

# ADC

## *Flexible Duct Performance & Installation Standards (5<sup>th</sup> Edition)*

### *The “Greenbook” of Flex*

Provides information about –

*Characteristics of flexible duct*

*Testing, Listing, Reporting,  
and Certifying*

*Installation Requirements*

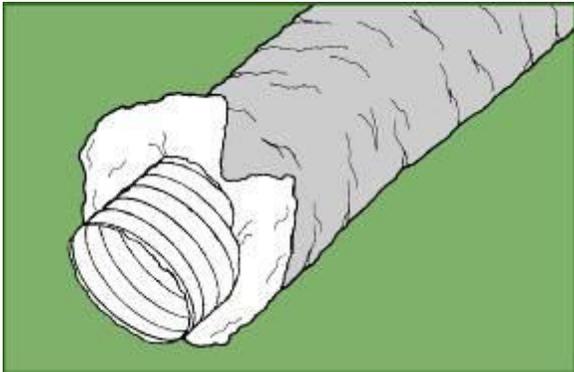
*Typical Accessories*

*General Commentary*

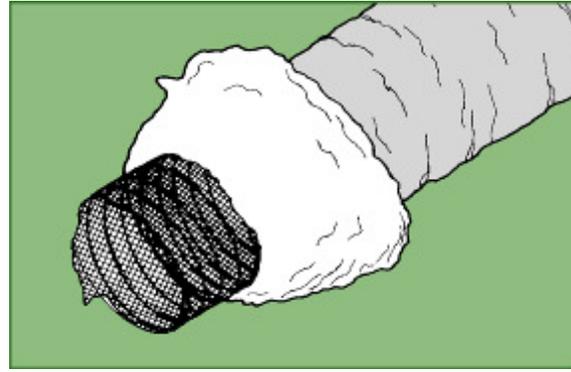


# Flexible Duct Types

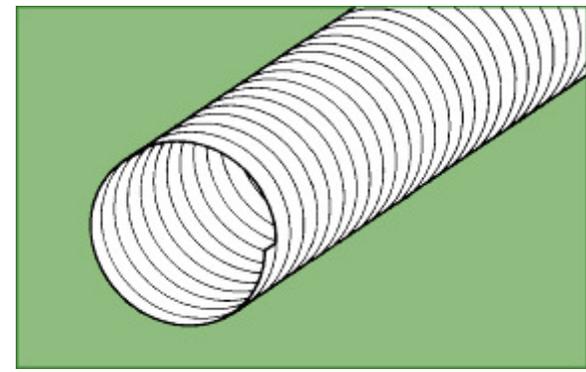
## (Non-Metallic Ducts)



**Insulated –  
Non Porous Inner Core**  
Various types of Outer  
Vapor Barriers



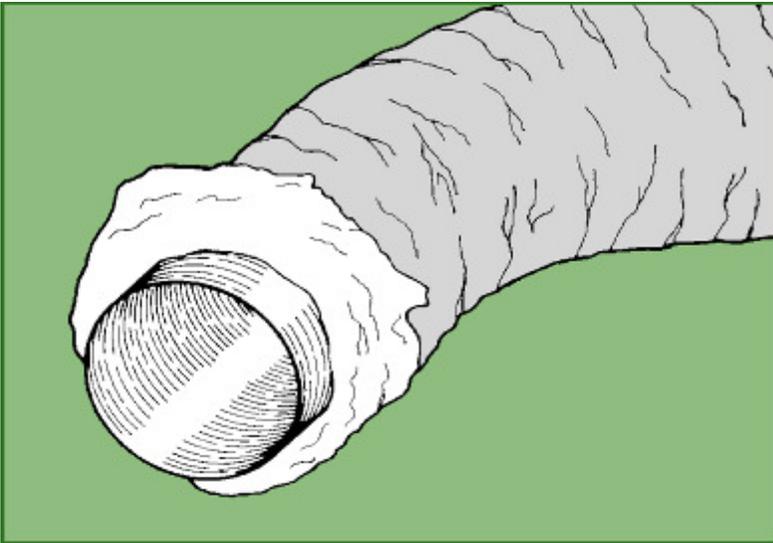
**Insulated –  
Perforated Porous Inner Core**  
Various types of Outer  
Vapor Barriers



**Uninsulated**

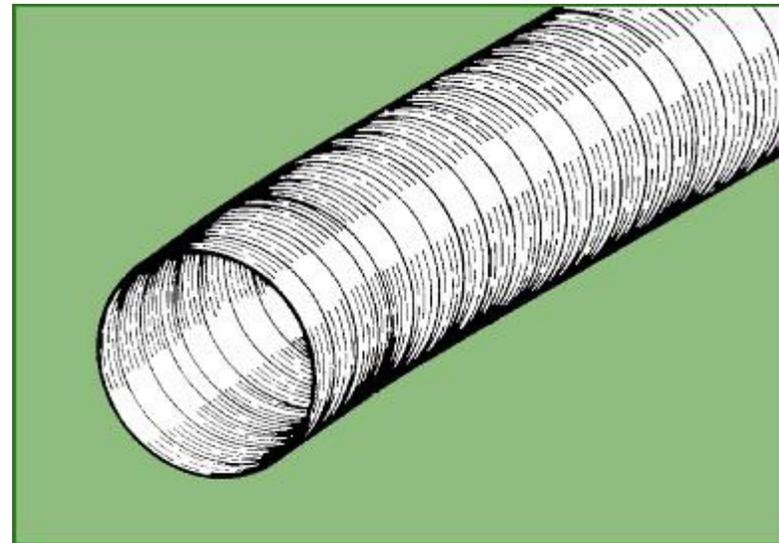
# Flexible Duct Types

## (Metallic Ducts)



**Insulated –  
Metallic Inner Core**

Various types of Outer Vapor Barriers



**Uninsulated**

## Longitudinal Compression of Flexible Duct

Compression causes increased pressure drop:

15% = approximate 2 times

30% = approximate 4 times

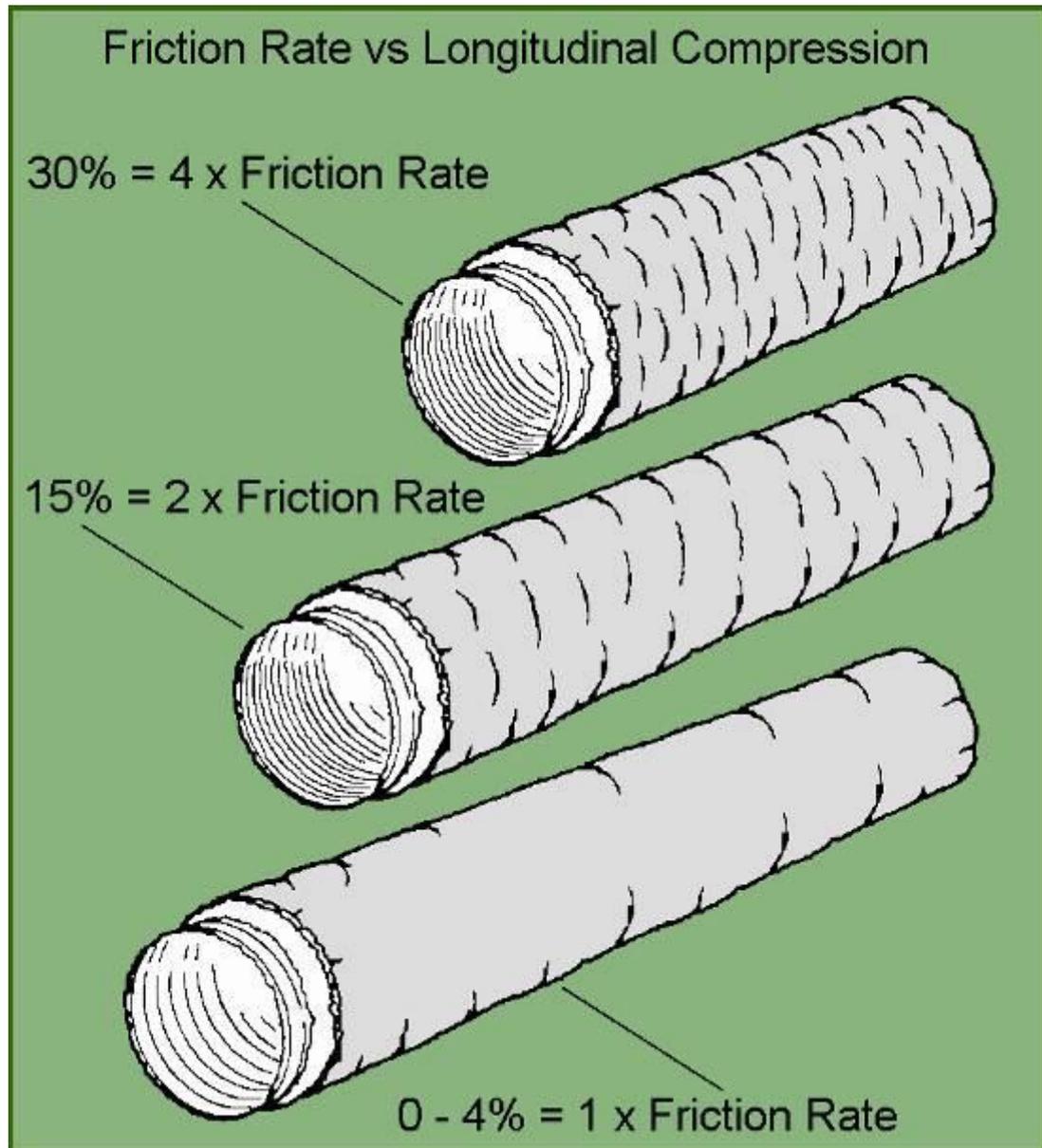
45% = approximate 6 to 8 times

The moral of the story:

Ducts should be fully extended before and during installation.

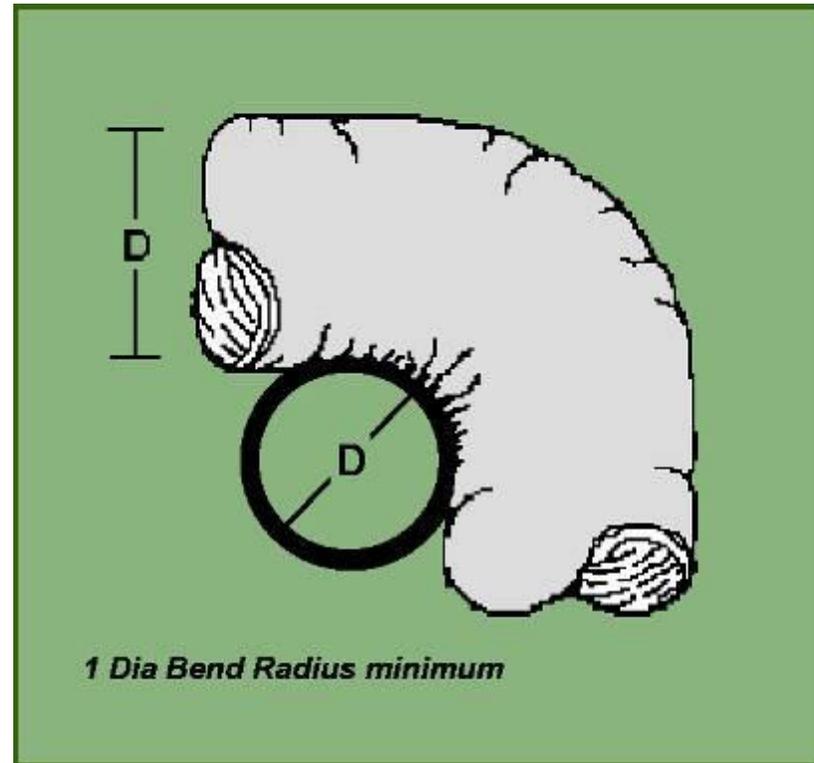
System has optimum air flow

- Minimizes pressure drop
- Maximizes savings



# Key Point #4

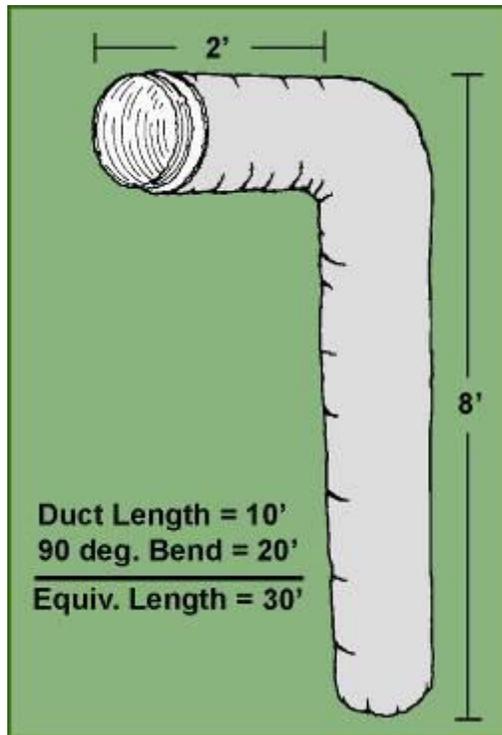
- Keep bends greater than or equal to one (1) duct diameter. Minimize sagging and “snaking” of the duct runs.



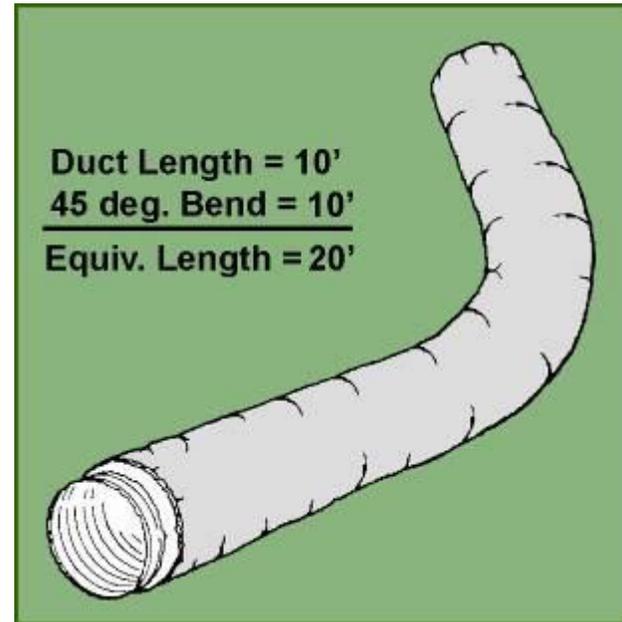
## *Goals:*

- 1. Make it easy for the air to change direction.*
- 2. Reduce overall “equivalent feet” of the duct run.*

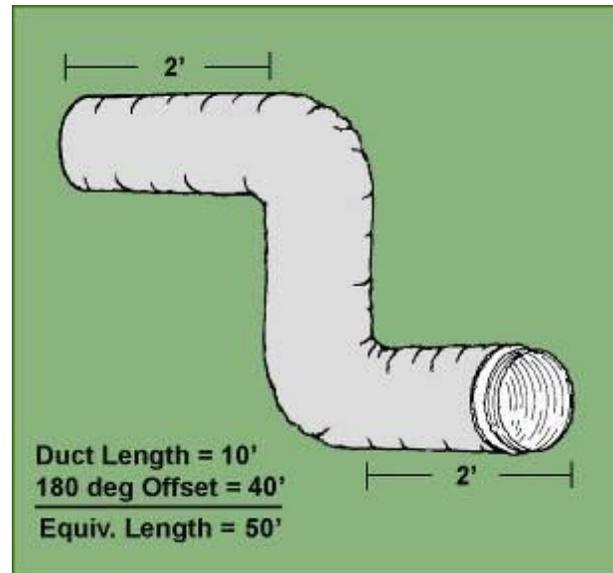
# So how **do** bends actually affect the air flow?



90° = 20 equiv. ft.

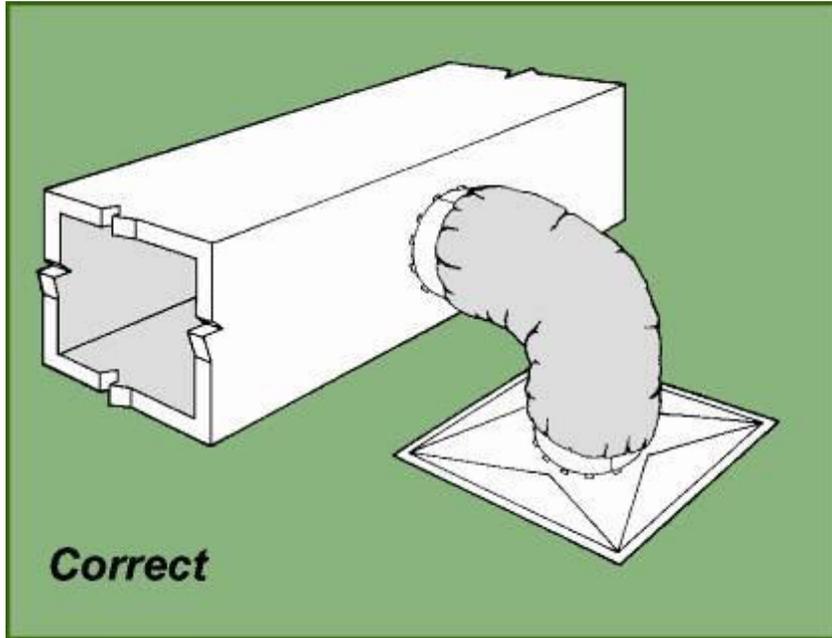


45° = 10 equiv. ft.

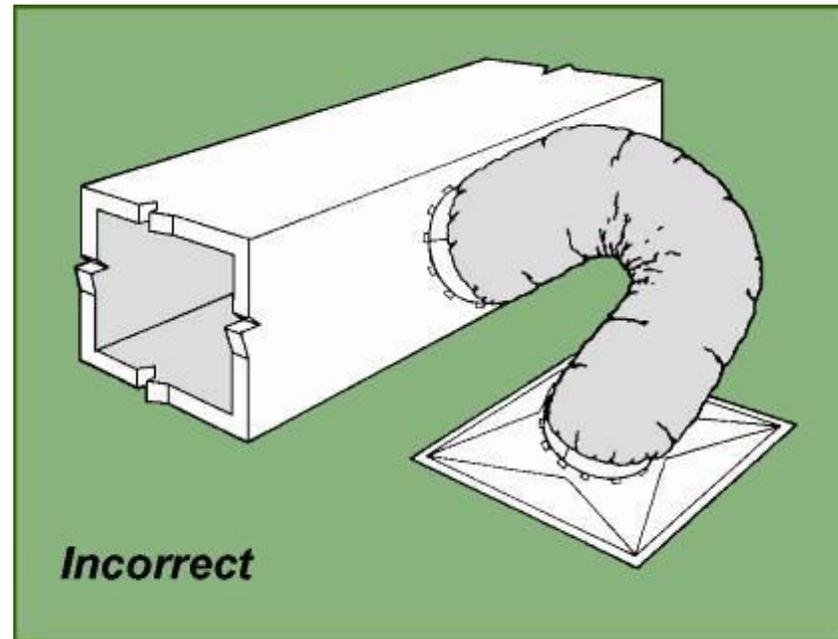
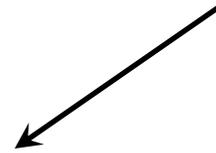


180° offset = 40 equiv. ft.

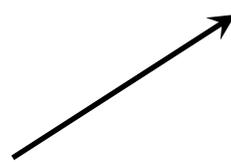
# Examples



If duct is 8 feet long then the total equivalent length = 28 feet.

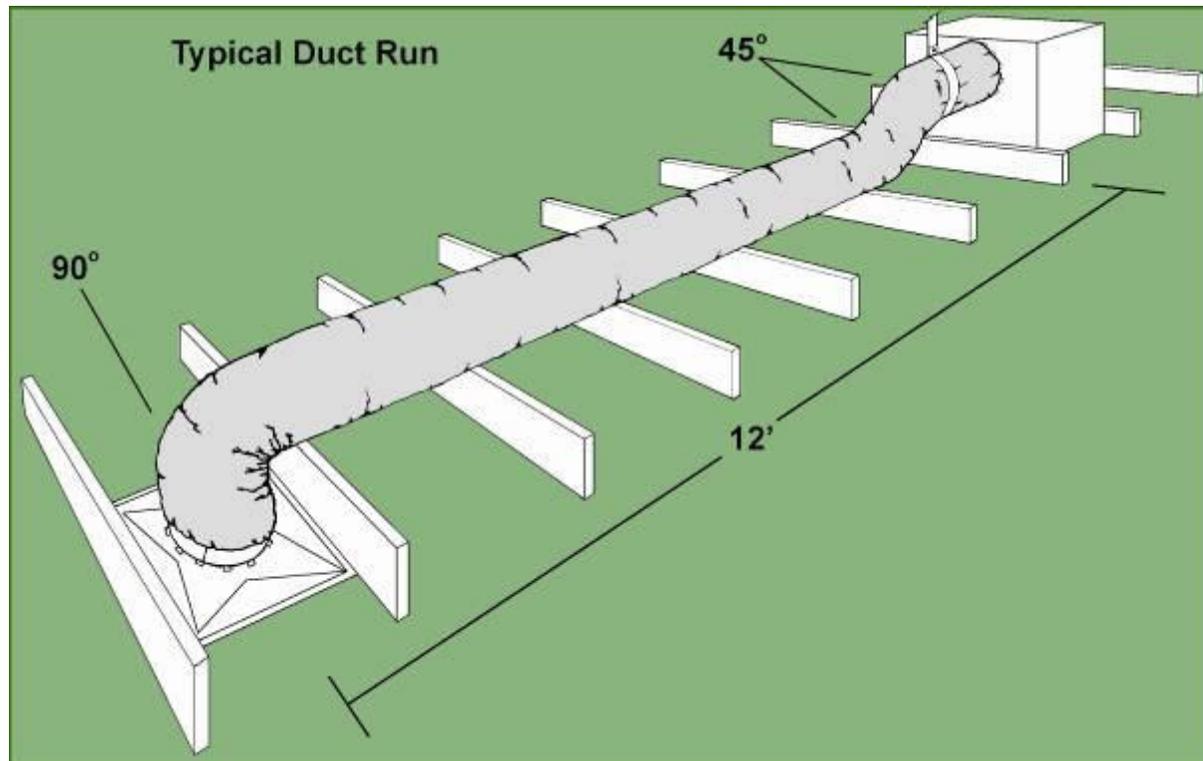


For this installation the total equivalent length is nearly twice at approximately 50 feet.



Entrance & exit losses intentionally ignored for this demonstration.

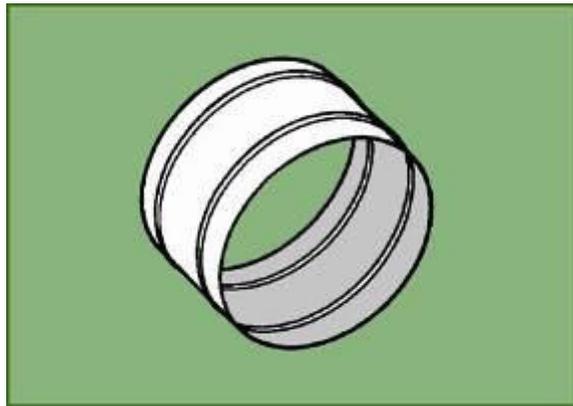
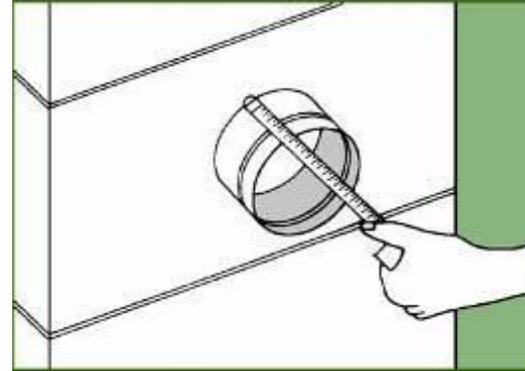
The total pressure drop for any duct run equals the sum of the fitting (or bend) pressure drops and the pressure drop of the straight duct section.



Entrance fitting =	35 ft.
Total duct length =	14 ft.
2 x 45° bends (2 x 10') =	20 ft.
1 x 90° bend (1 x 20') =	20 ft.
Exit fitting =	35 ft.
<hr/>	
Total Equivalent Length =	124 ft.

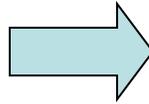
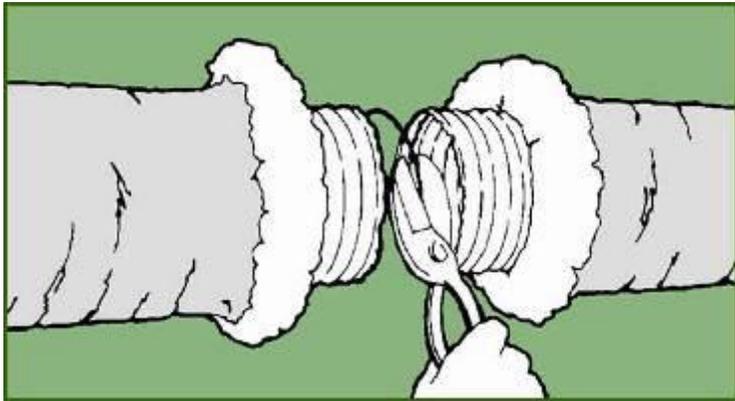
# Proper Flexible Duct Connections

- For non-metallic ducts, fittings shall be beaded and have a minimum of 2 inches collar length.

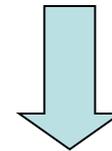
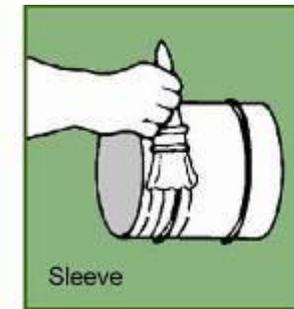
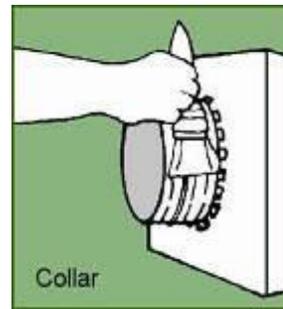
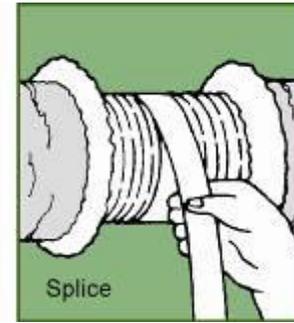
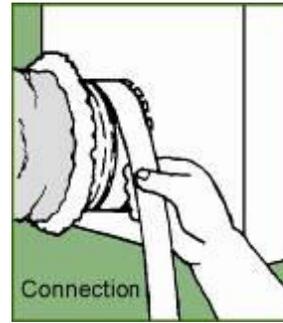
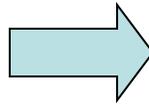


- Sleeves used to connect 2 flex duct pieces together shall be a minimum of 4 inches in length and beaded on each end.

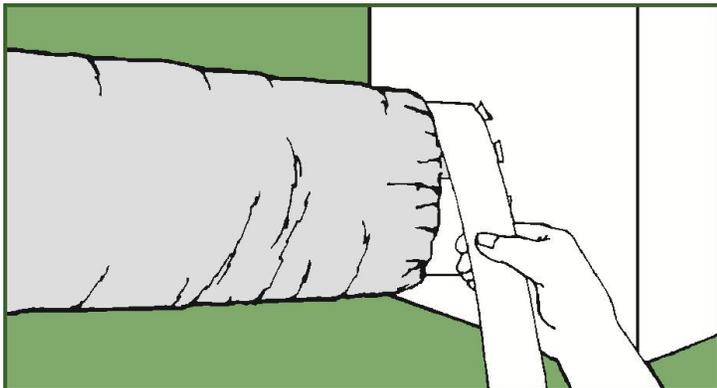
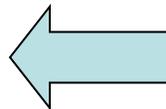
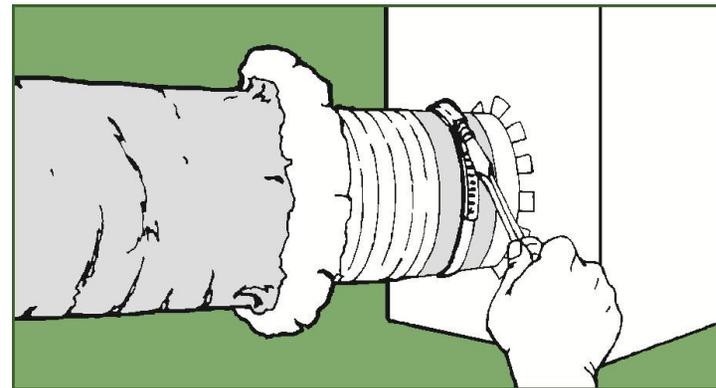
- Use tapes or mastics listed to the UL181B Standard and marked “UL181B-FX” for tape and “UL181B-M” for mastic.
- If non-metallic straps are used, the straps should be listed to the UL181B Standard and marked “UL181B-C”. Maximum pressure is limited to 6 inches W.C. with non-metallic straps.



or



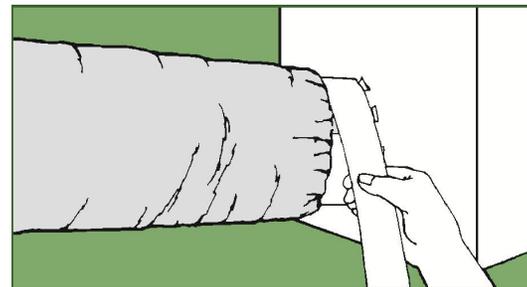
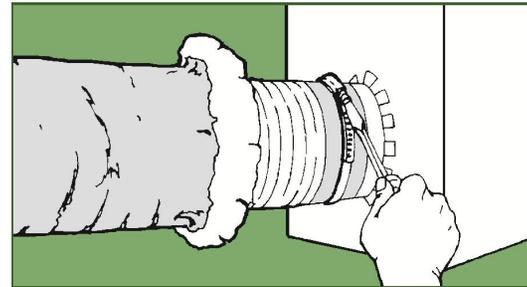
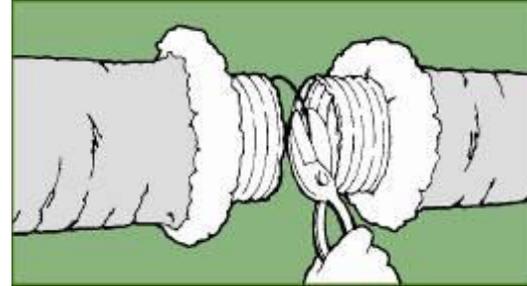
The *right* way to get from here to there!!!!!!!



# Flexible Duct Connection (Non-Metallic)

Using tape and fasteners to make connection

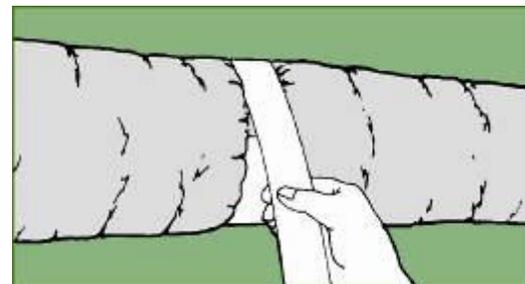
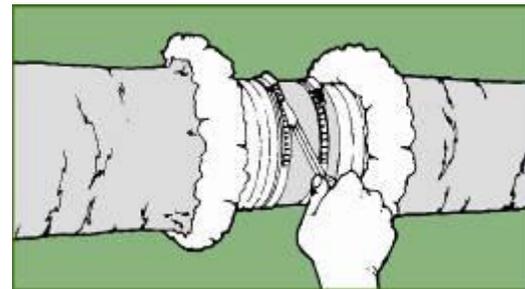
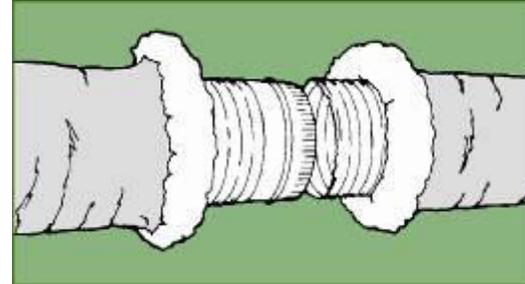
- Cut completely through duct and wire
- Fold back vapor barrier and insulation
- Slide 1" of core over fitting and bead
- Seal core to collar with 2 wraps of duct tape
- Secure connection with clamp placed over the core and tape, past the bead
- Pull vapor barrier and insulation back over the core
- Tape barrier with 2 wraps of duct tape



# Flexible Duct Splice (Non-Metallic)

Using tape and fasteners to make splice

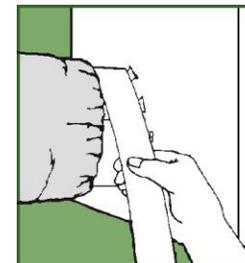
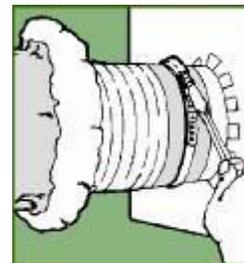
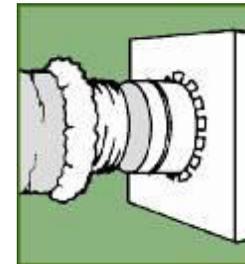
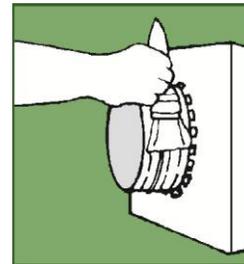
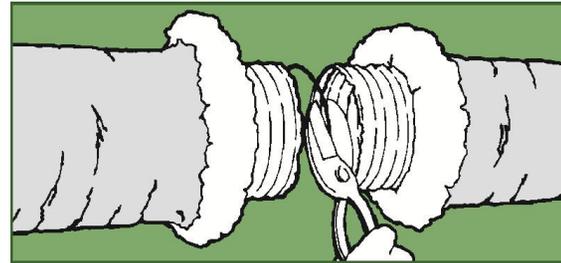
- Cut completely through duct and wire
- Fold back vapor barrier and insulation on both ends
- Slide 1" of each core over connecting collar and beads
- Seal cores to collar with 2 wraps of duct tape
- Secure each connection with clamp placed over the core and tape, past the bead
- Pull vapor barrier and insulation back over the core and overlap
- Tape barrier with 2 wraps of duct tape



# Flexible Duct Connection (Non-Metallic)

Using mastic and fasteners to make connection

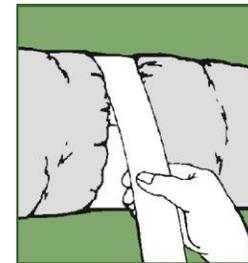
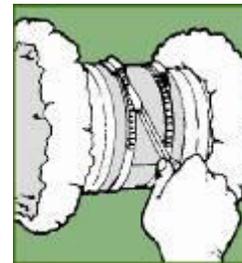
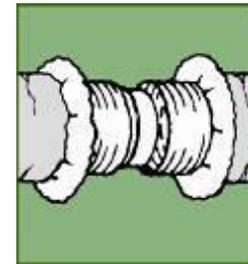
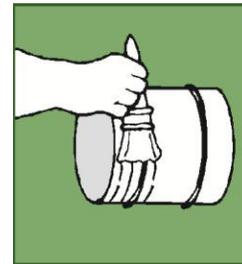
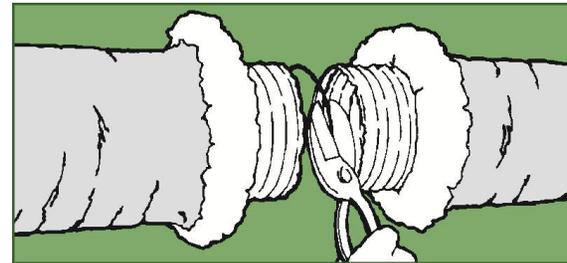
- Cut completely through duct and wire
- Fold back vapor barrier and insulation
- Apply mastic uniformly to the outside surface of collar
- Slide 1" of core over collar and past the bead
- Secure connection with clamp placed over the core and past the bead
- Pull vapor barrier and insulation back over the core and fitting
- Tape barrier with 2 wraps of duct tape



# Flexible Duct Splice (Non-Metallic)

Using mastic and fasteners to make splice

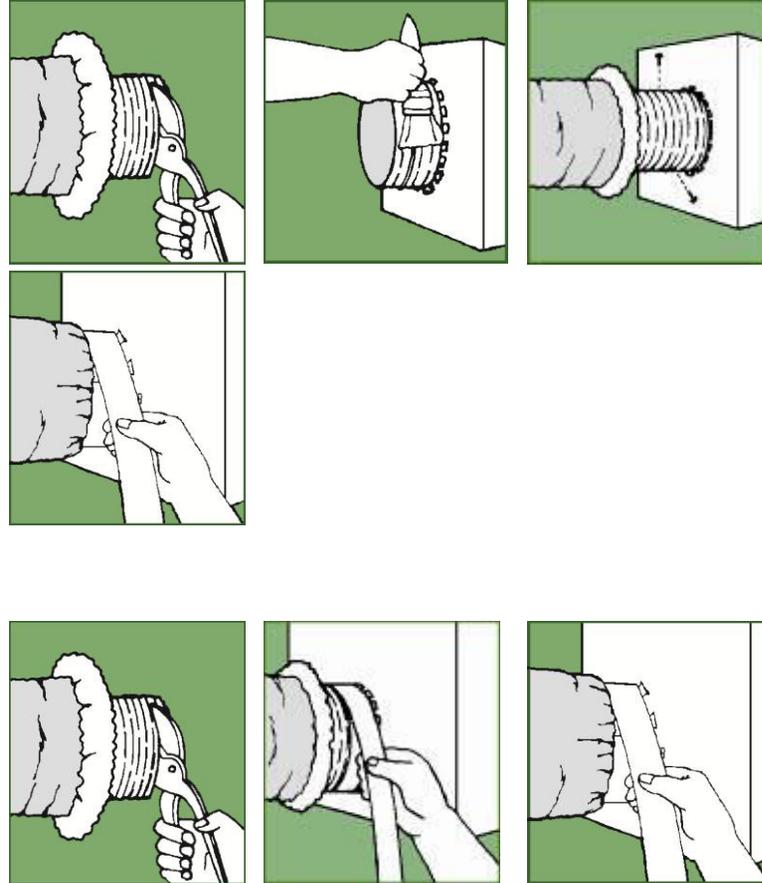
- Cut completely through duct and wire
- Fold back vapor barrier and insulation on both ends
- Apply mastic uniformly to both ends of the connecting collar
- Slide 1” of each core over connecting collar and beads
- Secure each connection with clamp placed over the core, past the beads
- Pull vapor barrier and insulation back over the core and overlap
- Tape barrier with 2 wraps of duct tape



# Flexible Duct Connection (Metallic)

Using tape or mastic and screws to make a connection

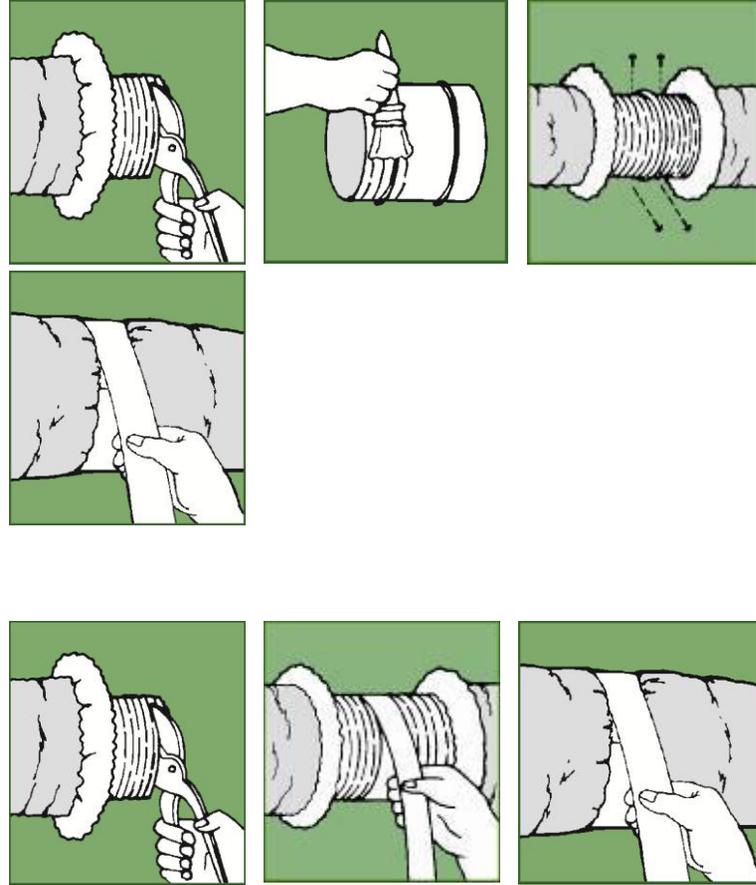
- Cut completely through duct and trim edge
- Fold back vapor barrier and insulation
- When using mastic, apply uniformly to collar
- Slide 1" of core over fitting
- Secure connection with #8 sheet metal screws spaced equally around circumference. Use 3 screws for diameters under 12" and 5 for diameters 12" and over
- When using tape (press. < 4"), seal core to collar with 2 wraps of duct tape
- Pull vapor barrier and insulation back over the core
- Tape barrier with 2 wraps of duct tape



# Flexible Duct Splice (Metallic)

Using tape or mastic and sheet metal screws to make splice

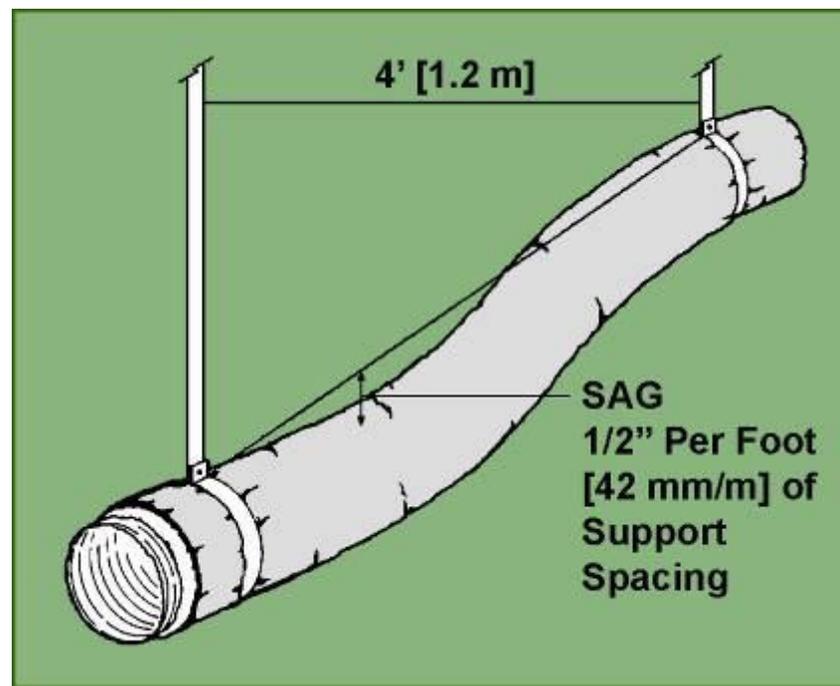
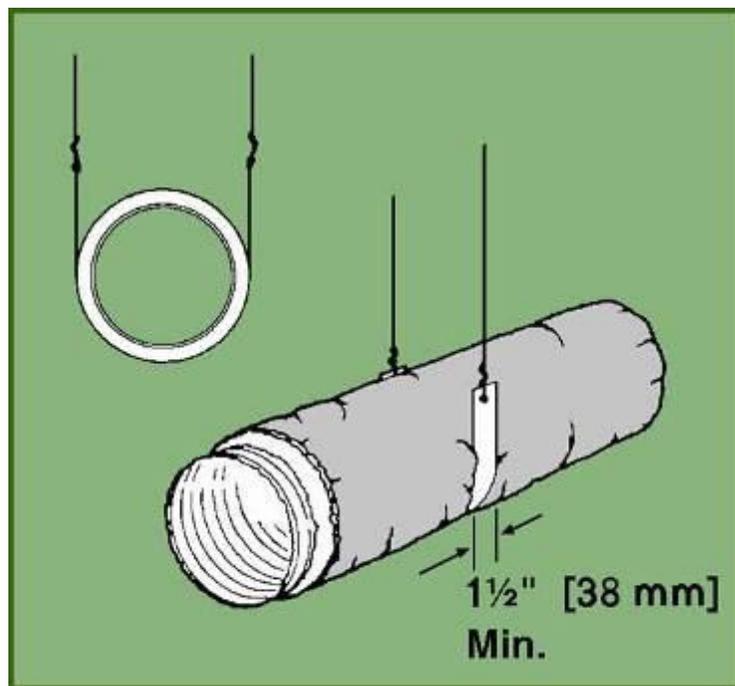
- Cut completely through duct and trim edge
- Fold back vapor barrier and insulation on both ends
- When using mastic, apply uniformly both ends of the connecting collar
- Slide 1" of core over connecting collar
- Secure cores with #8 sheet metal screws spaced equally around circumference. Use 3 screws for diameters under 12" and 5 for diameters 12" and over
- When using tape (press. <4"), seal cores together with 2 wraps of duct tape
- Pull vapor barrier and insulation back over the cores and overlap
- Tape barrier with 2 wraps of duct tape



# What material should I use to support flexible duct?

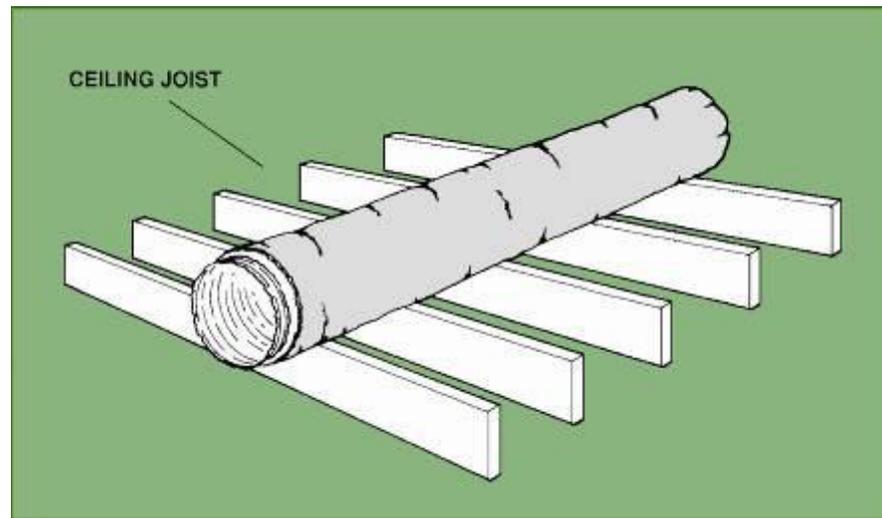
Per NFPA 90A and 90B, supplementary material used with air ducts shall meet the requirements of Class 1 when tested to UL 723 (Surface Burn Characteristic Testing), i.e. 25 Flame Spread & 50 smoke developed maximum.

Per ADC, any strapping material in contact with the flexible duct shall be 1-1/2 inch wide minimum and be applied at intervals not to exceed 4 feet (6 feet for vertical supports). Sag should not exceed 1/2 inch per foot of support spacing.

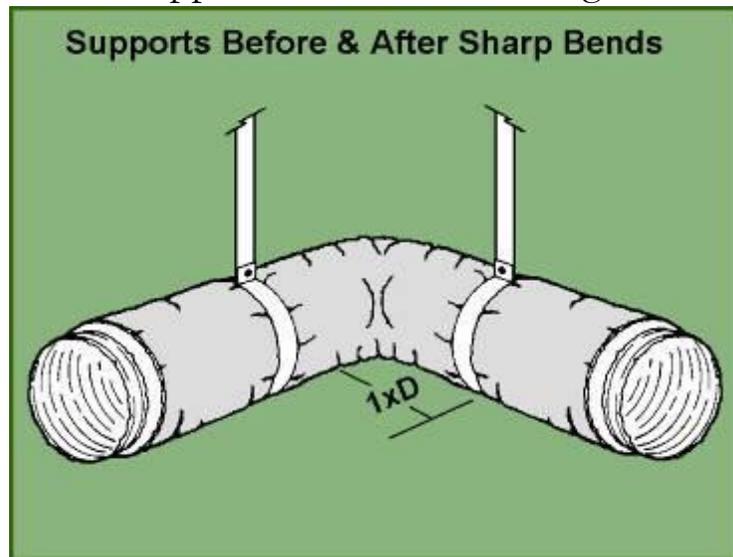


# Additional Points on Supporting Flex Duct

Ceiling joists or truss supports used to support flexible duct



Added supports before and after tight bends



Added support to avoid damage by fitting

