Specifications, Installation, Operation
Service and Spare Parts Manual
SR-SERIES

Low Intensity Infrared Heater/Radiateur á infrarouge á faible intensité
For either indoor or outdoor installation/Installer á l'itérieur ou á l'estérieur
Also for Brooder Use/Auss pour l'eveage des poules
Industrial, Commercial and Agricultural Applications.

⚠ **WARNING: Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation operating and maintenance instructions thoroughly before installing or servicing this equipment.**

⚠ **ADVERTISSEMENT. Une installation, un reglage, une modification, une reparation ou un entretien incorrect peut entraîner des dommages matériels, des blessures ou la mort. Lisez attentivement les instructions d'installation, de fonctionnement et d'entretien avant de procéder á l'installation ou á l'entretien de cet équipement.**

⚠ **DANGER: What to do if you smell gas:**

1) **Extinguish any open flame**
2) **DO NOT try to light any appliance.**
3) **DO NOT use or touch electrical switches.**
4) **DO NOT use any phone in your building**
5) **Turn off gas.**
6) **Open Windows**
7) **Leave the building**
8) **Immediately call your gas supplier from a neighbour's phone or after you have left the building**
9) **If you cannot reach your gas supplier, call the fire department.**

⚠ **WARNING: FIRE HAZARD**
Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

⚠ **ADVERTISSEMENT: ILL es interdit d'utiliser des liquids inflammables ou degageant des vapours inflammables, a proximite de tout appareil fonctionnant au gaz.**

⚠ **WARNING:**
Heat exchanger surface is hot. Do not touch surface or burn may result. Combustible material or articles should not be placed on or near heater. Observe clearance to combustibles as noted on heater and in this manual.

⚠ **ADVERTISSEMENT:**
Si vous sentez une odeur de gaz:

1. **Ouvrez les fenetres**
2. **Ne touchez pas aux interrupteurs electriques**
3. **Eteignez toute flame nue**
4. **Contact immediatement votre compangie**

DESIGN CERTIFIED ™

CERTIFIED ™

USA
Calcana USA Ltd.
30345 Suite A,
County Rd 49
Loxley, AL, 36551
Tel: 251-964-4400
Fax: 251-964-4404

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GENERAL INFORMATION

Thank you for purchasing our product. We have designed this unit to provide you with years of trouble-free heating enjoyment. Please take the time to read this manual in its entirety. It will familiarize you with the unit and its operation. Store this manual in a location near the heater for future reference.

Important Notice — These instructions are for the use of qualified individuals specially trained, licensed and experienced in the installation of this type of equipment and related system components.

**Note — The words "shall" or "must" indicate a requirement which is essential to satisfactory and safe performance.

⚠ WARNING:

The heater and related gas piping, fitting & wiring must be installed by individuals or firms qualified, licensed and specially trained and experienced in installation of this type of equipment and related system components.

Only persons who can understand and follow the instructions shall install or service this heater.

Persons not qualified shall not install this equipment nor interpret these instructions.

Failure to comply with the precautions and instructions provided with this heater can result in death, serious bodily injury and property loss or damage from hazards of fire, explosion, burn, asphyxiation, carbon monoxide poisoning or electrical shock.

⚠ WARNING:

Warranty is void if heater is **NOT** installed by a licensed/qualified gas fitter or contractor: Regular maintenance must be performed prior to heating season. Heaters used in dusty locations such as brooder barns, sawmills, or woodworking shops will require more frequent maintenance. No one should work on a heater unless they are a licensed/qualified gas fitter or contractor. For all repairs, parts MUST originate from the manufacturer of this heater in order not to void CGA/AGA certification.

OWNERS RESPONSIBILITY:

⚠ WARNING:
Improper installation, adjustment, alteration, servicing or maintenance can cause property damage, injury or death.

Read this manual in its entirety. Store this manual in a location near the heater, for future reference, Make sure installation is performed by well qualified, licensed contractors in the required field of work. If in doubt, DO NOT allow units to be installed. DO NOT park vehicles or place combustible objects close to the heater, other than specified on the Clearance to Combustibles chart located in this manual and on the heater. Property damage, injury or death could occur. Maintenance is required once a year. Have the heater or heaters inspected before 'the heating season starts. If units are in a dusty environment, maintenance will be required more often. If dusty conditions are extreme, monthly or weekly maintenance may be required, (refer to page 74 titled 'Maintenance')

⚠ WARNING:
Only allow qualified, licensed, service people trained to service gas-fired heating equipment to perform any repairs on this unit. All replacement parts MUST originate from the manufacturer of this heater in order not to void CGAIAGA certification.
Safety devices are not allowed to be rendered inoperative and left unattended. Failure to do any of the above can cause property damage, injury or death.

⚠ WARNING:
Do not store or use halogen-emitting substances in the vicinity of this heater. Such substances include chlorine based cleaners and swimming pool chemicals, water softening chemicals, de-icing salts and chemicals, cleaning solvents such as carbon tetrachloride or perchloroethylene, halogen type refrigerants, printing inks, paint and paint removers, varnishes, hydrochloric acid, cements and glues, and masonry acid washing materials. 'The air used by the burner for combustion must be free of halogens to avoid possible corrosion to the heating surfaces which could result in asphyxiation, fire and/or death.

INSTALLER RESPONSIBILITY

⚠ WARNING:

FIRE OR EXPLOSION HAZARD

The heater and related gas piping and wiring must be installed only by individuals or firms well qualified and licensed in the required field of work.

Read and understand this manual in its entirety BEFORE you install this heater, If you have any questions call your local representative. Verify that the fuel on the installation site is the same as what is required for this heater. Check heater for damage or missing parts. If damage has occurred, notify carrier or point of purchase at once for reconciliation of damaged goods. We are not responsible for transit damage. Do not install if heater is damaged,

Verify that model, input & length is what was ordered and is appropriate for installation, If heater is too small for the heating load of the building, property damage can occur due to freezing. If unit is too large, severe heat damage can occur to the building and/or its contents, fire, explosion, injury or death. If in doubt compare heat loss of building with unit on site. If you are unable to calculate heat loss call your local representative for assistance.

Installation shall be in accordance with local codes. (see code compliance).
If installation requires tilting, DO NOT over tilt the unit. Units are certified for installations up to 45°, however the maximum recommended tilt is 25°.

Install unit according to the Clearance to Combustibles for that particular heater and type of installation. Make sure that clearances are maintained from vehicles parked below or in front of heater. Take into consideration hoists. Failure to do so could result in property damage, injury or death.

Make sure unit is adequately suspended from ceiling or roof. Select hanging location that has adequate strength to support heater.

If combustion air is contaminated or if there is a negative air pressure in the building, install outside air for combustion. (see pages 47 & 48 titled 'Optional Outside Air').

If unit is to be sidewall vented, use part #5200210 (sidewall vent kit). Make sure vent cap is past eave. (see pages 49, 50, 51 & 52 titled 'Venting').

Do not render safety devices inoperable. Make sure gas line and/or service have adequate capacity for the increased load of heater.

Check line and manifold pressure with a manometer to confirm unit is set according to the specification on the rating plate. Perform check with all gas-fired appliances operating. (see pages 59 & 66 for further details).
Make sure units are operating as quiet and efficient as possible before leaving the job site.

CODE COMPLIANCE

Installation shall be in accordance with local building codes, or in the absence of local codes, in accordance with:

A) **FUEL SUPPLY:**
CANADA: ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition.
USA: ***National Fuel Gas Code, ANSI Z223.1/NFPA 54***, or latest edition.

B) **ELECTRICAL GROUNDING:**
CANADA: ***Canadian Electrical Code, CSA C22.1*** or latest edition.
USA: ***National Electrical Code, ANSI/NFPA 70*** or latest edition

In Canada: Electrical equipment and wiring shall comply with the applicable provisions of the current ***Canadian Electrical Code, CAN/CSA C22.1, Part I and Part II, and CAN/CSA C22.2 No. 3, Electrical features of Fuel Burning Equipment.***

C) **PUBLIC GARAGE INSTALLATION**: Adequate clearances must be maintained according to the following standards:
CANADA: ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition.
USA: ***Parking Structures, ANSI/NFPA 88A*** or the standard for ***Repair Garages, ANSI/NFPA 88B*** or latest edition.

D) **AIRCRAFT HANGERS**: Adequate clearances must be maintained according to the following standards:
CANADA: ***Enforcing Authority***
USA: ***Aircraft Hangars, ANSI/NFPA 409***

DO NOT INSTALL THS UNIT IN RESIDENTAL SPACES

HEATER OPERATION NOTE: Heater will have a higher heat output at the burner end as compared to the exhaust end.

SPACE HEATING: As a general rule, it is suggested to locate the burner end toward the highest heat-loss area (doors) of the space being heated. If you have any concerns or questions concerning orientation or layout of the heater in your application, contact factory for assistance.

SPOT HEATING: On heaters with a straight line configuration as well as units that have the maximum length of radiant tube selected for the input capacity of a given burner, there will be a noticeable and more pronounced perception of greater heat output from the burner end of the heater as compared to the exhaust end. As a general rule, it is suggested for spot heating applications, to use a u-tube configuration to provide a more even source of heat. If you have any concerns or questions concerning orientation or layout of the heater in your application, contact factory for assistance.

NOTE: A small amount of condensation may occur from the heater when it starts the heating cycle. The condensation will stop once the heater warms up. Make sure venting is sealed according to page 49.

General Specfications

Input Rating: (Natural Gas & Propane or LPG fuels)

In Canada: 0-4500' (1372m) In USA: 0-2000' (610m)- Derate above 2000' (610M) (see pg 59)

BURNER INPUT	MINIMUM LENGTH	MAXIMUM LENGTH
40,000 Btu/hr	10' (3m)	20' (6.1m)
50,000 Btu/hr	20' (6.1m)	20' (6.1m)
60,000 Btu/hr	20' (6.1m)	40' (12.2m)
75,000 Btu/hr	20' (6.1m)	40' (12.2m)
80,000 Btu/hr	20' (6.1m)	40' (12.2m)
100,000 Btu/hr	30' (9.1m)	50' (15.2m)
125,000 Btu/hr	40' (12.2m)	50' (15.2m)
150,000 Btu/hr	40' (12.2m)	60' (18.3m)
175,000 Btu/hr	50' (15.2m)	70' (21.3m)
200,000 Btu/hr	60' (18.3m)	80' (24.4m)

Gas Inlet Pressure:	Minimum	Maximum
Natural Gas	4.5" (11.43 cm) W.C.	14.0" (35.56 cm) W.C.
L.P.G (Propane)	11.5" (29.21 cm) W.C.	14.0" (35.56 cm) W.C.

Gas Pressure at Manifold:	
Natural Gas	3.5" (8.89 cm) W.C.
L.P.G (Propane)	10.5" (26.67 cm) W.C.

Gas Connection Size:	0.5" (1.27 cm) N.P.T.

Flue Connection:	
All Models	4" (10.16 cm)

Combustion Air Intake:	
40,000 to 80,000 Btu/hr input	4" (10.16 cm)
100,000 to 200,000 btu/hr input	6" (15.24 cm)

Electrical Rating:	
DSI Igniton	120v 60hz
1.0 amp	40,000 to 80,000 Btu/hr input
2.25 amp	100,000 to 200,000 Btu/hr input

Standard Equipment:

Burner control housing is pre-assembled and pre-wire, unit comes complete with the following: industry standard gas, electrical and venting connections, balanced air rotor, thermal overload protected motor, visual burner inspection sight glass, combustion and air proving safety switches, 3-try spark ignition control, low voltage thermostat connection, " aluminized combustion tube, polished aluminum standard reflector, " mild steel radiant heat exchanger, tube couplers, joint/hanger pieces, heat economizer baffle/turbulator.

Optional Equipment:

- Side Reflectors
- Aluminized Steel Tube
- Side Wall Vent Kit
- 180° U-Bend Kit
- Stainless Steel Construction
- 90° Elbow Kit
- Thermostat
- Outdoor Installation Kit

DIMENSIONS

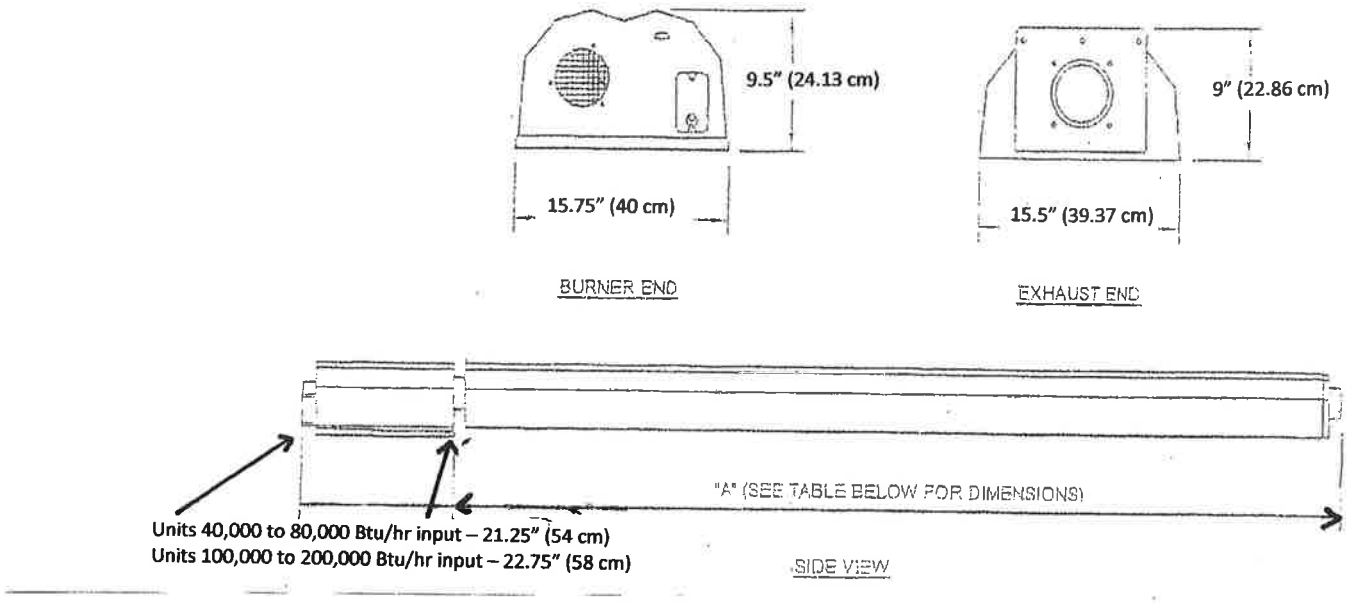


FIGURE #1. EQUPMENT DIMENSIONS

Table Of Dimensions

UNITS	DIMENSION "A"	
BURNER INPUT	MINIMUM LENGTH	MAXIMUM LENGTH
40,000 Btu/hr	10'-4" (3.15m)	20'-4" (6.4m)
50,000 Btu/hr	20'-4" (6.4m)	20'-4" (6.4m)
60,000 Btu/hr	20'-4" (6.4m)	40'-4" (12.3m)
75,000 Btu/hr	20'-4" (6.4m)	40'-4" (12.3m)
80,000 Btu/hr	20'-4" (6.4m)	40'-4" (12.3m)
100,000 Btu/hr	30'-4" (9.25m)	50'-4" (15.3m)
125,000 Btu/hr	40'-4" (12.3m)	50'-4" (15.3m)
150,000 Btu/hr	40'-4" (12.3m)	60'-4" (18.4m)
175,000 Btu/hr	50'-4" (15.3m)	70'-4" (21.5m)
200,000 Btu/hr	60'-4" (18.4m)	80'-4" (24.5m)

CLEARANCE TO COMBUSTIBLES

Installation of overhead heaters in garages or hangars MUST meet the requirements for bottom (below) clearances detailed in CANADA: *Natural Gas and Propane Installation Code, CSA B149.1* or latest edition or USA: *National Fuel Gas Code, ANSI Z223.1/NFPA 54*, or latest edition.

The stated clearance to combustibles represents a surface temperature of 90°F (32°C) above room temperature. Building materials with a low heat tolerance (such as plastics, vinyl siding, canvas, tri-ply, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility to assure that adjacent materials are protected from degradation.

⚠ WARNING: In all situations, clearances to combustibles must be maintained. Minimum clearance from heater must be maintained from vehicles parked below heater. The posting of signs may be required in storage areas referring to clearances to combustibles to the heater and/or limiting the stacking height of stored items near the heater specifying a maximum height. Clearances are not for use in four (4) sided enclosures.

END CLEARANCES

(BURNER HEAD END)

Minimum clearances from air intake end of burner head to object is **12" (30.5 cm)**.

END CLEARANCES

(VENT END)

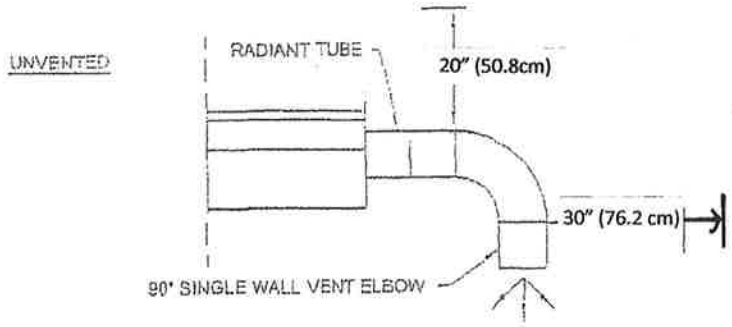


FIGURE #2. UNVENTED CLEARANCES

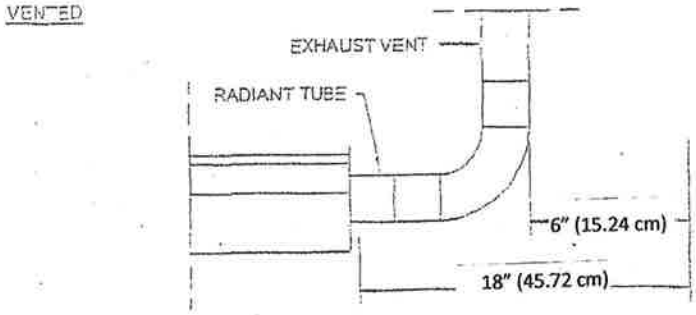


FIGURE #3. VENTED CLEARANCES

CLEARANCE TO COMBUSTIBLES FOR SPACE HEATNG AND BROODER INSTALLATION

⚠ **WARNING:** In all situations, clearance to combustibles must be maintained. Minimum clearance from heater must be maintained from vehicles parked below heater. The posting of signs may be required in storage area(s) referring to clearance to combustibles to the heater and/or limiting the stacking height of stored items near the heater specifying a maximum height. Clearances are not for use in four (4) side enclosures.

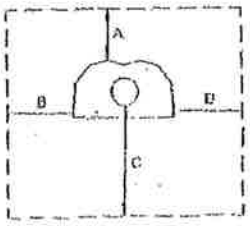


FIGURE #4
STANDARD REFLECTOR

INSTALLATION TYPE 1 - (Inches)				
Input*	A	B	C	D
40	6	12	36	12
50	6	12	36	12
60	6	15	44	15
70	6	20	50	20
80	6	20	53	20
100	6	22	55	22
125	6	22	55	22
150	6	24	60	24
175	6	24	65	24
175+20'**	6	20	45	20
200	6	27	65	27
200+20' **	6	20	45	20

INSTALLATION TYPE 1 - (cm)				
Input*	A	B	C	D
40	16	31	92	31
50	16	31	92	31
60	16	39	112	39
70	16	51	127	51
80	16	51	135	51
100	16	56	140	56
125	16	56	140	56
150	16	70	152	70
175	16	70	152	70
175+20'**	16	51	115	51
200	16	69	165	69
200+20' **	16	51	115	51

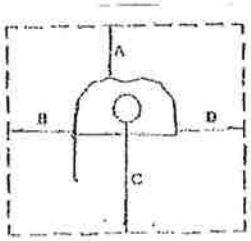


FIGURE #5
ONE SIDE REFLECTOR

INSTALLATION TYPE 2 - (Inches)				
Input*	A	B	C	D
40	6	12	36	36
50	6	12	36	36
60	6	12	44	36
70	6	12	50	36
80	6	20	53	40
100	6	22	55	40
125	6	22	55	40
150	6	24	60	40
175	6	24	65	40
175+20'**	6	16	45	36
200	6	27	65	40
200+20' **	6	16	45	36

INSTALLATION TYPE 2 - (cm)				
Input*	A	B	C	D
40	16	31	92	92
50	16	31	92	92
60	16	31	112	92
70	16	31	127	92
80	16	51	135	102
100	16	56	140	102
125	16	56	140	102
150	16	70	152	102
175	16	70	165	102
175+20'**	16	41	115	92
200	16	69	165	102
200+20' **	16	41	115	92

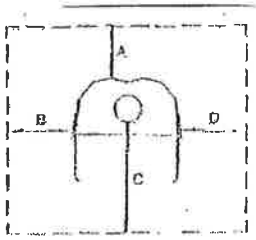


FIGURE #6
TWO SIDE REFLECTOR

INSTALLATION TYPE 3 - (Inches)				
Input*	A	B	C	D
40	6	15	53	15
50	6	20	60	20
60	6	23	66	23
70	6	25	72	25
80	6	25	72	25
100	6	27	78	27
125	6	32	84	32
150	6	32	88	32
175	6	32	88	32
175+20'**	6	24	48	24
200	6	32	88	32
200+20' **	6	24	48	24

INSTALLATION TYPE 3 - (cm)				
Input*	A	B	C	D
40	16	39	135	39
50	16	51	152	51
60	16	59	168	59
70	16	64	183	64
80	16	64	183	64
100	16	69	199	69
125	16	82	214	82
150	16	82	224	82
175	16	82	224	82
175+20'**	16	70	122	70
200	16	82	224	82
200+20' **	16	70	122	70

* per 1,000 btu/hr input ** Clearance 20' (6.1m) downstream from burner

CLEARANCE TO COMBUSTIBLES FOR SPACE HEATNG AND BROODER INSTALLATION

⚠ **WARNING:** In all situations, clearance to combustibles must be maintained. Minimum clearance from heater must be maintained from vehicles parked below heater. The posting of signs may be required in storage area(s) referring to clearance to combustibles to the heater and/or limiting the stacking height of stored items near the heater specifying a maximum height. Clearances are not for use in four (4) side enclosures.

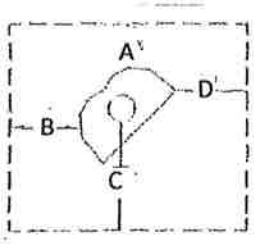


FIGURE #7
25° to 45° Tilt

INSTALLATION TYPE 4 - (Inches)				
Input*	A	B	C	D
40	6	6	36	36
50	6	6	36	36
60	6	6	44	44
70	6	6	50	50
80	6	6	53	53
100	6	6	55	55
125	6	6	55	55
150	6	6	60	60
175	6	6	65	65
175+20'**	6	6	45	45
200	6	6	65	65
200+20' **	6	6	45	45

INSTALLATION TYPE 4 - (cm)				
Input*	A	B	C	D
40	16	16	92	92
50	16	16	92	92
60	16	16	112	112
70	16	16	127	127
80	16	16	135	135
100	16	16	140	140
125	16	16	140	140
150	16	16	152	152
175	16	16	152	152
175+20'**	16	16	115	115
200	16	16	165	165
200+20' **	16	16	115	115

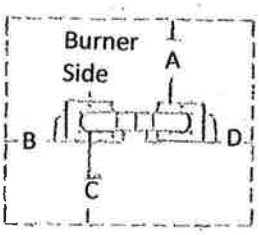


FIGURE #8
U - Tube Standard

INSTALLATION TYPE 5 - (Inches)				
Input*	A	B	C	D
40	6	12	60	12
50	6	12	63	12
60	6	12	63	12
70	6	12	69	12
80	6	20	69	20
100	6	22	76	22
125	6	22	79	22
150	6	24	84	24
175	6	24	86	24
-	-	-	-	-
200	6	27	86	27
-	-	-	-	-

INSTALLATION TYPE 5 - (cm)				
Input*	A	B	C	D
40	16	31	152	31
50	16	31	161	31
60	16	31	161	31
70	16	31	176	31
80	16	51	176	51
100	16	56	194	56
125	16	56	201	56
150	16	70	214	70
175	16	70	219	70
-	-	-	-	-
200	16	69	219	69
-	-	-	-	-

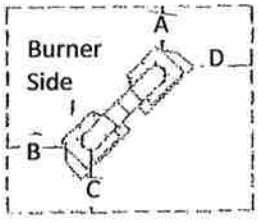


FIGURE #9
25° to 45° Tilt U-Tube

INSTALLATION TYPE 6 - (Inches)				
Input*	A	B	C	D
40	6	6	51	40
50	6	6	57	40
60	6	6	60	43
70	6	6	66	47
80	6	6	66	47
100	6	6	71	53
125	6	6	77	62
150	6	6	80	67
175	6	6	84	70
-	-	-	-	-
200	6	6	94	70
-	-	-	-	-

INSTALLATION TYPE 6 - (cm)				
Input*	A	B	C	D
40	16	16	130	102
50	16	16	145	102
60	16	16	152	110
70	16	16	168	120
80	16	16	168	120
100	16	16	181	135
125	16	16	196	158
150	16	16	204	171
175	16	16	214	178
-	-	-	-	-
200	16	16	214	178
-	-	-	-	-

* per 1,000 btu/hr input ** Clearance 20' (6.1m) downstream from burner

PRE-INSTALLATION INSPECTION:

Refer to pages 11 to 23 for packaging contents.

Inspect the shipping container and beater for any evidence of shipping damage. If heater damage is found, notify freight carrier and file a claim.

> ⚠ **WARNING:** If heater is damaged, DO NOT install.

Check that all parts and pieces are present and accounted for. Report any missing items to carrier or point of purchase at once.

Check that overall general appearance, source of fuel required and model numbers match unit requested. Report any discrepancy to carrier or point of purchase at once.

THOROUGHLY INSPECT THE EQUIPMENT
IMMEDIATELY UPON ARRIVAL

OUR RESPONSIBILITY FOR THIS SHIPMENT CEASED WHEN THE CARRIER SIGNED THE WAYBILL.

If goods are received short or in damage condition, it is important that you notify the carrier and insist on a notation of the loss or damage across the face of the freight bill, otherwise no claim can be enforced against the transportation company.

If concealed loss or damage is discovered, notify your carrier at once and request an inspection. This is absolutely necessary. A concealed damage report must be made within 15-days of delivery of shipment. Unless you do this the carrier will not entertain any claim for loss or damage. The Agent will make an inspection and grant a concealed damage notation. If you give the Transportation Company a clear receipt for goods that have been damaged or lost in transit you do so at your own risk and expense.

WE ARE WILLING TO ASSIST YOU IN EVERY POSSIBLE MANNER TO COLLECT CLAIMS FOR LOSS OR DAMAGE, BUT THIS WILLINGNESS ON OURPART DOES NOT MAKE US RESPONSIBLE FOR COLLECTION OF CLAIMS OR REPLACEMENT

WE ARE NOT RESPONSIBLE FOR FREIGHT DAMAGEDIN TRANSIT!

IF CONTENTS ARE DAMAGED,
EVEN TROUGH CARTON DOES NOT LOOK DAMAGED:

A. MAKE CLAIM TO DELIVERY CARRIER AT ONCE
B. SAVE CARTONS FOR INSPECTION BY CARRIER

A) BURNER PACKAGE

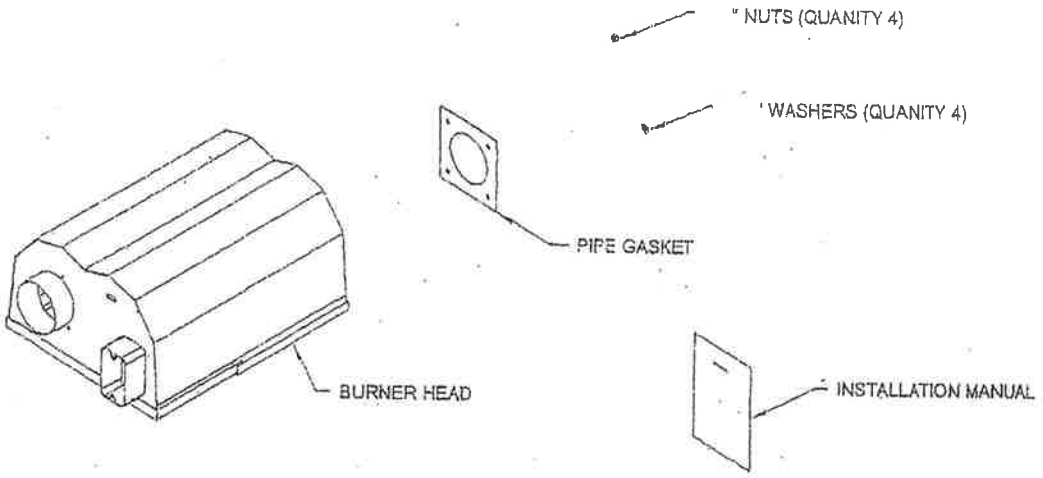


FIGURE #13. BURNER PACKAGE CONTENTS

B) PIPE BOXES

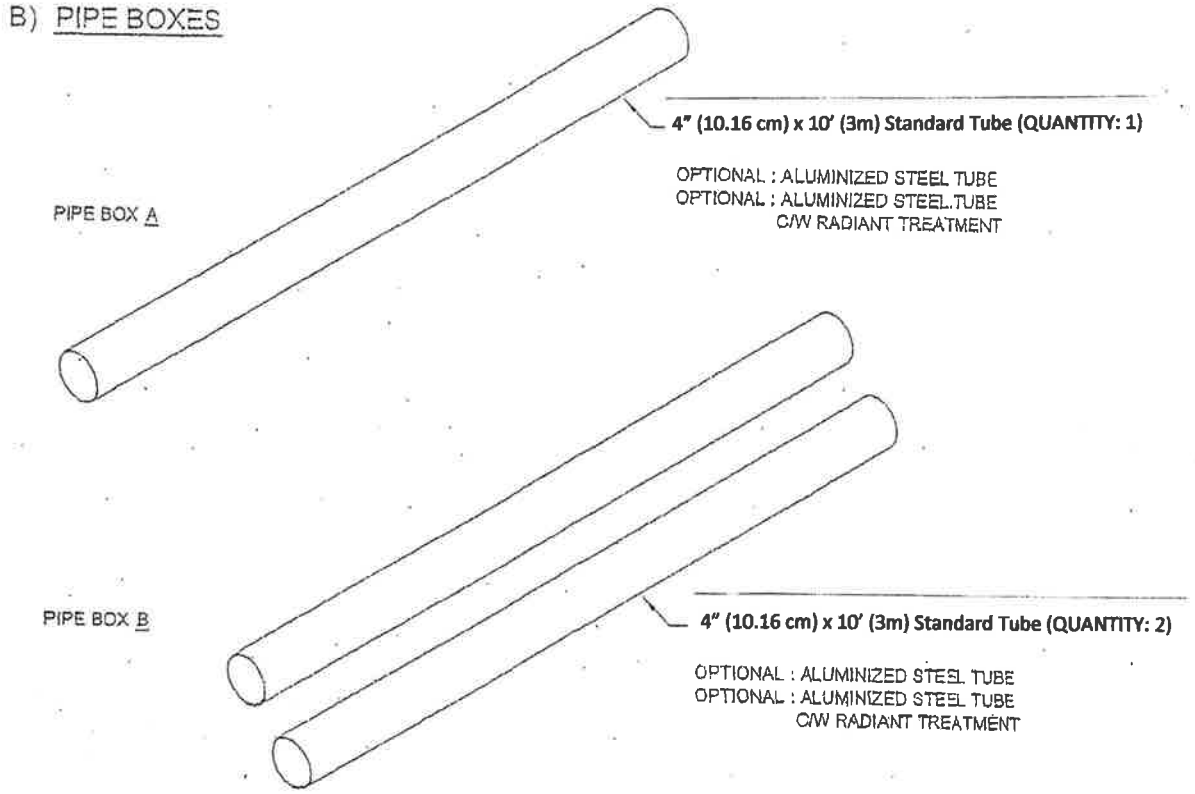
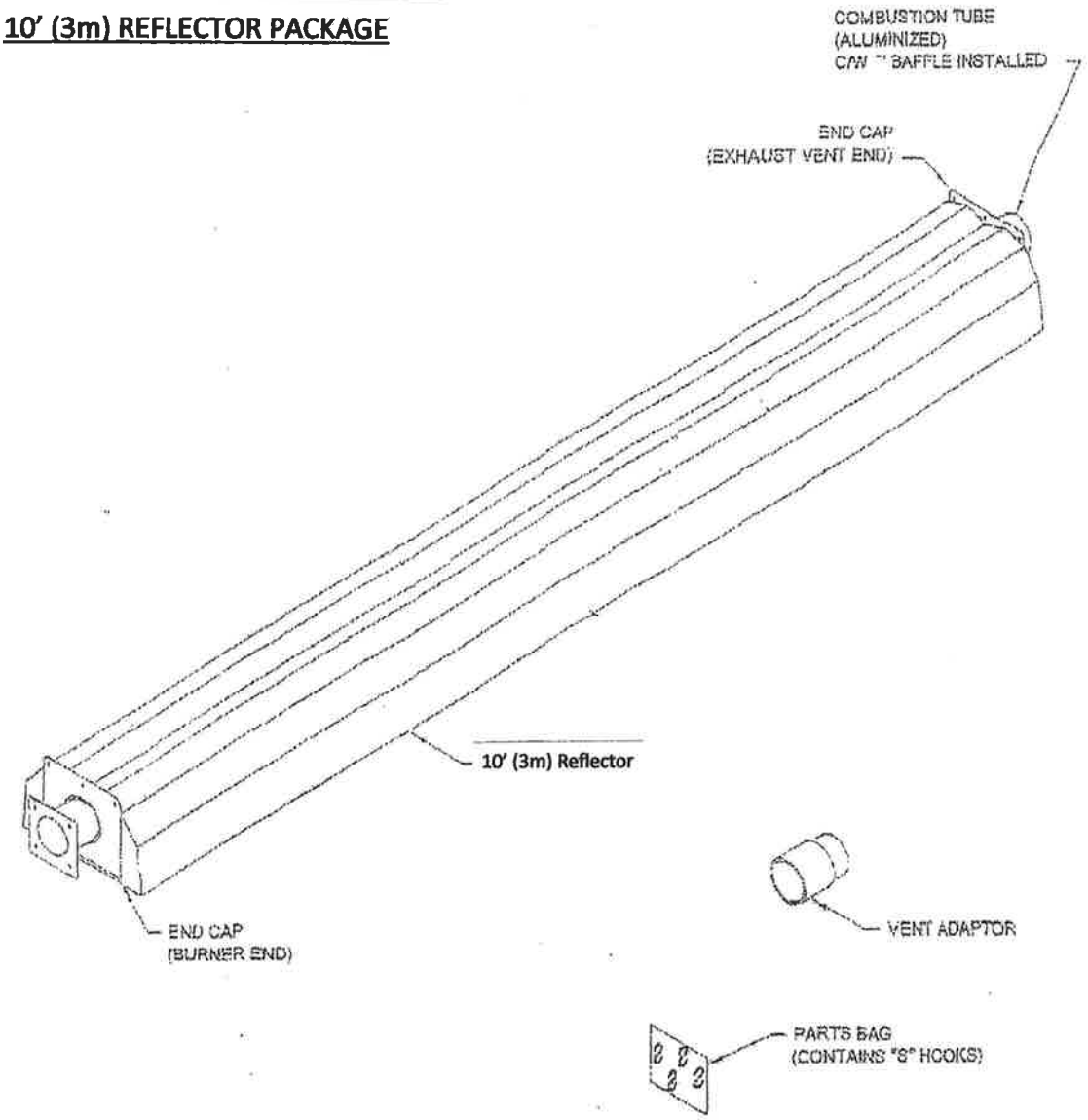


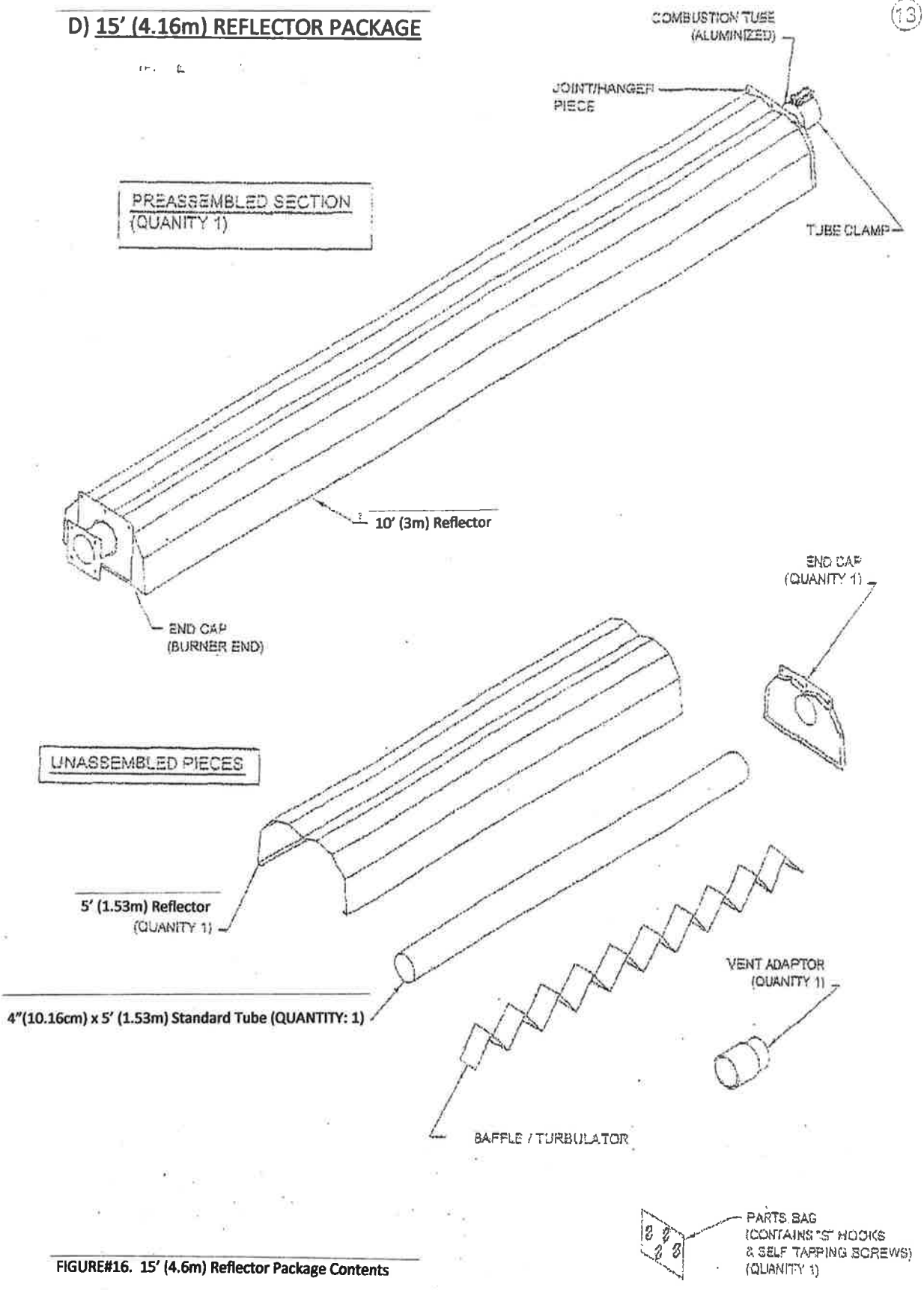
FIGURE #14. PIPE BOX CONTENTS

C) 10' (3m) REFLECTOR PACKAGE



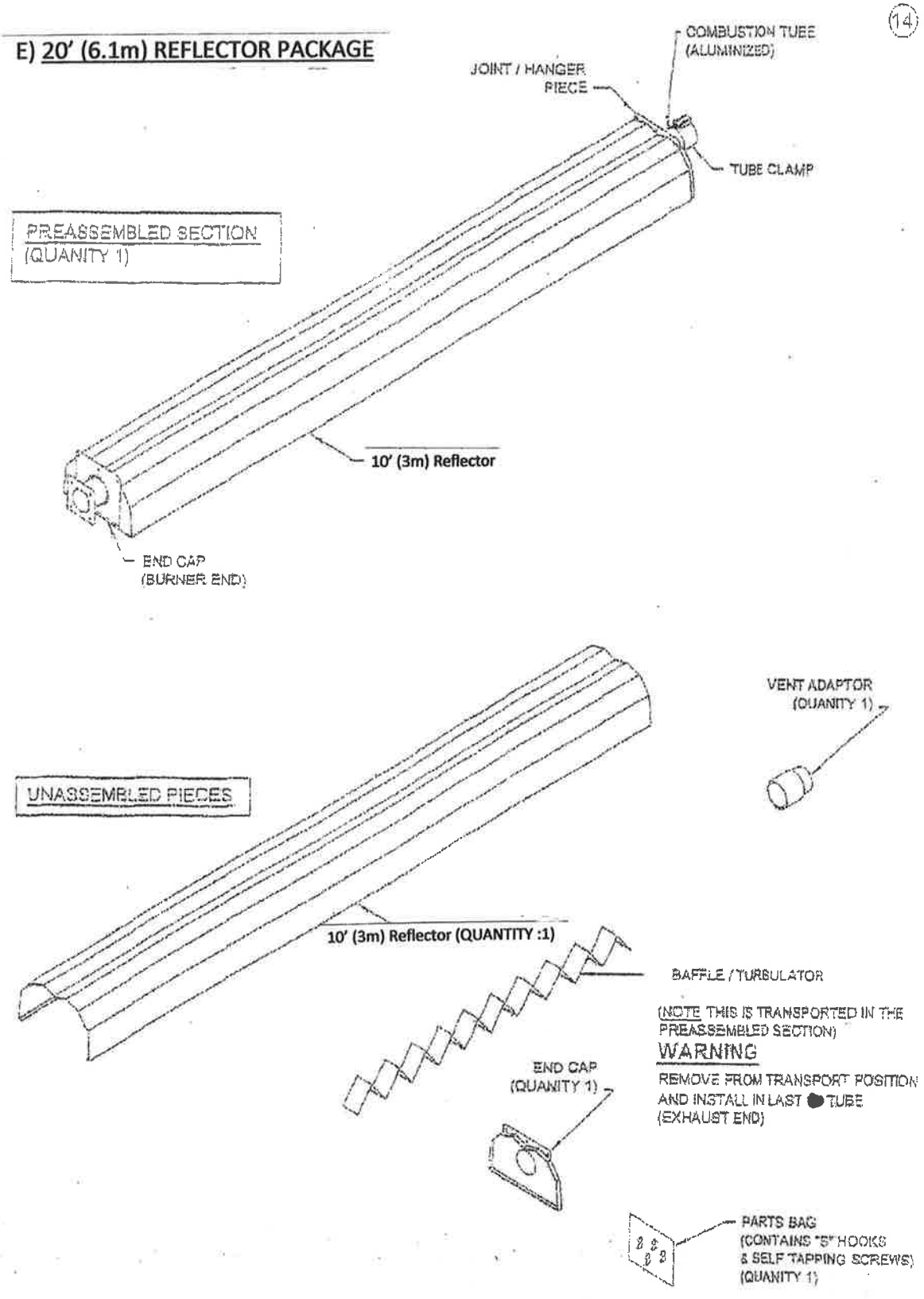
FIGURE#15. 10' (3m) Reflector Package Contents

D) 15' (4.16m) REFLECTOR PACKAGE



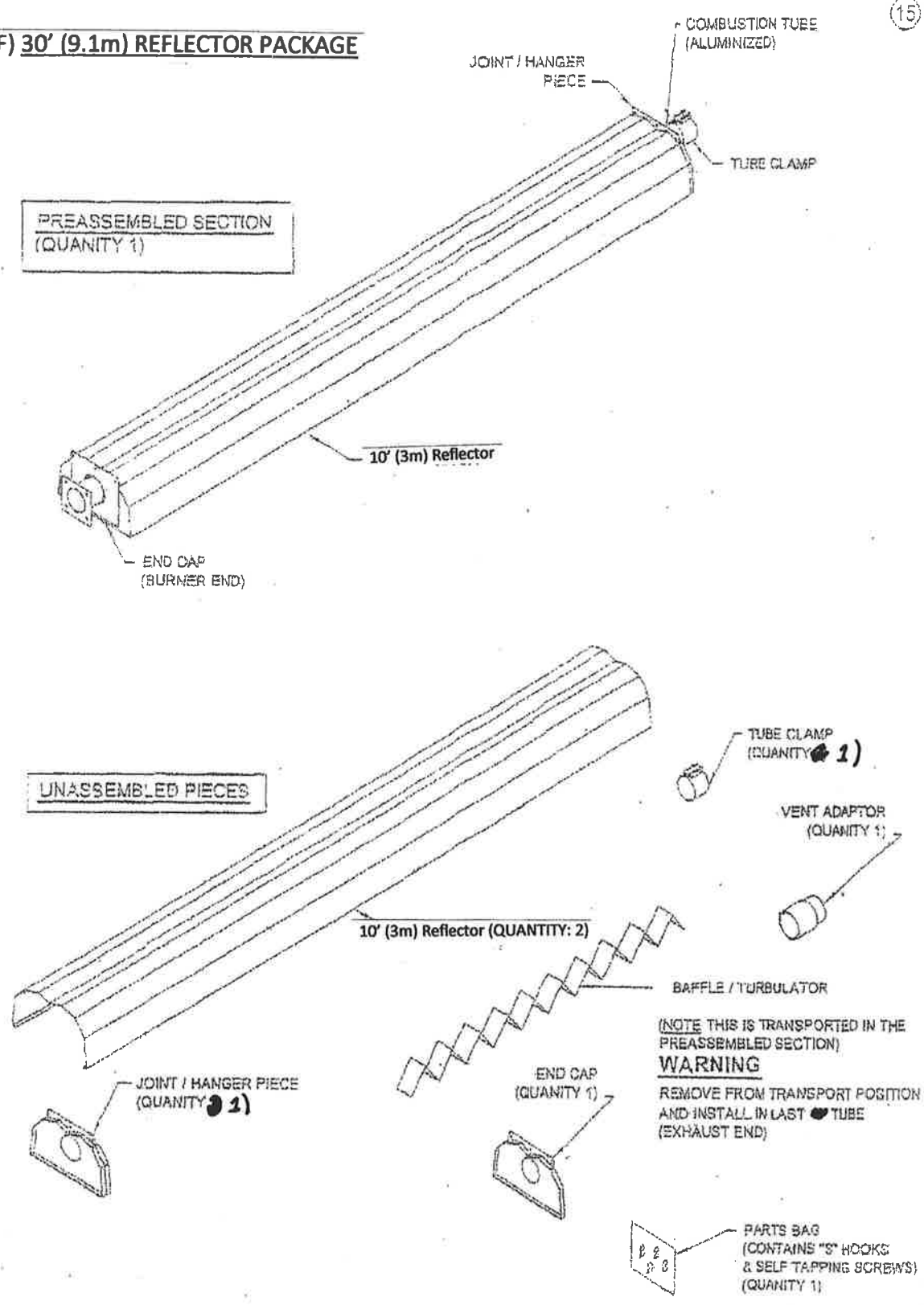
FIGURE#16. 15' (4.6m) Reflector Package Contents

E) 20' (6.1m) REFLECTOR PACKAGE



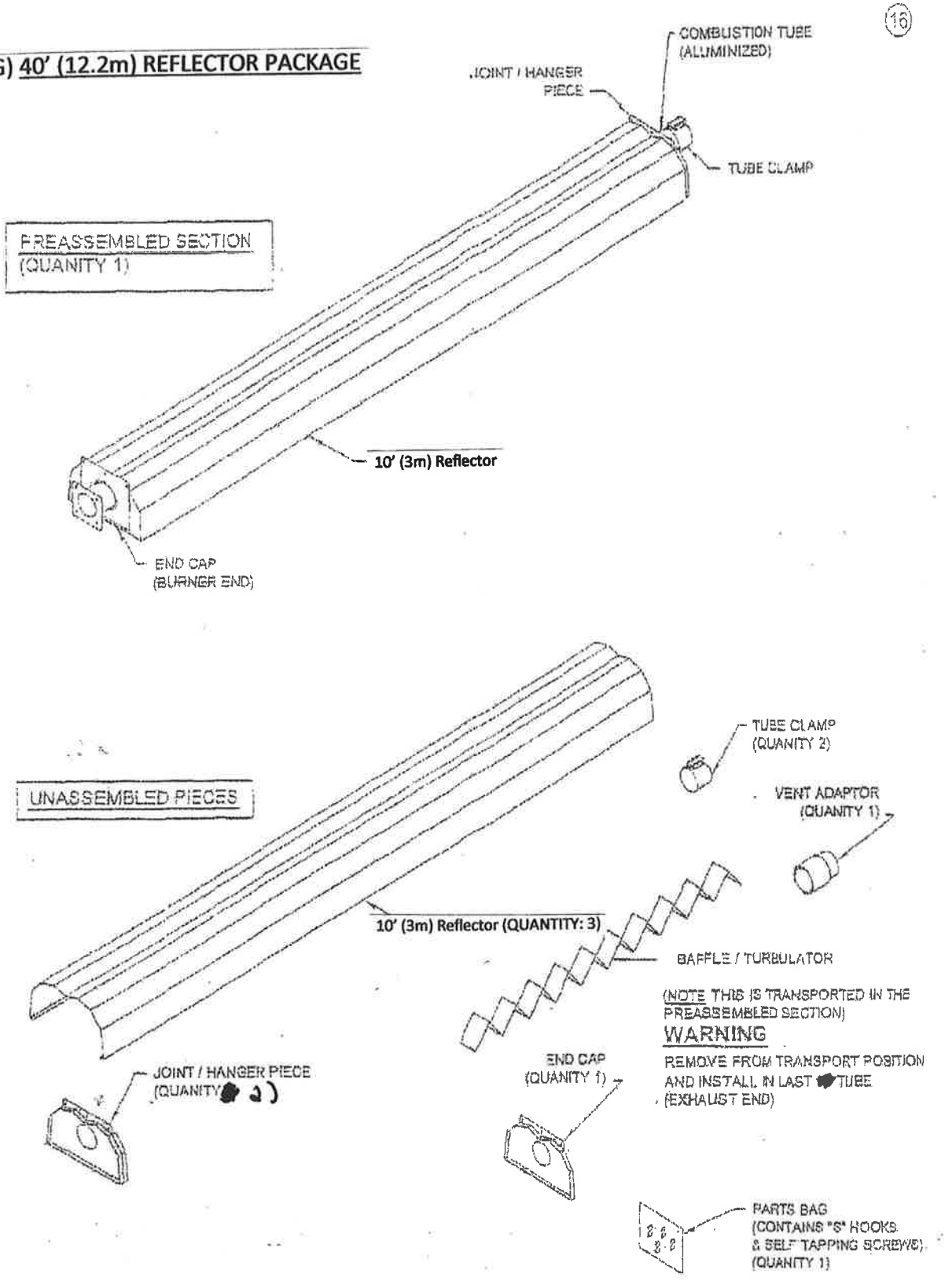
FIGURE#17. 20' (6.1m) Reflector Package Contents

F) 30' (9.1m) REFLECTOR PACKAGE



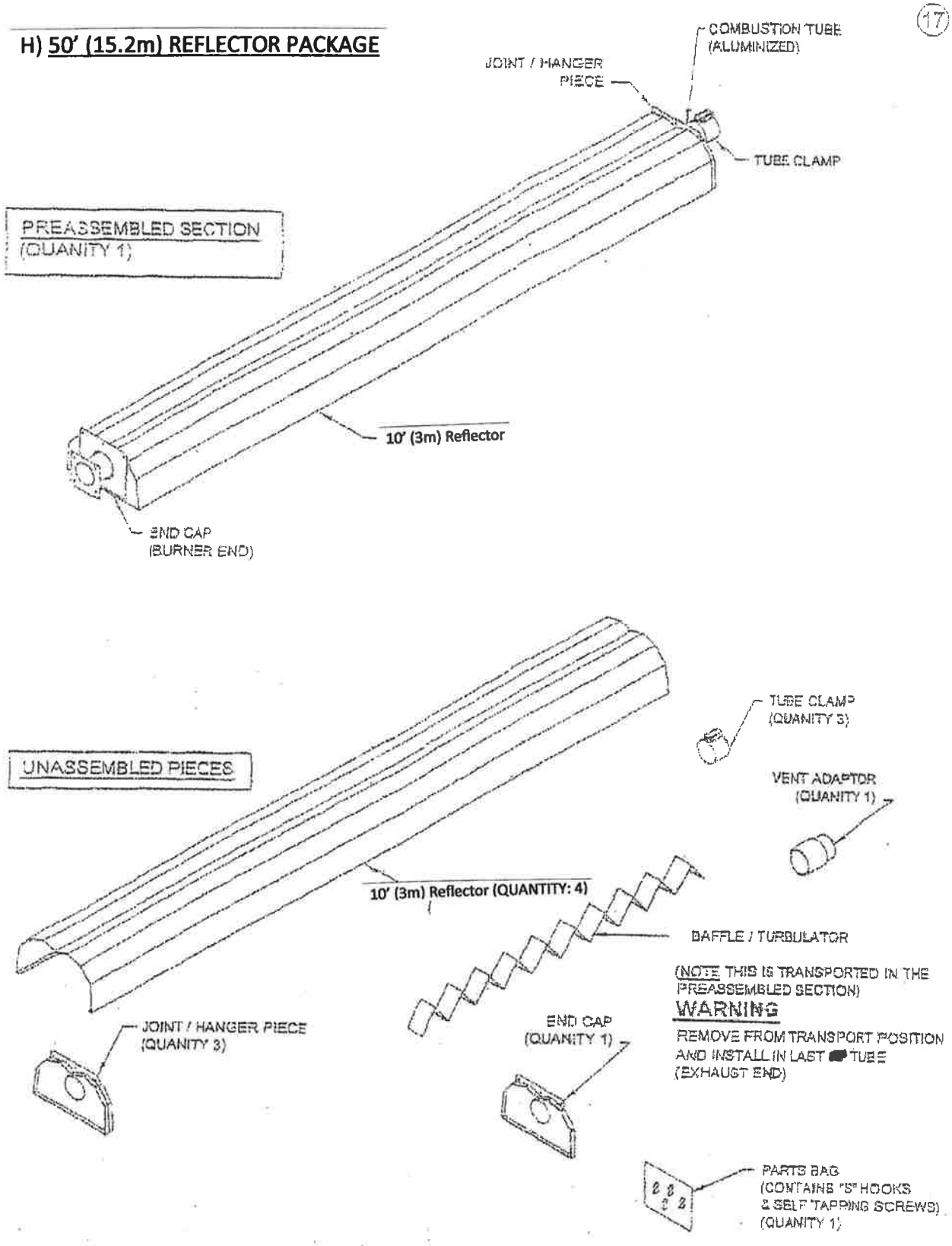
FIGURE#18. 30' (9.1m) Reflector Package Contents

G) 40' (12.2m) REFLECTOR PACKAGE



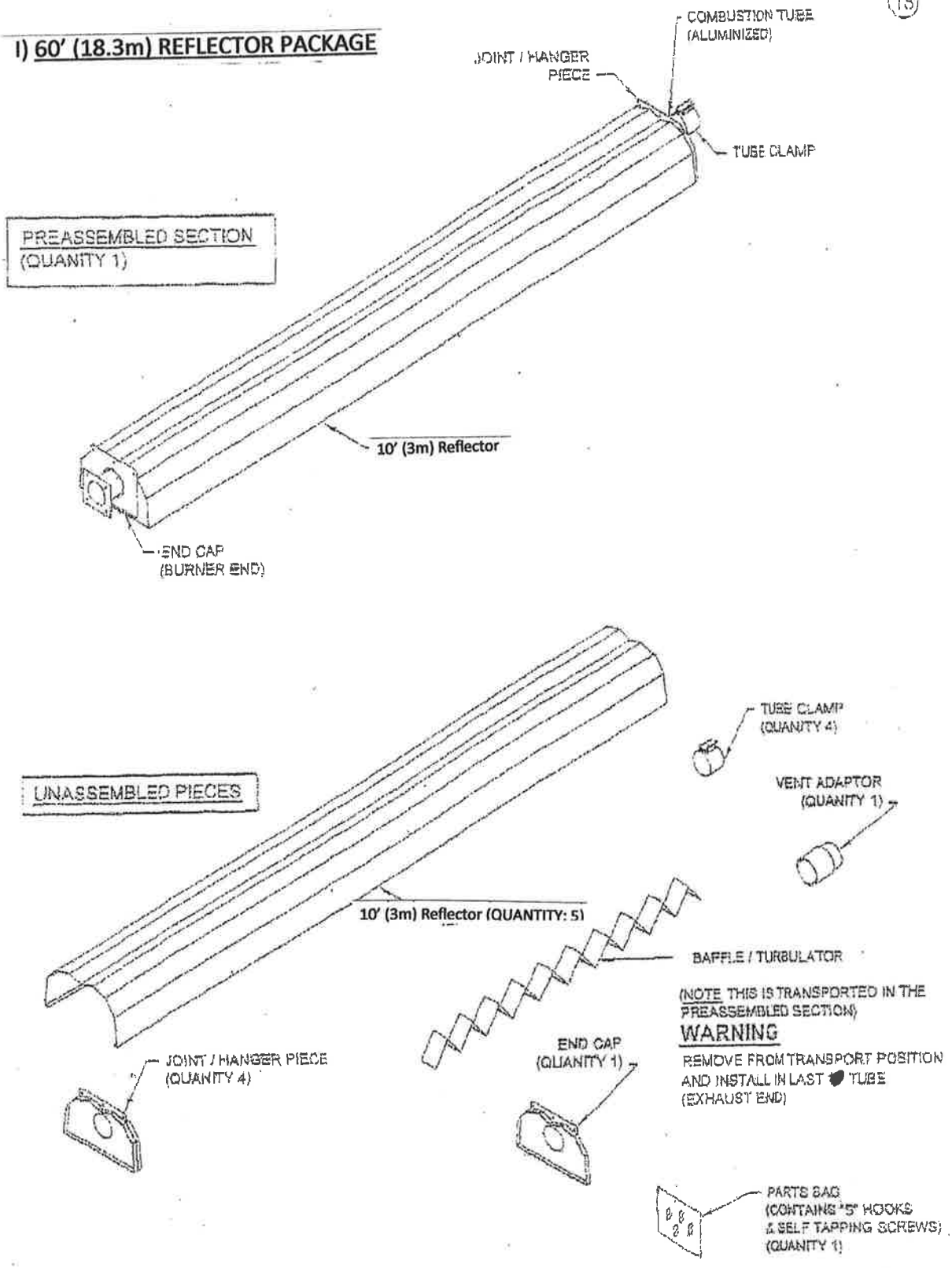
FIGURE#19. 40' (12.2m) Reflector Package Contents

H) 50' (15.2m) REFLECTOR PACKAGE



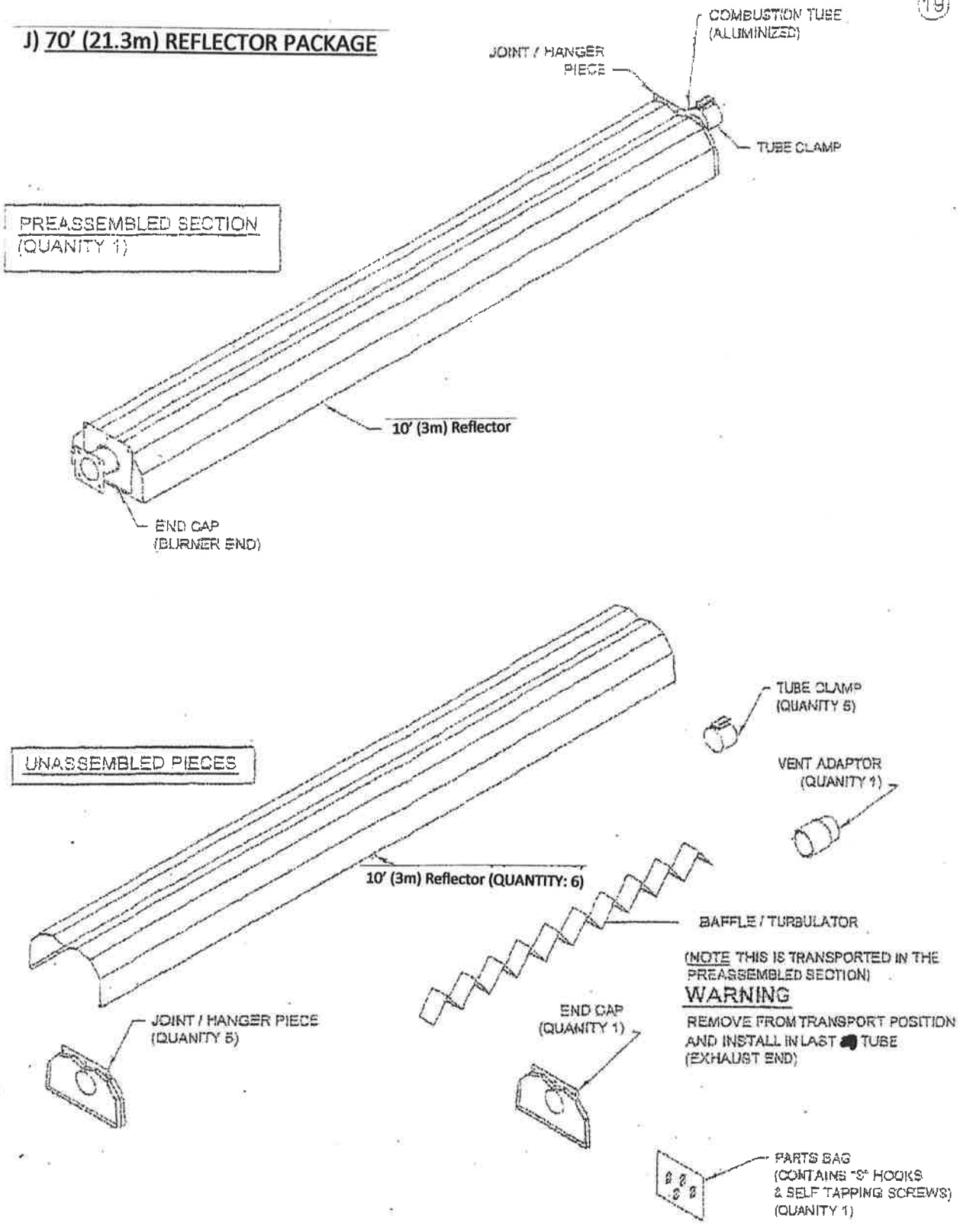
FIGURE#20. 50' (15.2m) Reflector Package Contents

I) 60' (18.3m) REFLECTOR PACKAGE



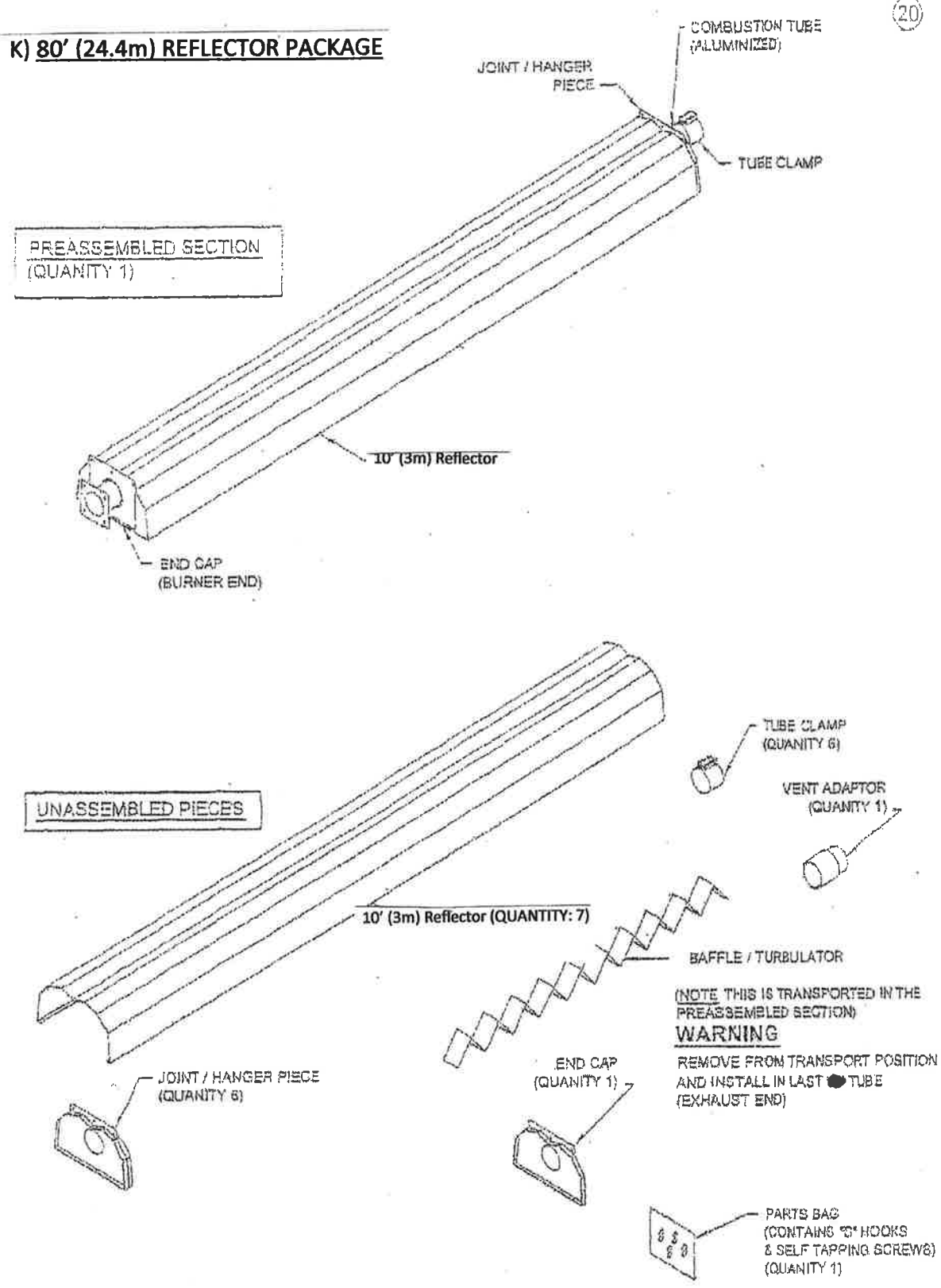
FIGURE#21. 60' (18.3m) Reflector Package Contents

J) 70' (21.3m) REFLECTOR PACKAGE



FIGURE#22. 70' (21.3m) Reflector Package Contents

K) 80' (24.4m) REFLECTOR PACKAGE



FIGURE#23. 80' (24.4m) Reflector Package Contents

L) 10' (3m) EXTENSION KIT

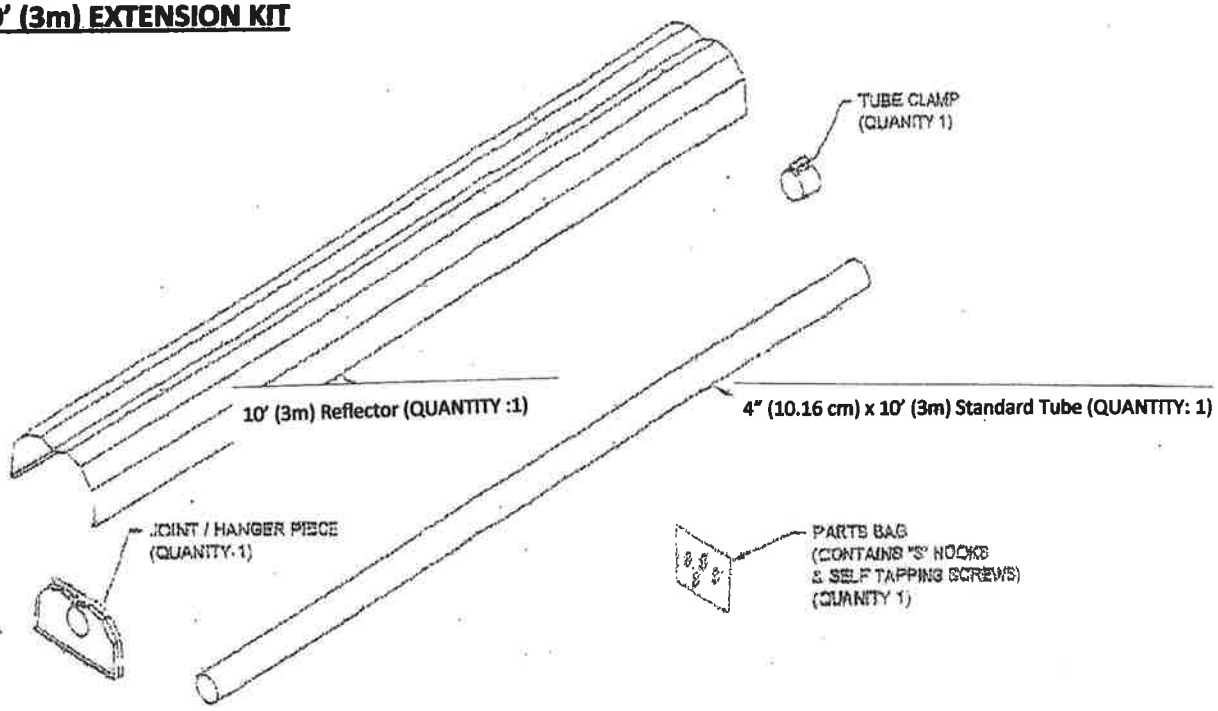


FIGURE #24. 10' (3m) EXTENSION PACKAGE CONTENTS

M) SIDE REFLECTOR PACKAGE

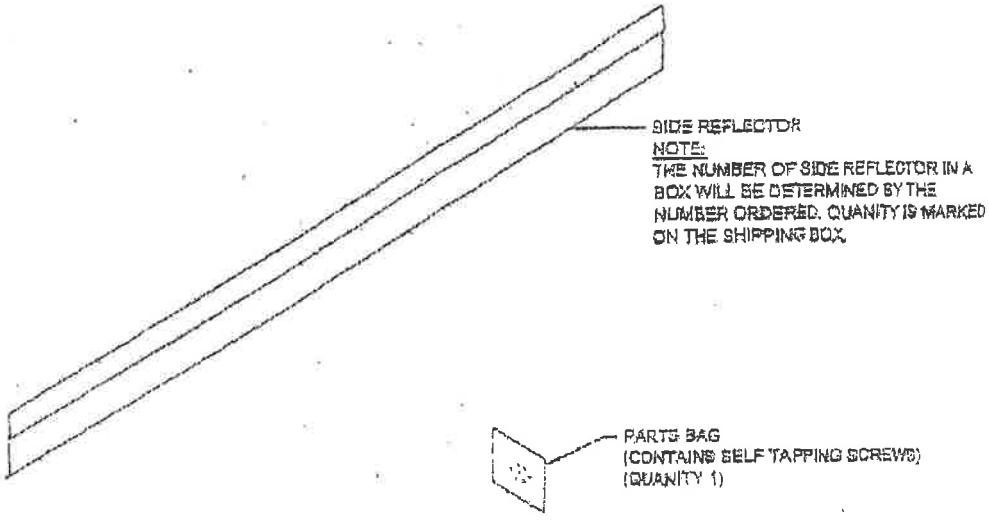


FIGURE #25, SIDE REFLECTOR PACKAGE CONTENTS

N) 90° ELBOW PACKAGE

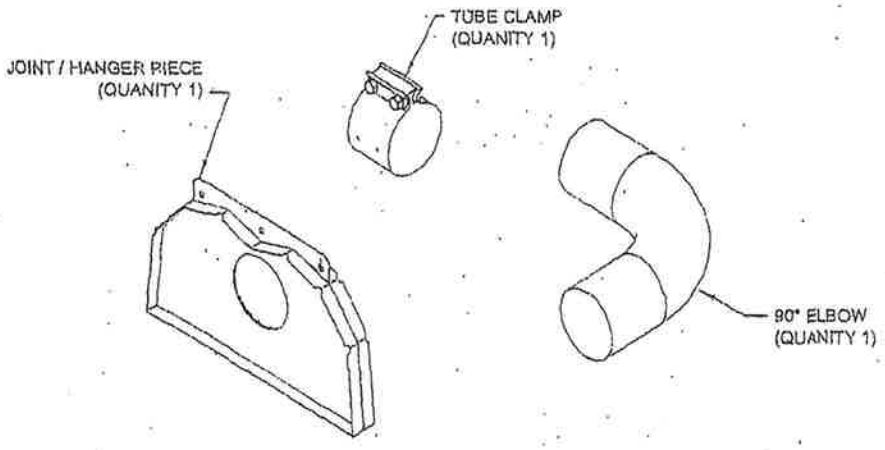


FIGURE #26: 90° ELBOW PACKAGE CONTENTS .

O) 180° U-BEND PACKAGE

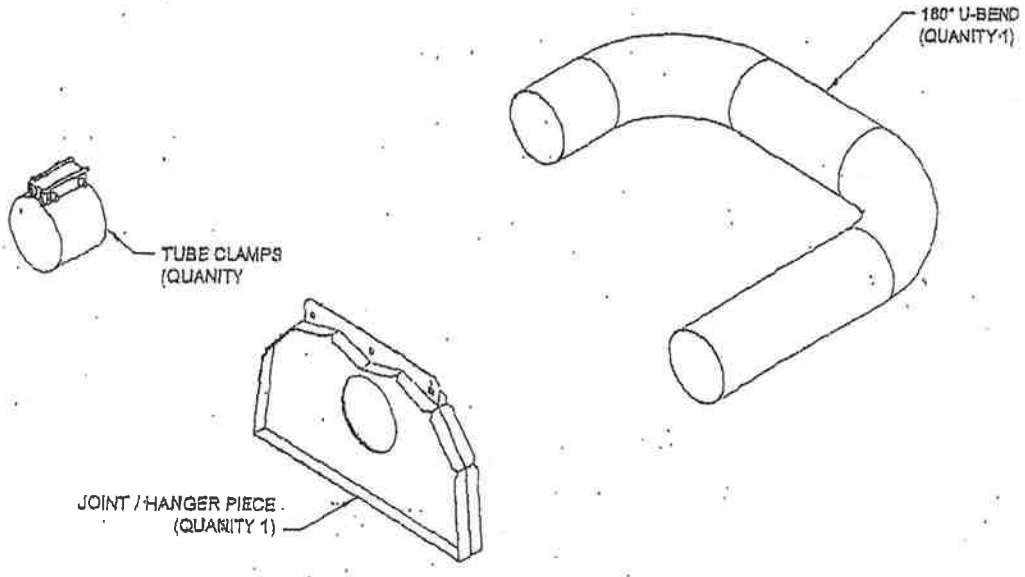


FIGURE #27. 180° U-BEND PACKAGE CONTENTS .

P) SIDE WALL VENT KIT

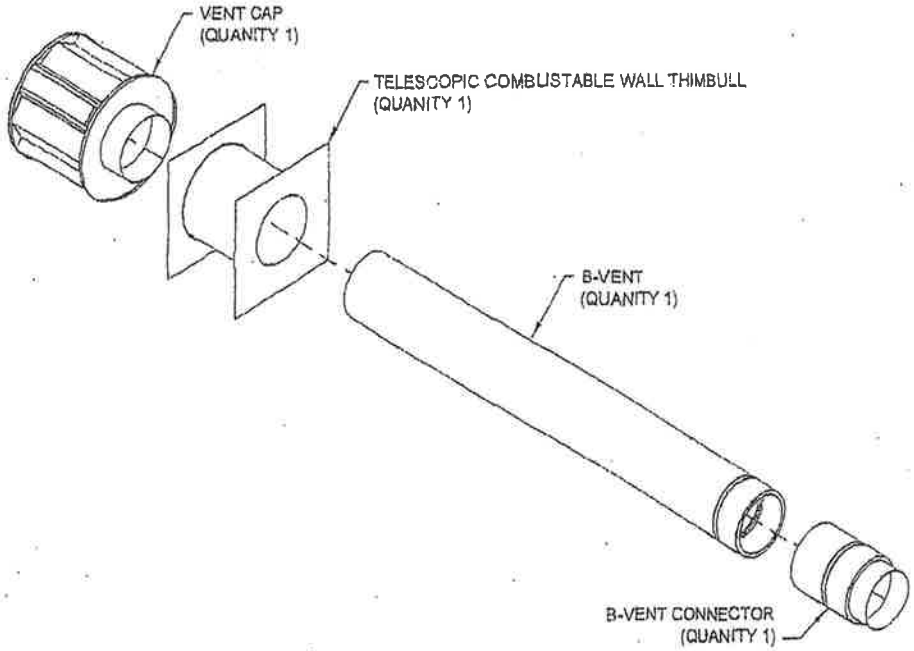


FIGURE #28. SIDE WALL VENT PACKAGE CONTENTS

Q) OUTDOOR INSTALLATION KIT

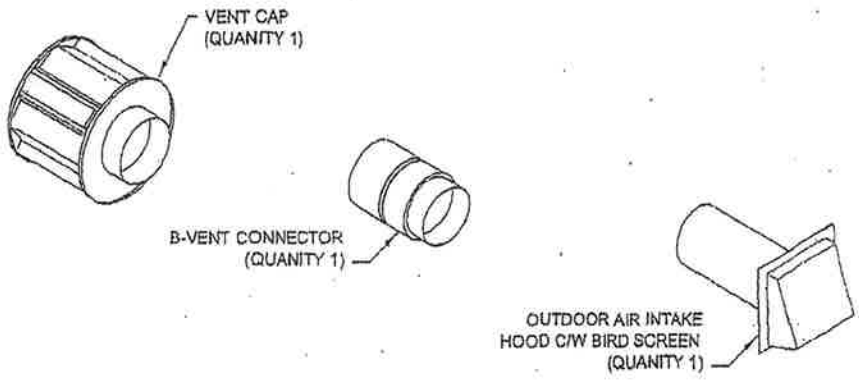


FIGURE #29. OUTDOOR INSTALLATION PACKAGE CONTENTS

INSTALLATION:

Provide for adequate clearance around air openings into the combustion chamber, clearances from combustible material, provisions for accessibility and for combustion and ventilating air supply.

PLANNING:

- Familiarize yourself with the equipment and any accessories that you may require.
- Locate the area where unit is to be installed
- Locate area where any holes might have to be cut for:

a) Venting
b) Any gas piping requirements

- Make sure that there is no obstruction such as hidden electrical wiring, water lines etc... in the areas of concern.
- Locate the thermostat location.

> ⚠ **WARNING:** Observe minimum clearance to combustibles

- Locate the electrical source for unit.
- Measure required amount of various materials required to do the installation, and have these materials on site in an organized manner prior to commencement.

SUSPENSION OF HEATER:

Horizontal Installation:

Locate suspension points on ceiling or roof. Heater is suspended at standard **10' (3m) intervals (refer** to page 25). Adequately secure chains to beam (refer to page 25) suspension points. Hang chains down from suspension point to desired level. Heater is to be hung level. NOTE: Front & rear endcaps are double chained.

Tilt Installation

Refer to page 27, for 25° to 45° tilts. Locate suspension points as described above under the title "Horizontal Installation". It is important NOT to over-tilt the heater. Units are certified for installation up 45°, however the MAXIMUM recommend tilt is no greater than 25°.

> ⚠ **WARNING: It is the responsibility of the installer to use hanging chain that is a minimum of 2/0 or with a minimum support capacity of no less than 75 lbs. Also make sure all suspension points are adequate to support weight of heater and any accessories. Also make sure all S-Hooks are affixed properly and the open ends squeezed closed. If the suspension system fails, it is the responsibility of the installer. A failed suspension system can cause property damage, severe injury and/or death.**

Refer to pages 28 & 34 for ASSEMBLY OF COMPONENTS and ASSEMBLY OVERVIEW.

A) SUSPENSION POINTS

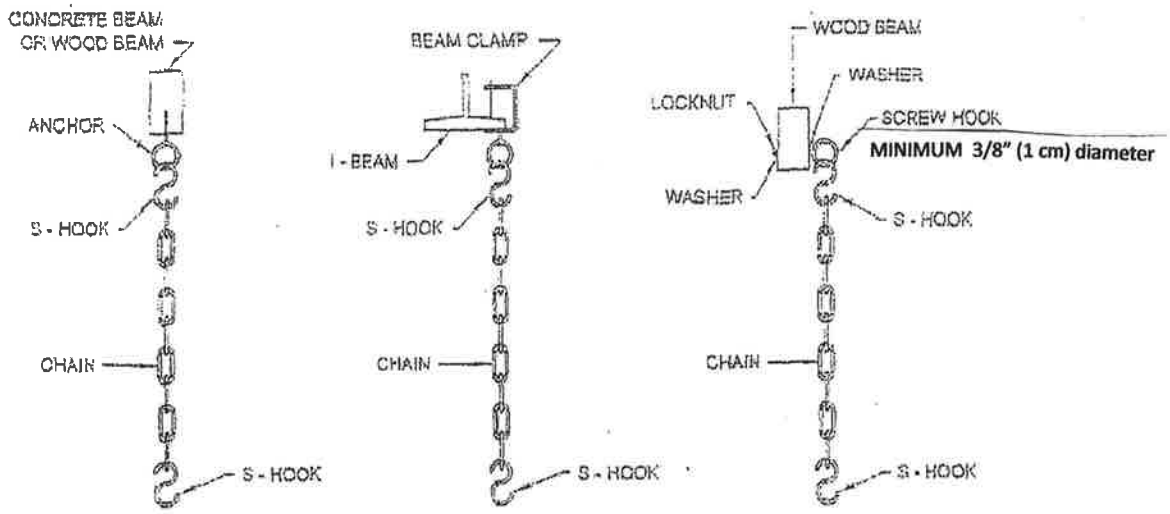


FIGURE #30. EXAMPLE SUSPENSION DETAILS

B) HORIZONTAL INSTALLATION

SUSPENSION LOCATIONS
10' (3m) REFLECTOR PACKAGE

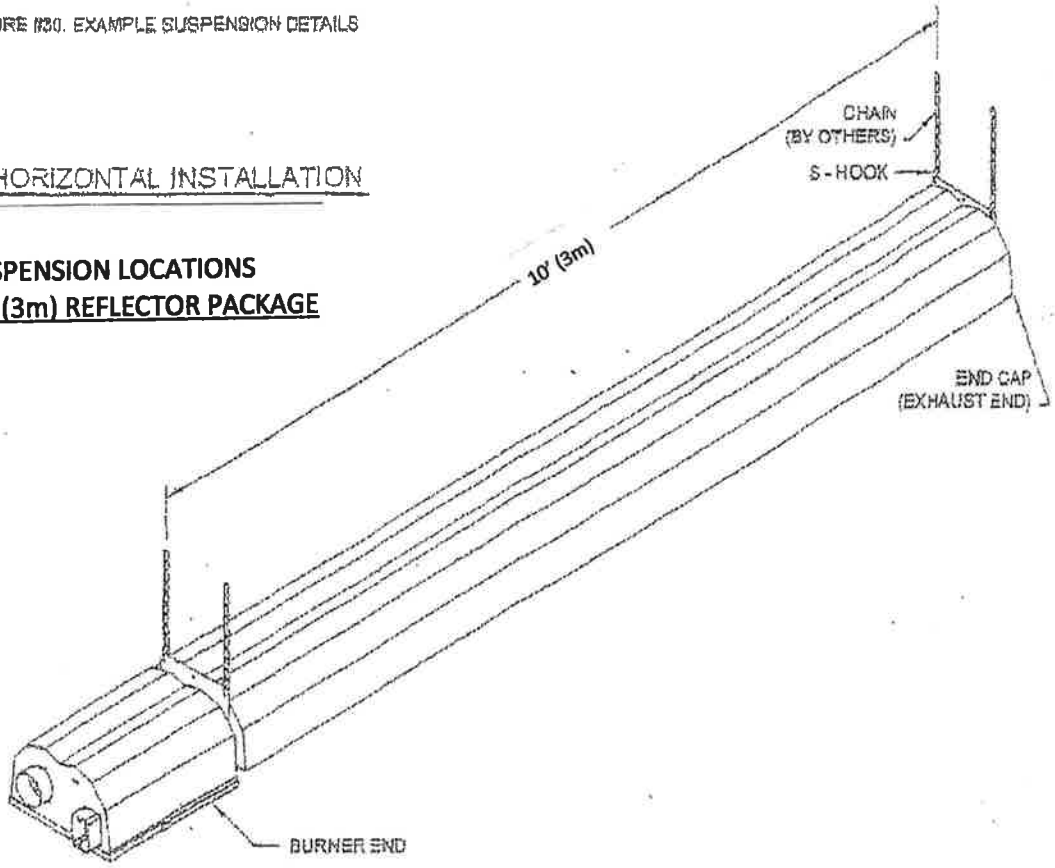


FIGURE #31. HORIZINTAL INSTALLATION – 10' (3m) PACKAGE

C) HORIZONTAL INSTALLATION

SUSPENSION LOCATIONS

15' (4.6m) TO 80' (24.4) Reflector Packages

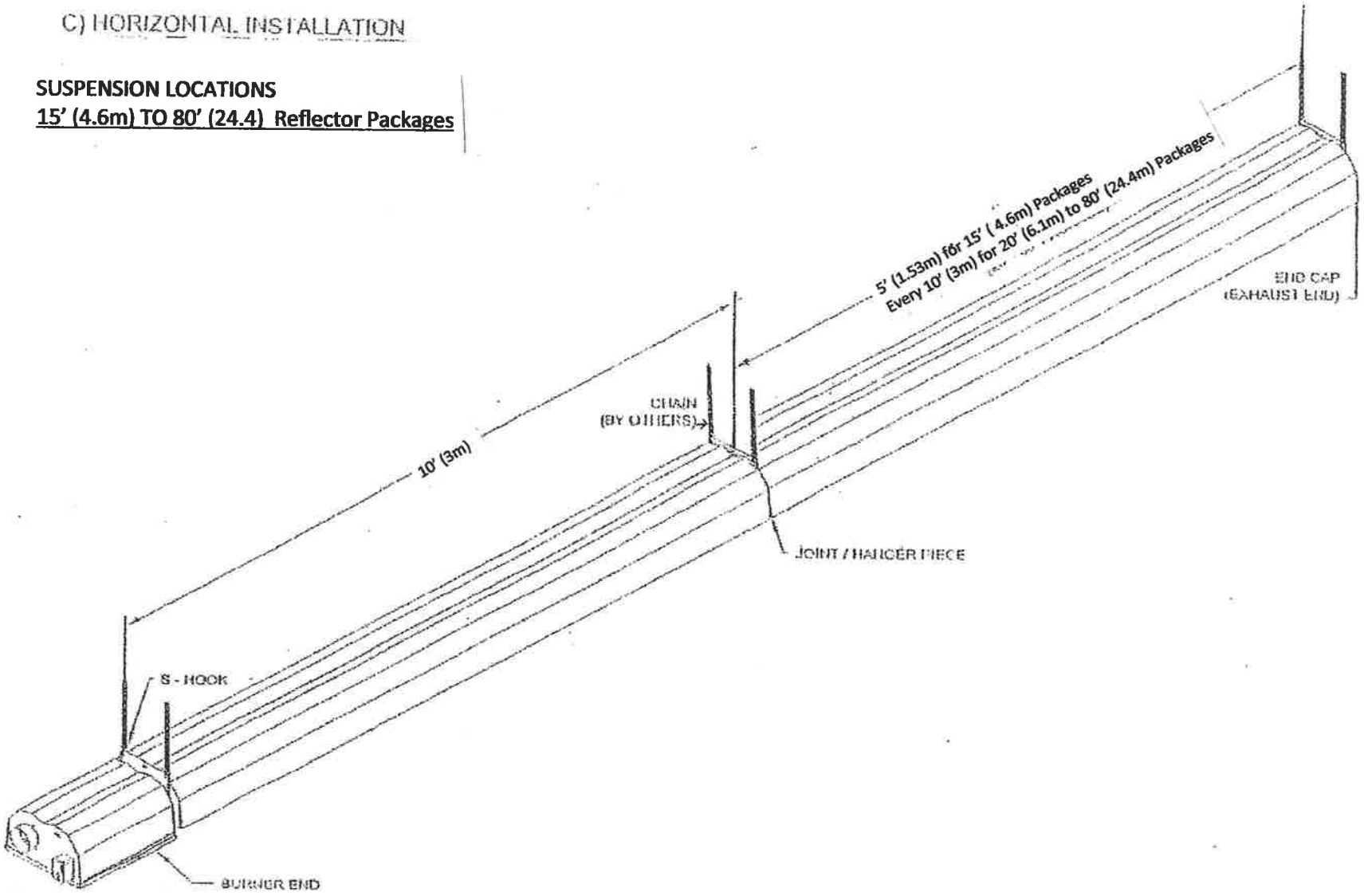


FIGURE # 32. HORIZINTAL INSTALLATIONS – 15' (4.6m) TO 80' (24.4m) PACKAGES

D) 25° TILT (ALL LENGTHS)

NOTE: 25° Tilt is the maximum recommended tilt for most tilt installations.

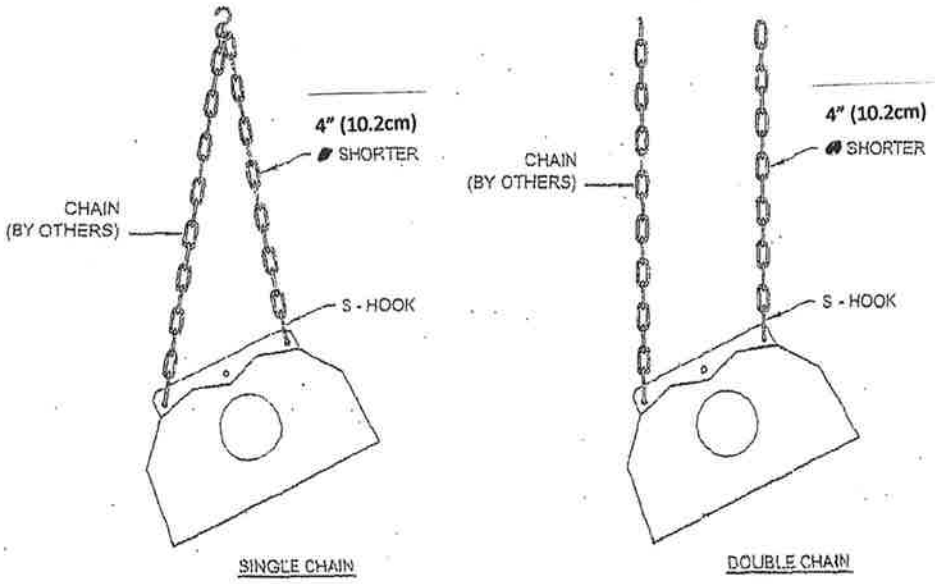


FIGURE #33. 25° TILT

E) 45° TILT (ALL LENGTHS)

NOTE: 45 degree tilt is **NOT RECOMMENDED**. This angle of tilt causes the ambient air to form a convection current over the tube. The net effect of this action is reduced infrared output (decreased heating capacity) as well as decreased exhaust temperature which may increase the chance of condensation of combustion by-products.

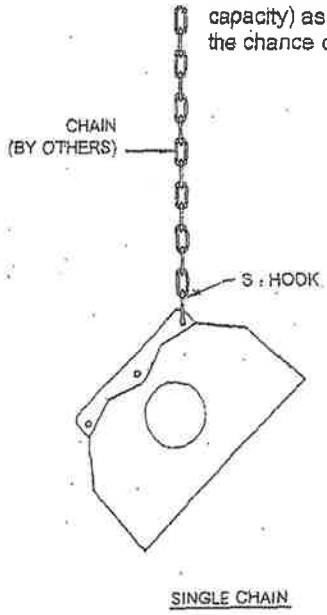


FIGURE #34. 45° TILT

ASSEMBLY OF COMPONENTS

Refer to text & figures in section titled ASSEMBLY OVERVIEW (see page 34 to 46) Refer to COMPONENT ASSEMBLY (see pages 30 to 33)

1) **Remove turbulator or baffle from transport location on tube. Set aside as it is to be install in the last 10' (3m) tube of the heater (see page 30). The only exception to this is the 80' (24.5) reflector package. It does not require the turbulator or baffle.**

2) **Attach burner head to initial 10' (3m) preassembly (see page 30). MAKE SURE WELDED SEAM IS AT BOTTOM OF TUBE POINTING TOWARD THE FLOOR WHEN HEATER IS INSTALLED.**

3) **Install S-hooks into joint hangers. Hang preassembled burner box, combustion tube, and reflector (first 10' (3m) of heater from chains with adequate load rating (see warnings on page 24). NOTE: If you are installing a 40,000 Btu/hr – 10' (3m) unit, your installation is complete.**

4) **Secure a joint hanger to one end of the reflector by overlapping reflector onto joint/hanger ¾" (1.9cm) and secure via provided self tapping screws.**

5. Attach the above-assembled reflector to the pre-assembled joint/hanger by overlapping reflector on hanger and securing via provided self-tapping screws. (see page 31)

6. Hang assembly from suspended chains via 'S' hooks.

7. Install radiant tube by positioning one end into joint/hanger and butting the other end to the previously installed radiant tube. Secure tubes with clamp and self-tapping screws.

IMPORTANT:	Make sure to secure clamp to tube via self-tapping screws. (see diagram 38 on page 31)

8. Secure remaining joint/hanger pieces to reflectors as per item #4,

9. Install assembled reflectors by:
   a) hanging joint/hanger piece end from the next chain in line for installation
   b) install other end of reflector by over lapping the reflector onto the joint/hanger pieces previously assembled and hung, securing via provided self-tapping screws. (see page 31)

10. Install radiant tubes as per #7.

11. Install reflector end cap into last reflector securing with self-tapping screws. -

12. Hang assembled reflector and end cap via double chains onto end cap end. Over lap other end of the reflector onto joint/hanger piece on previous section. (see page 32) Secure reflector to joint/hanger via self-tapping screws.

13. Install final radiant tube as per #7.

14. Install baffles in final radiant tube (see page 33), **(not required for 80' (24.5m) reflector package)**

IMPORTANT: Install baffle into last piece of radiant tube.

15. Install a flue/vent adaptor. (see page 33)

16. Install reflector support strap, as per #8.

17. Install any accessories as per their related instruction and illustrations contained in this manual.

18. Connect to vent.

19. Connect to outside combustion air. (optional).

20. Connect gas, electricity and controls.

COMPONENT ASSEMBLY

(BAFFLE - TRANSPORT POSITION)

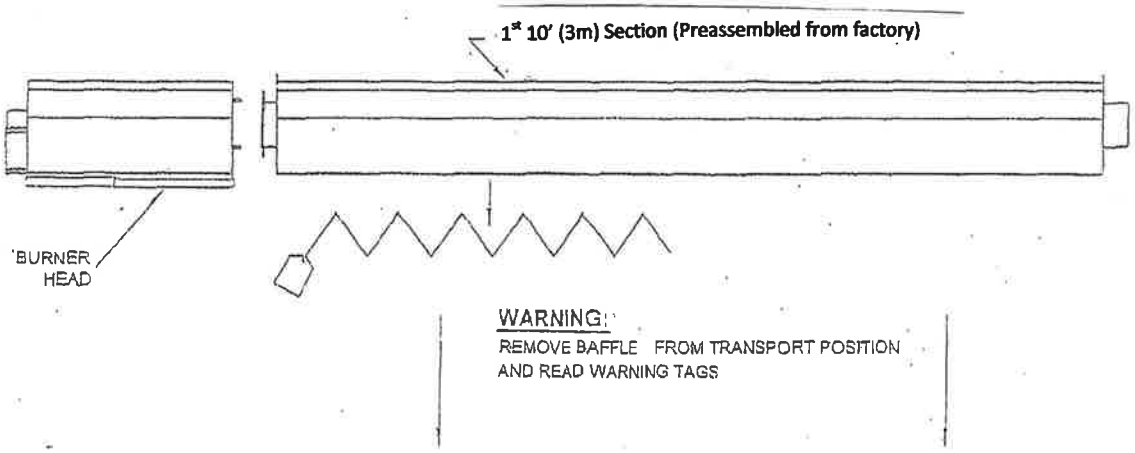


FIGURE #35. BAFFLE / TURBULATOR REMOVAL FROM TRANSPORT POSITION

BURNER HEAD TO FIRST 10' (3m) OF REFLECTOR PACKAGE

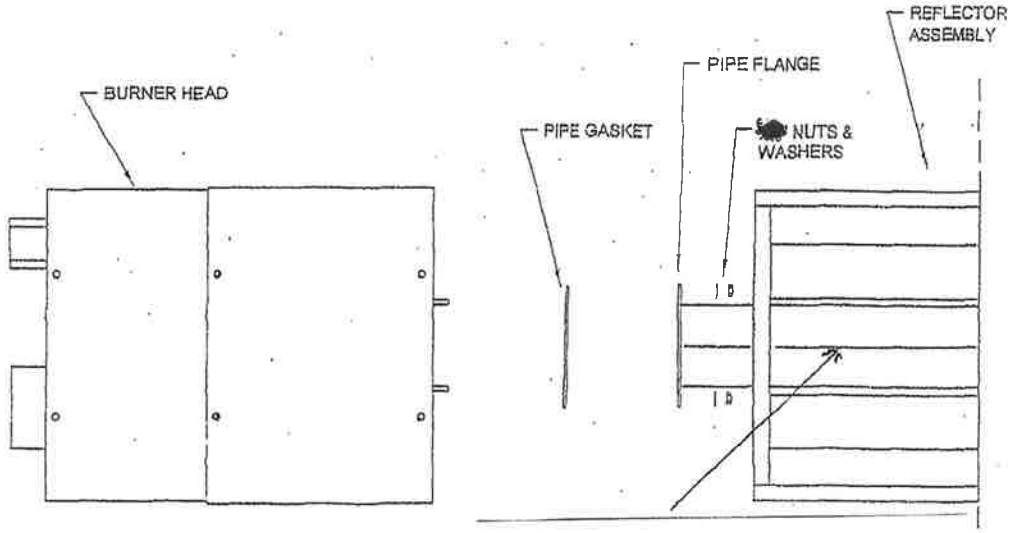


FIGURE #36. BURNER HEAD INSTALLATION

JOINT HANGER TO REFLECTOR

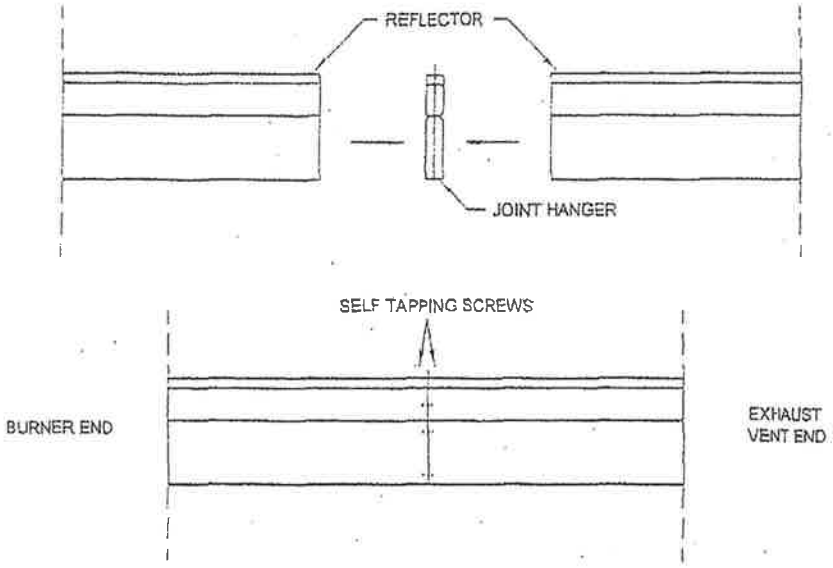


FIGURE #37, JOINT HANGER INSTALLATION

CLAMP COUPLER

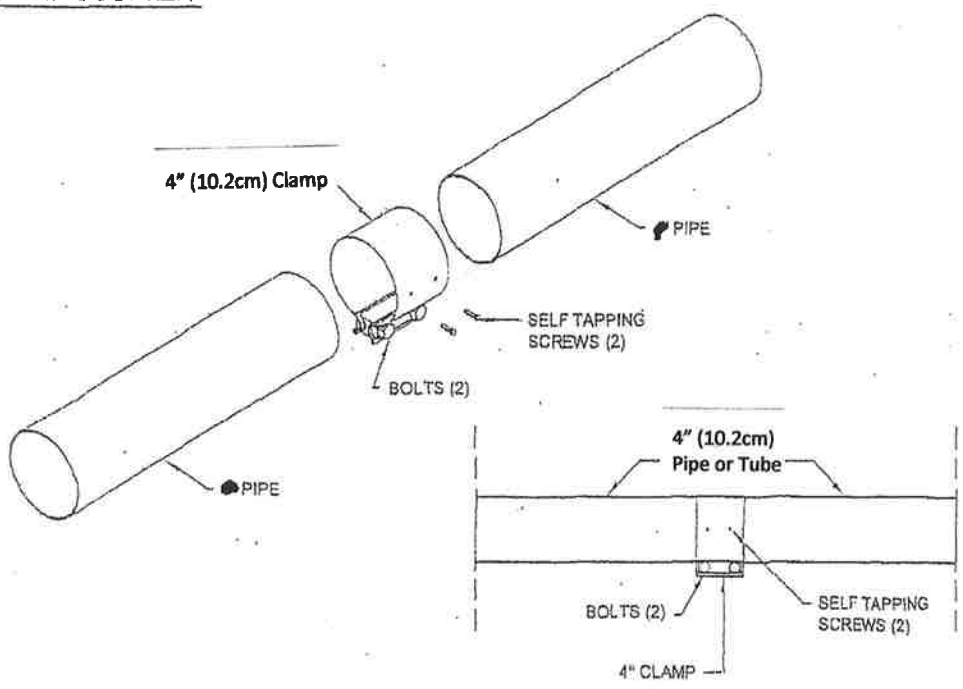


FIGURE #38, CLAMP COUPLER INSTALLATION

END CAP TO REFLECTOR

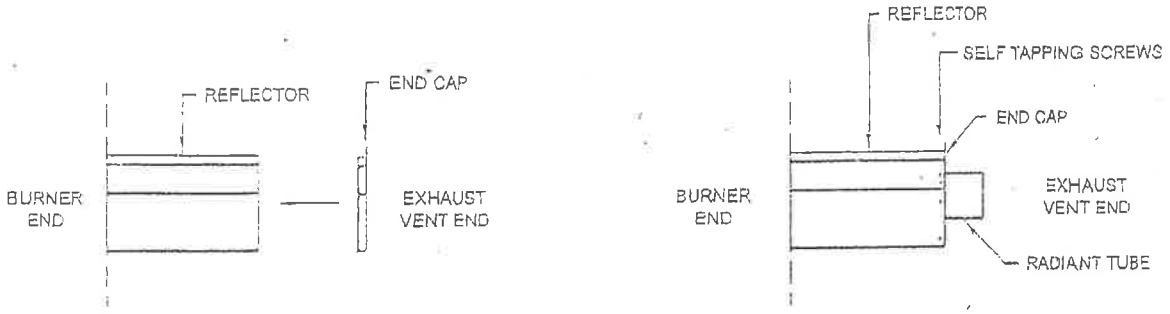


FIGURE #40. END CAP INSTALLATION

BAFFLE/TURBULATOR INSTALLATION

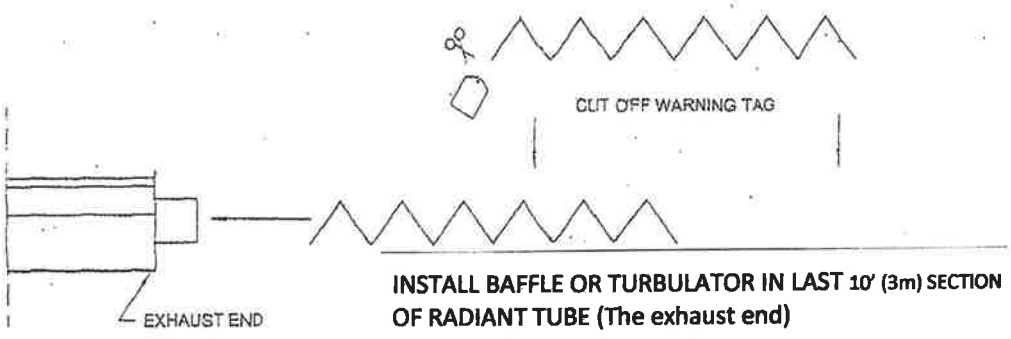


FIGURE #41. BAFFLE / TURBULATOR INSTALLATION

VENT ADAPTOR INSTALLATION

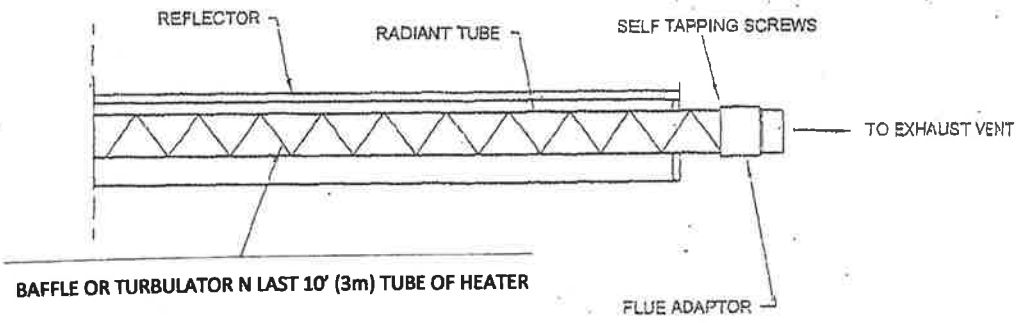


FIGURE #42. BAFFLE / TURBULATOR + FLUE ADAPTOR INSTALLATION

ASSEMBLY (OVERVIEW)

1. Verify length of reflector package to be installed. Read 'ASSEMBLY OF COMPONENTS", on page 25 and view related diagrams on pages 30— 33.

2. Locate section of manual that corresponds with length to be installed. View the corresponding exploded view. The illustration contains the details required to install the unit.

REFLECTOR PACKAGE LENGTH	CORRESPONDING PAGE
10' (3m)	35
15' (4.6m)	36
20' (6.1m)	37
30' (9.1m)	38
40' (12.2m)	39
50' (15.2m)	40
60' (18.3m)	41
70' (21.3m)	42
80' (24.4m)	43

ASSEMBLY OF OPTIONS:

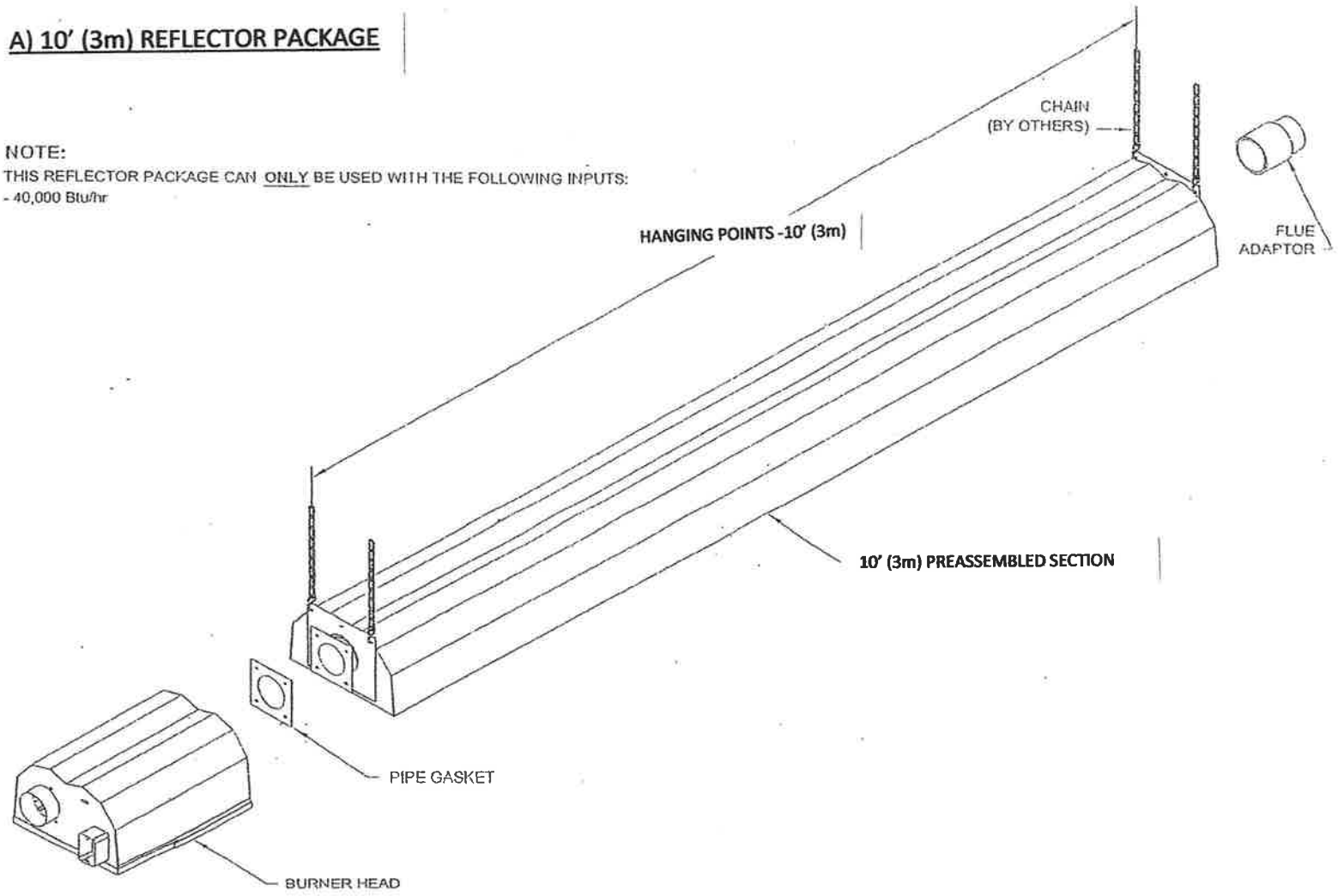
Refer to section of manual containing option to be installed.

Options	Corresponding Page
Sidewall Vent Kit	44
Outdoor Installation Kit	44 & 56
90° Elbow Kit	45
180° U-Bend Kit	45
Side Reflectors	46
Low Voltage Thermostat	64
Line Voltage Thermostat	65

View exploded illustration, install accordingly.

A) 10' (3m) REFLECTOR PACKAGE

NOTE:
THIS REFLECTOR PACKAGE CAN ONLY BE USED WITH THE FOLLOWING INPUTS:
- 40,000 Btu/hr



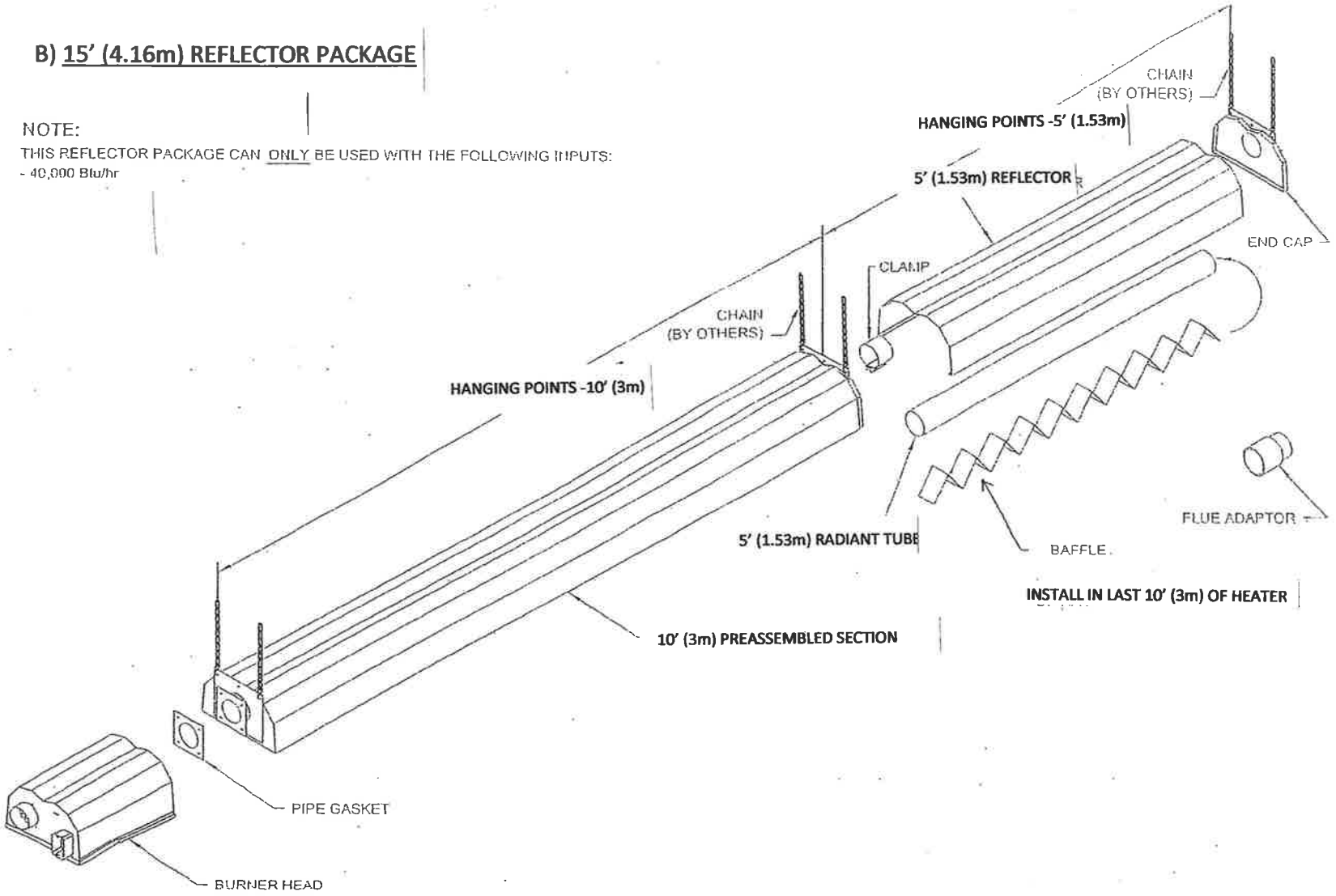
FIGURE#43. 10' (3m) Reflector Package INSTALLATION

B) 15' (4.16m) REFLECTOR PACKAGE

NOTE:

THIS REFLECTOR PACKAGE CAN ONLY BE USED WITH THE FOLLOWING INPUTS:

- 40,000 Btu/hr



FIGURE#44. 15' (4.6m) Reflector Package INSTALLATION

C) 20' (6.1m) REFLECTOR PACKAGE

NOTE:

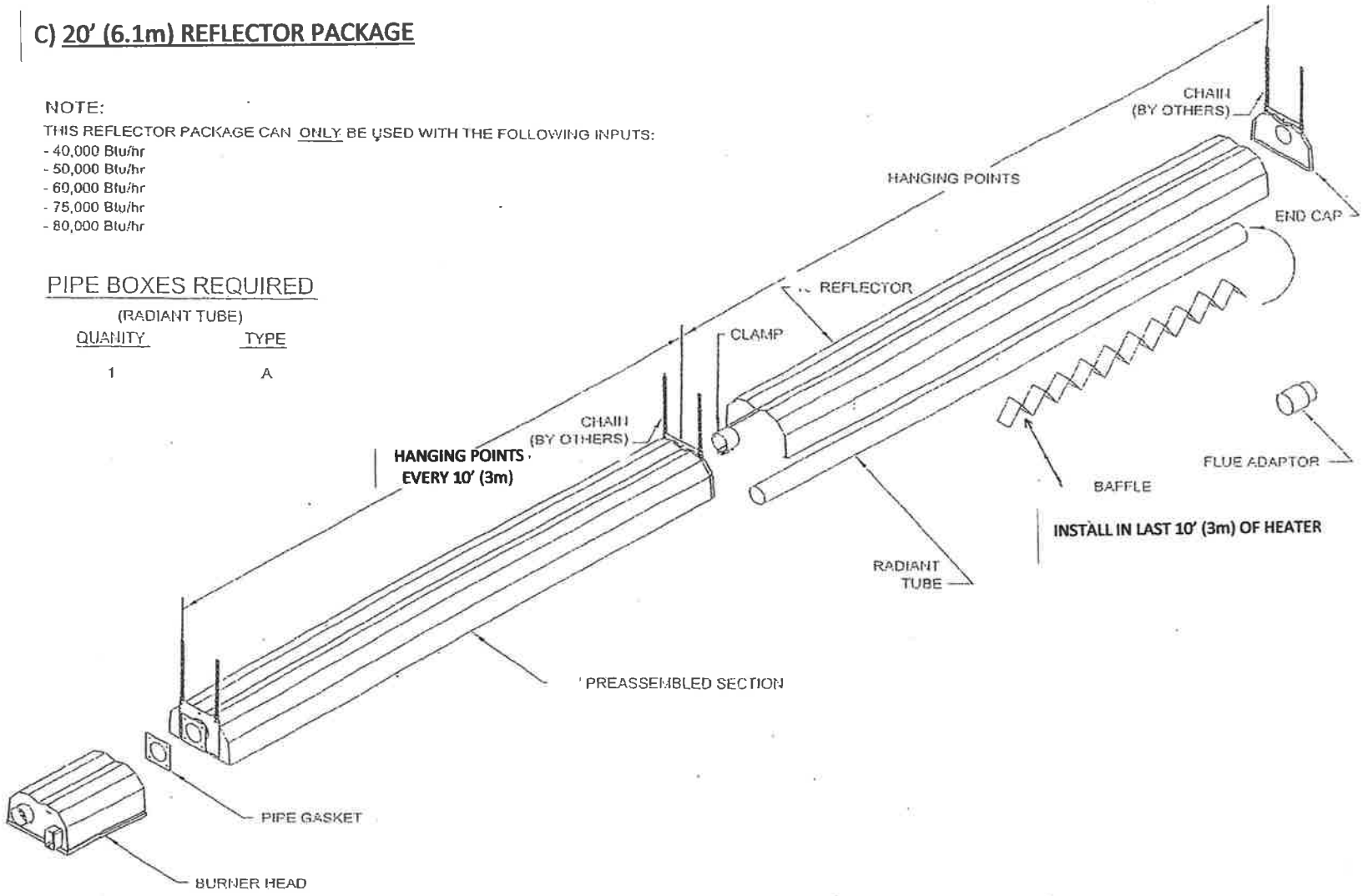
THIS REFLECTOR PACKAGE CAN ONLY BE USED WITH THE FOLLOWING INPUTS:

- 40,000 Btu/hr
- 50,000 Btu/hr
- 60,000 Btu/hr
- 75,000 Btu/hr
- 80,000 Btu/hr

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
1	A



FIGURE#45. 20' (6.1m) Reflector Package INSTALLATION

D) 30' (9.1m) REFLECTOR PACKAGE

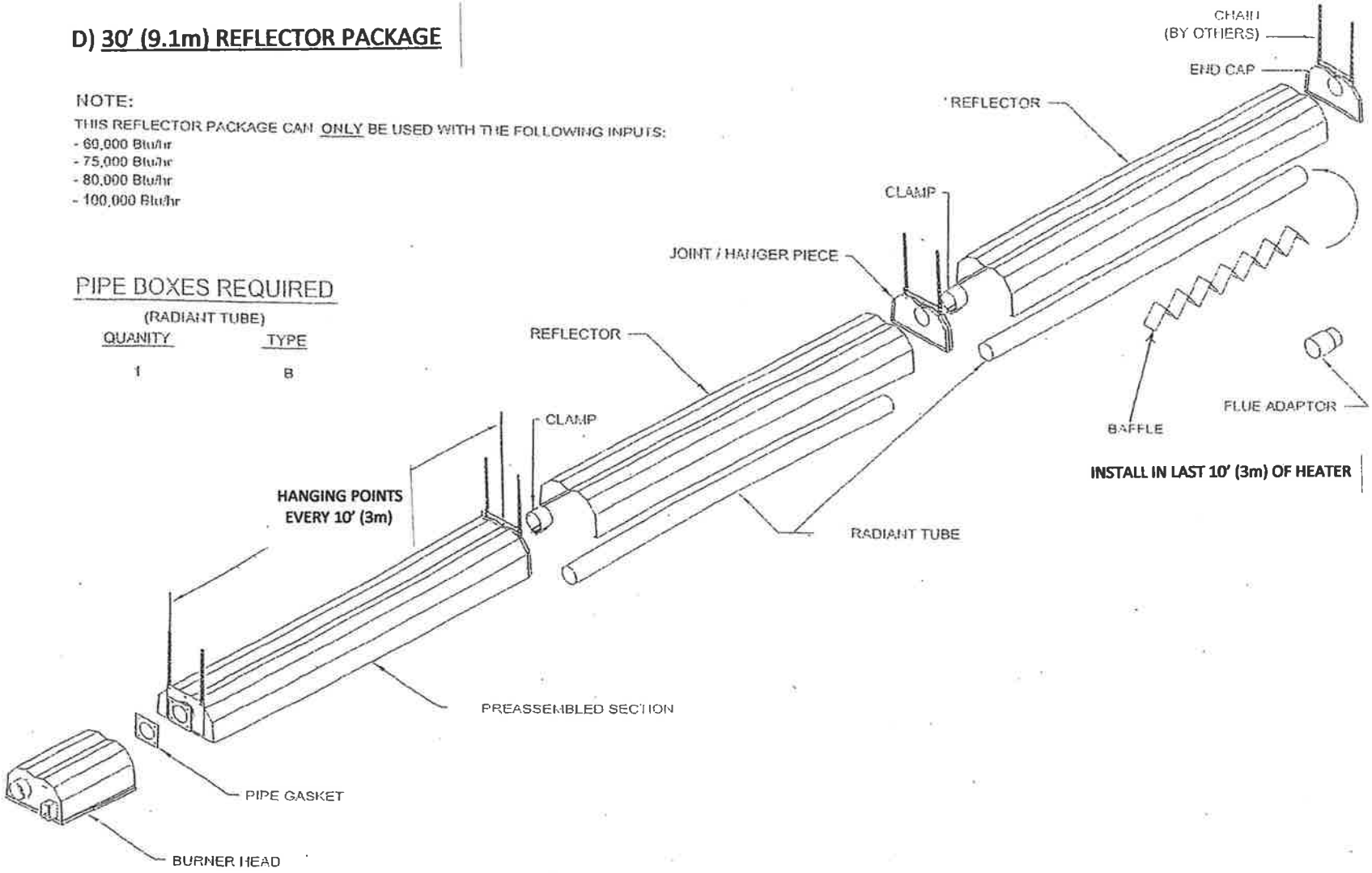
NOTE:

THIS REFLECTOR PACKAGE CAN ONLY BE USED WITH THE FOLLOWING INPUTS:
- 60,000 Btu/hr
- 75,000 Btu/hr
- 80,000 Btu/hr
- 100,000 Btu/hr

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
1	B



FIGURE#46. 30' (9.1m) Reflector Package INSTALLATION

E) 40' (12.2m) REFLECTOR PACKAGE

NOTE:

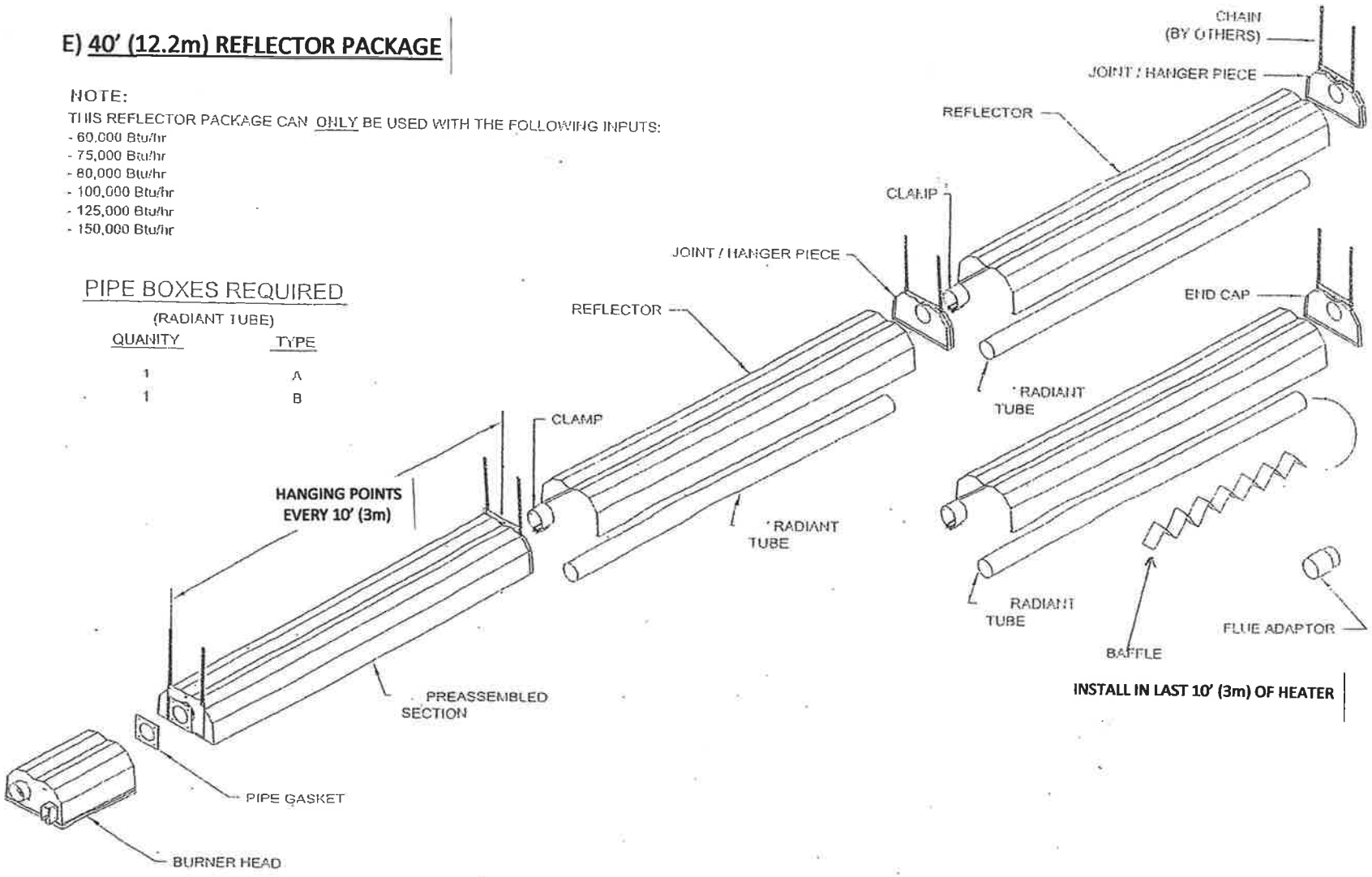
THIS REFLECTOR PACKAGE CAN ONLY BE USED WITH THE FOLLOWING INPUTS:

- 60,000 Btu/hr
- 75,000 Btu/hr
- 80,000 Btu/hr
- 100,000 Btu/hr
- 125,000 Btu/hr
- 150,000 Btu/hr

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
1	A
1	B



FIGURE#47. 40' (12.2m) Reflector Package INSTALLATION

F) 50' (15.2m) REFLECTOR PACKAGE

NOTE:

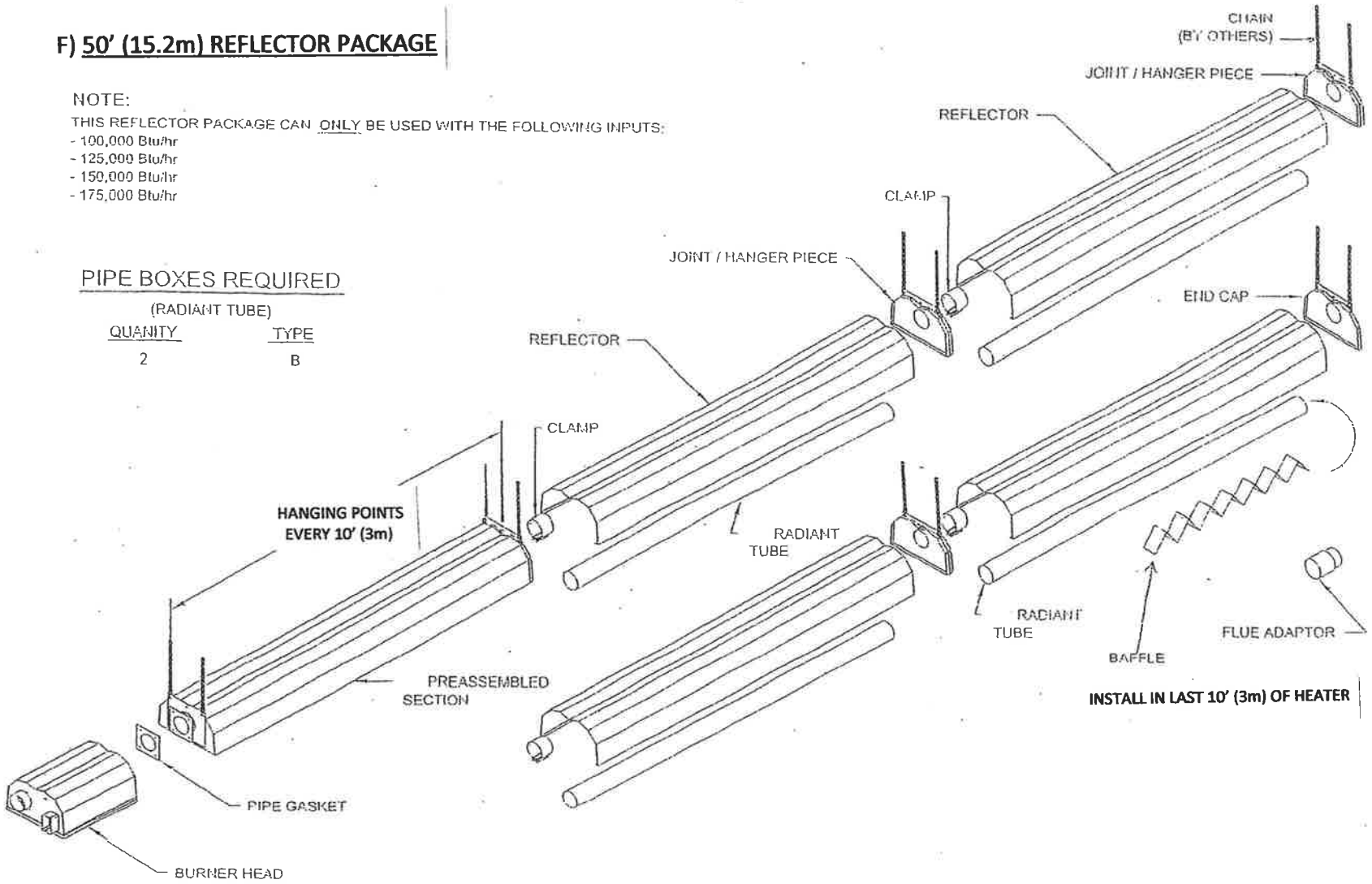
THIS REFLECTOR PACKAGE CAN ONLY BE USED WITH THE FOLLOWING INPUTS:

- 100,000 Btu/hr
- 125,000 Btu/hr
- 150,000 Btu/hr
- 175,000 Btu/hr

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
2	B



FIGURE#48. 50' (15.2m) Reflector Package INSTALLATION

G 60' (18.3m) REFLECTOR PACKAGE

NOTE:

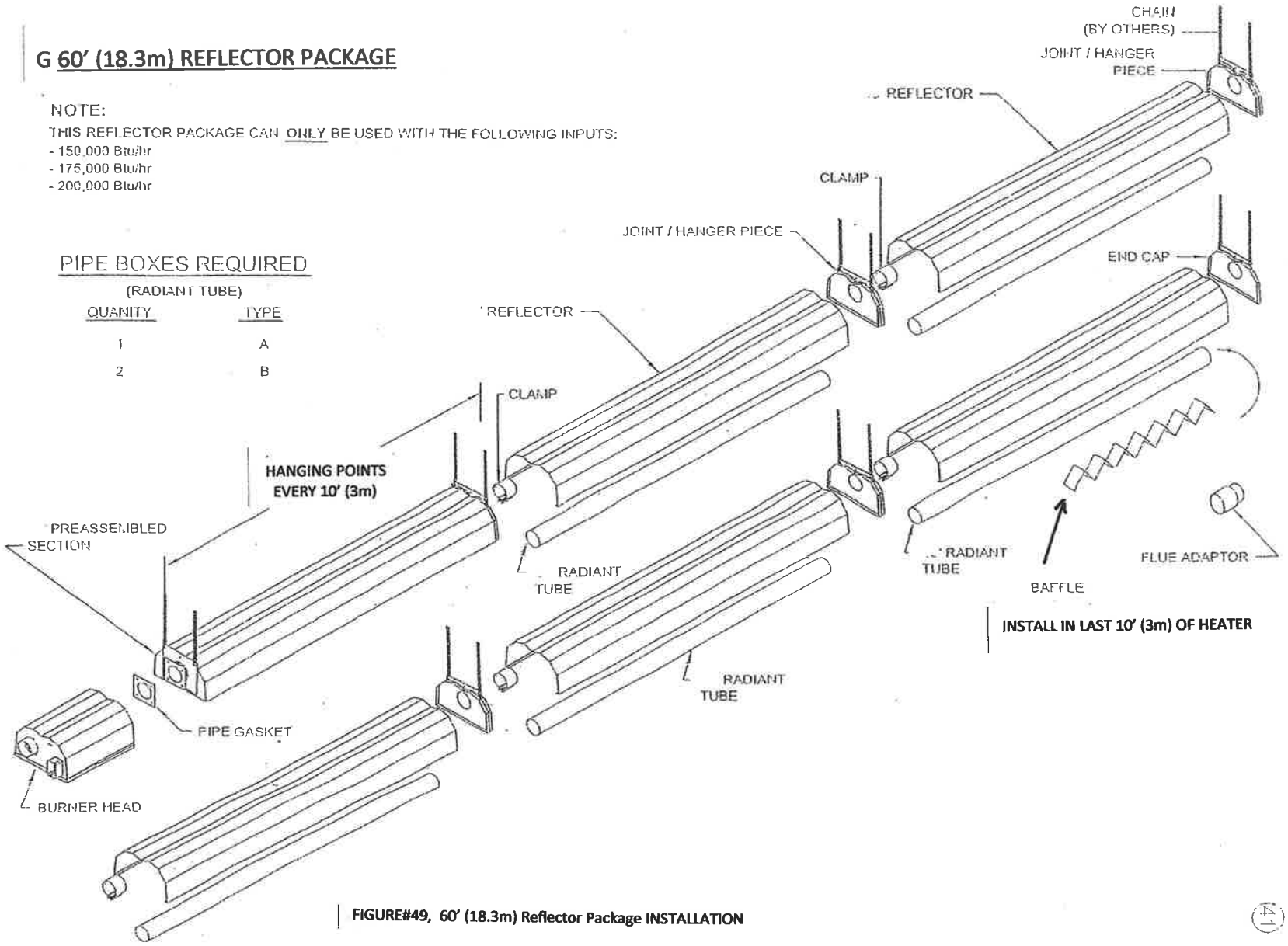
THIS REFLECTOR PACKAGE CAN ONLY BE USED WITH THE FOLLOWING INPUTS:

- 150,000 Btu/hr
- 175,000 Btu/hr
- 200,000 Btu/hr

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
1	A
2	B



FIGURE#49, 60' (18.3m) Reflector Package INSTALLATION

H 70' (21.3m) REFLECTOR PACKAGE

NOTE:

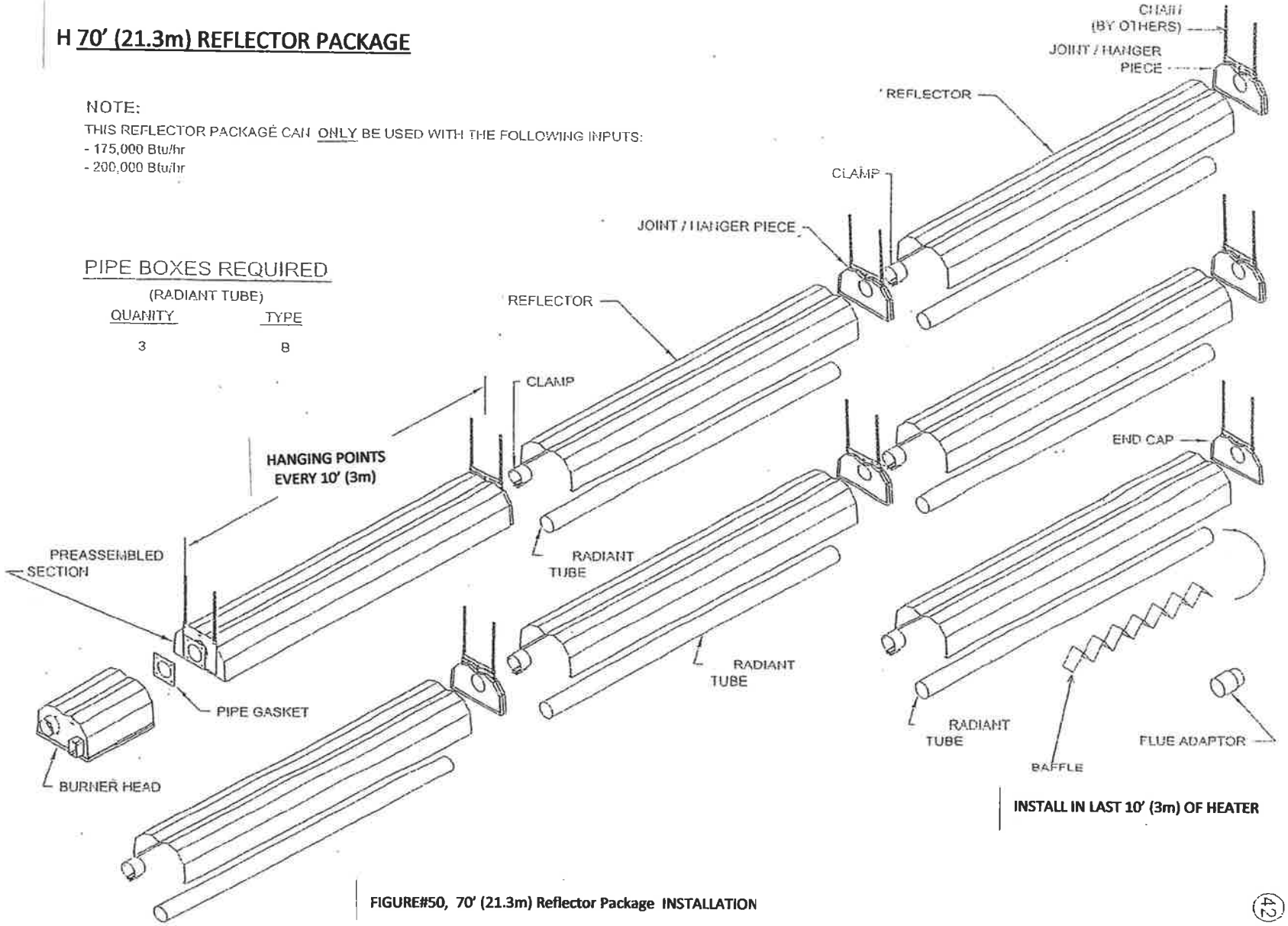
THIS REFLECTOR PACKAGE CAN ONLY BE USED WITH THE FOLLOWING INPUTS:

- 175,000 Btu/hr
- 200,000 Btu/hr

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
3	B



FIGURE#50, 70' (21.3m) Reflector Package INSTALLATION

I) 80' (24.4m) REFLECTOR PACKAGE

NOTE:

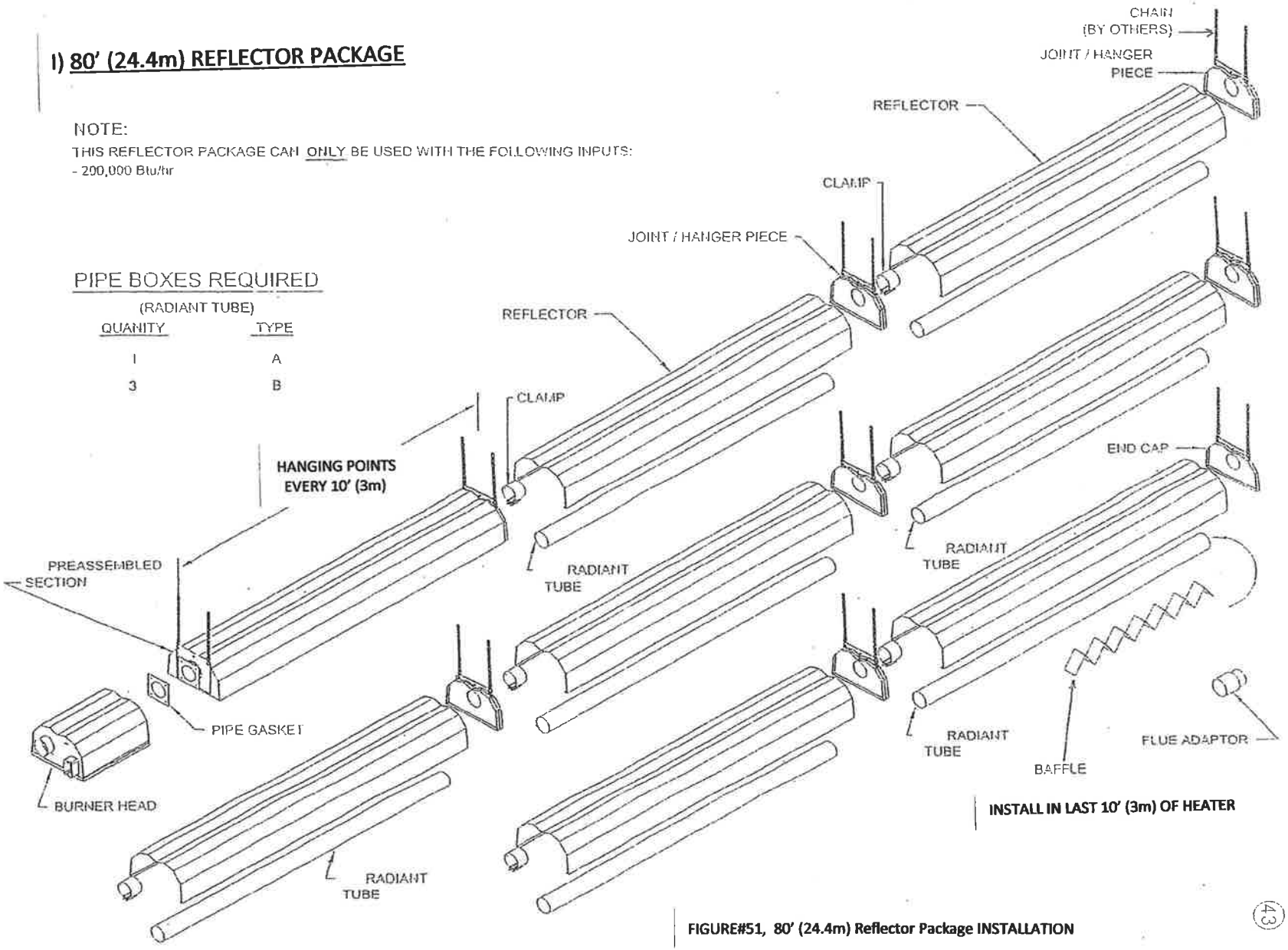
THIS REFLECTOR PACKAGE CAN ONLY BE USED WITH THE FOLLOWING INPUTS:

- 200,000 Btu/hr

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
1	A
3	B



FIGURE#51, 80' (24.4m) Reflector Package INSTALLATION

SIDE WALL VENT KIT

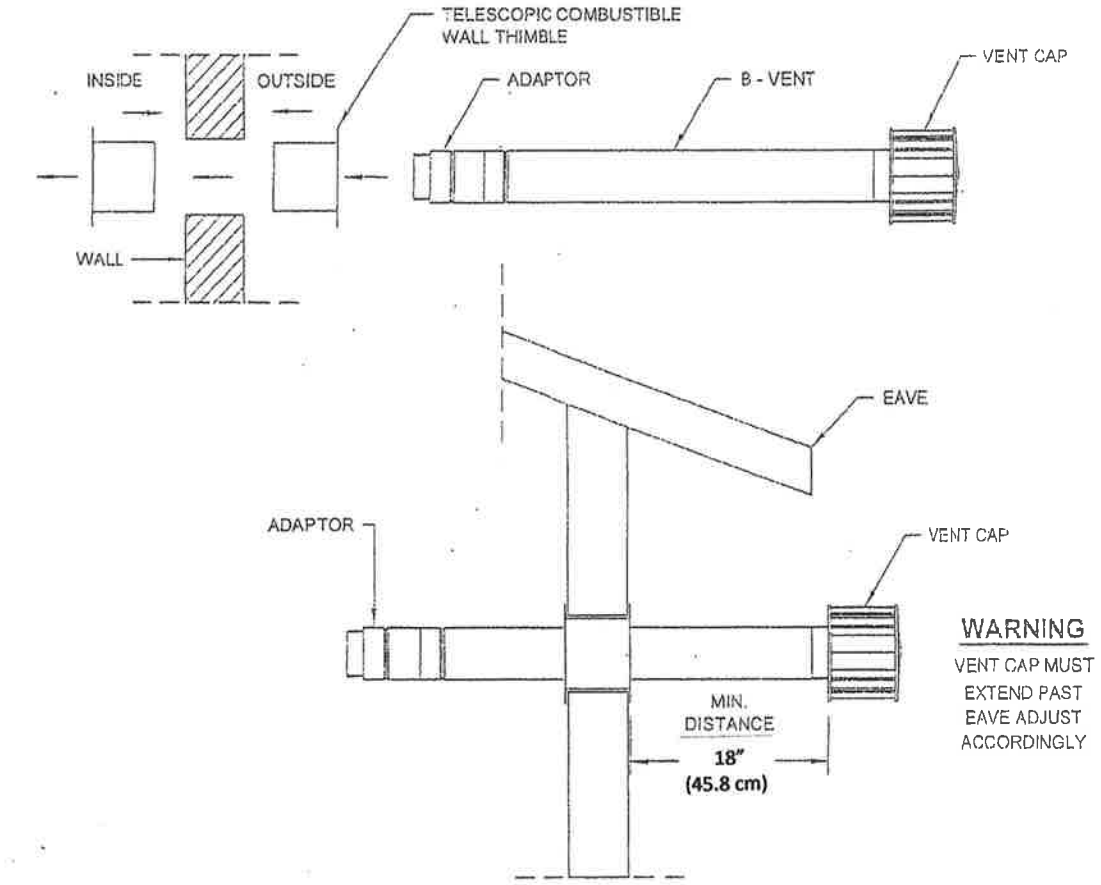


FIGURE #52. SIDE WALL VENT KIT INSTALLATION

OUTDOOR INSTALLATION KIT

(ALSO REFER TO PAGE 56)

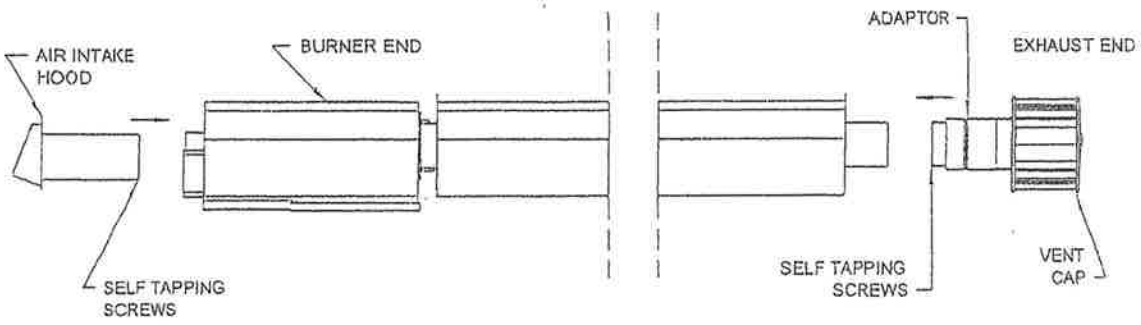
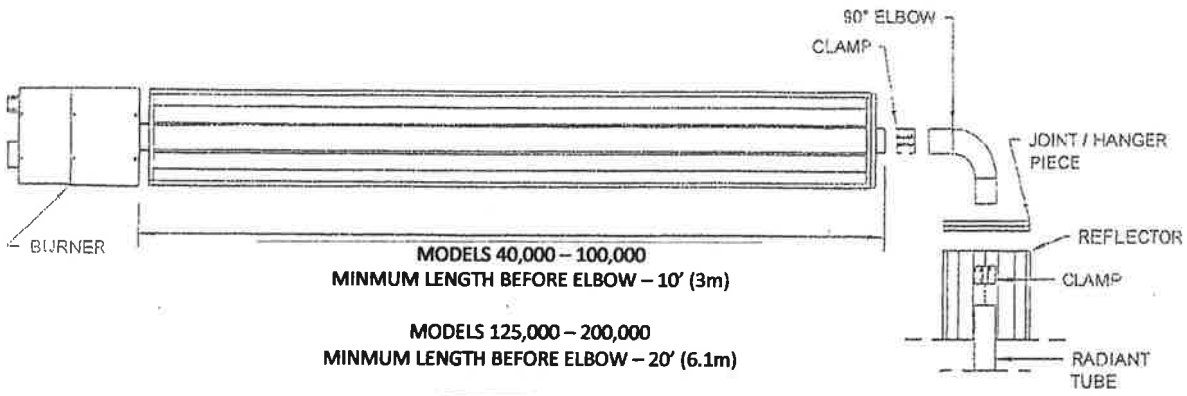


FIGURE #53. OUTDOOR INSTAILATION KIT

90° ELBOW KIT



MODELS 40,000 – 100,000
MINMUM LENGTH BEFORE ELBOW – 10' (3m)

MODELS 125,000 – 200,000
MINMUM LENGTH BEFORE ELBOW – 20' (6.1m)

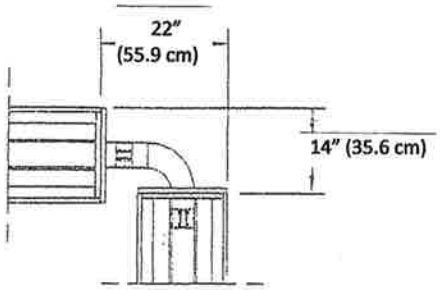


FIGURE #54. 90° ELBOW KIT INSTALLATION

180° U - BEND KIT

MODELS 40,000 – 100,000
MINMUM LENGTH BEFORE ELBOW – 10' (3m)

MODELS 125,000 – 200,000
MINMUM LENGTH BEFORE ELBOW – 20' (6.1m)

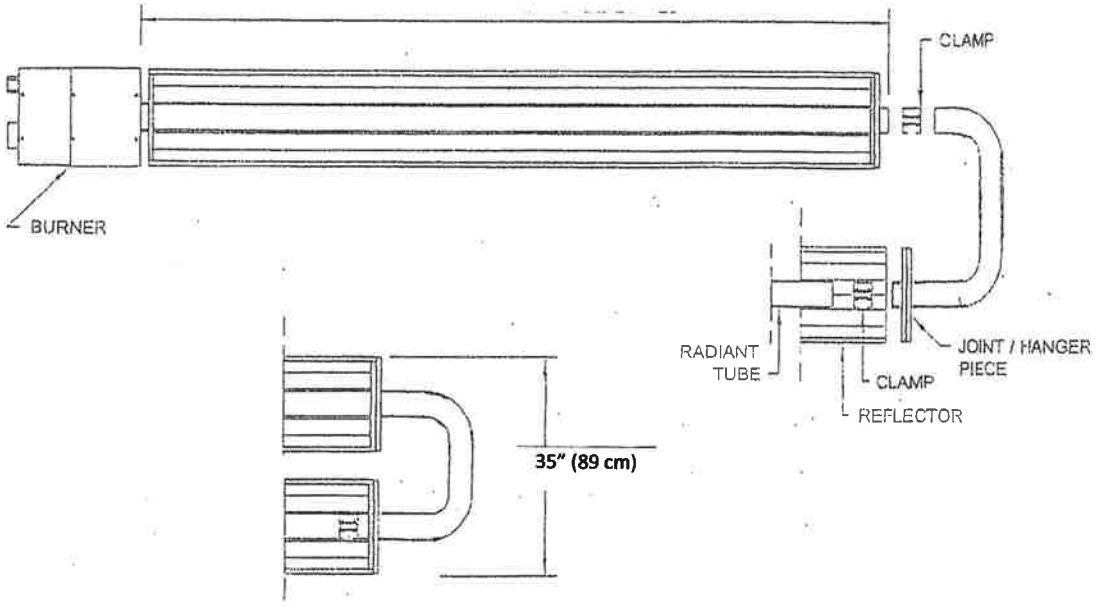
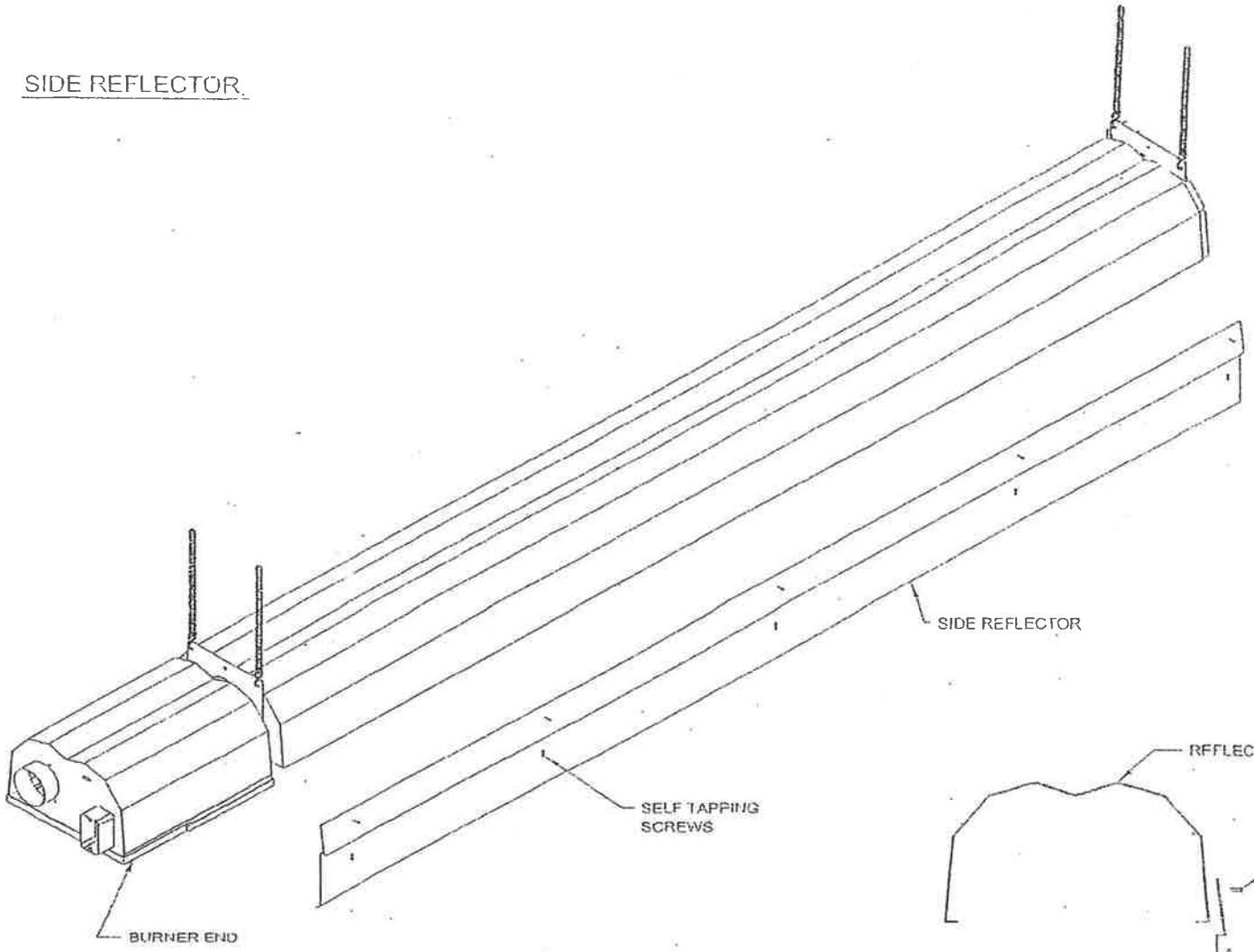


FIGURE #55. 180° U - BEND KIT INSTALLATION

SIDE REFLECTOR



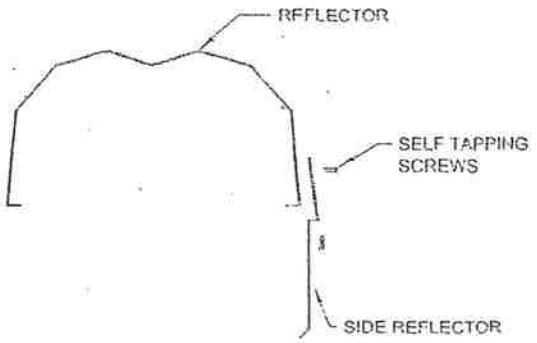


FIGURE #56 SIDE REFLECTOR INSTALLATION

OPTIONAL COMBUSTION AIR SUPPLY (refer to page 48)

The heater must be installed in a location where there is adequate air supply for combustion to take place. If any of the following conditions are met, outside air must be brought to the unit.

a) If installed in a tightly closed building that has less than one square inch of free opening for each 1,000 B.T.U. of heater input or less than 100 square inches of free opening.

b) If building has contaminants in the air or area is under slight negative pressure.

IMPORTANT: Outside air supply duct is to be no less than 4" (10.2cm) in diameter for inputs from 40,000 to 80,000 Btu/hr, and 6" (15.24 cm) for inputs from 100,000 to 200,000 Btu/hr. Duct to be smooth, single wall or "B" vent style materials. Flexible materials are acceptable if lengths are no greater than 36" (92 cm) in length. A combination of flexible material attached to the Burner Head with the balance of the air supply duct being rigid, smooth materials, is acceptable. If condensation occurs and becomes a problem, insulate the duct with approved materials.

NOTE: Maximum duct length for inputs of 40,000 to 150,000 Btu/hr s 45' (13.7m) minus any exhaust vent length. Deduct 10' (3m) for every 90° elbow and 5' (1.52m) for every 45° elbow used.

Maximum duct length for inputs of 175,000 to 200,000 Btu/hr s 30' (9.1m). Total length of heater including the length of intake and exhaust is not to exceed 110' (33.6 m). Shorten length of intake by 10' (3m) for every 90° elbow and 5' (1.53) for every 45° elbow used.

Example A
100,000 Btu/hr input – 50' (15.2m) reflector package, with 20' (6.1m) of exhaust vent and 1 - 90° elbow.
Calculation:

Maximum duct length is:	45' (13.7m)
Minus exhaust vent length:	-20' (6.1m)
Minus 90° exhaust elbow:	-10' (3m)

Conclusion:
The Maximum length of fresh air duct in this example is: **15' (4.6m)**

Example B
200,000 Btu/hr input – 80' (24.4m) reflector package, with 10' (3m) of exhaust vent and 1 - 90° elbow.
Calculation:
Total maximum length of heater c/w outside air & exhaust vent is: 110' (33.6m)
Total combined length of heater and exhaust in this example is:

Heater Length:	80' (24.4m)
Exhaust length:	10' (3m)
90° Exhaust vent elbow:	10' (3m)
TOTAL COMBINED LENGTH:	100' (30.5m)

Amount to be deducted from total available length: -100' (30.5m)

Conclusion:
The Maximum length of fresh air duct in this example is: **10' (3m)**

If condensation occurs, insulate duct or contact distributor for alternate methods for your installation. Slope duct down, away from burner box towards the combustion air intake hood. The combustion air intake hood MUST be installed at a height sufficient enough to prevent any blockage by snow for your area.

COMBUSTION AIR

HORIZONTAL

FRESH AIR INTAKE HOOD

4" (10.2 cm) - 40,000 – 80,000 input

6" (15.3 cm) – 100,000 – 200,000 input

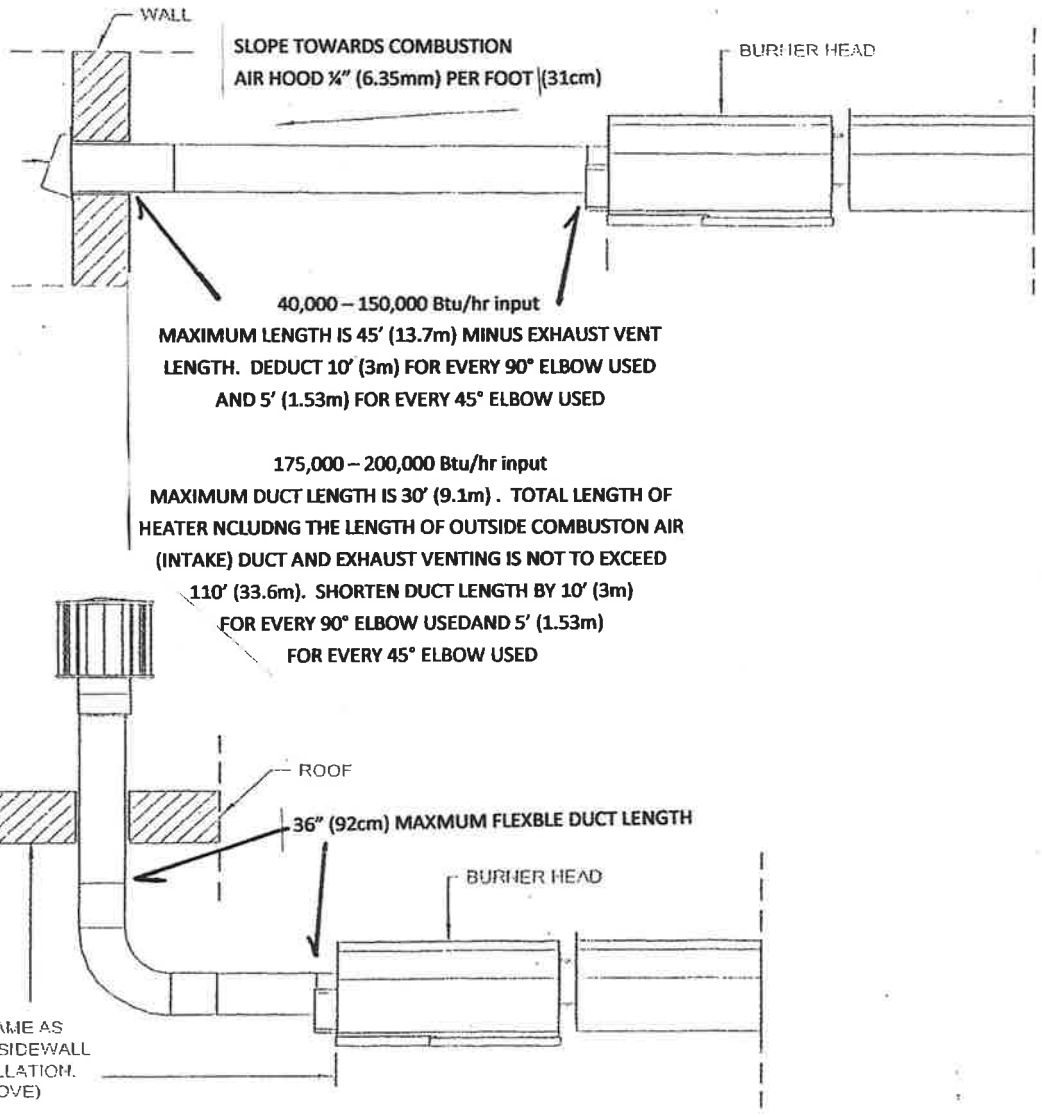


FIGURE #57. OUTSIDE COMBUSTION AIR SUPPLY

VENTING

(Refer to pages 51-54)

Venting of the unit(s) must comply in Canada with the ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition and in the USA, the ***National Fuel Gas Code, ANSI Z223.1/NFPA 54*** or latest edition. In Canada, vent terminal clearances shall be in accordance with the Canadian ***CSA B149.1, Natural Gas and Propane Gas Installation Code.***

A) Select exhaust vent point:
   A vent shall not terminate:
   1) within 6 feet (1.9m) of a mechanical air supply inlet to a building;
   2) above a meter/regulator assembly within 3 feet (92cm) horizontally of the vertical line of the regulator;
   3) within 6 feet (1.9m) of any gas service regulator vent outlet;
   4) less than 1 foot (31 cm) above grade level'
   5) less than 7 feet (2.2) above a paved sidewalk or a paved highway;
   6) within 3 feet (92 cm) of a window or door which can be opened in any building, any non-mechanical air supply inlet to any building or the combustion air inlet or any other appliance.

   NOTE: Maybe reduced to 1 foot (31cm) for inputs up to 100,000 Btu/hr (30kw) and 3 feet (1m) for inputs exceeding 100,000 Btu/hr

   In the USA, the ***National Fuel Gas Code, ANSI Z223.1/NFPA 54***, specifies a 4 ft (1.22 m) horizontal vent terminal clearance from gas and electrical meters, regulators and relief equipment.

B) For horizontal, sidewall venting a single unit use 4" (10.16 cm) side wall vent kit PIN 5200210 or HIGH WIND VENT TERMINAL equal to Simpson Dura-Vent PIN# 4GVVTH. For two units horizontally vented, use 6" (15.24 cm) HIGH WIND VENT TERMINAL equal to Simpson Dura-Vent PIN# 6GVVTH . (see pages 51 & 52)

C) If roof exhaust; then use "B" style chimney. (see pages 53 & 54)

D) Vent terminal must be at a height sufficient to prevent any blockage by snow for your area where this product is installed.

E) Protect building materials from any degradation that may be caused by flue gases.

F) Adequately support vent to prevent sagging in a manner that is in accordance with codes for your area.

Make sure that all flue joints are sealed. Use only suitable products equal to General Electric RTU106 or Permatex Form a Gasket Red High Temperature Silicone Adhesive Sealant.

If condensation in venting is present then venting should be insulated or shortened. In Canada, install according to the ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition and in the USA, the ***National Fuel Gas Code, ANSI Z223.1/NFPA 54*** or latest edition.

NOTE: For venting of two or more heaters into one common chimney, in Canada refer to the ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition and in the USA, the ***National Fuel Gas Code, ANSI Z223.1/NFPA 54*** or latest edition.

NOTE: A small amount of condensation may occur from the heater when it starts the heating cycle. The condensation should stop once the heater warms up. Make sure venting is sealed as previously noted.

NOTE: Maximum exhaust vent length for inputs of 40,000 to 150,000 Btu/hr s 45' (13.7m) minus any outside air intake duct length. Deduct 10' (3m) for every 90° elbow and 5' (1.52m) for every 45° elbow used.

Maximum duct length for inputs of 175,000 to 200,000 Btu/hr s 50' (15.2m) minus any outside air intake duct length or any amount of optional length of actual heater. Total length of heater including the length of intake and exhaust is not to exceed 110' (33.6 m). Shorten length of exhaust vent by 10' (3m) for every 90° elbow and 5' (1.53) for every 45° elbow used.

Example A
200,000 Btu/hr input – 60' (18.3m) reflector package, no outside air (therefore no intake duct length to take into consideration) or optional length of heater.

Calculation:

Maximum combined length of heater, intake duct and venting:	110' (33.6m)
Heater length is 60' (18.3m)	-60' (18.3m)

Conclusion:
Maximum exhaust vent length in a straight line (no elbows): **50' (15.2m)**

Example B
200,000 Btu/hr input – 80' (24.4m) reflector package, with 10' (3m) of outside air intake duct and 1 - 90° elbow in the exhaust vent.
Calculation:
Total maximum length of heater c/w outside air & exhaust vent is: 110' (33.6m)
Total combined length of heater and exhaust in this example is:

Heater Length:	80' (24.4m)
Outside air intake duct length:	10' (3m)
90° Exhaust vent elbow:	10' (3m)
TOTAL COMBINED LENGTH:	100' (30.5m)
Amount to be deducted from total available length:	-100' (30.5m)

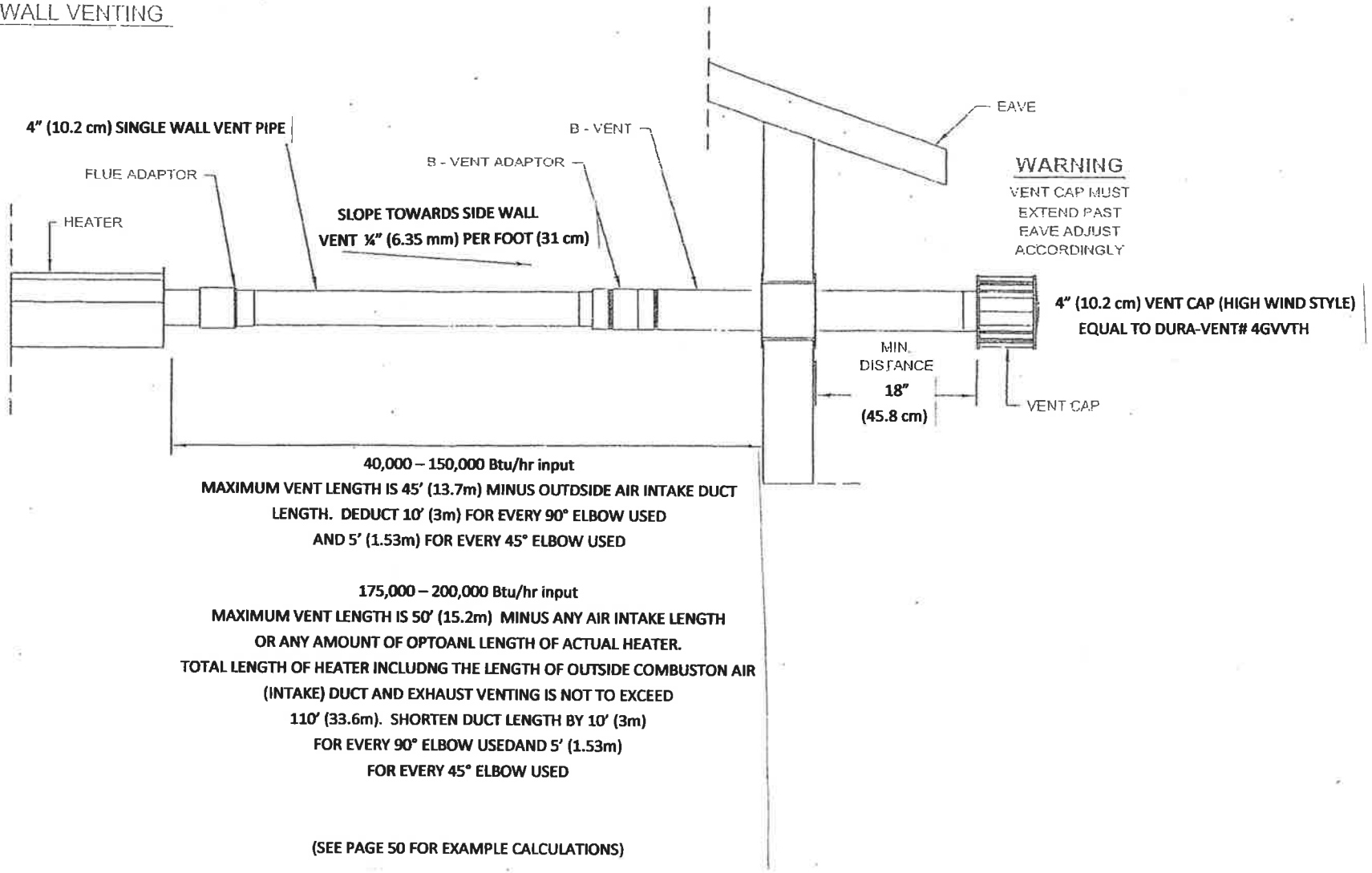
Conclusion:
The Maximum length of exhaust vent in this example is: **10' (3m)**

If condensation in exhaust venting is present then venting should be insulated or shortened. In Canada, install according to the ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition and in the USA, the ***National Fuel Gas Code, ANSI Z223.1/NFPA 54*** or latest edition.

NOTE: For venting of two or more heaters into one common chimney, in Canada refer to the ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition and in the USA, the ***National Fuel Gas Code, ANSI Z223.1/NFPA 54*** or latest edition.

NOTE: A small amount of condensation may occur from the heater when it starts the heating cycle. The condensation should stop once the heater warms up. Make sure venting is sealed as previously noted. The amount of condensation will increase the lower the ambient temperature is in the environment the heater is operated in.

SIDE WALL VENTING



40,000 – 150,000 Btu/hr input
MAXIMUM VENT LENGTH IS 45' (13.7m) MINUS OUTDSIDE AIR INTAKE DUCT LENGTH. DEDUCT 10' (3m) FOR EVERY 90° ELBOW USED AND 5' (1.53m) FOR EVERY 45° ELBOW USED

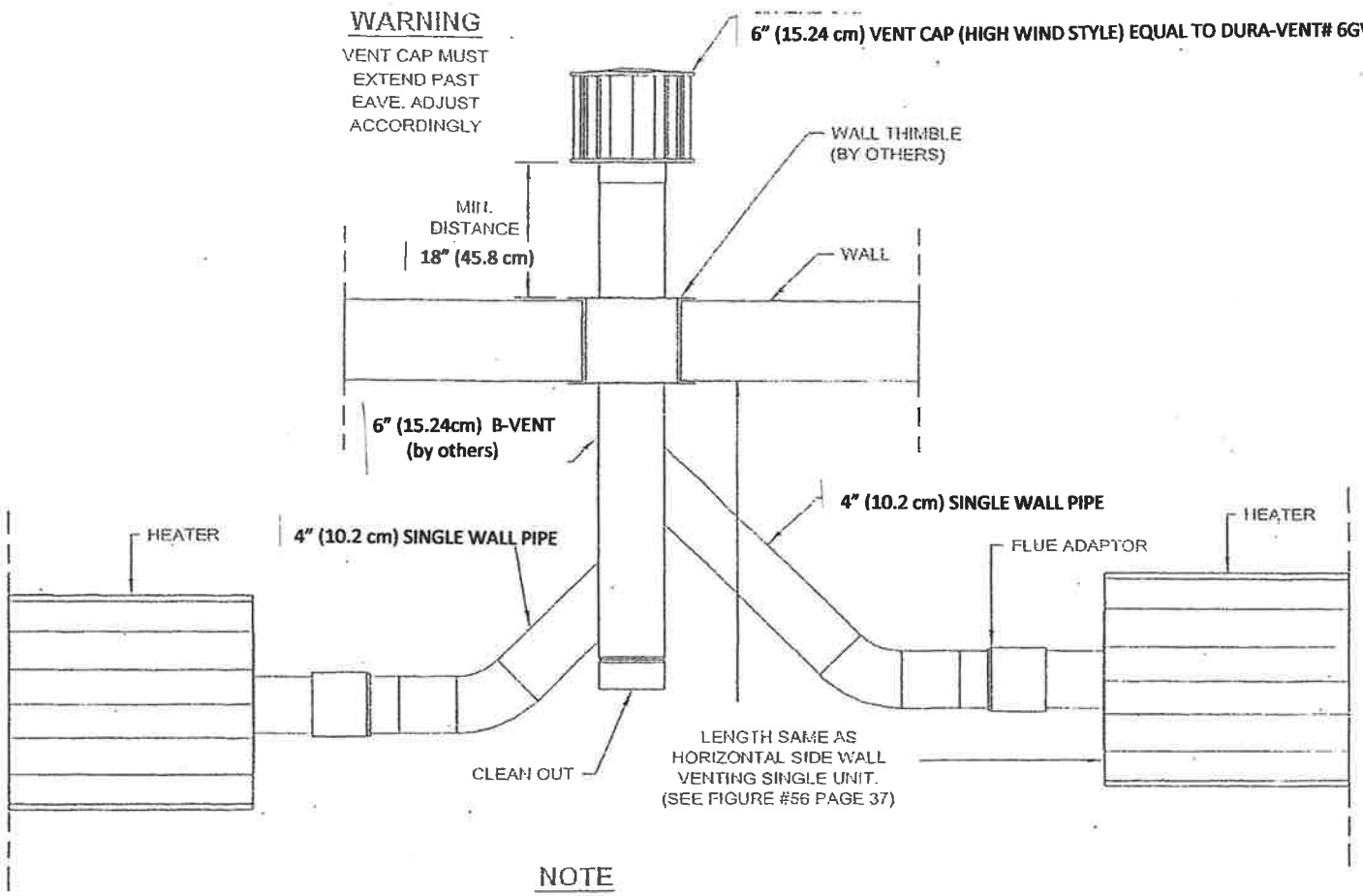
175,000 – 200,000 Btu/hr input
MAXIMUM VENT LENGTH IS 50' (15.2m) MINUS ANY AIR INTAKE LENGTH OR ANY AMOUNT OF OPTOANL LENGTH OF ACTUAL HEATER. TOTAL LENGTH OF HEATER INCLUDNG THE LENGTH OF OUTSIDE COMBUSTON AIR (INTAKE) DUCT AND EXHAUST VENTING IS NOT TO EXCEED 110' (33.6m). SHORTEN DUCT LENGTH BY 10' (3m) FOR EVERY 90° ELBOW USEDAND 5' (1.53m) FOR EVERY 45° ELBOW USED

(SEE PAGE 50 FOR EXAMPLE CALCULATIONS)

FIGURE #58. SIDE WALL VENTING, SINGLE UNIT

COMMON SIDE WALL VENTING

(TOP VIEW)



NOTE

UNITS THAT ARE COMMONLY VENTED MUST BE CONTROLLED BY THE SAME LINE VOLTAGE THERMOSTAT

FIGURE #59. HORIZONTAL SIDE WALL VENTING, TWO UNITS INTO ONE COMMON VENT

VERTICAL VENTING

(SIDE VIEW)

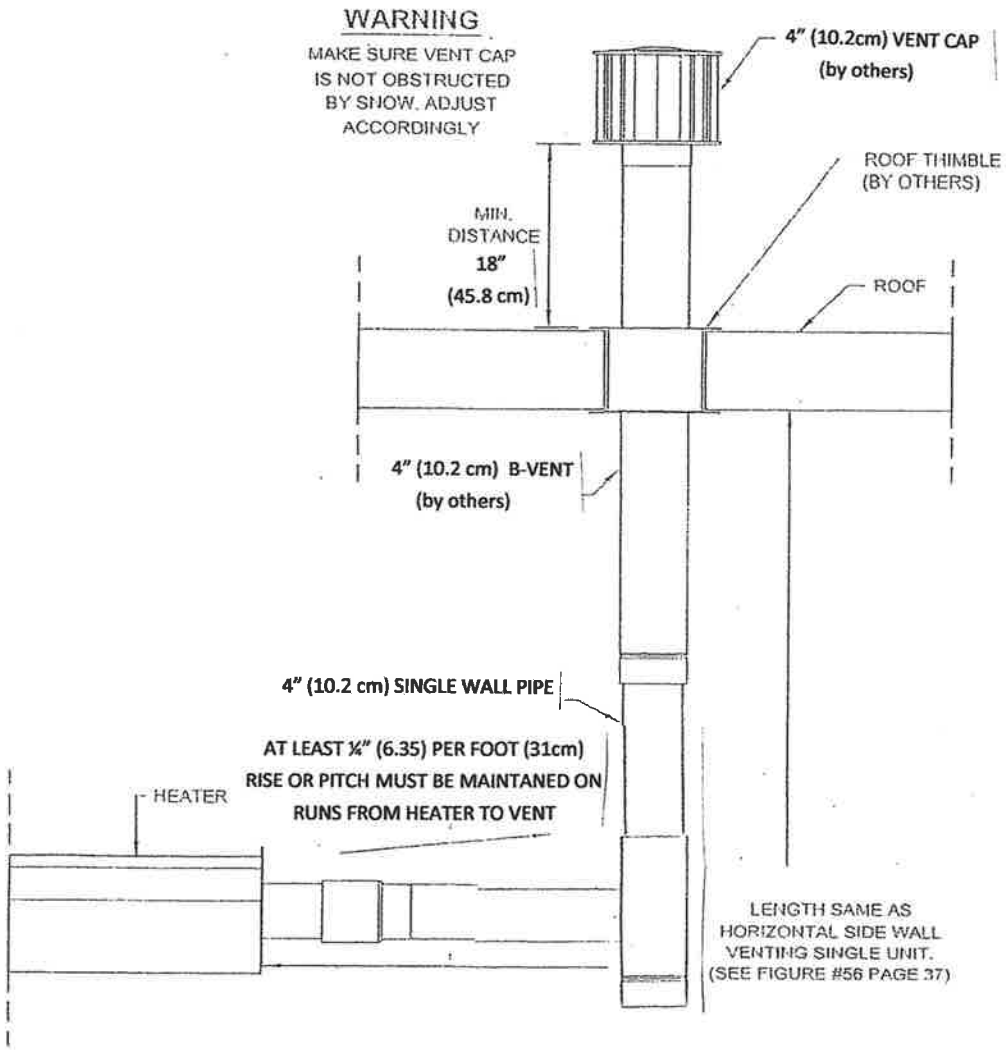


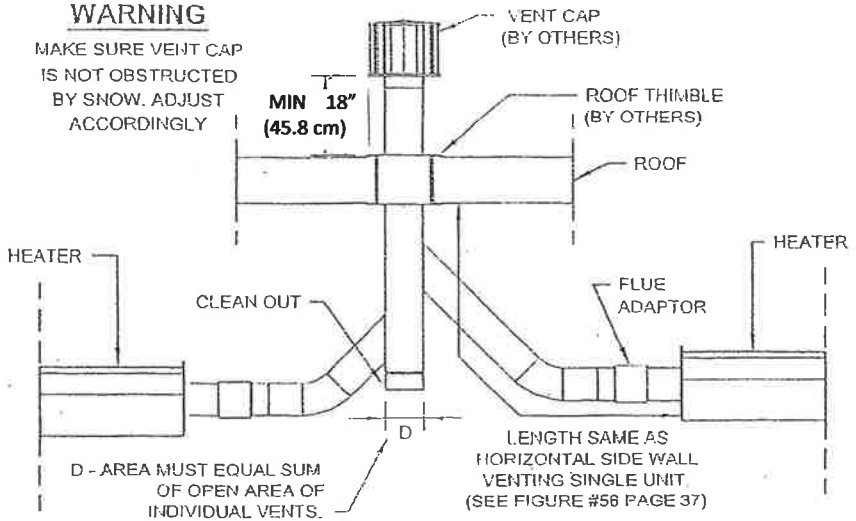
FIGURE #60. VERTICAL VENTING, SING[illegible]

COMMON VERTICAL VENTING

WARNING

MAKE SURE VENT CAP IS NOT OBSTRUCTED BY SNOW. ADJUST ACCORDINGLY

(SIDE VIEW)



NOTE

UNITS THAT ARE COMMONLY VENTED MUST BE CONTROLLED BY THE SAME LINE VOLTAGE THERMOSTAT

(TOP VIEW)

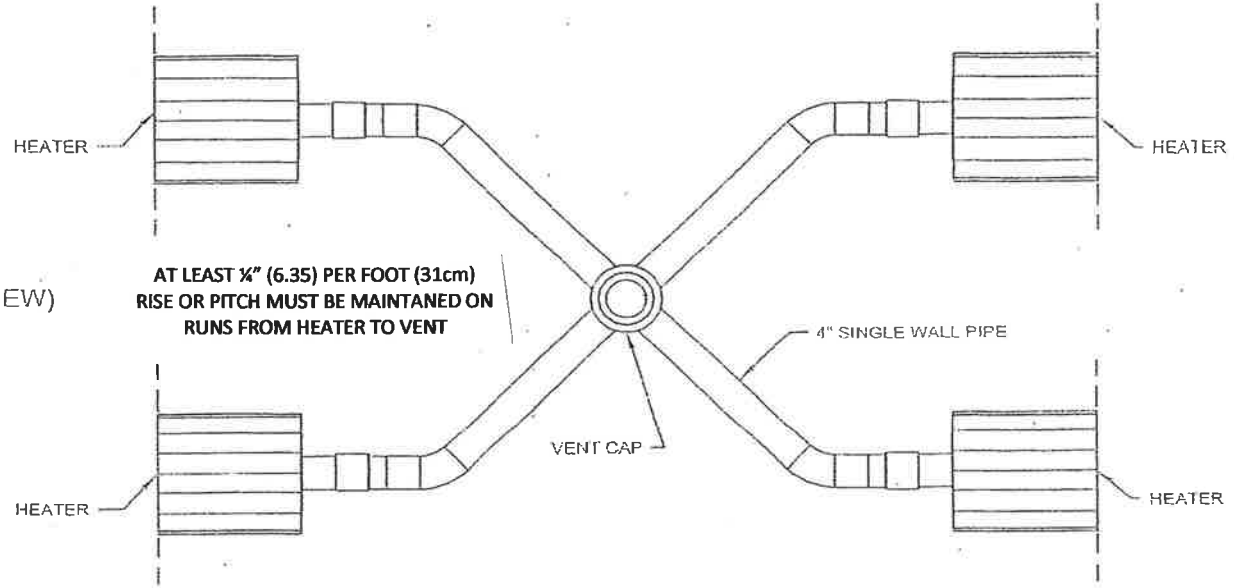


FIGURE #61. COMMON VERTICAL VENTING, TWO OR MORE UNITS INTO ONE COMMON VENT

UNVENTED NSTALLATIONS

Units may **ONLY** be installed in unvented installations such as brooder barns or industrial buildings if the following conditions are met:

1) A 4" (10.2 cm) diameter by 90° elbow must be attached to the flue, vent or exhaust end of heater and turned down pointing towards the floor. (see diagram #62)

2) The heater must be interlocked with an exhaust fan sized at 4 (four) CFM (114 Liters) for every 1000 Btu/hr input.

3) For BROODER NSTALLATION ONLY, the fan interlock is not required only if the maximum input does not exceed 30 Btu/hr per cubic foot (28.32 Liters) of volume of air in the building or the input specified by local codes or authorities.

4) Maintain clearance to combustibles at exhaust (vent) end as noted below.

UNVENTED INSTALLATIONS

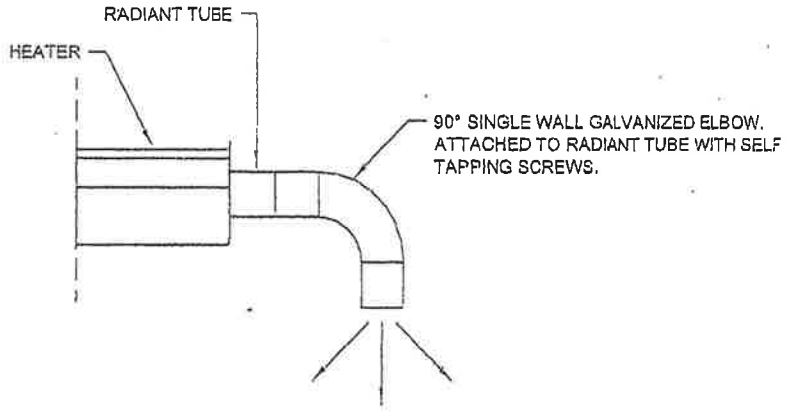


FIGURE #62. UNVENTED INSTALLATION

FOR OUTDOOR APPLICATIONS

Units can be installed in outdoor locations by ordering the following options:

Part Number	Description
5200312	Outdoor Installation Upgrade Kit for 40,000 to 100,000 BTU units
5200313	Outdoor Installation Upgrade Kit for 125,000 to 200,000 BTU units

Procedure:

- Attach Outdoor Air Intake Hood to air intake collar located on the end of the burner box with three (3) screws. Apply silicone adhesive to seal joint.

- Attach vent cap to exhaust end of heater with three (3) screws.

- Electrical connections for outdoor locations must be made in accordance with CSA C22.1 CANADIAN ELECTRICAL CODE PART 1 as well as/or local codes, conditions and authorities. In the USA, refer to NATIONAL ELECTRIC CODE ANSI/NFPA 70 1987 or most current edition.

- Gas connection is to be via an approved stainless steel gas flex. Refer to CAN/CGA B149-M86.1 and .2 INSTALLATION CODES and/or local codes, conditions and authorities. In the USA, refer to ANI Z 223.1/NFPA 54 NATIONAL FUEL GAS CODE or current edition.

OUTDOOR INSTALLATIONS

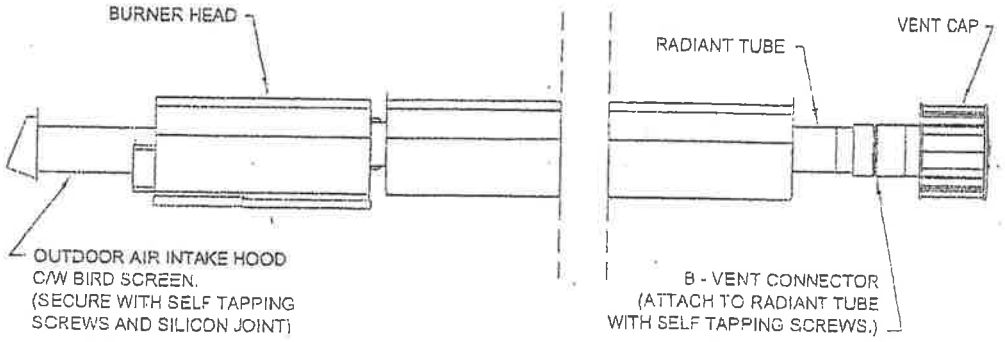


FIGURE #63. OUTDOOR INSTALLATION

GAS PIPING

> ⚠ **WARNING:** All gas work MUST be performed by qualified/licensed personnel with adequate training and experience in this field.

> ⚠ **WARNING:** Use only the type of gas for which the heater is equipped. Using the wrong gas could create a hazard, resulting in damage, personal injury or death.

In Canada refer to the *Natural Gas and Propane Installation Code, CSA B149.1* or latest edition and in the USA, the *National Fuel Gas Code, ANSI Z223.1/NFPA 54* or latest edition.

a) Adequate supply of gas to the heater is required for it to produce the designed amount of heat output. The gas meter must have a large enough capacity to handle the extra consumption required by the heater.

b) The gas line must be of an adequate size to deliver the necessary amount of fuel to the unit.

c) If there is any question concerning a) or b) call your local gas company for further assistance.

d) Make sure that all piping is supported properly.

e) All connections must have special sealing compound applied to them.

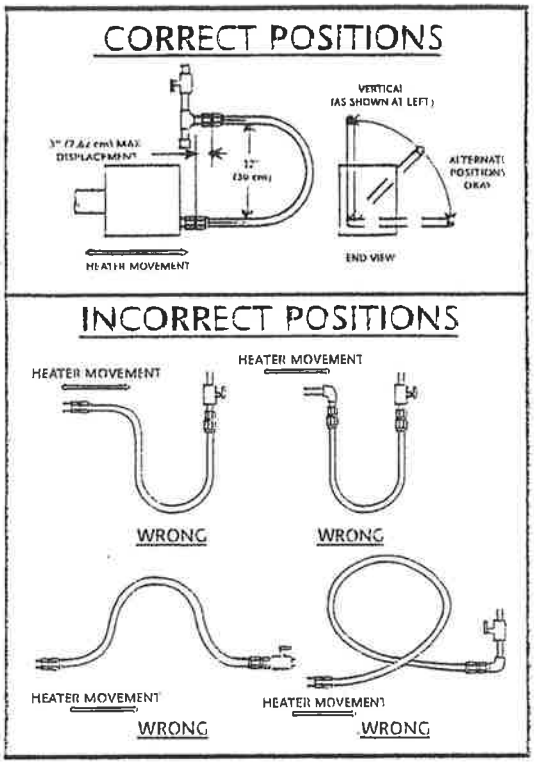
f) A drip leg must be installed before the heater to prevent contaminating matter interfering with the operation of the unit.

g) Check piping for leaks via pressure test. **Install a 1/8" (3.175 mm) N.P.T. plugged tapping** immediately ahead of heater in gas supply. Use this location for test gauge. A soap and water test can be used to verify location of any possible leak.

> ⚠ **WARNING:** Do not use an open flame for testing!

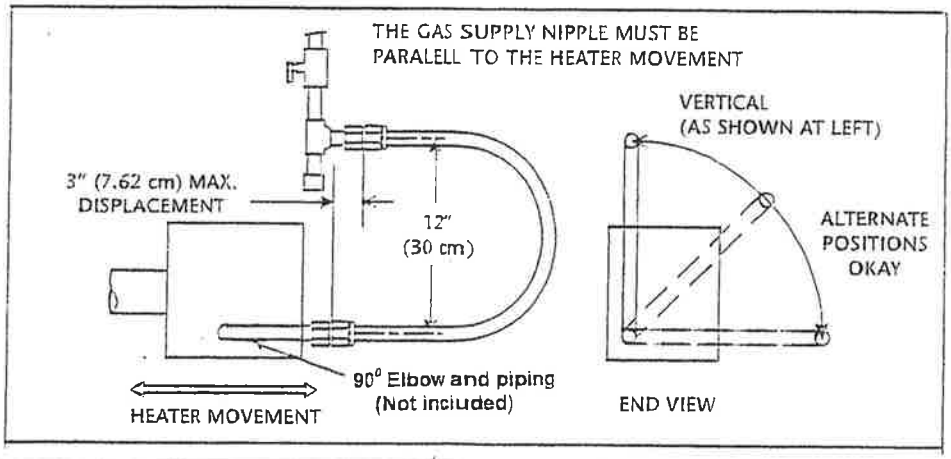
> ⚠ **WARNING:** For high pressure testing, disconnect heater(s) and shut-off cocks and cap off pipe for test. Failure to do so will damage pressure ratings on the above mentioned equipment and cause a complete replacement of these parts.

Refer to page 58 for gas connection to heater.



Installation Position Instructions

Connector Installation



⚠ WARNING:

CONNECTOR MUST BE INSTALLED AS PER THE CONFIGERATION LLUSTRATED ABOVE.
USE ONLY THE 36" (90 cm) CONNECTOR OF ½" (1.27 cm) NOMINAL ID FOR LENGTHS FROM 10' (3m) TO 70' (21.3 m) AND A 36" (90 cm) CONNECTOR OF ¾" (1.905 cm) NOMINAL ID FOR LENGHTS GREATER THAN 70' (21.3m).

IN CANADA: "A radiant tube-type infrared heater shall only be connected with a Type 1 hose connector that is (a) certified as being in compliance with the Standard for Elastomeric Composite Hose and Hose coupiings for Conducting Propane and Natural Gas, CAN/CGA 8.1 and (b) of a length of 36 +/- 6" (90 +/- 15 cm)."

IN USA: Flexible Metaliic connectors must be certified for use on a radiant tube-type infrared heater as per the Standard for Connectors for Gas Appliances, ANSI Z21.24/CSA 6.10. Connector is available from manufacturer.

FIGURE #64. GAS LINE CONNECTION WITH CERTIFIED FLEXIBLE GAS CONNECTION

WARNING

Natural gas heating values can vary widely. It is the responsibility of the Installer to make sure that the input rate to the heater as installed does not exceed the nameplate rating of the heater. Failure to do so can cause radiant tube failure, resulting in injury or death.

The maximum BTUH input capacity for each model is shown on the heater's rating plate and in the specification table. This input must not be exceeded.

The input shown may be used in geographic area where the elevation is from 0 to 4,500 feet (1372 m) above sea level (Canada only) in accordance with CGA 2.17-M91 (R2003), no change required to main orifice. For installations above 4,500 (1372 m) refer to *Natural Gas and Propane Installation Code, CSA B149.1* or latest edition, or contact the factory. In the USA: For installations above 2000 feet (610 m), the appliance shall be de-rated 4 percent (%) for each 1000 feet (305 m) of elevation above sea level. The Btu/hr input depends on the calorific heating value of the gas, orifice size, and manifold pressure. Orifice sizes are based upon values of 1000 Btu/hr/cu. ft (.028316 cubic meter) and 2500 Btu/hr/cu. ft. (.028316 cubic meter) for L.P.G. (propane)

WARNING

NEVER ATTEMPT TO MODIFY THIS HEATER — FIRE, EXPLOSIQN, OR ASPHYXIATION MAY RESULT. If malfunction is apparent, contact qualified service agency and/or gas utility for assistance.

How to Determine Gas Input Rate:

Where gas is metered, the input rate may be determined by the following method, Contact the gas supplier, public utility company or LP (propane) gas distributor to obtain the calorific gas value of the gas being used. When checking the gas input rate, any other gas burning appliances connected to the same meter must be completely off. The heater should be allowed to operate for 5 minutes before attempting to check the gas input rate.

To check flow rate, observe the one cubic foot dial on the gas meter and determine the number of seconds required for the dial hand to complete one revolution (seconds to flow one cubic foot).

To determine the number of seconds per cubic foot that is necessary to achieve the correct input rate, use the following formula:

GAS VALUE X 3600/ DESIRED INPUT= SECONDS NEEDED

Example: 1000 STU gas, heater input 100,000 BTUH

Seconds for one cubic foot = 1000 X 3600? 100,000 = 36 seconds

If when clocking the meter, the one cubic foot dial makes a complete revolution in less time than was calculated that it should be derated. It if takes more time for the meter to make one revolution than was calculated, the unit is underfired.

The orifice size must be changed to correct an overfired or underfired condition If it is determined that different orifices are needed, please contact your distributor for assistance in selecting the correct replacement.

ELECTRICAL CONNECTION

Refer to rating plate on heater for electrical specifications. All electrical connections must be made by a qualified/licensed experienced electrician.

Supply adequate electricity to junction box on burner head.

⚠ **WARNING:** DO NOT operate heater until it has been thoroughly installed, inspected and is ready for initial fire-up.

NOTE: All Electrical connections and wiring must be made in accordance as follows:

CANADA: ***Canadian Electrical Code, CSA C22.1*** or latest edition.
USA: ***National Electrical Code, ANSI/NFPA 70*** or latest edition

In Canada: Electrical equipment and wiring shall comply with the applicable provisions of the current ***Canadian Electrical Code, CAN/CSA C22.1, Part I and Part II, and CAN/CSA C22.2 No. 3, Electrical features of Fuel Burning Equipment.***

If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 105 degree C (221 F).

ELECTRICAL CONNECTION
BURNER HEAD

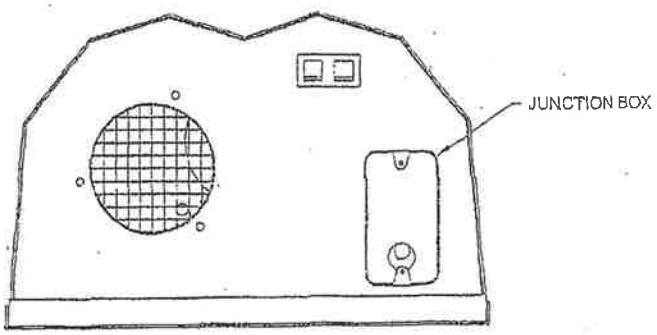


FIGURE #65. ELECTRICAL JUNCTION BOX

WIRING DIAGRAM

If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 105 degree C (221 F).

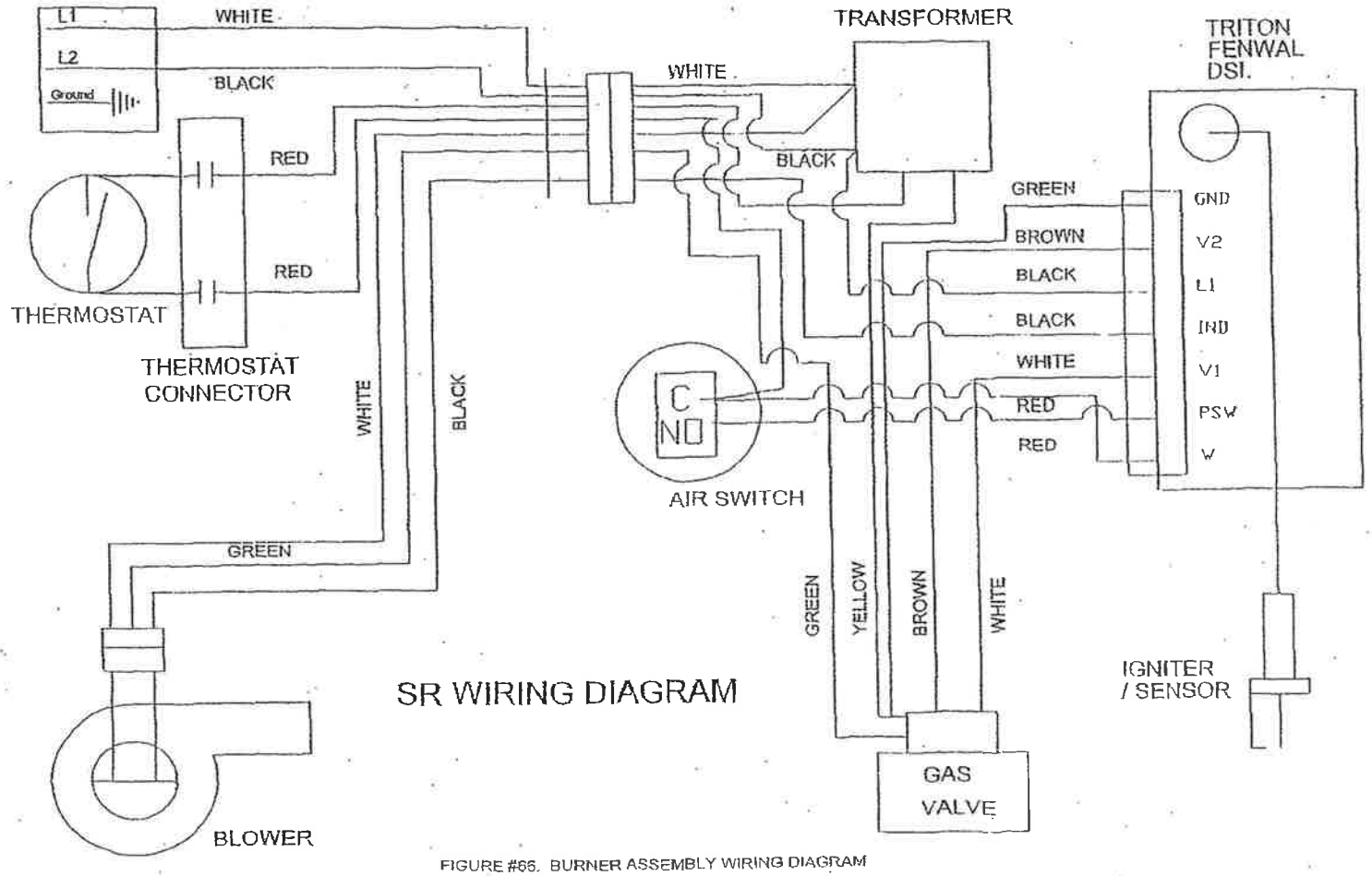


FIGURE #66. BURNER ASSEMBLY WIRING DIAGRAM

WIRING DIAGRAM

If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 105 degree C (221 F).

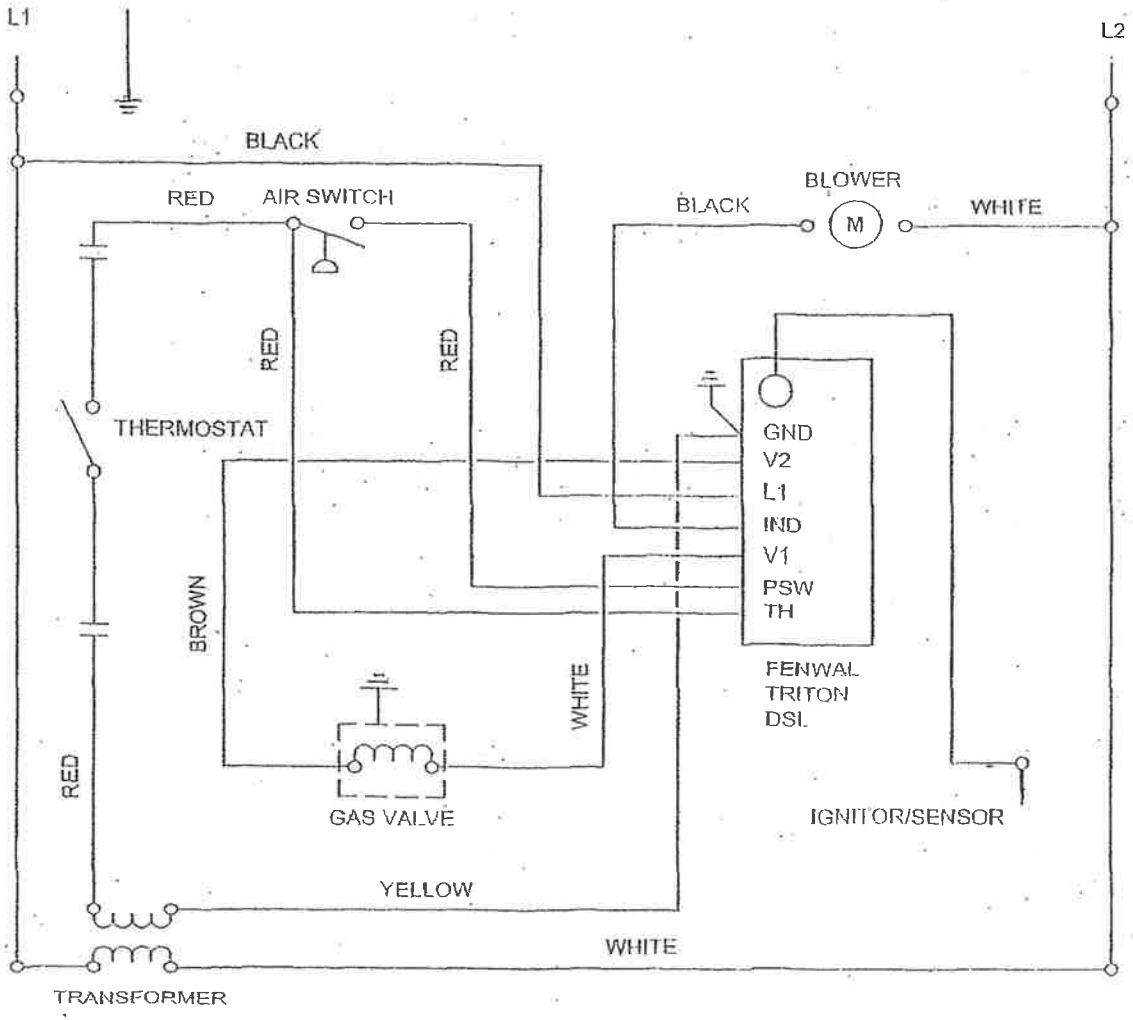


FIGURE #67. BURNER ASSEMBLY WIRING DIAGRAM, LADDER DIAGRAM

THERMOSTATS

LOW VOLTAGE (SINGLE HEATER)
(for wiring diagram, refer to pages 62 & 63)

DO NOT use thermostats that have heat anticipators in them. The heat anticipators will cause the unit to cycle unnecessarily reducing its heating capacity, which can cause incomplete combustion and the combustion by products to condensate. **A suitable thermostat can be purchased from Calcana.**

Use (part # 3060225) for this heater.

a) Locate thermostat in a convenient location away from drafts.
b) Mount thermostat to wall with hardware supplied.
c) Attach low voltage wire to connector block on heater.
d) Run wire from unit to thermostat securing wire to joists or studs along the way.
e) Trim excess wire and attach to thermostat accordingly.

NOTE: Thermostat part #3060225 can be used for line or low voltage applications. For low voltage applications, simply connect the two wire leads on the thermostat to the low voltage wiring that is attached to the low voltage thermostat connector on heater and ignore the line voltage wiring diagram on the thermostat packaging. DO NOT CONNECT LINE VOLTAGE TO THE THERMOSTAT WHEN USING THE LOW VOLTAGE OPTION TO CONTROL THE HEATER OTHERWSE SEVERE, UNWARANTABLE DAMAGE WILL RESULT.

LOW VOLTAGE
ONE THERMOSTAT - ONE HEATER

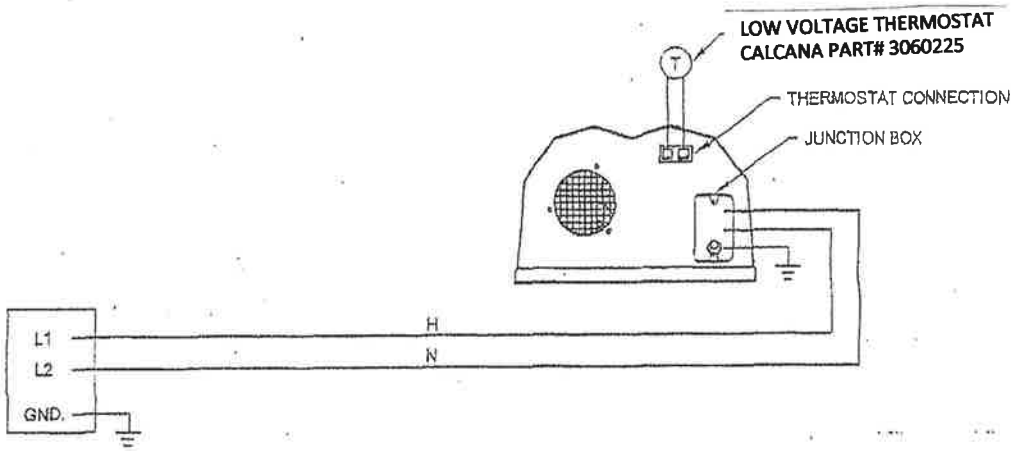


FIGURE #68. LOW VOLTAGE THERMOSTAT WIRING

THERMOSTATS - CONTINUED

LINE VOLTAGE (TWO OR MORE HEATERS), if two or more heaters are to be controlled by one common thermostat, proceed as follows:
(for wiring diagram, refer to pages 62 & 63)

a) Provide a common switched line voltage circuit to heaters controlled by a line voltage thermostat.
b) Connect a short piece of wire between the two low voltage thermostat connections to close low voltage circuit.

Recommended line voltage thermostats are as follows:

Honeywell (or equivalent): - T631
- T4098A
- T410A

Thermostat part #3060225) can be purchased from Calcana.

LINE VOLTAGE
ONE THERMOSTAT - 2 OR MORE HEATERS

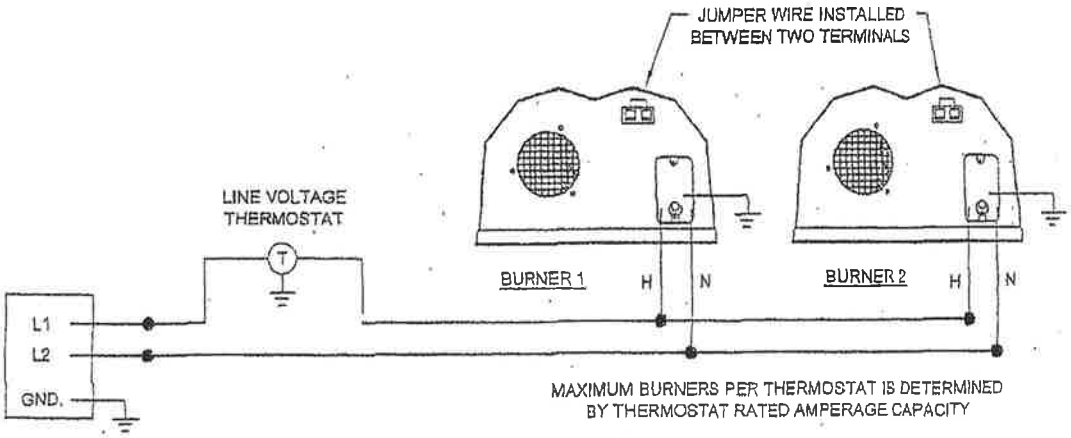


FIGURE #69. LINE VOLTAGE THERMOSTAT WIRING

INITIAL START-UP

WARNING: DO NOT ATTEMPT TO IGNITE HEATER BY HAND

IMPORTANT NOTICE: This heater is not to be used as a construction heater to supply heat to an unfinished building during the finishing phases of construction. This practice exposes the unit to an abnormally corrosive atmosphere from sources such as paint, varnish and adhesives, which can lead to premature radiant tube exchanger or vent failure. The practice also allows foreign materials such as sawdust or sheet rock dust to enter the combustion blower, burner, heat exchanger and vent system, resulting in shorter life of the unit.

Use of the heater as a construction heater will void the warranty.

Procedure:

a) Make sure gas is turned on.
b) Check for any possible blockages in combustion air intake and exhaust areas of unit.
c) Make sure that venting material is properly fastened to the unit.
d) Make sure all options are attached securely.
e) Make sure electricity is on to unit.
f) Turn thermostat up past room temperature.
g) Check the flame port to see flame has established,
h) If flame is not established, turn the thermostat down for 5 seconds then turn back up or interrupt electrical supply to unit for 5 seconds, and allow unit to try again.
i) Verify that the manifold pressure (outlet pressure tap) on the gas valve is the same pressure as stated on the rating plate of the unit. Use a manometer that measures inches of water column for this procedure. If adjustment is required, remove the cap screw from the pressure regulator housing. Adjust the white pressure regulator adjusting screw clockwise (in) to increase pressure, counterclockwise (out) to reduce pres sure. Replace cap screw. After measurement has been taken, replace pipe plug in outlet pressure tap. Check for leaks. (see pages 3 & 67)
j) Verify gas input rate. (see page 59)

NOTE: Oil smoke might appear off of exchanger tube after it heats up initial firing. Do not be alarmed. The smoke. is just a small amount of oil on the surface of the tube from manufacturing. If smoke is excessive, open door and 'air out' the building until smoke is removed.

NOTE: Heater will have a higher heat output at the burner end as compared to the exhaust end. See page 5 for details.

NOTE: A small amount of condensation may occur from the heater when it starts the heating cycle. The condensation will stop once the heater warms up. Make sure venting is sealed according to page 49.

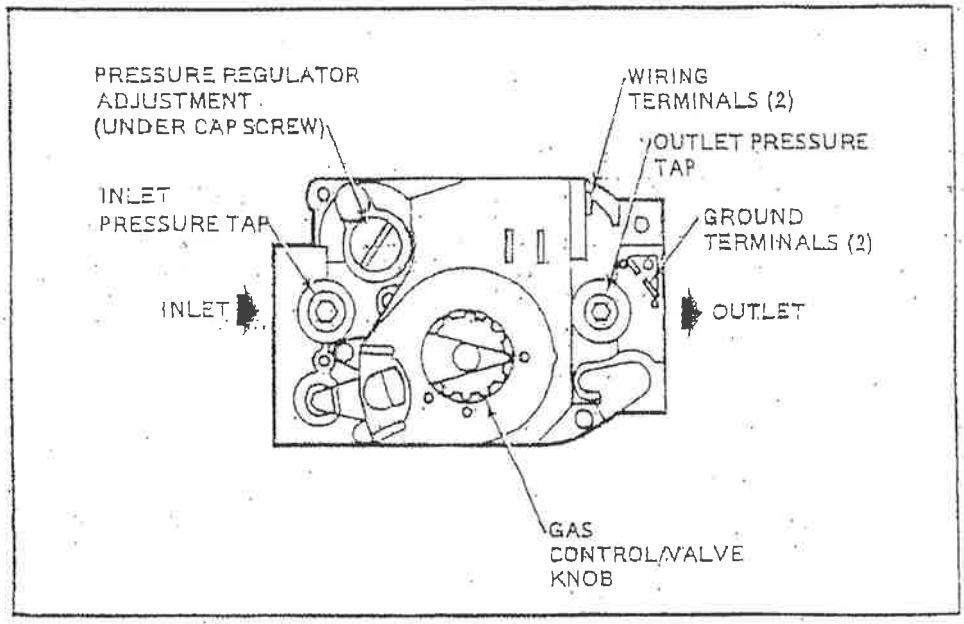


Figure #70 – Gas Valve

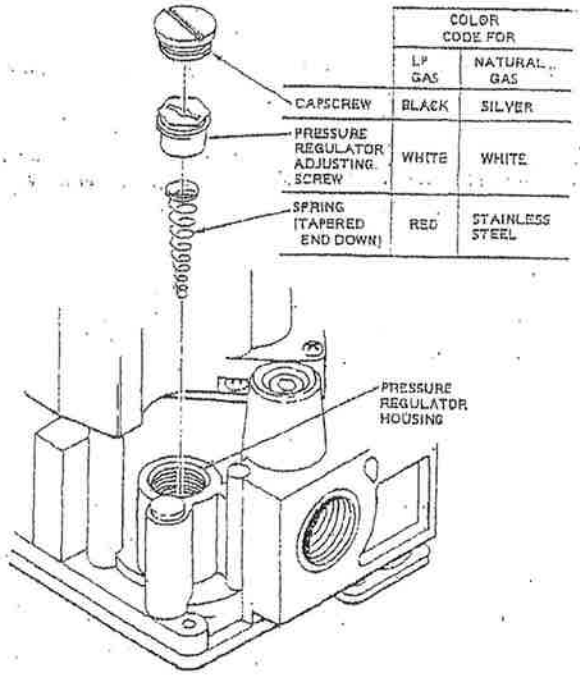


Figure #71 – Pressure Regulator

SEQUENCE OPERATION

DESCRIPTION OF 3-TRY DIRECT SPARK IGINITION SYSTEM:

The TRITON 2461D is a 24 VAC Microprocessor Based Direct Spark Ignition Control designed for use in all types of heating applications such as gas furnaces, boilers, water heaters and other similar appliances: The control utilizes a microprocessor to continually and safely monitor, analyze and control the proper operation of the gas burner. Value added features such as combustion blower control, LED diagnostics, automatic one hour reset, and flame current test pins highlight the controls benefits.

OPERATION:

POWER UP/ STANDBY

- Upon applying power (24 volts) to 24 VAC!R, the control will reset, perform a self check routine, initiate fulltime flame sensing, flash the diagnostic LED for up to four seconds, and enter the thermostat scan state.

HEAT MODE

- When a call for heat is received from the thermostat supplying 24 volts to TH/W, the control will check the pressure switch for normally open contacts. The combustion blower is then energized and once the pressure switch contacts close, a pre-purge delay begins. Following the pre-purge period the gas valve is energized and sparks commence for the trial for ignition period.

- When flame is detected during the trial for ignition , sparks are shut off immediately and the gas valve and combustion blower remains energized. The thermostat, pressure switch, and main burner flame are constantly monitored to assure the system continues to operate properly. When the thermostat is satisfied and the demand for heat ends, the main valve is de-energized immediately, the control senses the loss of flame signal and de-energizes the combustion blower.

FLAME FAILURE.- RE-IGNITION

- If the established flame signal is lost while the burner is operating, the control will respond within 0.8 seconds. The HV spark will be energized for a trial for ignition period in an at tempt to re-light the burner, If the burner does not light the control will make two more at tempts to re-light the burner. If the burner does not re-light, the control will go into lockout and flash the LED 3-times. If flame is re-established, normal operation resumes.

TROUBLESHOOTING

NO POWER TO HEATER...

CAUTION: Prior to performing any service or maintenance work on the unit:
a) disconnect the electrical supply
b) shut off gas to supply unit
c) make sure unit has cooled down before opening service panel

⚠ WARNING:

Only allow qualified, licensed, service people trained to service gas fired heating equipment to perform any repairs on this unit. All replacement parts **MUST** originate from the manufacturer of this heater in order not to void CGNAGA certification.

Safety devices are not allowed to be rendered inoperative and left unattended. Failure to do any of the above can cause property damage, injury or death.

INITIAL ELECTRICAL CHECKS

a) Make sure thermostat is calling for heat.
b) Make sure electrical connection is secure.
c) Check electrical supply for blown fuse or breaker.
d) Test for power to burner head. -
e) Check wiring to components. Refer to wiring diagram on pages 62 & 63. Also refer to legend below, This legend is located on the control module.

TERMINAL DESIGNATIONS

S1	NOT USED
GND	SYSTEM GROUND (GREEN)
V2	VALVE GROUND (BROWN)
R	NOT USED
L1	120/240 VAC INPUT (HOT) BLACK
IND	INDUCER FAX OUTPUT (BLACK)
V1	VALVE POWER (WHITE)
PSW	PRESSURE SWITCH INPUT (RED)
W	THERMOSTAT INPUT (RED)

CAUTION: *Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. A functional checkout of a replacement control is recommended.*

INITIAL GAS CHECKS

a) Make sure manual valve is turned on.
b) Make sure gas valve knob is turned on.
c) Check for gas supply and proper pressure to valve.
d) Check wires and make sure that they and their connections are in good condition.
e) Check for power to valve.
f) If no power, check control board. (see page 71)

ELECTRICITY AND GAS TO HEATER, BUT STILL IS INOPERATIVE

If after confirming that adequate gas and electricity are present and unit still does not operate, review the symptoms below. After the symptom has been identified, refer to the corresponding cause/cure, Review CHECK CONTROL BOARD section, and finalize troubleshooting procedure.

Symptom	Cause/Cure
1. Dead	A) Miswired B) Transformer bad C) Fuse/circuit breaker bad D) Bad control (check LED for steady on
2. Thermostat on - No Blower Output	A) Miswired (check PSW terminal voltage) B) Bad thermostat—no voltage @ terminal W C) Bad control (check LED for steady on)
3. Pressure Switch, input okay but no Trial for Ignition after purge delay	A) Miswired (check PSW terminal voltage) B) Flame sense problem (existing flame-check LED-2 Flashes) C) Bad control (check voltage between L1 & IND
4. Valve on, no spark	A) Shorted elecurode B) Open HV cable C) Bad Control
5. Spark on, no valve	A) Valve coil open B) Open valve wire C) Bad control (check voltage between V1 & V2
6, Flame okay during TFI, no flame sense (after TFI)	A) Bad electrode B) Bad S1 or HV wire C) Poor ground at burner D) Poor flame (check flame current)

NOTE: TFI = Trial For Ignition

CHECK CONTROL BOARD

Open access door and view the diagnostic red LED, located on the grey direct spark ignition module.

FAULT CONDITIONS

Error Mode	LED Indication
Internal Control Failure	Steady On
Air Flow Fault	1 flash
Flame with No Call for Heat	2 flashes
Ignition Lock Out	3 flashes

The LED will flash on for ¼ second, then off for 1/4 second during a fault condition. The pause between fault codes is 3-seconds.

INTERNAL CONTROL FAULT

- If power supply cycle are fluctuating beyond 50/60 cycles such as with an unstabilized power supply from a generator, unit will not operate. If the circuit board is faulty the unit will not operate.

AIRFLOW FAULT — LOCK OUT (Combustion. Air Flow Problems)

- Combustion airflow is continually monitored during an ignition sequence by the airflow switch (PSW). If during the initial call for heat the pressure switch contacts are in the closed position for 30-seconds without an output to the Combustion Blower, an airflow fault will be declared and the control will remain in this mode with the combustion blower off.

- If the airflow switch remains open for more than 30-seconds after the combustion blower output (L1 & IND) is energized an airflow fault will be declared and the control will stay in this mode with the combustion blower off.

- If the airflow signal is lost while the burner is firing, the control will immediately de-ener gize the gas valve and the combustion blower will remain on. If the call for heat remains, the control will wait for proper airflow to return. If proper airflow air is not detected after 30-seconds an airflow fault signal will be declared.

Proceed as follows to verify reason for airflow lockout:

1. Check air intake and exhaust for blockage. Remove any blockage.
2. Check combustion air blower for dirt. Clean and/or replace as necessary.
3. If there is no blockage, disconnect fresh air intake at burner head (if equipped). Retry for ignition. If unit does ignite, check to verify that duct size to unit is of proper size and length and that there is no blockage (refer to 'OPTIONAL COMBUSTION AIR' on page 46). Re place ducting as necessary to reduce amount of air restriction to unit.

4. If unit still does not ignite, disconnect exhaust vent at heater and retry for ignition. If unit does ignite, check to verify that vent size to unit is of proper size and length and that there is no blockage. (Refer to VENTING on page 49). Replace venting as necessary to reduce amount of restriction.
5. If after 2, Sand 4 are performed and unit still does not operate, replace air switch.
6. Reconnect venting and ducting, verify operation of unit

FLAME WITH NO CALL FOR HEAT (Flame Fault)

- If at anytime the main valve fails to close completely and maintains a flame, the full time flame sense circuit will detect it and energize the combustion blower. Should the main valve later close off completely removing the flame signal, the combustion blower will power off.

IGNITION LOCK OUT (Failure to Light)

- FENWAL DSI Module will attempt three ignition trials before going into lockout. The valve relay will be de-energized immediately, and the combustion blower will be turned off.
- Recovery from lockout requires a manual reset by either resetting the thermostat or removing 24 volts, or removing the electrical power supply for a period of 5-seconds.
- If the thermostat is still calling for heat after one hour, the control will automatically reset and attempt to ignite the burner again.

If units still does not operate, proceed as follows:

- Check flame sensor current. (see below)
- Check electrode for cracks and proper location, (see page 73)

FLAME SENSOR CURRENT CHECK

SERVICE CHECKS

Flame current is the current which passes through the flame from the sensor to the ground. The minimum flame current necessary to keep the system from lockout is .7 micro amps. To measure flame current, connect an analog DC micro ammeter to the FC- FC terminals per figure. Meter should read .7 uA or higher. If meter reads below "0" on scale, meter leads are reversed. Disconnect power and reconnect meter leads for proper polarity.

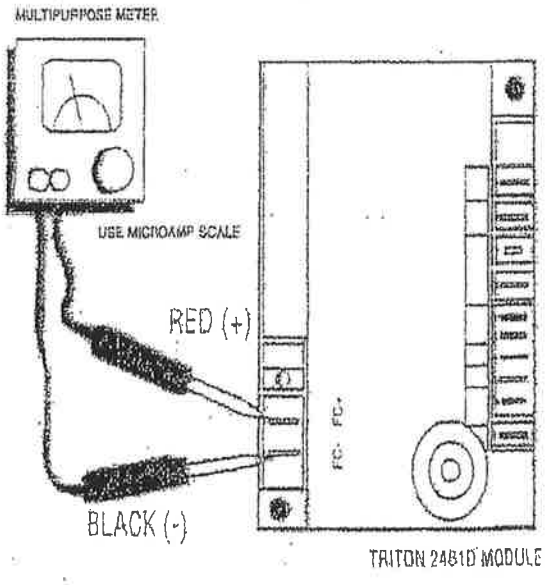


Figure #72 – Flame Sensor Current Check

PROPER ELECTRODE LOCATION

Proper location of the electrode assembly is important for optimum system performance. The electrode assembly should be located so that the tips are inside the flame envelope about3h tol inch.

CAUTIONS

1. Ceramic insulators should not be in or close to the flame

2. Electrode assemblies should not be adjusted or disassembled. Electrodes should have a gap spacing of .125" (3.175mm). If this spacing is not correct, the assembly must be replaced. Electrodes are NOT field adjustable.

3. Exceeding the temperature limits can cause nuisance lockouts and premature electrode failure.

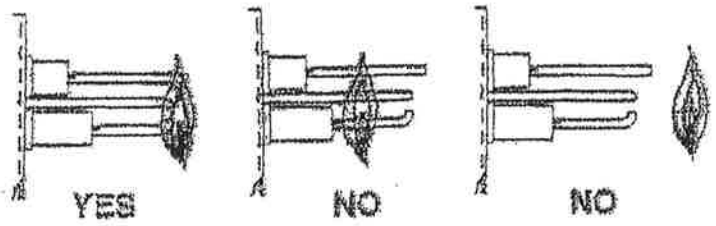


Figure #73 – Proper Electrode Location

MAINTENANCE

Maintenance is required once a year. Annually inspect your heater, before the heating season starts. If unit is in a dusty environment, maintenance will be required more often. If dust conditions are extreme, monthly or weekly maintenance may be required.

⚠ **WARNING:** Disconnect electrical supply to heater and shutoff gas prior to inspection.

A) Check combustion air intake for blockage.
B) Check vent terminal and/or roof terminal for blockage. Remove as necessary for Cleanliness and reinstall. Check for cracks or holes. Replace as necessary.
C) Open service door.
D) Check blower motor and scroll for dirt and/or locked rotor. Remove dirt with compressed air or vacuum cleaner. If rotor is locked, replace assembly.
E) Make sure all wiring is intact and in good condition.
F) Check electrode for proper gap and cleanliness. Clean or replace as necessary.
G) Check ignition system for spark. Replace as necessary.
H) Check exchanger tube for holes and/or cracks, dirt and/or deposits. Clean and/or replace as necessary.
I) Wash any dirt or Just off of the unit with a soap and water solution.
J) Check any gas connections that were disconnected during maintenance for leaks. Use soap and water solution. DO NOT USE FLAME.
K) Test fire unit by setting thermostat above room temperature. Make sure unit is operating quietly and efficiently.
L) Check all couplers for tightness and/or leakage.

⚠ **WARNING:**

Only allow qualified/licensed service people, trained to service gas fired heating equipment, to perform any repairs on this unit. All replacement parts MUST originate from the manufacturer of this heater in order not to void CGNAGA certification. Safety devices are not allowed to be rendered inoperative.

⚠ **WARNING:**

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

BURNER HEAD & RELATED PARTS
(refer to pages 77 & 78 for part number & description)

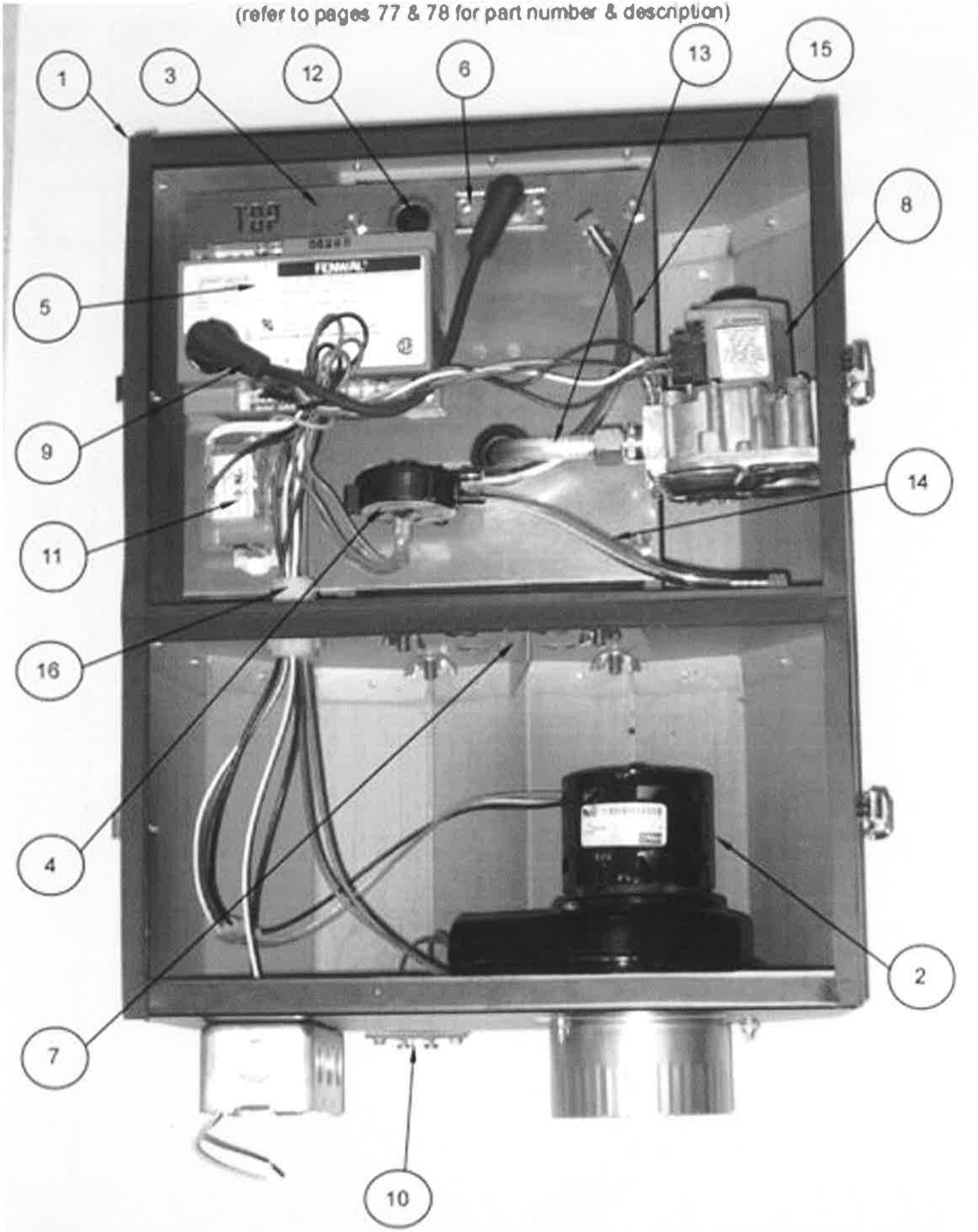


FIGURE #74-BURNER HEAD PARTS

REFLECTOR AND TUBE PARTS

(REFER TO PAGE 79 FOR PART NUMBER & DESCRIPTION)

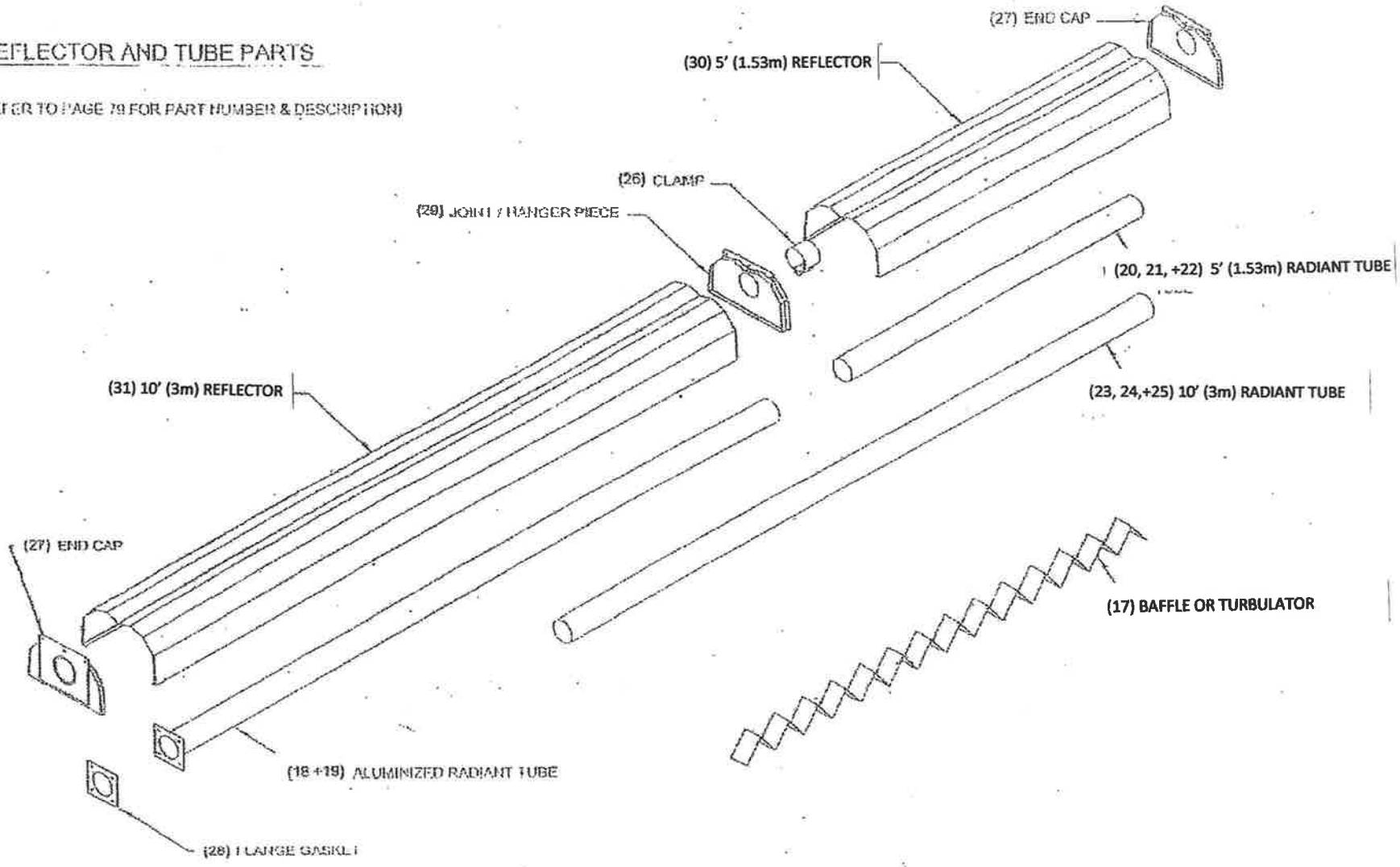


FIGURE #75 REFLECTOR AND TUBE PARTS

See page 75 for visual detals.

PARTS LIST

REPLACEMENT BURNER HEADS

STANDARD BURNER HEAD ONLY - *NATURAL GAS*				
ITEM	**PIN**	**MODEL**	**FUEL**	**WEIGHT**
1	5120181	SR-40	NG	36 LBS (16.4 KG)
1	5120183	SR-50	NG	36 LBS (16.4 KG)
1	5120185	SR-60	NG	36 LBS (16.4 KG)
1	5120187	SR-75	NG	36 LBS (16.4 KG)
1	5120189	SR-80	NG	36 LBS (16.4 KG)
1	5120191	SR-100	NG	36 LBS (16.4 KG)
1	5120193	SR-125	NG	36 LBS (16.4 KG)
1	5120195	SR-150	NG	36 LBS (16.4 KG)
1	5120197	SR-175	NG	36 LBS (16.4 KG)
1	5120199	SR-200	NG	36 LBS (16.4 KG)

STANDARD BURNER HEAD ONLY - L.P.G. (Propane)				
ITEM	**PIN**	**MODEL**	**FUEL**	**WEIGHT**
1	5120182	SR-40	LPG	36 LBS (16.4 KG)
1	5120184	SR-50	LPG	36 LBS (16.4 KG)
1	5120186	SR-60	LPG	36 LBS (16.4 KG)
1	5120188	SR-75	LPG	36 LBS (16.4 KG)
1	5120190	SR-80	LPG	36 LBS (16.4 KG)
1	5120192	SR-100	LPG	36 LBS (16.4 KG)
1	5120194	SR-125	LPG	36 LBS (16.4 KG)
1	5120196	SR-150	LPG	36 LBS (16.4 KG)
1	5120198	SR-175	LPG	36 LBS (16.4 KG)
1	5120200	SR-200	LPG	36 LBS (16.4 KG)

See page 75 for visual detail

ITEM	PART #	DESCRIPTION	WEIGHT (LBS)
		BURNER HEAD COMPONENTS	
2	5010436	Blower Moto: Assembly (SR-40 to SR-100 Series)	**
2	3010002	Blower Motor Assembly (SR-125 to SR-200 Series)	**
4	3070420	Air Switch (SR-40 Series)	**
4	3070423	Air Switch (SR-50, 60, 75 & 80 Series)	**
4	3070424	Air Switch (SR-100 Series)	**
4	3070425	Air Switch (SR-125 Series)	**
4	3070426	Air Switch (SR-150 Series)	**
4	3070428	Air Switch (SR-175 & 200 Series)	**
5	3030613	Direct Spark Ignition Module (Fenwal)	**
6	3030376	Electrode Assembly (SR-40 to SR-100 Series)	**
6	3030377	Electrode Assembly (SR-125 to SR-200 Series)	**
7	5010379	Air Shutter with dam SR 40 NG #6	**
7	3010090	Air Shutter with dam SR 40 LPG	**
7	5010381	Air Shutter with dam SR 50,60 &100 #78	**
7	5010382	Air Shutter with dam SR 75, 80 & 150 #10	**
7	5010383	Air Shutter with dam SR 125 #12	**
8	3020005	Gas Valve LP (SR-40 to SR-200 Series)	**
8	3020003	Gas Valve NG (SR-40 to SR-200 Series)	**
9	3030026	High Voltage Ignition Wire	**
10	3070025	Thermostat Connector	**
11	3070016	Tranformer	**
12	3110022	View Port - Mica Window assembly	**
13	3020740	Fuel Line SR 40-150	**
13	3020743	Fuel Line SR 175-200	**
15	5040371	Vinyl Hose for Differential Air Proving Switch	**
16	3070307	SR Wire Harness	**
	5110624	Lid Small	**
	5110625	Lid Large	**
	5110627	Rating Plate	**

See page 76 for visual details.

ITEM	PIN	DESCRPTION	WEGHT
TUBE COMPONENTS			
17	5170743	Baffle/Turbulator	5 lbs (2.3 kg)
18	5170163	Flanged Tube 4" (10.2 cm) x 124" (315 cm)	30 lbs (13.7 kg)
20	5170171	Standard Tube 4" (10.2cm) x 5' (1.53m)	15 lbs (6.8 kg)
21	5170255	Aluminized Tube 4" (10.2cm) x 5' (1.53m)	15 lbs (6.8 kg)
23	3170169	Standard Tube 4" (10.2cm) x 10' (3m)	30 lbs (13.7 kg)
24	3180245	Alumninized Tube 4" (10.2cm) x 10' (3m)	30 lbs (13.7 kg)
26	3170201	Tube Clamp	**
REFLECTOR COMPONENTS			
27	5190139	End Cap	**
28	5080319	Flange Gasket	**
29	5190137	Hanger/Joint Piece	**
30	5180163	Reflector 5' (1.52m)	5 lbs (2.3 kg)
31	5180164	Reflector 10' (3m)	10 lbs (4.6 kg)
n/a	5180240	Side Reflector 10' (3m)	8 lbs (3.7 kg)

** Under 3 lbs (1.4 kg)

Non-Transferable Limited Warranty Calcana Heaters

Calcana USA Ltd. ("the Manufacturer") warrants to the original owner at the original installation site that the heater manufactured by the manufacturer ("the Product") will be free from defects in material and workmanship for one (1) year from date of shipment from the factory. Calcana further warrants that the heat exchanger, reflectors, brackets, burner and burner box will be free from defects in material and workmanship for three (3) years from the date of shipment from the factory. If upon examination by the Manufacturer the Product is shown to have a defect in the material or workmanship during the warranty period, the Manufacturer will repair or replace, at its option, that part of the Product which is shown to be defective. In no event shall the customer be entitled to consequential, indirect or special damages of any nature for defective merchandise, and in no instance may damages include loss of profit. Calcana reserves the right to inspect the system involved in any claim against the warranty. The warranty is null and void if any of the components installed are not original Calcana parts, or the installation does not conform to the supplied installation manual.

This limited warranty does not apply;

a) if the Product has been subjected to misuse or neglect, has been accidentally or intentionally damaged, has not been installed, maintained or operated in accordance with the furnished written instructions, or has been altered or modified in any way by an unauthorized person.
b) To any expenses, including labour or material, incurred during removal or reinstallations of the Product.
c) To any damage due to corrosion by chemicals, including halogenated hydrocarbons precipitated in the air.
d) To any workmanship of the Installer of the Product
e) If Product is not paid for in a timely manner and in accordance with payment terms
f) If Product or any part of it is damaged by any act of nature including, but not limited to; hurricanes, gales, tornadoes, wind snow, sleet, hail, rain, flood, fire or any other similar or dissimilar condition, or by normal wear and tear, which included marks and/or dents to the reflector caused by improper transportation or installation.
g) If Product or any part of it is damaged by vandalism, improper use, accumulation of weight or heavy loads on the heater.
h) If Product is damaged due to lack of cleaning or maintenance, whether routine or otherwise.

The limited warranty is conditional upon;

a) Advising the installing contractor, who will in turn notify the distributor or Manufacturer
b) Shipment to the Manufacturer of that part of the Product thought to be defective. Goods can only be returned with prior written approval of the Manufacturer. All returns must be freight prepaid.
c) Determination in the reasonable opinion of the Manufacturer that there exists a defect in material or workmanship.

Repair or replacement of any part under the Limited Warranty shall not extend the duration of the warranty with respect to such repaired or replaced part beyond the stated warranty period.

This Limited Warranty is in lieu of all other warranties, either express or implied, and all such other warranties, including without limitation implied warranties of merchantability and fitness for a particular purpose, are hereby disclaimed and excluded from this limited warranty. The warranty cannot be transferred or assigned by the Customer. All disputes arising from this warranty are to be governed by the laws of the State of Alabama and any action to enforce this warranty must be initiated in the State of Alabama. In no event shall the Manufacturer be liable in any way for any consequential, special, or incidental damages of any nature whatsoever, or for any amounts in excess of the selling price of the Product or any parts thereof found to be defective. This Limited Warranty gives the original owner of the Product specific legal rights. You may also have other rights which may vary by each jurisdiction.

USA
Calcana USA Ltd.
30345 Suite A,
County Rd 49
Loxley, AL, 36551
Tel: 251-964-4400
Fax: 251-964-4404

CONVERSION KIT FOR HONEYWELL SINGLE INPUT GAS VALVES

USE WITH HONYWELL PART #393691 LP Gas AND 394588 Natural Gas Conversion Kits used in Models SR, SLR and CAL Series Heaters.

The conversion shall be carried out in accordance with the requirements of the provincial/state authorities having jurisdiction and in accordance with the requirements as follows:

CANADA: ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition.
USA: ***National Fuel Gas Code, ANSI Z223.1/NFPA 54***, or latest edition.

⚠ **WARNING:** This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instructions is not followed exactly, a fire, explosion or production of carbon monoxide may result causing property damage, personal injury or loss of life. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit. The installer of this conversion kit assumes full responsibility and liability for the installation of this conversion kit. If you do not understand these instructions or the information contained in the installation manual, DO NOT INSTALL THIS CONVERSION KIT OR OPERATE THE UNIT ASSOCATED WITH THIS GAS CONVERSION.

DIRECTIONS:

1) Caution the gas supply shall be shut off prior to disconnecting the electrical power, before proceeding with the conversion.
2) Turn off electrical supply to heater
3) Disconnect gas supply line to heater
4) Disconnect electrical supply to heater
5) Disconnect thermostat control wire from heater
6) Remove burner head from reflector assembly being careful to support burner head in such a fashion that it will not fall from the location overhead where it was installed. Use two people if necessary.
7) Remove service door that provides access to gas valve location
8) Remove ignitor assembly
9) Use deep wall socket to remove orifice spud.
10) Install correct orifice for the fuel that you are converting to. **CHECK TWICE TO MAKE SURE.** Reference chart below:
11) Locate gas valve and following instructions as detailed on the enclosed **Honey Well Instruction sheet for Gas Conversion Kits. Make sure you have the correct conversion spring for the fuel type you are converting to.**
12) **Verify Manifold pressure using a manometer. Adjust pressure if necessary. (see valve instructions for details) Manifold Pressure is: NG: 3.5 "w.c" for LPG: 10.5" w.c.. Leak Test all Fittings Prior to Operation**
13 When the conversion is complete, fill out the information as required on the enclosed conversion label.
14) **Attach completed label on or near the rating plate**

Conversion Chart With Part Numbers and Corresponding Orifice Sizes

MODEL	PIN	FROM	TO	ORIFICE
SR/SLR 40	3025000	NG	LPG	#51
SR/SLR 50	3025003	NG	LPG	1.95 mm
SR/SLR 60	3025004	NG	LPG	#45
SR/SLR 75	3025002	NG	LPG	#42
SR/SLR 80	3025005	NG	LPG	2.4mm
SR/SLR 100	3025006	NG	LPG	#36
SR/SLR 125	3025007	NG	LPG	#31
SR/SLR 150	3025008	NG	LPG	#3.4 mm
SR/SLR 175	3025009	NG	LPG	#25
SR/SLR 200	3025010	NG	LPG	#20
CAL-40	3025000	NG	LPG	#51
CAL-50	3025001	NG	LPG	#48
CAL-75	3025002	NG	LPG	#42

MODEL	PIN	FROM	TO	ORIFICE
SR/SLR 40	3025014	LP	NG	#31
SR/SLR 50	3025012	LP	NG	3.3mm
SR/SLR 60	3025015	LP	NG	#28
SR/SLR 75	3025013	LP	NG	#21
SR/SLR 80	3025016	LP	NG	#19
SR/SLR 100	3025017	LP	NG	#13
SR/SLR 125	3025018	LP	NG	5.3 mm
SR/SLR 150	3025019	LP	NG	6.1mm
SR/SLR 175	3025020	LP	NG	#H
SR/SLR 200	3025021	LP	NG	7.3 mm
CAL-40	3025011	LP	NG	#32
CAL-50	3025012	LP	NG	3.3mm
CAL-75	3025013	LP	NG	#21

Calcana USA Ltd.
30245 Suite A
County Rd 49
Loxley, AL, 36551
Tel: 251-964-4400
Fax: 251-964-0444

NOTE: CONVERSION KITS COME WITH GAS VALVE CONVERSION SPRING, PREDRILLED ORIFICE AND CONVERSION LABEL.
CONVERSION KITS ARE FOR UNITS RATED FOR THE FOLLOWING LOCATIONS AND ELEVATIONS: CANADA: 0 – 4500 FT (1372 m)
FOR INSTALLATIONS ABOVE THE DESIGNATED ELEVATIONS, CONTACT FACTORY. USA: 0 – 2000 FT (610 m)

a. For one ft^3 per revolution gas meter dials, use Table 1 directly.
b. For 1/2 ft^3 per revolution gas meter dials:
   (1) Determine time for two dial revolutions
   (2) Use Table 1 directly.
c. For two ft^3 per revolution gas meter dials:
   (1) Determine time for one complete dial revolution.
   (2) Divide time by two.
   (3) Use Table 1 directly.

Table 1. Converting Gas Flow Rate.

Time (sec)	Flow (cfh)	Flow (m^3/hr)
40	90	2.55
41	88	2.50
42	86	2.44
43	84	2.38
44	82	2.32
45	80	2.27
46	78	2.21
47	77	2.18
48	75	2.12
49	73	2.07
50	72	2.04
51	71	2.01
52	69	1.95
53	68	1.93
54	67	1.90
55	65	1.84
56	64	1.81
57	63	1.78
58	62	1.76
59	61	1.73
60	60	1.70
62	58	1.64
64	56	1.59
66	54	1.53
68	53	1.50
70	51	1.44
72	50	1.42
74	49	1.39
76	47	1.33
78	46	1.30
80	45	1.27
84	43	1.22
88	41	1.16
92	39	1.10
96	38	1.08
100	36	1.02
105	34	0.96
110	33	0.93
115	31	0.88
120	30	0.85
125	29	0.82
130	28	0.79
135	27	0.76
140	26	0.74
150	24	0.68
160	23	0.65
170	21	0.59
180	20	0.67

CHECKOUT

1. Make certain the primary air supply to the main burner is properly adjusted for complete combustion at final pressure regulator setting. Main burner must light reliably under all conditions.
2. Place system in operation and observe through at least one complete cycle to assure all controls are operating properly.
3. If manometer (pressure gauge) method is used, perform Gas Leak Test at outlet pressure tap plug.
4. Apply the conversion label in the conversion kit to the gas control, heating appliance, and any other controls to show conversion to a new type of gas.

Honeywell

Automation and Control Solutions
Honeywell International Inc.
1985 Douglas Drive North
Golden Valley, MN 55422

Honeywell Limited-Honeywell Limitée
35 Dynamic Drive
Scarborough, Ontario
M1V 4Z9

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Honeywell

393691 LP Gas and 394588 Natural Gas Conversion Kits

FOR VR8200/VR8300/SV9500/SV9600 FAMILY OF COMBINATION GAS CONTROLS

INSTALLATION INSTRUCTIONS

APPLICATION

The 393691 LP Conversion Kit changes VR8200/VR8300/SV9500/SV9600 family combination gas controls from regulated natural gas to regulated LP gas. The 394588 Natural Gas Conversion Kit changes VR8200/VR8300/SV9500/SV9600 family combination gas controls from regulated LP gas to regulated natural gas. Kits include a new cap screw, pressure regulator adjustment screw, spring and conversion label.

To use this kit, assure gas control is equipped with a standard or slow opening pressure regulator.

NOTE: Step regulator valves cannot be converted.

INSTALLATION

When Installing this Product...

1. Read these instructions carefully. Failure to follow instructions can damage product or cause a hazardous condition.
2. Check ratings given in instructions and on product to make sure product is suitable for your application.
3. The installer must be a trained, experienced service technician.
4. After installation is complete, use these instructions to check out product operation.

⚠ WARNING

Fire or Explosion Hazard.
Can cause severe injury, death or property damage.
Follow these warnings exactly:

1. Disconnect power supply before wiring to prevent electrical shock or equipment damage.
2. To avoid dangerous accumulation of fuel gas, turn off gas supply at appliance service valve before starting installation and perform Gas Leak Test after completion of installation.
3. Use only your hand to turn gas control knob. Never use any tools. If gas control knob will not operate by hand, then a qualified technician should replace the gas control. Force or attempted repair may result in fire or explosion.
4. Change main and pilot burner orifices to meet appliance manufacturer specifications.

To convert from one gas to another:

1. Turn off gas supply at the appliance service valve.
2. Remove regulator cap screw and pressure regulator adjusting screw. Refer to Fig. 1.
3. Remove the existing spring.
4. Insert the replacement spring. Refer to Fig. 2.

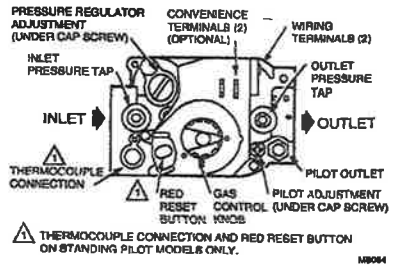

Fig. 1. Top view of VR8200 combination gas control.

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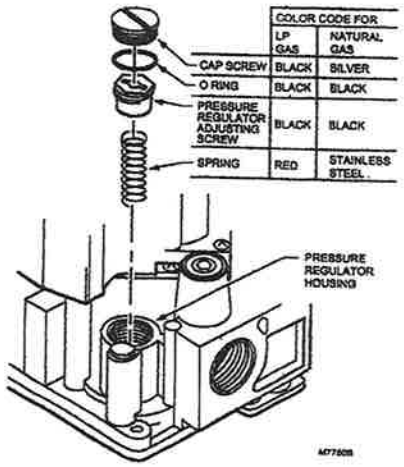

Fig. 2. Conversion kit installation in regulator.

5. Install the new plastic pressure regulator adjustment screw. Assure that the screw top is flush with the regulator top.
6. Turn pressure regulator adjustment screw clockwise ↷ eleven complete turns. The preliminary pressure setting is approximately 10.0 in. wc (2.5 kPa) for LP gas regulator (393691) and 3.5 in. wc (0.9 kPa) for natural gas regulator (394588).
7. Check the regulator setting using a manometer or by clocking the gas meter. See Check and Adjust Gas Input and Burner Ignition section.
8. Install the new cap screw and O.ring.
9. Mount conversion label on the gas control.
10. Install the gas control and appliance according to appliance manufacturer instructions.

START-UP

Gas Control Knob Settings

OFF: Prevents pilot and main burner gas flow.

PILOT (On standing pilot controls only): Permits pilot burner gas flow when red knob is held down or thermocouple current is above power unit dropout value.

ON: Permits gas flow into gas control. Pilot burner gas is controlled as in the PILOT position for standing pilot and intermittent pilot systems. Main burner gas flow is controlled by thermostat and automatic valve operators.

Perform Gas Leak Test

⚠ WARNING

Fire or Explosion Hazard.
Can cause severe injury, death or property damage.
Check for gas leaks with soap and water solution any time work is done on a gas system.

Gas Leak Test

1. Paint pipe connections upstream of gas control with rich soap and water solution. Bubbles indicate gas leak.
2. If gas leak is detected, tighten all pipe connections.
3. Stand clear of main burner while lighting to prevent injury caused from hidden leaks that could cause flashback in the appliance vestibule. Light main burner.
4. With main burner operating, paint pipe joints (including adapters) and control inlet and outlet with rich soap and water solution.
5. If another gas leak is detected, tighten adapter screws, joints, and pipe connections.
6. Replace part if gas leak can not be stopped.

Light Pilot (Standing Pilot Models)

1. Turn gas control knob clockwise ↷ to OFF. Wait five minutes to dissipate any unburned gas. Smell for gas around the appliance near the floor. Do not relight pilot flame if you smell gas.
2. Turn gas control knob counterclockwise ↶ to PILOT. Push down and hold the knob while lighting the pilot flame.
3. Hold down the gas control knob about one minute, then release.
   a. If pilot flame goes out, turn gas control knob clockwise ↷ to OFF and repeat steps 1 through 3.
   b. If pilot flame remains lit, turn gas control knob counterclockwise ↶ to ON.

Turn on System (Intermittent and Direct Ignition Systems)

Rotate the gas control knob counterclockwise ↶ to ON.

Turn on Main Burner

Follow appliance manufacturer instructions or adjust thermostat setting to call for heat.

Adjust Pilot Flame

The pilot flame should envelop 3/8 to 1/2 in. (10 to 13 mm) of the thermocouple or igniter-sensor tip. Refer to Fig. 3. To adjust pilot flame:

1. Remove pilot adjustment cap screw. Refer to Fig. 1.
2. Turn inner adjustment screw clockwise ↷ to decrease or counterclockwise ↶ to increase pilot flame.
3. Always replace cap screw after adjustment and tighten firmly to safeguard proper operation.

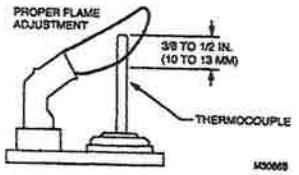

Fig. 3. Proper flame adjustment.

Check and Adjust Gas Input and Burner Ignition

⚠ CAUTION

Equipment Damage Hazard.
Exceeding input ratings can damage the equipment.

1. Do not exceed input rating stamped on appliance nameplate, or manufacturer recommended burner orifice pressure for size orifice(s) used. Make certain primary air supply to main burner is properly adjusted for complete combustion. Follow appliance manufacturer instructions.
2. IF CHECKING GAS INPUT BY-CLOCKING GAS METER:
   a. Make sure that the only gas flowing through the meter is for the appliance being checked.
   b. Make certain that other appliances are turned off with their pilot flames extinguished (or deduct their gas consumption from the meter reading).
   c. Convert flow rate to Btuh as described in form 70-2602, Gas Controls Handbook, and compare to Btuh input rating on appliance nameplate.
3. IF CHECKING GAS INPUT WITH MANOMETER:
   a. Be sure the gas control knob is in the PILOT position before removing outlet pressure tap plug to connect manometer (pressure gauge).
   b. Turn the gas control knob back to PILOT when removing gauge and replacing plug.
   c. Shut off gas supply at the appliance service valve, or for LP gas, at the gas tank, before removing the outlet pressure tap plug and before disconnecting manometer and replacing outlet pressure tap plug.
   d. Perform Gas Leak Test at outlet pressure tap plug.

Checking Gas Pressure Using Meter Clocking Method

NOTE: Use this method when manometer is not available or when manifold pressure is not specified in in. wc (kPa) by the burner manufacturer.

1. Make sure that the only gas flowing through the meter is for the appliance being checked.
2. Make certain that other appliances are turned off with their pilot flames extinguished (or deduct their gas consumption from the meter reading).
3. Turn gas control knob to ON position.
4. To obtain an accurate outlet pressure reading, cycle main burner on and off several times to stabilize the pressure regulator diaphragm.
5. Using a watch with a second hand, carefully clock the gas meter to determine the time per revolution. Use Table 1 to determine the exact main burner gas flow rate in cubic feet per hour (cfh).
6. Compare actual input with burner manufacturer recommended input (stamped on burner nameplate). To convert Btuh rating to cfh (m^3/hr) use the following formula:

   $$\frac{\text{Input Rating in Btuh (MJ/hr}}{\text{Btu Content of Gas per ft}^3 \text{ (MJ Content of Gas per m}^3\text{)}} = \text{cfh } (m^3/hr) \text{ or gas}$$

7. If necessary, adjust pressure regulator to match appliance rating. (On step-opening regulators, match the full rate outlet pressure.)
   a. Remove pressure regulator adjustment cap screw.
   b. Using a screwdriver, turn inner adjustment screw clockwise ↷ to increase or counterclockwise ↶ to decrease gas pressure to main burner.
   c. Always replace cap screw and tighten firmly to prevent gas leakage.
8. Turn gas supply back on to other appliances and relight all pilot flames according to appliance manufacturer instructions.
9. Proceed to Checkout section.

Checking Gas Pressure Using a Manometer (Pressure Gauge)

1. Turn gas control knob to PILOT (standing pilot systems) or OFF (intermittent and direct ignition systems).
2. Remove outlet pressure tap plug from gas control and connect pressure gauge. Refer to Fig. 1.
3. Turn gas control knob to ON position.
4. To obtain an accurate outlet pressure reading, main burner must be cycled on and off several times to stabilize the pressure regulator diaphragm.
5. Light main burner and read pressure gauge.
6. If necessary, adjust pressure regulator to match appliance rating. (On step-opening regulators, match the full rate outlet pressure.)
   a. Remove pressure regulator adjustment cap screw.
   b. Using a screwdriver, turn inner adjustment screw clockwise ↷ to increase or counterclockwise ↶ to decrease gas pressure to main burner.
   c. Always replace cap screw and tighten firmly to prevent gas leakage.
7. Turn gas control knob to PILOT (standing pilot system) or OFF (intermittent and direct ignition systems).
8. Remove pressure gauge and replace outlet pressure tap plug and pressure regulator cap screw.
9. Proceed to Checkout section.

EXAMPLE OF CONVERSION KIT LABEL
TO BE COMPLETED AS PER INSTRUCTIONS IN KIT

This appliance was converted on DAY:_____
MONTH:_____ YEAR:_____
to NG:____ LP.____ gas with Kit #_____
by: NAME:_____
COMPANY:_____
ADDRESS:_____
CITY/TOWN: _____STATE/PRO:____
TELEPHONE:_____
Orifice Size:_____ Leak Test Performed: Yes:__
Manifold Pressure: Min_____ Max_____
Input:_____ Altitude:_____
(The name of the individual and organization making this conversion accepts the responsibility that this conversion has been properly made and has performed a leak test on the appliance prior to placing into service.) Locate label in a conspicuous location on the appliance near rating plate.
==========
Cet appareil a ete converti au:_____
Injecteur:_____ Date:_____
Pression a la tubulure d'alimertation:_____
Debit calorifique:_____