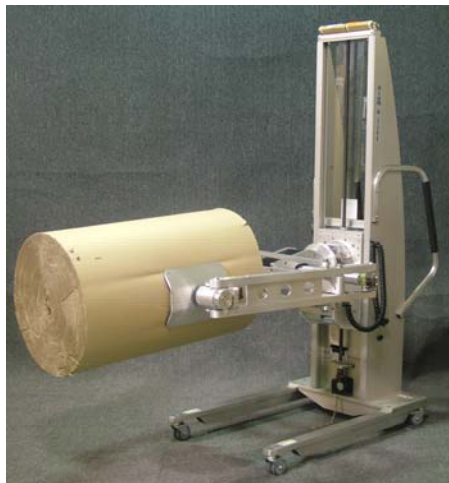


# alum-a-lift inc

*"The Back Saver"*

## Ergonomic Lifting Guide *For* Roll Handling





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**alum-a-lift inc**

*"The Back Saver"*

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Since 1990, Alum-a-lift has conceived, designed, developed and manufactured ergonomic lifting devices; Devices to lift, lower, move, position and hold objects too heavy for the unaided human.

Responding to customer requests, primarily from major corporations, there have evolved groups of products that today comprise specialties, placed into niche market sectors. Sometimes what appears to be a unique application, thought never to be seen again, resurfaces; then, again and again. From the body of accumulated knowledge, elements can be modified, adapted and reused. Examples include lifts for use in class 100 cleanrooms, lifts for handling test fixtures, lifts for handling tool components used in the semiconductor industry and those to be used in the pharmaceutical and related industries.

There are two parts to an Alum-A-Lift; the lift itself and the end effector. The lift is selected from categories of constructions spanning a range of lifting capacities from 100 lbs to (now) 2000 lbs. Modular Construction allows each construction to be modified as required to fit the specific application. End effectors allow the lift to perform its intended, sometimes, unique, task. There is a very wide range of end effectors, emulating functions performed by the human body. Reach, grab, rotate and articulate are such typical functions.

Common to all lifts is the strict adherence to all known applicable standards in the U.S and in the EU community, in which the CE Mark is a requirement. In contrast to other designs, our products are fail-safe.

Alum-A-Lift is represented in almost all industrial nations and is thus able to provide local support in most situations. A policy is to have available spare parts, priced reasonably, that are shipped the same or next day upon receipt of order.

Available is an Application Guide, showing step-by-step, the translation of basic information into a lift configured to solve the perceived lifting problem. Please feel free to request this informative booklet.

Thank-you.

Stan Bressner

President

# Roll Handling

Roll Handling is a daily task performed in essentially every industry. Two sets of opposing considerations are generally faced: Economics and ergonomics. The use of larger rolls results in fewer handlings, less scrap and less downtime. Ergonomic guidelines, along with machine constraints, tend to limit the roll sizes that are actually used. The general objective is to optimize the handling system. The use of an ergonomic lifting device demonstrated that an investment in alum-a-lift will result in a relatively short pay-back period and thus represents a favorable return on assets employed.

The handling strategy to be employed depends on the interaction of three sets of variables:

**The Roll:** Dimensions, weight and constraints imposed by the material

**The Source:** Location, conditions, height, constraints and roll orientation

**The Target:** The take-up or pay-off device, location, height, roll orientation and constraints.

Solutions to the handling problems are shown in groups of annotated images.

## TROUGHS

When light to medium weight rolls are stored horizontally and are readily accessible, to have a through shaft inserted into the core and placed horizontally onto an accessible pay-off stand, a simple static trough will serve as the end effector. The trough may have a trapezoidal, triangular or curved shape to center rolls of varying diameters. The shaft is assembled to the core at the best ergonomic height. An extra shaft, inserted into the next roll to be used while on the lift, will serve to reduce the changeover and machine waiting time.



# Roll Handling



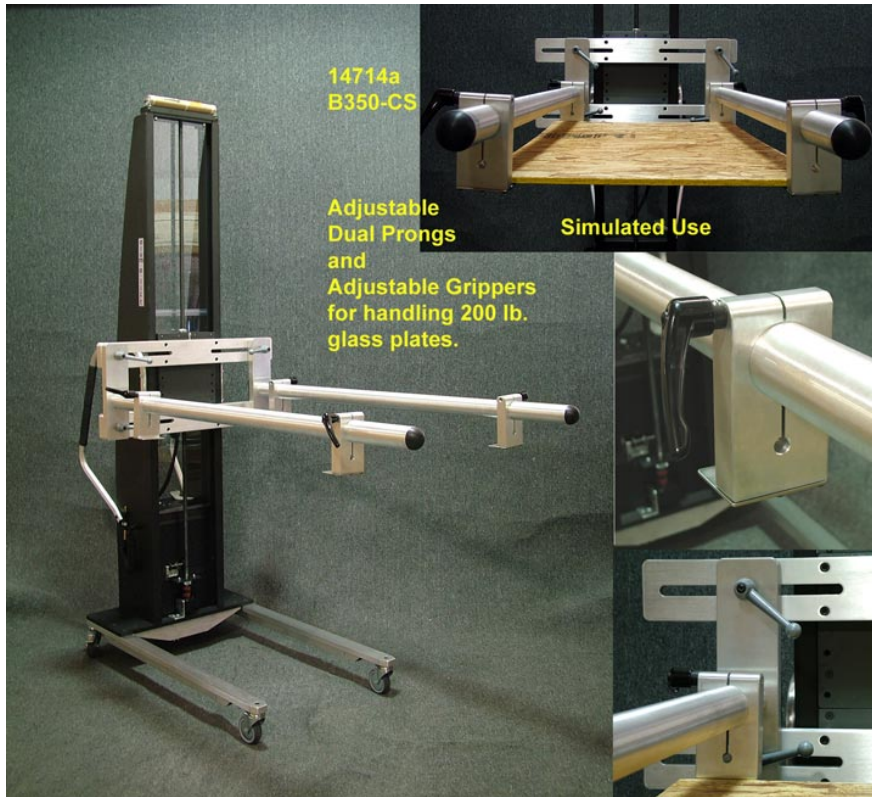
A trough may also be used to handle heavy rolls. Side guides and machine interlocks assure alignment and prevent the lift from moving when the roll is transferred from the lift to the pay-off stand.

The machine pay-off may be a set of rollers onto which the roll is to be placed. At times, the location of the pay-off is at some distance from the accessible end of the using machine; or there may be obstacles between the end of the machine and the pay-off rollers. An extended end effector is used to span the distance to the rollers. A front stop, actuated by the user, releases the roll when the target is reached. As with all configurations, stability is a major consideration.

Calculations are made to ascertain if and how much counter mass is required to satisfy the stability criterion. After construction, the lift is subject to physical tests to assure stability.

# Roll Handling

## Prongs & Forks



When the core is to be left open and the material is not fragile, the horizontal roll may be captured by a set of prongs or forks, with fixed or variable widths. This arrangement is used when the target is a cantilevered mandrel.



# Roll Handling

## Cradles

When the roll is horizontal at the source and a loose shaft is used to mount the roll onto a pay-off stand, a set of notched forks, spaced to straddle the roll, may be used. The shaft is first inserted into the roll's core, and the shaft may be used as the lifting point. If the roll is found on a pallet, the forks must be long enough to reach the core center from the edge of the pallet. Implied in this arrangement is clear access to the pay-off stand on the using machine. If the rolls are to be found, supported by shafts, on a storage rack, the fork set is dimensioned to straddle the roll, while fitting between the roll ends and supporting brackets. With varying width rolls, the fork set may have adjustable widths.



# Roll Handling

## Booms & Roller Booms



When the rolls are stored horizontally, and are to be placed onto an accessible, cantilevered mandrel, a boom is used to “spear” the roll, lift it as required, and align with the machine mandrel. If the roll is fairly light, and easily transferred, a smooth boom is used. If the roll is too heavy to be transferred manually, inset rollers ease the pushing task. Accessories include a spring loaded front stop that traps the roll on the lift’s mandrel

until physical contact is made with the machine’s mandrel, and a docking arrangement with a male fitting attached to the machine’s mandrel and a female fitting attached to the lift’s mandrel. With the latter accessory, the roll is aligned slightly higher than the machine’s mandrel and then lowered until the two fittings are engaged. When the two fittings are engaged, there is effectively formed a continuous shaft abetting the transfer of the roll from the lift to the machine. Docking fittings are also available in sets and may be accordingly ordered.



# Roll Handling

## Powered Pushers

When very heavy rolls are horizontal at the source and must be assembled to a machine mandrel, especially at higher elevations, a powered pusher is used. Along with a set of docking fittings, a continuous shaft is effectively formed for ease of transfer. With such heavy weights, the lift's mandrel will deflect under load. Accordingly, docking fittings should be used to minimize misalignment between the mandrels. In some roll handling operations, such as a laminating and printing, the roll is introduced at the pay-off end of the machine and the processed roll is to be removed from the take-up. In such instances, the pusher is used in reverse to become a puller. The roll is then transferred from the take-up back to the lift for subsequent handling.



## Expanding Mandrels



More often than not, rolls are stored vertically (“eye-to-the sky”) on pallets. Depending upon the rolls’ configurations, they may be stacked, one over the other in tiers. The pallets may be located in a warehouse or in an area in the vicinity of the processing machinery. The usual challenge is to capture a roll at some level on a pallet, lift it off, then rotate it 90° in order that

the core become horizontal for assembly to a machine mandrel at some elevation. Often the pallets are located, for example, tightly spaced, sometimes along a wall or on the floor under a pallet rack. In such instances neither the alum-a-lift nor the human has access without having first moved the pallet to another location where access is provided to at least two sides or two corners of the pallet. Even with such access, the lift’s end effector must have a reach length adequate to access all the rolls. Depending upon the rolls’ diameters, their array, and the pallet’s dimensions, the worst case is to reach the geometric center of the pallet. Attention must always be given to the loaded lift’s stability. In some situations, without room for forward projecting legs, a counterbalanced configuration may be required. This configuration inevitably leads to the addition of counterweights, adding to the load to be pushed and maneuvered. Applied creative thinking and willingness to improve handling conditions will often lead to a lighter, less costly lift and accompanying user-friendliness. One of two lifting strategies is employed: The expanding mandrel to capture the core; or a clamp to capture the roll by its outside.



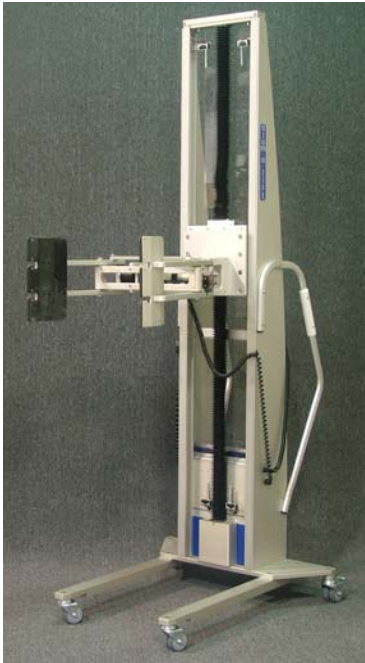
When the inserted mandrel is expanded, a safe light comes on, signaling that it is safe to lift the roll. By utilizing a lead-in on the mandrel tip, the end effector self aligns with the roll core during engagement. When proper depth of engagement is reached, the lifting function automatically shuts off, preventing damage to the equipment or the roll.




Both the expanding and the articulating functions are powered on the units illustrated. The operator does not have to leave his position to perform these functions. Also available at a lower cost is an end effector that is manually operated. the roll weight and frequency of use determine the more economical method.

# Roll Handling

## Clamps



Clamps are used when the roll's core must be left open and when the material will tolerate clamping action, especially on the outer layers. Clamp jaws are lined with a non-marring, resilient (high friction) material. Powered and manual functions are available. Powered clamps have regulated clamping force. When vertically on pallets, rolls must be spaced to allow entry of the clamp jaws.

 Powered Clamp, No Rotation

Examples show manually operated clamps and manual rotation. Rolls should be clamped relatively close to their centers to minimize the tendency to pendulum. Clamps operated with hand wheels located on both left and right hand sides.

Manual Clamp, Manual Wrist



Powered Clamp, Manual Trunion



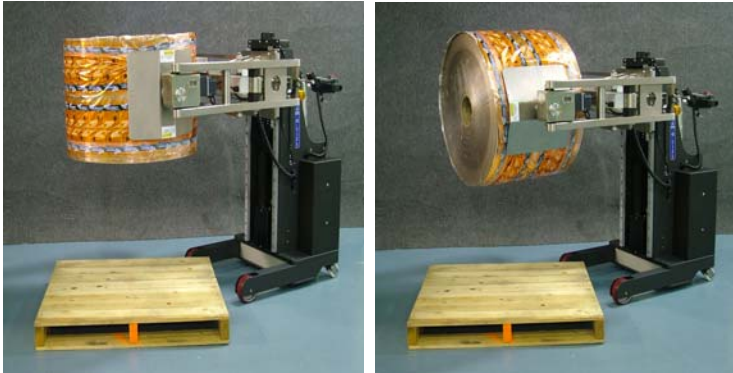
Powered Clamp, Powered Trunion, Manual Wrist



Manual clamp and manual rotation; with pivoting clamp jaws to rotate core from vertical horizontal.

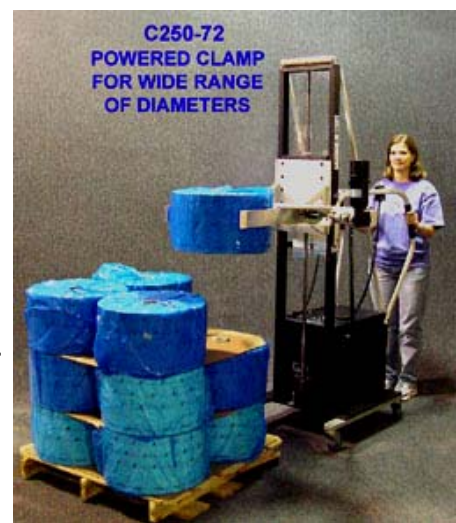
# Roll Handling

## Advanced Clamping Devices



Powered clamp and powered rotation, with pivoting clamp jaws to re-orient core from vertical to horizontal. With the heavily loaded lift, a powered drive is used.

Powered Clamp without rotation for capturing rolls with a wide range of diameter with the same end effector. Clamp arms move left and right (equal & opposite) on linear rails. Without provision for forward projecting legs, a counterbalanced configuration is used.



## Core Plugs



Large Roll Handling within the converting industry is typically performed by means of core plugs and shafts. For light weight hollow core plugs (less than 100 lbs.) Alum-A-Lift handles the plug by means of manual or powered grippers. This eliminates manual handling and prevents back strain among operators required to manually remove and insert core plugs. For heavier solid plugs and shafts (100 lbs or more), Alum-A-Lift offers Powered Grippers mounted to either manually driven or power driven lifts. These lifts allow the plugs and shafts to be removed and inserted at the push of a button and are a beneficial alternative to the stationary core plug and shaft handlers on the market

# Roll Handling

## Mobile Racks and Carts



Designed to interface with Alum-A-Lift, these racks may be located close to the using machines. Often, conventional fork trucks are not welcome in such areas. Using Alum-A-Lift will save time lost awaiting fork truck and their licensed drivers.



Various carts may be constructed to temporarily store rolls. These carts are configured to interface with processing machinery and with Alum-A-Lift to form a handling system. One shown here is equipped with a docking fitting to align its prongs with that on the lift. The prongs fold up, out of the way, for compact storage when the carts are not loaded. Carts have ergonomic handles, as do the alum-a-lift.



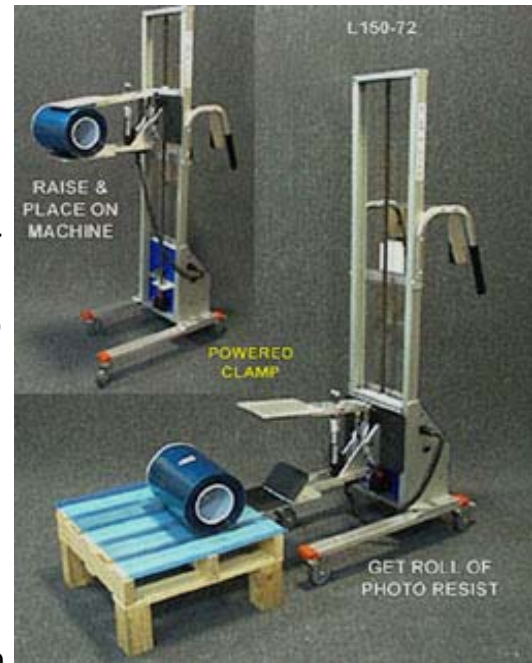
## Some Special Conditions

### Narrow Spacing Between Rolls

Rolls with end inserts (spacers) are sometimes shipped horizontally on pallets, stacked one over the other. Rolls of photo resist material are shipped in the manner. The narrow, vertical space between rolls prevents the use of conventionally shaped clamp jaws. In such instances, one jaw is nearly flat so that it can enter the limited space, while the opposite jaw has a vee or trapezoidal shape to trap the roll.

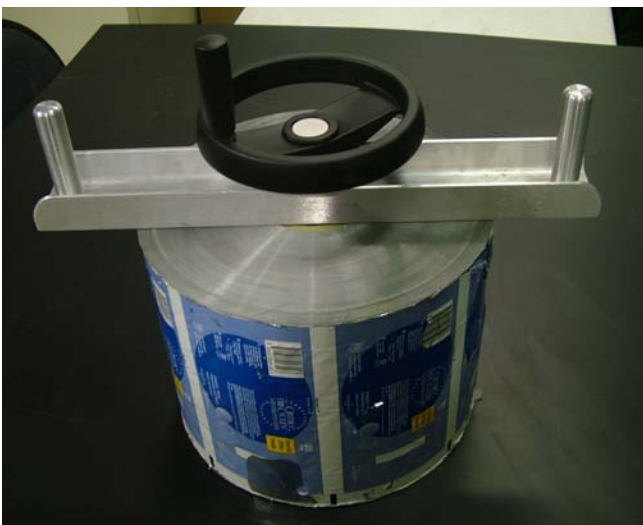
The powered clamp has a regulated clamping force to prevent damage to, or distortion of the roll.

The same approach is used when vertically oriented rolls, on pallets have limited space between tiers.



### Slippery Materials

The tendency to telescope while lifting is prevented by employing an anti-telescoping device. The device is available for use with 3" and 6" cores.



# Roll Handling

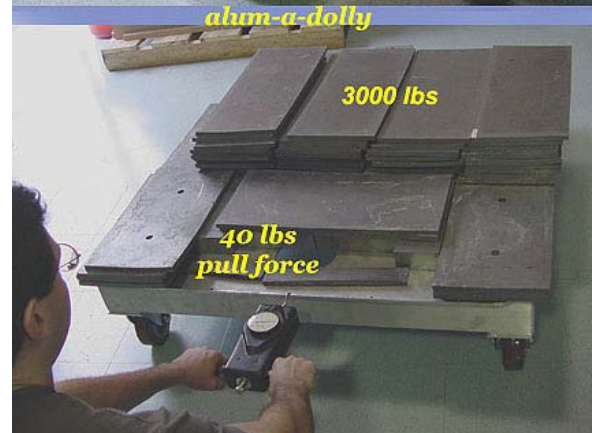
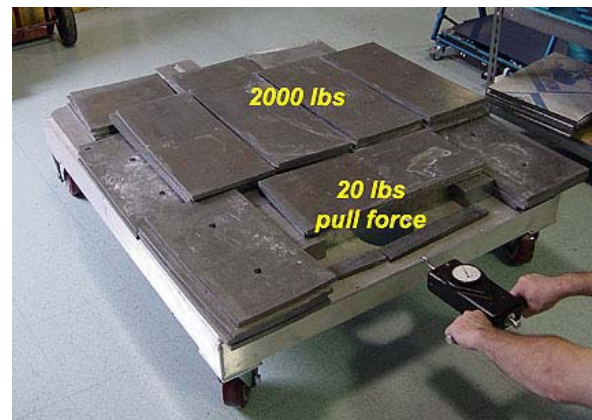
## Alum-A-Dolly



Place a pallet on the Alum-A-Dolly instead of the floor.

Doing so will:

- Provide crawl space for lift's forward projecting legs
- Eliminate or minimize counter weights
- Reduce reach distance for end effector
- Eliminate or minimize counter weights
- Lighter, more user friendly lift
- Locate pallet where most convenient
- Save floor space
- Eliminate waiting time for fork lift & licensed driver



# Roll Handling

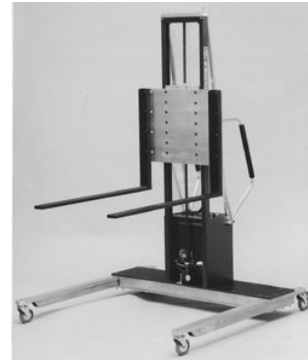
## Example Problems and Solutions

### Problem



Limited and Difficult Access. Await Fork Lift.

### Solution



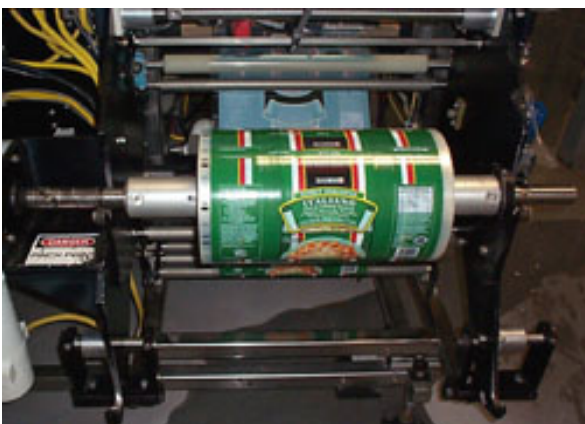
Use Alum-A-Lift. Anyone can use it.



Long Rolls to Cutting Table



Lift with long boom, which acts as a pay-off shaft.



Hold Roll While Shaft is Inserted, Then place on to pay-off stand.



Use a vee trough to hold roll while shaft is inserted.

