBER
APPRV	RDF	STUD, THREADED WELD, 1/4-20 UNC "PENCIL" POINT	23-11467
DATE	11/30/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 2

UNLESS OTHERWISE NOTED, ALL DIMENSIONS IN INCHES.



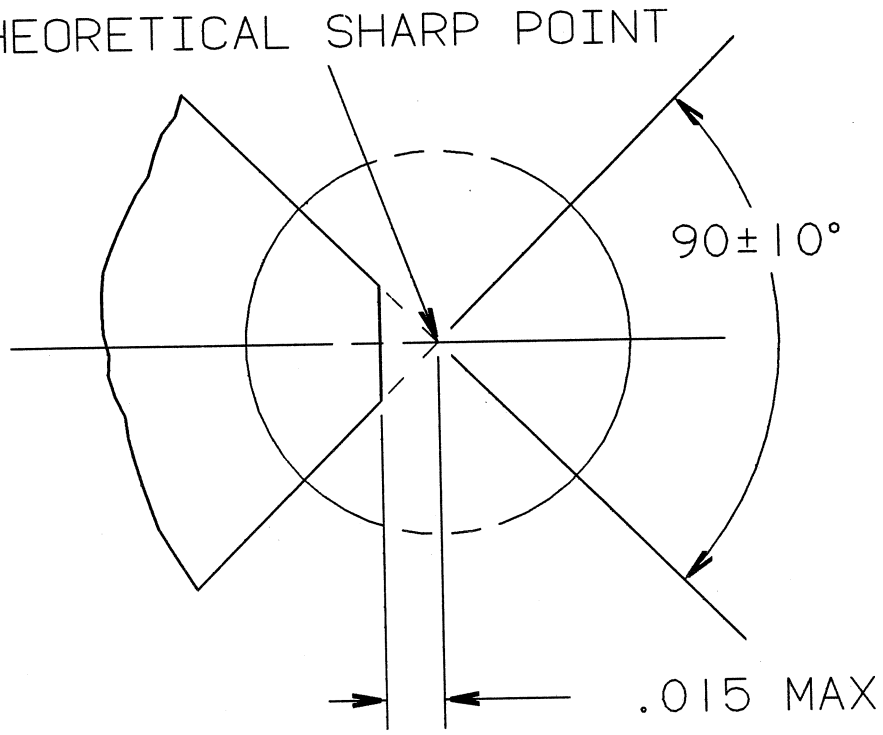
LENGTH L	MANUFACTURER P/N		F/L P/N
	ERICO	TRW	
3/4	006-911		23-11467-000
25/32	037-770		23-11467-001
7/8	006-912		23-11467-002
1	006-914		23-11467-003
1-1/8	006-916	101-010-445	23-11467-004
1-1/2			23-11467-005

D

CHG	JOB/RLSE NO	DATE	BY	REVISION
C	P4389F-01	11/30/89	DAT	REVISED AND REDRAWN
D	PN0470-11	10/20/92	ERK	ADDED -005

DRAWN	DAT	TITLE	ITEM NUMBER
APPRV	RDF	STUD, THREADED WELD, 1/4-20 UNC "PENCIL" POINT	23-11467
DATE	11/30/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 2 OF 2

UNLESS OTHERWISE NOTED, ALL DIMENSIONS IN INCHES.



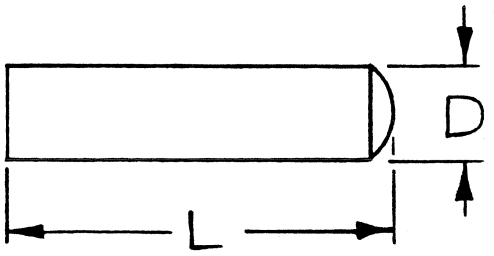
VIEW B: SCALE 20X

1. MATERIAL: LOW CARBON STEEL
2. MECHANICAL PROPERTIES, AS FORMED
   TENSILE: 60KSI MIN, YIELD: 50KSI MIN
   REDUCTION IN AREA: 50% MIN.
3. NO CRACKS ON SHANK SURFACES
4. TO BE USED WITH FERRULE SUPPLIED WITH STUD (REF23-11468)

CHG	JOB/RLSE NO	DATE	BY	REVISION
C	P4389F-01	11/30/89	DAT	REVISED AND REDRAWN
D	PN0470-11	10/20/92	ERK	SEE SHEET 1

ORIGINAL JOB NO.	TITLE	PART NO.
K0117	STUD, WELD, NO THREAD TYPE NBL	23-11481
LAST CHG LTR		SHEET 1 OF 1

SKETCH



SIZE	L	D		MANUFACTURER'S NUMBER NSW	FREIGHTLINER PART NUMBER**
1/2	2.000 1.125	.500 .500		101-063-307 101-063-297	23-11481-200 23-11481-112

** Dash number is length in 1/100's of an inch.

ENGINEERING NOTES

1. Material: Mild Steel SAE 1006 to 1022
2. Finish: Plain, but with solid fluxed end.
3. Minimum Physical Properties:

Ult. Tensile k.s.i.	Yield Point k.s.i.	Elong % in 2 in
60	50	20

PRE-RELEASE PRINT

COMPILED	LS	DATE DRAWN		MATERIAL	
APPROVED		6-27-83		1	

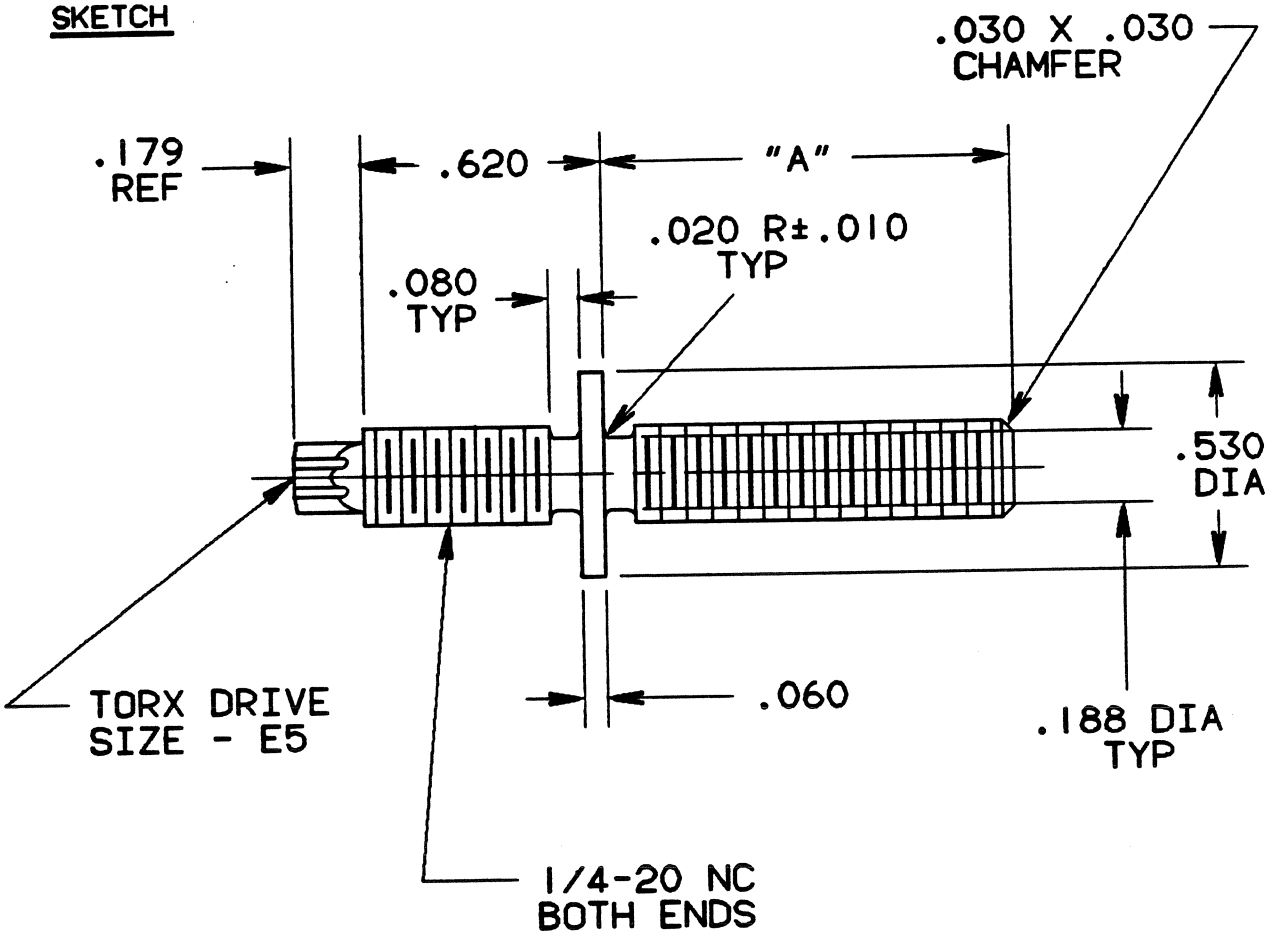
CHANGE INFORMATION | DATE | BY | JOB NO.

CHANGE INFORMATION | DATE | BY | JOB NO.

ORIGINAL JOB NO.	TITLE	PART NO.
M0196	STUD - DASH	23-11632
LAST CHG LTR: C		SHEET 1 OF 1

CHANGE INFORMATION	DATE	BY	JOB NO.
ADDED -001.	06-29-87	TTR	PM0401

SKETCH



SIZE THREAD	"A" DIM.	MANUFACTURE'S NUMBER	FREIGHTLINER PART NUMBER
1/4-20	.440	CMR	23-11632-000
1/4-20	1.060	CMR	23-11632-001

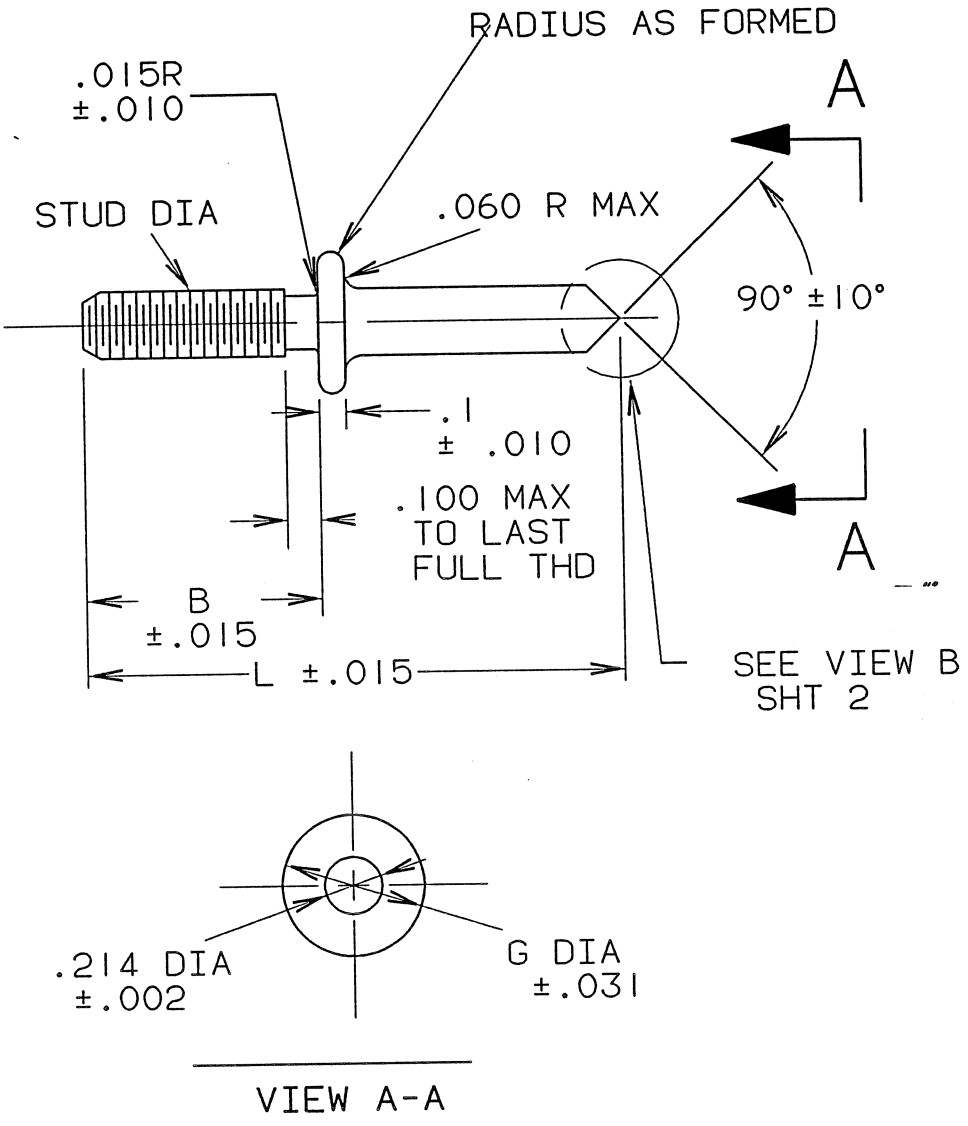
CHANGE INFORMATION	DATE	BY	JOB NO.
REVISED NOTES 1 & 2.	03-28-84	TTR	M0196
DELETED BOTH ENDS.	03-28-84	TTR	M0196
ADDED TORX DRIVE DIM.	04-11-84	TTR	M0196
DELETED TORX DRIVE DIMENSIONS.	06-29-87	TTR	PM0401
A			
B			
C			

ENGINEERING NOTES

1. MATERIAL: HEAT TREATED STEEL 1021 OR 1022, GRADE 5.1.
2. FINISH: PHOSPHATE/ORGANIC/OIL TYPE (BRITEGARD), PER GM 6174-M.
3. UNLESS OTHERWISE SPECIFIED ALL TOLERANCES ARE ±.015.
4. COATED PARTS MUST SHOW A MINIMUM SALT SPRAY RESISTANCE OF 240 HR WHEN TESTED ACCORDING TO ASTM B117.

COMPILED	TTR	DATE DRAWN	CADAM ORIGINAL	MATERIAL	MASTER NUMBER	
APPROVED	DHM	12-05-83		1	01280	010D1

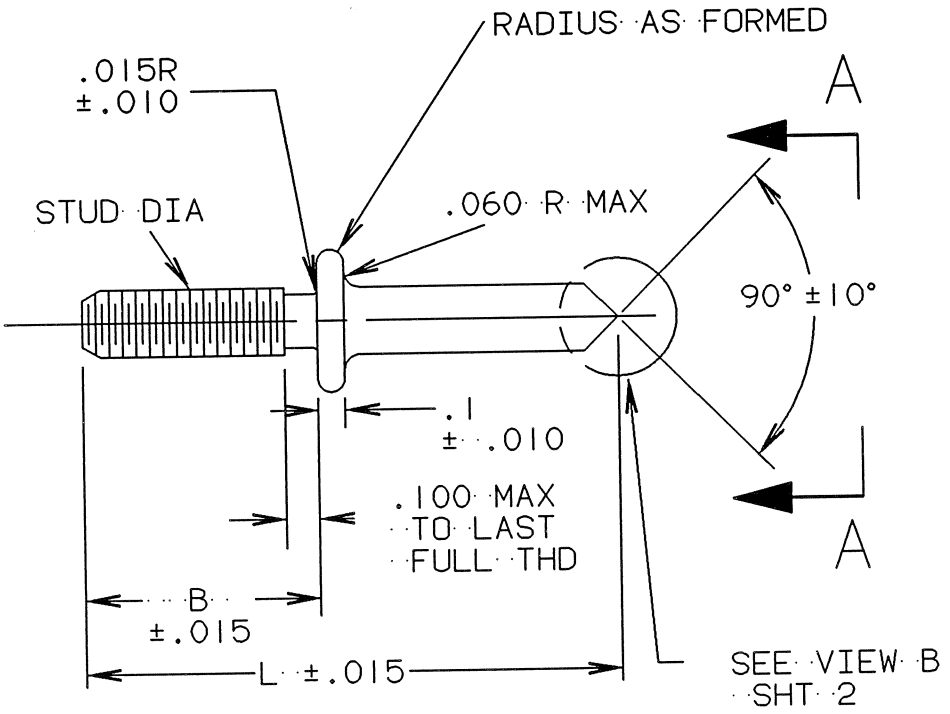
DRAWN	RDF	TITLE	ITEM NUMBER
APPRV	PCK	STUD, COLLARED WELD "PENCIL" POINT	23-11665
DATE	11/08/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 2

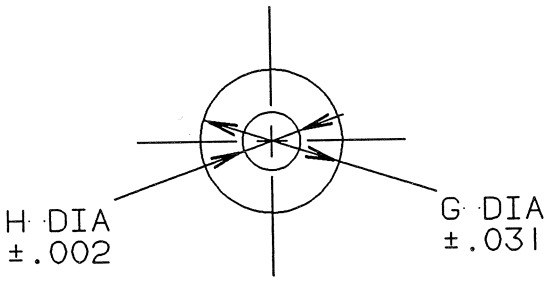


VIEW A-A

CHG	JOB/RLSE NO	DATE	BY	REVISION
C	P4389F-01	11/08/89	RDF	REVISED AND REDRAWN
D	PX2403-16	08/19/90	PCK	ADDED -003
E	P6124G-01	04/20/94	ERK	ADDED -004
F	P6333H-01	04/04/95	DAJ	REVISED FLANGE DIM TO VARIABLE "G"
G	PA2042-59	09/27/95	ERK	RESTATED "G" DIMENSION, COLLAR R TO .060 FROM .04

DRAWN	RDF	TITLE STUD, COLLARED WELD "PENCIL" POINT	ITEM NUMBER 23-11665
APPRV	PCK		
DATE	11/08/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 2



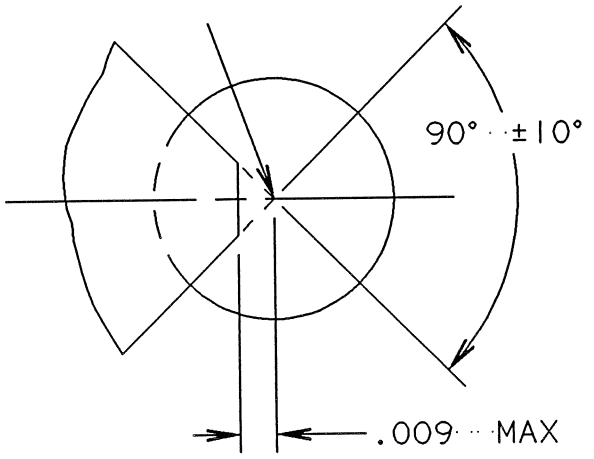


VIEW A-A

CHG	JOB/RLSE NO	DATE	BY	REVISION
D	PX2403-16	08/19/90	PCK	ADDED -003
E	P6124G-01	04/20/94	ERK	ADDED -004
F	P6333H-01	04/04/95	DAJ	REVISED FLANGE DIM TO VARIABLE "G"
G	PA2042-59	09/27/95	ERK	RESTATED "G" DIMENSION, COLLAR R TO .060 FROM .04
H	PA2042-64	01/26/96	ERK	RESTATED "H" DIMENSION

DRAWN	RDF	TITLE	ITEM NUMBER
APPRV	PCK	STUD, COLLARED WELD, "PENCIL" POINT	23-11665
DATE	11/09/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 2 OF 2

THEORETICAL SHARP POINT



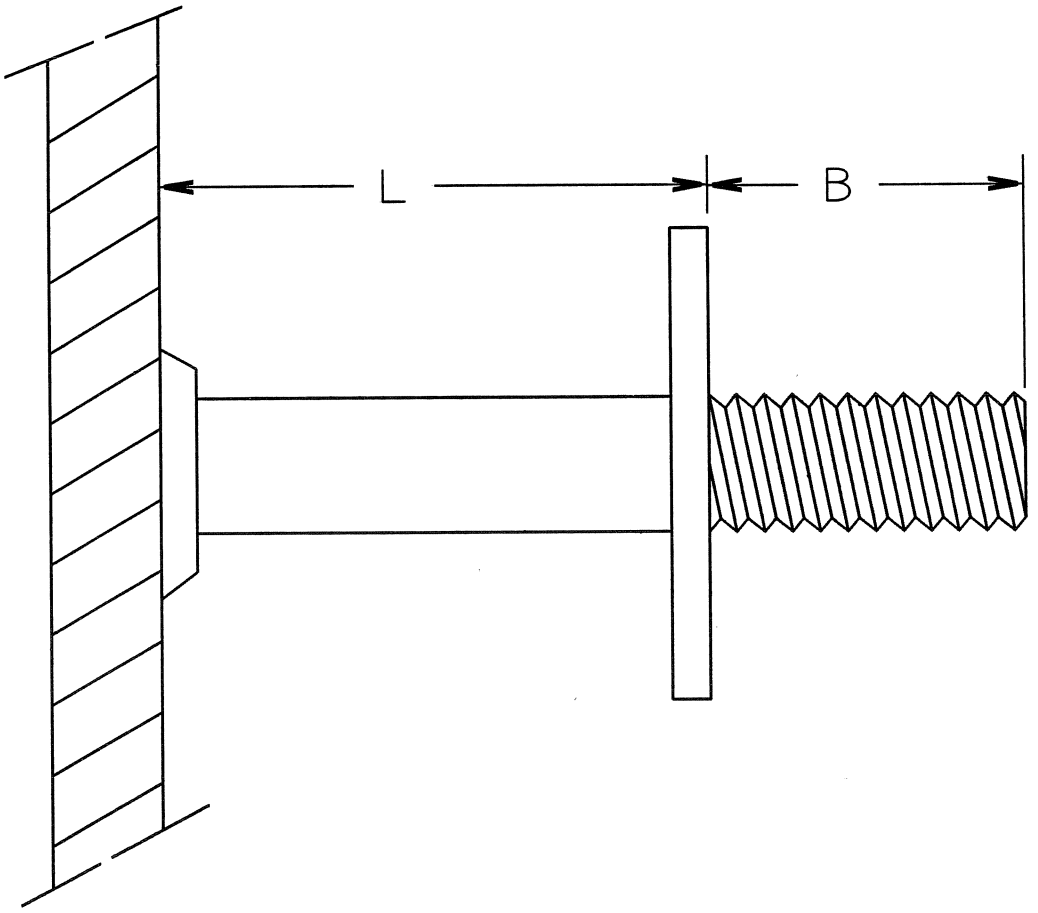
VIEW B

STUD DIA	B	G	H	L	MANUFACTURER		FREIGHTLINER PART NUMBER
					TRW	ERICO	
1/4-20 UNC	1.000	.531	.214	2.00			23-11665-001
1/4-20 UNC	0.875	.531	.214	2.00	101-016-797	050-816P	23-11665-000
3/8-16 UNC	1.000	.625	.330	2.00			23-11665-002
3/8-16 UNC	1.750	.625	.330	2.25			23-11665-003
3/8-16 UNC	1.250	.625	.330	2.00			23-11665-004

1. MATERIAL: LOW CARBON STEEL
2. MECHANICAL PROPERTIES, AS FORMED
   TENSILE: 60KSI MIN.
   YIELD: 50KSI MIN.
   REDUCTION IN AREA: 50% MIN.
3. NO CRACKS ON SHANK SURFACES
4. TO BE USED WITH FERRULE SUPPLIED WITH STUD(REF.23-11468)

CHG	JOB/RLSE NO	DATE	BY	REVISION
D	PX2403-16	08/19/90	PCK	ADDED -003
E	P6124G-01	04/20/94	ERK	ADDED -004
F	P6333H-01	04/04/95	DAJ	CHARTED "G" DIM, SEE PAGE 1
G	PA2042-59	09/27/95	ERK	RESTATED "G", COLLAR R. TO .060 FROM .04
H	PA2042-64	01/26/96	ERK	RESTATED "H"

DRAWN	PCK	TITLE	ITEM NUMBER
APPRV	ANF	STUD, COLLARED WELD ASSY TYPE CK	A23-11666
DATE	06/10/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



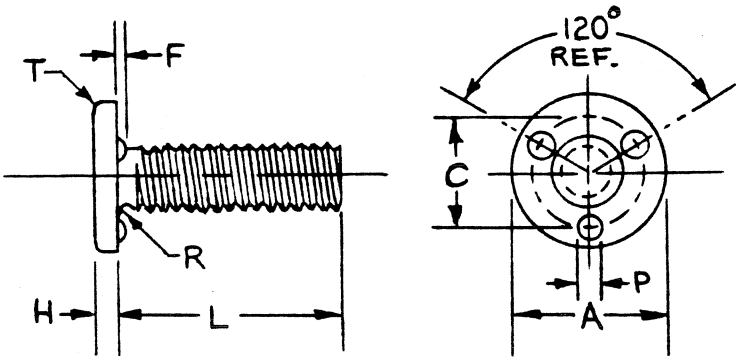
THREAD SIZE	B ±.06	L ±.12	STUD PART NO.	ARC SHIELD PART NO.	FREIGHTLINER PART NO.
1/4-20	.875	1.125	23-11665-000	23-11468-104	A23-11666-000
1/4-20	1.00	1.00	23-11665-001	23-11468-104	A23-11666-001

B

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	P2110C-01	06/04/84	DJL	
A	P4969F-01	06/10/89	PCK	REDRAWN. ADDED A23-11666-001
B	PA2042-37	07/07/93	ERK	"B" & "L" DIMENSIONS CORRECTED.

ORIGINAL JOB NO.	TITLE	PART NO.
2880C	STUD, PROJECTION WELD 5/16 -18 TYPE U3	23-11669
LAST CHG LTR		SHEET 1 OF 1

SKETCH



PART NUMBERS

THREAD UNC	A HEAD DIA.	H HEAD HEIGHT	P PROJECTION DIA.	F PROJECTION HEIGHT	LOCATING CIRCLE C	T EDGE RADIUS	R FILLET RADIUS	FREIGHTLINER PART NUMBER*
5/16-18	.755 .725	.099 .089	.125 .115	.047 .043	.531	.055	.045	23-11669-L

*Add 3-digit dash number indicating length in 1/100's of an inch.

ENGINEERING NOTES

(1) Material: Weldable grade of low carbon steel

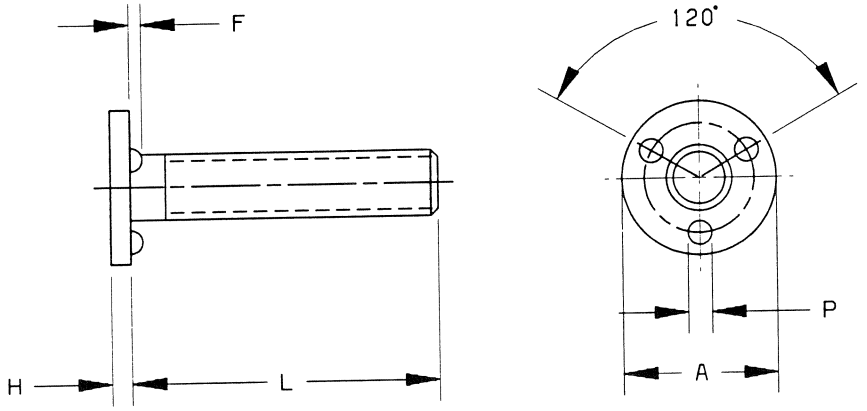
2. Finish: Plain

COMPILED	DJL	DATE DRAWN		MATERIAL	Master	Number
APPROVED	DJL	6-8-84		(1)	01290	000D1

CHANGE INFORMATION | DATE | BY | JOB NO.

CHANGE INFORMATION | DATE | BY | JOB NO.

DRAWN	CGD	TITLE	DRAWING NUMBER	
APPRV	DAJ	STUD-PROJECTION WELD	23-11836	
DATE	06/29/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. G
CATIA ORIGINAL				



THREAD UNC	A HEAD DIA	H HEAD HEIGHT	P PROJECTION DIA.	F PROJECTION HEIGHT	L LENGTH	MANUFACTURERS NUMBER ONB	FREIGHTLINER PART NUMBER
3/8-16	.880 .850	.114 .104	.135 .125	.052 .048	3/4	HW3312	23-11836-075
					1	HW3316	23-11836-100
					1-1/4	HW3320	23-11836-125
					1-1/2	HW3324	23-11836-150
					1-3/4		23-11836-175 G
					3	OP-8480-HW	23-11836-300
1/2-13	1.005 .975	.146 .136	.155 .145	.062 .058	1	HW4416	23-12192-100
					1-1/4	HW4420	23-12192-125
					1-3/4	HW4428	23-12192-175

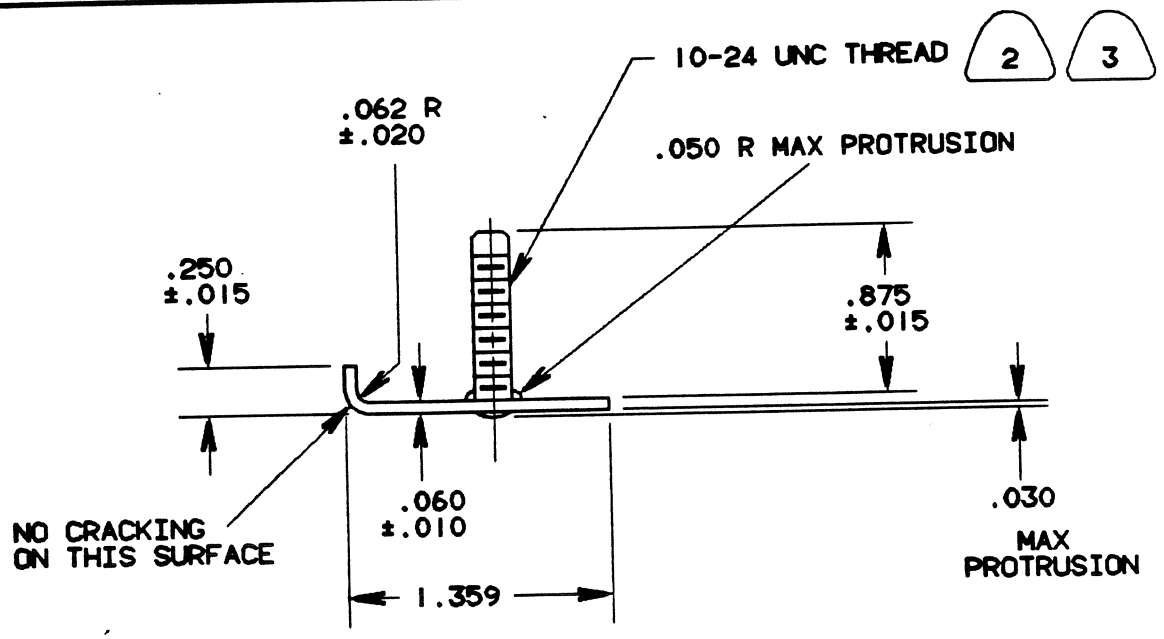
ENGINEERING NOTES:

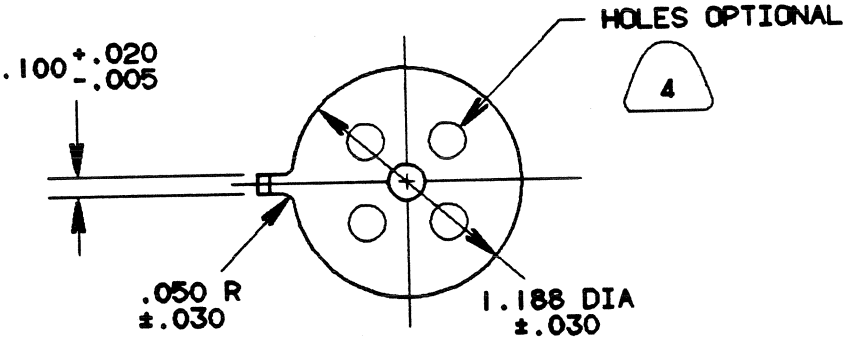
1. MATERIAL: STEEL, C1008-1010 HIGH-WELDING QUALITY, LOW CARBON STEEL.
2. FINISH: PLAIN
3. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY.

CHG	JOB NO	DATE	BY	REVISION
G	P09138-01	06/29/99	CGD	REVISED AND REDRAWN IN CATIA, ADDED 23-11836-175.

DRAWN	REG	TITLE	DRAWING NUMBER
APPRV	RDF	STUD, GRILLE MTG	23-11861
DATE	07-17-87	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. -
CADAM ORIGINAL			

UNLESS OTHERWISE NOTED, DIMENSIONS ARE IN INCHES | UNIT OF MEASURE: EA.





1. MATERIAL-TYPE 304 OR 305 SS

2 STUD MAY BE PRESSED, WELDED OR COLD-HEADED

3 STUD MUST WITHSTAND 2 FT-LBS TORQUE, 400 LBS AXIAL (PUSH/PULL-OUT) FORCE, 25 LBS LATERAL FORCE APPLIED .75 ABOVE DISC.

4 AT MANUFACTURER'S OPTION DISC MAY CONTAIN HOLES, PROVIDED THEY DO NOT INTERFERE WITH MEETING REQUIREMENTS OF NOTE 3.

5. SIMILAR TO 681 990 02 05.

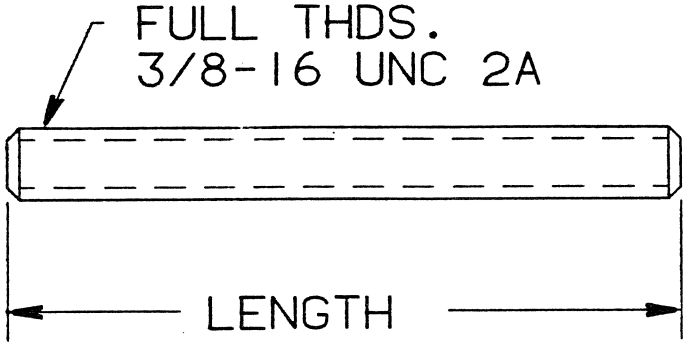
CHG	JOB NO	DATE	BY	REVISION
-	PL0230	07-17-87	REG	ORIGINAL RELEASE

M/F

DRAWN	DWR	TITLE	ITEM NUMBER
APPRV	RDF	STUD, 3/8-16, GR 8 FULLY THREADED	23-12055
DATE	10/10/89	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1

UNLESS OTHERWISE NOTED, ALL DIMENSIONS IN INCHES.

SKETCH



COMPLETE PART NUMBER BY ADDING A THREE-DIGIT NUMBER TO INDICATE LENGTH (L) IN HUNDREDTHS OF AN INCH. EXAMPLE: 23-12055-350 SPECIFIES A 3.500 LONG 3/8-16 FULL THREAD STUD. 1/4 INCH INCREMENTS PREFERRED.

ENGINEERING NOTES:

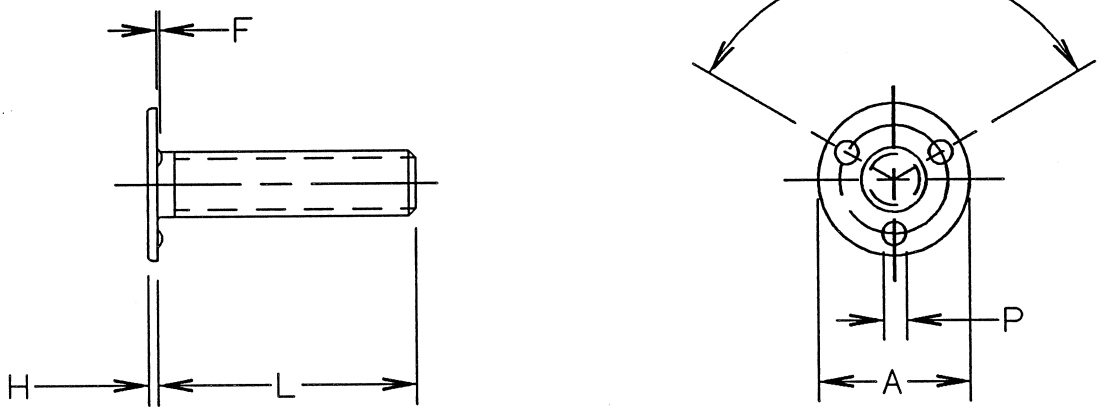
1 MATERIAL: STEEL, GR 8/8.2, PER SAE J429.

2 FINISH: PHOS & OIL, TYPE Z, CLASS 2 PER F/L SPEC 49-00006-041.

3 CONTINUOUS THREAD STUD PER IFI 136, SEC. C (4). LENGTH TOL. ±.06 TO 6 IN., ±.12 OVER 6 IN.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	361891-90	10/10/89	DWR	DOCUMENTED

DRAWN	ERK	TITLE	ITEM NUMBER
APPRV	MKN	STUD-PROJECTION WELD SAE 1018/1022	23-12068
DATE	02/23/93	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



THREAD	A HEAD DIA.	H HEAD HEIGHT	P PROJECTION DIA.	F PROJECTION HEIGHT	FREIGHTLINER PART NUMBER*
3/8-16 UNC	.880 .850	.114 .104	.135 .125	.052 .048	23-12068-L
A B 7/16-20 UNF	.940 .910	.255 .245	.145 .135	.057 .050	23-12383-L

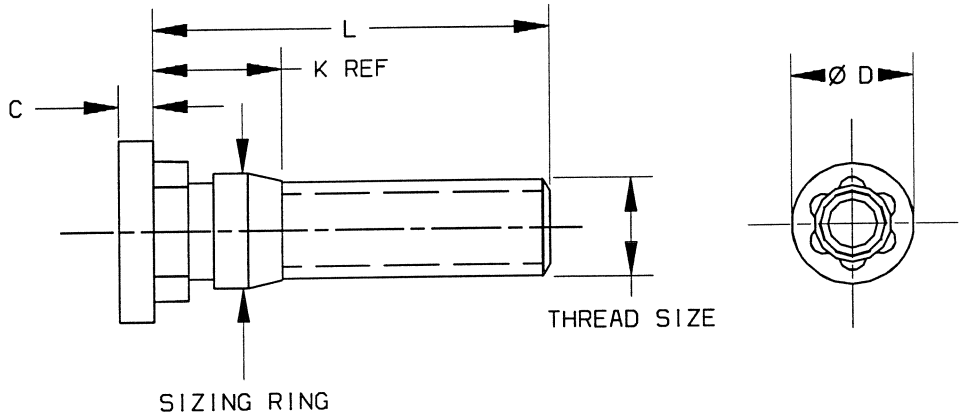
*ADD A THREE DIGIT DASH NUMBER TO EXPRESS DIM "L" LENGTH IN ONE-HUNDREDTHS OF AN INCH. EG.: 23-12068-125 REPRESENTS A 3/8-16 WELD STUD 1 1/4 INCH LONG.

ENGINEERING NOTES:

1. MATERIAL: STEEL, SAE 1018/1022.
2. HEAT TREAT: ROCKWELL C25-35.
3. STUD MUST BE TREATED FOR HYDROGEN EMBRITTLEMENT.
4. THREADS: 2A
5. FINISH: ZINC PLATE PER F/L SPECIFICATION 49-00005-403.

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PH0425-19	02/23/93	ERK	INITIAL RELEASE
A	P00184-01	06/21/96	DAJ	ADDED 23-12383 & "L" TO PN. RMVD UNNECESSARY DIMS.
B	P00184-03	09/11/96	DAJ	DIMENSION H WAS .120/.130 FOR THE 23-12383 SPEC.

DRAWN	LFB	TITLE	DRAWING NUMBER	
APPRV	DAJ	STUD-CLINCH STEEL, ZINC PLATED	23-12138	
DATE	10/27/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. D
CATIA ORIGINAL				



THREAD SIZE	SIZING RING +.002 -.003	C ±.005	D ±.010	K REF	ENGAGEMENT MATERIAL MIN.	HOLE SIZE ±.002	FREIGHTLINER PART NUMBER*
10-24	.204	.070	.370	.095	.060	.198	23-12254-L
1/4-20	.270	.090	.470	.095	.060	.264	23-12138-L
5/16-18	.331	.110	.600	.180	.120	.274	23-12706-L
3/8-16	.398	.130	.690	.185	.120	.391	23-12212-L

D

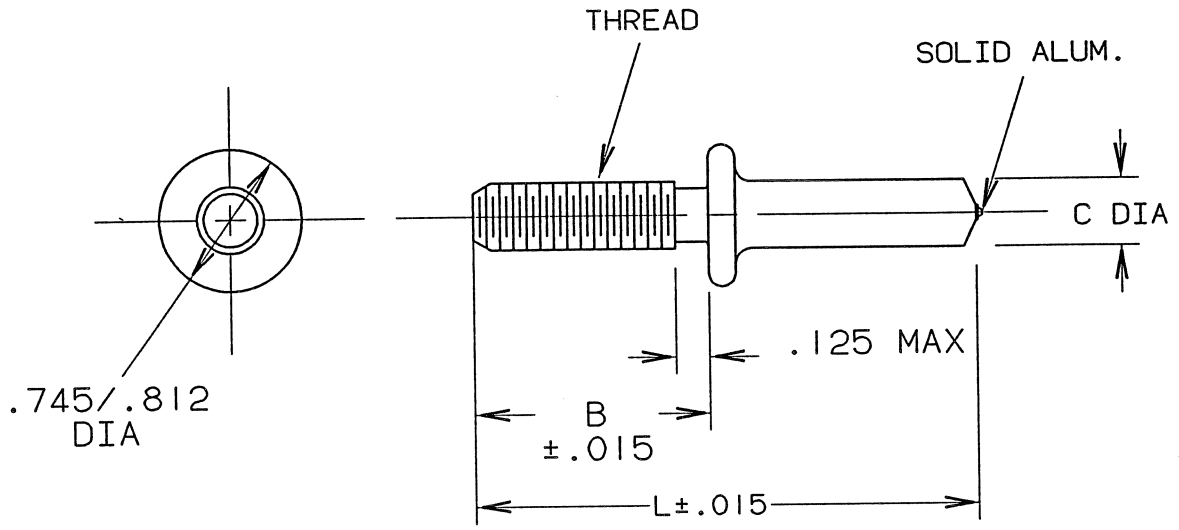
* ADD THREE-DIGIT DASH NUMBER INDICATING LENGTH IN 1/100'S OF AN INCH, E.G. 23-12210-175 IS A 3/8-16 STUD 1 AND 3/4 INCH LONG.

SPECIFICATIONS:

1. MATERIAL: 10B22 BORON STEEL, R/C 30-36.
2. FINISH: .0002" MIN. ZINC AND YELLOW CHROMATE.
3. THREAD FORM: UNC 2A.
4. APPROVED VENDOR: CAMCAR.

CHG	JOB NO	DATE	BY	REVISION
D	P07044-01	10/27/99	LFB	REVISED AND REDRAWN IN CATIA. ADDED 23-12706-L.

DRAWN	DAJ	TITLE STUD-WELD COLLARED	ITEM NUMBER 23-12229
APPRV	ERK		
DATE	04/04/95	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1



	THREAD	DIMENSION			MANUFACTURER'S NUMBER	FREIGTHLINER PART NUMBER
		B	L	C	TRW	
B	3/8-16 UNC2A	1.000	1.625	.449/.444	A-101 016356	23-12229-000
		.625	1.250		A/4 101-015-941	681 311 00 70

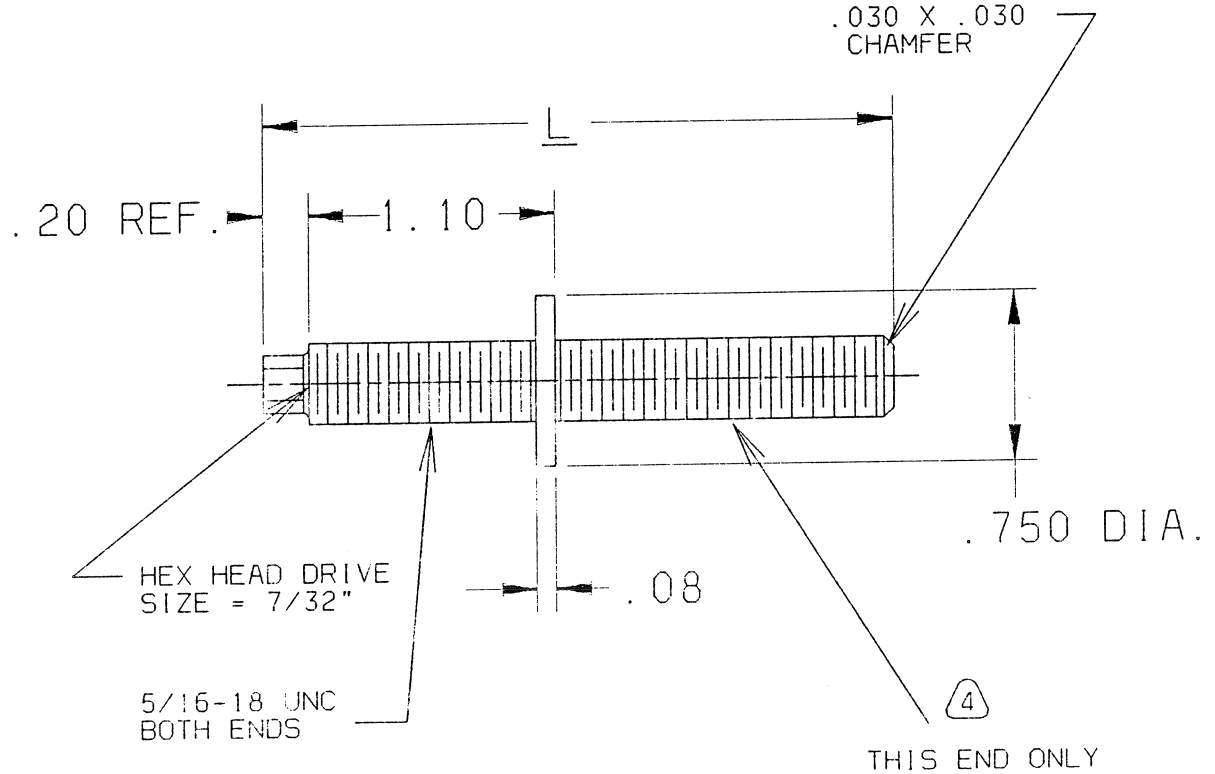
ENGINEERING NOTES:

1. MATERIAL: LOW CARBON STEEL PER ASTM A108 GRADES 1010-1020.
2. FINISH: NICKLE PLATED
3. NO CRACKS ON SHANK SURFACES
4. TO BE USED WITH FERRULE SUPPLIED WITH STUD (REF TRW 100-101-118).

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	P6333H-01	04/04/95	DAJ	INITIAL LOAD
A	P6333H-03	04/18/95	DAJ	RMVD TOL & NOTE 3. ADDED FERRULE REF. P/N.
B	PA2042-59	05/25/95	ERK	TRW NO. ADDED FOR 23-12229-000.

ADRIENNE CHILBERG

DRAWN	ERK	TITLE	DRAWING NUMBER
APPRV	MJP	STUD - COLLARED	23-12239
DATE	04/27/95	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. D
CATIA ORIGINAL			



SIZE THREAD	"L"	FINISH	FREIGHTLINER PART NUMBER	
5/16-18	2.27	5	23-12239-000	D
5/16-18	2.52	1	23-12239-001	

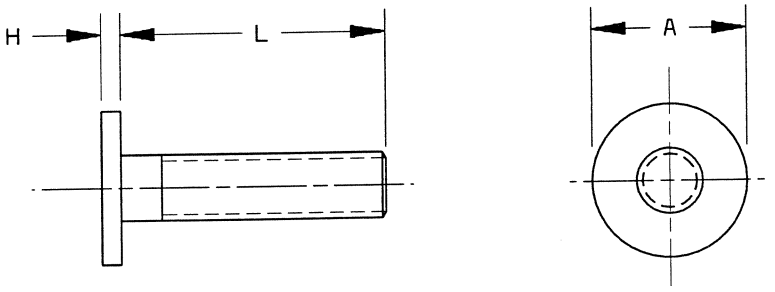
ENGINEERING NOTES:

1. MATERIAL: HEAT TREATED STEEL 1021 OR 1022, GRADE 5.1.
2. FINISH: PHOSPHATE/ORGANIC/OIL PER GM 6174.
3. UNLESS OTHERWISE SPECIFIED ALL TOLERANCES ARE ±.015.
4. PRE-APPLIED CHEMICAL THREAD LOCKING COMPOUNDING, SIMILAR TO IFI-125. 1-3 THD CLEAR LEAD, 6 THD MIN LOCKING ELEMENT.
D 5. FINISH: ZINC PLATE PER FREIGHTLINER SPEC. 49-00005-403.

CHG	JOB NO	DATE	BY	REVISION
-	P2A412-56	04/27/95	ERK	INITIAL RELEASE
A	P2A412-67	05/26/95	DAJ	ADDED NOTE 4.
B	P2A412-A9	10/25/95	ERK	E7 IPO E6, DELETED .020R & .250 DIA., REV. NOTE 4
C	P01046-01	08/23/96	PTS	DRIVE WAS EXTERNAL TORX DRIVE
D	P03151-01	07/01/97	PTS	ADDED -000, REVISED CHART, ADDED NOTE 5

DEBBIE

DRAWN	LFB	TITLE STUD-WELD NO PROJECTIONS, GRADE 5	DRAWING NUMBER 23-12296
APPRV	DAJ		
DATE	12/07/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. A
CATIA ORIGINAL			



THREAD UNC	"A" HEAD DIA	"H" HEAD HEIGHT	"L" LENGTH	MANUFACTURERS NUMBER		FREIGHTLINER PART NUMBER
				BRANUM		
3/8-16	.875	.109	1-1/2	MSO-332452		23-12296-150

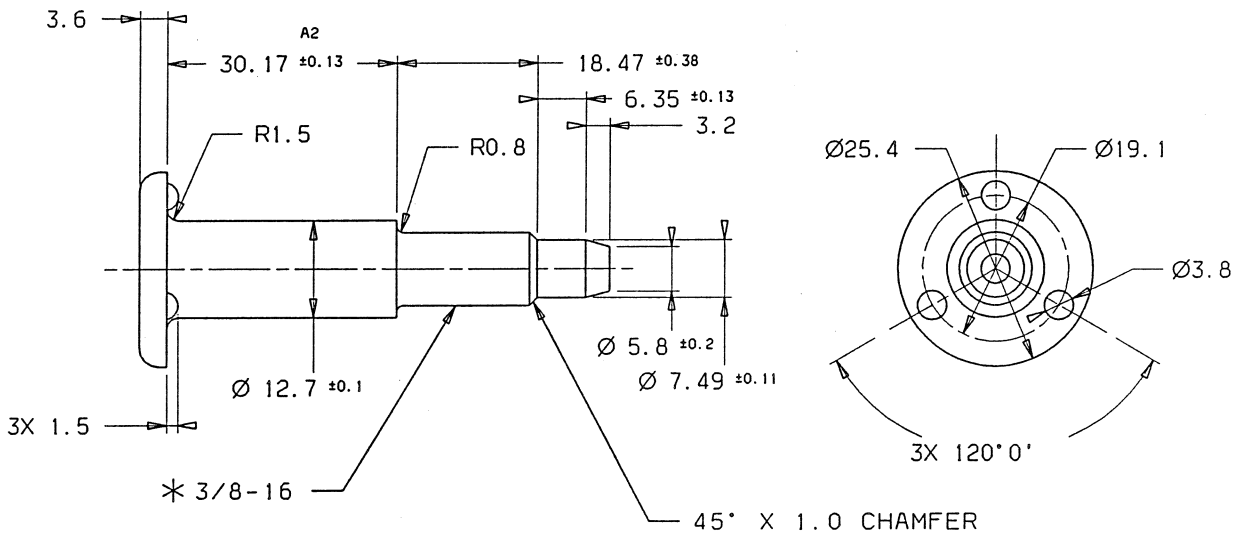
ENGINEERING NOTES:

1. MATERIAL: STEEL, EQUIVALENT TO GRADE 5 PER SAE J429.
2. FINISH: PLAIN.
3. SUPPLIER: BRANUM OR APPROVED EQUIVALENT.

CHG	JOB NO	DATE	BY	REVISION
A	PA2042-98	12/07/99	LFB	REVISED AND REDRAWN IN CATIA. J429 WAS J995.

RELEASE NUMBER	LTR	ZONE	REVISION DESCRIPTION	BY	DATE	APPD
P5926P-01	-		INITIAL RELEASE	JLR	04/18/96	SJH

23-12344-



1. MATERIAL: C1035, HEAT TREAT GRADE 5 EQUIVALENT.
2. IDENTIFY COMPONENT PER SPEC 49-00051.
3. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED.
4. * INDICATES INCH DIMENSION.

FREIGHTLINER CORPORATION

THE INFORMATION CONTAINED HEREIN IS PROPRIETARY DATA, AND IS NOT FOR DISSEMINATION OR DISCLOSURE, IN WHOLE OR IN PART, FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SUBMITTED, EXCEPT AS AUTHORIZED IN WRITING BY FREIGHTLINER CORPORATION.

MATERIAL APPROVAL / DATE	UNLESS OTHERWISE NOTED, DIMENSIONS AND TOLERANCES ARE DEFINED ACCORDING TO ANSI STANDARD Y14.5M-1982, WITH EXCEPTIONS PER FREIGHTLINER EOM SECT 307.
DRAWN BY: JLR / DATE: 04/18/96	
CHECKED BY: NCC / DATE: 04/20/96	
RESPONSIBLE ENGINEER: CGB / DATE: 04/18/96	THIRD ANGLE PROJECTION / UNITS OF MEASURE: MM
APPROVED BY: SJH / DATE: 04/18/96	RESPONSIBLE MFG. ENGR.: P. ROGERS 04/18/96

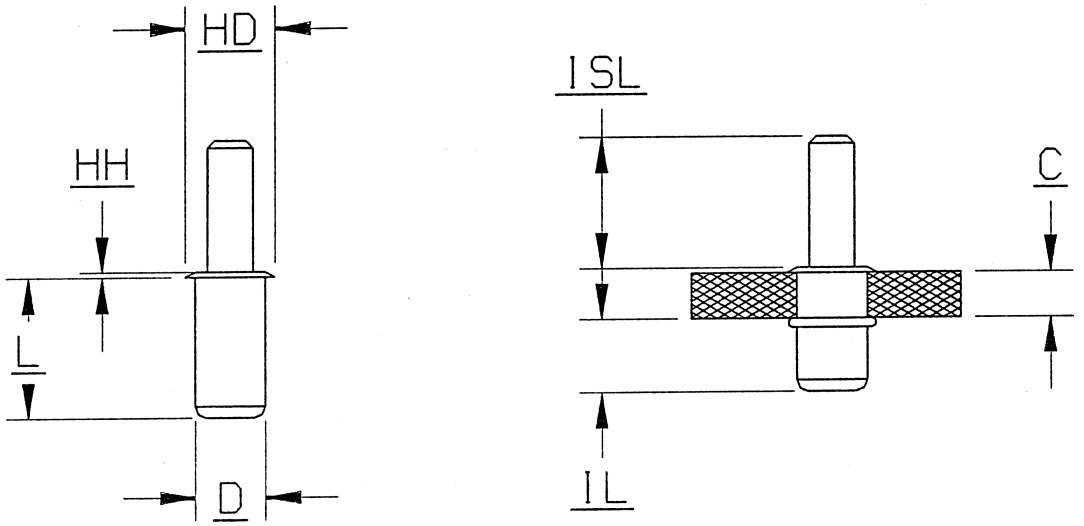
DESCRIPTION: STUD-WELD, SHOULDER, 3/8-16

SUPPLEMENTARY DESCRIPTION: 02190

ITEM/DRAWING NUMBER	REVISION LETTER	SHEET NUMBER
23-12344	-	1 OF 1

ADRIENNE CHILBERG

DRAWN	DEK	TITLE	DRAWING NUMBER	
APPRV	AJF	STUD - INSERT	23-12460	
DATE	11/04/97	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -
CATIA ORIGINAL				



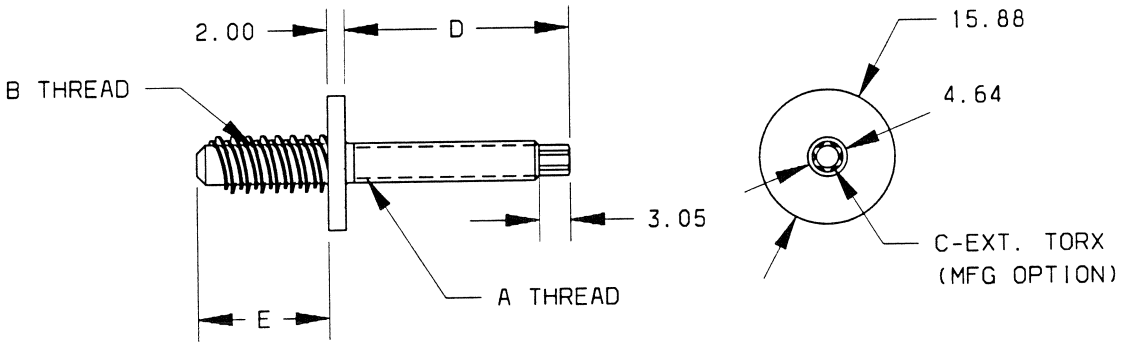
THREAD SIZE	REF HH	REF HD	REF L	REF D	DRILL DIA. DRILL (NOM)	DRILL DIA. HOLE SIZE	C GRIP	IL MAX	ISL STUD LENGTH	AVK PART NUMBER	FREIGHTLINER SPEC NUMBER
1/4-20	.030	.500	.770	.390	25/64	.3906	.165/.260	.465	.7175	ASS9-420-260-7175S	23-12460-717

ENGINEERING NOTES:

1. MATERIAL: AS SERIES - STEEL SHELL AISI 1008/1010 & 12L14
   - STEEL STUD AISI 1038
2. FINISH: YELLOW TIN ZINC PER BPS-TZ-327 (.003) WITH CLEAR PROTECTIVE COATING.

CHG	JOB NO	DATE	BY	REVISION
-	P02047-13	11/04/97	DEK	INITIAL RELEASE

DRAWN	NXM	TITLE	DRAWING NUMBER	
APPRV	DAJ	STUD-DOUBLE ENDED HI-LO/MCH SCREW WITH COLLAR	23-12499	
DATE	03/06/98	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. B
CATIA ORIGINAL				



	A THREAD SIZE	B THREAD SIZE DOUBLE LEAD HI-LO THREAD	C EXTERNAL TORX SIZE	D DIM	E DIM	FREIGHTLINER PART NUMBER
	1/4-20 UNC	9/32-16	E5	15.75	11.68	23-12499-000
A	1/4-20 UNC	9/32-16	E5	22.35	15.75	23-12499-001
B	1/4-20 UNC	9/32-16	E5	44.45	15.75	23-12499-002

ENGINEERING NOTES:

1. MATERIAL: SAE 1010-1020 STEEL HAVING 60 KSI MINIMUM TENSILE STRENGTH AND ROCKWELL HARDNESS B SCALE READING BETWEEN 70 AND 100.

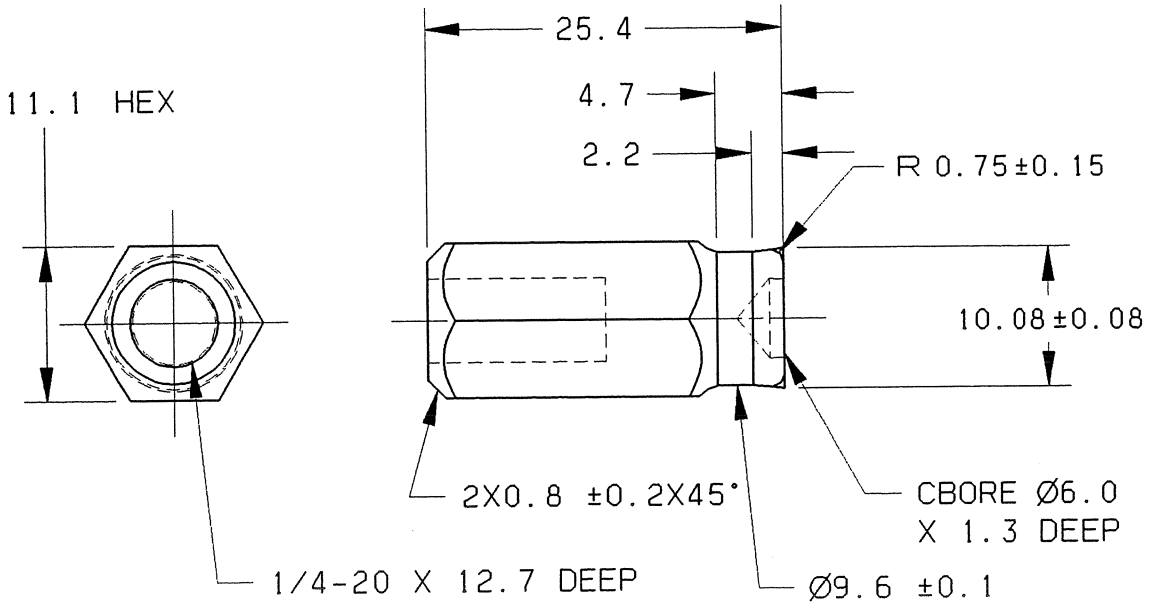
A 2. FINISH: YELLOW CHROMATE ZINC PLATE PER F/L SPEC 49-00005-203

3. DIMENSIONS: PER ANSI B18.6.3. ABOVE DIMENSIONS FOR REFERENCE ONLY.

4. THREADS: UN2A PER ANSI B1.1.

CHG	JOB NO	DATE	BY	REVISION
-	P2D241-30	03/06/98	NXM	INITIAL RELEASE
A	P2D241-67	07/10/98	NXM	ADDED 23-12499-001 & REVISED FINISH NOTE
B	P06868-26	07/19/99	CGD	ADDED 23-12499-002.

DRAWN	NXM	TITLE STUD-WINTERFRONT ATTACHMENT 1/4-20 UNC	DRAWING NUMBER 23-12535
APPRV	DAJ		
DATE	09/11/98	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. A
CATIA ORIGINAL			



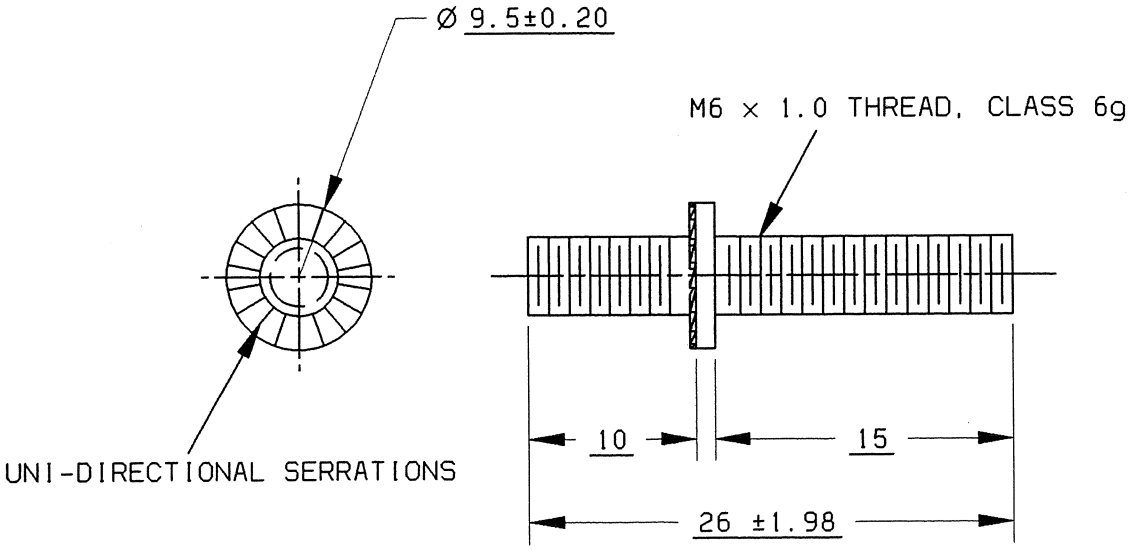
-000 SHOWN

SPECIFICATIONS:

1. MATERIAL: LOW CARBON STEEL
1. FINISH: ZINC-BLACK PER 49-00005-202

CHG	JOB NO	DATE	BY	REVISION
-	P06530-01	09/11/98	NXM	INITIAL RELEASE
A	PA2042-85	10/14/98	DAJ	0.8±0.2X45° WAS 2±0.5X45°, 1.3 DEEP WAS 3.3 DEEP

DRAWN	DAJ	TITLE STUD-DOUBLE ENDED, METRIC	DRAWING NUMBER 23-12550	
APPRV	DAJ			
DATE	10/21/98	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -
CATIA ORIGINAL				



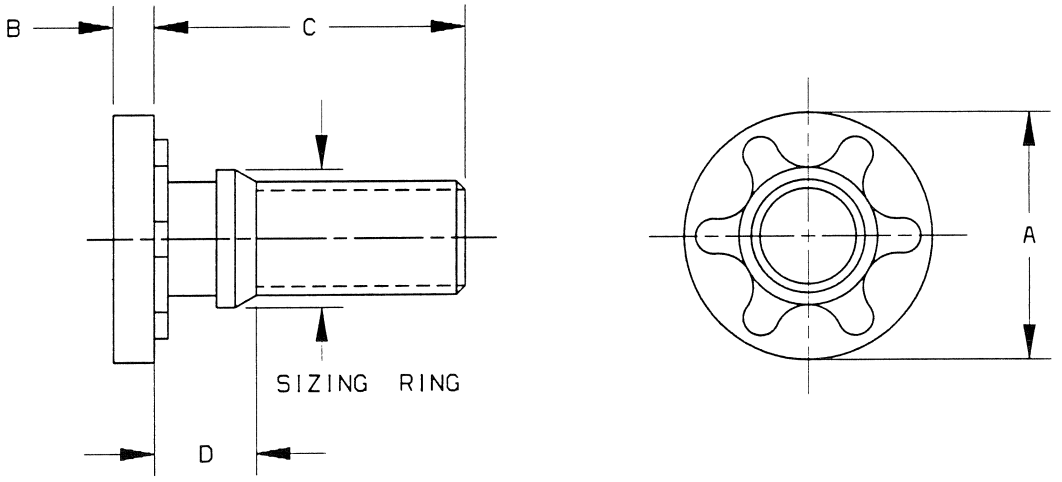
-000 SHOWN

ENGINEERING NOTES:

1. MATERIAL: STEEL, C1020, GRADE 2, CASE HARDEN 35-40 RC
2. FINISH: PHOSPHATE AND OIL PER FTL 49-00006-041
3. ALL DIMENSIONS ARE FOR REFERENCE ONLY.
4. APPROVED SUPPLIER: POLYTECH NETTING, PART NUMBER 600979120BPO

CHG	JOB NO	DATE	BY	REVISION
-	P2D220-S6	10/21/98	DAJ	INITIAL RELEASE

DRAWN	CGD	TITLE	DRAWING NUMBER	
APPRV	DAJ	STUD-THREADED CLINCH	23-12626	
DATE	06/28/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -
CATIA ORIGINAL				



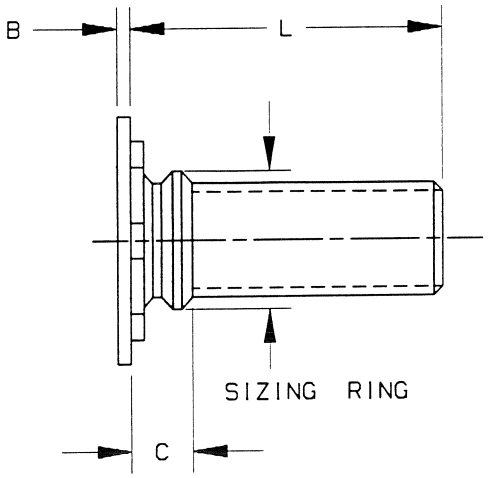
THREAD SIZE	SIZING RING +.002 -.003	DIMENSIONS				MINIMUM SHEET THICKNESS	HOLE SIZE IN SHEET	FREIGHTLINER PART NUMBER
		A DIA	B MAX	C	D MIN			
M10X1.5	10.62	19.75	3.5	28.0	3.6	2.2	10.0 +0.13 -0.00	23-12626-028
M10X1.5	10.62	19.75	3.5	37.0	3.6	2.2	10.0 +0.13 -0.00	23-12626-037

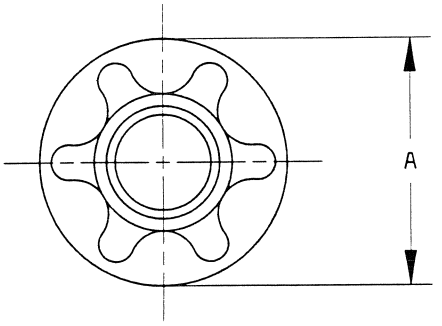
ENGINEERING NOTES:

1. MATERIAL: ANSI 4037
2. HARDNESS: RC 25-34
3. PROPERTIES: CLASS 9.8
4. SUGGESTED SUPPLIER: CAMCAR
5. DIMENSIONS: DIMENSIONS SHOWN ABOVE ARE FOR REFERENCE ONLY.

CHG	JOB NO	DATE	BY	REVISION
-	P06696-70	06/28/99	CGD	INITIAL RELEASE

DRAWN	CGD	TITLE	DRAWING NUMBER	
APPRV	DAJ	STUD-THREADED FLUSH STRUX	23-12633	
DATE	06/22/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -
CATIA ORIGINAL				





THREAD SIZE	SIZING RING +.002 -.003	DIMENSIONS			MINIMUM SHEET THICKNESS	HOLE SIZE IN SHEET		FREIGHTLINER PART NUMBER *
		A DIA	B NOM	C MIN		MIN	MAX	
5/16	.331	.600	.110	.180	.120	.323	.327	23-12633-L

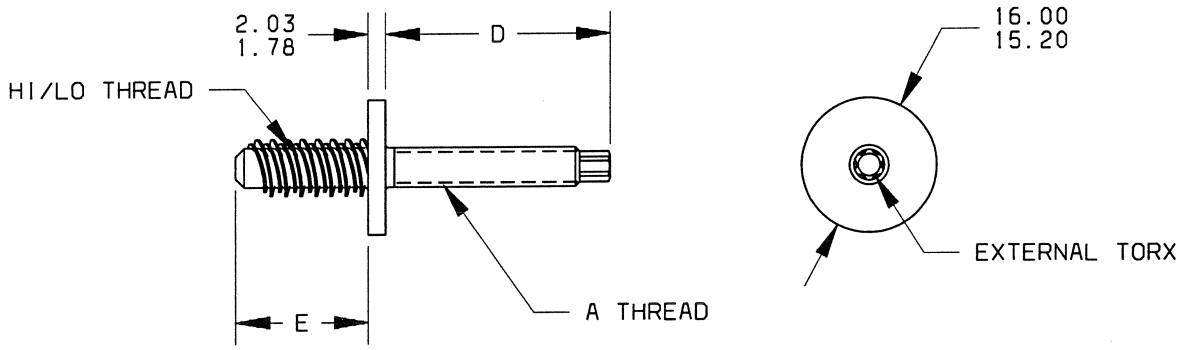
* ADD 3-DIGIT DASH NUMBER INDICATING LENGTH IN HUNDREDTHS OF AN INCH.
E.G. 23-12633-050 IS THREADED STUD 1/2 INCH LONG.

ENGINEERING NOTES:

1. MATERIAL: ANSI 4037 ALLOY STEEL
2. HARDNESS: RC 25-34
3. PROPERTIES: GRADE 5
4. SUGGESTED SUPPLIER: CAMCAR
5. THREAD FORM: UNC 2A.
6. DIMENSIONS: ABOVE DIMENSIONS ARE SHOWN FOR REFERENCE ONLY.

CHG	JOB NO	DATE	BY	REVISION
-	P07498-02	06/22/99	CGD	INITIAL RELEASE

DRAWN	CGD	TITLE STUD-DOUBLE ENDED, METRIC HI-LO/MCH SCREW WITH COLLAR	DRAWING NUMBER 23-12654
APPRV	DAJ		
DATE	06/16/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. B
CATIA ORIGINAL			



	A THREAD SIZE	DOUBLE LEAD HI/LO THREAD	EXTERNAL TORX SIZE	D DIM MIN/MAX	E DIM MIN/MAX	FREIGHTLINER PART NUMBER
A, B	M6X1.0	M7X1.59	E4	16.6/17.4	14.8/16.0	23-12654-000
B	M6X1.0	M7X1.59	E4	15.4/16.2	10.9/12.4	23-12654-001

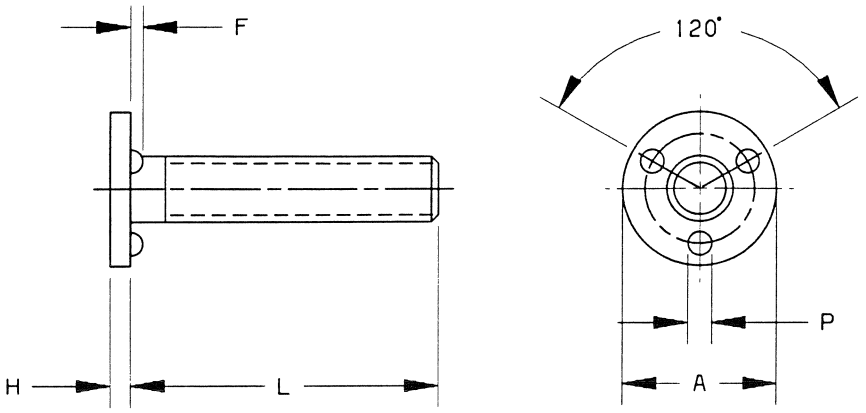
ENGINEERING NOTES:

A

1. MATERIAL: SAE 1010-1022 STEEL HAVING 60 KSI MINIMUM TENSILE STRENGTH AND ROCKWELL HARDNESS B SCALE READING BETWEEN 70 AND 100.
2. FINISH: ZINC PLATE PER F/L SPEC 49-00005-403
3. DIMENSIONS: ABOVE DIMENSIONS FOR REFERENCE ONLY.
4. THREADS: ANSI B1.13M.

CHG	JOB NO	DATE	BY	REVISION
-	P05733-06	06/16/99	CGD	INITIAL RELEASE
A	P05733-19	10/11/99	LFB	M7X1.79 WAS M7X1.9, 16.6/17.4 WAS 21.6/22.4
B	P07725-13	01/28/00	LFB	M7X1.59 WAS M7X1.79. ADDED -001.

DRAWN	CGD	TITLE STUD-PROJECTION WELD METRIC	DRAWING NUMBER 23-12671
APPRV	DAJ		
DATE	08/12/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. A
CATIA ORIGINAL			



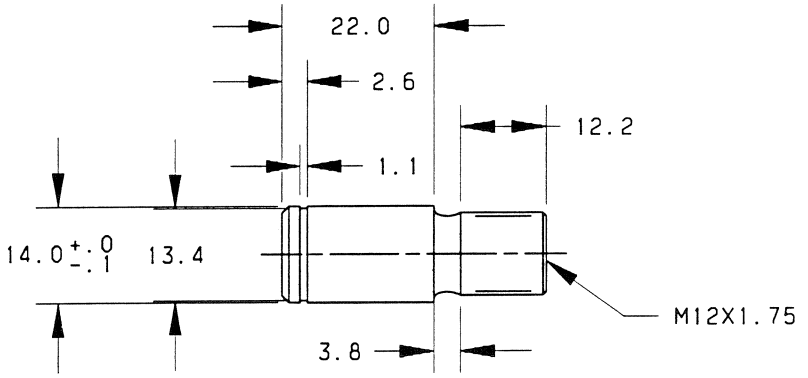
THREAD UNC	A HEAD DIA	H ±0.13 HEAD HEIGHT	P ±0.13 PROJECTION DIA.	F ±0.05 PROJECTION HEIGHT	L LENGTH	FREIGHTLINER PART NUMBER
M6	14.0 ±0.3	1.9	2.54	1.02	16.0	23-12688-016
					30.0	680 990 10 05
M8	18.8 ±0.4	2.5	3.10	1.20	25.0	680 990 19 05
M10	23.0 ±0.4	3.1	3.56	1.40	25.0	680 990 18 05
					35.0	23-12671-035
					45.0	680 990 21 05
					80.0	23-12671-080

ENGINEERING NOTES:

1. MATERIAL: STEEL, C1008-1010 HIGH-WELDING QUALITY, LOW CARBON STEEL.
2. FINISH: PLAIN
3. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY.

CHG	JOB NO	DATE	BY	REVISION
-	P09310-02	08/12/99	CGD	INITIAL RELEASE
A	P06688-04	09/17/99	JJS	ADDED 23-12688-016

DRAWN	CGD	TITLE	DRAWING NUMBER	
APPRV	DAJ	STUD-RETAINING RING METRIC, CLASS 8.8	23-12679	
DATE	09/03/99			
CATIA ORIGINAL		FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -



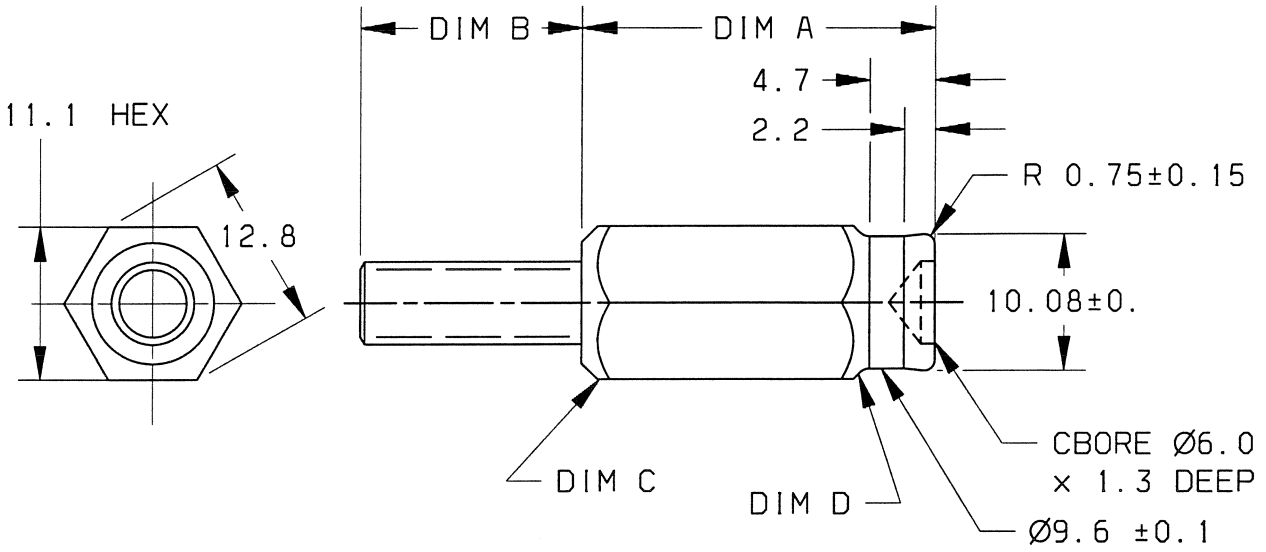
-001 SHOWN

ENGINEERING NOTES:

1. MATERIAL: STEEL, PROPERTY CLASS 8.8 PER DIN 939.
2. FINISH: PHOS & OIL PER F/L SPEC 49-00041-041.
3. THREAD WITH INTERFERENCE FIT SK6 TOLERANCE.

CHG	JOB NO	DATE	BY	REVISION
-	P07440-24	09/03/99	CGD	INITIAL RELEASE

DRAWN	LFB	TITLE	DRAWING NUMBER	
APPRV	DAJ	STUD-WINTERFRONT ATTACHMENT	23-12692	
DATE	10/22/99			
CATIA ORIGINAL		FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. B



METRIC DIMENSIONS IN MM

NOMINAL STUD SIZE	DIM A MM	DIM B MM	DIM C MM ±0.2	DIM D MM ±0.2	FREIGHTLINER PART NUMBER
M6 X 1	29.4	16.0	0.8X45°	0.8X45°	23-12692-002 (3)
M6 X 1	50.8	13.0	0.8X45°	0.8X45°	23-12692-001

B

ENGLISH DIMENSIONS IN INCHES

NOMINAL STUD SIZE	DIM A IN	DIM B IN	DIM C IN ±0.008	DIM D IN ±0.008	FREIGHTLINER PART NUMBER
1/4-20	1.2	1.0	0X90°	0.031X45°	23-12692-007

SPECIFICATIONS:

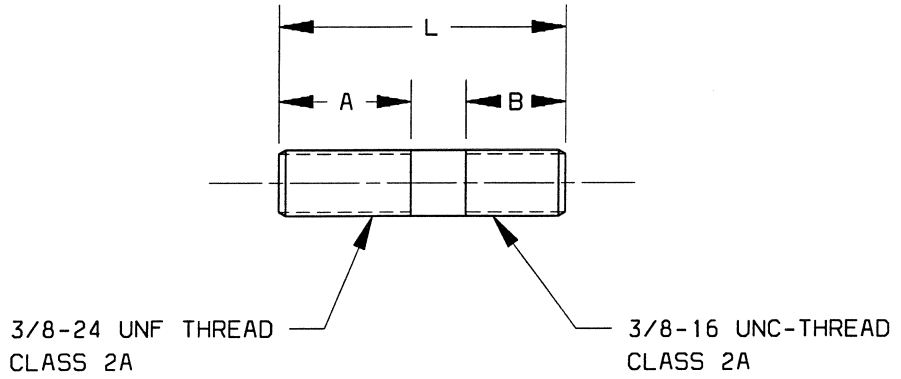
1. MATERIAL: LOW CARBON STEEL
2. FINISH: ZINC-BLACK PER 49-00005-202
3. PART SHOWN
4. DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED

CHG	JOB NO	DATE	BY	REVISION
-	P05733-18	10/22/99	LFB	INITIAL RELEASE
A	P06868-89	11/11/99	AJB	ADDED STUD TO DRW
B	P05733-40	01/14/00	LFB	13.0 WAS 16.0.

23-12736 , A , STUD-DOUBLE ENDED

DRAWN	LFB	TITLE STUD-DOUBLE ENDED GRADE 5, TEXACOTE 436	DRAWING NUMBER 23-12736
APPRV	DAJ		
DATE	12/10/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. A
CATIA ORIGINAL			

A



A DIM	B DIM	FREIGHTLINER PART NUMBER*
.750	.563	23-12736-L

* DASH NUMBER EQUALS LENGTH "L" IN INCHES.
EXAMPLE: 23-12736-275 IS 2.75 INCHES LONG.

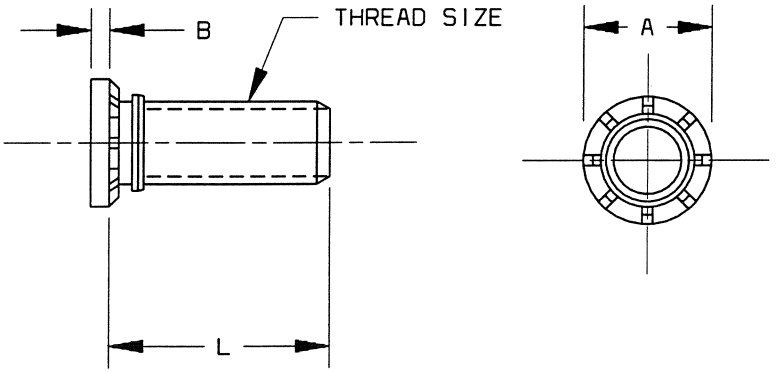
ENGINEERING NOTES:

1. MATERIAL: STEEL, GRADE 5 PER SAE J429.
2. FINISH: TEXACOTE 452.
3. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY.

CHG	JOB NO	DATE	BY	REVISION
-	P07725-10	12/10/99	LFB	INITIAL LOAD.
A	P07725-12	01/19/00	LFB	ADDED "A" AND "B" DIMS TO DRAWING.

DEBBIE

DRAWN	LFB	TITLE	DRAWING NUMBER	
APPRV	DAJ	STUD-CLINCH PHOS/BRZ	23-12743	
DATE	12/20/99	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1	CHG. LTR. -
CATIA ORIGINAL				



THREAD SIZE	DIMENSIONS			MIN. SHEET THICKNESS	HOLE SIZE IN SHEET		FREIGHTLINER PART NUMBER*
	A DIA	B MAX	C MAX		MIN	MAX	
3/8-16	.580±.01	.085	.155	.090	.375	.380	23-12743-L

* ADD 3-DIGIT DASH NUMBER INDICATING LENGTH IN HUNDREDTHS OF AN INCH.
E.G. 23-12743-050 IS THREADED STUD 1/2 INCH LONG.

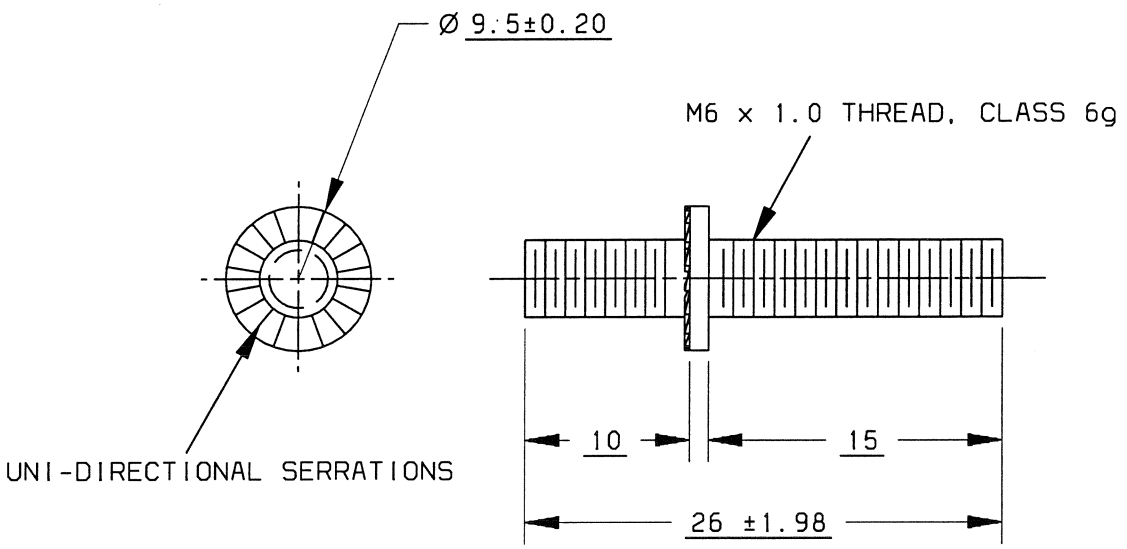
ENGINEERING NOTES:

1. MATERIAL: CDA-510 PHOSPHOR BRONZE
2. HARDNESS: B60.
3. PROPERTIES: GRADE 1.
4. SUGGESTED SUPPLIER: CAPTIVE FASTENERS.
5. THREAD: 2A
6. DIMENSIONS: ALL ABOVE DIMENSIONS ARE SHOWN FOR REFERENCE ONLY.

CHG	JOB NO	DATE	BY	REVISION
-	PN0554-13	12/20/99	LFB	INITIAL RELEASE

DEBBIE

DRAWN	DRG	TITLE STUD-DOUBLE ENDED, METRIC	DRAWING NUMBER 23-12749
APPRV	DAJ		
DATE	01/07/00	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1 / CHG. LTR. -
CATIA ORIGINAL			



-000 SHOWN

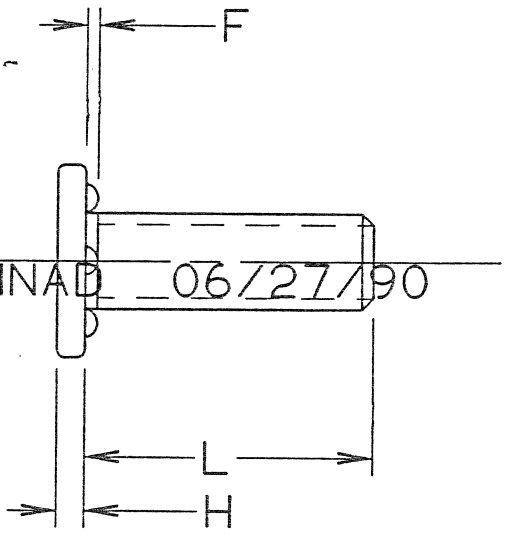
ENGINEERING NOTES:

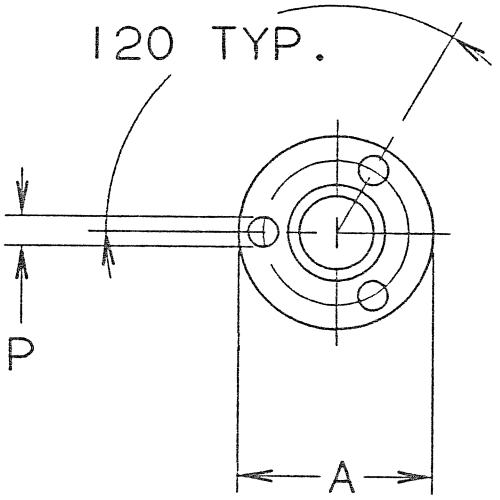
1. MATERIAL: STEEL, C1020, GRADE 2, CASE HARDEN 35-40 RC
2. FINISH: DACROMET.
3. ALL DIMENSIONS ARE FOR REFERENCE ONLY.

CHG	JOB NO	DATE	BY	REVISION
-	P10995-02	01/07/00	DRG	INITIAL RELEASE

DRAWN	WLB	TITLE STUD-WELD, PROJECTION	ITEM NUMBER 680 990 10 05
APPRV	PCK		
DATE	04/27/90	FREIGHTLINER CORPORATION PORTLAND, OREGON	SHEET 1 OF 1

PC KRISHNAD 06/27/90





THREAD SIZE (6g)	HEAD DIA	H±0.13 HEAD HEIGHT	P±0.13 PROJECTION DIA	F±0.05 PROJECTION HEIGHT	L* LENGTH	FREIGHTLINER PART NUMBER
M6	14.0 ±0.3	1.9	2.54	1.02	30.0	680 990 10 05
					50.0	680 990 12 05

* TOL FOR LENGTH: UPTO 25 MM(INCLUDING): $^{+0.0}_{-0.8}$

BETWEEN 25 AND 50 MM(INCLUDING): $^{0.0}_{-1.6}$

OVER 50MM: $^{0.0}_{-2.3}$

MATERIAL: LOW CARBON STEEL, AISI 1008/1010

FINISH: PLAIN

CHG	JOB/RLSE NO	DATE	BY	REVISION
-	PX1905-12	05/09/90	WLB	DOCUMENTED
A	PX1918-09	06/12/90	PCK	ADDED 680 990 12 05. ADDED TOLERANCES.