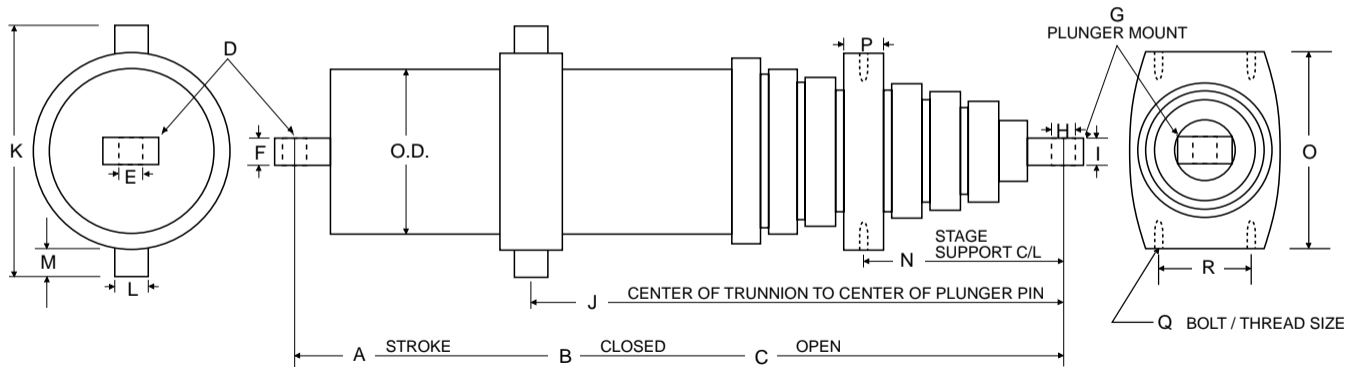


# TELESCOPIC CYLINDER SPECIFICATION DATA



# TELESCOPIC CYLINDERS

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## NORMAL MAINTENANCE ITEMS

Packing, wipers and bushings are considered normal maintenance or service items. These items are subject to contamination from external and internal foreign materials, many of which are abrasive in nature, causing abnormal wear or damage to the parts, to the extent that replacements are required.

Cylinders may be subject to leaking oil past the seals for various reasons requiring adjustment of head/packing nuts. This adjustment is considered normal maintenance.

### **WARNING!!**

**Before working on a telescopic cylinder mounted on a truck or trailer unit, use supports or holding devices that will absolutely prevent the body from accidentally lowering. Place control valve in the “Lower” position to assure that all pressure has been relieved from the cylinder.**

### **Procedure for Adjusting Telescopic Cylinder Head Nuts.**

1. Loosen set screw (or set screws) in head nut that holds in packing of leaking stage.
2. Lightly tap head nut around circumference with a hammer.
3. Back head nut off 1/2 to 1 full turn using a spanner or chain wrench.  
(Note: If stage rotates when head nut is turned, hold stage with strap wrench.)
4. Cycle cylinder 2 to 3 times to reset chevron vee packing.
5. Retighten head nut approximately 1/2 turn further than it was when it loosened.
6. Tighten set screws.

### **Procedure for Mis-Staging of Mis-Sequencing Cylinder.**

1. Loosen set screws in head nut that holds in packing that fits over stage that is sticking.
2. Lightly tap head nut around circumference with a hammer.
3. Back head nut off 1/2 turn using a spanner or chain wrench.
4. Cycle cylinder, if cylinder still mis-stages back head nut off another 1/2 turn.
5. Cycle cylinder, if cylinder still mis-stages tighten the head nut of the next stage that is extending.
6. Tighten set screws.

### **Bleeding Air from Single-Acting Telescopic Cylinders.**

For smooth operation on these cylinders, it is advisable to bleed the air from the cylinder weekly.

Manual bleeding is accomplished by:

1. Empty the dump body of any material.
2. Remove the cover plate from the dog house of the dump body to access the bleeder valve.
3. Fully extend the cylinder, raising the EMPTY dump bed.
4. Lower the dump to within 1 foot from resting on the frame.
5. With the fingers turn the bleeder valve in a counterclockwise direction. This opens the valve and allows the air to escape from the cylinder.
6. When a steady stream of oil comes from the bleeder, turn the valve in a clockwise direction until it is closed.

## WAYS TO EXTEND THE LIFE OF YOUR CYLINDERS

### **WARNING!!**

**Before working on a telescopic cylinder mounted on a truck or trailer unit, use supports or holding devices that will absolutely prevent the body from accidentally lowering. Place control valve in the "LOWER" position to assure that all pressure has been relieved from the cylinder.**

### **Single-Acting Telescopic Dump Cylinders**

Cylinders are not to be used as a stabilizer on a dump body or dump trailer. The cylinder is strictly a lifting device and is not a structural member of the dumping unit.

The cylinder should float in the pin mountings. It should be installed with 1/8" to 3/16" of clearance between the pin and the pin hole if the mounting eye is wider than 5", or with 1/16" to 1/8" clearance if the mounting eye is less than 5" wide. There should be a clearance of 1/4" per side on eyes less than 5" to 1/2" clearance per side on eyes in excess of 5" wide. This is to allow the body to sway slightly while dumping, without putting a side load on the cylinder. The cylinder end mounts should be lubricated regularly.

Cylinders cannot withstand side pressures from a dump unit leaning. A tractor trailer unit must be in a straight line when dumping, not jackknifed. All dump units must be on firm, level ground and not operated during heavy crosswinds. Failure to do so may cause the unit to upset.

Do not overload the dump unit. The load must be evenly distributed during loading and unloading. Do not jerk or slingshot dump unit in an attempt to free a sticking or frozen load. Pulling forward (or backing up) and hitting the brakes or lowering the body part way and then quickly engaging the valve in the "HOLD" or "RAISE" position will cause a tremendous pressure spike. This pressure spike may bulge or split one of the larger stages of the cylinder.

When lowering a load that is sticking, the dump unit must be feathered down slowly to avoid a high pressure build up in the cylinder.

Do not operate cylinder at pressures above factory recommended operating pressures (Normally 2,000 P.S.I. unless otherwise approved).

The driver should stay at the controls during the entire dumping operation. If the body starts to lean to one side, the driver should immediately lower the body. It is important to feather the control valve into the hold position to avoid a pressure spike in the cylinder.

Do not operate cylinder with personnel or equipment alongside. The dump unit must be lowered completely before moving unit.

Do not drive with P.T.O. or Hydraulic Pump engaged.

Hydraulic hoses should be inspected regularly and replaced if worn out or damaged.

Hydraulic oil should be inspected or changed regularly and whenever a new cylinder is installed.

A damp to light film of oil on each plunger or stage of a telescopic cylinder indicates good cylinder operation. After many cycles of the cylinder, a small accumulation of oil may be noticed on the plungers or sleeves at the head nuts. This should not be mistaken for packing leakage.

Cylinder should be free of entrapped air. It is advisable to bleed air from cylinder weekly for a smooth operation.

# TELESCOPIC CYLINDERS

## WAYS TO EXTEND THE LIFE OF YOUR CYLINDERS

### **WARNING!!**

**Before working on a telescopic cylinder mounted on a truck or trailer unit, use supports or holding devices that will absolutely prevent the body from accidentally lowering. Place control valve in the "LOWER" position to assure that all pressure has been relieved from the cylinder.**

### **Double-Acting Telescopic Cylinders**

A double-acting telescopic cylinder should be fully retracted when not in use.

A double-acting telescopic cylinder should not be extended until it has been fully retracted. A partially extended cylinder with pressure relieved may drift out of position. This can happen if a cylinder experiences vibration, such as an ejector or push out cylinder does in a refuse body. If this happens and the cylinder is then extended, the out of position plunger or sleeves will rapidly reposition themselves and possibly cause high pressure oil to be trapped on the retract side of the cylinder. This could cause a stage / sleeve to bulge and or the packing and bearings to be blown out from under a head nut.

Do not operate a packer / ejector cylinder with a misaligned blade. If the packer / ejector blade is bent, damaged, or if blade slide shoes or guide track assembly are worn out, this can cause excessive side loading to the cylinder damaging it internally or bending a plunger or sleeve.

If the hydraulic system uses quick disconnects (such as on a transfer trailer) or holding / lock type valves, make sure they are properly connected. If not, oil may become trapped in the cylinder causing an excessive pressure build up and damage to the cylinder. This is particularly true if there is a blockage on the retract side of the cylinder and the cylinder is then extended. This could internally intensify the pressure 10 times or more inside the cylinder. (Example: The pump develops 2,000 P.S.I. trying to extend cylinder, oil pressure trapped on the retract side of the cylinder could see 20,000 P.S.I.)

Do not operate a cylinder at pressures above factory recommended operating pressures (Normally 2,000 P.S.I. unless otherwise approved.) Make sure hydraulic pump is developing required G.P.M., Double-acting telescopic cylinders normally require 15 G.P.M. to retract properly.

Most double-acting telescopic cylinders will self bleed themselves of air. Upon installation of a new cylinder this will require cycling the cylinder approximately 10 times to the complete extend and retract positions with no load against it. Check to make sure stages are sequencing properly. When extending, the largest stage should move first then the next largest, etc. and when retracting the smallest should move first then the next smallest, etc.

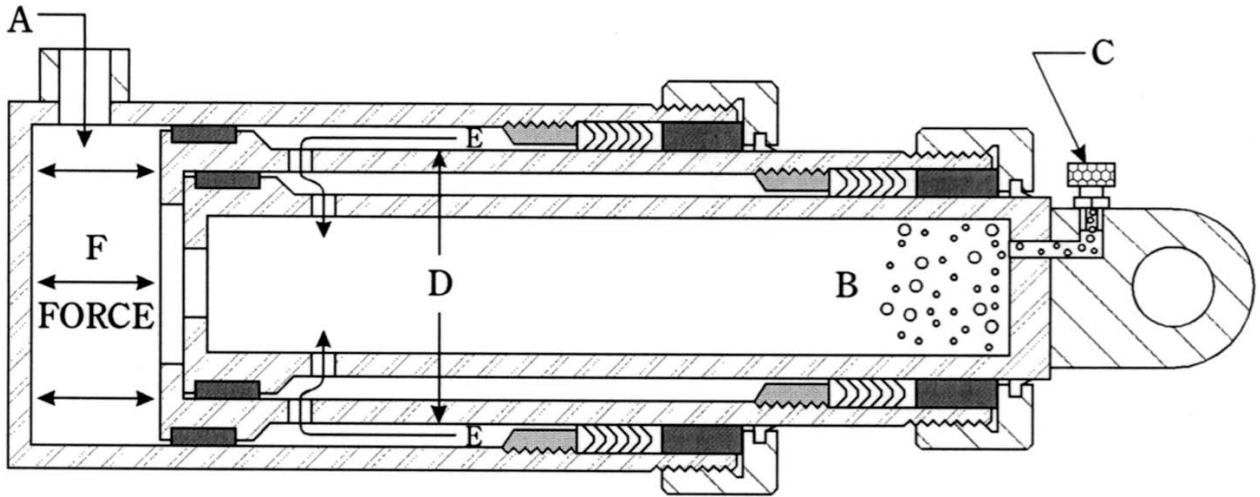
On Roll Off units, if the Lift Cylinders are not completely extended when a container is being pulled onto the hoist, the lift cylinders may be pulled open by the weight of the load. Then as the container is pulled over center, the cylinders will be forced closed until they hit the column of oil inside the cylinders causing a sudden pressure surge. If the lift cylinders are pulled open by the load, they should be extended with the control valve to fill them with oil before pulling the container on the rest of the way. Care should be taken if moving a Roll Off unit with tilt cylinders extended, avoiding sudden stops or jolts.

On Roll Off units dropping off a loaded container, feather control valve to avoid any pressure surges in the reeving / cable cylinders as gravity pulls the container to the ground.

On Roll Off units, if the container is not evenly loaded and is heavy on one side, the lift cylinders may mis-stage. When the plunger / sleeves attempt to correct themselves, there may be a sudden pressure surge, possibly damaging the cylinder.

# TELESCOPIC CYLINDERS

## SINGLE ACTING TELESCOPIC CYLINDER OPERATION



### **To Extend:**

High pressure oil from the pump is directed by the control valve through the port (A) to fill the cylinder. Any air in the system is trapped in the end of the cylinder (B) and may be bled off through the bleeder valve (C). Generally, bleeding is only necessary on initial start up or if air has been allowed to enter the system.

Oil pushes on the bottom of the sleeve or plunger forcing (F) it to move out. The outside diameter or sealing area of the sleeve or plunger (D) determines the effective area.

As the sleeve or plunger moves out, the oil trapped between (E) the sleeve or plunger wall is released through holes in the sleeve or plunger.

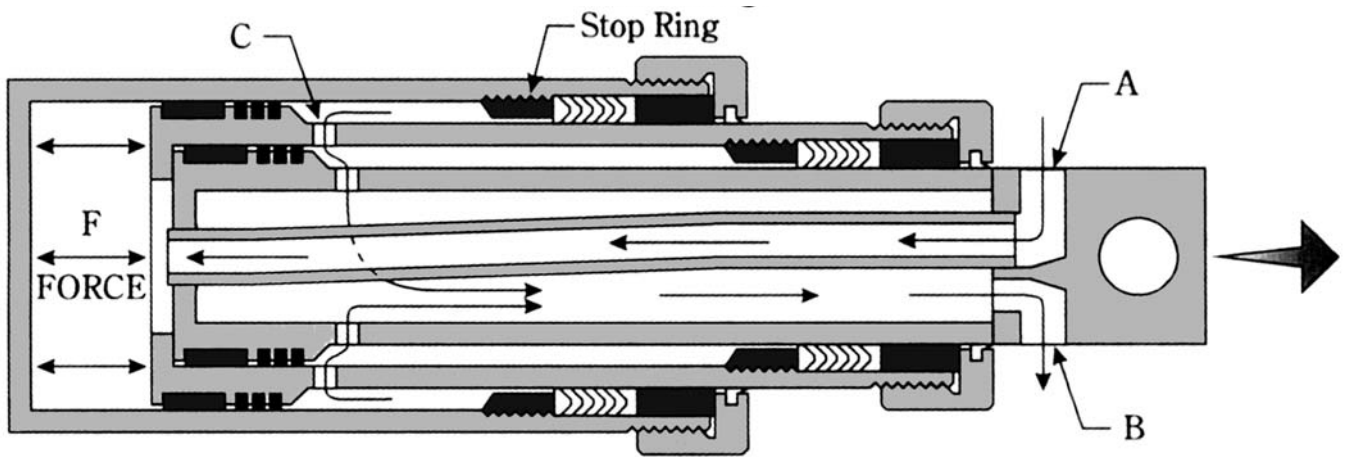
### **To Retract:**

A single acting cylinder must be retracted by gravity or mechanical means.

# TELESCOPIC CYLINDERS

## DOUBLE ACTING TELESCOPIC CYLINDER OPERATION

### EXTENDING



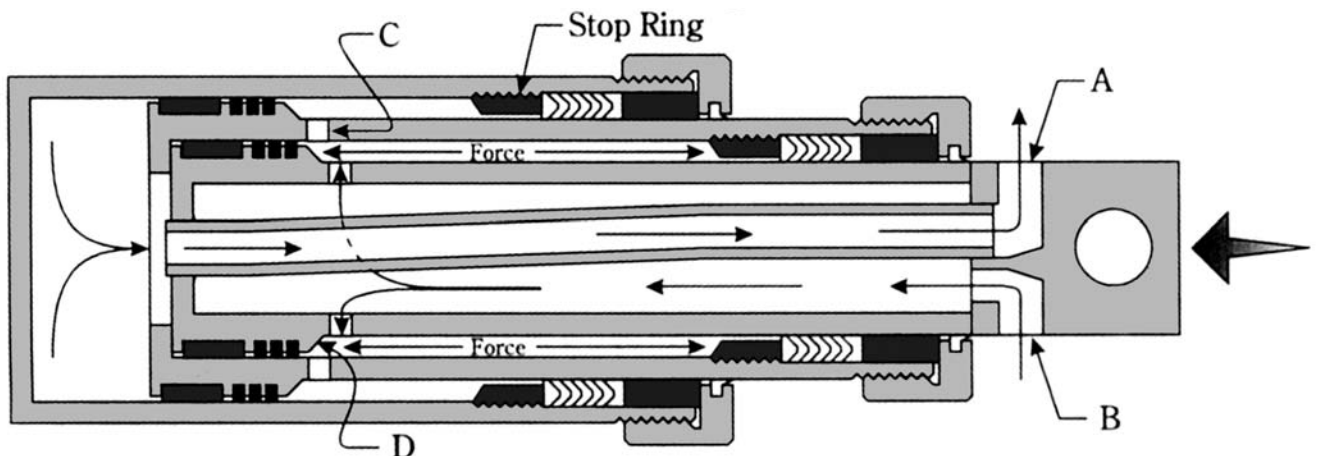
#### **To Extend:**

High pressure oil is directed by the control valve into port A. The oil passes through the transfer tube in the rod to the base of the cylinder. The pressure acts on the effective area (area of the largest piston) and extends all stages to the first stop ring.

The next stage then begins to extend. The effective area of each stage is figured from the inside diameter of the next largest stage. Each stage extends in its turn to the stop ring.

Oil trapped between the sleeves escapes through holes (c) in each sleeve and returns to tank through port B.

### RETRACTING



#### **To Retract:**

High pressure oil is directed by the control valve in port B. The pressure is applied to the effective area (d) of the plunger which retracts first. Each stage from the smallest to the largest retracts in its turn, however, THE EFFECTIVE AREA FOR RETRACTING EACH STAGE IS THE AREA (D) OF THE PLUNGER.

Oil inside the cylinder is forced out of port A. Because of the area differential the flow into port B must be multiplied by this differential to determine the flow out of port A. It may be necessary to install a dump-to-tank valve to speed up the retracting cycle.

# FRONT MOUNT DUMP BODY

## Stroke & Lifting Calculations Mounting

Note: This guide is for use to determine approximate stroke and lifting requirements for a front mount dump body. Final dimensions should be determined by an engineering drawing.

### Formula for Calculating Initial Required Cylinder Force to Lift a Load

$$\frac{\text{Load (lbs)} \times \text{"A"}}{\text{"B"}} = \text{Initial required cylinder force}$$

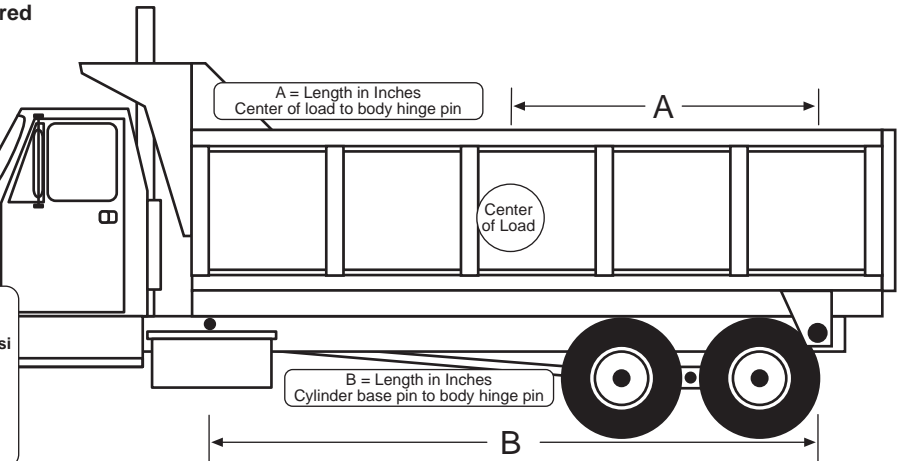
#### Example

$$\frac{50,000\# \times 85"}{166"} = 25,603\# \text{ of force to start the lift}$$

Note: For a good design, initial pressure should not exceed 800 psi at start of lift

### Telescopic Lifting Capabilities

Stage O.D. in inches	800 psi	1000 psi	1500 psi	2000 psi
2.75"	4752	5940	8909	11879
3.75"	8836	11045	16567	22089
4.75"	14176	17721	26581	35441
5.75"	20774	25967	38951	51935
6.75"	28628	35785	53677	71570
7.90"	39213	49017	73525	98034
9.37"	55165	68956	103434	137911



### Formula for Calculating the Required Cylinder Stroke for a Dump Angle

$$\text{"B"} \times \text{"D"} = \text{Approximate Stroke}$$

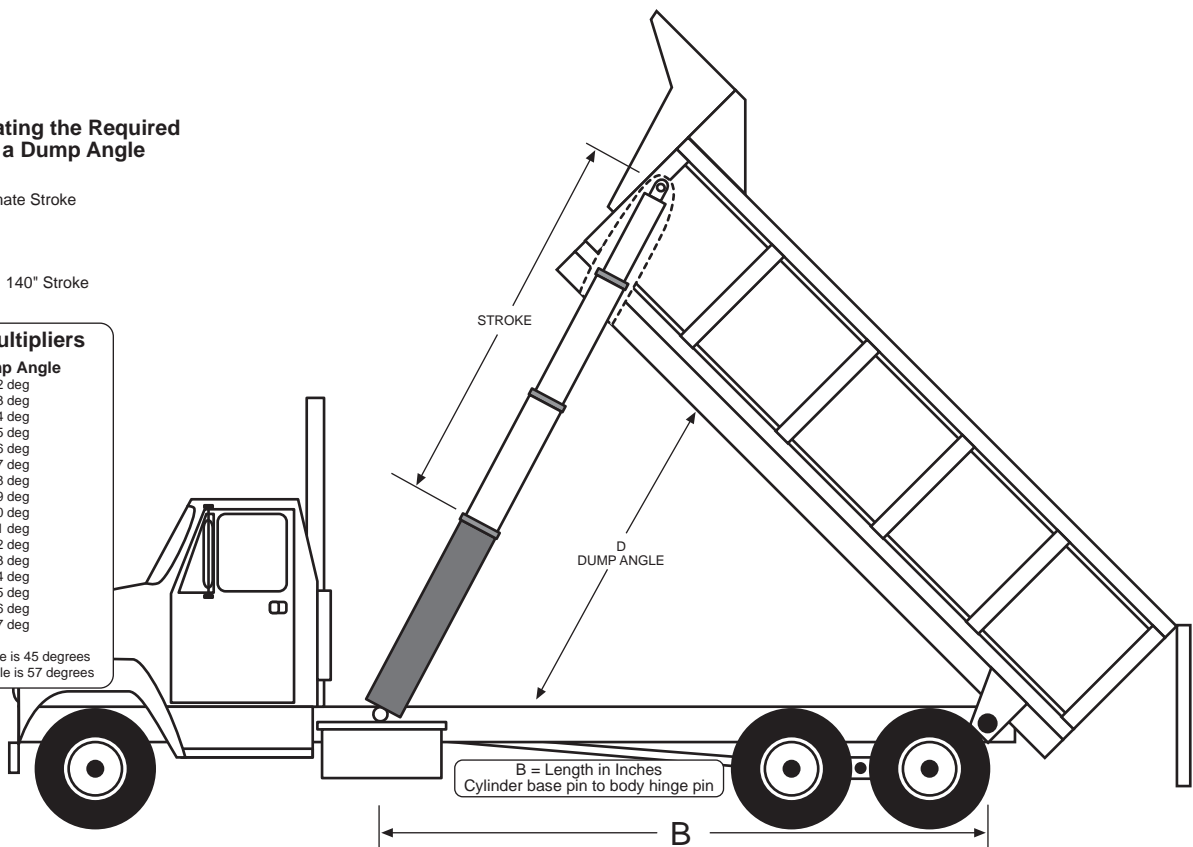
#### Example

$$166" (\text{B}) \times .845 (\text{D}) = 140" \text{ Stroke}$$

### Dump Angle Multipliers

"D" =	Dump Angle
.715	42 deg
.733	43 deg
.750	44 deg
.765	45 deg
.780	46 deg
.797	47 deg
.813	48 deg
.830	49 deg
.845	50 deg
.861	51 deg
.877	52 deg
.892	53 deg
.903	54 deg
.923	55 deg
.939	56 deg
.954	57 deg

Normal minimum dump angle is 45 degrees  
Normal maximum dump angle is 57 degrees

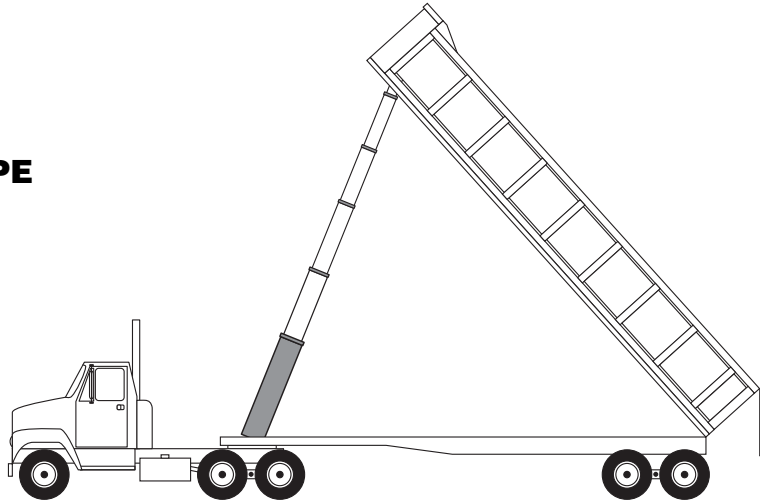


# DUMP TRAILER TYPES

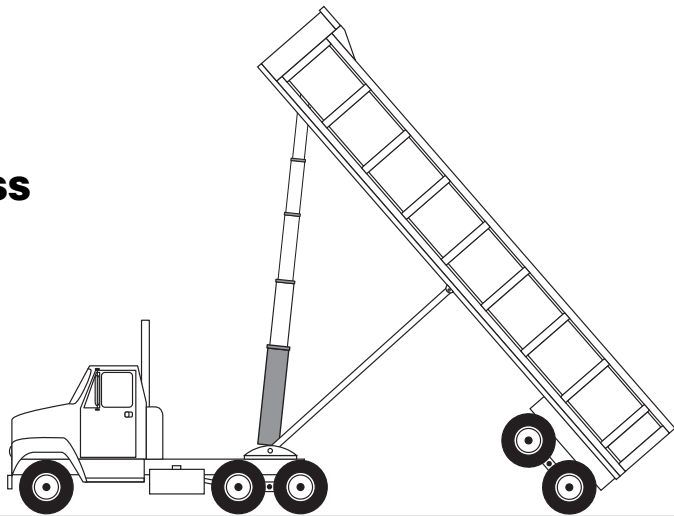
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## Identification Chart

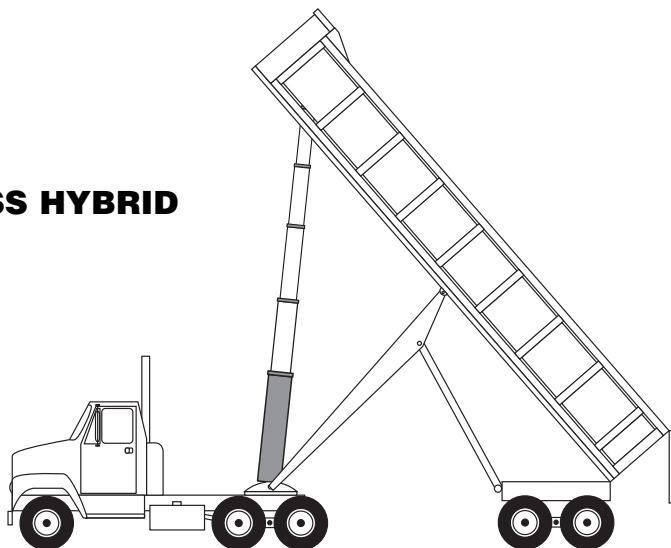
**FRAME TYPE**



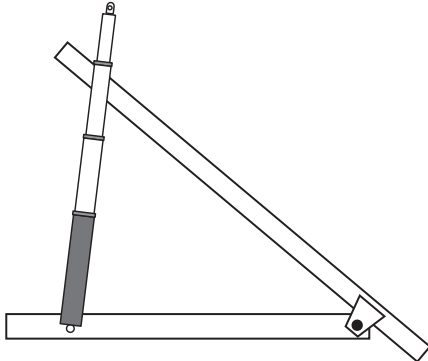
**FRAMELESS**



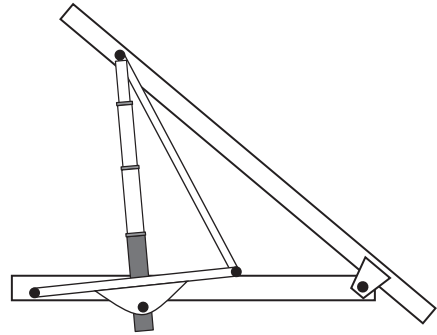
**FRAMELESS HYBRID**



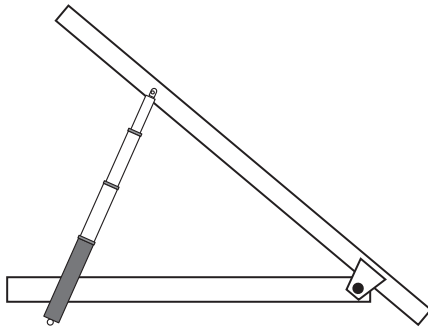
## Identification Chart



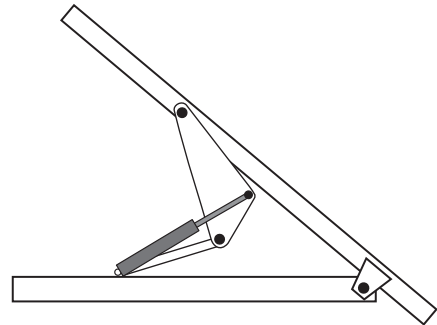
**FRONT MOUNT TELESCOPIC**  
HEAD LIFT OR BOTTOM LIFT



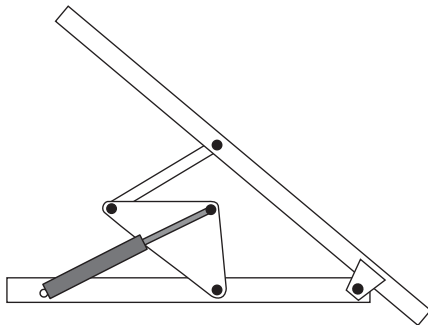
**TELESCOPIC SCISSOR**  
HINGE FORWARD OR REARWARD



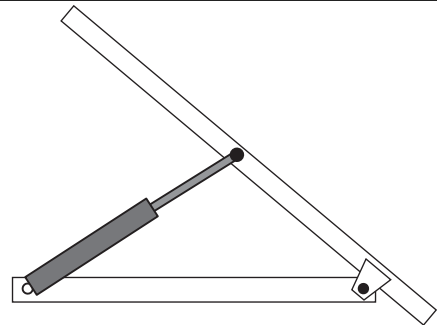
**UNDERBODY TELESCOPIC**  
SLANT FORWARD OR SLANT REARWARD



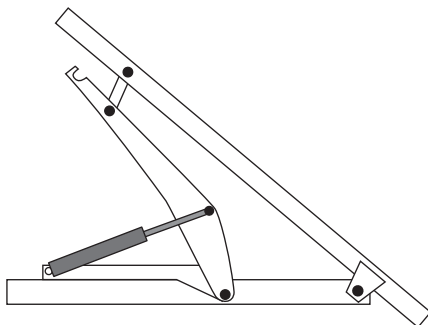
**SINGLE STAGE SCISSOR**



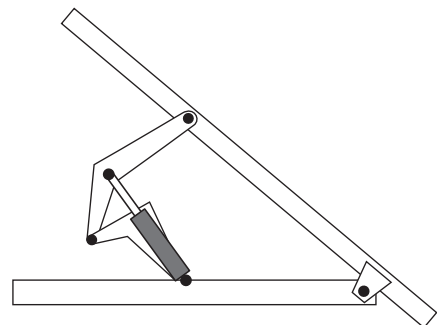
**UNDER BODY ARM HOIST**



**UNDER BODY DIRECT LIFT**



**UNDER BODY ARM - SCISSOR**

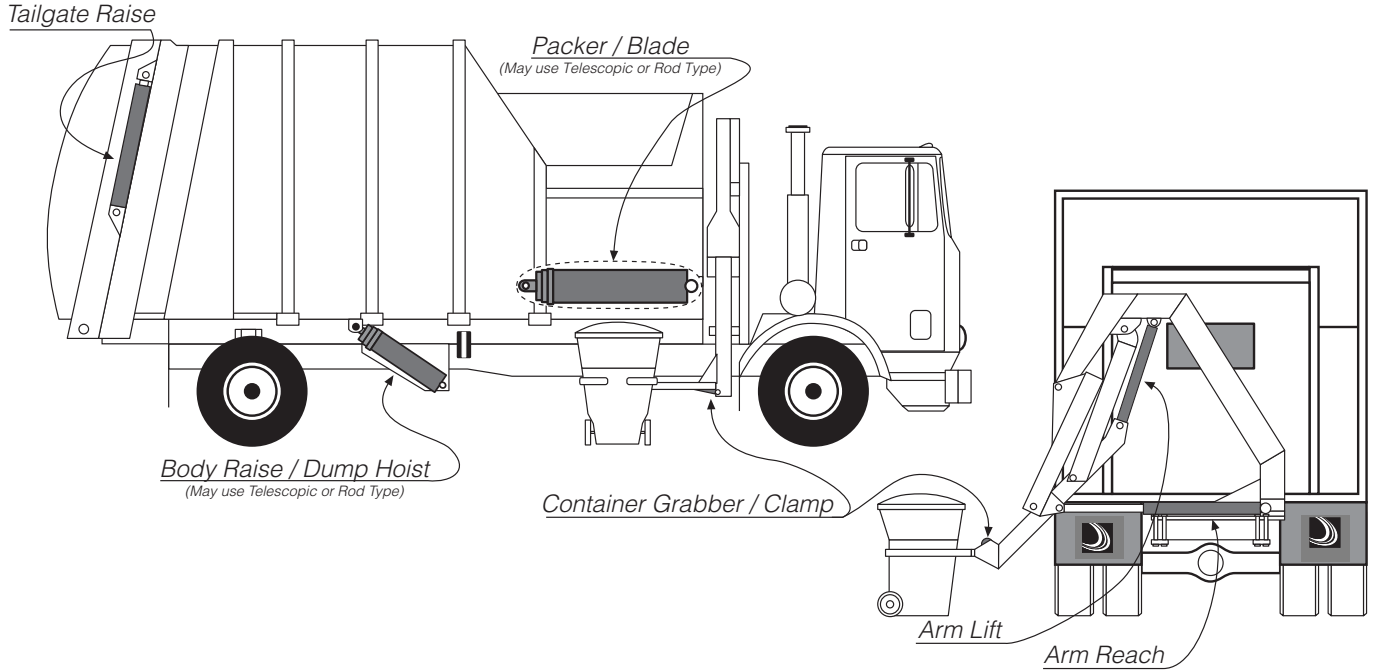


**LOST MOTION SCISSOR**

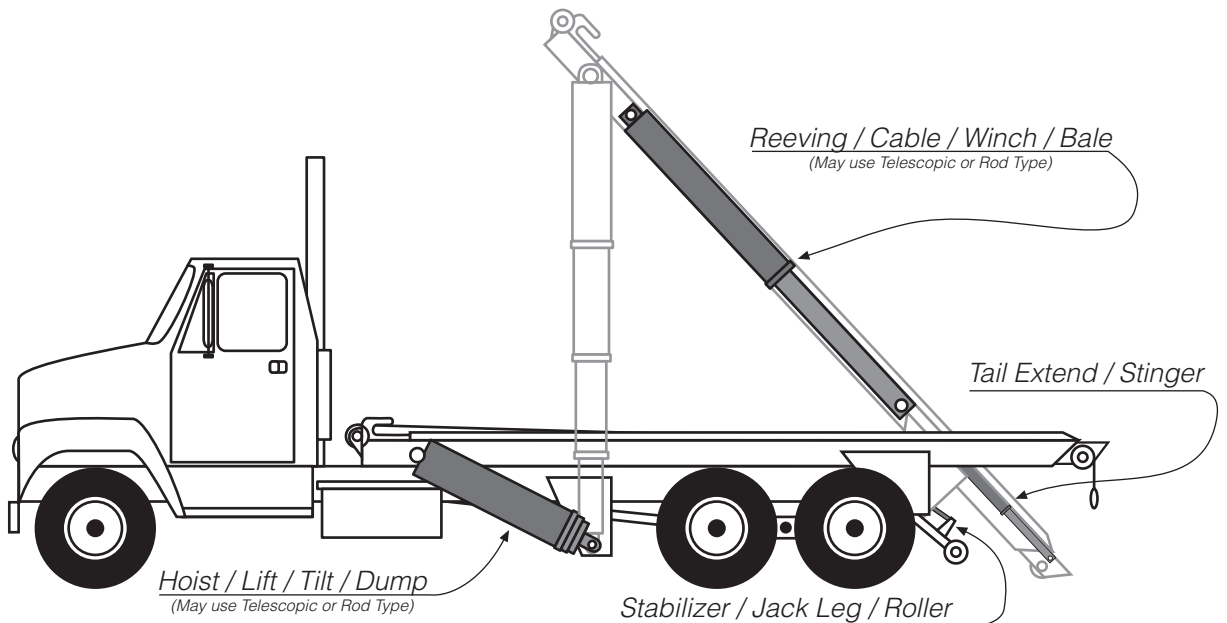
# REFUSE BODY CYLINDER APPLICATIONS

## Application Guide

### Side Loader Refuse Bodies



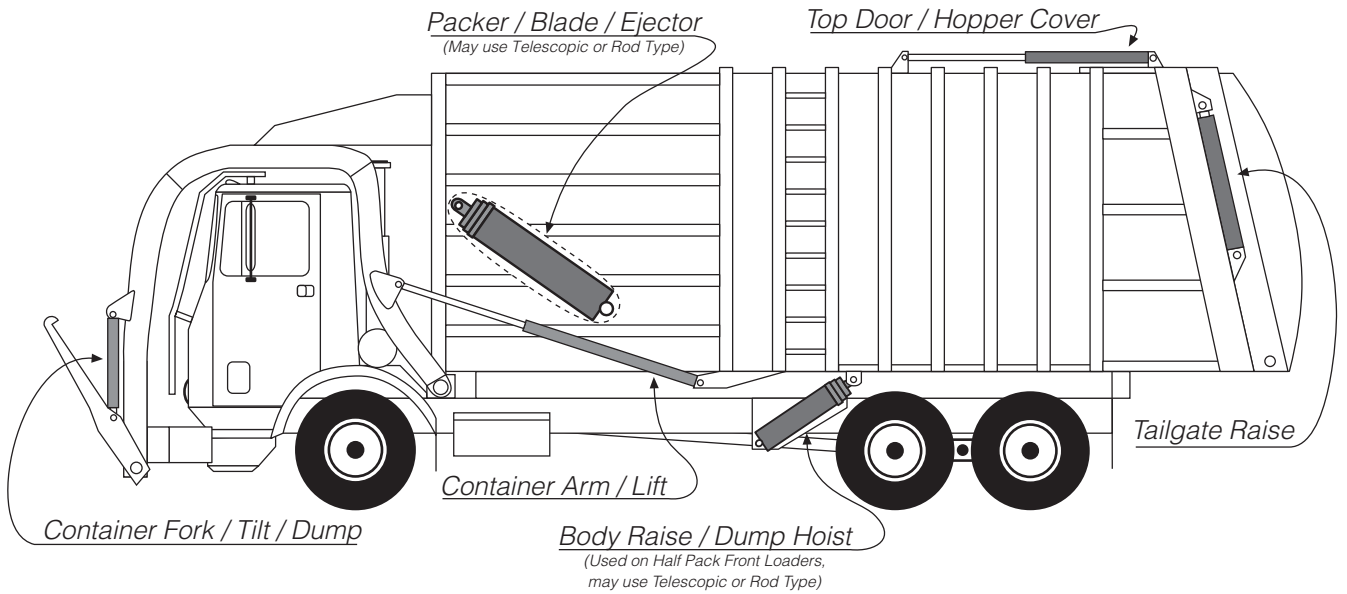
### Roll Off & Tilt Frame Hoists



# REFUSE BODY CYLINDER APPLICATIONS

## Application Guide

### Front Loader Refuse Bodies



### Rear Loader Refuse Bodies

