

# HIGH DENSITY CONSTRUCTION SPECIFICATIONS

## GENERAL

The shelving is a four-post/single entry and six-post/double entry design consisting of four basic components; universal upright, shelves, shelf supports and backstops; no clamps or special tools are required for assembly. There are no sway braces, gussets, nuts or bolts to slow assembly, or detract from form or function. The shelving has a clean appearance without holes on exposed front facial surfaces; sides of posts, shelves, backstops and center stops are slotted to accept dividers or to install backstops between posts.

Double entry units can be configured with back-to-back independently positioned single entry shelves and /or through style double depth shelves between two common universal uprights and can be mixed or configured in any combination. The universal upright and removable end panel allow for easy add-on and reconfiguration of additional units without disassembling existing units. Single entry units can be attached to double-depth units without use of brackets, ties or clamps; no additional upright is required; all main structural components are interchangeable and can be used to reconfigure single depth units into double depth units using the universal uprights.



## UNIVERSAL UPRIGHT

Formed of 18 gauge cold rolled steel, the outside posts are rolled into a  $\frac{3}{4}$ "w hollow "box" shape with  $\frac{1}{8}$ "w x  $\frac{11}{16}$ "h chamfered slots punched on  $1\frac{1}{2}$ " vertical centers along the  $\frac{1}{4}$ " inner walls to accept shelf support and  $\frac{1}{16}$ "w x  $\frac{11}{16}$ "h slots on post sides to accept backstop (single entry units only). There are no holes or slots on face of outside posts. Center posts (double entry units only) are formed of 18 gauge cold rolled steel and formed into a  $1\frac{1}{2}$ "w x  $\frac{5}{16}$ "h hat channel with a series of three (3)  $\frac{1}{16}$ "w x  $\frac{11}{16}$ "h slots positioned horizontally  $\frac{5}{16}$ " center-to-center and  $1\frac{1}{2}$ " centers vertically. Center post is comprised of two (2) opposing hat channels welded along both  $\frac{3}{4}$ " flanges of hat channel cross-section.

The outside posts (front and back) and center posts are joined by welding 16 gauge  $3\frac{3}{32}$ " spacers, with  $\frac{1}{4}$ " stiffening flange on bottom edges, to maintain required distances apart and add rigidity to the assembly.

All sizes of open uprights have three (3) spacers. Closed uprights have same specifications as open style except the 16 gauge spacers are replaced by welding a 22 gauge closure sheet between outside posts.

All uprights are universal and can be interchanged at the beginning or intermediate section of the range configurations or used to add a section without disassembling adjacent section.



## END PANEL

Used to finish range end and close off open style uprights. Panel formed of 18 gauge cold rolled steel with two (2)  $\frac{3}{4}$ " vertical flanges formed 90 degrees to surface to fit around outside posts of upright. A series of 18 gauge clips welded in position to match location of upright spacers and panel is affixed to upright by hanging and is secured by the end panel clips. Uprights used with closed uprights have "key-hole" bracket welded in bottom position with independent clips to secure panel to upright. All surfaces are clean, smooth and free from any visual interruptions. End panels can be removed and re-hung without disassembly of shelving unit. Simply remove panel to add sections then replace.

## SHELF

The Shelf shall be formed of 18 gauge cold rolled steel with flanges on all sides and turned under in front and back on double entry and front only on single entry; front profile of all shelves will be  $\frac{5}{8}$ ". Shelves for filing shall have slots to accept file divider tabs equally spaced 2" on center - on row on single entry; two rows on double entry. Shelves are adjustable on  $1\frac{1}{2}$ " centers.

## SHELF SUPPORTS

Made from 14 gauge, up to 36"w and 11 gauge over 36"w hot rolled pickled steel, the  $\frac{11}{16}$ " high "J-channel" shape has two (2) 11 gauge, two pronged stamped interlock flanges welded at 90 degree right angles to support channel. Prongs of flange are spaced to set into chamfered slots on the inner wall of the upright outer posts. Supports for heavy and x-ray shelving are the same as above except they are  $1\frac{1}{4}$ " high. Supports are available with single or double prongs. The bottom of single prong heavy supports can fit flush with the floor, and single prong thin supports are optional on intermediate levels.

## SHELF REINFORCEMENT BARS

Formed of 11 gauge hot rolled pickled steel, bars are inverted "U-shape" and have two equally formed legs notched to fit over the short inner-leg of the shelf support "J-channel" and provide a flush front-to-back surface to add under-support to the shelf.

## CANOPY TOP

Formed of 18 or 22 gauge cold rolled steel with  $\frac{5}{8}$ " profile and turned under flanges front and back. Ends of canopy are flat and extend over upright posts to provide a clean finish without gaps.

## BACKSTOP

Formed of 18 gauge cold rolled steel with a  $\frac{7}{16}$ " high "V-channel" formation on top and bottom. Bottom channel is used as a back shelf support on single entry or double entry back-to-back configurations. Face is slotted on the same centers as the shelf to receive and retain

# HIGH DENSITY CONSTRUCTION SPECIFICATIONS

file divider tabs. Ends have three (3) prongs which interlock in slots of upright posts and hold backstop in position. Center stop used for double entry through-style configurations has same construction but is used to support dividers only.

## FILE DIVIDER

Made from 18 gauge cold rolled steel, divider shall have one hook tab on bottom edge and two angled tabs on back edge with reinforcing ribs in all tabs for extra strength and to locate firmly in shelf and backstop. A 1 1/4" round "thumb grab" relief, 1/32" deep, is also provided to assist user in the insertion and relocation of dividers.



## FRONT BASE

Formed from 22 gauge steel set in 5/8" from front of posts and mounted by concealed means with no loose fasteners or special tools.

## BACK

Made from 22 gauge cold rolled steel, backs are suspended by hanger brackets and secured with #1/4-20 pan head screws and lock nuts. Single hanger brackets have an offset "C" formation, which inserts in top shelf support and locked in place with canopy top. Double hanger brackets have a 5/16" offset with one (1) hook at each end to insert in side slots of posts. With the use of four (4) double hanger brackets an individual back can be installed through the center of a double entry back-to-back unit.

## REFERENCE SHELF

Formed of 18 gauge cold rolled steel, front and back edges have a 1" profile with a 1/2" stiffening hem on bottom formed edge. Sides are 1/2" high and prevent suspension (slides) from view when fully extended. Reference shelf attaches to upright by means of two (2) snap-in brackets, which fit in side slots of posts. Slides are attached by four (4) #8-32 Phillips pan head screws and nylon insert hex nuts. All shelves are full width to match nominal I.D. of shelving unit.

## HIGH DENSITY MOBILE STORAGE SPECIFICATIONS GENERAL HIGH DENSITY AREA REQUIREMENTS

High density system area may include a combination of mobile or static carriages, or freestanding shelving units. Mobile carriages will be mechanically assisted and consist of carriage, track, mechanical assist assembly and shelving.

The sizes of mobile and stationary systems may vary, but will be specified in space planning drawings.



The actual carriage lengths, depths and aisle way dimensions will be determined, with approval of customer, by the manufacturer

The height of each unit will consist of the measurement from the existing floor to the canopy top of the shelving

Any aisles created by the high density system will be in compliance with ADA standards.

The carriages, shelving and related components will be designed, constructed and tested to support and operate within the specified weight loads and within specified tolerances

The operation of mobile carriages within the high density system will be quiet and smooth with minimal racking or twisting during operation.

Wheels, tracks and drive components will exhibit no abnormal wear, friction or binding between contacting surfaces

Mechanical assist crank assembly will have a detention push cap to prevent drift while in position.

## TRACK SYSTEM

Track to be designed and manufactured to carry a minimum load of 1000 pounds per lineal foot of carriages. Carriage supports up to 5000 lbs. per lineal carriage foot.

3.5" wide x 7/16" thick steel milled base track. 10 gauge steel U-channel.

Track will exhibit no movement or deflection during operation of mobile system.

Track will require no decking, and will meet ADA regulations for profile height and inclusive ramp angle.

Track will be designed to attach to a variety of surfaces including concrete, wood, vinyl, and carpeted surfaces, and allow for adjustability.

Track will be leveled to a maximum variation of 1/4" over the area of length and width of the high density area.

All high density systems will have one track-run per shelving upright. All tracks will be driven.

The tracks will not exceed 3/8" in height, 5/8" maximum from the floor when leveled to its maximum.

Tracks will be solid 1018 steel, milled from a single blank to meet ADA requirements with a concave center well to accept a convex wheel. Track pieces shall be no longer than 48".

Track anchors distance will not be greater than 15", and will have two potential anchor locations linearly.



# HIGH DENSITY CONSTRUCTION SPECIFICATIONS

## CARRIAGE / DRIVE SYSTEM

All carriage frames will consist of 14 gage galvanized steel channels and 6061-T6 hardened aluminum connecting rails, fastened at all channel points with flat socket screws 4 points per channel

Three wheels per rail – two idlers and one drive wheel located in center. Wheels connected by 1.25" tubular steel drive shaft

The overall carriage height from the flooring surface when riding on track shall not exceed 4.50"

Static carriages located at the end of track runs will be of the same construction and height as the mobile carriages and must be anchored to the floor

Each carriage will operate with a minimum load capacity of 1,000 lbs. per lined foot.



## DRIVE TRAIN

Drive wheels will be convex in design, with an outside diameter of no greater than 4.00" and no less than 3.25"

Carriage drive train will be offset to one side of the carriage depth, and shall simultaneously rotate drive wheels on all track runs.

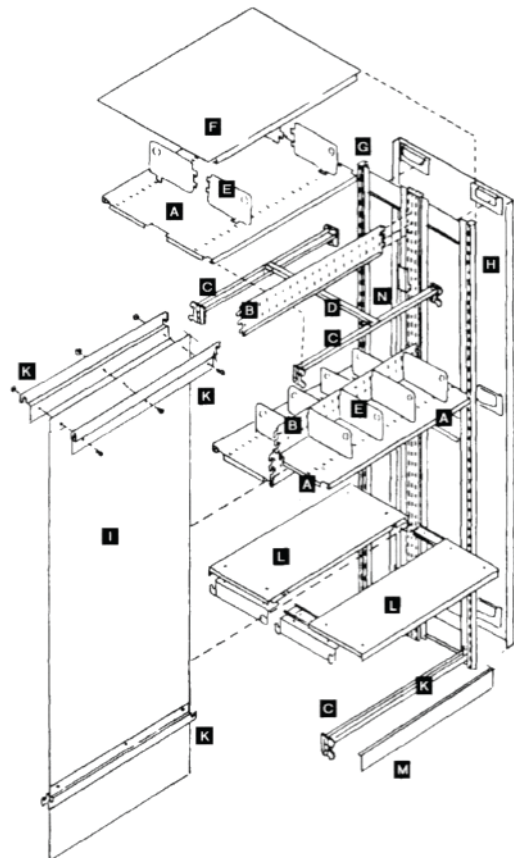
The opposite side of the carriage will be fitted with idler wheels that replicate the same convex design of the drive wheel. Each idler wheel will contain two (2) double sealed bearings, separated by an internal retaining ring.

Drive shaft will be constructed of tubing with a minimum 1.25" outside diameter and .13" wall thickness, and will have hexagonal bushings welded to both ends.

Each drive wheel will have a CNC broached hexagonal bore in the concentric center of the wheel which will allow a hex axle to be fitted through the wheel and into the drive shaft sub assembly.

The drive axle will be engaged in the 14 gage galvanized channel using extended reach bearings with retaining rings. Spring pins will be pushed through holes on both sides of the ER bearing through the axle, retaining the bearings, wheels and axles, except for locations at the end of carriages. There will be a substitution of one spring pin for one E-clip retainer.

The Mechanical Assist Mechanism will be attached flush to the first channel of a carriage. The MAM will utilize a minimum chain specification of ANSI 41B with a 1:3 ratio gear reduction, and a maximum 7 inch moment arm at the handling point. The crank assembly will utilize a push/pull style detent hub to prevent drift in the pushed position, and have key lock capability.



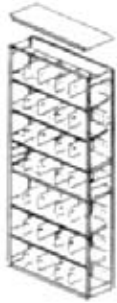
## COMPONENTS

- A) Shelf
- B) Backstop
  - 1) Standard – Used for single entry and back-to-back style double entry
  - 2) Center – Used for through-style double entry
- C) Shelf Support
- D) Reinforcement Bar
- E) Divider
- F) Canopy Top
- G) Upright
- H) End Panel
- I) Back Panel (optional)
- K) Back Panel Hanger (optional)
- L) Reference Shelf & Brackets
- M) Front Base
- N) Double Shelf Clip

# HIGH DENSITY CONSTRUCTION SPECIFICATIONS

## RANGE CONFIGURATION GUIDE

### STARTER ADDER

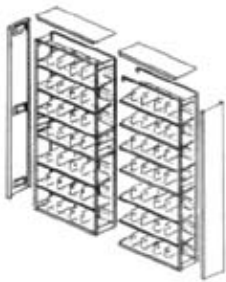


Each Starter Unit exceeds the standard measurement. (36", 48" by 1/2")

### ADDER



Each Starter Unit is 1/4" less than the standard measurement. (36", 48" by 1/2")



NOTE: Units pictured with optional end panels.

## ACTUAL MEASUREMENTS

Std.	Starter	Adder
30"	2' 6 1/2" (30.50")*	2' 5 3/4" (29.75")
36"	3' 1/2" (36.50")*	2' 11 3/4" (35.75")
42"	3' 6 1/2" (42.50")*	3' 5 3/4" (41.75")
48"	4' 1/2" (48.50")*	3' 11 3/4" (47.75")

For ease of range configuration, identify the Starter Unit you wish to use and add the appropriate Adder(s) 36" or 48".

	36" Wide Units		48" Wide Units	
	Feet & Inches	Decimal Equiv.	Feet & Inches	Decimal Equiv.
Starter Unit*	3' 1/2"	36.50"	4' 1/2"	48.50"
Adder +1	2' 11 3/4"	35.75"	3' 11 3/4"	47.75"
+2	5' 11 1/2"	71.50"	7' 11 1/2"	95.50"
+3	8' 11 1/4"	107.25"	11' 11 1/4"	143.25"
+4	11' 11"	143.00"	11' 11 1/4"	191.00"
+5	14' 10 3/4"	175.75"	19' 10 3/4"	237.75"
+6	17' 10 1/2"	214.50"	23' 10 1/2"	286.50"
+7	20' 10 1/4"	250.25"	27' 10 1/4"	334.25"
+8	23' 10"	286.00"	31' 10"	382.00"
+9	26' 9 3/4"	321.75"	35' 9 3/4"	429.75"
+10	29' 9 1/2"	357.50"	39' 9 1/2"	477.50"

\* For Starter Units with end panels (set of 2), add 1/4" to Starter Unit width.

## STANDARD (CLEAR) SHELF SPACING

	Letter / Legal †		Library †		X-Ray		Mobile ltr/Lgl †		Mobile Library †		Mobile X-Ray	
# of Openings	76.25"	88.25"	76.25"	88.25"	76.25"	88.25"	76.25"	88.25"	76.25"	88.25"	76.25"	88.25"
9												
8		9.75"						11.25"				
7	9.75"	9.75"		11.25"			11.25"	9.75"		12.75"		
6	9.75"	9.75"	11.25"	11.25"			9.75"	9.75"	12.75"	11.25"		
5	9.75"	9.75"	11.25"	11.25"		17.25"	9.75"	9.75"	11.5"	11.25"		18.75"
4	9.75"	9.75"	11.25"	11.25"	17.25"	15.25"	9.75"	9.75"	11.25"	11.25"	18.75"	15.25"
3	9.75"	9.75"	11.25"	11.25"	16.75"	15.25"	W	9.75"	11.25"	11.25"	16.75"	15.25"
2	9.75"	9.75"	11.25"	11.25"	16.75"	15.25"	9.75"	9.75"	11.25"	11.25"	16.75"	15.25"
1	9.75"	9.75"	11.25"	11.25"	16.75"	15.25"	9.75"	9.75"	11.25"	11.25"	16.75"	15.25"
B*	2.75"	4.25"	4.25"	4.25"	4.25"	4.25"	1.25"	1.25"	1.25"	1.25"	1.25"	1.25"

Measurements shown are with no reference shelf. Shelf spacing increments are 1.5" center-to-center for maximum adjustability.

† Also available in 40.25" and 64.25".

\* Height to top of bottom shelf.

For center-to center shelf spacing, add the following clear dimension:

Letter/Legal & Library – 3/4"

X-Ray – 1.25"