

# WHEN HANDLING "BAG IN THE BOX" CONTAINERS



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# MANEJO DE BOLSAS EN LA CAJA



## Reporte una lesión



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Si es una emergencia o una lesión que pone en peligro la vida, llame al 9-1-1.

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# Safety Meeting Topic

## Convenience Stores

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### **Bag – In – A – Box: Prevent Strains & Sprains**

**What can happen!** Soft drink boxes contain an internal bag to hold the drink syrup for the dispensers. Improper lifting or lifting when there is little room to move when handling these containers can contribute to muscle strains and sprains. Strain and sprain injuries will not only ruin your day, it can also prevent you from enjoying many of the activities we take for granted.

#### **LIFTING BAG IN THE BOX**

- Before lifting the items, plan your lift, the carry, and the placement.
- Ensure you have room to properly lift by bending your knees, grasping the box firmly and you are able to stand up using your legs, not your back, while keeping the box close to your body.
- As you are lifting, tighten the stomach muscles. This will protect & strengthen your back.
- Keep the item you are lifting close to your body. This gives you one integrated movement.
- Stand by straightening your legs.
- Move your feet when you are ready to place the box into the rack. Never twist your back while you lift or lower.
- If you're lifting the 5 gallon box, get a co-worker to help you lift the item safely.
- Use a dolly to move multiple boxes from one place to another.
- When you are lowering a box onto a rack, bend your knees, keep your back straight and keep the box as close to your body as possible until you are ready to put it onto the shelf.

#### **STOP! THINK!**

**NEVER** try to carry a big or heavy load alone - ask for help or use material handling equipment.

**NEVER** assume that a small load will be light in weight. Size up the load before attempting to lift.

## National Institute of Occupational Safety & Health Lifting Equation

### Summary

Handling of 5 and 2.5-gallon soda syrup boxes in the 7-Eleven stores is an injury risk for employees. The NIOSH lifting equation was used to evaluate the potential for back and muscle strains from typical handling of these items in stores.

Historically, the handling of 5-gallon syrup boxes contributed to back injuries and other muscle strains. The risk is increased when lifting the larger boxes from on or near floor heights and when lifting above shoulder. The use of the smaller 2.5-gallon bag in a box reduces the risk of injury but is not the optimal weight for men and women to lift.

### Conclusions/Recommendations:

1. The Recommended Weight Limit for the task of lifting and positioning the soda syrup boxes is 15.7 pounds when making a low lift from near the floor. Both size boxes increase the risk of injury for store clerks.
2. The 2.5-gallon box is safer to handle when moved within the knuckle to shoulder lifting range and reduces the potential for back and muscle strains.
3. Store 5 and 2.5-gallon boxes when in storage and on the dispensing racks between shoulder and knuckle height of employees. This is an optimal lifting range and eliminates the risky body postures when making low and high lifts. This lessens the risk of muscle strain but does not eliminate it.

### Findings:

In 7-Eleven stores, clerks are required to lift soda syrup box containers to replace empty containers. Containers are found in two sizes: 5-gallon (53 pounds) and 2.5-gallon (26 pounds).

- Soda syrup containers are stored directly on the floor or on shelving that has varying shelf heights from which to initiate the lift.
- Stores use a standard shelving dispensing system where syrup boxes are placed.
  - Lowest height shelf = 6" from floor
  - Highest height shelf = 64" from floor
- The time to exchange out 3 empty syrup boxes is approximately 15 minutes; 3-5 boxes are changed during a shift.

### NIOSH Lifting Equation

The NIOSH Lifting Equation was used to evaluate the risk of musculoskeletal injury among 7-Eleven store clerks when handling Bag-in-a-Box soda syrup boxes. The lifting equation is a tool used by occupational health and safety professionals to assess the manual material handling risks associated with lifting and lowering tasks in the workplace. This equation considers job task variables to determine safe lifting practices and guidelines. (<https://ergo-plus.com/niosh-lifting-equation-single-task/>);

**NIOSH Lifting Equation:**  $LC (51) \times HM \times VM \times DM \times AM \times FM \times CM = RWL$

**Lifting Index (LI) - how significant is the risk?**

A Lifting Index value of less than 1.0 indicates a nominal risk to healthy employees. A Lifting Index of 1.0 or more denotes that the task is high risk for some fraction of the population. As the LI increases, the level of low back injury risk increases correspondingly. Therefore, the goal is to design all lifting jobs to accomplish a LI of less than 1.0.

**Recommended Weight Limit (RWL)**

The primary product of the NIOSH lifting equation is the Recommended Weight Limit (RWL), which defines the maximum acceptable weight (load) that nearly all healthy employees could lift over the course of an 8 hour shift without increasing the risk of musculoskeletal disorders (MSD) to the lower back.

### Task: Lifting & replacing 5-gallon Soda Syrup Container onto Dispensing Rack

**Lifting Index = 3.4**

A Lifting Index of 1.0 or more denotes that the task is high risk for some fraction of the population. As the LI increases, the level of low back injury risk increases correspondingly.

Origin                                      Destination  
Recommended Weight Limit (RWL) = 15.7                                      27

NIOSH Lifting Variables									
	H Horizontal Location	V Vertical Location	D Travel Distance	A Angle of Asymmetry	C Coupling (1=good, 2=fair, 3=poor)	F Frequency (0.2 – 1.5 lifts/min)	L Avg. Load Lifted (lbs.)	L Max. Load Lifted (lbs.)	Duration (1,2,8 hours)
Origin: Lifting from bottom shelf of storage rack to top shelf of dispensing rack	22" Start	7.5 Start	56.5	10 degrees	2	.2	53 lbs.	53 lbs.	1
Destination: Place carton onto top shelf of dispensing rack	12" Finish	64" Finish		0 degrees	2	.2	53 lbs.	53 lbs.	1

### Task: Lifting & replacing 2.5-gallon Soda Syrup Container onto Dispensing Rack

**Lifting Index = 1.7**

Origin                                      Destination  
Recommended Weight Limit (RWL) = 15.7                                      27

NIOSH Lifting Variables									
Lifting Task	H Horizontal Location	V Vertical Location	D Travel Distance	A Angle of Asymmetry	C Coupling (1=good, 2=fair, 3=poor)	F Frequency (0.2 – 1.5 lifts/min)	L Avg. Load Lifted (lbs.)	L Max. Load Lifted (lbs.)	Duration (1,2,8 hours)
Origin: Lifting from bottom shelf of storage rack to top shelf of dispensing rack	22" Start	7.5 Start	56.5	10 degrees	2	.2	26 lbs.	26 lbs.	1
Destination: Place carton onto top shelf of dispensing rack	12" Finish	64" Finish		0 degrees	2	.2	26 lbs.	26 lbs.	1

## Dispensing racks and employee lifting boxes from lower shelf of rolling rack



Note: 5-gallon boxes on upper & lower shelves



Low lift is awkward because of arm extension, lack of good hand holds on box and confined space to reach into.

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