

High-Density Mobile Storage

SPACESAVER  
DESIGN GUIDE



Storage Solved®



# WE'LL CUSTOMIZE THE PRODUCT TO MEET YOUR NEEDS

When you choose Spacesaver, you gain a partner who will work with you every step of the way—from pre-contract through final evaluation.

We customize solutions for any and all facility storage requirements. The versatility of the system makes it possible to mount virtually any type of filing or storage equipment on our carriages. That, plus a wide range of styles, colors and configurations, gives you design options limited only by your imagination.

With more than 85,000 systems in use, Spacesaver is North America's leading manufacturer of high-density mobile storage systems for office, institutional and industrial applications. There's no better storage solution than Spacesaver.

Benefits include:

- Up to 100% greater utilization of space
- Uncompromising user safety
- Secured access for added security
- Compliance with all government mandates
- Unlimited design flexibility

## Double the capacity of existing space . . . or save half the space

Spacesaver systems give you 100% greater storage capacity or a 50% reduction in floor space. How? The need for fixed aisles is eliminated. You simply push a button or turn a handle to open an aisle where you want it.

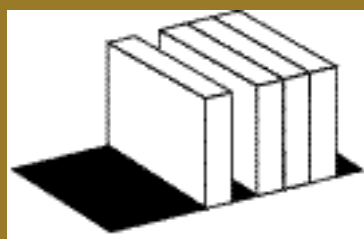


## THE SPACESAVER CONCEPT



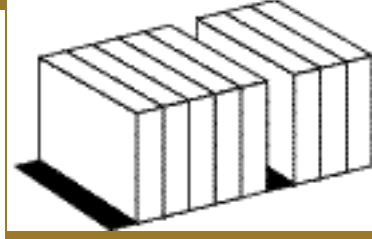
### CONVENTIONAL STORAGE

Floor space is wasted in aisles.



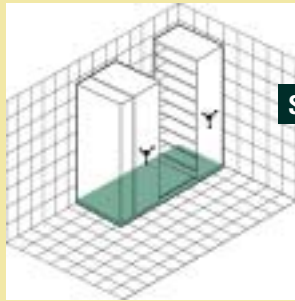
### SPACESAVER STORAGE

Get the same capacity in half the floor space, or double the capacity in the same floor space.



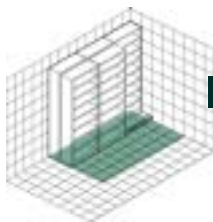
# THE COMPARISON

Spacesaver gives you more filing/storage inches per square foot of valuable floor space. Compare for yourself.



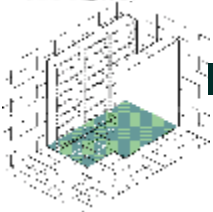
## SPACESAVER MOBILE SYSTEM

**54.6** Filing/Storage Inches/Sq. Ft.  
(2 Moveables + 1 Stationary)  
1,360 Linear Inch Capacity  
24.9 Sq. Ft. of Floor Space



## LATERAL SLIDING SHELVES

**39.0** Filing/Storage Inches/Sq. Ft.  
(5 Eight Tier Sliding Shelves)  
1,360 Linear Inch Capacity  
34.9 Sq. Ft. of Floor Space



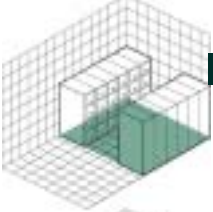
## OPEN SHELVING

**36.3** Filing/Storage Inches/Sq. Ft.  
(5 Eight Tier Shelf Files)  
1,360 Linear Inch Capacity  
37.5 Sq. Ft. of Floor Space



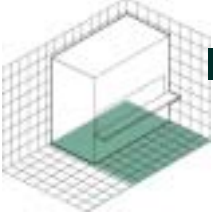
## ROTARY SHELVING

**33.6** Filing/Storage Inches/Sq. Ft.  
(4 Rotary Shelves)  
1,536 Linear Inch Capacity  
45.7 Sq. Ft. of Floor Space



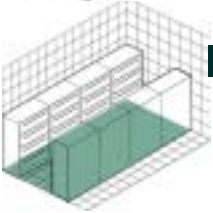
## 4-DRAWER CABINETS

**20.7** Filing/Storage Inches/Sq. Ft.  
(Twelve 4-Drawer Cabinets)  
1,152 Linear Inch Capacity  
55.6 Sq. Ft. of Floor Space



## MECHANIZED SHELVING

**18.2** Filing/Storage Inches/Sq. Ft.  
(95" High Unit)  
1,232 Linear Inch Capacity  
67.8 Sq. Ft. of Floor Space



## LATERAL FILES

**16.7** Filing/Storage Inches/Sq. Ft.  
(Eight 4-Drawer Files)  
1,440 Linear Inch Capacity  
86.3 Sq. Ft. of Floor Space

# THE FLEXIBILITY

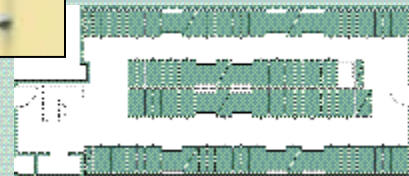
Spacesaver offers a range of system control options. By selecting your choice of manual, mechanical assist or powered controls, you also gain greater potential storage density and less wasted space. This provides you with wide specification capacity.

To demonstrate the flexibility of Spacesaver Mobile Storage Systems, illustrated below are three different density configurations designed for the same architectural space. Note especially, the handling of the column obstruction in each and how density increases as we move from manual to mechanical assist and finally to powered system control.

## 1 MANUAL



Up to 16' (4.8m) long standard. Easy, frictionless movement for smaller applications.



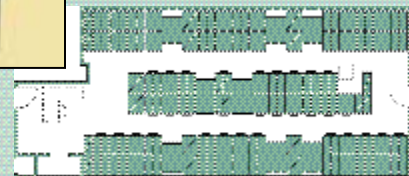
Four rows of 4' (1.2m) long manual units with two entry corridors.

Total = 3,424 Nominal Shelf Feet (1,043m)

## 2 MECHANICAL ASSIST



Up to 45' (13.7m) long standard. Three-spoke operator allows one pound of effort to move minimum of 4,000-pound load.



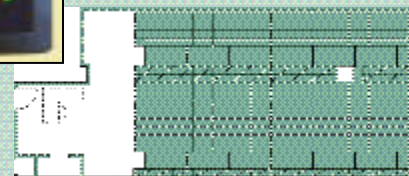
Three sections of larger capacity units and two entry corridors.

Total = 4,152 Nominal Shelf Feet (1,265m)

## 3 POWERED



Up to 81' (24.6m) long standard (longer available). Programmable options available.



Maximum density with minimum space needed for aisles.

Total = 4,976 Nominal Shelf Feet (1,516m)

# DESIGN CONSIDERATIONS

## 1 CONTROLS

You'll choose manual, mechanical assist or powered controls based on your individual customer's needs. See page 3 for details.

## 2 STRUCTURAL RAILS

We offer a variety of rails and structural rails that can be employed as flooring members to meet load requirements or overcome structural constraints. Rail size, spacing and orientation are flexible to accommodate the loads to the building structure. Patented anti-tip systems meeting all present seismic codes and regulations are available. See page 7 for details.

## 3 CARRIAGES

Carrriages are welded "uniframe" steel or aluminum construction and engineered to meet your specific load requirements. A minimum 3/4" (19mm) retaining lip holds shelving or other storage housing in place.

## 4 HEIGHTS

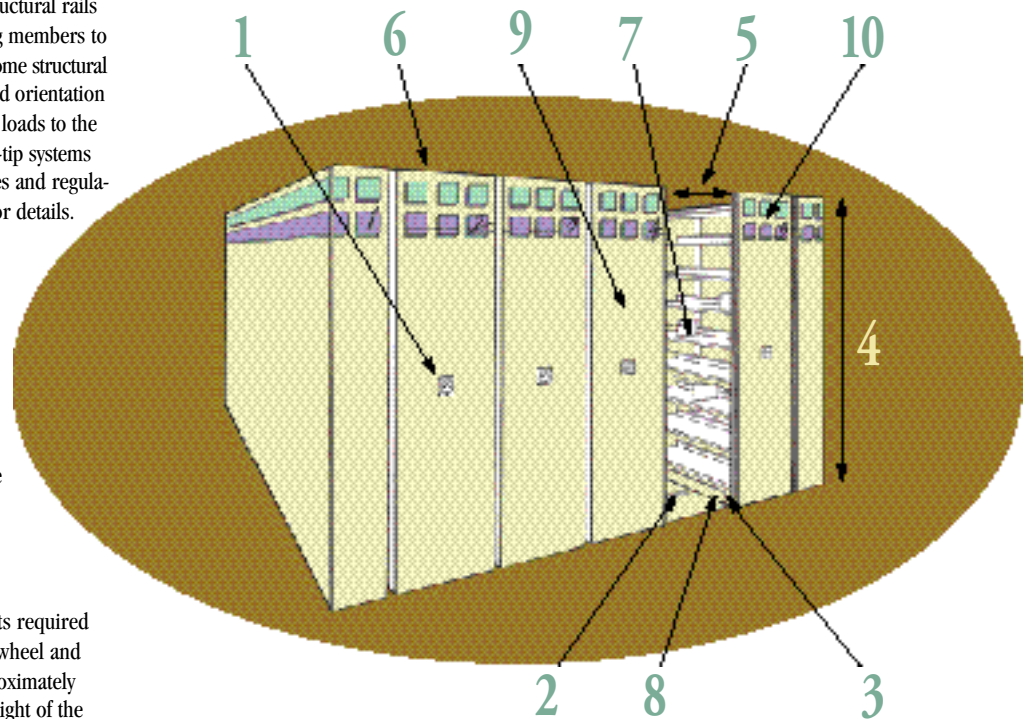
Depending upon the components required for your application, the track, wheel and carriage elements will add approximately 6 to 9" (152–228mm) to the height of the storage equipment used.

## 5 AISLE WIDTHS

When planning aisle space for a bank of carrriages, add a minimum 1-1/2" (38mm) to the depth of each shelving section—i.e. 24" (609mm) deep shelving will require 25-1/2" (648mm) of floor space. This helps maintain required aisle width for a bank of carrriages given architectural restrictions. Check local accessibility regulations (ADA) for additional requirements.

Additionally, add 3" (76mm) to overall carriage length (including handle) of shelving range for manual and powered systems, 6" (152mm) for mechanical assist systems. Also note that there is a slight "growth factor" for shelving width which may become significant for multiple shelving sections on long carrriages.

These guidelines, and the specifications that follow, will get you started designing a Spacesaver Mobile Storage System for your building project. Our Spacesaver design team is ready to assist you with specific recommendations.



## 6 CLEARANCES

All systems require a minimum clearance of 2" (50mm) from the back wall and 3" (76mm) from the ceiling or any other protrusions. Additional clearance may be required for sprinkler heads, smoke alarms, by powered systems or by local fire and building codes. (Follow local codes.)

## 7 SHELVING

We offer four-post, case-type and cantilever shelving for both mobile and stationary applications, although our systems are designed to accommodate virtually any kind of new or existing shelving, cabinets or other storage housing.

## 8 SAFETY FEATURES

Our safety features are virtually unparalleled in the industry. See page 5 for details.

## 9 FACE PANELS

In addition to standard laminate, we offer an extensive choice of colors and finishes, including high-pressure laminates, fire-retardant laminates, wood veneer and steel.

## 10 SPACESAVER GRAPHICS

Design options are virtually limitless with our wide range of both decorative and functional graphic elements—all in high-performance vinyls. We also can reproduce nearly any company logo or symbol.

800.492.3434

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# SAFETY FEATURES

Safety has been paramount in Spacesaver's engineering from the very beginning. As a result, we've pioneered virtually every significant safety feature in the industry. Any of our systems can be designed to close and lock when not in use. All of our powered systems—many of which can also be programmed for controlled, selective access—are UL system listed and CSA approved.

The safety system you choose will depend upon your individual customer's needs, the type of controls selected and whether the system will be accessed by the general public or restricted to trained personnel. We urge you to let us do a customer needs analysis and make recommendations for your individual projects.

## Zero-Force Sensor (ZFS)<sup>®</sup>

Provides a completely passive method of protecting people and objects in the open aisles of all programmable electric systems. It prevents the system from moving when someone or something is in the aisle, and automatically resets when the aisle is cleared.



## Safety Sweep

A photoelectric beam, running the full length of every carriage, protects users, as well as any object that may have fallen to the floor, by stopping carriage movement upon contact. Mechanical sweep also available.



## Anti-Tip Protection

With anti-tip devices that are approved even for the most earthquake-prone areas of the country, stability is designed right in.



## Aisle Lighting

For operator safety and convenience, overhead lighting is available for all Spacesaver systems. It can be interfaced with any system to activate automatically when anyone enters an aisle or it can be tied into your building's security system.



# SPECIFICATIONS

These short-form specifications are presented as an aid for compiling final specifications. Due to the technical nature of high-density storage systems and the virtually unlimited options and accessories available, we recommend utilization of Spacesaver's planning services (see page 8) to obtain more detailed specifications designed specifically for your project. Specifications subject to change.

## Scope

Furnish labor, materials, equipment, special tools, supervision and services required to complete high-density mobile storage systems specified herein and shown on the drawings.

## Responsibility

It shall be the responsibility of each bidder to become fully informed as to the nature and extent of the work required and its relation to any other work in the building.

## Related Work by Others

Finished floor materials (if any) will be in accordance with the room finish schedule and/or specifications. Powered junction boxes when required.

## Qualifications

The high-density mobile storage systems shall be furnished and installed only by those firms engaging in the manufacture of this type of equipment for the last ten (10) years. The entire system shall be warranted by the manufacturer against defective parts and/or workmanship for a period of five (5) years from final acceptance.

## Installation & Field Quality Control

Installation shall be performed under the direct supervision of a full-time factory trained and authorized installation representative, who is an employee of the bidding firm or equipment manufacturer.

## Submittals

Furnish shop, setting and erection drawings, manufacturer's written installation instructions and color cards, charts and chips required for color selections by architect.

# PRODUCT DETAILS

## Stationary Platforms

Fixed units in systems, as shown on the drawings, to be of same construction and height as mobile carriages, only anchored to the rail for a complete homogeneous system.

## Face Panels

All exposed ends and exposed backs (refer to drawings) to have high-pressure laminate (laminate to be .040" [1mm] thick) panels (color as selected by architect from manufacturer's standards) core 3/4" (19mm), 45 lb./cu. ft. (720 kg/m<sup>3</sup>) density particleboard. Provide handles, cardholders and all other necessary hardware for a complete installation.

## Substitute Face Panels, Alternate 1

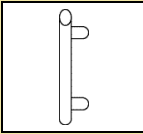
All exposed ends and exposed backs (refer to drawings) to have low-pressure laminate panels (color as selected by architect from manufacturer's standards) core 3/4" (19mm) 45 lb./cu. ft. (720 kg/m<sup>3</sup>) density particleboard.

## Substitute Face Panels, Alternate 2

All exposed ends (refer to drawings) shall have steel face panels. Face panels shall be constructed of 18 gauge (1.2mm thick) steel using a 4-bend (2-bend for manual systems) structural design that forms a 2-1/4" (57mm) (3/4" [19mm] for manual systems) thick edge channel that runs the full length of each vertical edge. Face panels shall be powder coat painted from manufacturer's standard colors.

# SPECS, CONTINUED

## System Types



### Manual System Control

Overall Product, in place

- Lengths: to 16 feet (4.8m) standard
- Aluminum pull handle operation
- Easy movement for smaller systems

Manual

#### Technical Support

Rail: (See Rail Options, page 7)

**Raised Floor & Ramp:** Finished elevation of the raised floor shall be flush with the top of the rails. Ramps shall extend under all moveable and stationary ranges. Floor panels shall be constructed of minimum 3/4" (19 mm) thick, 7-ply exterior grade plywood. (See Related Work By Others for finish floor covering, page 5.)

**Or Substitute:** Rails to be recessed into floor so that top of rail is level with finished floor material. Mobile manufacturer is to supply recess detail. (See Related Work By Others for concrete fill, page 5.)

**Carriages:** Carriages shall be welded, uniframe assemblies constructed of minimum 12-ga. steel with main supporting face sections 5-3/4" (146 mm) high with two reinforcing flanges running the full length of the carriage. Main supporting structural face sections shall provide a 3/4" (19 mm) shelf mounting recess for positive shelf alignment and attachment. Carriage face sections shall provide a smooth, clean appearance without any exposed holes or protruding hardware.

Carriages shall be powder coat paint finished inside and out. Color selection by owner to match shelving.

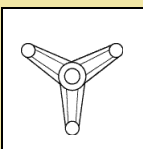
**System Operation:** Manual control handle constructed from non-corrosive smooth finished aluminum shall be provided on the face panel of each moveable carriage, located 39" (990mm) from the base of and centered on the face panel. Handle shall protrude no more than 2-3/16" (55mm) from the finished surface of the face panel.

**Wheels:** Wheels shall be constructed of solid steel for smooth operation. All wheel bearings permanently shielded and lubricated.

**Stationary Platforms:** (See Stationary Platforms, page 5)

**Face Panels:** (See Face Panels, page 5)

**Shelving:** (See Shelving Types, page 7)



### Mechanical Assist System Control

Overall Product, in place

- Lengths: to 45 feet (13.7m) standard\*\*

Mechanical Assist

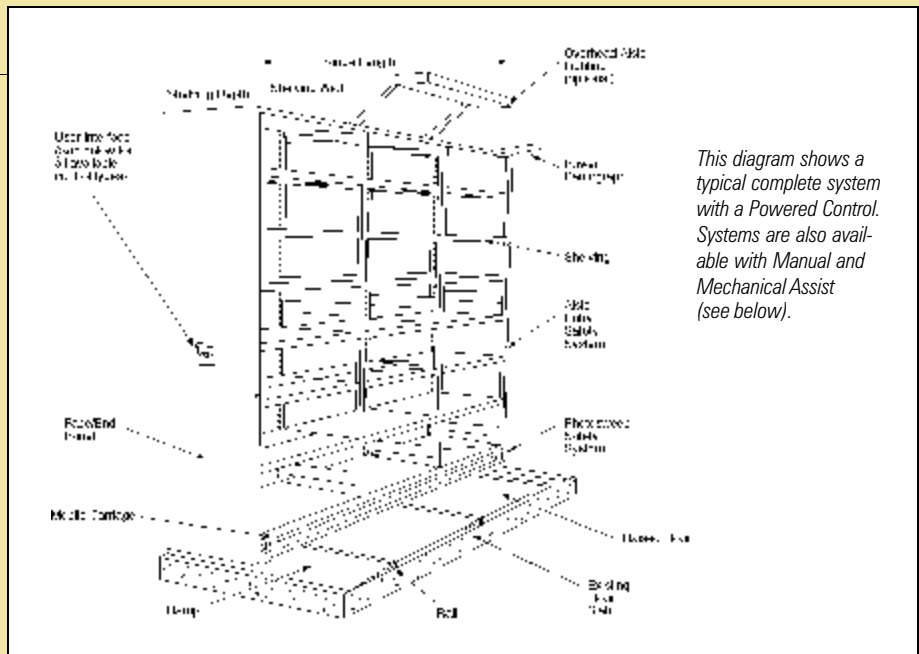
- Spoke drive handle with rotating knobs
- User-activated safety locking pin
- Synchro or line-shaft drive
- External chain tensioner standard

#### Technical Support

Rail: (See Rail Options, page 7)

**Raised Floor & Ramp:** (See Manual System, above)

**Carriages:** (See Manual System, above)



This diagram shows a typical complete system with a Powered Control. Systems are also available with Manual and Mechanical Assist (see below).

**System Operation:** The system shall be of the mechanical assist type having a chain sprocket drive system. A driving system is required to provide uniform movement along the total length of the carriage with unbalanced loads on the carriage.

Operating handles shall be single or three spoke type with steel spokes, approximately 17" (43cm) diameter which transmits power through a chain drive to the drive wheels. Provide operating handles on drive end of carriages as noted on drawings. A starting effort of 1:4000 lbs. is standard and a starting effort of 1:10,000 lbs. is available.

**Safeties:** Each mechanical assist carriage to be complete with color-coded manual safety locking pin, on all operating ends.

**Wheels:** (See Manual System, at left)

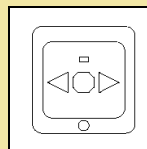
**Stationary Platforms:** (See Stationary Platforms, page 5)

**Face Panels:** (See Face Panels, page 5)

**Shelving:** (See Shelving Types, page 7)

**Other Options:**

- Safety Sweep
- Safety Floor/Ramp
- Automatic Aisle Locks
- Aisle Lighting



Powered

### Powered System Controls

Overall Product, in place

- Lengths: to 81 feet (24.6m) standard\*\*
- Push-button control operation
- Soft-start & soft-stop
- Current-limited drive & automatic time-out
- UL system listed & CSA approved
- Synchro drive
- User-activated & passive safeties
- May be designed for controlled, selective access

#### Technical Support

Rail: (See Rail Options, page 7)

**Raised Floor & Ramp:** (See Manual System, at left)

**Carriages:** (See Manual System, at left)

**System Operation:** Operation control shall be provided for each possible access aisle at the end of each range adjoining a permanent aisle and shall provide a visual indication of activity and control system status within each module. Operation controls and logic system shall permit the desired aisle to open automatically regardless of the position of the carriages. All ranges shall have controls on all faces that end at a main aisle. Controls shall provide an emergency stop and/or reset.

**Safeties:** Minimally, each aisle to be equipped with safety sweep running full length of carriage. Once aisle is open, aisle shall lock out (LED at face panel shall turn red). Aisle must be manually reset at open aisle (promoting visual check) before another selection is made. If aisle has been reset and no aisle selection is made within 15 seconds, aisle shall automatically lock out (LED red) to protect the open aisle.

**Wheels:** (See Manual System, at left)

**Stationary Platforms:** (See Stationary Platforms, page 5)

**Face Panels:** (See Face Panels, page 5)

**Shelving:** (See Shelving Types, page 7)

**Other Options:**

- Push Button Controls
- Aisle Entry Sensors
- Zero Force Sensor System
- AisleGuard™ Sensor System
- Dual Safety Sweeps
- Aisle Lighting
- Programmable Logic Control
- LCD System Status Displays

\*\*Consult factory for carriage lengths longer than standard lengths listed above.

## Rail Options

### Typical Rail & Carriage Elevations

#### Uses, Applications

- Guidance Systems

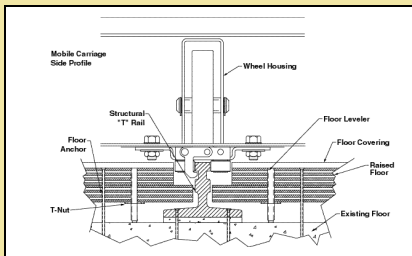
**Rail:** Rail shall be minimum 1035 hardness rating. Rails shall be designed and manufactured to carry a minimum load of 1000 pounds per linear foot (1,500 kg per linear M) of carriage. All rail connection joints shall be designed to provide horizontal and vertical continuity between rail sections, to gradually transfer the concentrated wheel point load to and from adjoining rail sections, and to absolutely prevent rail separation and rail delamination.

**Grout:** All rail assemblies shall be fully grouted with a non-shrink hydraulic cement type grout with an 8000 p.s.i. strength after curing.

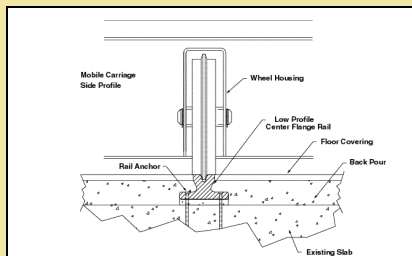
**Or Substitute Grout:** Modular rail and floor systems also available.

**Drive/Rail Guide System:** Rail design shall incorporate smooth contact surfaces for the wheel/wheel guidance. Guidance shall be dual flange, center flange or roller bearing guidance, as required. Guidance system shall absolutely prevent carriage derailment. Drive/guide system shall absolutely prevent carriage whipping, binding, and wheel/rail wear under normal operation.

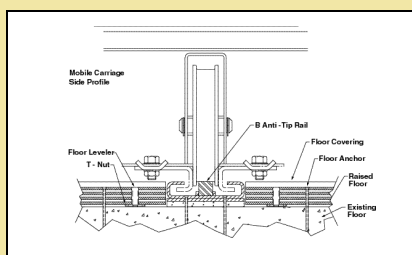
These diagrams show a typical grouted rail, wheel and carriage base profile detail. Note, additional rail options available, including low-profile.



Roller Bearing Guidance



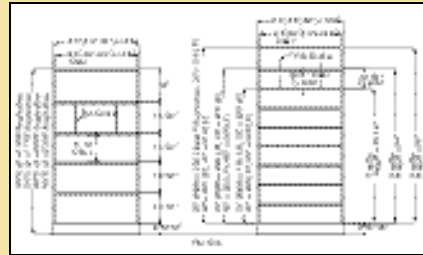
Center Flange Guidance



Dual Flange Guidance

## Shelving Types

### 4-Post Shelving



#### Uses, Applications

- Recommended for letter and legal size filing, x-ray film and light-duty boxes and bulk storage.

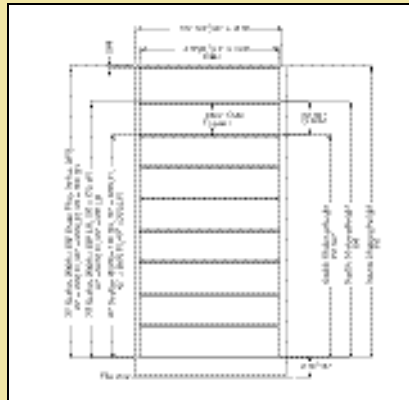
#### Technical Support

**Uprights:** Uprights shall consist of 18-ga. (1.2mm) cold rolled steel formed into either a 2" (50mm) wide "T" shape common post, or a 1" (25mm) wide angle shape end post. Keyhole shaped slots are placed on 1-1/2" (38mm) centers vertically on inner face of posts. Standard shelving heights available up to 121-1/4" (3,079mm).

**Standard Shelves:** Standard shelves shall be formed of 22-ga. (.75mm) cold rolled steel with flanges on all four sides. Front and rear flanges shall also be turned "down" and "in." Shelves to be adjustable on 1-1/2" (38mm) centers vertically. Shelves to be supported front and back by two shelf supports of 14-ga. (1.9mm) min. hot rolled steel. Full depth shelves shall have mounting holes for attachment of an optional center stop. Slots (for optional dividers) shall be placed on 2" (50mm) centers across entire shelf length (starting 1" [25mm] from each end). Height of shelf supports shall be 3/4" (19mm).

**Heavy-Duty Shelves:** Heavy-duty shelves shall be 3/4" (19mm) in height and be formed of 18-ga. (1.2mm) cold rolled steel with flanges on all four sides. Slots for optional file dividers or holes for optional fixed bin dividers shall be placed on 2" (50mm) centers across entire shelf length (starting 1" [25mm] from each end). Height of shelf (with heavy-duty shelf supports) shall be 1-1/4" (31mm).

### Case-type Shelving



#### Uses, Applications

- Recommended for letter and legal size filing and library bookstack storage.

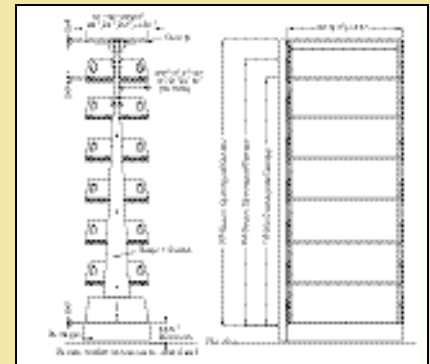
#### Technical Support

**Uprights:** Uprights shall consist of 18-ga. (1.2mm) cold rolled steel formed into either a 2" (50mm) wide "T" shape common

post, or a 1" (25mm) wide angle shape end post. Uprights shall have two 24-ga. (0.6mm) closure panels between the posts and flush with the outer edges of the upright.

**Standard Shelves:** Standard shelves shall be formed of 22-ga. (.75mm) cold rolled steel with flanges on all four sides. Front and rear flanges shall also be turned "down" and "in." Shelves to be adjustable on 1-1/2" (38mm) centers vertically. Shelves to be supported front and back by two shelf supports of 14-ga. (1.9mm) min. hot rolled steel. Full depth shelves shall have mounting holes for attachment of an optional center stop. Slots (for optional dividers) shall be placed on 2" (50mm) centers across entire shelf length (starting 1" [25mm] from each end). Height of shelf supports shall be 3/4" (19mm).

### Cantilever Shelving



#### Uses, Applications

- Recommended for library bookstack shelving and display requirements.

#### Technical Support

**Upright Frames:** Upright frames are a welded assembly consisting of two 14 ga. (1.9mm) 2" (51mm) by 1-1/4" (32mm) posts; a 14-ga. 1" (25mm) by 2-1/2" (64mm) tubular top spreader and a 16-ga. (1.5mm) 1" (25mm) by 1-3/4" (44mm) channel bottom spreader with provisions for screw type levelers. Uprights have attachment slots for shelves on 1" (25mm) centers along their entire height.

**Shelves:** Shelves are formed of 18-ga. (1.2mm) cold rolled steel with triple 90 degree bends on the front and rear. Shelf ends are formed down 90 degrees. Shelves attach to upright posts with 16-ga. (1.5mm) end brackets. Shelf end brackets are 7" (178mm) tall with two attachment hooks for engagement to the upright posts and a safety lug to prevent accidental disengagement.

Shelves are adjustable on 1" (25mm) centers and back to back shelves are individually adjustable.

**Canopy Tops:** Optional canopy tops can be provided to act as a dust cover for both single and double-faced units. Canopy tops are formed of 18-ga. (1.2mm) cold rolled material with triple 90-degree bends identical to standard shelves to accept optional hanging wire dividers at top shelf level.

# APPLICATIONS

Our high-density mobile and stationary shelving systems are widely used in office, institutional and industrial applications. From small mobile systems adjacent to work stations to massive systems for bulk storage, Spacesaver has the product and expertise to fit any situation. The Spacesaver Group has installed more mobile storage systems than the rest of the industry combined. Current applications include:

- Financial
- Healthcare
- Manufacturing
- Justice
- Professional Services
- Libraries and Education
- Museums
- Government

Other Spacesaver products include:

- Library specialty display shelving
- Mobile art racks
- Modular floor mobile systems
- Quickspace® pull-out storage units
- Lateral sliding shelving
- Modular doors & drawers for 4-post shelving
- Industrial pallet-rack systems
- Rotary storage systems
- Lateral filing cabinets
- Bookcases
- Pedestal files



# 800.492.3434

www.spacesaver.com • ssc@spacesaver.com

# PLANNING AND SERVICES

## Design Assistance Centers

As our ISO 9001 certification would suggest, Spacesaver is dedicated to the highest standards of product quality. Equally important is our commitment to customer service, both before the sale and after.

Through our extensive nationwide network of local Area Contractors, Spacesaver provides a level of experience and competency that others simply do not. From architectural constraints and building codes to system design and floor-loading, we have the expertise to handle every issue and customer concern.

Spacesaver also offers a number of brochures, guidebooks and design aids for both general and specific applications. Contact Spacesaver for complete CSI formatted specifications. And, if you'd like to visit a Spacesaver installation(s) in your area, your Spacesaver Area Contractor can make the arrangements. For more information, call 1-800-492-3434.

## Installation Service

For details on delivery and installation, contact Spacesaver for your local Area Contractor. Our network of 100 North American service locations assures you of prompt, courteous service and expert installation by technicians with years of factory-trained experience. Call for contractor and service locations at the numbers below.

## Warranty

Spacesaver systems carry a five (5) year warranty against defects in material or workmanship. This warranty is subject to Spacesaver's standard terms and conditions of warranty. See a certificate of warranty/system acceptance form for all warranty details and terms that apply to Spacesaver products.

## Web Site

For additional and more current information, visit our Web site at [www.spacesaver.com](http://www.spacesaver.com).



## Educational Seminars

Learning units may be earned through Spacesaver's IIDA pre-approved and AIA/CES registered seminars. Spacesaver offers comprehensive study on storage systems planning. Contact us to schedule a seminar.

## The Spacesaver Group

UNITED STATES  
1450 Janesville Avenue  
Fort Atkinson, WI 53538-2798  
920-563-6362  
800-492-3434  
FAX: 920-563-2702  
Internet: [www.spacesaver.com](http://www.spacesaver.com)  
e-mail: [ssc@spacesaver.com](mailto:ssc@spacesaver.com)

CANADA  
266 King Street East  
Toronto, Ontario M5A 4L5  
416-360-1022  
800-544-3679  
FAX: 416-360-7290

UNITED KINGDOM  
Commonwealth House  
148-153 High Holborn  
London, England WC1V 6PJ  
020-7404-7441  
FAX: 020-7404-7442



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