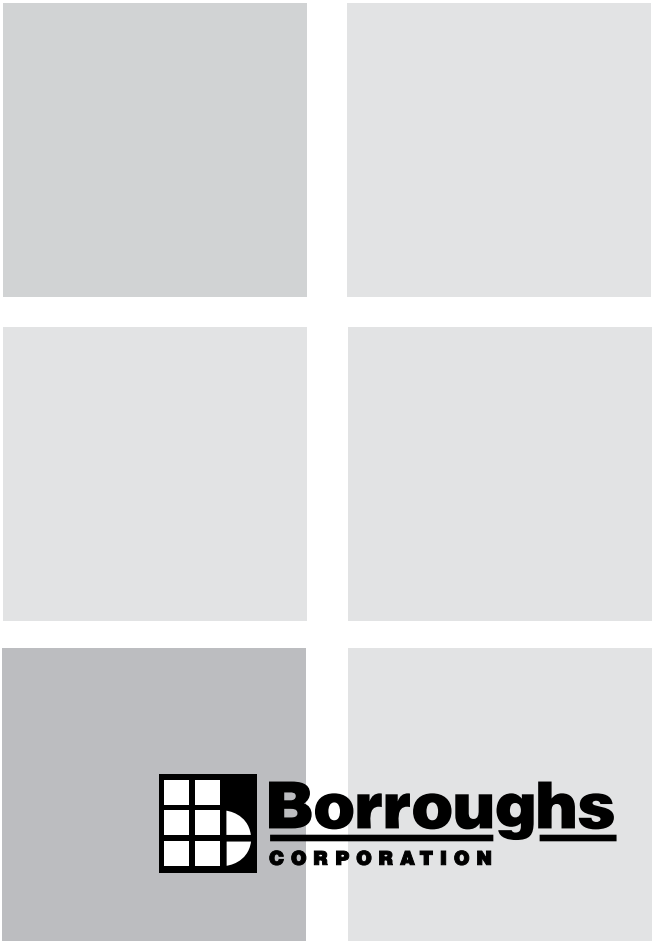


# **BOX EDGE PLUS®**

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steel shelving  
technical specifications



**Storage for the back room, the supply area, the warehouse or the records center requires shelving that is strong, versatile and flexible. Borroughs Steel Shelving is easy-to-use, versatile and has a proven record of durability in thousands of installations worldwide.**

## Basic Data

### WIDTHS:

Nominal unit width: 24", 36", 42" or 48"

Actual beaded post unit width is the nominal width plus  $1" \begin{smallmatrix} +1/16" \\ -0" \end{smallmatrix}$

Actual angle post unit width is the nominal width  $\begin{smallmatrix} +1/16" \\ -0" \end{smallmatrix}$

Actual high-rise post unit width is the nominal width plus  $2" \begin{smallmatrix} +1/16" \\ -0" \end{smallmatrix}$

### DEPTHS:

Nominal depth: 12", 15", 18", 24", 30", 32" or 36"

Actual beaded post unit depth is the nominal depth plus  $15/32" \begin{smallmatrix} +1/32" \\ -0" \end{smallmatrix}$  with beaded post in front and angle post in back

Actual angle post unit depth is the nominal depth  $\begin{smallmatrix} +1/32" \\ -0" \end{smallmatrix}$

Actual high-rise post unit depth is the nominal depth plus  $15/32" \begin{smallmatrix} +1/32" \\ -0" \end{smallmatrix}$  with high-rise post in front and angle post in back

Actual high-rise post unit depth is the nominal depth plus  $1-15/16" \begin{smallmatrix} +1/16" \\ -0" \end{smallmatrix}$  with high-rise posts in front and in back

### HEIGHTS:

Nominal height: One foot increments from 3'3" to 16'3"

Actual height is the nominal height minus  $1/4" \pm 1/16"$

*NOTE:* Unit anchoring is recommended when the height to depth ratio exceeds 4.

*EXAMPLE:* 7'3" high x 18" deep unit has a height to depth ratio of 4.873 and should be anchored to a firm restraint such as a floor, wall or tied overhead across the aisle to an opposite upright assembly.

### LENGTH OF RUN:

Actual length of beaded post shelving run is the nominal unit width  $\begin{smallmatrix} +1/16" \\ -0" \end{smallmatrix}$  per unit plus 1/2" for each row end

Actual length of angle post shelving run is the nominal unit width  $\begin{smallmatrix} +1/16" \\ -0" \end{smallmatrix}$  per unit

Actual length of high-rise post shelving run is the nominal unit width  $\begin{smallmatrix} +1/16" \\ -0" \end{smallmatrix}$  per unit plus 1" for each row end

### CLEAR SHELF OPENING:

Actual clear opening between beaded posts is the nominal width minus 1"

Actual clear opening between angle posts is the nominal width minus 2"

Actual clear opening between high-rise posts is the nominal width minus 2"

Vertical clearance between shelves is equal to center-to-center shelf spacing minus 1-7/32"

### VERTICAL ADJUSTMENT:

All shelves are adjustable on 1-1/2" centers

## Features

## Benefits

### BOX-EDGE PLUS® Shelf

This value engineered shelf provides additional capacity without additional investment or reinforcement. The design creates added carrying capacity and a choice of three load ratings.

### Borroughs Shelf Brackets

Wide load bearing surface provides support at shelf edge. Non-compression bracket allows easy installation and adjustment without tools or nuts and bolts.

### Beaded Posts

Provides 1" additional clear shelf opening and a neater appearance. The beaded post acts as a common front post between units, eliminating bolting of two angle posts. The Borroughs' beaded post design is strong enough to support multi-level systems.

### Vertical Expansion

Borroughs offers one-piece posts as high as 16'3" for multi-level shelving installations. Utilization of a one-piece post reduces the number of parts required, decreases installation time and lowers cost. (No post splicing required). Units can also be added on top of existing shelving to create or expand multi-tier systems. With proper planning, future vertical expansion can easily be accommodated.

### Accessories

A wide range of accessories allows you to design a storage system versatile enough to meet today's requirements and adapt to the changes of tomorrow.

### Borroughs Color Selection

A wide choice of standard colors allow you to create a clean, professional work environment which will help increase worker productivity. The use of light reflective colors on sides, backs and shelves enhances picker productivity and accuracy while improving inventory control.

### Phosphatized Finish

Creates a long-lasting, durable finish which protects against rust and corrosion.

# Borroughs Steel Shelving General Specifications

## Upright Posts

### *Beaded Post*

Front posts shall be a beaded-type post to allow maximum shelf width openings. Minimum material thickness shall be 14 ga. The minimum face width shall be 7/8" to give strength in the down aisle direction and the maximum face width shall be 1" to prevent intrusion of the shelf opening and growth or creepage. The tail flanges of the post shall be welded 6" or less on center for column strength. Posts to be punched on 1-1/2" centers for vertical shelf adjustment.

### *Angle Post*

Posts shall be angle type posts bolted together at 12" centers to form a "T" post. Minimum material thickness shall be 13 ga. The maximum length of the short flange shall be 1". Posts to be punched on 1-1/2" centers for vertical shelf adjustment.

### *Box T (High-Rise) Post*

Box T type posts shall be formed from 14 ga. steel and be 2" wide x 2-3/4" deep to provide maximum strength. Box T post shall be compatible with all accessories for the standard shelving line. Posts to be punched on 1-1/2" centers for vertical shelf adjustment.

### *Post Height*

One-piece posts shall be available in heights ranging from 3'3" to 16'3" in order to allow unrestricted multi-level height placement and to reduce the number of components required. (No splicing shall be required unless post height requirements exceed 16'3").

## Upright Posts Technical

### *Beaded Post / Front Post - Technical*

Front posts shall not be angle posts. Minimum material thickness shall be 14 ga. The minimum and maximum face width shall be, respectively, 0.875 inches and 2.000 inches. The net effective weak axis moment of inertia shall be greater than 0.0250 in. but less than 0.6250 in.. The net effective cross sectional area shall be greater than 0.2635/Q in. (Q as defined in ANSI MH 28.1 - 1982, Section 5). The tail flanges of the post shall be welded 6" (or less) on center. Posts to be punched on 1-1/2" centers for vertical shelf adjustment.

### *Angle Post - Technical*

Rear posts shall be angle posts. Minimum material thickness shall be 13 ga. The net effective weak axis moment of inertia of each angle shall be greater than 0.0156 in. but less than 0.0806 in. The effective cross sectional area shall be greater than 0.1164/Q in. (Q as defined in ANSI MH 28.1 - 1982, Section 5). The maximum length of the short leg shall be 1". Posts to be punched on 1-1/2" centers for vertical shelf adjustment.

## Closed Sides and Upright Accessories

### *Closed Side*

Closed sides shall consist of 22 ga. panel welded between two standard posts, either one angle post in the front and one angle post in rear or a beaded post in front and one angle post in the rear. Welds shall be at 12" (or less) intervals and shall provide sufficient structural integrity to be used in lieu of cross-bracing.

### *Post Splicer*

Angle post corner splicers shall be used at the four outside corners of each row of angle post shelving. They shall wrap around the front and side flanges of the posts, giving support in two directions.

Splicer bars and splicer plates shall be used for splicing intermediate angle posts. The splicer bar shall be used between two posts or back-to-back posts and the splicer plate shall be used on the face of the two posts.

The beaded post splice kit shall be a welded assembly which provides lateral support and include a splicer bar to provide front-to-back support. This item shall always be used in conjunction with face braces on the shelf below the splice.

The high-rise splicer kit shall be a welded steel assembly which provides front-to-back as well as lateral support. Posts shall be joined with eight self-drilling screws and four bolts, with the upper post resting on a 1/4" steel support plate. The splice shall be internal to the high-rise post in order to produce a finished appearance. This item shall always be used in conjunction with face braces at the next lowest shelf level.

### *Post Cover*

Post covers shall be 20 ga. steel and attach to posts via weld screws. Three types shall be available for specific applications; angle post corners, front flanges of adjoining angle posts, and side flange only of angle or beaded post.

### *Foot Plate Kit - Front*

Foot plates shall be made of 3-1/2" x 3-3/4" 12 ga. steel providing 13-1/8 square inches for post weight distribution and floor anchoring. Two 3/8" diameter holes shall be provided for floor bolts, as well as a single hole for locating shim plates.

### *Foot Plate Kit - Back-to-Back*

Back-to-back foot plates shall be 3-3/4" x 6-1/4" 12 ga. steel providing 23-1/2 square inches for weight distribution. Two 3/8" diameter holes shall be provided for floor anchoring bolts as well as a single centering hole for locating shim plates.

### Shim Plate - Front

Shim plates shall consist of 3-1/2" x 3-3/4" 16 ga. steel and shall be dimpled for easy matching of the holes for floor-anchored installations. Shim plates shall be 1/16" thick to simplify estimating the quantity needed.

### Shim Plate - Back-to-Back

Back-to-back shim plates shall be made of 3-3/4" x 6-1/4" 16 ga. steel. Centering dimples shall be provided to simplify matching holes for floor-anchored installations. The shim shall be 1/16" thick to simplify estimating the quantity needed.

## Base Strips

### Base Strip (for Angle and Beaded Posts)

Angle and beaded post base strips shall be 22 ga. steel formed to fill in the space between the lower edge of the bottom shelf and shall act as a spacer to insure that the top edge of the bottom shelf shall be 3" above the floor. Base strips shall keep dirt and refuse from collecting under shelving units.

### Shelf Side Support

Shelf side supports shall be able to serve as base strips on ends of rows of open-type shelving.

## Braces and Backs

### Cross Brace

Cross braces shall be made from 3/4" x 12 ga. band steel. Cross bracing shall be available for sides and backs. All cross braces shall attach on 30" vertical centers and shall be bolted together in the center for added stability. Sufficient cross-bracing shall be provided to insure structural integrity. (See page 6 for recommendations).

### Face Brace (Angle or Beaded)

Face braces shall be 11 ga. steel 4" x 6" x 15/16" formed with slight offset in horizontal leg so that one leg bolts flush to face of post and one leg attaches flush to front flange of the shelf. Face braces shall allow the elimination of back cross-braces for double-entry applications.

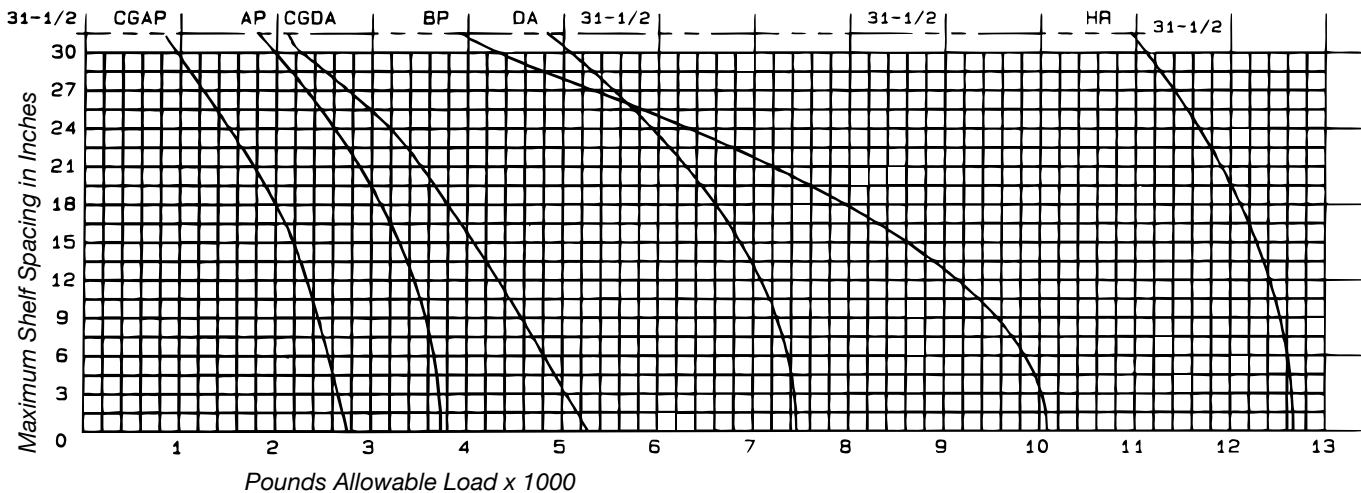
Backs shall be made of 22 ga. steel perforated down each side for attachment to 1" flange of angle posts. Each back shall be bolted 18" on center to provide stability and rigidity.

## Post Capacity

Data applies only to properly erected and braced shelving in accordance with the most current installation instructions. This chart supersedes any previous load charts. This chart is subject to change without notice.

- AP = Angle Post
- BP = Beaded Post
- DA = Double Angle (T Post)
- HR = High-Rise
- CGAP = Commercial Grade Angle Post
- CGDA = Commercial Grade Double Angle

## ALLOWABLE LOAD vs SHELF SPACING



**NOTES:** All shelf loads are assumed to be uniform. Data applies only to properly erected and braced units. The curves were developed from formulae found in the AISI cold formed steel design manual. The data in this chart is subject to change without notice. Contact Borroughs for current data.

# Sway Bracing Recommendations

## For Units 99" and Less in Height

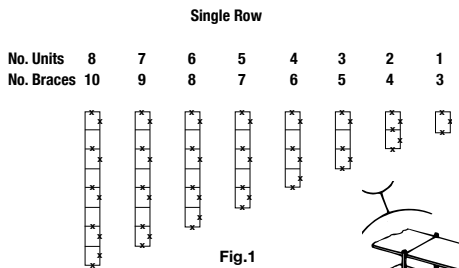


Fig. 1

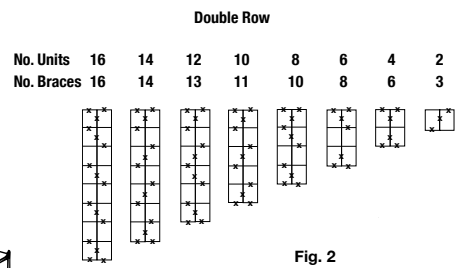


Fig. 2

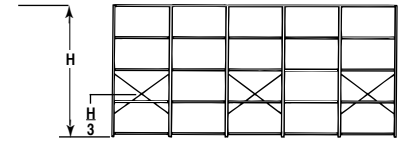


Fig. 3  
Back Brace

### Light Loading

Both single and double rows may use sway braces as in Figures 1 and 2. The end and back of the first and last section of each row always contains a sway brace. Every other intermediate and every other back should contain a sway brace. The height location of the sway brace is determined as in Figure 3, where the center line of the cross is "height divided by 3" up from the bottom.

**NOTE:** FOR CRITICAL SHELF LOCATIONS, MINOR CHANGES TO THESE RECOMMENDATIONS ARE ACCEPTABLE.

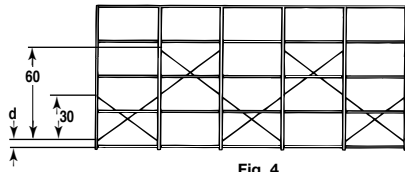


Fig. 4  
Back Brace

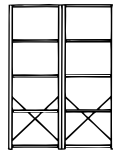


Fig. 4A  
Side Brace

### Standard Loading

For rigidity in standard duty applications, a pair of sway braces should be put in every opening at the heights illustrated in Figure 4. Each open end should be braced as illustrated in Figure 4A.

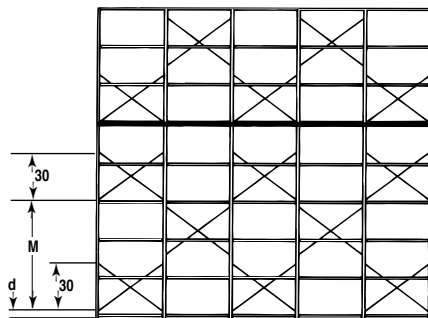


Fig. 5  
Back Brace

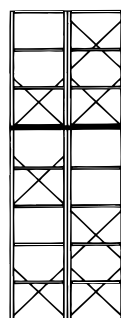


Fig. 5A  
Side Brace

Connection point as close as possible to mezzanine level - may be either above or below level.

M = maximum distance possible - up to and including 30"

d = minimum reasonable distance (e.g. 4.5" - 6.0")

### Multi-level Application

For rigidity in mezzanine applications, two sway braces should be put in every other opening at the heights illustrated in Figure 5. The intervening openings should be braced with one pair of sway braces as shown. The term "d" equals the distance for mounting the sway braces to the post from the floor. Bolt the front of the center shelf and the front of the top shelf and the base strip in place. The open ends should be braced as illustrated in Figure 5A.

## For Units Over 99" High

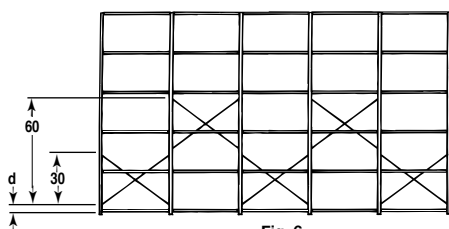


Fig. 6  
Back Brace

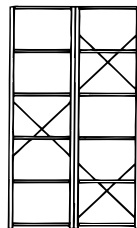


Fig. 6A  
Side Brace

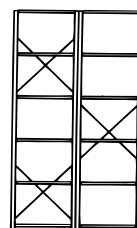


Fig. 6B  
Side Brace

### Light Loading

For rigidity, Borroughs recommends that one pair of sway braces be installed in each open end and open back. Sway brace height is as shown in Figure 6. Figure 6A and 6B are an end and an intermediate, respectively. The bracing patterns are opposite each other and should alternate from one end of a row down to the other end. Pre-assembly of the two uprights is identical.

#### NOTE:

FOR CRITICAL SHELF LOCATIONS, MINOR CHANGES TO THESE RECOMMENDATIONS ARE ACCEPTABLE.

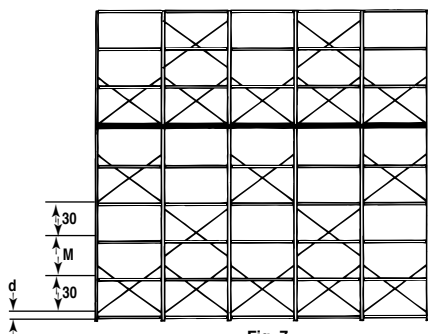


Fig. 7  
Back Brace

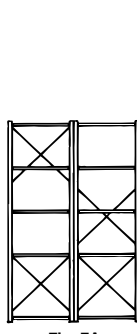


Fig. 7A  
Side Brace

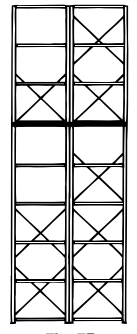


Fig. 7B  
Side Brace

Connection point as close as possible to mezzanine level - may be either above or below level.

M = maximum distance possible - up to and including 30"

d = minimum reasonable distance (e.g. 4.5" - 6.0")

### Standard Loading and Multi-Level

For rigidity, Borroughs recommends that sway braces be used in open backs as illustrated in Figure 7. Sway brace height is as shown in Figure 7. Bolt the front of the center shelf and the front of the top shelf and the base strip in place. Sway bracing for the ends of sections should be installed as shown in Figure 7A for heavy-duty and Figure 7B for multi-level applications.

PLEASE NOTE: FAILURE TO FOLLOW THESE SWAY BRACING RECOMMENDATIONS COULD RESULT IN AN IMPROPER INSTALLATION, SHELVING COLLAPSE, PERSONAL INJURY AND/OR COMMODITY LOSS.

## Shelves

### General Construction

All shelves shall be constructed of cold-rolled steel with the front and rear edges of the shelf formed into a closed, welded box shape and the corners lapped and welded to give the shelf maximum strength and rigidity. Shelf surface shall be punched on 2" centers to allow for fixed shelf dividers (except 42" x 30" and 42" x 32"). One edge of each shelf shall be pierced to allow for the attachment of label holders.

### Reinforcement

The front edge of all shelves shall be of a closed, welded box shape or reinforced by a channel or bar to protect against impact or point loads.

### Clip Type

Non-binding, saddle-type clips shall be provided to hold shelves in place. Shelf clips shall allow easy adjustment of shelf position without requiring tools or movement of adjoining shelves.

### Shelf Load Rating

All shelves provided shall be rated to support the following uniform distributed loads (see chart below):

## Shelf Dividers

### Shelf Divider - Sliding Type

Sliding type shelf dividers shall be formed from 22 ga. steel and snap into place over front and rear shelf flanges. They must hold their position firmly, yet be easily readjusted. Each divider shall have built-in label holder. Sliding type shelf dividers shall be available in 4-1/2" and 6" heights and in 12", 15", 18" and 24" depths.

### Shelf Divider - Fixed Type

Fixed type dividers shall be made of 22 ga. steel, flanged on top and bottom and pierced to be attached with push-in rivets. Dividers shall be available in heights from 6" to 18" in 3" increments, and in 12", 15", 18", 24" and 36" depths. Dividers must be notched at top front and rear so as not to interfere with shelves' box edge. Front edge shall be beaded, for safety and added strength, rear edge shall be flanged for extra rigidity. Fixed dividers shall be adjustable on 2" centers and held in place with push-in rivets. Push-in rivets shall be included with each divider.

### Shelf Divider - Angle Type

Angle type dividers shall be 22 ga. steel, flanged and pierced to align with holes on the top surface of the shelf. Angle type dividers shall be available in 1-1/2" and 3" heights and 12" and 18" depths. Angle type dividers shall be adjustable on 2" centers and held in place with push-in rivets. Push-in rivets shall be included with each divider.

Size	BOX EDGE	BOX EDGE	BOX EDGE	BOX EDGE
	P-0	P-1	P-2	P-3
	<i>Capacity</i>			
24" x 12"		550 lbs.		
36" x 12"	420 lbs.	550 lbs.	725 lbs.	1000 lbs.
42" x 12"			550 lbs.	925 lbs.
48" x 12"	220 lbs.	375 lbs.	450 lbs.	725 lbs.
36" x 15"		550 lbs.	725 lbs.	1000 lbs.
42" x 15"			550 lbs.	925 lbs.
48" x 15"			450 lbs.	725 lbs.
24" x 18"		550 lbs.		
36" x 18"	400 lbs.	550 lbs.	725 lbs.	1100 lbs.
42" x 18"			550 lbs.	925 lbs.
48" x 18"	210 lbs.	375 lbs.	450 lbs.	725 lbs.
24" x 24"		550 lbs.		
36" x 24"	460 lbs.	550 lbs.	725 lbs.	1100 lbs.
42" x 24"			550 lbs.	925 lbs.
48" x 24"	200 lbs.	375 lbs.	450 lbs.	725 lbs.
36" x 30"			550 lbs.	825 lbs.
42" x 30"		275 lbs.	550 lbs.	725 lbs.
48" x 30"			450 lbs.	700 lbs.
42" x 32"			600 lbs.	925 lbs.
36" x 36"			375 lbs.	550 lbs.
42" x 36"			425 lbs.	550 lbs.
48" x 36"			425 lbs.	650 lbs.

**NOTE:** All shelves shall be tested using procedures approved by the Shelving Manufacturer's Association and shall be tested for both capacity and acceptable shelf deflection and include a minimum 1.65 safety factor.



## Label Holders

### *Steel Label Holder - Full Length*

Steel label holders shall be curl-formed from 24 ga. steel to hold and retain standard 7/8" label. Label holders shall attach with push-in rivets. Steel label holders shall be available in 24", 36", 42" and 48" lengths.

### *Magnetic and Plastic Label Holders*

Label holders shall hold standard 7/8" labels and be available in 4' strips which can be easily cut to length with ordinary household scissors.

## Bin Fronts

### *Bin Front*

Bin fronts shall be used on the front of shelves and posts to keep items within the bin. Bin fronts shall be made of a minimum 22 ga. steel. All bin fronts have a 1/2" bead on top and bottom edges. Attachment clips shall be provided for 1-1/2" bin front. Bolts shall be provided for 3" and 6" sizes. Bin fronts shall be available in 36", 42" and 48" widths and 1-1/2", 3" and 6" heights.

## Shelf Boxes

### *Shelf Box*

Shelf boxes shall be made of 20 ga. steel with sides slotted at 1" intervals to receive box partitions. Hand-pull and label holder for 7/8" label shall be formed into the front, while the back of the box projects upward to engage shelf above and prevent accidental removal. Shelf boxes shall be 4-5/8" high and shall be available in 11", 17" and 23" depths and 5-9/16", 8-3/8" and 11-3/16" widths. Box partitions shall be 22 ga. engaged in shelf box side slots to compartmentalize the box. Each partition shall have a formed-in label holder to accept a standard 7/8" label.

## Shelf Box Guide

Shelf box guides shall be angle shaped, 18 ga. steel, bolt behind the front flange of the angle post and extend 5" back along the edge of the shelf to prevent shelf boxes from becoming lodged behind the front flange of the post.

## Doors

### *Framed Door*

Doors shall be 20 ga. and shall be attached to 16 ga. and 14 ga. welded steel frame. Entire frame assembly shall bolt to the face of the shelving (used with angle post units only). Three-point locking shall be achieved by means of upper and lower throw bolts and a center cam, all activated by one locking handle. Left and right hand doors shall interlock for security. Framed doors shall be available in 36", 42" and 48" widths and 3'3", 4'0", 4'3", 6'3" and 7'3" heights. Framed doors shall be available to fit shelving up to 7'3" tall. A 4'0" tall door shall be available for use above ledges.

### *Sliding Door*

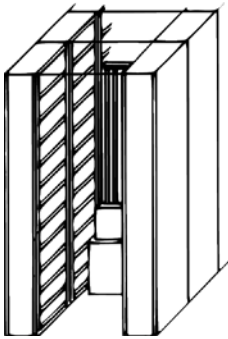
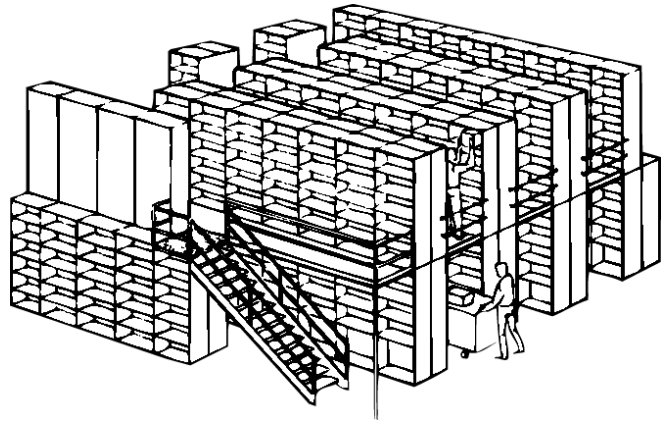
Sliding doors shall be of 20 ga. steel and shall be designed to span two 36" wide by 7'3" high units of adjoining angle post closed sections. Sliding doors shall be supplied with header and base, including track. Sliding doors shall lock in the middle with one built-in, grooved key lock. Sliding doors shall roll on steel ball bearing rollers.

### *Hardware*

Bolted, structural connections shall use grade 5 bolts. Unless otherwise stated, all necessary hardware shall be included in the part number and shall be shipped as part of the total hardware requirement.

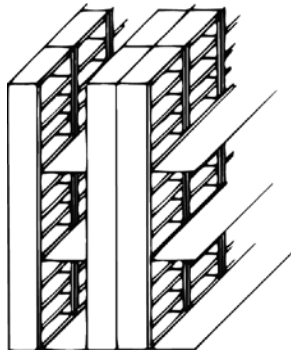
# Borroughs Multi-Level and High-Rise Shelving Systems General Specifications

Multi-level and high-rise storage systems are designed to maximize the use of floor space by taking advantage of unused overhead space (cube) available in existing facilities. High-rise and multi-level systems are a cost-effective alternative to new construction.



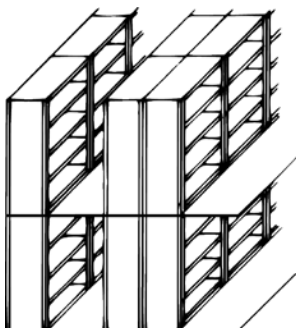
## High-Rise System

Shelving sections in excess of 10' high reaching as high as 40' and serviced by rolling ladders or mechanical high-rise order picker. Normally tied together across the top over the aisles. This means a more efficient use of your cube and can result in a reduction in the floor space required.



## Catwalk Multi-Level System

Utilize aisles attached to the shelving itself and a second level of shelving, either vertically continuous from or stacked as an extension of the lower level shelving. This requires post-to-post match-ups between levels, but, makes catwalks less expensive to construct.



## Full-Mat Multi-Level System

Consists of a "second floor" of grating built over the entire lower level...and no post-to-post match-ups are required. The second level of shelving or office is built on top of the grating. This allows second level storage units of differing sizes and types and provides relatively unlimited shelving placement.



# Borroughs Catwalk System Components for Multi-Level & High-Rise Systems General Specifications

## Borroughs Catwalk Construction Methods

### *One-Piece Post*

Borroughs offers one-piece posts as high as 16'3" for double-deck shelving installations. The one-piece post method offers the advantage of fewer required parts, ease of installation (no post splicing required) and unrestricted multi-level height placement.

### *Splicing Post*

This method can be used to add height to existing installations or for new installations over 16'3". Because of the required bolting of the splicers, this method involves extra labor and components.

### *Bricking Post*

Generally restricted to new installations, this method utilizes four angle posts of two different heights to achieve a rigid T post configuration. For example, a 15'6" installation would utilize an 8'3" angle post on the bottom and a 7'3" post on the top bolted to a 7'3" post on the bottom and an 8'3" post on the top.

### *Capping Post*

The Borroughs Cap Multi-Level System is specifically designed to lower material and labor costs. This is accomplished by the use of caps that fit over the top of the posts eliminating post splices. Face aisle beams are actually extensions of the cap itself. The Cap System can be used to add a second level catwalk multi-level to existing installations.

NOTE: Borroughs does not recommend this system in Seismic Zones 3 or 4 (see map on page 10).

## Catwalk System Components

### *Cross Aisle Support Beam*

Cross aisle ties shall be of 12 ga. hot-rolled steel and shall be available in standard lengths of 36", 42" and 48". Cross aisle ties shall provide secure cross aisle support when used in conjunction with cross aisle support brackets.

### *Cross Aisle Support Beam Bracket*

Cross aisle support brackets shall be 11 ga. hot-rolled steel and shall incorporate high-strength bolts to provide a secure anchor for cross aisle ties or multi-level beams. Cross aisle support brackets shall be available for both beaded and angle posts. Cross aisle support brackets shall attach on 1-1/2" centers for maximum flexibility.

### *Catwalk Beam*

Catwalk beams shall be 12 ga. hot-rolled steel. Available in standard lengths of 30", 36", 42" and 48" and shall attach directly to posts with high-strength bolts to provide a secure cross aisle decking support beam. Catwalk beams shall be available for both beaded and angle posts. Catwalk beams shall attach on 1-1/2" centers and support decking at same height as cross aisle support beams.

# Borroughs Cap Multi-Level Systems General Specifications

## Cap Beams

### *Face Aisle Cap Beam*

Face aisle cap beams shall be made of 14 ga. steel and available in 36", 42" and 48" lengths. They are used to support an aisle between two rows of shelving and provide the cap needed for the unit front posts.

NOTE: Using face aisle cap beams with angle posts adds 1" to aisle widths.

### *Cross Aisle Cap Beam*

Cross aisle cap beams shall be made of 14 ga. steel and be available in lengths of 36", 42" and 48". Their purpose is the support of cross aisles that run between units.

### *Outside Aisle Cap Beam*

Outside aisle cap beams shall be made of 14 ga. steel and be available in lengths of 36", 42" and 48". They are designed to be used between the face of a shelving unit and an outside structure such as a wall or between the side of a shelving unit and an outside structure.

## Caps

### Single Face Back Cap

Single face back caps shall be made of 14 ga. steel and provide the cap needed for the back of a single face row of shelving for two rear angle posts to nest properly.

### Back-to-Back Cap

Back-to-back caps shall be made of 14 ga. steel and provide the cap needed for rear angle posts on back-to-back units to nest properly.

## Cap Accessories

### Single Face Attachment Bracket

Single face attachment brackets shall consist of 14 ga. steel and be used in conjunction with face aisle cap beams on single face row to provide added stability for a second level single face row of shelving.

### Row-End Corner Splice Channel

Row-end corner splice channels shall be made of 14 ga. steel and are used at the four outside corners of each row in conjunction with face aisle beams to provide added stability for second level units.

### Row-End Kick Plate

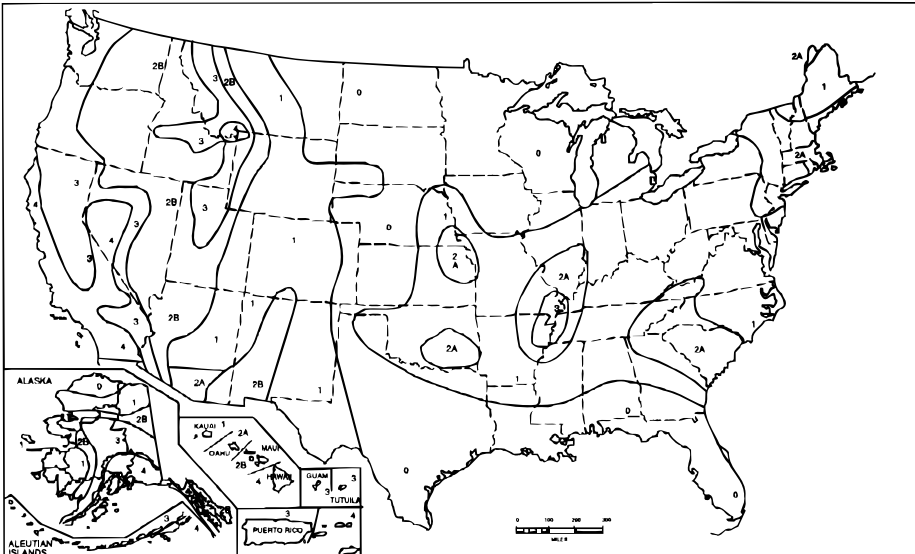
Kick plates shall consist of 14 ga. steel and be available in 36", 42" and 48" lengths. Their purpose is to run along the end of an aisle next to the decking material to help prevent personnel and small items from falling off of multi-level shelving systems.

### Row-End Hand Rail

Hand rails shall be made of 16 ga. steel rolled into a 1" diameter rail. They are used when an aisle ends at the edge of the multi-level system to keep personnel and equipment from falling off.

NOTE: The Cap Multi-Level System is not recommended for use in Seismic Zones 3 and 4 (see map below).

## Seismic Risk Map



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Additional components to be considered, depending on your locations seismic zone, are as follows:

**Zones 0, 1 and 2A:** No additional components or anchoring may be required for freestanding units. Top tie struts and floor anchoring are optional depending on local building codes.

**Zones 2B, 3 and 4:** Floor anchors, top ties, sway braces, additional spreader in the frame and gussets required as per local codes.

All single shelving units must be wall anchored. For Zones 2B, 3 and 4, single faced shelving units must be floor anchored as well.

This information is offered as a guide only. Many local codes could require changes to or review by a structural engineer.

## Warranty

Boroughs Corporation extends to the original purchaser from the date of purchase a 5-year limited warranty against manufacturing defects in material and workmanship.

If a Boroughs product fails to perform because of a manufacturing defect, Boroughs will examine it. If found defective, it will be repaired or replaced at our option.

This warranty applies only to Boroughs products acquired directly from Boroughs Corporation or from Authorized Boroughs Dealers.

This warranty does not apply to any product which has been subject to misuse, negligence, or accident; has been damaged in shipment, storage, or installation; has been misapplied or has been modified or repaired by unauthorized persons or been

repaired with non-standard Boroughs replacement parts. This warranty specifically excludes claims for indirect, incidental, or consequential damages arising in any way from a product defect. This warranty is exclusive, and exists in lieu of all other warranties, either expressed or implied.

This warranty gives you specific legal rights; you may also have other rights which may vary from state to state.

To obtain warranty service, contact your Boroughs Selling Dealer. You must make a written claim. Provide a copy of your purchase record and a written description of the warranty problem with your claim. If you are unable to contact your Dealer, contact: Boroughs Corporation, Customer Service Manager, 3002 N. Burdick Street, Kalamazoo, MI 49004-3483.

# Steel Shelving Standard Colors

**#065 Industrial Gray**  
**#445 White**  
**#C-386 Red**

**#B-504 Blue**  
**#F-604 Pebble**

**#161 Mist Gray**  
**#040 Black**

## Borroughs Steel Shelving Paint Application General Specifications

1. Epoxy Polyester Hybrid powder coat paint shall be applied in an electrostatic-charged powder coat spray-painting system to provide a durable, hard, inert finish.
2. Powder coating uses no solvents, subsequently no off-gassing or any chemicals banned by the Environmental Protection Agency or any state level Department of Natural Resources. There are no heavy metals such as chrome, lead or mercury.
3. All steel to be painted must be processed and prepared for painting using a continuous line washer, which cleans and phosphatizes.
4. Phosphate-treated steel parts shall immediately be dried in a temperature-controlled dry off oven.
5. Epoxy Polyester Hybrid powder coat paint shall be applied using powder handling, air-assisted electrostatic powder spray guns to achieve a uniform dry film coating, with adequate surface coverage.
6. Epoxy Polyester Hybrid powder coat paint shall be used to ensure that exact, final color matching can be achieved during batch processing. This shall ensure color uniformity from batch to batch in all colors.
7. System shall be capable of both short lead times and small quantity runs to achieve maximum flexibility for customer orders to add-on, fill-in or replace finished product with high degree of assurance that exact color match will be achieved. Custom colors shall be possible, with all coverage and performance characteristics the same as for standard colors.
8. System shall ensure efficient recovery and reuse of over-spray, and comply fully with all Federal and State regulations.
9. Epoxy Polyester Hybrid powder coat paint shall be oven cured to provide a furniture quality finish.
10. Epoxy Polyester Hybrid powder coat paint shall be used to provide superior performance qualities with regard to abrasion, impact, corrosion, stain and chemical resistance per ASTM test methods and standards.
11. Epoxy Polyester Hybrid powder coat paint shall be used to ensure painted, finished surfaces are inert. There shall be no interactions between paint and stored items that could cause damage to stored items.
12. Epoxy Polyester Hybrid powder coat paint shall be used to ensure that product in use can be refinished, or touched-up, with paint that will be a match to both the color and composition of the original paint finish.

## Paint Film Performance General Specifications

<i>Test</i>	<i>Test Description</i>	<i>Test Result</i>
B117	Salt Spray Corrosion	Pass - 180 hours no paint on tape in cross hatched area
D522	Conical Mandrel Bend	Pass - no cracking or peeling at 1/8" Conical Mandrel
D523	Specular Gloss	60 Gloss Units +/-10 at 60° geometry
D1308	Chemical and Stain Resistance	Passes open spot tests (alcohol, nail polish remover, ammonia, Coca-cola, mustard, catsup, tee, coffee, Clorox, 5% acetone)
D2247	100% Relative Humidity	Pass - no blistering after 200 hours
D2454	Oven Bake Resistance	Passes color, gloss, hardness and adhesion after double bake
D2794	Impact Resistance	Passes both 60 inch/lbs. direct and indirect impact
D3359	Adhesion (Method B)	Passes - no loss of adhesion, Class 5B
D3363	Pencil Hardness	Passes 2H
D4060	Abrasion Resistance	Passes 0.3 - 0.4 g material loss after 100 cycles

## Why Borroughs?

Because we know how important your storage system is to you and your organization. That's why we produce Borroughs BOX-EDGE PLUS® steel shelving. Our shelving is value-engineered to provide strength, durability, flexibility and cost effective storage solutions. Shelving that will maximize your space utilization and needs today and tomorrow.

But Borroughs is more than shelving. During our 70+ years, we've also earned a reputation for outstanding service and responsive on-time delivery that we continue to work hard to maintain. Plus, Borroughs people are experienced and knowledgeable in storage planning and design. They have ideas and solutions to help your shelving system to continue to contribute to the efficiency of your company as it grows and changes.

You can count on the combination of Borroughs people and products to create the perfect storage solutions for your needs.



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