NORTH AMERICAN KITCHEN SOLUTIONS INCORPORATED

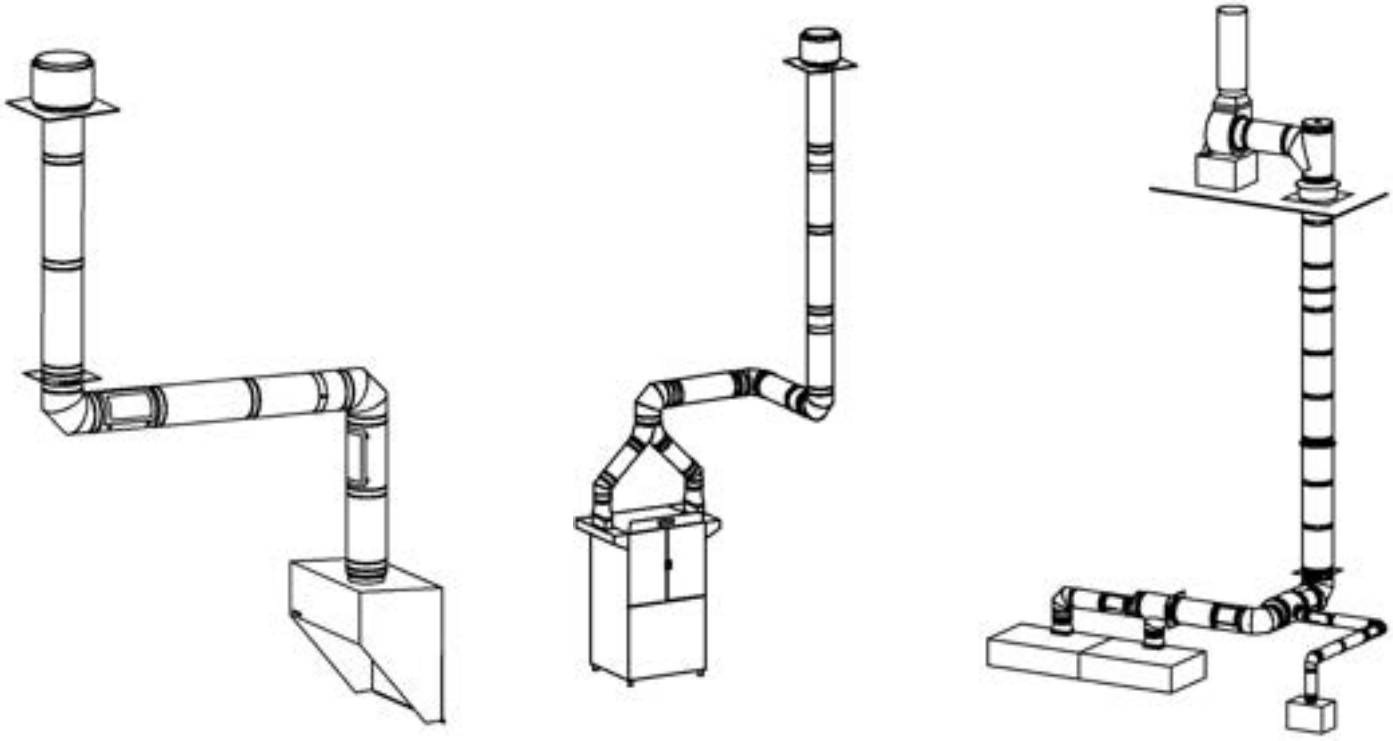
c UL us LISTED

NAKS Kitchen Ventilation Systems

Grease Ducts, Ovens, Dishwashers and Industrial Cooking Appliances

- **Model SW-NAKS-CK – Single-Wall**
- **Model DW-NAKS-CK-RC – Double-Wall Reduced Clearance Fiber Insulation**
- **Model DW-NAKS-CK-ZC – Double-Wall Zero Clearance Fiber Insulation**

Installation Instructions



A MAJOR CAUSE OF VENT RELATED FIRES IS FAILURE TO MAINTAIN REQUIRED CLEARANCES (AIR SPACES) TO COMBUSTIBLE MATERIALS. IT IS OF THE UTMOST IMPORTANCE THAT NAKS SYSTEMS BE INSTALLED ONLY IN ACCORDANCE WITH THESE INSTRUCTIONS.

Important: Read all instructions before beginning the installation. Failure to comply with with these instructions may result in a hazardous installation resulting in injury or damage to property. An improper installation will void the manufacturer's warranty.

Keep these instructions for future reference.

For Technical Support or more product information please contact us at (800) 854-3267 or visit our website at www.NAKSinc.com

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SECTION 1 – GENERAL INFORMATION

IMPORTANT:
These instructions must be followed in all details. Failure to do so may result in a hazardous installation. Contact NAKS if there are any questions regarding these instructions.

Compliance with local code, acceptance by the local code authority (AHJ) and warranty coverage is contingent upon the NAKS system being installed and maintained in strict accordance with these installation and maintenance instructions.

Contact Local Building or Fire Officials about restrictions and installation inspection in your area.

Failure to follow proper installation procedures as described in these instructions, including joint connections, vent pitch and improper appliance connections may cause unsafe conditions.

It is the responsibility of the installer to contact the local authorities having jurisdiction concerning any installation restrictions, including guarding or placement of terminations and/or inspection requirements that may apply.

Permits may be required before starting an installation. This product must be installed in accordance with local building code requirements as well as National codes: USA-National Fuel Gas Code ANSI-Z223.1 or NFPA Standard 54, or NFPA 211. In Canada, CAN/CGA-B149.1 or CAN/CGA-149.2 Propane Installation Code as applicable.

Introduction
NAKS Grease Duct are factory built stainless steel venting systems intended for use in connecting Type 1 and 2 kitchen hoods, and cooking ovens to the outdoors. There are also many other applications and uses including, but not limited to the following: Chutes, Dryer Vents, Fume Venting, Industrial Oven, Paint Booth Exhausts, Particle Conveying, and Ventilation Ducts.

The vent segments are easily joined together to form a secure, install leak free vent system. A full range of fittings & accessories are available to accommodate each application.

Each model has several variations including single wall, double wall, material grade, material thickness, insulation type and insulation thickness. These models/variations may be intermixed in the same exhaust or chimney system assuming proper clearances and other installation guidelines are maintained for each system. For purposes of these instructions both models single wall and double wall as well as all variations will be treated together. Differences in UL listings, installation and weights will be shown where needed. See Product Code Key Section for model details.

Listings
NAKS-CK Grease Duct is listed to the following Standards:

UL-1978 Standard, Grease Duct – under this Listing, Models SW-NAKS-CK, DW-NAKS-CK-RC & DW-NAKS-CK-ZC have been determined suitable for Grease Ducts as defined by NFPA-96, the "Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations". UL confirmed proper minimum air space clearance to combustibles for 500°F continuous exhaust gas temperatures and 2000°F exhaust gas temperature for 30 minutes simulating a kitchen exhaust fire. UL also confirmed that the installed joints are grease and smoke tight.
ULC-S662, (Canadian) Standard for Factory-Built Grease Ducts – under this (c-UL) Listing, Models SW-NAKS-CK, DW-NAKS-CK-RC & DW-NAKS-CK-ZC have been determined suitable for Grease Duct applications in accordance with the National Building Code -2010.

UL 2221 Standard for Tests of Fire Resistive Grease Duct Enclosure Assemblies – Under this listing, model DW-NAKS-CK-ZC has been determined to be an effective grease duct and as a fire rated enclosure system and through penetration firestop system.

Product Code Key
Each part manufactured by NAKS is identified with a product code. The product code contains the Model, Vent size, Part ID, and Other information.
Part Number Example:

	Family	Diameter	Product ID
Example	DW-NAKS-CK-ZC	6	45EL
	SW-NAKS-CK = Single Wall DW-NAKS-CK-RC = Double Wall 1.25" fiber insulation DW-NAKS-CK-ZC = Double Wall 3.25" fiber insulation	6" to 48"	45 Elbow

General Installation Requirements

Failure to conform to these installation instructions and all applicable codes may result in catastrophic property damage, personal injury or death. These instructions are a guide to assist a professional installer.

- Proper operation of the vent system and appliance depends on the use and correct assembly of all parts specified for a particular installation.
- The vent system must not come in contact with plumbing or electrical systems.
- Maintain rated clearances to combustibles over the entire length of the vent system.
- Except for installation in one- or two-family dwellings, a vent system that extends through any zone above that on which the connected appliance is located, shall be provided with an enclosure having a fire resistance rating equal to or greater than that of the floor or roof assemblies through which it passes.
- The vent system shall not be routed into, through or within any vent, such as an existing masonry or factory-built chimney that is connected to another appliance.
- Do not field install insulation in any required clearance around NAKS-CK GREASE DUCT except as described in NFPA-96.
- Note: Reference the appliance manufacturer's installation and operating guides and follow any allowances and limitations for elbows.
- Reference the appliance manufacturer's installation and operating guides for maintaining ventilation and air circulation where required.

Suggested Tools, Equipment & Hardware

Reciprocating & Keyhole Saws	Drill	Plumb Bob, Level & Tape Measure	#3 Phillips Screw Driver
Metal Snips	Hammer	Caulk Gun	5/16" Nut Driver
Screwdrivers	Safety Glasses & Gloves	Ladder	Roofing Nails
High Temp Sealant	8-penny nails	#8 1-1/2" x 2-1/2" screws	Framing Square
Anti-Seize Lube for Stainless Steel fasteners			

Safety Notice
Product has sharp edges. Use extreme caution while working with product. Always wear proper personal protection equipment (gloves, safety glasses, sleeves, etc.) while working with product.

Enclosures & Clearances

Grease Duct systems are intended to be installed unenclosed or with non-combustible enclosures and are not for use in one- or two-story family dwellings.

If the Grease Duct passes through any zone or story of a building outside of which the connected appliance or hood is located, it is to be enclosed in non-combustible construction having a fire rating equal to or greater than that of the wall or ceiling though which it passes. Check with the local code authority (AHJ) for material with an appropriate fire rating. Do not place any type of insulation in the required clearance space surrounding the Chimney. Follow NFPA-96 regarding methods of reduced clearances and alternatives for fire-rated Grease Duct enclosure.

Table 1-1 - Clearance to Combustibles – Grease Duct

Minimum Airspace Clearance to Combustibles			
Model:	**SW-NAKS-CK**	**DW-NAKS-CK-RC**	**DW-NAKS-CK-ZC**
Application:	**Single-Wall Grease Duct UL1978**	**Double-Wall Grease Duct UL1978**	**Grease Duct & Fire-Resistant Enclosure UL1978 & UL2221**
3" (76mm) - 6" (152mm)	18" (457.2mm)	2" (50.8mm)	0" (0 mm)
7" (178mm) - 14" (456mm)	18" (457.2mm)	2" (50.8mm)	0" (0 mm)
16" (406mm) - 34" **(863**mm)	18" (457.2mm)	3" (76.2mm)	0" (0 mm)
36" (914mm)	18" (457.2mm)	4" (76.2mm)	0" (0 mm)

Where, according to local code, no chase enclosure is required, NAKS Grease Duct may be installed adjacent to a wall of combustible construction at the minimum clearance specified on each pipe section and in the individual Listing as shown in the following tables.

WARNING: Do not place insulation in the required clearances spaces surrounding the vent system.

Clearance for Non-combustibles
0" clearance or as required for installation, access, inspection or per local code.

For clearances to combustibles for other items such as thimbles, see SECTION 6 – THIMBLE & FLASHINGS in these instructions.

Minimum Framing Dimensions though Wall or Ceiling
Where the vent passes through the wall or ceiling, the minimum Clearance to Combustibles must be maintained (See Table 1-2). Framing should also provide support and attachment for roofing and other assemblies.

Table 1-2 – Minimum Framing Dimensions

Vent Size (ID) SW-NAKS-CK & DW-NAKS-CK-RC	Vertical Penetration Ceiling/Roof	Horizontal Penetration Wall
3" to 12"	O.D. + 3.5" x O.D. + 3.5"	O.D. + 3.5" x O.D. + 3.5"
13" to 48"	O.D. + 3.5" x O.D. + 3.5"	O.D. + 3.5" x O.D. + 3.5"

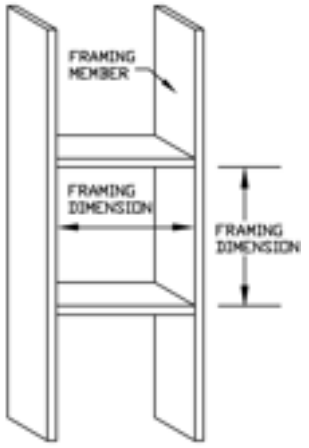

Fig 1-1. Framing Dimensions

Vent Size
Refer to the appliance manufacturer's installation instructions for proper sizing and vent configuration – **contact NAKS Technical Support for assistance in this regard**.
Follow any horizontal/vertical length and height limitations, minimum clearances (air space) to combustibles, or specifications for the specific use of elbows, tees, or drain tees.

Horizontal Installation Requirements / Vent Slope

Any horizontally installed portion of a venting systems shall have a slope upwards not less than ¼" (0.64mm) every 12" (304.8mm) and be installed so that condensate flows back toward the appliance or drain. The install must be such to prevent collection of condensates, formation of ice buildup or blockage at any location of the assembly. Condensate must flow freely and may not be retained in any part of the vent system. Refer to appliance manufacturer's installation instructions for further details regarding the installation of condensate drain fittings and the pitch of the system. See Fig. 1-3. As an option, the installer may also use 87° elbows and fittings that will create a slope of ⅝" (15.9mm) per every 12" (0.64mm).

Vertical or Through-the-Roof Installation

Determine an appropriate path to route the vent system. See Termination Requirements section for guidance on location. See Table 2-2 (DIM C) and Fig 2-1 for Maximum vertical unsupported height above the roof. If the vent length exceeds this figure, it must be re-supported with a Guy Section or other horizontal support. If necessary, cut holes in floors and ceilings to frame firestop plates. Exterior portions of the vent located below the roof line should be enclosed to limit condensation in the system. As an alternate, Model double-wall exhaust may also be used.

Commercial Cooking Operations

Strictly follow NFPA-96 for the termination requirements for Grease Duct and/or kitchen exhaust duct systems.

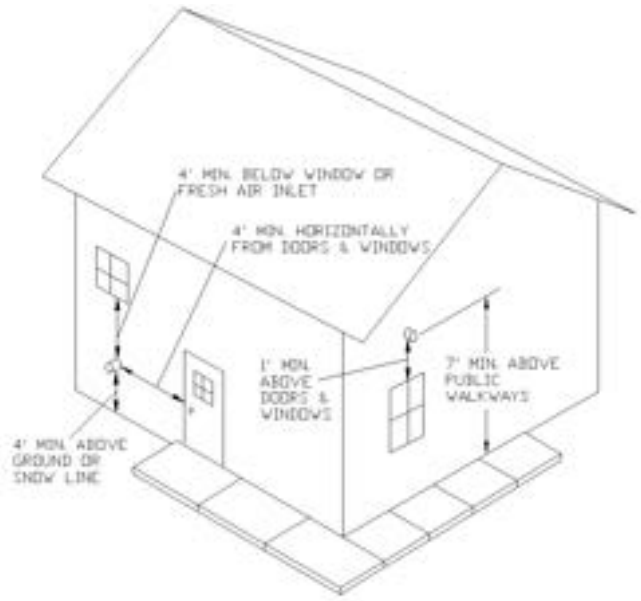

Fig 1-2. Horizontal Termination Requirements

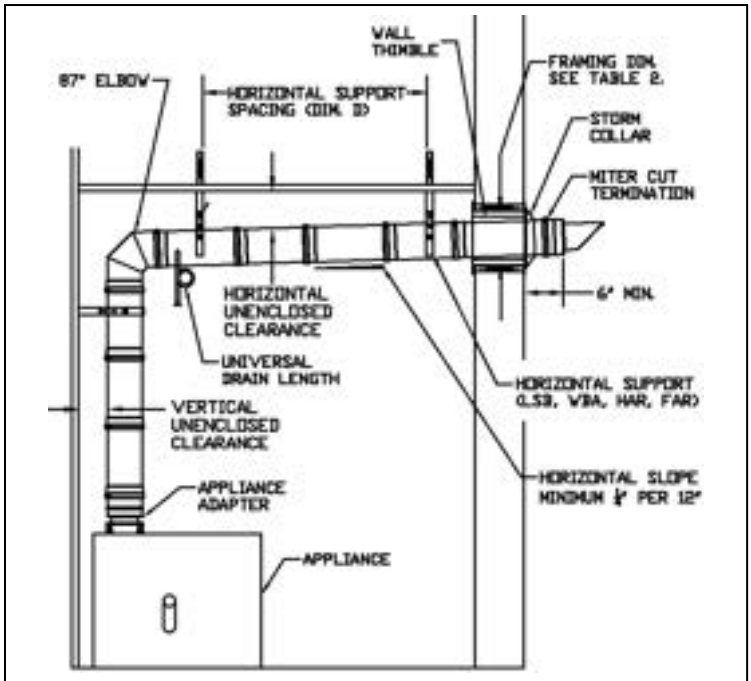

Fig 1-3. Horizontal / Through-The-Wall

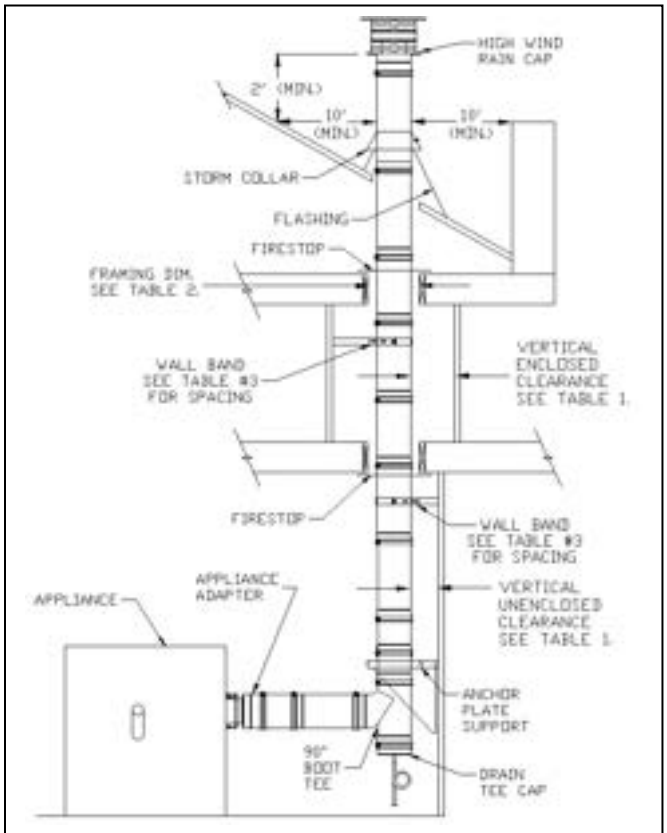

Fig 1-4. VERTICAL INSTALLATION

PIPE WEIGHT

The approximate installed weight of the NAKS exhaust systems can be found using Table 1-3. This table does not include accessories such as supports and guides, nor shipping packaging or palletizing weight (See Table 1-3).

Table 1-3. Installed Pipe Weight (Lb./ft)

Model	SW-NAKS-CK	DW-NAKS-CK-RC	DW-NAKS-CK-ZC
Wall Thickness	N/A	1.25"	3.25"
Insulation Type	N/A	Ceramic Fiber	Ceramic Fiber
Inside Diameter	lb./ft	lb./ft	lb./ft
6"	2.2	7.6	15.0
7"	2.6	8.6	16.7
8"	3.0	9.7	18.3
9"	3.4	10.7	20.0
10"	3.7	11.8	21.6
11"	4.1	12.8	23.3
12"	4.5	13.8	25.0
13"	4.9	14.9	26.6
14"	5.2	15.9	28.3
16"	6.0	18.0	31.6
18"	6.7	20.1	34.9
20"	7.5	22.2	38.2
22"	8.2	24.3	41.5
24"	9.0	26.4	44.8
26"	9.5	28.5	48.1
28"	10.3	30.6	51.4
30"	11.0	32.7	54.7
32"	11.7	34.7	58.1
34"	12.5	36.8	61.4
36"	13.2	38.9	64.7

Models
DW-NAKS-CK-RC, DW-NAKS-CK-ZC, and SW-NAKS-CK are cylindrical, factory built, modular exhaust systems that incorporate an overlapping joint and clamp system for quick and easy assembly in the field. Sealant is used to make a gas and liquid tight seal.

Each connection has a 2.2" overlap allowing greater stiffness, sealing, and durability.

Model SW-NAKS-CK (Fig 1-5)
Single wall Model SW-NAKS-CK may be field insulated. Follow NFPA 96 regarding methods of achieving reduced clearances, zero clearances, or fire resistance enclosures for Grease Ducts. It may also be used as an option for Unlisted Metal Chimneys (Smokestacks) or single wall Steel Pipe Connectors as defined by NFPA-211. Model SW-NAKS-CK is intended for an entirely non-combustible surrounding and must be installed in strict accordance with NFPA-211 requirements for single wall stacks and connectors.

Fig 1-5. Single-Wall
Model SW-NAKS-CK

Further features of Model SW-NAKS-CK single wall include:

- No field welding
- All stainless-steel construction
- Smooth flowing inner liner
- Wide array of accessories such as supports and drains
- May be connected to and from Double Wall NAKS

Model DW-NAKS-CK-RC (Fig 1-6)
The double wall Model DW-NAKS-CK-RC reduced clearance grease duct is insulated with 1¼" thick compressed fiber which allows the inner and outer pipes to stay aligned, without the use of additional clips or brackets, eliminating hot spots at the joint connections.
Features of Model DW-NAKS-CK-RC double wall and fiber insulated duct include:

- Easier to clean than field welded rectangular
- Reduced clearance to combustibles
- Reduced outer pipe skin temperatures
- Reduced building heat gain
- Increased efficiencies of energy recovery systems
- Reduced noise levels caused by high velocity exhausts

Fig 1-6.
Double-Wall Reduced Clearance
Model DW-NAKS-CK-RC

Model DW-NAKS-CK-ZC (Fig 1-7)
Double-wall Model DW-NAKS-CK-ZC zero-clearance grease duct is insulated with 3¼" thick compressed fiber and is listed as a grease duct and as a fire rated enclosure system and through penetration firestop system.
Features of Model DW-NAKS-CK-ZC double wall and fiber insulated duct include:

- Easier to clean than field welded rectangular
- True Zero-inch clearance to combustibles
- Reduced outer pipe skin temperatures
- Reduced building heat gain
- Increased efficiencies of energy recovery systems
- Reduced noise levels caused by high velocity exhausts
- UL-2221 2-hr Fire Rated Grease Duct System
- May be connected to or from double wall reduced clearance or single wall systems

Fig 1-7.
Double-Wall Zero Clearance
Model DW-NAKS-CK-ZC

Joint Assembly – Model SW-NAKS-CK

The Model NAKS-CK joint system is designed for a quick and easy installation. See Figs 1-8 to 1-11.

To Assemble:

1. Clean / prepare the surfaces where sealant is to be applied.
2. Select correct sealant based on flue gas and application: J-600 Sealant is for Flue Gas temperatures up to 600F for low temperature heating system or Grease Duct. Sealant usage is shown in Table 1-4.
3. Apply J- Sealant continuously (1/4" bead minimum) to the male end of the inner flue pipe. Sealant is to be approximately 1-1/4" from the end of pipe. (See Fig 1-8)
4. Position both pipes so they are in alignment. Engage the pipes and press them together until they completely engage by 2.2". (See Fig 1-9)
5. Position the Locking Band (LB) around the joint and ensure the LB spans over the bead on the male end and over the female socket. See Figs 1-10 & 1-11.
6. Secure LB, using 5/16" nut driver or flat-head screwdriver to tighten gear clamps

Diameter	# of Joints
3" - 6"	6.7
8" - 10"	6.0
11" - 12"	5.3
13" - 16"	4.7
18" - 20"	4.0
22" - 24"	3.3
26" - 28"	2.7
30" - 32"	2.0
34" - 36"	1.3
38" - 48"	0.7

Table 1-4. Sealant Usage

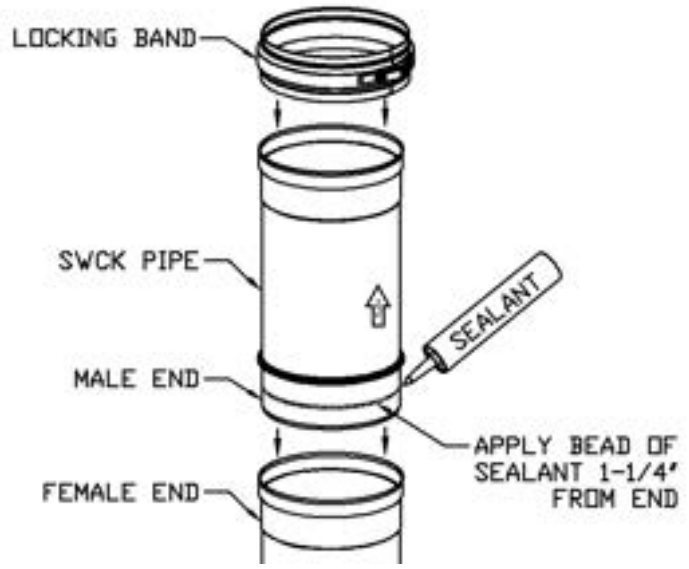

Fig 1-8. Apply Sealant

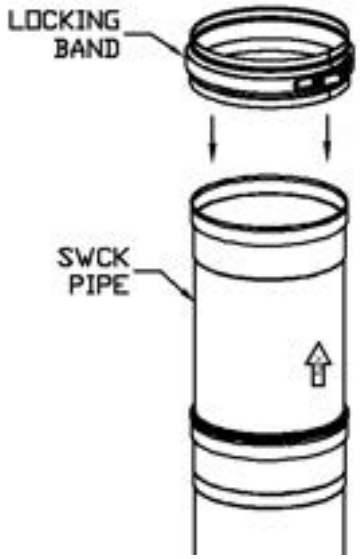

Fig 1-9. Engage Pipe

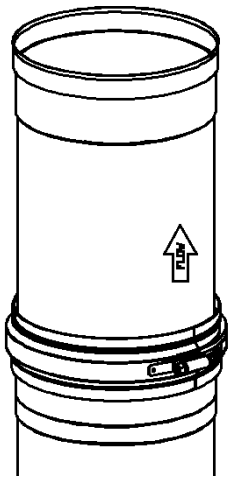

Fig 1-10. Install Locking Band

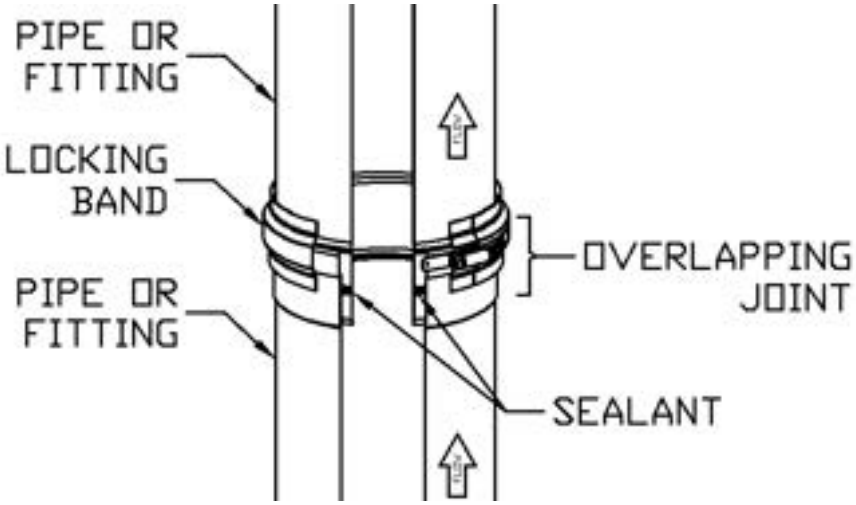

Fig 1-11. SW-NAKS-CK Assembly (Cutaway View)

Joint Assembly – Model DW-NAKS-CK-ZC & DW-NAKS-CK-RC

The Model NAKS-CK joint system is designed for a quick and easy installation. See Figs 1-12 to 1-15.

To Assemble:

1. Clean / prepare the surfaces where sealant is to be applied.
2. Select correct sealant based on flue gas and application: J-600 Sealant is for Flue Gas temperatures up to 600F for low temperature heating system or Grease Duct. Sealant usage is shown in Table 1-4.
3. Apply J- Sealant continuously (1/4" bead minimum) to the male end of the inner flue pipe. Sealant is to be approximately 1-1/4" from the end of pipe. (See Fig 1-13)
4. Position both pipes so they are in alignment. Engage the pipes and press them together until they completely engage by 2.2".(Fig 1-14)
5. Position the Locking Band (LB) around the joint and ensure grooves in LB are seated in the Pipe grooves. (See Fig 1-15)
6. Secure LB, using 5/16" nut driver or flat-head screwdriver to tighten gear clamps

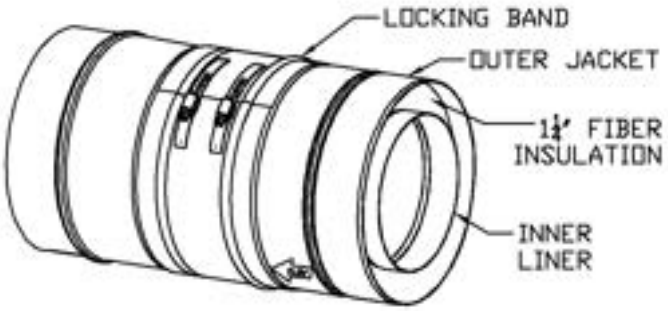

Fig 1-12. DW-NAKS-CK-RC

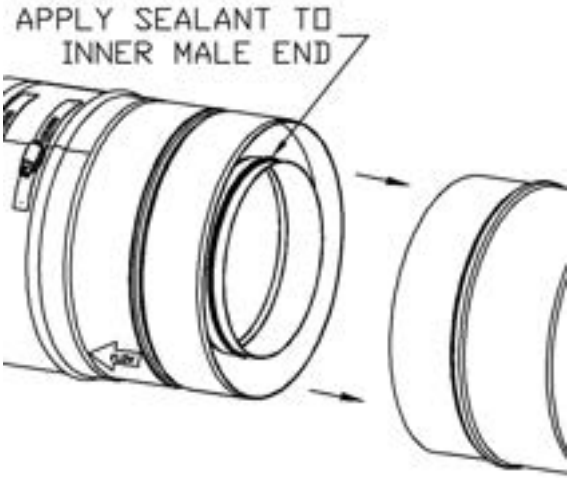

Fig 1-13. Apply Sealant on Inner male end

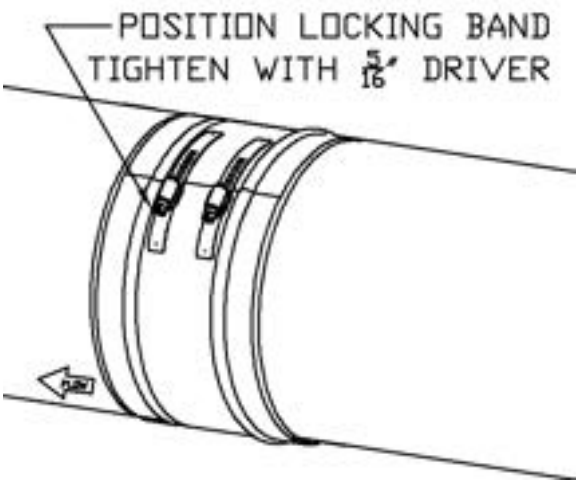

Fig 1-14. Engage Pipe & Install Locking band

Installed Vent Length

Due to the engagement of the vent sections, the effective installed length of any vent pipe or fitting is 2-3/16" less than the described length.

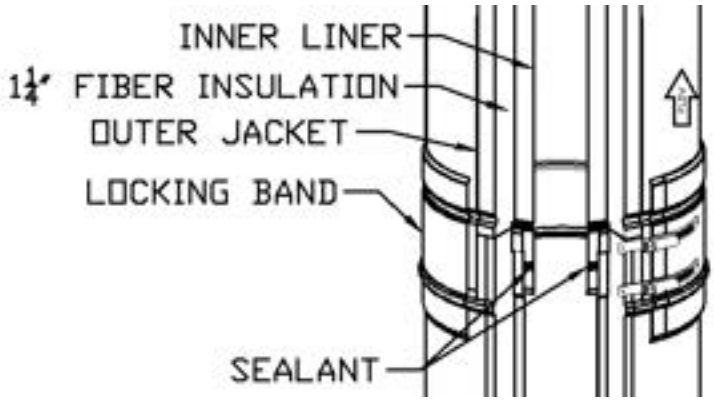

Fig 1-15. DW-NAKS-CK-RC Assembly (Cutaway View)

SECTION 2 – SUPPORT & GUIDING

Vertical Support Spacing and Limits

NAKS-CK Grease Duct must be supported properly. Several support options are available. Refer to Table 2-1 and Fig 2-1 (Dim A) for maximum support height capabilities. For all support options, ensure non-combustible hanger straps (or similar) are secured into joists or other solid structures. Ensure all minimum clearances to combustibles are maintained. Never drill or screw through the vent system. Additional support must always be located at an elbow or offset to prevent unacceptable stress on that fitting.

Table 2-1 – Maximum Support Height (Dim A)

Dim A - Maximum Support Height (Feet)			
Diameter	SW-NAKS-CK	DW-NAKS-CK-RC	DW-NAKS-CK-ZC
Anchor Plate Support (APS) or Plate Support (PS)			
3" - 6"	300	239	124
7" - 10"	300	172	98
11" - 13"	300	136	78
14" - 18"	300	101	60
20" - 24"	231	77	46
26" - 30"	222	70	44
32" - 36"	213	69	43
38" - 48"	84	32	21
Anchor Plate Support (APS) or Plate Support (PS) with Heavy Duty Base (HDB)			
3" - 6"	300	239	126
7" - 10"	300	247	139
11" - 13"	300	251	144
14" - 18"	300	191	112
20" - 24"	300	146	88
26" - 30"	275	89	55
32" - 36"	230	75	47
38" - 48"	91	34	23
Anchor Plate Support (APS) or Plate Support (PS) with Wall Bracket (WB)			
3" - 6"	200	56	29
7" - 10"	119	36	20
11" - 13"	90	28	16
14" - 18"	66	21	13
20" - 24"	49	16	10
26" - 30"	29	10	6
32" - 36"	24	8	5

Vertical Guide Spacing

In addition to vertical support, NAKS-CK grease duct systems require guides to maintain proper alignment of the system and lateral support for wind loads. Refer to Table 2-1 & Fig. 2-1 (Dim B) for Vertical Guide Spacing. Applicable vertical guides are FAR Full Angle Ring, LSB Light Support Band, and GWB Guy Wires Band. For Maximum Vertical Unsupported (Freestanding) Height above the support see Dim. C.

Table 2-2 – Vertical Guide Spacing Between Supports (Dim B) & Max Vertical Unsupported / Freestanding Height Above Support (Dim. C)

	Vertical Guide Spacing	
Diameter	(Dim. B)	(Dim. C)
3" – 24"	19'6"	10'
26" – 36"	20'4"	8' 2"

Horizontal Support Spacing

Horizontal installations of NAKS-CK Grease Duct require guides to maintain proper alignment of the system and lateral support for wind loads. Refer to Table 2-3 and Fig. 2-2 for Horizontal Spacing.

Applicable horizontal supports are FAR Full Angle Ring, HAR Half Angle Ring, LSB Light Support Band, and GWB Guy Wires Band. Refer to corresponding section for detailed instructions.

Table 2-3 – Maximum Horizontal Support Spacing Between Supports (Dim. D).

Diameter	(Dim D)
3" – 14"	15'
16" – 24"	12'
26" – 36"	9'
38" – 48"	8'

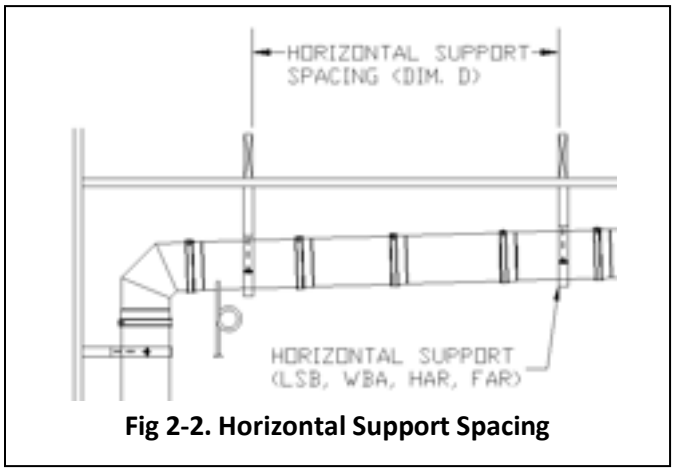

Fig 2-2. Horizontal Support Spacing

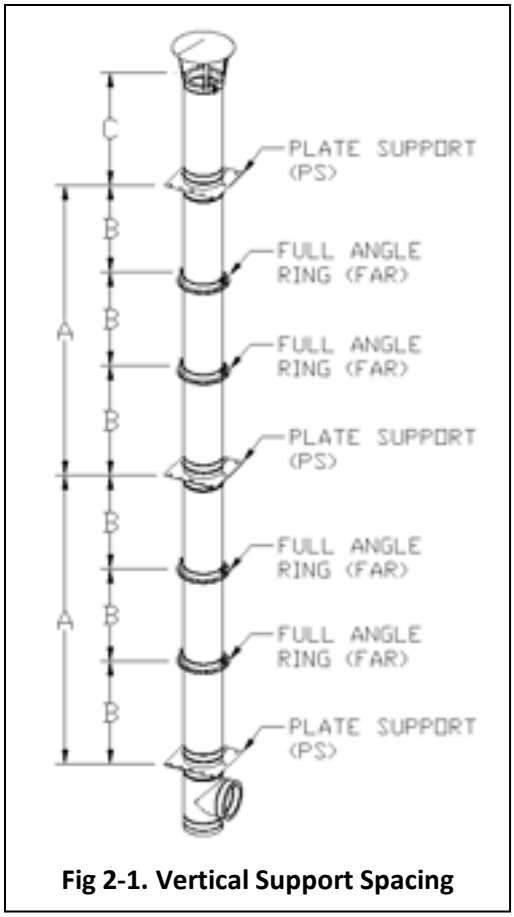

Fig 2-1. Vertical Support Spacing

Anchor Plate Support (APS)

The APS is a section of vent that is used to provide vertical support sections and provide an anchor support for horizontal sections. The APS must be anchored with rigid structural members by the installing contractor. The structural project engineer should select support members in accordance with good engineering practice to suit each specific application or follow the guidelines in Figs 2-4 & 2-7. The Anchor Plate Support may only be attached to non-combustible construction such as block, concrete, or steel. DO NOT ATTACH THE SUPPORT PLATE TO COMBUSTIBLE MATERIALS. See Table 2-1 for Maximum Support height. It can be supported with standard Wall Brackets (WB) or with field fabricated supports.

To Install (See Fig 2-3):

1. Use supplied fasteners to bolt APS to WB (optional) or other support member.
2. Secure WB or other support member to joist or other solid structure.
3. Install adjoining vent sections as described in Joint Assembly section.

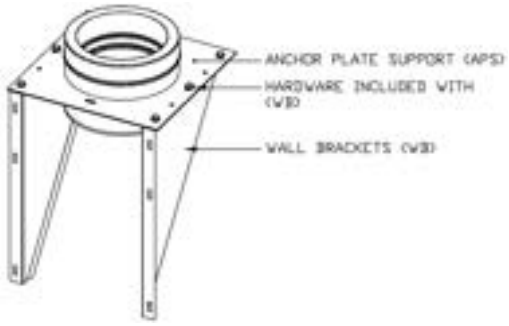

Fig 2-3. APS & WB

Wall Brackets (WB)

The wall bracket provides a mounting surface for the APS. The WB must be anchored with rigid structural members by the installing contractor. The structural project engineer should select support members in accordance with good engineering practice to suit each specific application See Fig 2-3.

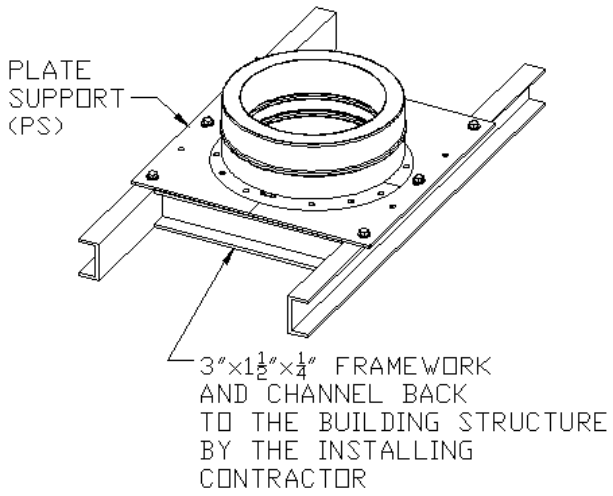

Fig 2-4. APS Support for Vertical

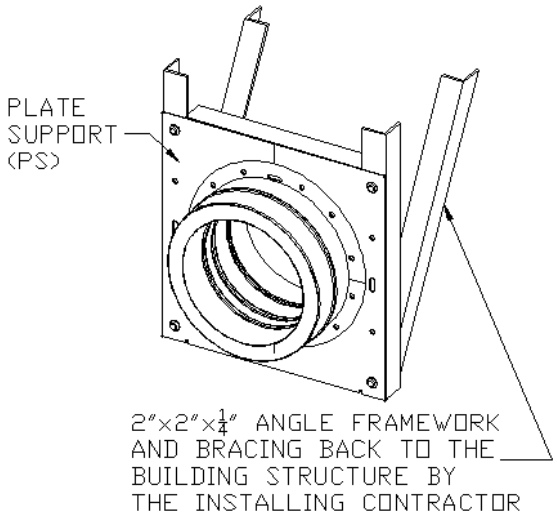

Fig 2-5. APS Support for Horizontal

HEAVY DUTY BASE (HDB)

The HDB is a factory-built base and framework for the Plate Support. It allows quick and easy installations when bracing the support back to the building structure. The installing contractor only provides the channel as Heavy-Duty Base acts as the framework. See Figs 2-6 & 2-7.

Hardware for attaching the Plate Support to the HDB Heavy Duty Base is supplied with the base.

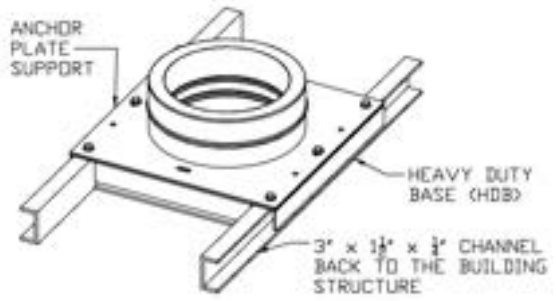

Fig 2-6. HDB Support for Vertical

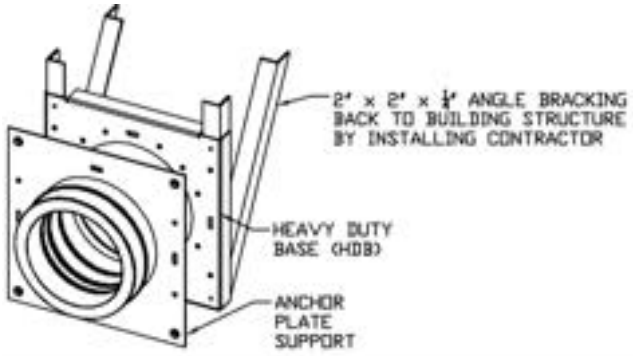

Fig 2-7. HDB Support for Horizontal

Half Angle Ring (HAR)
The Half Angle Ring is used to support/guide horizontal installations of vent. It may be suspended by threaded rods or angle iron. See Full Angle Ring (FAR) for outdoor or vibrating installations. See Fig 2-8.

Full Angle Ring (FAR)
The Full Angle Ring is used as a vertical guide to keep system aligned and provide horizontal support. It is braced to the building structure by the installing contractor. It can also be used in horizontal configurations where exposed to weather (wind) or on vibrating or high-pressure applications such as engine exhaust. See Figs 2-9 to 2-13

Light Support Band (LSB)
The Light Support Band can be used on low pressure and low temperature applications such as heating boiler stacks (not for use with engine or turbine exhaust) for support/guide in horizontal or vertical installations.

The band firmly clamps around the pipe outer jacket and includes four (4) ¼" x 20 stainless steel nuts and bolts. Remaining hole in the middle where wires or threaded rods (by the installing contractor) are used for support or guiding back to the building structure. See Fig 2-11.

Guy Wires Band (GWB)
The Guy Wires Band permits easy connection for three (3) guy wires at 120 degrees apart. The band firmly clamps around the pipe outer jacket and includes three (3) ¼" x 20 stainless steel nuts and bolts. See Fig 2-12.

The actual guy wires are by others, the structural engineer should select wire size in accordance with good engineering practice to suit each specific application. See Fig 2-14.

Fig 2-8. HAR

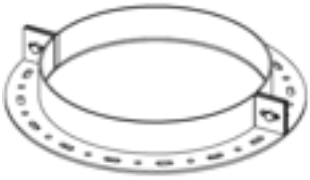

Fig 2-9. FAR

Fig 2-11. LSB

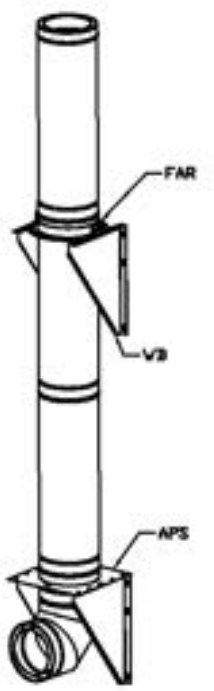

Fig 2-10. FAR

Fig 2-12. GWB

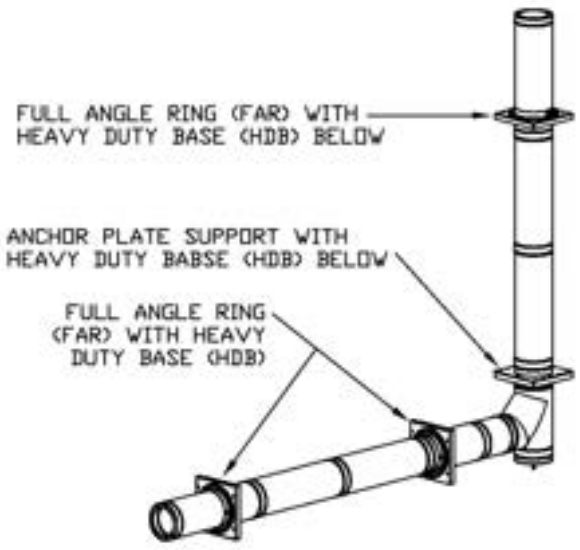

Fig 2-13. GWB

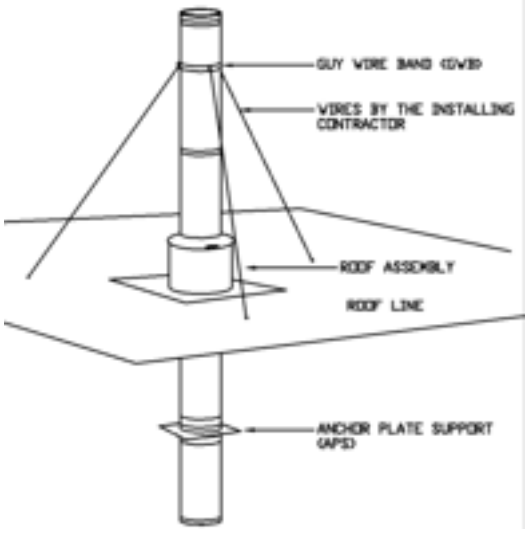

Fig 2-14. GWB

Fixed Pipe Lengths (__L)

NAKS-CK Grease Duct is available in a variety of fixed pipe lengths (e.g., 12", 18", 24", 30", 36", 42", & 48"). Refer to the catalog for available sizes. Additionally, where required, custom lengths may be ordered. Refer to the corresponding Joint Assembly section for installation instructions.

Fig 3-1. Fixed Lengths

Adjustable Length (AL)

The AL is used where odd length of vent is required. It is not intended to accommodate thermal expansion. The AL includes a Slip Section, AL-Locking Band and a Wraparound style outer jacket (DW-NAKS-CK-RC and DW-NAKS-CK-ZC only). The minimum installed length is 7" long. The Maximum installed length is 19" long.

To Install (See Figs 3-2 to 3-4):

1. Slide the Slip Section inside the adjacent pipe to the desired length. If the Slip Section is too long and interferes with elbow or other component, the extra length can be cut off.
2. Clean/Prepare surface and apply sealant between the Slip Section the connecting pipe to create a seal.
3. Position the AL-Locking Band over the female inner of adjoining pipe. Tighten AL-Locking Band to secure it in place.
4. Wrap the inner flue with provided insulation. It may be necessary to trim the insulation wrap to not interfere with the adjoining stationary length.
5. Install wraparound style outer around outer jacket around the upper outer section of the AL and the outer of the adjacent stationary length.
6. Tighten gear clamps on outer wraparound jacket to secure it in place. For exterior installations, apply J-400 Silver Silicone Sealant between the joint of the Outer Jacket and the pipe to prevent precipitation from entering the insulated wall section.
7. Refer to NAKS-CK Joint Assembly Section for instructions on installing the subsequent components.

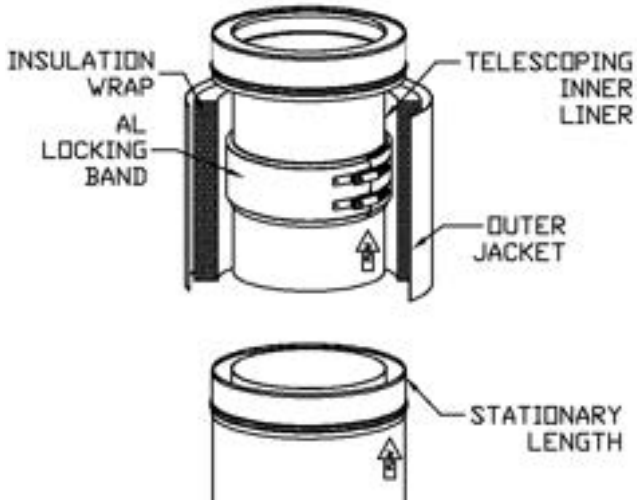

Fig 3-2. Adjustable Length (AL)

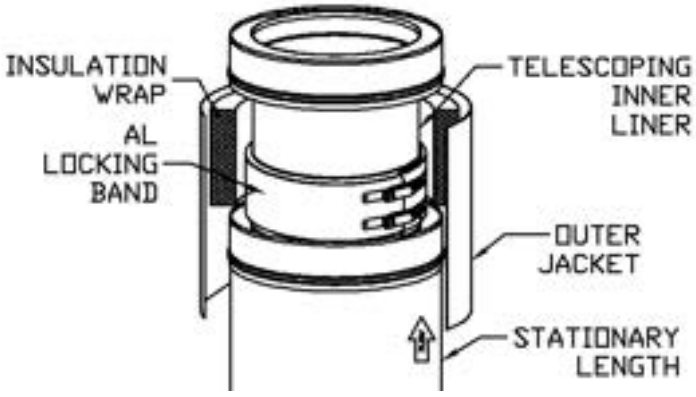

Fig 3-3. Secure Inner Locking Band

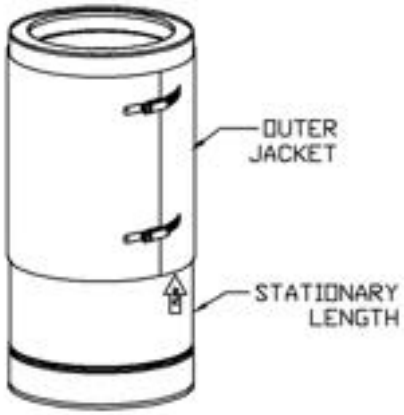

Fig 3-4. Secure Outer Jacket

Cutting a pipe to Length

NAKS-CK Pipe Lengths are specifically engineered to be field cut to desired length. This permits the greatest flexibility for complicated installations.

- Minimum installed length is 5.3".
- Maximum installed length is the length of the standard fixed length minus 4.4"

Cut Pipe Lengths are used in all applications and have been evaluated by UL and confirmed suitable for positive internal pressures up to 20" W.C.

IMPORTANT: Proper installation of the Cut Pipe Length involves a procedure of very careful measurement and cutting (either in the field or shop) of the outlet end(s) of the Cut Pipe Length with appropriate equipment and technique to achieve a clean, burr free, straight end(s). Experienced sheet metal tradesmen are familiar with such equipment and techniques and should be used for such purpose.

Examples of equipment commonly used for such purpose include:

Type 27 Right Angle Grinder Cutting Wheels for stainless steel and NOGA Model DB1000 double edge deburring tool for thin sheet metal.

Arrow shows direction of flue gas flow, or up direction.

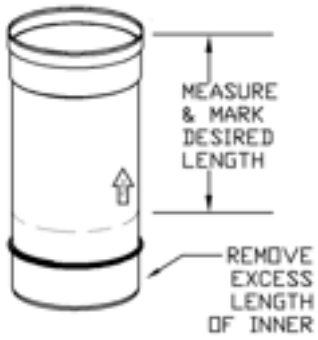

Fig 3-5. SW-NAKS-CK Cut to Length

SW-NAKS-CK Pipe Cut to Length

NOTE: An SW-NAKS-CK Cut Length Band (CLB) is required to complete the joint assembly.

1. Field measure required distance to fill between two pipe ends.
2. Add 4.4" to determine the overall cut pipe length required.
3. Measuring DOWN from the OUTLET end of the pipe, mark a line around the perimeter of the pipe at the desired location for the cut (See Fig 3-5).
4. Using this line as a guide, cut and remove the extra material from the Male End. Deburr all cut edges (See Fig 3-6).
5. Apply Sealant on the cut end approximately 1-1/4" up from the end of the pipe.
6. Engage Cut length until it bottoms out in the adjacent female socket. (See Fig 3-8).
7. Apply additional sealant at the seam between Female Socket and Cut Length
8. Position NAKS-CK Cut Length Band (CLB) so it captures the expansion on the female inner and adjacent pipe/fitting.
9. Use a 5/16" driver to evenly tighten the CK-Cut Length Band to the pipe.

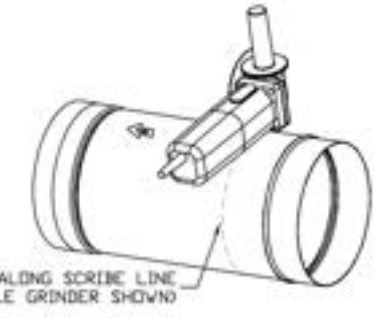

Fig 3-6. SW-NAKS-CK Cut to Length

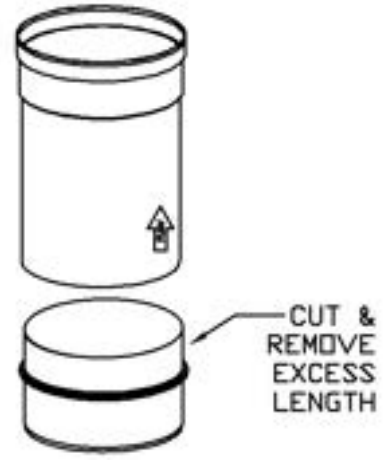

Fig 3-7. SW-NAKS-CK Cut and Remove

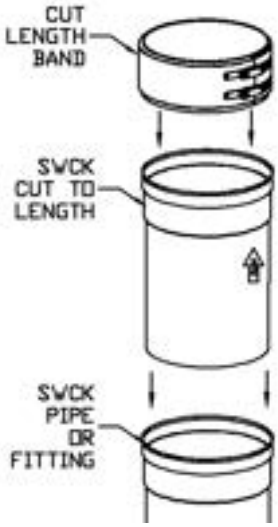

Fig 3-8. SW-NAKS-CK – Engage Joint

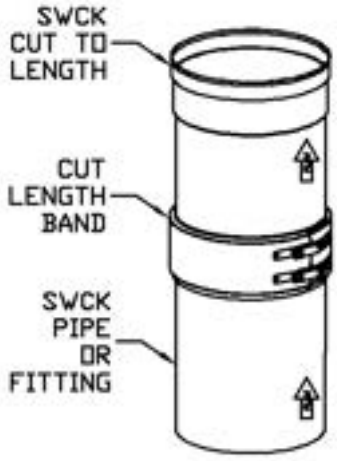

Fig 3-9. SW-NAKS-CK – Secure with Cut Length Band (CLB)

DW-NAKS-CK-ZC Pipe Cut to Length (See Fig 3-10 to 3-14.).

Cutting Double-Wall pipe to length involves a procedure of very careful measurement, cutting and repositioning of insulation. Experienced sheet metal tradesmen are familiar with such equipment and techniques and should be used for such purpose. Additionally, Cut Length Pipe sections (CL) are available to facilitate with this procedure.

To Assemble:

1. Field measure required distance to fill between two pipe ends.
2. Add 4.4" to determine the overall cut pipe length required.
3. Measuring up from the inlet end of the pipe length, mark a line around the perimeter of the cut length at the desired location for the cut (See Fig 3-10).
4. Using this line as a guide, cut the extra material (outer wall and insulation) away leaving the inner liner extending past the outer (See Fig 3-11 & 3-12).
5. Slide the remaining Outer Jacket and insulation up so that it is flush with the Female Socket of the Inner Liner (See Fig 3-13).
6. Measure and mark a second line around the inner liner to indicate the length that needs to be removed from the male Inner liner (See Fig 3-13).
7. Cut and remove the Male Inner (See Fig 3-14).
8. Deburr all cut edges
9. Refer to NAKS-CK Joint Assembly section for instructions for to complete the Joint Assembly.

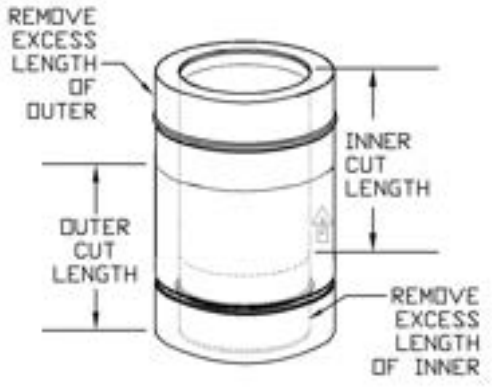

Fig 3-10. DW-NAKS-CK-ZC Measure & Mark Cut Line

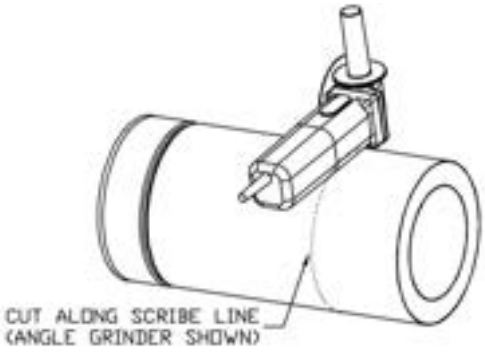

Fig 3-11. DW-NAKS-CK-ZC Cut to Length

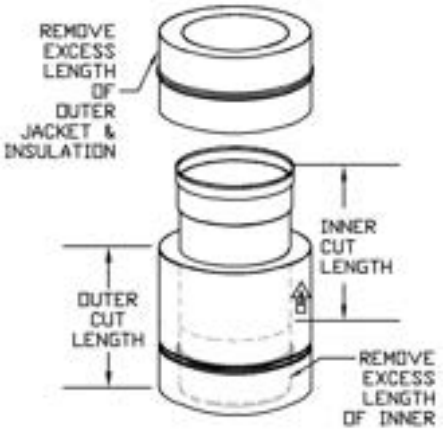

Fig 3-12. DW-NAKS-CK-ZC - Cut and Remove Outer Jacket & Insulation

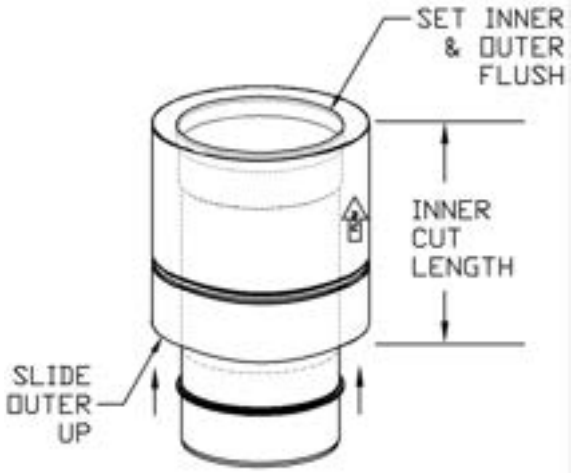

Fig 3-13. DW-NAKS-CK-ZC Reposition Outer Inner & Outer to be Flush

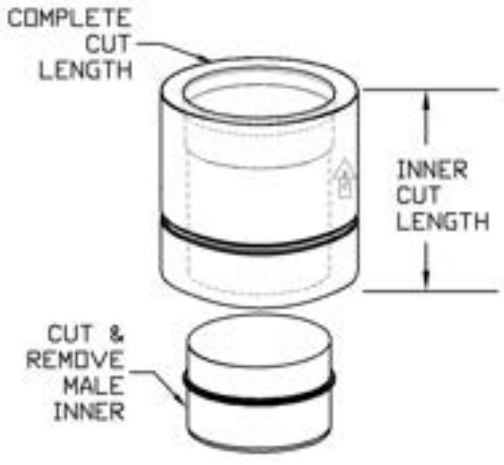

Fig 3-14. DW-NAKS-CK-ZC Cut & Remove Inner Male End

Cut Length (18CL & 24CL)

Any NAKS-CK Pipe can be cut to length, however, the CL provides the easiest installation method for cutting and accommodating odd lengths in the field. The CL includes an inner flue pipe (18" or 24" long), insulation wrap and a Cut Length Band (CLB). See Fig 3-15.

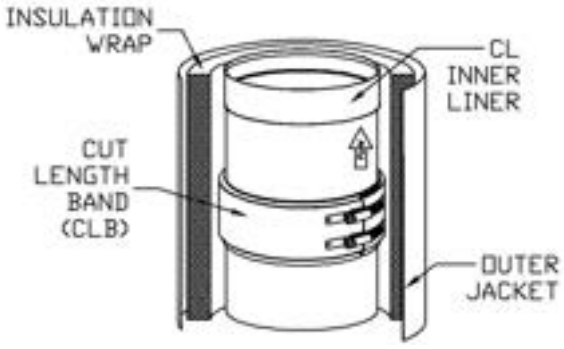

Fig 3-15. Cut Length (CL)

To Assemble:

1. Field measure required distance to fill between two pipe ends.
2. Add 4.4" to determine the overall cut pipe length required.
3. On the inner pipe, Measure DOWN from the OUTLET end of the pipe, mark a line around the perimeter of the pipe at the desired location for the cut (See Fig 3-5).
4. Using this line as a guide, cut and remove the extra material from the Male End. Deburr all cut edges (See Fig 3-6).
5. Apply Sealant on the cut end approximately 1-1/4" up from the end of the pipe.
6. Engage Cut length until it bottoms out in the adjacent female socket.
7. Apply additional sealant at the seam between Female Socket and Cut Length
8. Position NAKS-CK Cut Band so it captures the expansion on the female inner and adjacent pipe/fitting (See Fig 3-17).
9. Use a 5/16" driver to evenly tighten the NAKS-CK Cut Band to the pipe.
10. Install next adjoining pipe section. Refer to NAKS-CK Joint Assembly Section. (See Fig 3-18).
11. Wrap the inner flue with provided insulation. It may be necessary to trim the insulation wrap to not interfere with the adjoining stationary length (See Fig 3-19).
12. Install wraparound style outer around outer jacket around the upper outer section of the CL and the outer of the adjacent stationary length.
13. Tighten gear clamps on outer wraparound jacket to secure it in place. For exterior installations, apply J-400 Silver Silicone Sealant between the joint of the Outer Jacket and the pipe to prevent precipitation from entering the insulated wall section.
14. Refer to NAKS-CK Joint Assembly Section for instructions on installing the subsequent components.

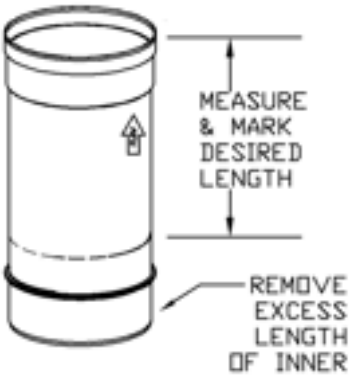

Fig 3-16. Measure & Cut inner pipe to length

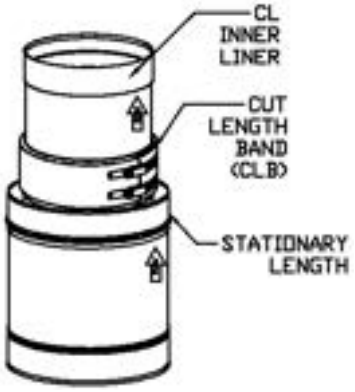

Fig 3-17. Install CLB

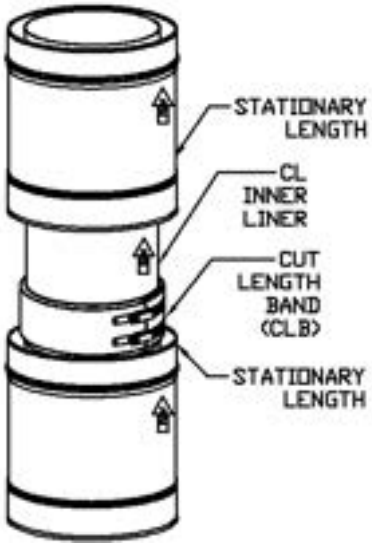

Fig 3-18. Install Adjacent Pipe section

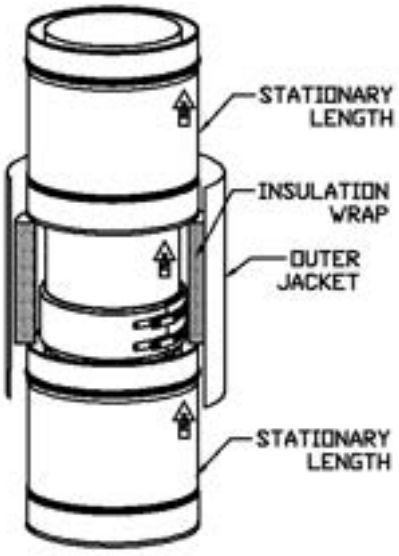

Fig 3-19. Install Insulation Wrap

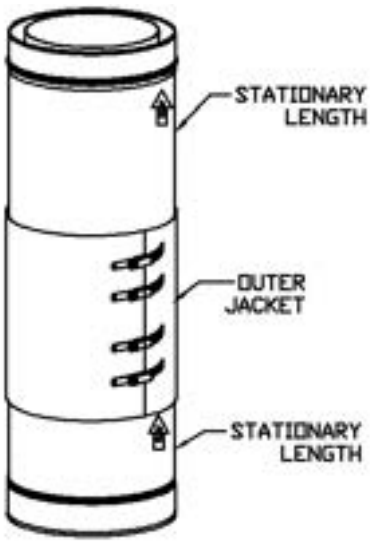

Fig 3-20. Install Outer Jacket

Test/Nozzle Port Length (TPL)
A Test/Nozzle Port Length can be used for monitoring flue gases, horizontal Grease Duct drain, or implementing internal cleaning equipment inside the pipe. Standard is one 1" NPT nipple, but any size can be factory installed and in multiple configurations.

All ports are continuously welded to the inner pipe. Gaskets or sealant used to connect other equipment and supporting of this equipment is by others. See Fig 3-22.

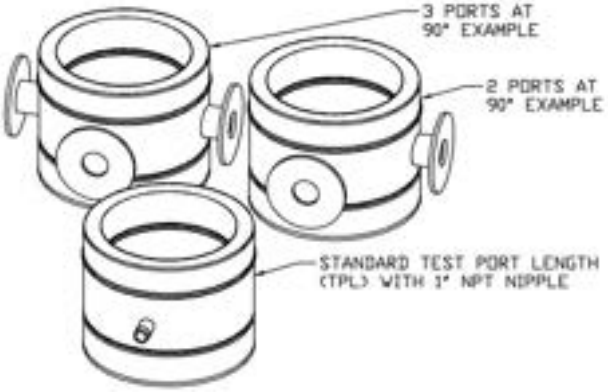

Fig 3-22. TPL

Special Considerations for Fittings
Notice: Tees, Elbows and other fittings must be protected from forces caused by thermal expansion and system weight. Where thermal expansion exceeds 0.375" prior to the fitting, it must be anchored with a support and provisions for thermal expansion be provided. After the fitting, the system is to be re-supported to accommodate weight from additional vent lengths.

Fig 4-1. Elbows

Elbow (__EL)
Elbows are used to provide changes in direction. They are available in a variety of standard angles (1.5°, 3°, 15°, 30°, 45°, 70°, 87°, & 90°). Refer to the catalog for available sizes. Additionally, where available, custom lengths may be ordered. Elbows are installed similar to standard pipe. Refer to the corresponding Joint Assembly section for installation instructions.

Fig 4-2. Tees & Boot Tees

TEE (__T)
Used as a manifold entry Tee, offset with one of the access cap options, or base Tee with one of the drain tee caps options. Snout can be same or any size smaller than the body.

87° & 90° Boot Tee (__Bt)
Boot Tees offer the added 45-degree gore that directs the flue gases towards the outlet at a 45-degree angle. Most others still allow the flue gases to enter the outlet branch at 90-degrees. Snout can be same or any size smaller than the body.

45° Double Tee (45DT)
Used as a two-way manifold entry Tee, offset with one or two of the access cap options, or base Tee with one of the drain tee caps options. Snouts can be any size smaller than the body. See Fig 4-3.

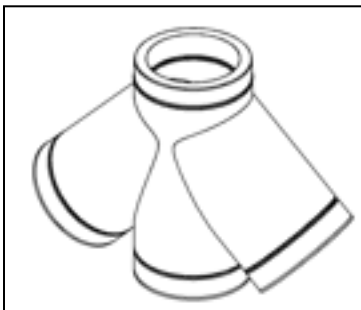

Fig 4-3. 45DT

90° Wye Tee (90WT)
Used for two-way entries where a tee cap or access cannot be used due to the application or as a 90° that can have an access cap at the middle. See Fig 4-4.

Fig 4-4. 90WT

Tee Cap Access (TCA)
Tee Cap Access permits access to the inside of the vent for inspection and/or cleaning. It can be placed at the end of a snout of any three or four-way fitting.

Gasket and hardware are included so that the internal cap may be removed and reinstalled. See Fig 4-6.

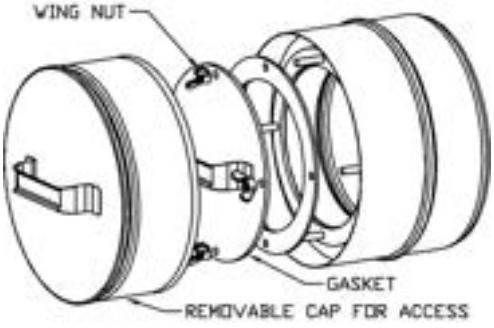

Fig 4-6. Tee Cap Access

Increasers and Reducers
Reduction fittings are typically used in manifold applications when needed. There are many options for increasers and reducers.

Tapered Increaser & Reducer (TI & TR)
Tapered Increasers and Reducers keep the same centerline. Be cautious of using these in the horizontal, due to increased or decreased diameter changes this will cause a low point in the exhaust where condensate can trap. Use the Eccentric increaser and reducer in horizontal installations instead.


Fig 4-7. Tapered Eccentric Increasers & Reducers

Tapered Eccentric Increaser & Reducer (TEI & TER)
Tapered Eccentric Increasers and Reducers keep the same low point or are flat on bottom. They also create a slight centerline offset if used in the vertical installation

Stepped Increaser & Reducer (SI & SR)
Stepped Increasers and Reducers can be used in tight situations and are available in all steps.
The stepped increasers and reducers are non-structural part and must not be subject to loads in either the axial or lateral directions.

Be cautious of using these in the horizontal. Increased or decreased diameter changes will cause a low point in the exhaust where condensation can trap. Use the Eccentric increaser and reducer parts in horizontal installations instead.


Fig 4-8. Stepped Increasers & Reducers

Stepped Eccentric Increaser & Reducer (SEI & SER)
Stepped Eccentric Increasers and Reducers can be used in tight situations and are available in all steps.
The Stepped Eccentric Increasers and Reducers are non-structural part and must not be subject to loads in either the axial or lateral directions.

Option to Reinforce Fittings
An option to requiring the use the Pressure Relief Valve in engine exhausts is to add external reinforcement to each fitting in the system. This is accomplished by using the Anchor Plate Support (APS) on the entry and exit sides and then reinforcing with external 2" x 2" x ¼" angle. Use the Heavy-Duty Base (HDB) to minimize field supplied framework.

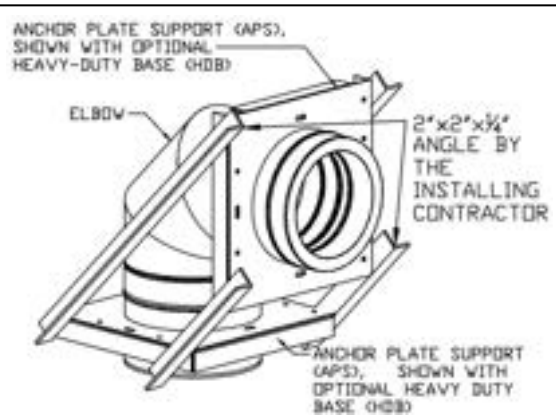

Fig 4-12 Reinforced Fitting

SECTION 5 – ADAPTERS & TERMINATIONS

Start & End Adapters
NAKS-CK Grease Duct is directional with flow therefore both START and END adapters are typically used in every application.

Up to 550°F flue gas temperatures use J-600 (Dow Corning 736) or equivalent sealant. Above 550°F use only appliance approved gaskets/blanket (that comes with equipment you are connecting to such as ANSI flange connections on engine and power generation equipment)

Raw Collar Adapter (Inside) (RCI)
Connects NAKS-CK Grease Duct to a nominal collar via flashing inside the appliance collar. Has a support clamp around the outside that rigidly holds the adapter in place. Use approved sealant for gas tight connection. See Fig 5-2.

Flange Collar Kit (FCK)
Connects NAKS-CK Grease Duct to any flanged appliance outlet and includes a split plate and beam clamps. Use approved sealant for gas tight connection

Fig 5-2. Raw Collar Adapter Inside (RCI)

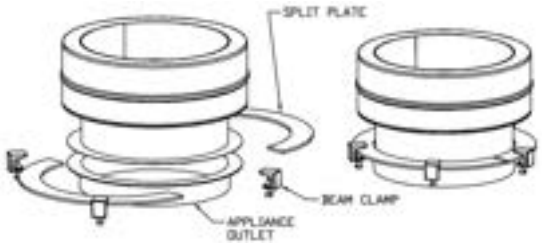

Fig 5-3. Flange Collar Kit (FCK)

Raw Collar Outside Adapter (RCO)
The Raw Collar Outside Adapter is used to add a flange on an appliance outlet for connection purposes.
To Install (See Fig 5-6.):

1. Select correct sealant based on flue gas and application (See Joint Assembly Section). Clean/Prepare all surfaces will sealant to be applied.
2. Apply sealant to the outside surface of the appliance outlet.
3. Clamp the RCO outside of appliance outlet.
4. Secured by tightening tensioner bolts.
5. Refer to Joint Assembly section to install subsequent flange pipe sections.

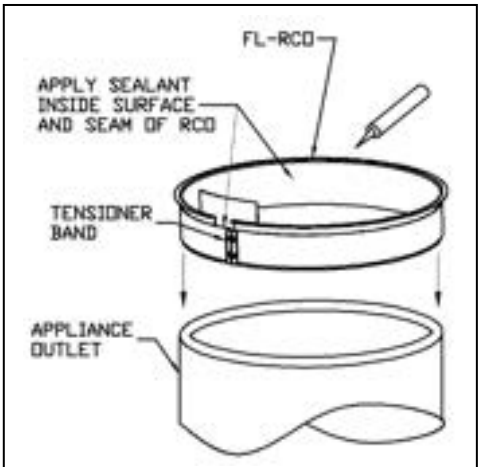

Fig 5-6. Raw Collar Outside Adapter

Raw Collar Adapter (Outside) Start & End (RCOS & RCOE)
Connects NAKS-CK Grease Duct to a nominal collar on the outside of the appliance collar. The adapter is split and uses hardware to tighten against the outside of the collar. Use approved sealant for gas tight connection. (See Fig 5-7)

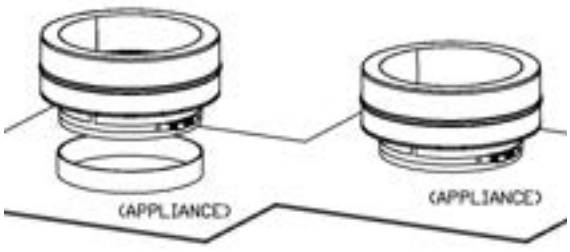

Fig 5-7. Raw Collar Outside Adapter

No-Weld Hood Adapter (NWHA)
Connects NAKS-CK Grease Duct to a kitchen exhaust hood without the need for field welding.
To Install (See Fig 5-8A & 8B):

1. Using the Lower ring as a template, scribe and cut center hole and pilot holes in Appliance Hood
2. Align Flanged Pipe Collar on top of appliance hood
3. Apply Gasket between collar connection and appliance hood
4. Align 2-Piece Receiver on top of Flanged Pipe Collar
5. Install Bolts in the lower ring, through Appliance hood and into 2-piece receiver and tighten securely.

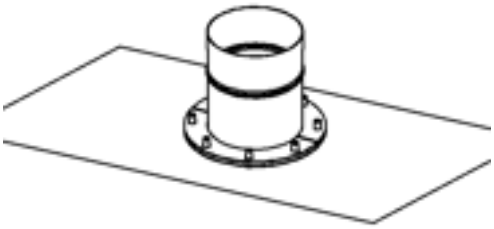

Fig 5-8A. NWHA Installed

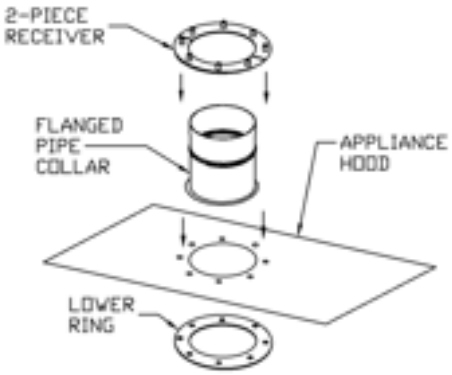

Fig 5-8B. NWHA - Exploded

Fan Plate Adapter (FP)
This is a heavier gauge flat plate that can be used to start at a masonry fireplace outlet, or to attach a fan or fan curb housing at the termination.

When used as a Fan Plate Adapter End (as shown in Figure 5-10), the flat plate is designed to set directly on top of the roof curb (by others). The installing contractor uses bolts or screws through the plate into the curb.

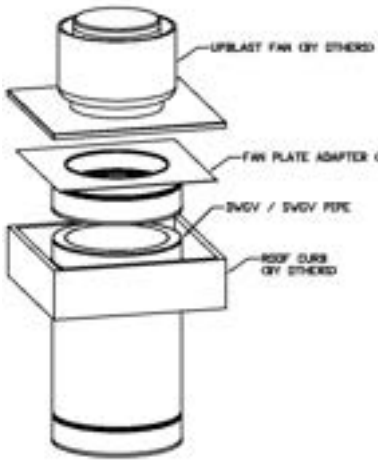

Fig 5-10. Fan Plate Adapter

Single-Wall to Double-Wall Adapters (D2S & S2D)
These adapters allow a smooth transition to and from Double-Wall and Single-Wall. They may be installed vertically or horizontally.
See Fig. 5-11.

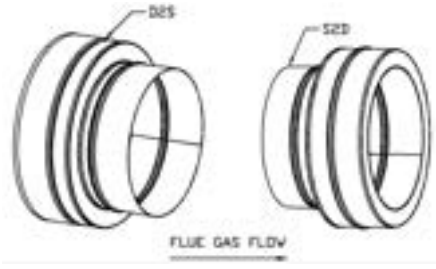

Fig 5-11. Single/Double Wall Adapters

Transition to Round Start & End (TRS & TRE)
Used to connect to and from rectangular or square outlets on hood, fans, or auxiliary equipment. Transitions are custom made to order for project requirements. The rectangular or square base can be made in accordance with NFPA-96 no-weld hood connection or may be field welded by the installing contractor. See Fig. 5-12.

Fig 5-12. Transition to Round

Terminations
See SECTION 1 - GENERAL INFORMATION for termination height above roof requirements.

There are two options to most terminations:
No Screen (N) or With Screen (S).
NAKS uses 1" x 1" x 0.059" thick stainless-steel wire mesh for termination screens. The purpose of a screen is to not allow debris or personnel into the exhaust and also used to restrict rodents or birds from entering the exhaust.

Miter Cut Termination W/ Screen (MCS)
The Miter Cut Termination can be used horizontal venting. Refer to corresponding Joint Assembly and termination requirements section for installation procedure & requirements. See Fig 5-17.

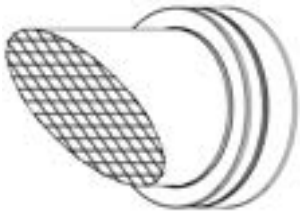

Fig 5-17.
Miter Cut w/ Screen

SECTION 6 – THIMBLES & FLASHINGS

Thimble & Flashing Application Requirements
Thimbles provide for safe installation where NAKS-CK grease duct passes through a combustible wall or ceiling. See Table 6-1 for selection of required Thimble and corresponding flashing and storm collar.

Non-Combustible Roof or Wall penetrations do not require Thimble. Framing dimension is as required for installation, access, inspection or per local code.

Table 6-1 - Thimble & Flashing requirements for Combustible Roof / Wall Penetrations

UL Listing / Application	Flue Gas (Max)	Framing Dimension	Roof Thimble	Flashing	Storm Collar	Wall Thimble	Fire-Rated Wall / Floor Penetration
UL-1978 / ULC-S662 Grease Duct	500°F / 2,000°F	Table 1-4	HTT	FRF or PRF	SC	HTT	N/A
UL-2221 / ULC-S144 Fire Resistance Assy.	500°F / 2,000°F	Table 1-4	HTT	FRF or PRF	SC	HTT	TPF

High Temperature Thimble (HTT)
This roof thimble provides safe installation against combustible materials. It is part of the Unvented and the Vented Roof Assemblies (see Figure 6-2). Only for Double-Wall use.

The thimble is fiber insulated and includes a lateral pipe guide with hardware at the top. The thimble extends 12" from the installation brackets. Hardware to connect brackets to the roof or wall is not included.

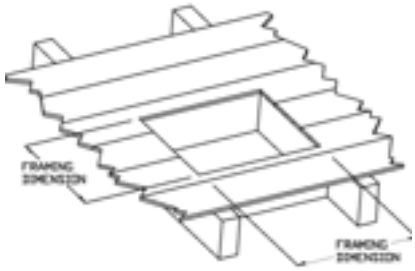

Fig 6-1. Roof/Wall – Framing (See Table 1-2)

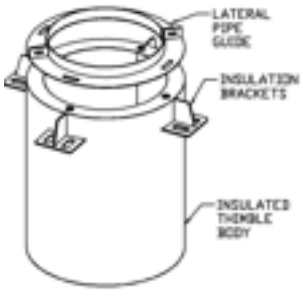

Fig 6-2. HTT

Single Wall

In Grease Ducts, the single wall Model SW-NAKS-CK is intended to be an alternative option to field welded kitchen exhaust ducts as defined by NFPA-96. In this application these models have the same air space clearance to combustibles as field welded.

Slope

Mechanical codes and good practice require that some slope (back to a grease reservoir or kitchen hood) be created to prevent pooling of grease within horizontal portions of grease duct systems. Per code, grease duct systems are required to incorporate a minimum ¼" per foot slope. Some codes require ¼" per foot for runs less than 75' in length and 1" per foot for runs of 75' and more.

While such slopes are critically important for flat bottom grease ducts in order to prevent pooling, it is well acknowledged that cylindrical ducts prevent pooling with far less slope.
Engineering analysis, including hydraulic fluid calculations and tests confirm that pooling of grease within factory-built, cylindrical grease duct systems can be achieved with far less slope compared to flat bottomed systems, due to the physical characteristics of their construction.

As such, per the terms of the UL Listing and in accordance with UL1978, NAKS recommends a minimum slope of 1/16" per foot (0.3 degrees) for horizontal segments of the grease duct systems. Normal system components will permit such slopes to be achieved on horizontal offsets of at least 2' in dimension. Shorter runs require no slope. Where a specific slope is desired, NAKS offers various options including 1.5°, 3° and 87° elbows as well as 87° tees.

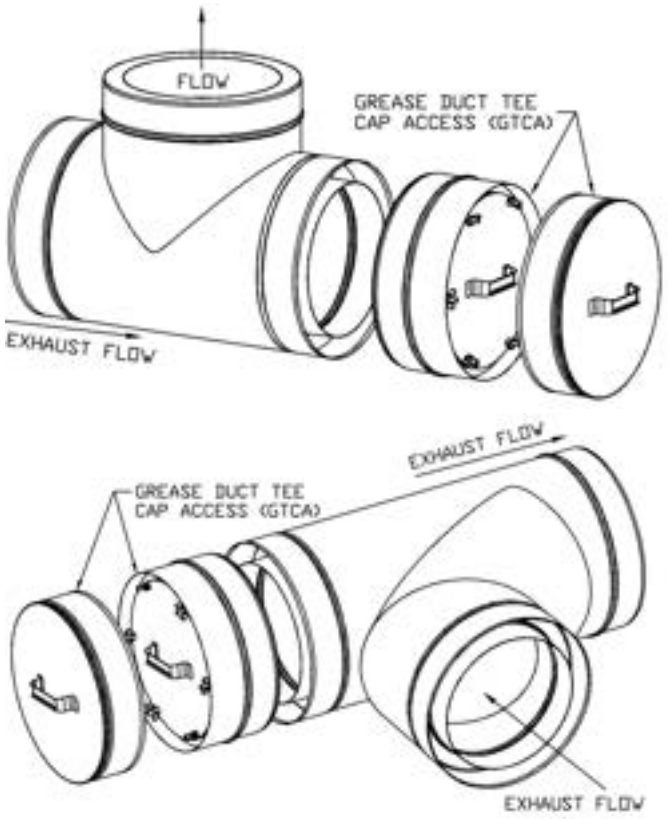

Fig 7-1 GREASE DUCT TEE (GT)

Access for Cleaning Grease Ducts

Follow NFPA-96 for required openings in Grease Duct for accessibility required for thorough cleaning. Following are some openings requirements as mentioned in NFPA-96:

1) Openings at changes of direction, if not accessible from the duct entry or discharge.
2) Access panel openings for installation and servicing of fire-extinguishing systems.
3) Access for cleaning and inspection where fans with ductwork connected on both sides within 3' of each side of fan.

Horizontal grease ducts only:

4) Opening for thorough cleaning at 12' intervals, where opening is not large enough for personnel entry.

Vertical grease ducts only:

5) Access at the top of a vertical riser to accommodate personnel descent.
6) Where personnel entry is not possible, access at every floor.

NAKS-CK Grease Duct has two standard options for access panels in Grease Duct systems. These are no-tool in design and specifically tested and Listed for Grease Duct use.
Inline Access Door (IAD), see Section 3.
Grease Duct Tee Cap Access (GTCA), see Section 4.
For Model SW-NAKS-CK single wall installations, it is permissible to install Listed Grease Duct Access Doors provided they are installed in accordance with the manufacturer's installation instructions.

Interconnection with Field Welded Grease Ducts

NAKS Grease Duct systems are intended to be installed as a complete system without the use of other manufacturer or field fabricated components. However, NAKS recognizes the occasional requirement for a rectangular portion of grease duct due to space constraints at certain locations in a system, or when making modifications or additions to an existing grease duct. In such a case, it is permissible to transition to and from Model SW-NAKS-CK & DW-NAKS-CK-RC Grease Duct to a code compliant, rectangular or round, welded steel grease duct and back again. In such a case, NAKS will manufacture and supply a custom single wall stainless steel transition, meeting code thickness requirements, that permits field welding to or from the field welded duct section(s). Maintain the minimum air space to combustibles of 18" with these custom transitions. Follow NFPA-96 regarding methods for reduced clearances for these single wall custom transitions as well as the field fabricated grease ducts.

Grease Duct Tee (__GT & __GBT)
Grease Duct Tee fittings have a reversed snout that permits accessibility for cleaning. This is available in every tee option; the arrows below dictate exhaust flow.

Grease Tee Cap Access (GTCA)
Grease Duct Tee Cap Access permits access to the inside Grease Duct for inspection and/or cleaning. It can be placed at the end of a snout of any three or four-way fitting and incorporates a 1½" tall dam to prevent liquid or grease from dropping out when opening.

Gasket and hardware are included so that the internal cap may be removed and reinstalled without tools.

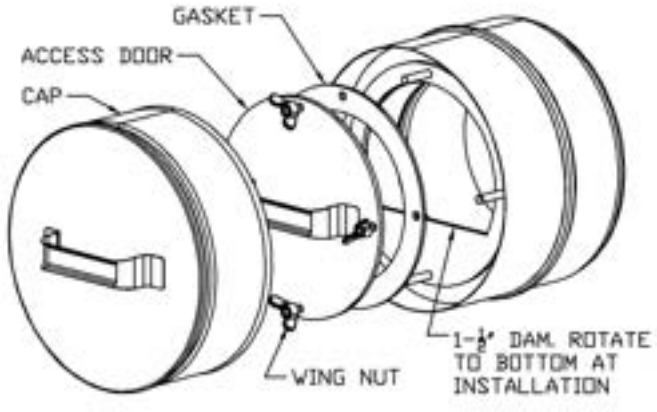

Fig 7-2 GREASE TEE CAP ACCESS (GTCA)

Inline Access Door Length (IAD)
The Inline Access Door is for the Grease Duct application and provides an easy and no-tool access to the inside exhaust for cleaning and inspection. The Inline Access Door ships fully assembled, and no modifications are required in the field.

To open the door, and gain access to the Grease Duct, follow these steps:
1. Unlatch the outer jacket clips and open the door (hinges are on the opposite side of the clips).
2. Remove the precut insulation blanket.
3. Loosen and remove the wing nuts.
4. Remove the inner door.
5. Access the Grease Duct.

Reverse the steps to close the door.

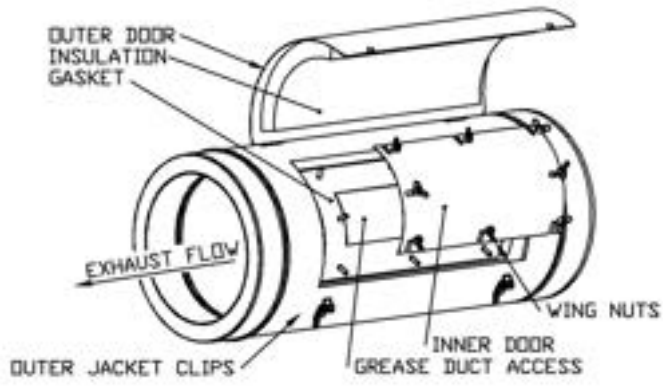

Fig 7-3 IAD

Through Penetration Firestop (TPF)

The TPF is used to retain a fire rating where (only) model DW-NAKS-CK-ZC passes through a fire-rated floor or wall. See UL Fire Resistance Directory No. R39862. Classified in Accordance With UL-2221.

For floor penetration, one TPF is installed on the top the floor. For wall penetration a TPF is to be installed on each side of the wall.

To Install:

1. Create round or square hole in fire rated wall or floor. Hole is to be a maximum of 2" larger than outside diameter of pipe.
2. Route Duct through opening.
3. Support duct with APS or PS (see Section 2).
4. Position Lower Cover Plates around the circumference of pipe. Secure by installing fasteners through pilot holes and into floor/wall surface. The Lower Cover Plates will overlap to close off hole.
5. Fill wall / floor cavity with provided insulation. Insulation to be oriented in vertical layers to create a firmly packed surface.
6. Install upper Cover Plates (See step 4)
7. Wrap Closure Band insulation around outside surface of pipe
8. Position Closure Band around insulation (from step 7) and clamp flanges together using hardware provided.
9. Apply Fire Barrier sealant around perimeter of Cover Plates and pipe circumference.

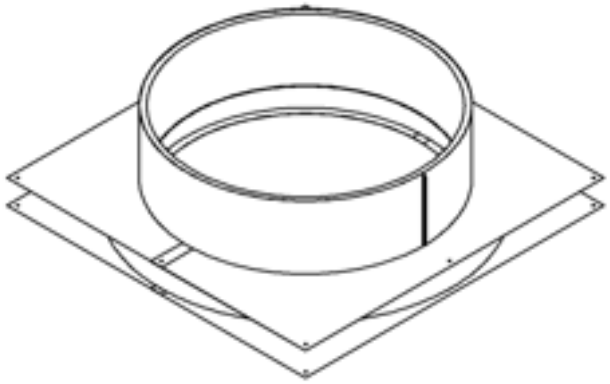

Fig 7-5 TPF (Assembled View)

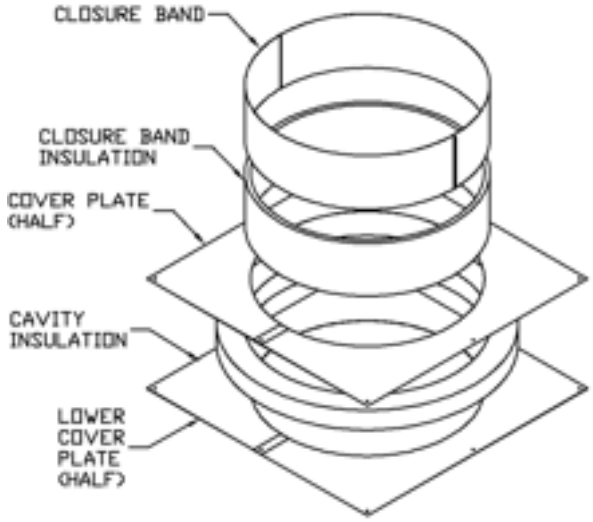

Fig 7-4 TPF (Exploded View)

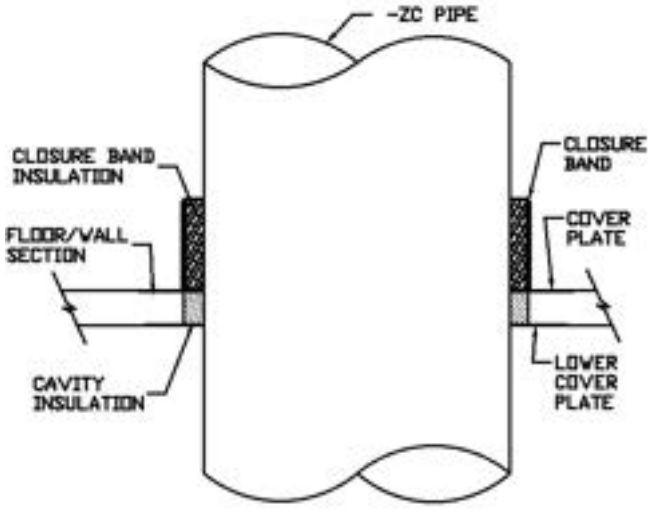

Fig 7-6 TPF

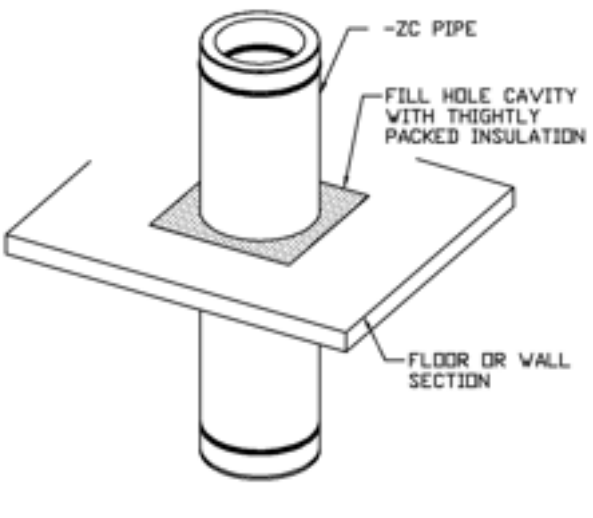

Fig 7-7 TPF

PART 8 – FINISHING STEPS, INSPECTION & MAINTENANCE

Final Check

Before completing assembly, recheck all joints to ensure the locking band has been properly installed and has captured the bead. For Category III and IV check joint for gas tightness. Confirm all clearances and support spacing is correct.

OPERATING PRECAUTIONS

Creosote and Soot – Formation and Need for Removal

When wood is burned slowly, it produces tar and organic vapors which combines with expelled moisture in the flue gases to form creosote. The creosote vapors condense in the cool chimney flue of a slow burning fire. As a result, creosote residue accumulates on the inner pipe. If ignited, this creosote makes an extremely hot fire.

For this reason, the chimney should be inspected at least once every two months during the heating season to determine if a creosote or soot buildup has occurred. If creosote or soot has accumulated, it should be removed to reduce risk of a chimney fire.

Important Notice

The UL listing for this product is void if components other than the Listed Components are used. All warranties, stated or implied, are void if the vent or appliance is installed in a non-conforming manner. After installation, check all joints and supports to assure they are secure and functioning as intended and are properly sealed for containment of flue gases.

Maintenance

NAKS recommends that the entire system be checked by a qualified inspector at least once a year after the system is placed in service.
The installation must conform to the requirements of the appliance manufacturer's instructions, the National Fuel Gas Code and local codes and regulations.

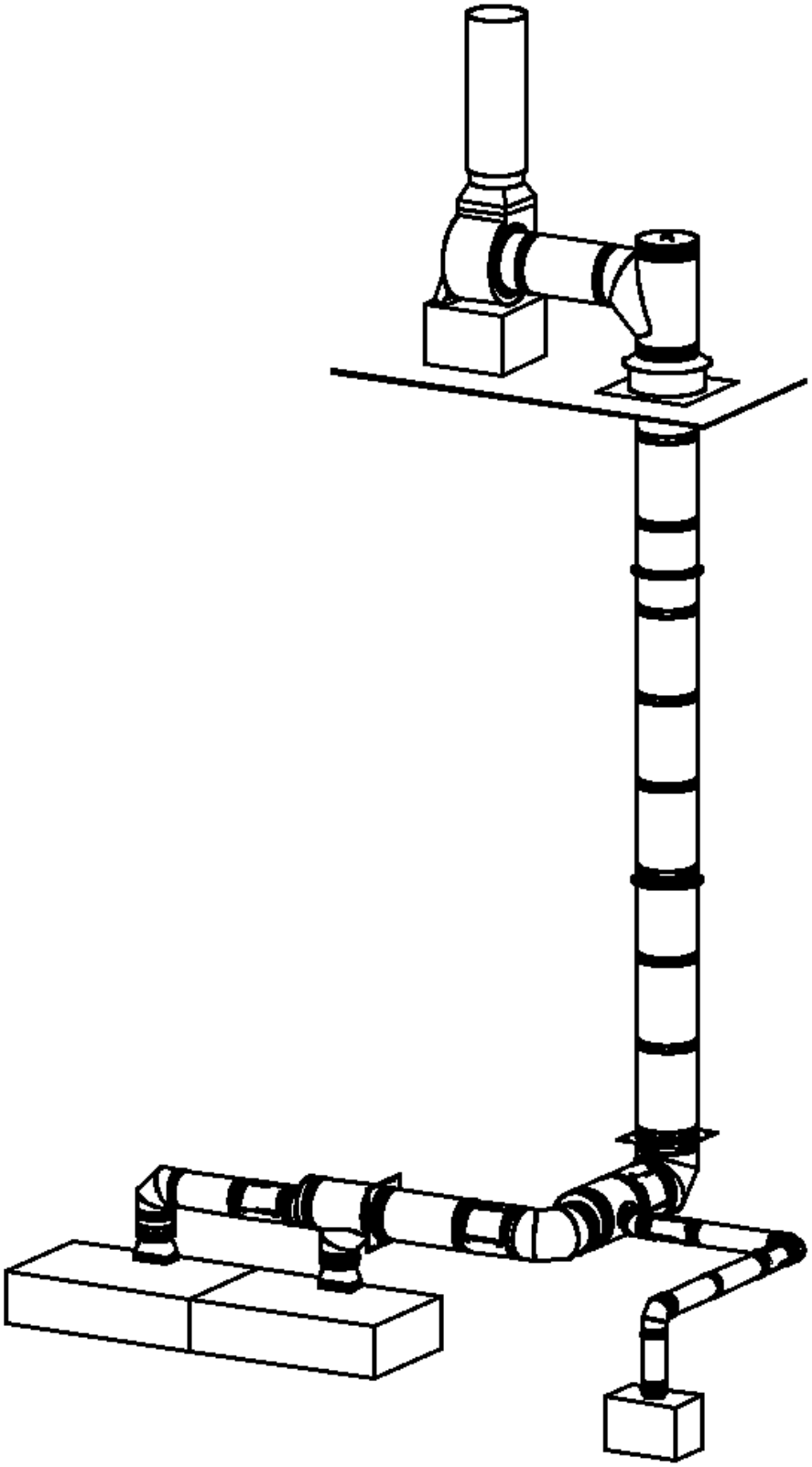

Fig 9-1. SAMPLE SYSTEM
Commercial Kitchen Exhaust

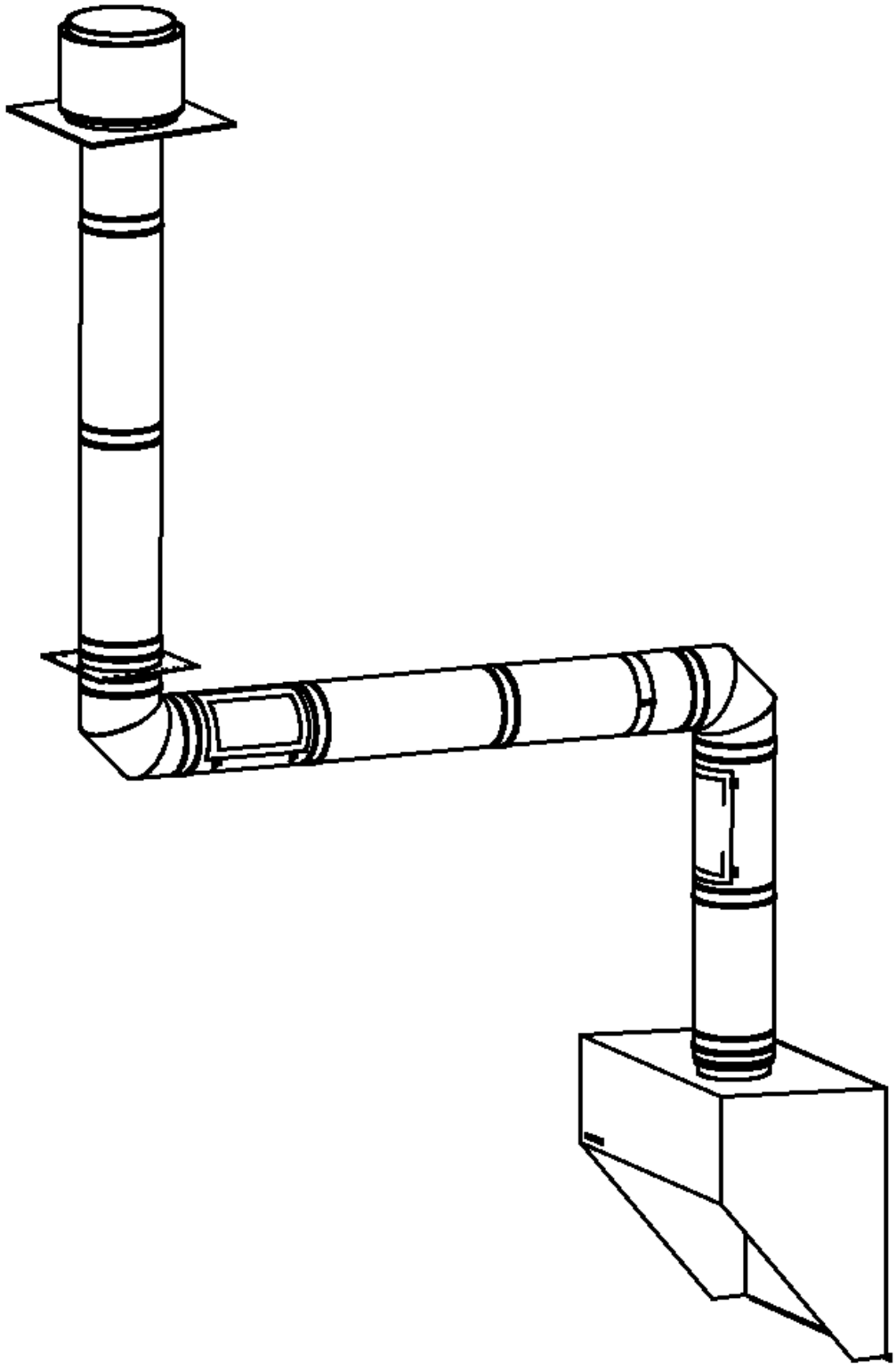

Fig 9-2. SAMPLE SYSTEM
Fast Food

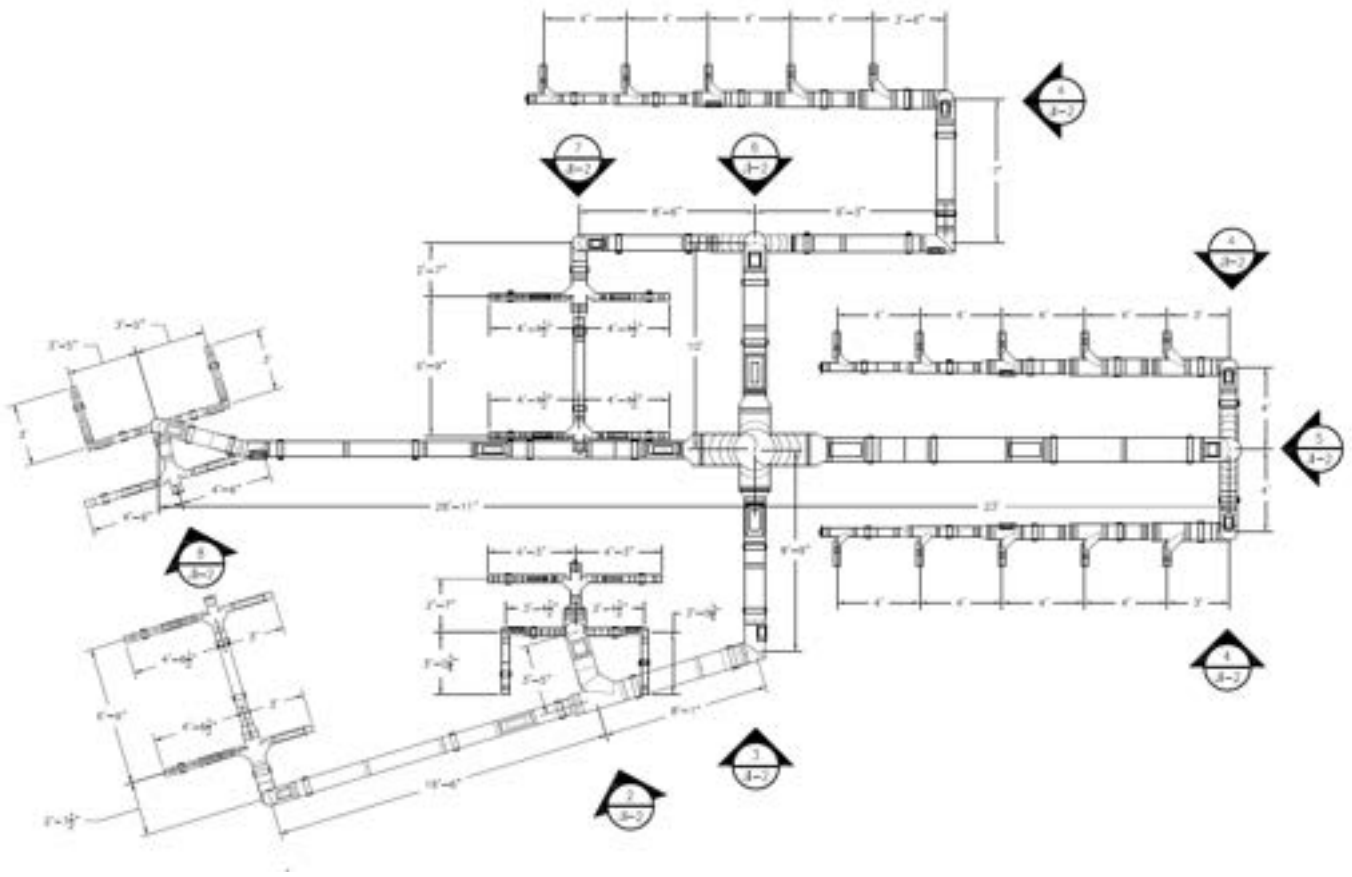

Fig 9-4. SAMPLE SYSTEM
Plan View

NORTH AMERICAN KITCHEN SOLUTIONS INCORPORATED

TERMS AND CONDITIONS OF SALE FOR GREASE DUCTS

THESE TERMS AND CONDITIONS OF SALE ("*TERMS*") CONTAIN VERY IMPORTANT INFORMATION REGARDING YOUR PURCHASE, AS WELL AS CONDITIONS, LIMITATIONS, AND EXCLUSIONS THAT APPLY TO YOU AND YOUR PURCHASE. PLEASE READ THEM CAREFULLY. YOUR PURCHASE IS EXPRESSLY LIMITED TO AND MADE CONDITIONAL UPON THE EXCLUSIVITY OF THESE TERMS. ANY PROPOSAL FOR DIFFERENT TERMS OR ANY ATTEMPT TO VARY, IN ANY DEGREE, ANY OF THESE TERMS IS EXPRESSLY REJECTED.

1. **Acceptance.** These Terms govern any purchase made from North American Kitchen Solutions Incorporated ("***NAKS***"). These Terms, the Manual in which they are contained, installation and maintenance instructions, the applicable invoice, and any documents incorporated or referred to herein or therein, including any future paper or electronic releases issued by NAKS, constitute the "Order." The Order is the entire contract between you, the buyer, and NAKS, the seller, for products purchased from NAKS. These Terms apply to the Order unless expressly modified or waived in writing by an officer of NAKS. An Order may only be cancelled by you upon payment of reasonable cancellation charges for expenses incurred or commitments made by NAKS. Captions in these Terms are for convenience only.

2. **Pricing.** The price for NAKS' grease ducts and grease duct accessories ("***Products***") is complete, and no deductions, credits, or offsets may be made without NAKS's express written consent. Prices are subject to change and surcharges in the event of cost increases in materials and transportation. All complete component accessory material manufactured by others and furnished with Products such as motors, drives, vibration equipment, controls, or other completely assembled component structures, are subject to adjustment to the price at time of shipment regardless of the date of original order entry.

3. **Sales and Similar Taxes.** NAKS' prices do not include sales, use, excise, or similar taxes. Present or future sales, use, excise, or other similar tax applicable to the sale of Products shall be paid you, unless an acceptable tax exemption certificate is provided to NAKS.

4. **Payment.** NAKS reserves the right to require full or partial payment in advance of any order if, in NAKS judgment, the financial condition of buyer does not justify continuation of manufacture or shipment. NAKS may require full or partial payment in advance. Pro-rata payments are due as shipments are made. Each shipment or delivery shall constitute a separate sale, and the default of any shipment or delivery shall constitute a separate sale, and the default of any shipment or delivery shall not vitiate the contract as to other shipments or deliveries.

5. **Return Policy – ALL SALES ARE FINAL.** Because we custom manufacture our hoods to each customer's specifications, **ALL SALES ARE FINAL.** We may accept the return of non-custom goods at our discretion, but a restocking fee of 30% will apply and all shipping costs are the responsibility of the purchaser or end user. No merchandise may be returned without a Return Goods Authorization (RGA). Items returned for warranty replacement or exchange will not be eligible for credit if not received within 14 days of the issuance of a Return Goods Authorization.

6. **Delivery.** Shipping and delivery dates are estimates only. No delay in delivery will subject NAKS to any costs, damages or fees for late delivery. Delivery of Products is made F.O.B. point of shipment, unless otherwise stated. NAKS shall not be liable for delay due to causes beyond its reasonable control (i.e., force majeure events). In the event of such a delay, the date of delivery shall be extended for a period equal to the time lost by reason of the delay.

7. **Changes.** NAKS may make changes, including improvements and additions, in the technical requirements, specifications, designs, materials, packaging, and place of delivery, method of transportation, quantities, or delivery schedules of the Products by notifying you.

8. **Safety.** The Products may be designed to serve multiple applications. NAKS offers a range of safety equipment, including guards and other devices, as may be required to meet customer specifications. Without exception, NAKS recommends that all orders include applicable safety devices. Use of Products ordered without applicable safety devices is your sole responsibility. You warrant that you have determined and acquired any and all safety devices required for the Products. Weather covers and guards for motor and V-belt drives, couplings, shafts and bearings, along with inlet and outlet screens, are optional accessories noted in the price list.

9. **Title.** Title and right of possession of Products remains with NAKS until all payments (including deferred payments whether evidenced by notes or otherwise) shall have been received to the satisfaction of NAKS and you agree to do all acts necessary to perfect and maintain such title and right in NAKS and not to subject any Products to any liens or encumbrances until such payment is made in full.

10. **Governing Law**. This Order shall be governed by and construed according to the laws of the State of Ohio (excluding the conflict of law provisions thereof). At NAKS' discretion, any action relating directly or indirectly to the Order shall be brought exclusively in the Common Pleas Court of Cuyahoga County, Ohio or the United States District Court for the Northern District of Ohio, Eastern Division, and you irrevocably waive any objection to the jurisdiction of, or venue in, either of these courts and agree that the acceptance of the Order constitutes doing business in the State of Ohio.

11. **Arbitration.** At NAKS' discretion, any dispute arising under or in connection with any Order may be submitted to binding arbitration administered by the American Arbitration Association under its Commercial Arbitration Rules, and judgment on the award rendered by the arbitrator may be entered in any court having jurisdiction thereof. The dispute shall be resolved by one neutral arbitrator who shall have no affiliation with either you as the buyer or with NAKS and shall be selected by the American Arbitration Association office, and held in, Cleveland, Ohio.

WARNING. NAKS' Products are designed and manufactured to provide reliable performance but they are not guaranteed to be 100% free of defects. Even reliable products will experience occasional failures and this possibility should be recognized by the buyer and all end users. If Products are used in life support ventilation systems where failure could result in loss or injury, the buyer and all end users should provide adequate back-up ventilation, supplementary natural ventilation or failure alarm system, or acknowledge willingness to accept the risk of such loss or injury. **DO NOT USE IN HAZARDOUS ENVIRONMENTS** where a fan's electrical system could provide ignition to combustible or flammable materials unless unit is specifically built for hazardous environments. Comply with all local and national safety codes including the National Electrical Code (NEC) and National Fire Protection Act (NFPA).

CAUTION. Guards must be installed when fan is within reach of personnel or within eight (8) feet (2.5 m) of working level or when deemed advisable for safety.

DISCLAIMER. NAKS has made a diligent effort to illustrate and describe the Products accurately in all materials; however, such illustrations and descriptions are for the sole purpose of identification and do not express or imply any warranty.

LIFETIME LIMITED WARRANTY

WARRANTY AND DISCLAIMER. This lifetime limited warranty extends to the original purchaser only with proof of purchase. NAKS provides a lifetime limited warranty that the Products shall be free from original defects in workmanship and materials under normal use subject to the exclusions and limitations herein.

For a period of ten (10) years from the date of the original installation and subject to the exclusions and limitations herein, NAKS will replace for the original owner any Product proven to be defective with same or similar Product, free of charge. From the eleventh (11th) through fifteenth (15th) years from the date of original installation, NAKS will provide replacement Product to the original owner at cost of a 75% discount from the Manufacturer's Suggested List Price in effect on the date the claim was received. Beyond fifteen (15) years from the date of installation, NAKS will provide the original owner with replacement Product at a cost of a 50% discount from the Manufacturer's Suggested List Price in effect on the date the claim was received. This warranty provides no reimbursement for labor charges.

This warranty applies provided the Products a) were at all times operated and maintained in full compliance with the operation and maintenance instructions as published at the time of installation or as later provided by NAKS, b) have not been altered or repaired in any way so as, in NAKS' sole judgment, to affect their performance or reliability, and c) have not been improperly installed or subjected to misuse, negligence, accident, or used incorrectly in combination with other substances. This warranty does not apply to (i) damages to: wear parts, *e.g.* seals; demonstration units; paintwork; moving parts, including but not limited to compensators, flue gas dampers, draught regulators, chimney, doors; flexible piping; insulation; consumables, such as granulates; or (ii) minor Product deviations which do not effect functionality; or (iii) damages caused by: contamination of ambient air or combustion air by chlorinated hydrocarbons or other vapors which may cause excessively severe acid condensate to form within the Products; or (iv) merchandise provided by other manufacturers; or (v) installation, transport or commissioning; or (vi) Purchaser, an installer or other third parties; or (vii) normal wear and tear; or (viii) force majeure, including, but not limited to flood, fire or frost; or (ix) improper commissioning; or (x) use of the Products not in accordance with their intended purpose; or (xi) exposure of Products to any metals of an inferior quality; or (xii) contamination of the Products between unpacking and assembly; or (xiii) burning of wood other than unpainted, natural wood, which has been stored for at least 3 years and which moisture level does not exceed 20% or burning of chipboard or domestic waste.

LIMITATION OF REMEDY AND DAMAGES. All claims under this warranty must be made in writing and delivered by U.S. Mail to:

North American Kitchen Solutions
172 Reaser Court
Elyria, OH 44035
Attn: WARRANTY CLAIMS DEPARTMENT

All Product claims must be made within 15 days after discovery of the defect and prior to the expiration of two years from the date of shipment. Claims made beyond that period are barred. Within 30 days after receipt of a timely claim, NAKS shall have the option either to inspect the Product at its location or request its return to NAKS at your expense. NAKS shall replace, or at its option repair, free of charge, any Product it determines to be defective, and it shall ship the repaired or replacement product to you F.O.B. point of shipment; provided, however, if in NAKS' judgment circumstances are such to prohibit repair or replacement to remedy the warranted defects, your sole and exclusive remedy shall be a refund of any part of the invoice price, paid to NAKS, for the defective Product or part.

NAKS is not responsible for the cost of removal of the defective Product or part, damages due to removal, or any expenses incurred in shipping the Product, or the installation of the repaired or replaced Product or part.

The warranties set forth above do not apply to any components, accessories, parts or attachments manufactured by other manufacturers; such being subject to the manufacturer's warranty, if any. To the extent not prohibited by the manufacturer's warranty, NAKS shall pass to you such manufacturer's warranty.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY EXPRESSLY DISCLAIMED AND WAIVED. THIS WARRANTY CONSTITUTES NAKS SOLE AND EXCLUSIVE WARRANTY FOR DEFECTIVE GOODS AND PURCHASER'S SOLE AND EXCLUSIVE REMEDY FOR DEFECTIVE PRODUCTS.

No employee, agent, dealer, or other person is authorized to give any warranties on behalf of NAKS or to assume for it any other liability in connection with any of its products except in writing and signed by an officer of NAKS.

LIMITATION OF LIABILITY. NAKS' cumulative liability to you and any other persons for all claims in any way relating to or arising out of the Products, including, but not limited to, any cause of action sounding in contract, tort, or strict liability, shall not exceed the total amount of the purchase price paid for those Products which are the subject of any such claim. This limitation of liability is intended to apply without regard to whether other provisions of this agreement have been breached or have proven ineffective even if NAKS has been advised of the possibility of such claims or demands. In no event shall NAKS be liable to you or any other person for any loss of profits or any incidental, special, exemplary, or consequential damages for any claims or demands brought by you or such other persons. BECAUSE SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, THIS LIMITATION MAY NOT APPLY TO YOU.

NAKS' maximum liability to you and to any end user is as set forth above. NAKS makes no warranty to anyone for any products not manufactured by it and shall have no liability for any use or installation of any products (whether manufactured by NAKS or other manufacturers) not specifically authorized by this sale. You acknowledge various warnings by NAKS regarding the Products and their installation and use. If NAKS incurs any claims, lawsuits, settlements, or expenses (including attorney fees) for any loss, injury, death or property damage including, but not limited to, claims arising out of your or any end user's installation or use of the Products, you agree to indemnify and hold NAKS harmless.

REPLACEMENT PARTS. If replacement parts are ordered, purchaser warrants that the original components in which these replacement parts will be placed are in satisfactory working condition, and when said replacement parts are installed, the resultant installation will operate in a safe manner, at speeds and temperatures for which the original product was purchased.

TECHNICAL ADVICE AND RECOMMENDATIONS, DISCLAIMER. Notwithstanding any past practice or dealings or any custom of the trade, sales shall not include the furnishing of technical advice or assistance or system design. Any such assistance shall be at NAKS' sole option and may be subject to additional charge(s).

NAKS assumes no obligation or liability on account of any recommendations, opinions or advice as to the choice, installation or use of Products. Any such recommendations, opinions or advice are given and shall be accepted at your and the end-user's risk and shall not constitute any warranty or guarantee of such Products or their performance.

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