

# STORAGE SPACE EFFICIENCY GUIDE

A DEMONSTRATION IN SPACE

**RAYMOND**





# SAVING SPACE IS JUST THE BEGINNING

Maximizing the efficiency and productivity of a facility is no simple task. With so many variables constantly changing, getting the most out of your business space is critical for your individualized success.

How can you get the most out of each square foot? How can you streamline operations from the ground up?



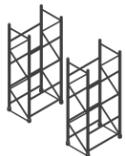
## EXCESS SPACE MAKES WASTE

With narrow aisles, you can store the same amount of goods in less space, or store more in the space you have. Narrower aisles give you more rack faces and access to stored goods, with less travel time in between picks. That means increased selectivity and greater productivity.



## SOLUTIONS BY RAYMOND

Raymond Sales and Service professionals are trained to provide you with personalized solutions for your business that can lead to increased efficiency and productivity. We call this CustomCare™. With solutions ranging from simple process recommendations to total system integration, Raymond offers a spectrum of options that save you space, time, labor and money.



## DISCOVER THE NARROW AISLE

Raymond® trucks can operate in aisles that are less than half the width required by conventional forklift trucks, and boast a greater stack height capability. Raymond created the narrow aisle concept. That way, companies can grow vertically without having to expand horizontally. By adopting narrow aisles, you may be able to increase up to 80% of your existing storage space.



## END TO END

When you work with Raymond, we'll study your operations to uncover what may be hindering your success. Our goal is to develop solutions that go beyond just hardware to include all aspects of your business. At Raymond, we offer an unparalleled depth of services that bridge the gap between innovation and reality.

## A DEMONSTRATION OF SPACE

Starting on the next page, we have included a very simple demonstration that shows the amount of storage space Raymond trucks can save you.

To simplify our example, the shaded area on the top page represents the area required to store 1,000 pallets. As you will see, the required space decreases according to the configuration and type of Raymond vehicle you choose.

As the required space decreases, the extra space available to you increases.

The examples are provided in three sections by type of building: existing buildings with 21 foot clear height, spec buildings with 27 foot clear height and purpose designed buildings with 40 foot or more clear height. In each section, we have kept the building and load specifications constant except for the aisle width required and the number of storage levels that are unique to each vehicle.

When you look through the examples you can see the dramatic space savings available when you convert your operation to narrow aisle.

At the end of the book you'll find the formula to calculate the average square foot per pallet stored. There is also room to do your own calculations and layout. In addition we have provided a table illustrating the space savings provided in our examples.

Go ahead and apply the formula to your specific situation. You'll see the numerous possibilities narrow aisle could bring to your operation. Your Raymond Sales and Service professional is available to work with you to help you arrive at the solutions best suited to your operation.

AREA  
REQUIRED:

10,140  
SQUARE  
FEET.

## EXISTING BUILDING

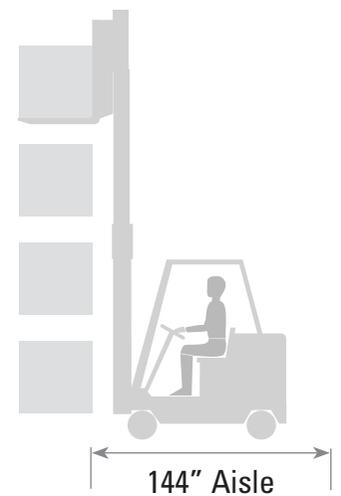
◀◀ THE GRAY SPACE  
REPRESENTS THE AREA  
REQUIRED TO STORE  
1,000 PALLETS USING:

### COUNTER- BALANCED TRUCK

The typical Counterbalanced truck requires an approximate aisle width of 12 feet, with stack height limited to 4 or 5 levels. This results in limited utilization of the cubic space and limited rack faces.

Key specifications:

- + 21' clear height building
- + 2,500 lb. load requirement
- + 180" top beam
- + 92" beam length
- + 188" lift height
- + 4 levels high
- + 144" aisle



## EXISTING BUILDING

◀◀ THE GRAY SPACE  
REPRESENTS THE AREA  
REQUIRED TO STORE  
1,000 PALLETS USING A:

### RAYMOND REACH-FORK TRUCK

The Raymond Reach-Fork truck requires an aisle of just over 8 feet, reducing the size of the storage area, and reducing travel distances and cycle times.

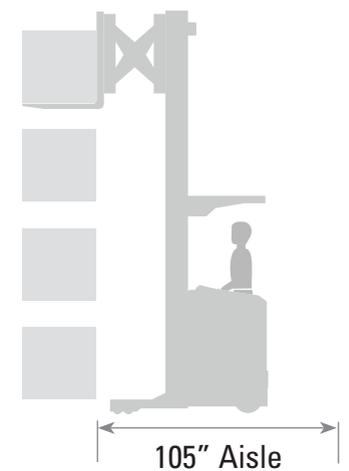
Key specifications:

- + 21' clear height building
- + 2,500 lb. load requirement
- + 180" top beam
- + 92" beam length
- + 188" lift height
- + 4 levels high
- + 105" aisle

AREA  
REQUIRED:

8,540  
SQUARE  
FEET.

You save approximately 16%  
of your valuable floor space  
or store 19% more pallets.



## EXISTING BUILDING

◀◀ THE GRAY SPACE  
REPRESENTS THE AREA  
REQUIRED TO STORE  
1,000 PALLETS USING A:

### RAYMOND SWING-REACH TRUCK

The Raymond Swing-Reach truck works both sides of the aisle by rotating the forks on the mast. Since no right angle stacking turns are required, the aisle can be as narrow as 5.5 feet.

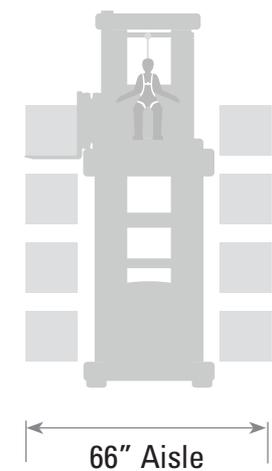
Key specifications:

- + 21' clear height building
- + 2,500 lb. load requirement
- + 180" top beam
- + 92" beam length
- + 188" lift height
- + 4 levels high
- + 66" aisle

AREA  
REQUIRED:

6,930  
SQUARE  
FEET.

You save 32% of your  
valuable floor space or store  
46% more pallets.



## EXISTING BUILDING

◀◀◀ THE GRAY SPACE  
REPRESENTS THE AREA  
REQUIRED TO STORE  
1,000 PALLETS USING A:

### RAYMOND REACH-FORK TRUCK

The Raymond Reach-Fork truck requires an aisle of just over 8 feet, and can stack 5 levels high without downrating. The counterbalanced truck is not practical going to 5 levels due to significant downrating.

Key specifications:

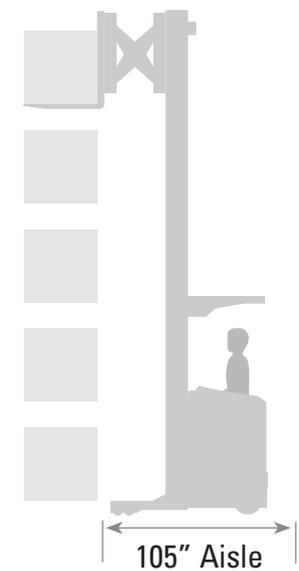
- + 27' clear height building
- + 2,500 lb. load requirement
- + 238" top beam
- + 92" beam length
- + 248" lift height
- + 5 levels high
- + 105" aisle

AREA  
REQUIRED:

6,830  
SQUARE  
FEET.



You save approximately 33%  
of your valuable floor space  
or store 49% more pallets.



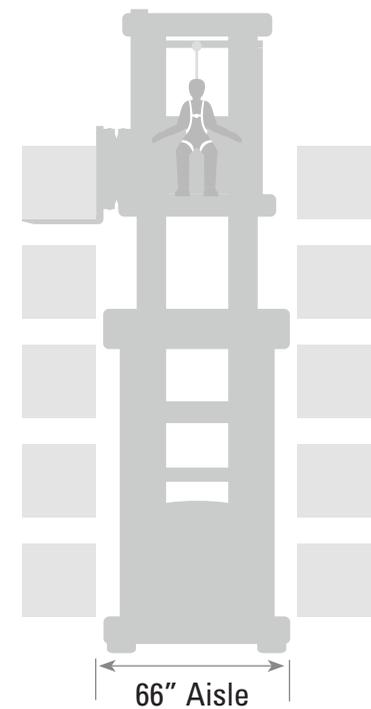
## SPEC BUILDING

### RAYMOND SWING-REACH TRUCK

The Raymond Swing-Reach truck works both sides of the aisle as narrow as 5.5 feet. Unlike the counterbalanced truck, there is no downrating at stack heights of 5 levels.

Key specifications:

- + 27' clear height building
- + 2,500 lb. load requirement
- + 232" top beam
- + 92" beam length
- + 242" lift height
- + 5 levels high
- + 66" aisle



◀◀ THE GRAY SPACE  
REPRESENTS THE AREA  
REQUIRED TO STORE  
1,000 PALLETS USING A:

AREA  
REQUIRED:

5,540  
SQUARE  
FEET.



You save more than 45% of  
your valuable floor space or  
store 83% more pallets.

**SPEC BUILDING**

◀◀◀ THE GRAY SPACE REPRESENTS THE AREA REQUIRED TO STORE 1,000 PALLETS USING A:

AREA  
REQUIRED:

5,310  
SQUARE  
FEET.



You save more than 48% of your valuable floor space or store 91% more pallets.

**RAYMOND  
DEEP-REACH  
TRUCK**

The Raymond Deep-Reach truck allows double-deep pallet storage in the racks, eliminating two aisles out of every five, for increased storage density. Aisle width is just over 8 feet and it allows one more storage level than a counterbalanced truck.

Key specifications:

- + 27' clear height building
- + 2,500 lb. load requirement
- + 238" top beam
- + 98" beam length (straddle method)
- + 248" lift height
- + 5 levels high
- + 105" aisle



105" Aisle

## PURPOSE DESIGNED BUILDING

◀◀ THE GRAY SPACE  
REPRESENTS THE AREA  
REQUIRED TO STORE  
1,000 PALLETS USING A:

AREA  
REQUIRED:

4,470  
SQUARE  
FEET.



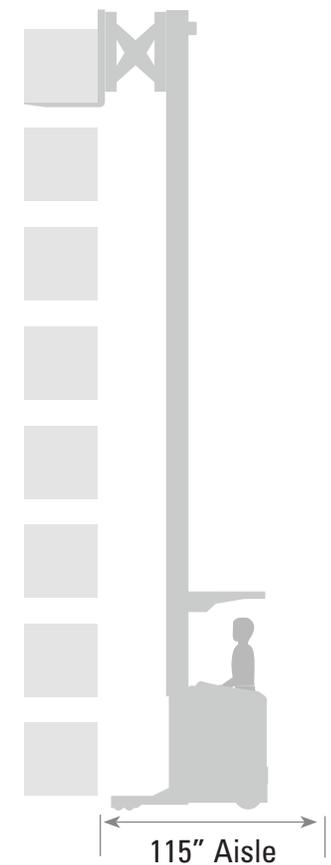
You save approximately 56%  
of your valuable space to  
store 127% more pallets.

## RAYMOND REACH-FORK TRUCK

The Raymond Reach-Fork truck  
enables you to take advantage  
of increased building heights to  
maximize the utilization of your  
storage space.

Key specifications:

- + 40' clear height building
- + 2,500 lb. load requirement  
(with potential downrating)
- + 411" top beam
- + 92" beam length
- + 421" lift height
- + 8 levels high
- + 115" aisle



## PURPOSE DESIGNED BUILDING

◀◀◀ THE GRAY SPACE  
REPRESENTS THE AREA  
REQUIRED TO STORE  
1,000 PALLETS USING A:

AREA  
REQUIRED:

3,400  
SQUARE  
FEET.



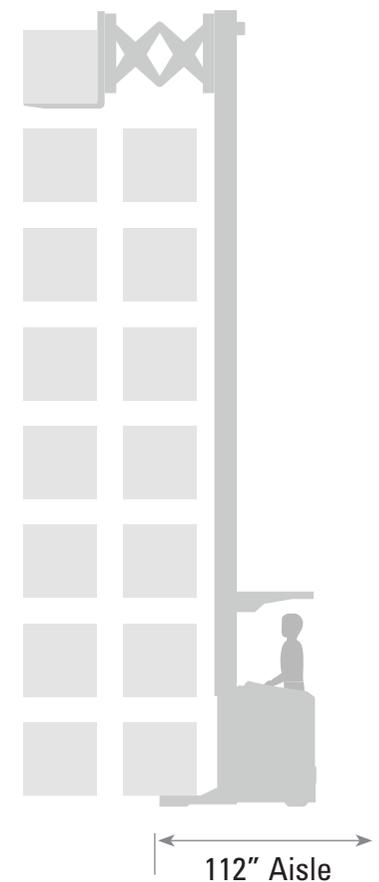
You save approximately 67%  
of your valuable floor space  
or store 199% more pallets.

## RAYMOND DEEP-REACH TRUCK

The Raymond Deep-Reach truck allows you to double-deep pallet storage in the racks. Not only can you take advantage of increased storage heights and narrower aisles, the Raymond Deep-Reach truck lets you eliminate two aisles out of every five.

Key specifications:

- + 40' clear height building
- + 2,500 lb. load requirement  
(with potential downrating)
- + 411" top beam
- + 98" beam length (straddle method)
- + 421" lift height
- + 8 levels high
- + 112" aisle



◀◀◀ THE GRAY SPACE  
REPRESENTS THE AREA  
REQUIRED TO STORE  
1,000 PALLETS USING A:

AREA  
REQUIRED:

3,190  
SQUARE  
FEET.



You save approximately 69%  
of your valuable floor space  
or store 218% more pallets.

## PURPOSE DESIGNED BUILDING

### RAYMOND SWING-REACH TRUCK

The Raymond Swing-Reach truck works both sides of the aisle by rotating the forks on the mast. Since no right angle stacking turns are required the aisle can be narrow as 6 feet.

Key specifications:

- + 45' clear height building
- + 2,500 lb. load requirement  
(with downrating above 240" fork elevation)
- + 469" top beam
- + 92" beam length
- + 480" lift height
- + 9 levels high
- + 72" aisle



**PURPOSE DESIGNED BUILDING**

◀◀◀ THE GRAY SPACE REPRESENTS THE AREA REQUIRED TO STORE 1,000 PALLETS USING A:

AREA  
REQUIRED:  
  
2,640  
SQUARE  
FEET.

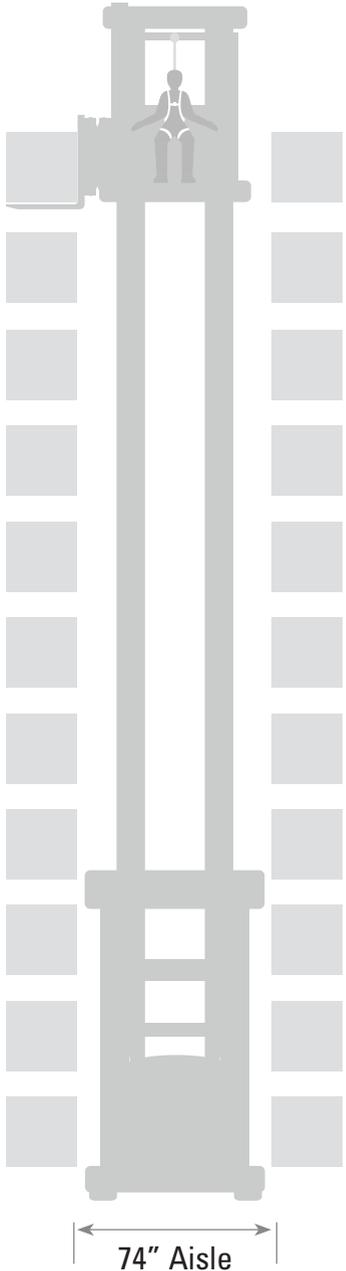
◀◀◀ You save approximately 74% of your valuable floor space or store 284% more pallets.

**RAYMOND  
SWING-REACH  
TRUCK**

The Raymond Swing-Reach truck is engineered to lift heavy loads higher in a highly compact footprint. It has the capacity to lift 2,500 pounds to 11 storage levels in only a 74-inch aisle.

Key specifications:

- + 55' clear height building
- + 2,500 lb. load requirement
- + 585" top beam
- + 92" beam length
- + 595" lift height
- + 11 levels high
- + 74" aisle



◀◀ THE GRAY SPACE  
REPRESENTS THE AREA  
REQUIRED TO STORE  
1,000 PALLETS USING A:

AREA  
REQUIRED:

2,000  
SQUARE  
FEET.



You save approximately 80%  
of your valuable floor space  
or store 406% more pallets.

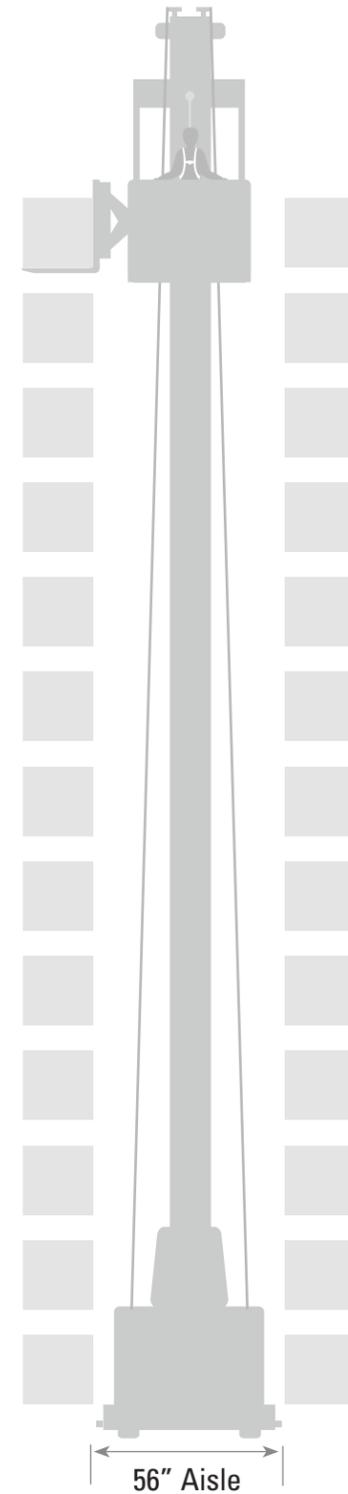
## PURPOSE DESIGNED BUILDING

### RAYMOND TRANSTACKER

The Raymond Transtacker increases stacking height to 13 levels while reducing aisle width to only 56 inches. It allows for maximum storage density and cube utilization.

Key specifications:

- + 64' clear height building
- + 4,000 lb. load requirement  
(no downrating)
- + 684" top beam
- + 92" beam length
- + 700" lift height
- + 13 levels high
- + 56" aisle



# "CALCULATING THE CUBE" FOR PALLET STORAGE

To calculate the storage space required per pallet, you can apply the formula shown below.

## 3 STEPS:

1.	$\frac{\text{Width (inches)} \times \text{Length (inches)}}{144"} = \text{Square Feet of Storage Unit}$
2.	$\frac{\text{Square Feet of Storage Unit (1)}}{\text{Number of Pallets in Storage Unit}} = \text{Square Feet per Pallet Footprint}$
3.	$\frac{\text{Square Feet per Pallet Footprint (2)}}{\text{Number of Levels (tiers) high}} = \text{Square Feet per Pallet Stored}$

Put simply, you will be calculating the width, length and height (levels) of a storage unit, which typically contains four pallets in single-deep applications or eight pallets in double-deep.

## WIDTH

2 (pallet width)  
 + 3 pallet spaces (*d*) 3 (*d*)  
 + 2 1/2 upright width 2 (.5 upright width)  
 = Width (see front view)

## LENGTH SINGLE-DEEP

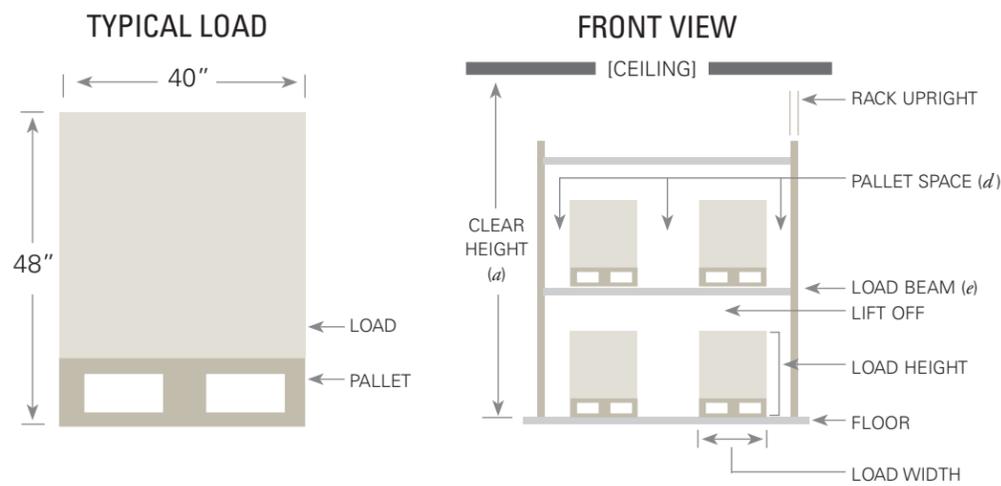
2 (pallet length)  
 + flue space (*f*)  
 + aisle width (*b*)  
 = Length (see footprint)

## LENGTH DOUBLE-DEEP

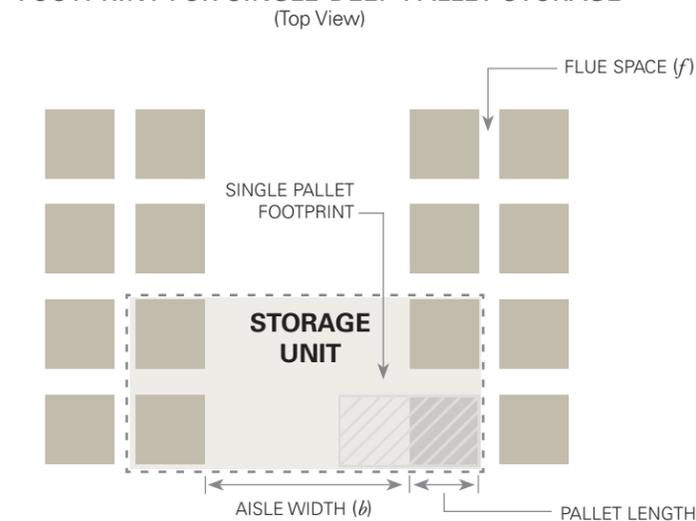
4 (pallet length)  
 + flue space (*f*)  
 + 2 back-to-back spaces (*g*)  
 + aisle width (*b*)  
 = Width (see footprint)

## LEVELS

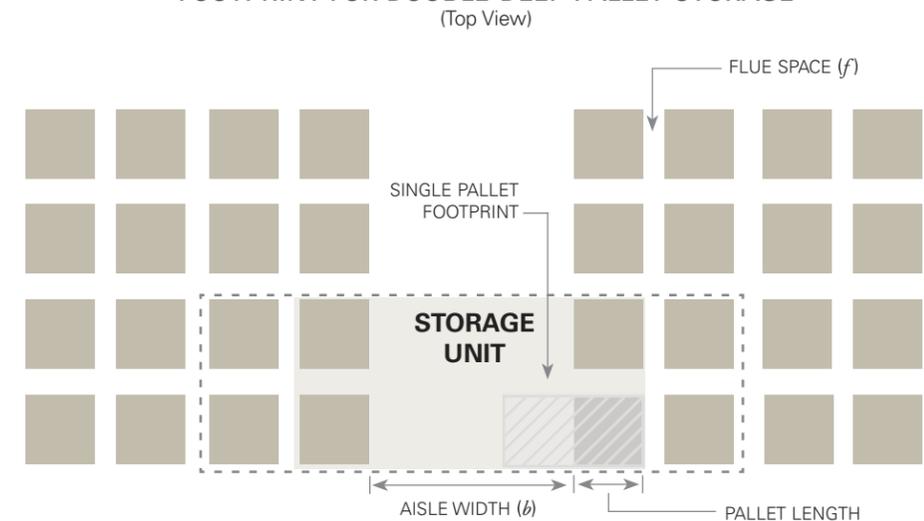
clear height (*a*)  
 ÷ load height + lift off + load beam thickness  
 = Levels



## FOOTPRINT FOR SINGLE-DEEP PALLET STORAGE



## FOOTPRINT FOR DOUBLE-DEEP PALLET STORAGE



# QUICK REFERENCE TABLE

This table shows the specifications used in our examples, assuming:

- + Load size 48" long x 40" wide x 48" high.
- + Load beams are 4" thick.
- + Rack uprights are 3" (TRT requires 5" uprights).
- + Lift off varies from 4" to 10".
- + Bay opening is 54".

	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	Sq. Ft. Per Pallet Stored
	Clear Height	Aisle (1)	Levels (2)	Pallet Space	Beam Length	Clear Flue Space	Back-to-Back Space	
Counterbalanced	21'	144"	4	4"	92"	6'	N/A	10.14
Reach-Fork Truck	21'	105" *	4	4"	92"	6"	N/A	8.54
	27'	105" *	5	4"	92"	6"	N/A	6.83
	40'	115" *	8	4"	92"	6"	N/A	4.47
Deep-Reach Truck	27'	105"(3) *	5	6"(3)	98"	6"	2"	5.31
	40'	112"(3) *	8	6"(3)	98"	6"	2"	3.40
Swing-Reach Truck	21'	66"	4	4"	92"	6"	N/A	6.93
	27'	66"	5	4"	92"	6"	N/A	5.54
	45'	72"	9	4"	92"	6"	N/A	3.19
	55'	74"	11	4"	92"	6"	N/A	2.64
Transtacker	64'	56"	13	4"	92"	6"	N/A	2.00

\* Includes 6" for maneuvering and sideshift.

- (1) Aisle dimensions are minimum aisle requirements.
- (2) Levels are based on clear height and/or 2,500 pound capacity requirement of vehicle.
- (3) Straddle Method (6" pallet space between loads).

NOTE: Examples do not account for intersecting aisles, column placement, dock area etc.

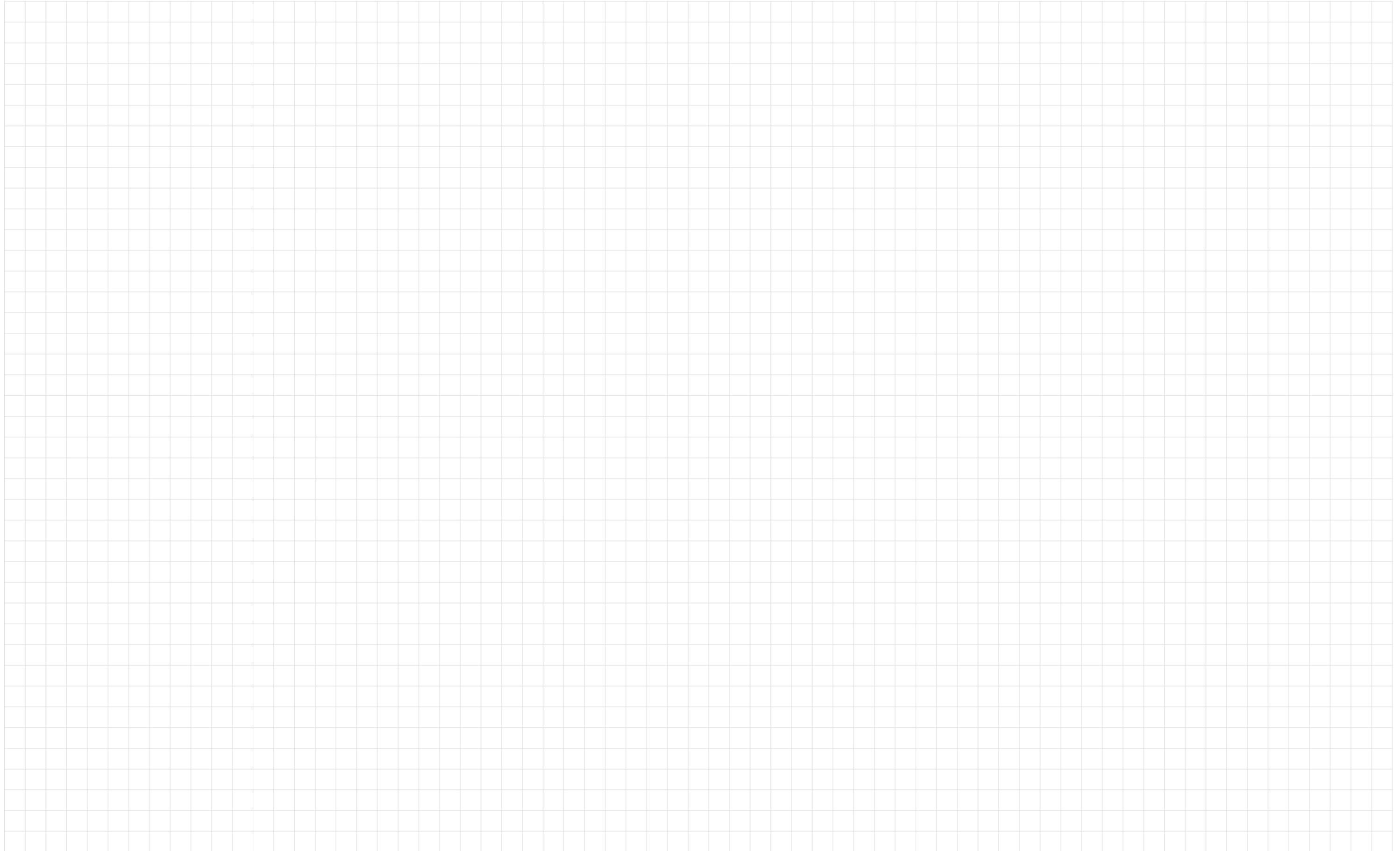
# DO YOUR CALCULATIONS HERE

# DO YOUR LAYOUT HERE

1.  $\frac{\text{Width (inches)} \times \text{Length (inches)}}{144''}$  = Square Feet of Storage Unit
2.  $\frac{\text{Square Feet of Storage Unit (1)}}{\text{Number of Pallets in Storage Unit}}$  = Square Feet per Pallet Footprint
3.  $\frac{\text{Square Feet per Pallet Footprint (2)}}{\text{Number of Levels (tiers) high}}$  = Square Feet per Pallet Stored

DO YOUR CALCULATIONS HERE

DO YOUR LAYOUT HERE



# RUN BETTER. MANAGE SMARTER.

At Raymond, our aim is to deliver the utmost quality and to work for continuous improvement every day, in every aspect of our business. We are proud of what we build. We are proud of the level of service we provide to keep our customers' business up and running. We take pride in our commitment to our customers through our end-to-end approach to helping them find smarter, more efficient, and more effective solutions.

We value the trust that Raymond has earned through decades of proven performance and hands-on innovation. Since the patenting of the first hand-pallet truck to the invention of the reach truck to our pioneering work in narrow aisle operations and beyond, Raymond has led the way in providing customers with the tools and expertise to improve their business.

IF YOU'RE LOOKING FOR A PARTNER WITH THE TOOLS AND EXPERIENCE TO HELP YOU RUN BETTER AND MANAGE SMARTER, LET'S TALK.

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