TEK-FINS, INC. TULSA, OKLAHOMA

CUST:
P.O. NO. #616595-0-STAT

DESIGN TEMPERATURE = 300 MDMT= -20
IMPACT TESTING EXEMPT BY UCS 66

INPUT INFORMATION:

DESIGN PRESSURE	1300
WIDTH	5
HEIGHT	7.5
WRAPPER THICKNESS	1.125
TUBE/PLUG SHT THICKNESS	1.75
CORROSION ALLOWANCE	0.063
ALLOWABLE STRESS	20000
TUBE OD	1
TUBE PITCH	2.3125

MEMBRANE STRESSES PSI:

WRAPPER	4667.51
TUBE/PLUG SHEET	3678.85

BENDING STRESSES PSI:

WRAPPER @ CTR SPAN	2598.36
WRAPPER @ CORNER	20116.64
TUBE/PLUG @ CTR SPAN	22261.62
TUBE/PLUG @ CORNER	7972.13

COMBINED STRESSES PSI:

WRAPPER PL @ CTR SPAN	7265.88
WRAPPER PL @ CORNER	24784.15
TUBE/PLUG PL @ CTR SPAN	25940.47
TUBE/PLUG PL @ CORNER	11650.98

MEMBRANE STRESSES MAY NOT EXCEED ALLOWABLE STRESS.
COMBINED STRESSES MAY NOT EXCEED 1.5 TIMES OR 30000

END PLATE IN ACCORDANCE WITH UG-34
MIN END PLATE THICKNESS = 0.84

DATE 3-12-07 APPROVED BY M. O'Banion

THESE CALCULATIONS ARE IN ACCORDANCE WITH SECTION VIII APPENDIX 13 OF THE ASME CODE 2006 ED., 2006 A. FIG. 13.2(a) SKETCH (1)

TUBE WALL AND NOZZLE NECK CALCULATIONS

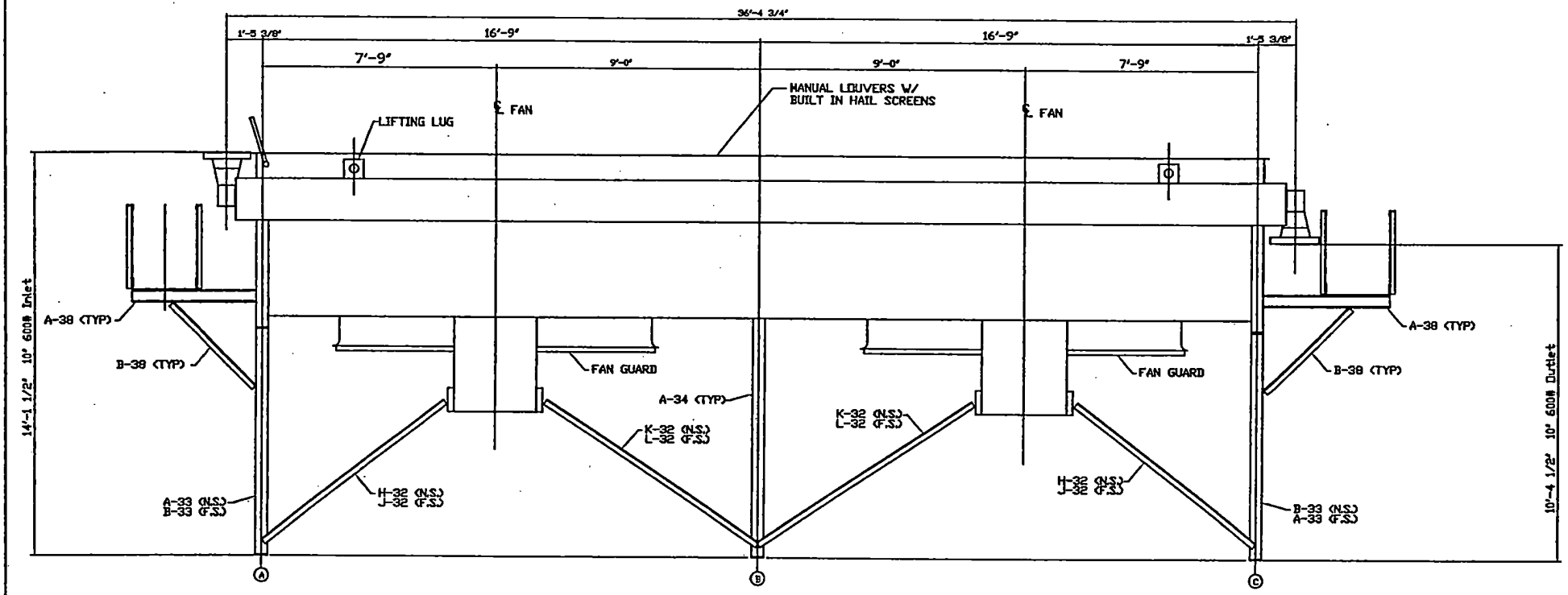
PER ASME SECTION VIII, DIV. 1, 2004 EDITION, 2006 ADDENDA

Job Number: 1843 **Date:** 7/30/2007

Design Pressure:	1300	PSI
Design Temperature:	300	Deg. F
Corrosion allowance:	0.0625	Inch
Tube Wall Calculation		Material: SA-179
Tube Description:	1.000	" O.D. X 0.083 inch Min.
Design Pressure (P):	1300	PSI
Tube OD (D):	1.000	Inch
Tube Stress (S):	13400	PSI (Allowable)

Minimum Req'd Wall = (P x D/2)/(.4P+S) = 0.046695 inch

Actual Min.Tube Wall = 0.083 inch



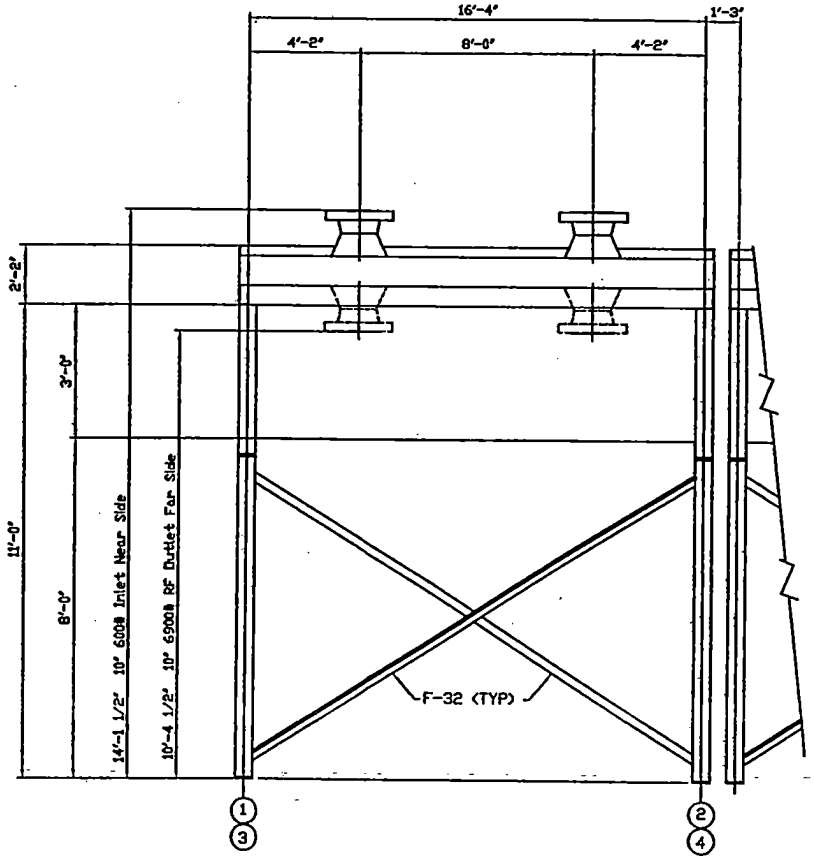
SIDE ELEVATION
ONE OF TWO (2) REQUIRED BAYS

MODEL 2-1736T12.5

CUST		DRAWN BY: BH	TITLE: FIELD ERECTION SIDE ELEVATION
P.O. NO:		DATE: 11-29-2006	
LOCATION:	TEXAS	CHECKED BY:	TEK-FINS INC. TULSA, OKLAHOMA
ITEM NO: STATION			

REV.	DATE	DESCRIPTION	BY
-	-	-	-

DWG. NO.	REV.
1843-1-FE1	0



INLET END ELEVATION

ONE OF TWO (2) REQUIRED BAYS

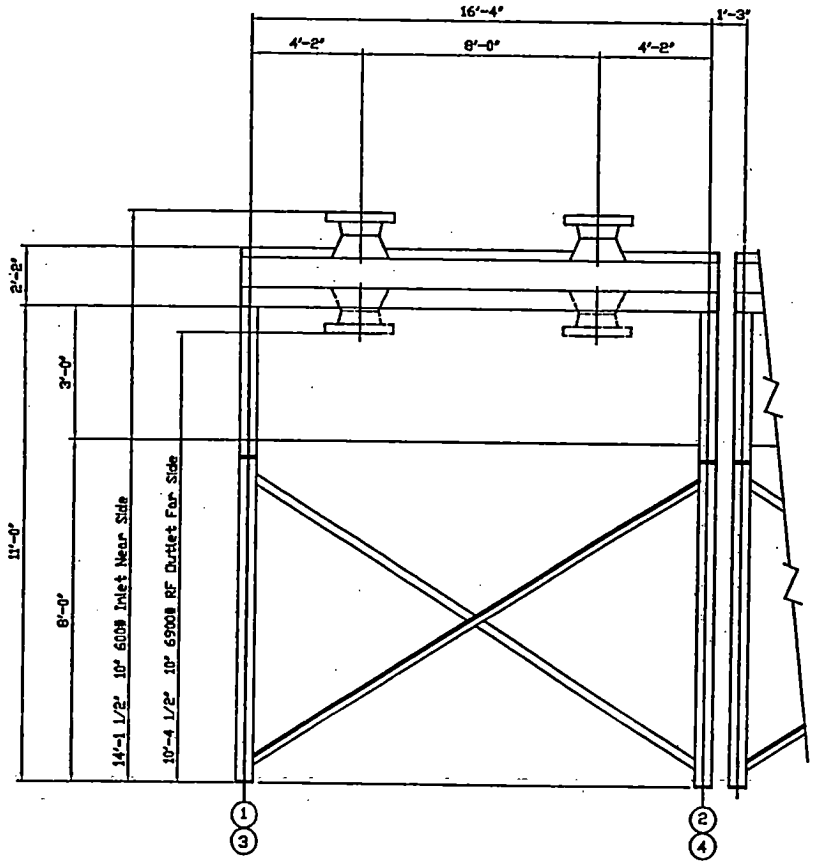
MODEL 2-1736T12.5

CUST:		DRAWN BY: BM	TITLE: FIELD ERECTION INLET END ELEVATION
P.O. NO:		DATE: 11-29-2006	
LOCATION:		CHECKED BY:	
ITEM NO: STATION			TEK-FINS INC. TULSA, OKLAHOMA

REV.	DATE	DESCRIPTION	BY
-	-	-	-

DWG. NO. 1843-1-FE2

REV. 0



INLET END ELEVATION

ONE OF TWO (2) REQUIRED BAYS

MODEL 2-1736T12.5

NOTES:

1. ALL HOLES 3/4 DIA UNLESS NTD.

2. SEE DWG 1843-1-09 FOR FINISH

CERTIFIED FOR CONSTRUCTION

BY

DATE

CUST:

P.O. NO:

LOCATION:

ITEM NO: STATION

REV.	DATE	DESCRIPTION	BY
1	3/12/07	REVISED UNIT SIZE	MDB

DRAWN BY: BH

DATE: 11-29-2006

CHECKED BY:

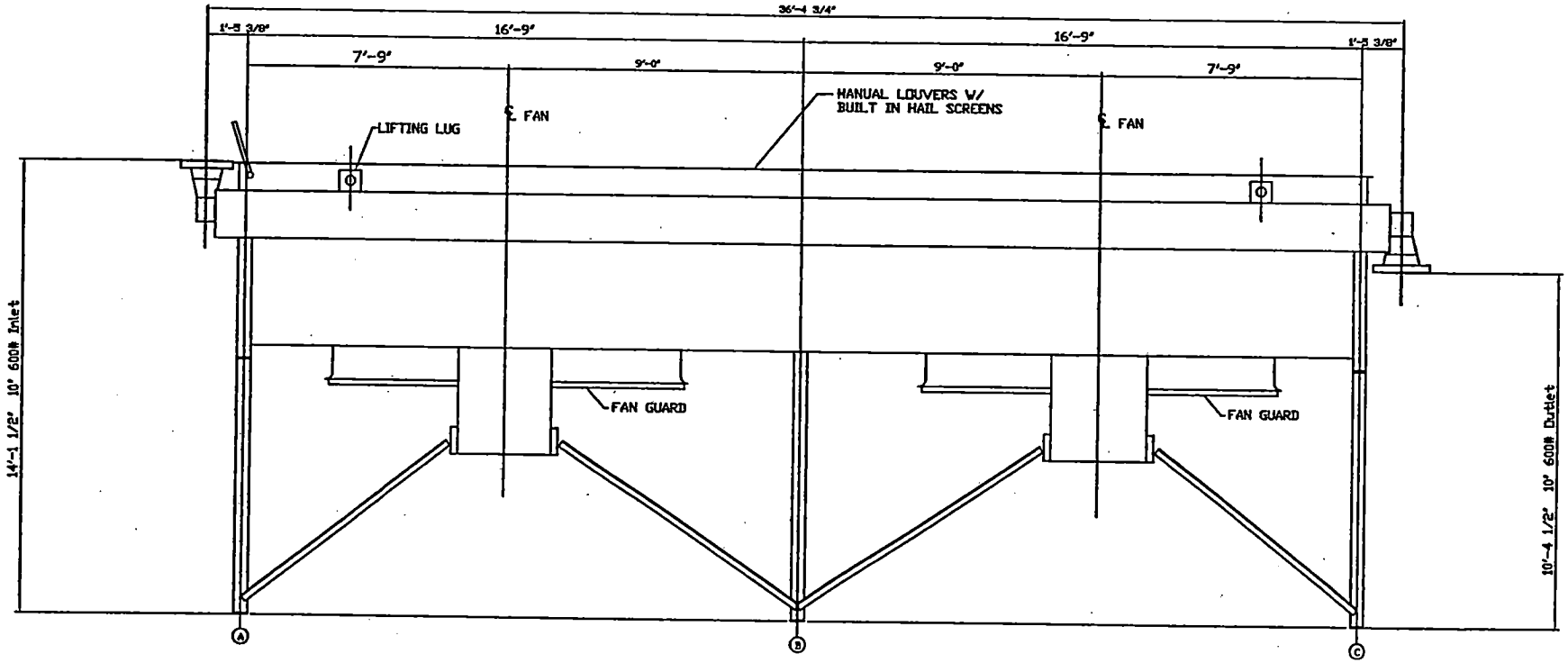
TITLE: INLET END ELEVATION

TEK-FINS INC.

TULSA, OKLAHOMA

DWG. NO. 1843-1-01

REV. 1



SIDE ELEVATION
ONE OF TWO (2) REQUIRED BAYS

MODEL 2-1736T12.5

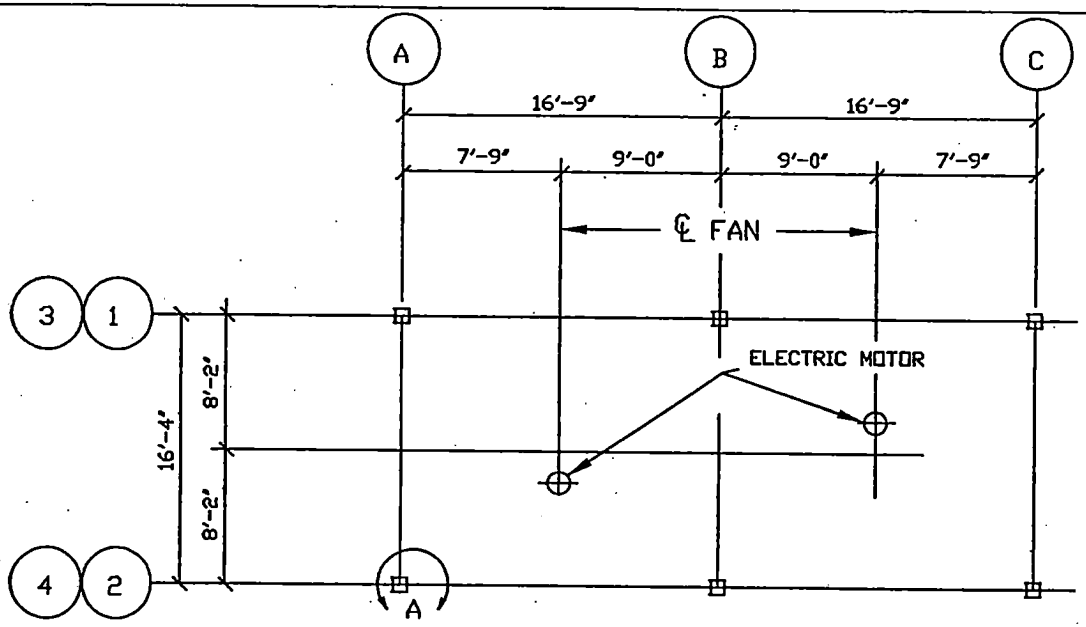
CUST:	DRAWN BY BM	TITLE: SIDE ELEVATION
P.O. NO:	DATE 11-29-2006	
LOCATION: TEXAS	CHECKED BY	TEK-FINS INC. TULSA, OKLAHOMA
ITEM NO: STATION		

REV.	DATE	DESCRIPTION	BY
1	3/13/07	REVISED UNIT SIZE	MOB
2	4/13/07	REMOVED WALKWAYS	MOB

DWG. NO. 1843-1-02 REV. 2

CERTIFIED FOR CONSTRUCTION
BY
DATE

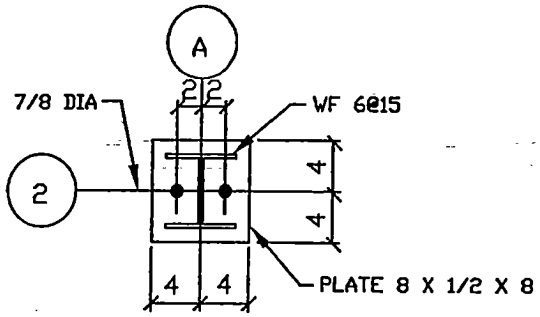
NOTES:
1. ALL HOLES 3/4 DIA UNLESS NTD.
2. SEE DWG 1843-1-09 FOR FINISH



ANCHOR BOLT PLAN

COLUMN LOADS				
		A	B	C
1	DL	6813	13625	6813
	S	1005	2010	1005
	R±	1232	2464	1232
2	DL	6813	13625	6813
	S	1005	2010	1005
	R±	1232	2464	1232

DL = DEAD LOAD + HYDRO TEST
S = HORIZONTAL WIND SHEAR
R ± = VERTICAL WIND LOAD



DETAIL A
(TYP 12 PLACES)

NOTES:

CERTIFIED FOR CONSTRUCTION
BY
DATE

REV.	DATE	DESCRIPTION	BY
1	3/13/07	REVISED UNIT SIZE	MOB

CUST:
P.O. NO:
LOCATION: TEXAS
ITEM NO: STATION
SERIAL NO:

MODEL 2-14.536T11.5

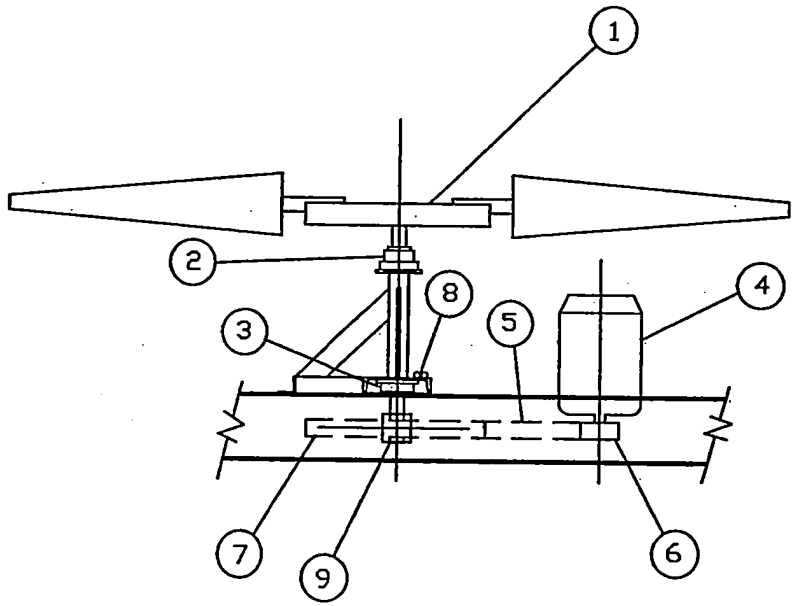
DRAWN BY BM
DATE 11-29-2006
CHECKED BY

TITLE: ANCHOR BOLT PLAN

TEK-FINS INCORPORATED
TULSA, OKLAHOMA

DWG. NO. 1843-1-03

REV. 1



BILL OF MATERIAL

1. FAN MOORE 10000HD #42 12'-6" DIA
2. DODGE TYPE E FLG BRG 2 7/16 BORE
3. DODGE TYPE SCM FLG BRG 2 7/16 BORE
4. ELECT MOTOR 10 Hp, 870 RPM, TEFC
   480/3/60
   CLASS B TEMP RISE
   CLASS F INSULATION
5. V-BELT 4 BELTS 3VX1120
6. SHEAVE 5.3" 4 GROOVE FOR 3V SECTION
7. SHEAVE 25" 4 GROOVE FOR 3V SECTION
8. LUBRICATION POINTS
9. VIBRATION SWITCH MURPHY VS-2EX

MODEL 2-1736T12.5

CUST:

P.O. NO:

LOCATION: TEXAS

DRAWN BY	TITLE
BH	FAN DRIVE ASSEMBLY
DATE 11-29-2006	
CHECKED BY	

REV.	DATE	DESCRIPTION	BY
1	3/13/07	REVISED UNIT SIZE	MDB

CERTIFIED FOR CONSTRUCTION

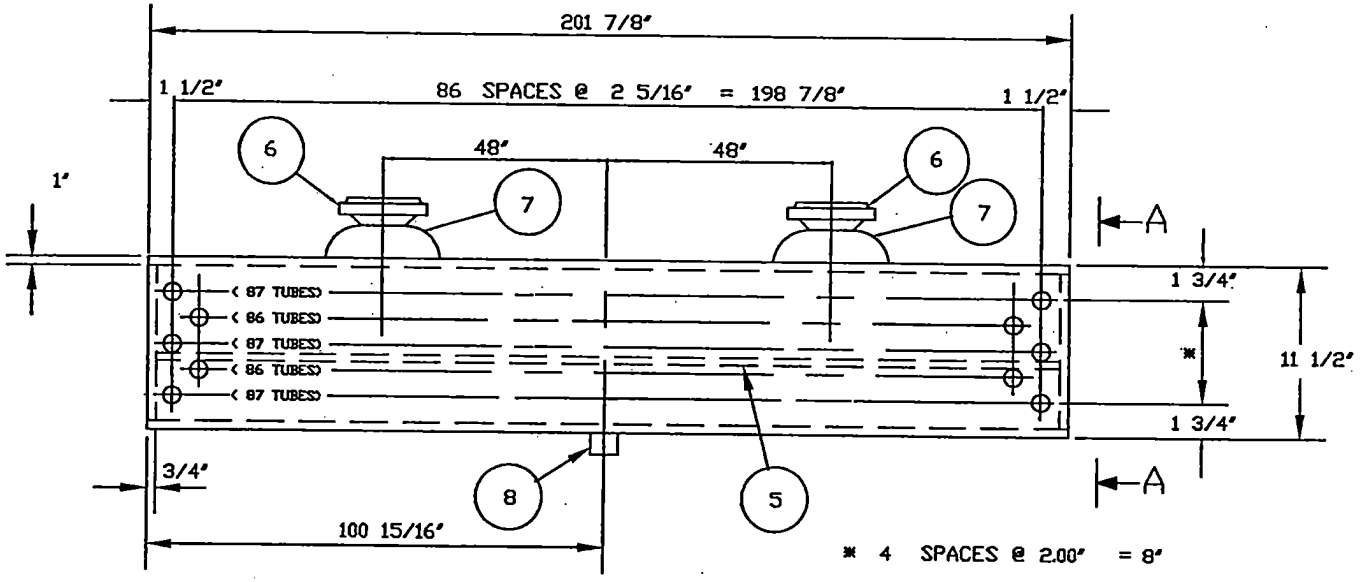
BY

DATE

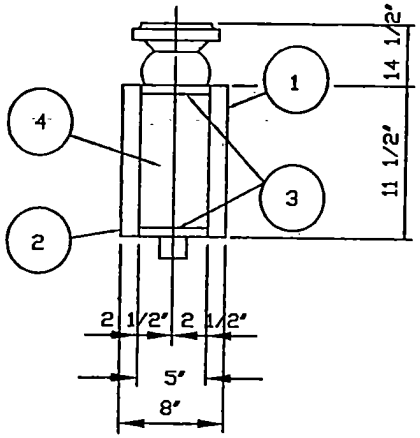
DWG. NO. 1843-1-04

REV. 1

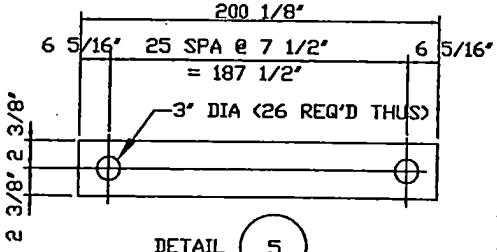
NOTES:



VIEW @ PLUG SHEET



VIEW A-A



DETAIL 5

BILL OF MAT'L FOR 2 FRONT HEADER

MARK	QTY	DESCRIPTION	MATL SPEC
1	2	PL 11 1/2 X 1 1/2 X 201 7/8 TUBE SHEET	SA-516-70N
2	2	PL 11 1/2 X 1 1/2 X 201 7/8 PLUG SHEET	SA-516-70N
3	4	PL 4 3/4 X 1 X 201 7/8 WRAPPER	SA-516-70N
4	4	PL 4 3/4 X 3/4 X 9 1/4 END PLATE	SA-516-70N
5	2	PL 4 3/4 X 3/4 X 200 1/8 STAY PLATE	SA-516-70N
6	4	FLG 10 -600 # RFWN . BORE= SCH 160	SA-105
7	4	SWAGES 10" SCH 160	SA-234 WPB
8	2	CPLGS 1" 6000# W/PLUG	SA-105
9	866	SHOULDER PLUGS 1 1/8" X 1 3/4" UNDER HD	SA-105
10	866	GASKETS 1 3/8"OD x 1 1/8"ID 316SS JKTED NON ASBESTOS	
11			
12			
13			
14			
15			
16			
17			

GENERAL NOTES

ASME STAMP [X] YES [ ] NO	N.B. [X] YES [ ] NO
2 SECTIONS REQ'D	API 661 [X] YES [ ] NO
TUBES 1"OD x .083MW x 36'-0" SA-179	
DESIGN PRESS 1300 PSIG @ 300 DEGREES F	
MDMT -20 DEGREES F @ 1300 PSIG	
HYDRO TEST 1950 PSIG	NO. OF TUBES 433
CORROSION AL 1/16"	PITCH 2 5/16" Δ
NO ROWS 5	NO PASSES 1
IMPACT TEST EXEMPT BY UCS-66	

CERTIFIED FOR CONSTRUCTION

BY

DATE

CUST:

P.O. NO:

LOCATION: , TEXAS

ITEM NO: STATION

SERIAL NO:

REV.	DATE	DESCRIPTION	BY
1	3/13/07	REVISED UNIT SIZE	MOB
2	4/13/07	REVISED HYDROTEST PRESSURE	MOB

DRAWN BY BM

DATE 11-29-2006

CHECKED BY

TITLE

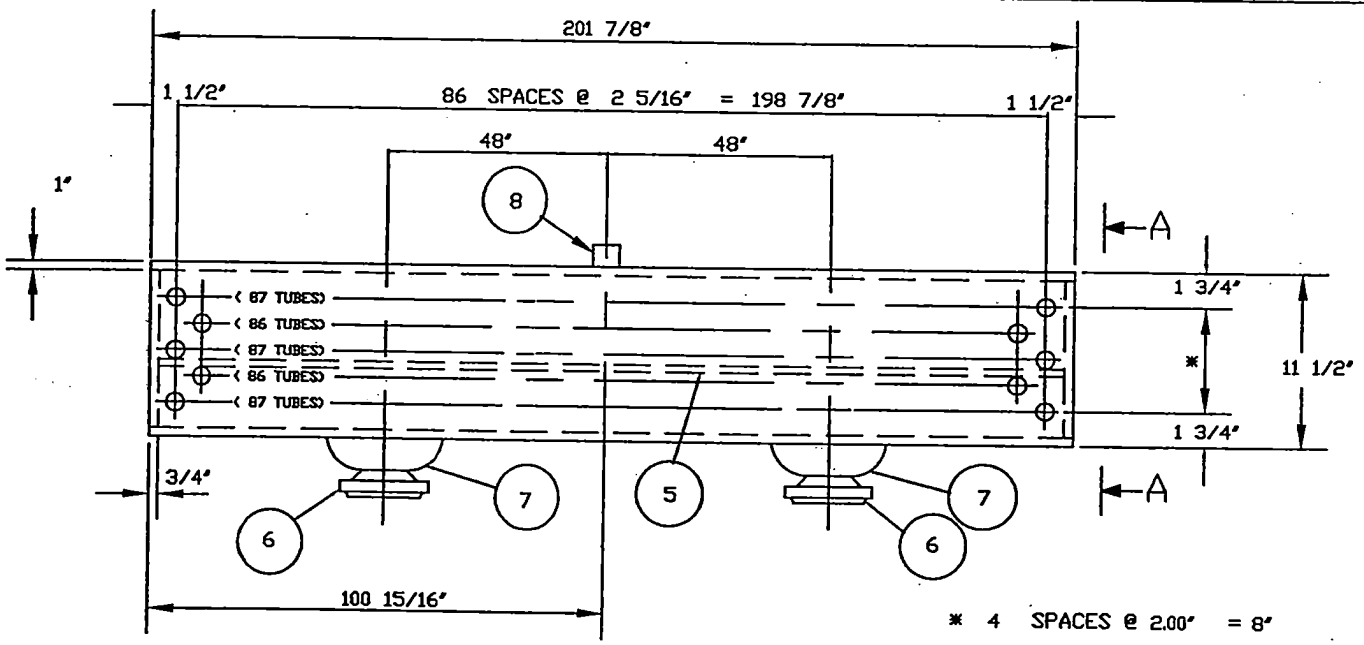
FRONT HEADER BOX DETAIL

TEKFINS INC.

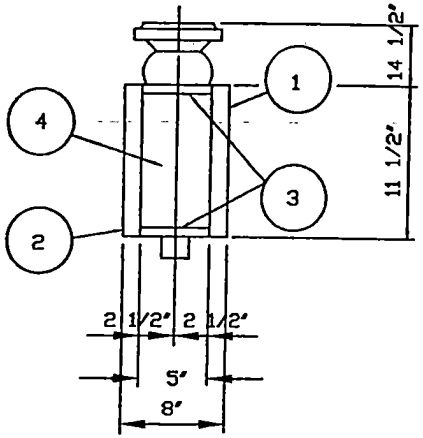
TULSA, OKLAHOMA

DWG. NO. 1843-1-05

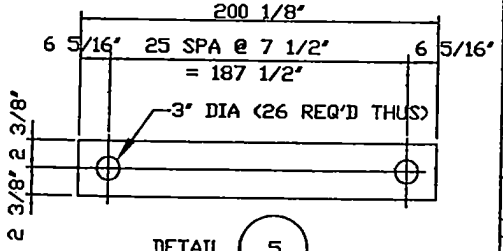
REV. 2



VIEW @ PLUG SHEET



VIEW A-A



DETAIL 5

BILL OF MAT'L FOR 2 REAR HEADER

MARK	QTY	DESCRIPTION	MATL SPEC
1	2	PL 11 1/2 X 1 1/2 X 201 7/8 TUBE SHEET	SA-516-70N
2	2	PL 11 1/2 X 1 1/2 X 201 7/8 PLUG SHEET	SA-516-70N
3	4	PL 4 3/4 X 1 X 201 7/8 WRAPPER	SA-516-70N
4	4	PL 4 3/4 X 3/4 X 9 1/4 END PLATE	SA-516-70N
5	2	PL 4 3/4 X 3/4 X 200 1/8 STAY PLATE	SA-516-70N
6	4	FLG 10 - 600 # RFWN BORE= SCH 160	SA-105
7	4	SWAGES 10" SCH 160	SA-234 WPB
8	2	CPLGS 1" 6000# W/PLUG	SA-105
9	866	SHOULDER PLUGS 1 1/8" X 1 3/4" UNDER HD	SA-105
10	866	GASKETS 1 3/8"OD x 1 1/8"ID 316SS JKTED NON ASBESTOS	
11			
12			
13			
14			
15			
16			
17			

GENERAL NOTES

ASME STAMP [X] YES [ ] NO | N.B. [X] YES [ ] NO

2 SECTIONS REQ'D | API 661 [X] YES [ ] NO

TUBES 1"OD x .083MW x 36'-0" SA-179

DESIGN PRESS 1300 PSIG @ 300 DEGREES F

MDMT -20 DEGREES F @ 1300 PSIG

HYDRO TEST 1950 PSIG | NO. OF TUBES 433

CORROSION AL 1/16" | PITCH 2 5/16" Δ

NO ROWS 5 | NO PASSES 1

IMPACT TEST EXEMPT BY UCS-66

CERTIFIED FOR CONSTRUCTION

BY

DATE

CUST:

P.O. NO:

LOCATION:

ITEM NO: STATION

SERIAL NO:

REV.	DATE	DESCRIPTION	BY
1	3/13/07	REVISED UNIT SIZE	MDB
2	4/13/07	REVISED HYDROTEST PRESSURE	MDB

DRAWN BY BM

DATE 11-29-2006

CHECKED BY

TITLE

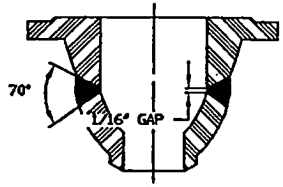
REAR HEADER BOX DETAIL

TEKFINS INC.

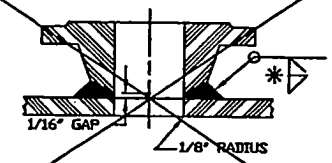
TULSA, OKLAHOMA

DWG. NO. 1843-1-06

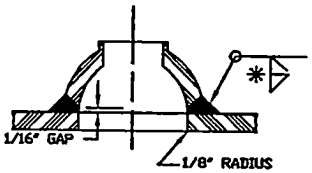
REV. 2



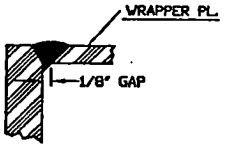
FLANGE TO SVAGE



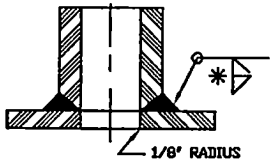
FLANGE TO WRAPPER



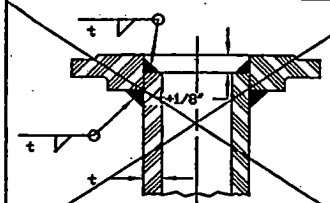
SVAGE TO WRAPPER



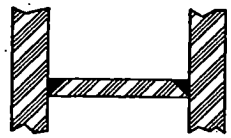
WRAPPER WELD DETAIL



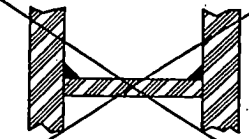
CPLG. TO WRAPPER



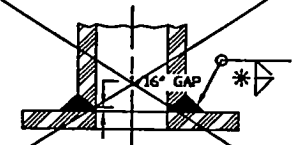
SLIP-ON FLANGE



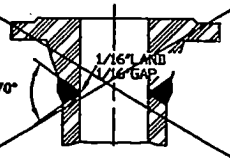
TIE PLATE



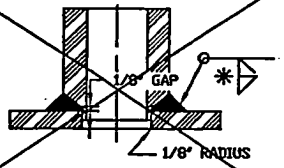
PASS PLATE



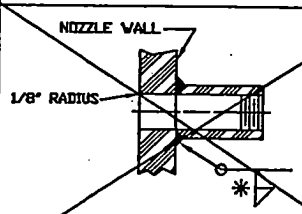
NOZZLE ON WRAPPER



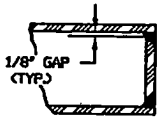
WELD-NECK FLANGE



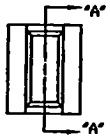
COUP - O - LET



COUPLING ON NOZZLE PIPE



SECTION "A-A"



END WRAPPER

NOTES:

1.) ALL WELDING TO BE IN ACCORDANCE WITH ASME CODE (SECTION IX)
2.) GRIND ALL INTERNAL NOZZLE WELDS SMOOTH.
3.) ALL FILLET WELDS 3/8"(MIN.) - UNLESS NOTED ON DETAILS

CUST:

P.O. NO:

LOCATION: , TEXAS

TAG: STATION

REV.	DATE	DESCRIPTION	BY
1	3/13/07	REVISED UNIT SIZE	MDB

DRAWN BY: BM
DATE: 11-29-2006
CHECKED BY:

TITLE: STANDARD WELD DETAILS

TEK-FINS INC.
TULSA, OKLAHOMA

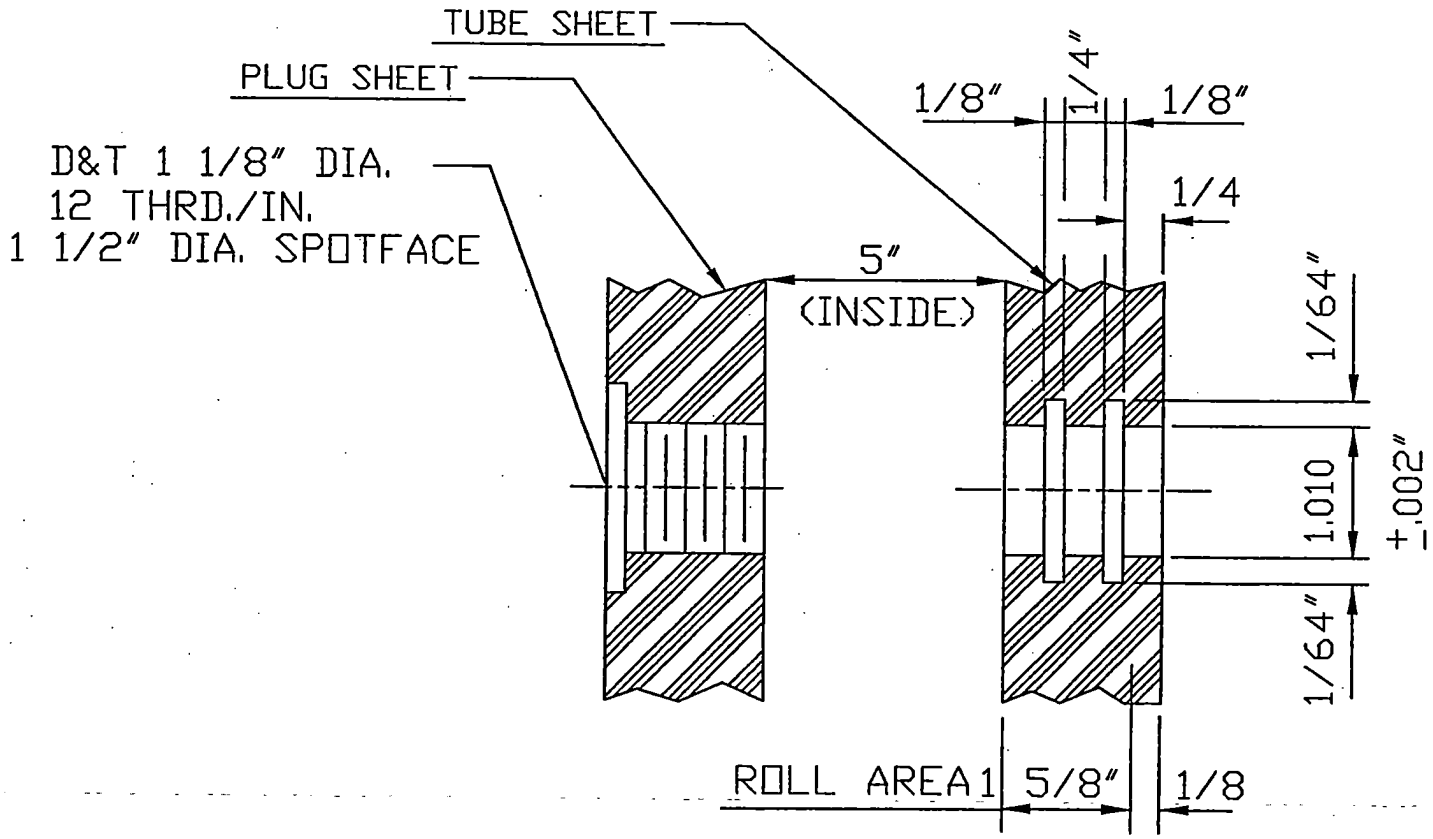
DWG. NO. 1843-1-07

REV. 1

CERTIFIED FOR CONSTRUCTION

BY

DATE



1" DIA TUBES

DRAWN BY: BM	TITLE: TUBE & PLUG HOLE FINISHING DETAIL	TEK-FINS INCORPORATED TULSA, OKLAHOMA	
DATE: 11-29-2006		DWG. NO. 1843-1-08	REV. 1
CHECKED BY:			

REV.	DATE	DESCRIPTION	BY
1	3/13/07	REVISED UNIT SIZE	MOB

CERTIFIED FOR CONSTRUCTION

BY

DATE

1) ASME STAMP: YES WITH NATIONAL BOARD STAMP

2) RADIOGRAPH: ALL PRESSURE CONTAINING WELDS ARE TO BE EITHER 100% RADIOGRAPHED OR ULTRASONIC EXAMINED PER THE ASME CODE.

3) SURFACE PROTECTION: ZINC METALIZE ON HEADERS
HOT DIP GALVANIZE ALL COLD METAL

4) FLANGE BOLT HOLES TO STRADDLE CENTER LINES.

5) HEAT TREAT: YES - HEAT FROM 800 TO 1150 DEG. AT 228 DEG. / HOUR HOLD AT 1150 DEG. FOR 1.2 HOUR. COOL FROM 1150 TO 800 DEG. AT 285 DEG. / HOUR. FINISH COOLING IN STILL AIR.

CERTIFIED FOR CONSTRUCTION

BY

DATE

CUST:

P.O. NO.:

LOCATION: TEXAS

ITEM NO.: STATION

SERIAL NO.:

REV.	DATE	DESCRIPTION	BY
1	3/13/07	REVISED UNIT SIZE	MDB

DRAWN BY BM

DATE 11-29-2006

CHECKED BY

TITLE: HEADER NOTES

TEK-FINS INC.

TULSA, OKLAHOMA

DWG. NO. 1843-1-09

REV. 1