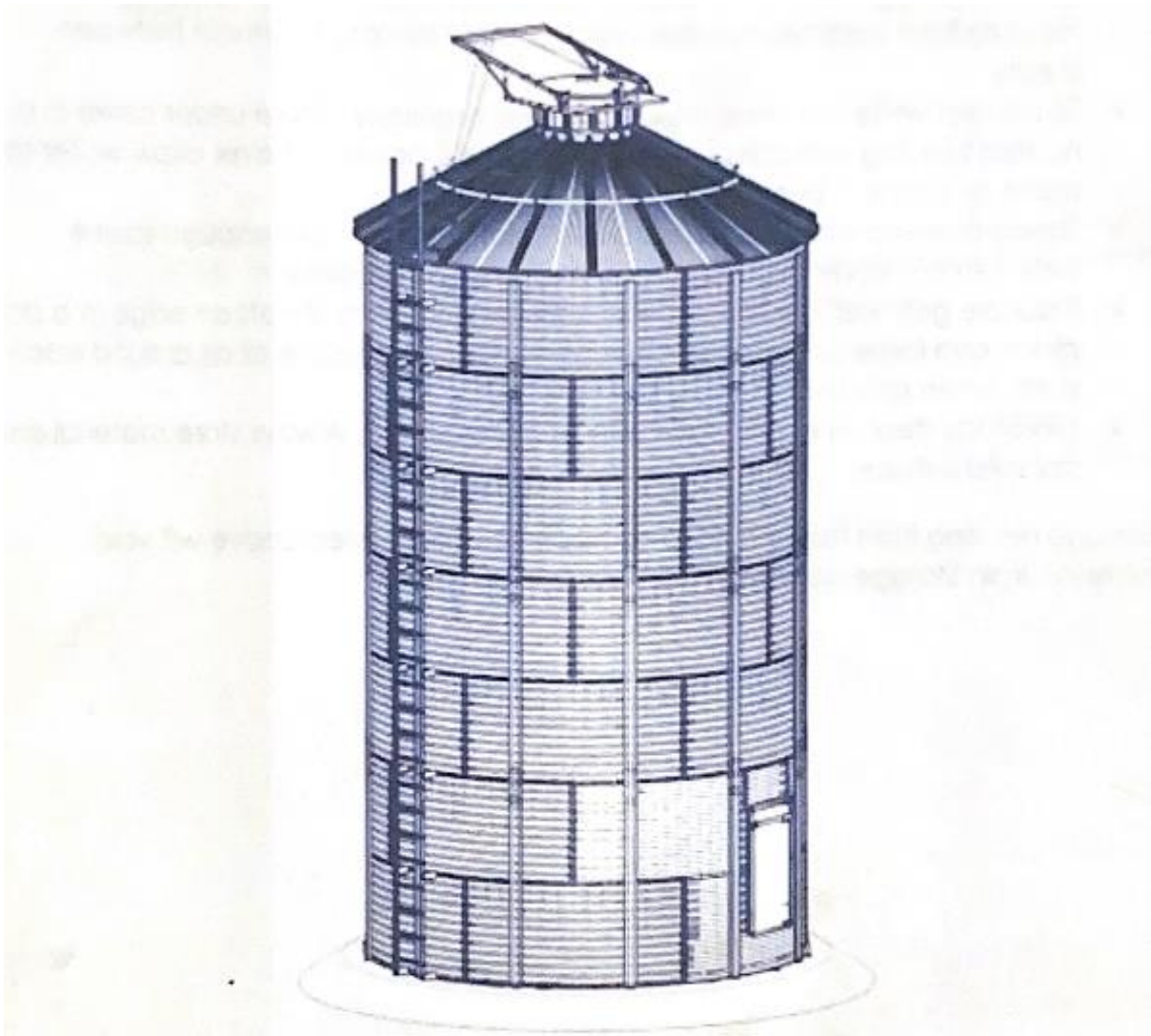


DARMANI

2022 GRAIN BIN INSTALLATION MANUAL 18' TO 36' DIAMETER



D&R Manufacturing Ltd.

P.O. Box 63

Fiske, SK

SOL 1C0

Phone: 1-866-665-6677 Fax: 1-306-377-4430

Website: www.darmani.ca

Email: darmani@sasktel.net

IMPORTANT NOTICE

KEEP GALVANIZED SHEETS

DRY BEFORE ERECTING!

➤ If this material is allowed to get wet or condensation is permitted to form between sheets, serious deterioration (white rust) will occur.

Upon receiving material, check for moisture between sheets. Do not permit moisture from weather, condensation, or other sources to remain between sheets.

➤ To prevent white rust, store sheets away from moisture. Store under cover in a heated building with adequate air circulation if possible. Never allow water to stand on sheets or bundles.

➤ Sheets covered with tarpaulin or polyethylene should have enough space between the cover and the sheets to allow air to circulate.

➤ If bundle gets wet, dry all materials immediately. Stack sheets on edge in a dry place and force air between them. Allow for free passage of air around each sheet when practical.

➤ NEVER lay steel on earth. Raise with timber or blocks. Always store material on a dry solid surface.

Damage resulting from failure to take appropriate actions listed above will void Darmani Grain Storage warranty.

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NOTE: Warranty Information, Foundation, Concrete Specifications, and Bin Operational Procedures can be obtained at the above address.

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DARMANI LIMITED WARRANTY

www.darmani.ca

1-866-665-6677

Fiske, Sk. CANADA

DARMANI GRAIN STORAGE (DARMANI) warrants, to the original retail purchaser within 5 years from date of purchase, that the grain bin shall be free from defects in material and workmanship. A part will not be considered defective if it substantially fulfills performance specifications. Should any part prove defective within the warranty period, the part will be replaced without charge F O B. Fiske, Sk. To obtain warranty, a copy of original invoice is required.

WARRANTY CERTIFICATION- Warranty registration card should be mailed/signed and c-mailed within two weeks of product delivery to certify warranty coverage. **WARRANTY VOID IF NOT REGISTERED.**

THE FOREGOING LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF

MERCHANTABILITY, FITNESS OR PURPOSE AND OF ANY OTHER TYPE, WHETHER EXPRESSED OR IMPLIED. DARMANI

neither assumes or authorizes anyone to assume for it any other obligation or liability in connection with said part, and will not be liable for incidental or consequential damages. THE REMEDIES STATED HEREIN SHALL BE THE EXCLUSIVE REMEDIES AVAILABLE UNDER THIS WARRANTY.

DARMANI reserves the right to change specifications, add improvements or discontinue manufacture of any of its equipment without notice or obligation to purchasers of its equipment.

WARRANTY EXCLUSIONS- Labour, transportation, or any cost related to a service call is not provided by DARMANI. This limited warranty does not apply to damage resulting from misuse, neglect, normal wear, accident, improper installation or maintenance. ITEMS NOT MANUFACTURED BY DARMANI ARE COVERED UNDER WARRANTIES OF THEIR RESPECTIVE MANUFACTURERS AND ARE EXCLUDED FROM COVERAGE UNDER THE DARMANI WARRANTY.

Foundation requirements are suggestions only and will vary according to local soil conditions. Soil bearing tests should be performed by a competent, independent, engineering firm. DARMANI will not assume responsibility for issues arising from improper foundation design or construction.

DARMANI will not warrant damage or loss caused, in whole or part, by inadequate or improper site selection, site preparation, foundation, or any other failure to provide a suitable erection or installation environment for a DARMANI grain bin or any product, component, equipment, accessories, or parts used in conjunction with a DARMANI grain bin. DARMANI will not warrant damage or loss caused, in whole or in part, by use of the bin other than which it was designed, unauthorized attachments, modifications, alterations, improper or inadequate maintenance, misuse or abuse of the bin.

DARMANI is not liable for direct, indirect, incidental or consequential damages, including without limitation, loss anticipated profits or benefits. DARMANI is not responsible for field modifications or erection defects which create structural or storage quality problems.

WARRANTY IS VOID- If not purchased from or constructed by an authorized dealer or a representative of DARMANI, or if used for substances other than grains and/or free flowing materials.

Prior to installation, purchaser has responsibility to properly store steel bin. Bin should be stored in dry, temperature and humidity controlled areas to eliminate condensation and other moisture concerns may that cause white rust and corrosion. Warranty does not extend to defects or damages caused by improper storage.

DARMANI is not responsible for acts of God, accident, neglect or inadequate ventilation which includes proper maintenance ensuring vents of any kind are free.

DARMANI does not warrant any roof damage caused by excessive vacuum or internal pressure from fans or other air moving systems. Adequate ventilation and /or "make-up air" devices should be provided for all powered air handling systems. Warranty is void if grain is above the eave and against the roof, as this will block roof vents and cause unwanted loads on roof sheets. The area above the surface of the grain must allow free movement of the air to the vents or opened lid. DARMANI does not recommend the use of downward flow systems (suction). Severe structural roof damage may occur if fans or other air moving devices are operated during certain high humidity/cold weather conditions. Roof ventilators/vents may frost over and plug or restrict air flow causing excessive vacuum or internal pressures, Roof damage may occur due to improperly installed grain temperature detection cable systems.

DARMANI does not warranty failures due to filling bin off center unless it is a small bin - (door with chute). If the foundation shifts, bin can be shifted sideways causing both sidewall and roof damage. Limitation of Remedies replacement: Within the warranty period, DARMANI will replace/repair the goods and /or original manufactured components thereof which are found, to DARMANI's satisfaction, to be defective. DARMANI is not responsible for direct, indirect, special, consequential, or any other damages of any kind, including personal injury to any individual howsoever caused, including caused by transportation of the goods for repair or replacement.

Procedure for obtaining Service: In the event of a warranty claim, the purchaser must complete any and all information required by DARMANI in order to properly assess or investigate the claim. DARMANI will not be responsible for the removal of any of the goods found to be defective, or transportation charges to and from DARMANI's authorized dealer or distributor, or for installation of any replacement goods and/or parts furnished under this warranty,

GRAIN BIN SAFETY SECTION

Recognize Safety Alert Symbols



The safety-alert symbol means

"Attention! Be Alert! Your personal safety is involved! This symbol draws your attention to

important instructions concerning your personal safety. Read the message carefully to avoid personal injury or death.

Follow Machine Safety Signs & Messages

Observe safe operating practices. Carefully read this manual and all safety signs on your equipment. Safety signs must be kept in good condition. Replace missing or damaged safety decals or shields available at no charge from

D&R Manufacturing
Box 63
Fiske, SK SOL 1C0
Canada



Learn how to use controls and operate equipment. Learn how to use controls and operate equipment.

Do not let anyone operate unit (especially youth) without thorough training of basic operating and safety procedures. Make no unauthorized modifications to equipment. Modifications may endanger function and/or safety of unit. Periodically check all mechanical and electrical components. Keep unit in good working condition. Make no unauthorized modifications to equipment. Modifications may endanger function and/or safety of unit. Periodically check all mechanical and electrical components. Keep unit in good working condition.

NEVER, NEVER, clean out bin with augers running!



When bin is nearly empty, sweep (floor) augers travel at increasing speed. Just turning around can

give augers time enough to trap you. Exposed auger in sump can cause serious injury if stepped or fallen into. Failure to follow above precautions may cause serious injury or death!

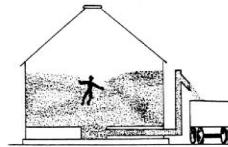
NEVER ENTER BIN

DANGER: Never enter bin, unless all power is locked off and another person is present.



Flowing grain may trap and suffocate. If you enter a

bin of flowing grain you can be completely submerged in grain in about 8 seconds.



Purchase and use safety harness. Failure to heed this warning may cause serious injury or death.

Metal edges are sharp. To avoid injuries wear protective clothing and handle equipment and parts with care.



Failure to do so may cause serious injury.

Emergencies - Know what to do

Have emergency numbers near your telephone:

For doctors:

Emergency Medical Squad:

Ambulance:

Hospital:

Fire department:

Written directions to your location:

CAUTION: Maintain secure hand and foot hold when climbing on bin. Metal is slippery when wet. Never carry items while climbing on bin to avoid falls.



Purchase ladder and safety cages and use safety harness.



Failure to do so may cause serious injury or death.

Grain Bin Safety

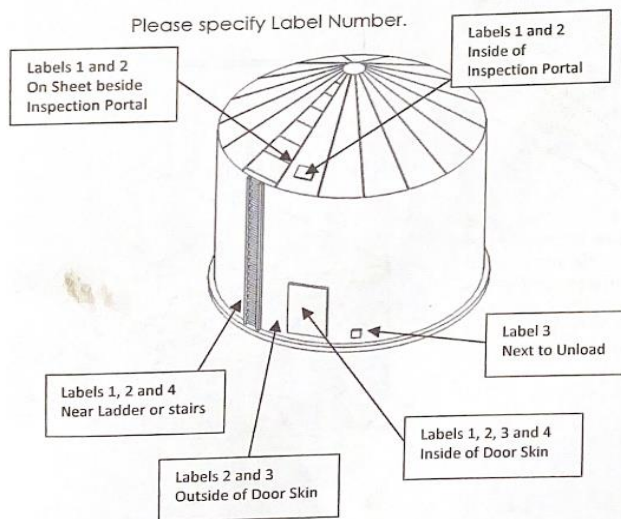
Safety decals should be mounted on your equipment as shown on this page. Safety decals are mounted whenever possible at factory.



Yearly and prior to equipment Use, please check that all decals are in place according to these drawings and in good, legible condition.

To order a replacement decal (no charge) contact your dealer or

D&R Manufacturing
Box 63,
Fiske, SK SOL 1C0.



1. WARNING DECAL – L0164



2. DANGER DECAL – L0258



3. CAUTION DECAL – L0269



4. WARNING DECAL – L0281



ROOF ASSEMBLY

CONTINUOUS EAVE CLIP

Prior to assembly of roof, it will be necessary to assemble the first (top) ring of bin sidewall. Refer to the sidewall assembly section of this manual for proper instructions. **Note: for best results, unless otherwise specified, leave all bolts loose until roof assembly is complete. For ease of construction, assemble on a flat surface.**

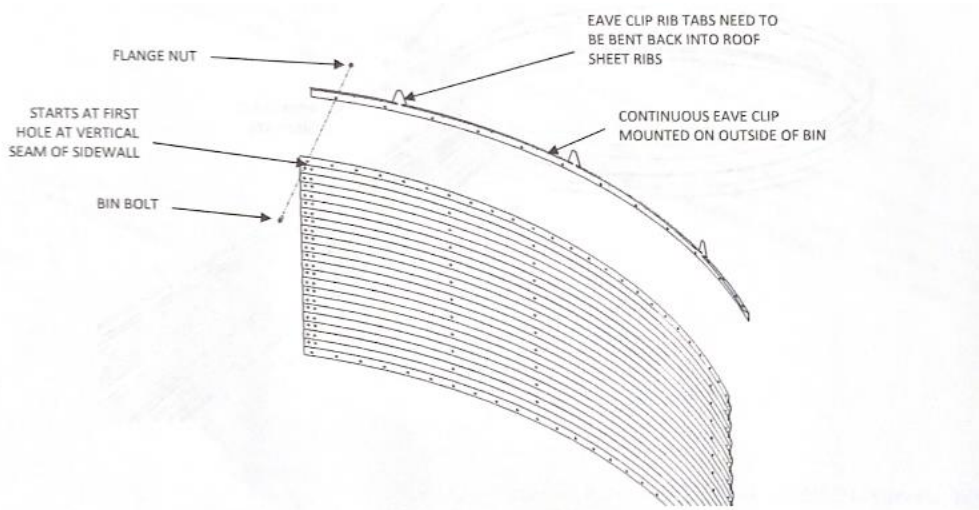


Figure 1 – Eave clip details

Attach continuous eave clip on the outside of the bin sidewall sheets to the top horizontal seam. An individual eave clip will attach to every sidewall sheet. Fasten with 5/16" x1" or 3/8" x1" bin bolts and flange nuts. Insert bolts on the top horizontal seam from the inside of the bin. Rib tabs can be bent back into the roof sheet rib after all roof sheets have been assembled to the peak ring and eave clip. See Figure 1.

Important Erecting Information

When constructing using a bin with a crane, a minimum of six (6) connections is required at the peak ring. Roof sheet laminate must be attached at the top of the roof sheet to the peak ring. See Figure 2. Attach laminate bracket to the roof sheet and peak ring using 5/16" x 1" bin bolts and 5/16" flange nuts. These laminate brackets are attached to each roof sheet/peak ring attaching location.

A MINIMUM OF SIX (6) ATTACHING LOCATIONS TO THE PEAK RING IS REQUIRED WHEN ERECTING BIN WITH A CRANE

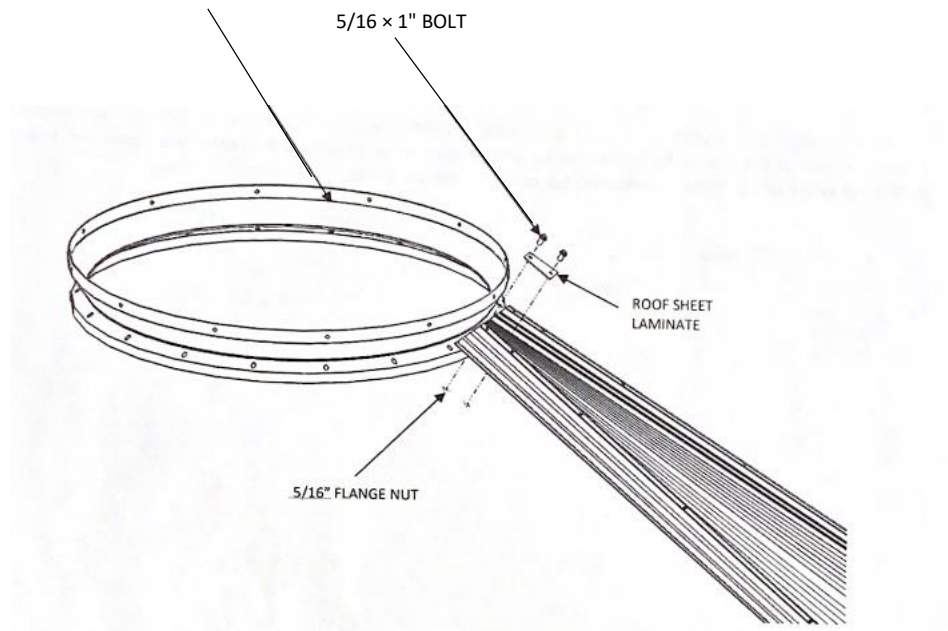


Figure 2 – Roof laminate details

ROOF LADDER RUNGS AND BENT ROOF RING BRACKETS

Installation of roof ring brackets and roof ladder rungs are attached to roof sheets using 5/16" x1" bin bolts, 5/16' flange nuts, and neoprene washers. Washer slips on bolts that have been inserted through roof ladder rungs and will be compressed between roof sheet rib and roof ladder rung to ensure watertight seal. See Figure 3. Roof ring bracket, roof ring, and U-bolt assemblies are located on the following pages. Inspection portal should be situated on the direct left or right of the roof sheet containing the roof ladder rungs as shown.

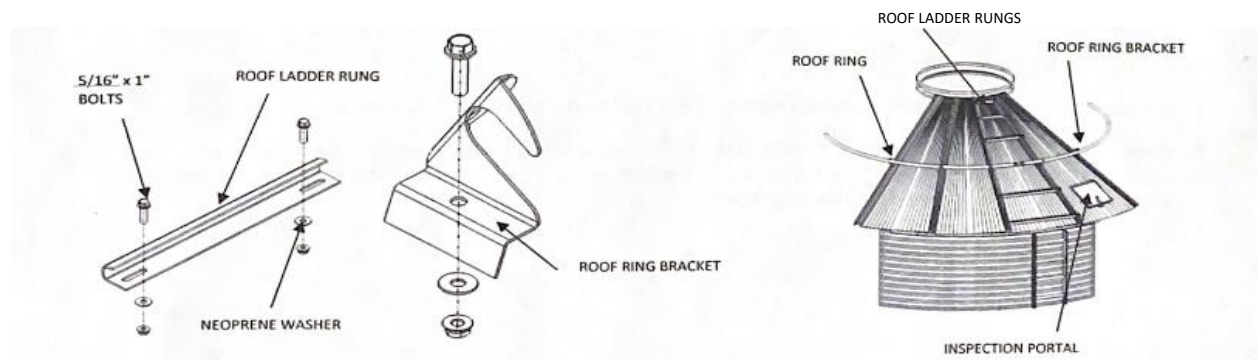


Figure 3 – Roof accessory details

INITIAL ROOF SHEET ASSEMBLY

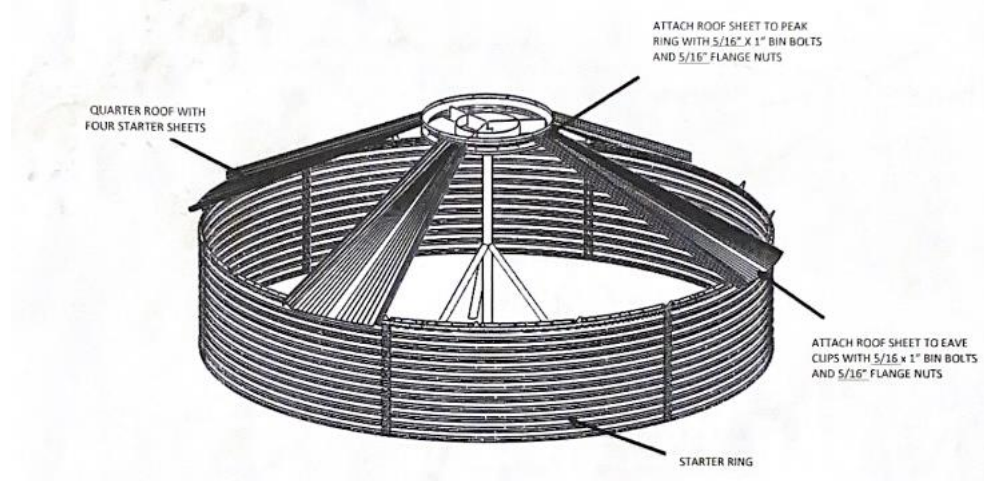


Figure 4 – Starting Roof Detail

Place support jack in center of side wall ring. See peak ring height chart below for approximate support setting. This height is a supporting point. You may need to raise or lower the jack to ensure that the holes in the roof sheets match up with the holes in the eave clips. **Note: An adjustable center support jack will allow for incremental adjustments making assembly for rood to eave clips easier.** See Figure 4.

If possible, fasten peak ring to center support jack using upper bolt holes. Begin installing four (4) individual roof panels, placing them directly opposite each other so roof is quartered. Use 5/16" x1" bolts and 5/16" flange nuts.

Measurements are to be taken from foundation to top of peak ring

Table 1 - Height of roof and one sidewall sheet

Bin Diameter	Height
18'	8'4"
21'	9'4"
24'	10'3"
27'	11'2"
30'	12'2"
36'	14'2"

ROOF SHEET ASSEMBLY

Leave the bolts out of right hand rib at top when viewing panel from outside of sidewall ring. This will allow assembly to continue in a counter-clockwise direction. When attaching roof sheet to eave clip, leave bolt closest to left-hand rib out on the four starter sheets, as this will need to be lifting for assembling last roof panel in each section.

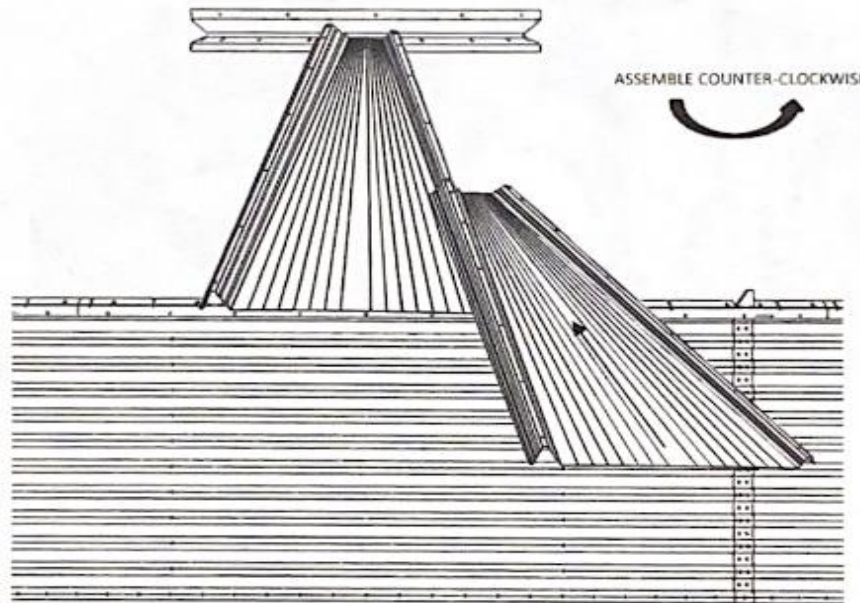


Figure 5 – Assemble roof counter-clockwise

Slide next roof panel into place overlapping the ribs. Use care to lay sheet flat when sliding panel up the roof as gouging may occur to roof sheet already in place. Continue to place two (2) or three (3) panels in each section, then move across and do the same. Fasten to peak ring with 5/16" x1" bolts. Fasten to continuous eave clip using 5/16" x1" bolts and 5/16" flange nuts. To install last panel in each section slide panel into place by lifting starter sheet. Add bent roof ring brackets at appropriate location with opening towards peak ring. See chart in Roof Ring Component section for the appropriate location of the bent roof ring mounting brackets. Assemble roof ladder rungs on designated roof sheet. See Figure 5.

Install 5/16 x1" bolts and 5/16" flange nuts in all of the rib holes. Note: Use an extra seal washer (supplied) on the bin bolt between any accessories and roof panel. This includes roof ladder rungs, bent roof ring brackets, and any other accessories used on the roof. This will provide a better protective seal against leakage. Tighten all roof assembly bolts according to torque specifications as noted in APPENDIX I - RECOMMENDED BOLT ASSEMBLY

IMPORTANT: At no time should any bolts be substituted for those supplied by DARMANI Grain Storage.

ROOF RING COMPONENTS

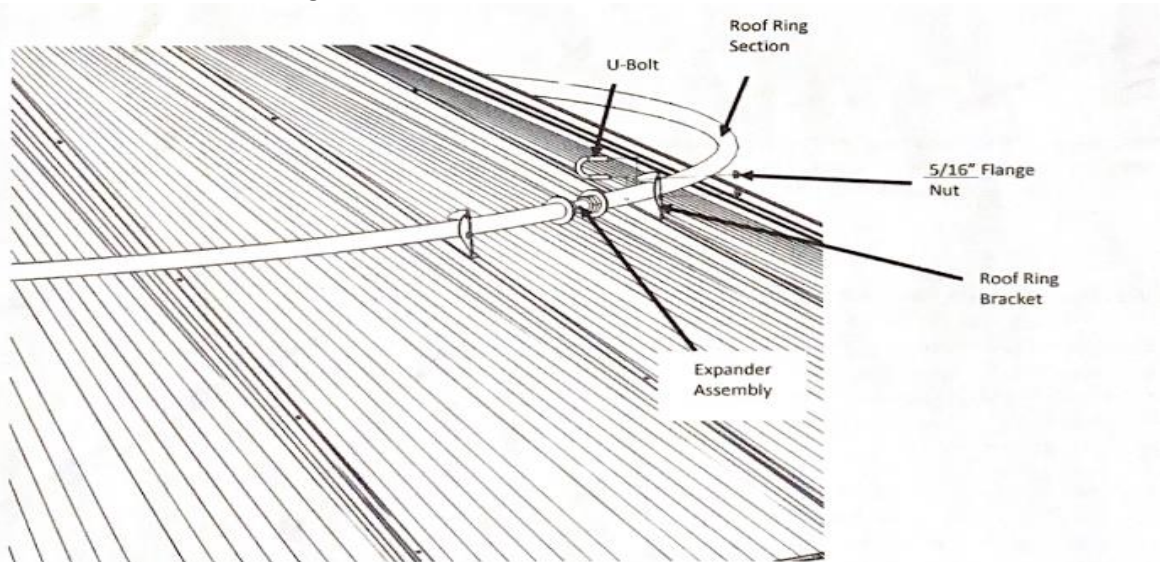
Table 2 - Quantity of roof ring components

Bin Diameter	Roof Ring Bracket Location *	Internal Tube Splices 8"	Expanders	10' Pieces 14 GA	U-Bolts
18'	3	2	2	4	10
21'	3	3	2	5	11
24'	4	3	2	5	13
27'	4	4	2	6	14
30'	5	3	3	6	16
36'	5	4	4	8	18
	8	3	2	5	18

*Hole location is the hole number from the bottom edge of the sheet (eave).

A roof ring consists of 10' long sections of 1 ¼ OD, 12 or 14 gauge galvanized tubing, rolled to a particular diameter. The primary role of the ring is to place the roof into tension with a slight crown to both strengthen the roof and resist wind motion.

During assembly of roof panels, the roof ring brackets should have been fastened to the specified locations. As ring sections are placed into brackets, place expander assemblies in appropriate locations. Preassembly of expanders (1" x 12" threaded rod, 1" nuts, and 1" washers) is needed before ring sections can be constructed. The 1" nuts need to be run the center of expansion bolts and flat washers on the outside of the nuts. See Figure 6.



The first expander assembly is placed near roof ladder. The first ring section is centered on roof ladder sheet. As ring sections are placed into bent roof ring brackets, evenly space remaining expanders around roof ring. Place tube splice assemblies at all other locations. Figure 7 shows the 8" internal tube splice using a 5/16" x 1" bin bolt and a 5/16" flange

nut as a stopper. See Table 2 - Quantity of roof ring components for number of expander assemblies and internal splices used on each ring.

Note: It may be necessary to field cut final section of pipe so ring will fit with the expander assemblies as bolts are fully contracted. If a short piece will be less than 24" in length, split the difference between the final two (2) ring sections. In other words, splice between two sections of roof ring so that there are two shorter sections of roof ring. See Figure 8. Note: It may be necessary to deburr any field cut edges for internal splices to fit.

Roof Sheet

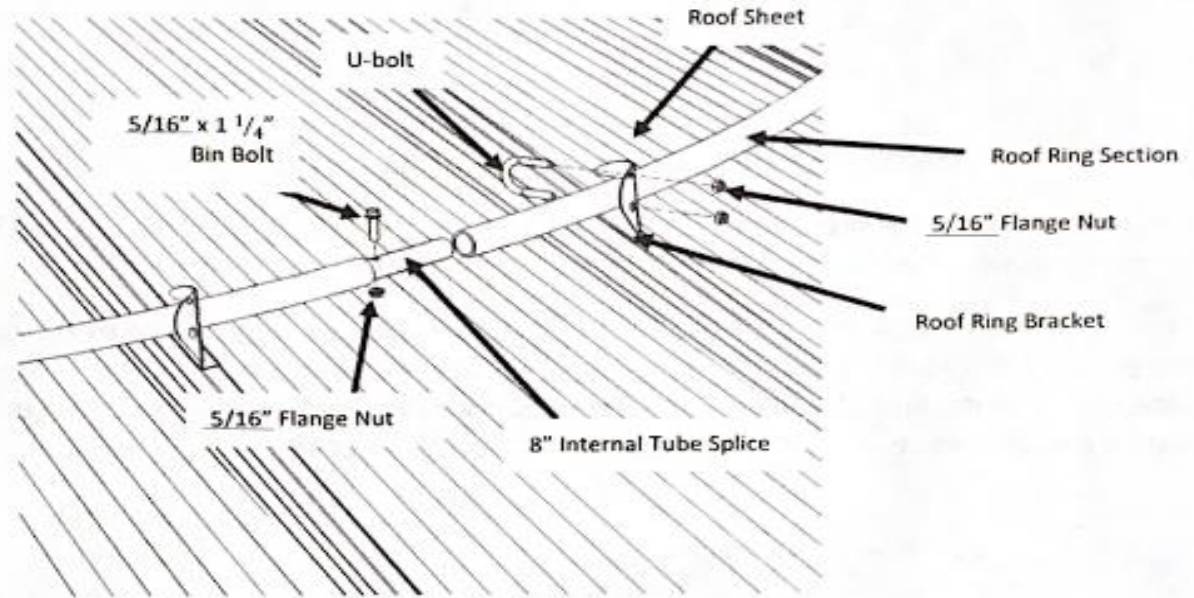
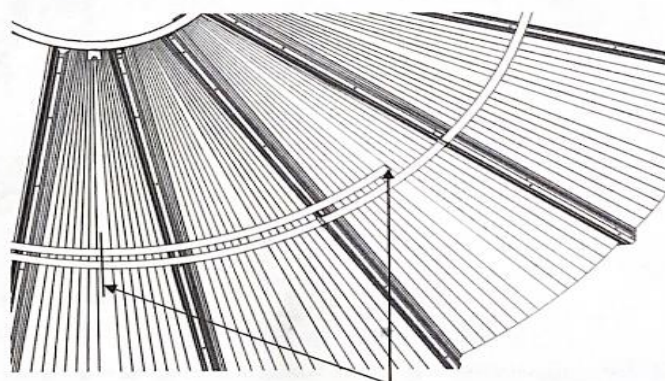


Figure 7 - Splice tube details

Add tension evenly to each set of expander assemblies until a slight crowning of the roof is noted. Set the second set of nuts (jam nuts) against expansion nuts to ensure against loosening of expander assemblies. Note: Staking (deforming) jam nut threads with a center punch and hammer is recommended to ensure nuts do not loosen.

Once expansion nuts have been set and staking, attach 5/16" U-bolts and 5/16" flange nuts to alternating roof ring brackets. See Figure 6 & Figure 7. Tighten 5/16" flange nuts to ensure roof ring sections do not slide away from the expander assemblies.

Attention: The possibility of the roof expansion bolts becoming dislodged during high winds or excessive pressure inside the bin does exist. If this component becomes dislodged, roof ring will fail. To provide containment to roof ring, be sure to follow procedures outlined on this page. Note: Welding of expansion and splice assembly is an additional option.



IF SHORT PIECE CREATED IS LESS THAN 24" SPLIT THE DIFFERENCE AND CUT TWO RING SECTIONS.

Figure 8 - Short roof ring details

SIDEWALL CONSTRUCTION

SHEET LAYOUT

Prior to beginning assembly of grain bin, it is necessary to determine the desired location of components that will make up the completed structure. See Foundation Section for typical accessory layout diagram. Locations for the bin door unload system, and fan or fan/heater transition should have been decided when foundation was formed or poured. Take time now to confirm desired locations of these items.

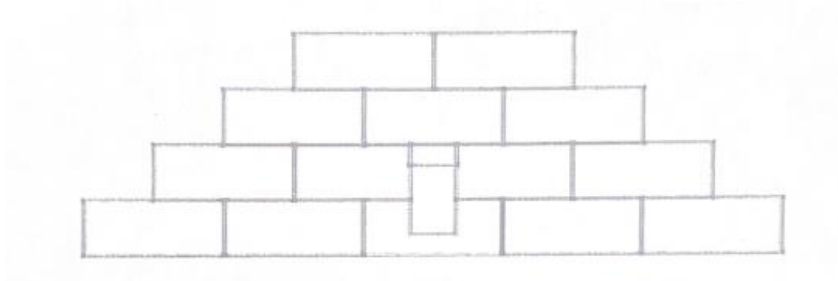


Figure 9 – Even Number of Rings Structure

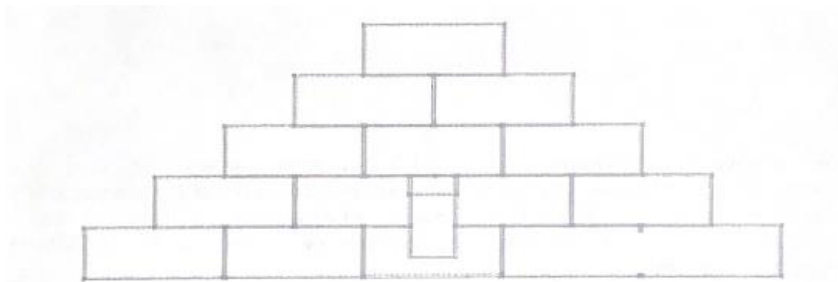


Figure 10 – Odd Number of Rings Structure

To help determine where door will locate consider that on a bin with an even number of rings, (4-6-8, etc.) sidewall door will align directly below a vertical seam in the top ring. On a bin with odd number of rings (5-7-9, etc.) sidewall door will locate directly below mid sheet of the top ring. See Figure 9 & Figure 10. Also refer to APPENDIX I - WALL SHEET LAYOUT for sheet layout details. **Note:** Prior to starting erection, sidewall panels should be located near the center of the foundation. Keep in mind the lighter gauged panels will be used first.

Locate first (top) set of sidewall sheets. Typically, this will be the lightest gauge of panels. Note: The larger the number, the lighter or thinner the material. (For example 20 gauge is thinner than 12 gauge.). Attention: Bin logo sheet is located in the first ring. Determine a suitable location and incorporate into sidewall pattern. Note: all sidewall panels are reversible, that is, there is not a top or bottom.

Wipe right edge of sidewall sheet clean and apply caulking between outside row of vertical seam bolts and edge of sheet with bin caulk. See Figure 11. A 12" strip of caulk is centered horizontally on the top & bottom of every seam.

12" STRIP OF CAULK
CENTERED
HORIZONTALLY ON THE
TOP AND BOTTOM OF
EVERY VERTICAL SEAM AS
SHOWN

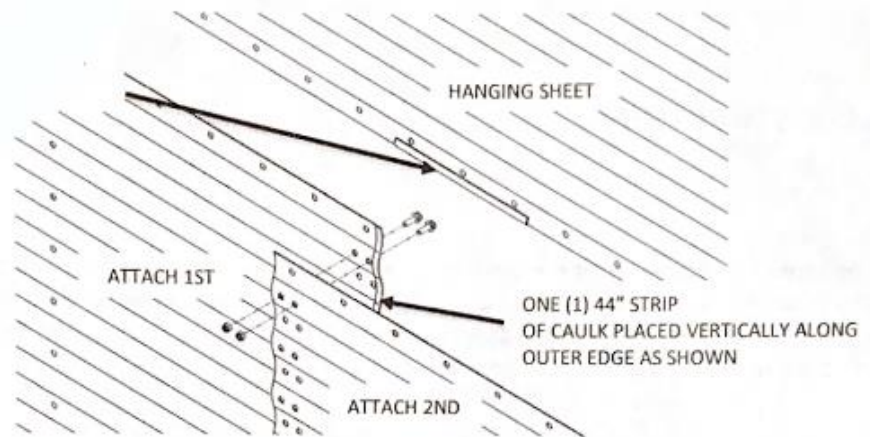


Figure 11 – Wall Sheet Sealing Detail

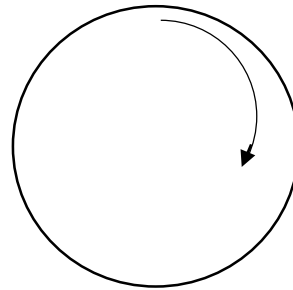


Figure 12 – Assemble Clockwise

Stand sidewall sheets around perimeter of foundation in a clock-wise direction - see Figure 12. Bolt panels together at vertical seam using sidewall bin bolts leaving very top and bottom horizontal seam bolt(s) out, using 5/16 x1' bolts with poly washer and nuts on stiffened bins, or 3/8 x1" bolts with poly washers and nuts on unstiffened bins. Insert bolts from the outside of the bin and fasten with nuts on the inside to ensure a watertight seal. **DO NOT TIGHTEN BOLTS UNTIL RING IS COMPLETELY ASSEMBLED.**

Attach lift brackets for jacks as recommended by jack manufacturer's specifications. Caution: Never exceed jack manufacturer's stated capacities. After the top ring is completed, assemble roof as outlined in Roof Assembly section of this manual. When roof assembly is complete, tighten all roof and sidewall bolts. Refer to the Ladder, section for proper attaching procedures of outside ladders.

Jack bin until the bottom horizontal seam is slightly higher than the next sidewall sheet, approximately 46". Prepare next ring of sheets by wiping clean and applying caulking as described for top ring (Figure 11). At the bottom of all vertical seams, clean and apply a continuous length of caulk about six (6") inches on either side. This is also done at the center of each side wall sheet where the top of the next vertical seam attaches. See Figure 11. Attach sidewall sheets to the inside of the upper sheet inserting all but the first and last holes in the horizontal seam.

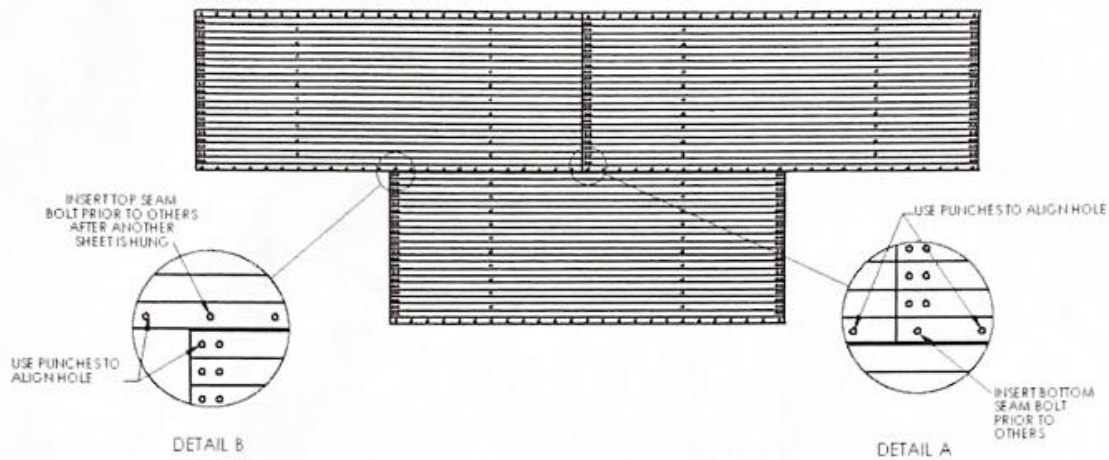


Figure 13 – Alignment Holes On Wall Sheet

Note: Bolts that mate into sidewall sheets must be inserted correctly to ensure precise erection of bin. Use tapered punches to ensure proper alignment of boltholes in the sidewall sheets. Do not leave the top or bottom boltholes of the vertical seams for last. Each sidewall sheet, as well as the entire bin, will fit together more accurately if bolts are inserted in these holes prior to the other holes in each sidewall sheet assembly process. See Figure 13, Details A & B Drilling or reaming out boltholes when sheets are not properly aligned is not recommended unless otherwise specified.

Continue installing sidewall sheets in a clockwise direction. Bolts may be tightened when ring is complete. **All Darmani Stiffened Bins require two (2) stiffeners per sidewall panel.** All stiffeners are to be installed on the exterior of the bin. Note: Stiffeners will change in gauge (thickness) dependent upon location. Be sure to consult APPENDIX I - WALL SHEET LAYOUT to ensure proper location of stiffener sections.

Start proper gauge stiffener with top hole of stiffener aligned with hole in second hill (4" down from top) of sidewall sheet. Proper vertical adjustment of stiffener is important. To ensure proper vertical alignment of stiffener, take note of where slotted bolt hole in stiffener and sidewall boltholes in each horizontal seam intersect. Proper vertical alignment of stiffener requires slotted hole to be centered over horizontal seam bolt hole. See Figure 14 & Figure 15.

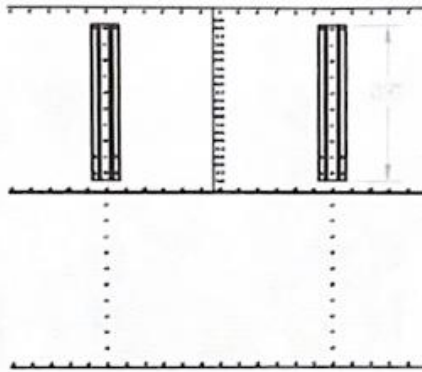


Figure 14 - 39" starter stiffener

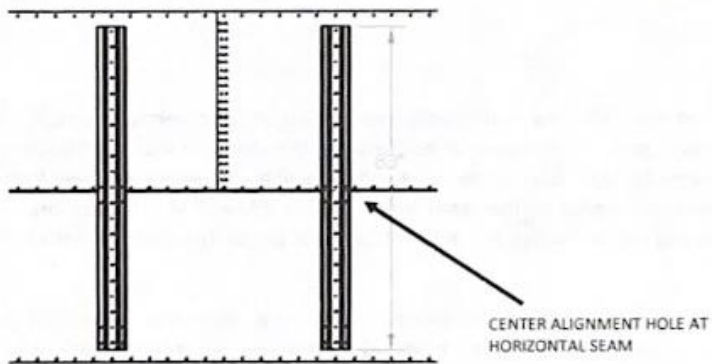


Figure 15 - 83" starter Stiffener

Note: Stiffener must be positioned correctly. Use tapered punch to assure proper alignment. Do not allow stiffener to sag. Failure to do so will result in increasing assembly difficulties.

Fasten stiffener to sidewall using 5/16" x1" bin bolts and 5/16" nuts. Bolts that fasten stiffeners together will follow same pattern as that used on sidewall. To prevent moisture from entering bin through stiffeners, insert bolts from the inside of the bin.

Leave bottom two (2) sets of bolts out of stiffener, as stiffener splice will attach using these two (2) holes. After first stiffener this will occur at top and bottom of each attaching stiffeners. Continue attaching sidewall stiffeners until first tier of stiffeners have all been installed.

Continue installing sidewall panels adding as many rings as is required to allow for the next tier of stiffeners. With sufficient sidewall rings installed begin installing next tier of stiffeners to sidewall. Remember: Leave out the top and bottom bolts until time to install stiffener splice. **Note: Stiffener splices occur above horizontal sidewall seams.** When attaching next tier of stiffeners, it will be necessary to ensure that no more than 1/16" inch gap occurs between upper and lower stiffener. See Figure 16.

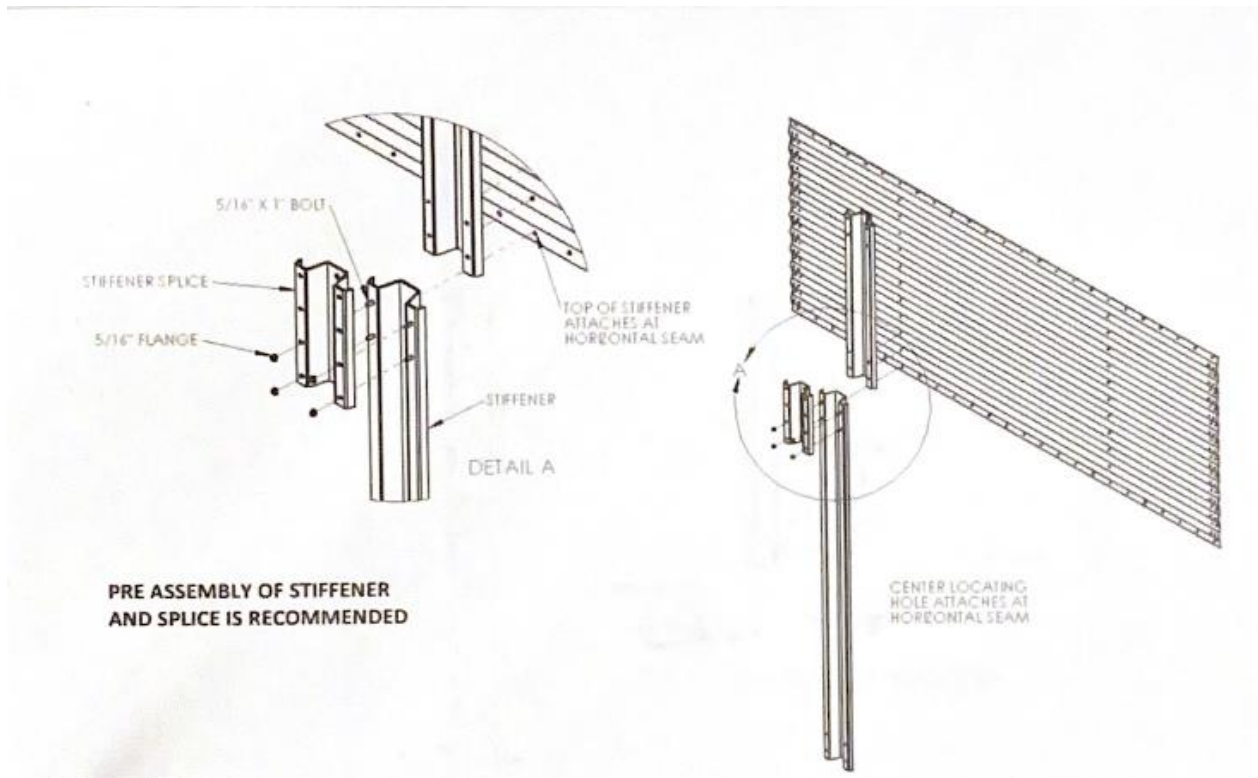


Figure 16 – Stiffener Splice Plate Details

With upper and lower tier stiffeners in place attach stiffener splice using 5/16" x 1" bin bolts and 5/16" nuts. Note: When next stiffener down (below) increases in gauge thickness, stiffener splice plate will also increase in gauge. Always use same gauge splice plate as heaviest stiffener being attached. Place eight (8) bolts in splice flanges and four (4) bolts through stiffener, neoprene washer, and bin sidewall. Continue assembly of bin including stiffeners in proper sequence as outlined in APPENDIX I - WALL SHEET LAYOUT.

Attach bottom stiffener to sidewall using appropriate sized bin bolts. Assemble bottom base to bottom stiffener with bin bolt and flange nut. Each stiffener will include two (2) shims. One shim is required for thickness of bolt-on base angle. An extra shim is supplied for allowances of uneven concrete surface. See Figure 17 - Stiffener Base Details. Attach final stiffener splice and tighten bolts.

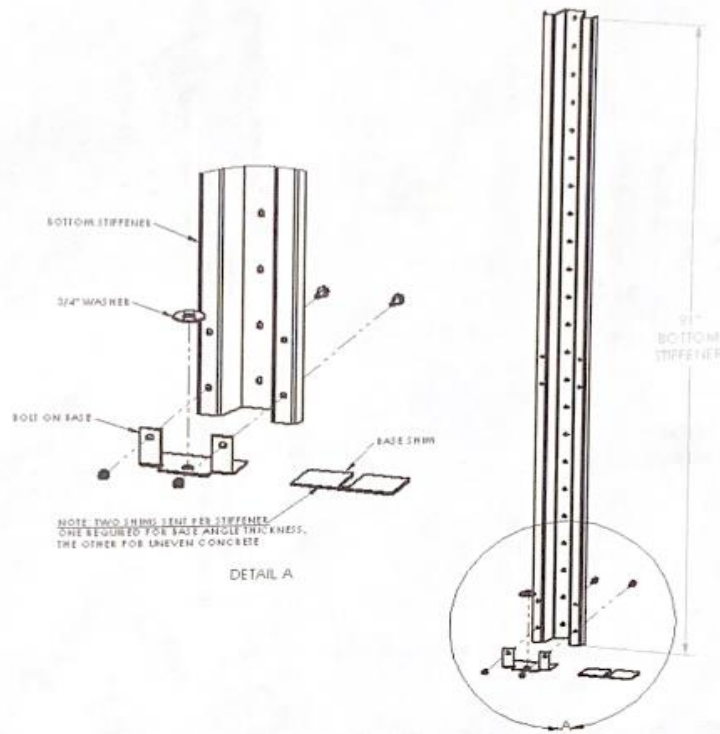


Figure 17 – Stiffener Base Details

If foam sealant is to be used as a seal for bin foundation, install to underside of base angle now. Lower bin onto foundation. Precaution should be taken to ensure stiffener anchor plates clear foundation anchor bolts. Check that stiffener anchor pads rest on foundation. One shim per stiffener is required. Shim as necessary any stiffeners not in contact with concrete. Note: Failure to ensure proper shimming may result in damage to bin structure. Ensure roundness of bin and check for seal. If foam base sealer is not used, seal inside of bin to concrete foundation using a sealing compound.

Assemble square washer, 3/4" round washer, and nut to anchor bolts. See chart below for the correct number of square washers needed. The 3/4" round washer is needed for the different sizes of anchor bolts and holes in the bottom bases. Tighten as required by manufacturer's specifications.

DOOR CUT OUT

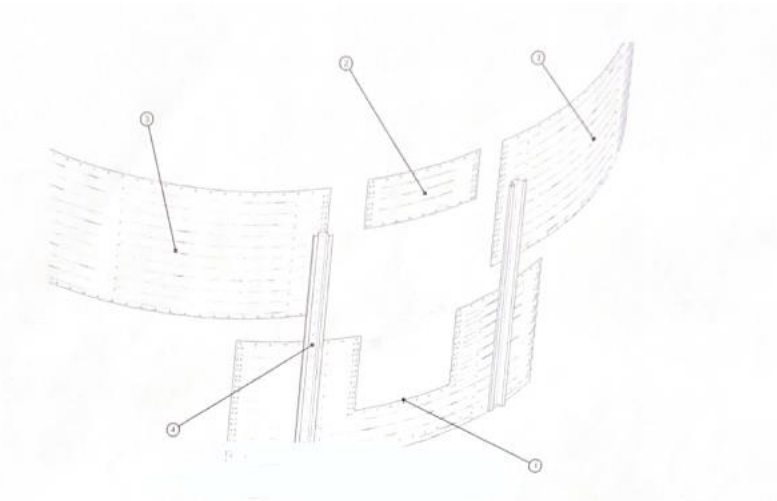
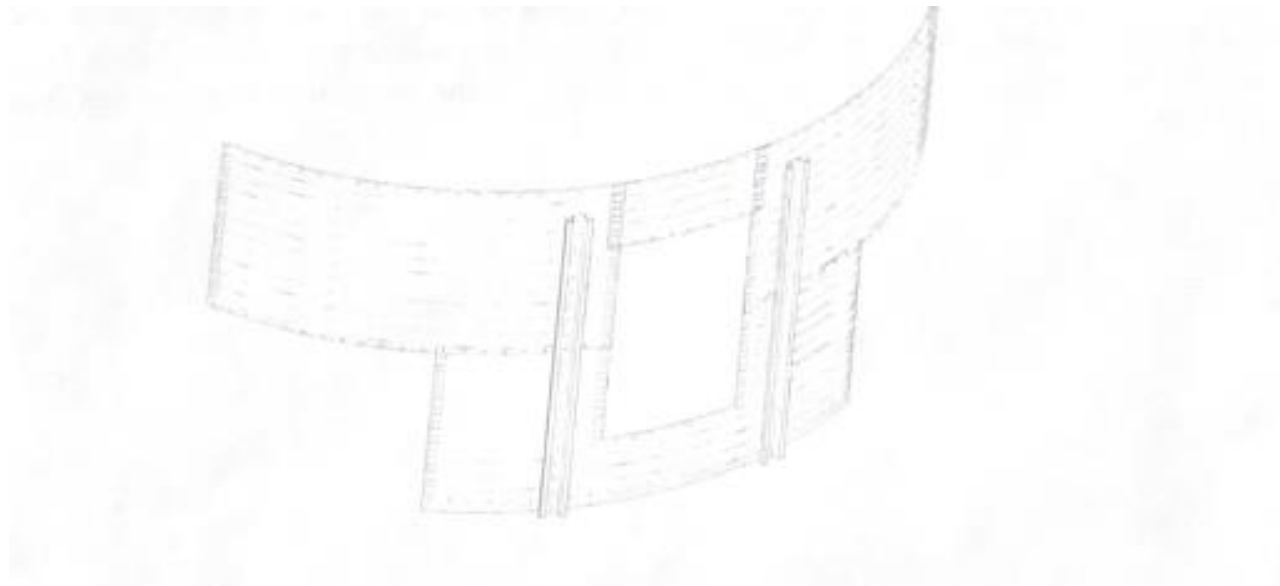


Figure 18 – Door Cut Out Details

Figure 18 – Door cut out details is viewed from the outside of the bin and shows the sheets that are assembled around a DARMANI door. Assemble door according to the appropriate door manual, and install door with 5/16" x 1 ¼" bolts. Attach sheets together in the proper side wall rings.

If sidewall door sheets around the door are punched for 3 ring stiffeners and stiffeners are not necessary, plug empty holes. Also, stiffened bins require a 44" stiffener to be placed in the column of stiffeners by the door. This will ensure proper alignment of stiffeners.



OUTSIDE LADDERS

The ladder consists of side rails, rungs, and standoff brackets, bolted together with 5/16" nuts and bolts.



Figure 20 – Top Ladder Assembly

The outside ladder consists of 88" ladder rails, 11 ladder brackets and pairs of standoff brackets. The standoff brackets normally align with the seams between the tiers of the bin; however, the first pair requires a set of 5/16" holes to be drilled. When the top bin tier and roof are completed, attach the top ladder section: Place the ladder against the wall, as close to center as possible on the roof panel that contains the roof ladder. Using the bottom seam on the tier to set the position, drill out a set of 5/16" clearance holes on the fifth corrugation down to match the position of the standoffs. Note that the topmost rung is shifted up a set of holes - this prevents a gap between the step and the eave of the roof that may trap a foot and cause a fall. Install the first section of the ladder as shown in Figure 21 - Top Ladder Assembly Mounting Position. When bolting to the bin, insert the bolt from the inside of the bin outwards to create a better seal.

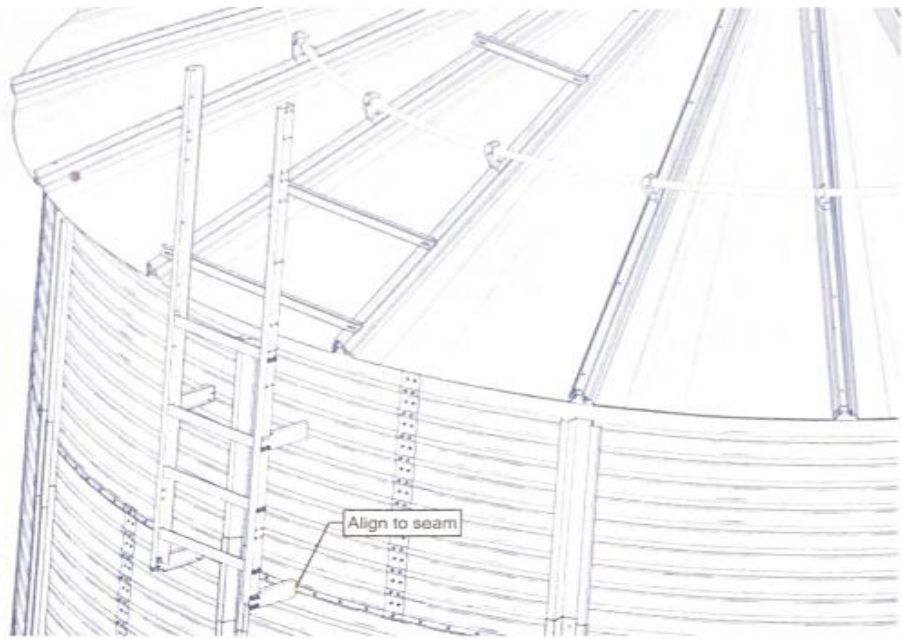


Figure 21 – Top Ladder Assembly Mounting Position

Ladder sections can then be assembled and added to the bin as it is being built. The sections are normally 88" long; however, some models of bins may require a ½ height section on the last ring.



Figure 22 – Regular Ladder Assembly

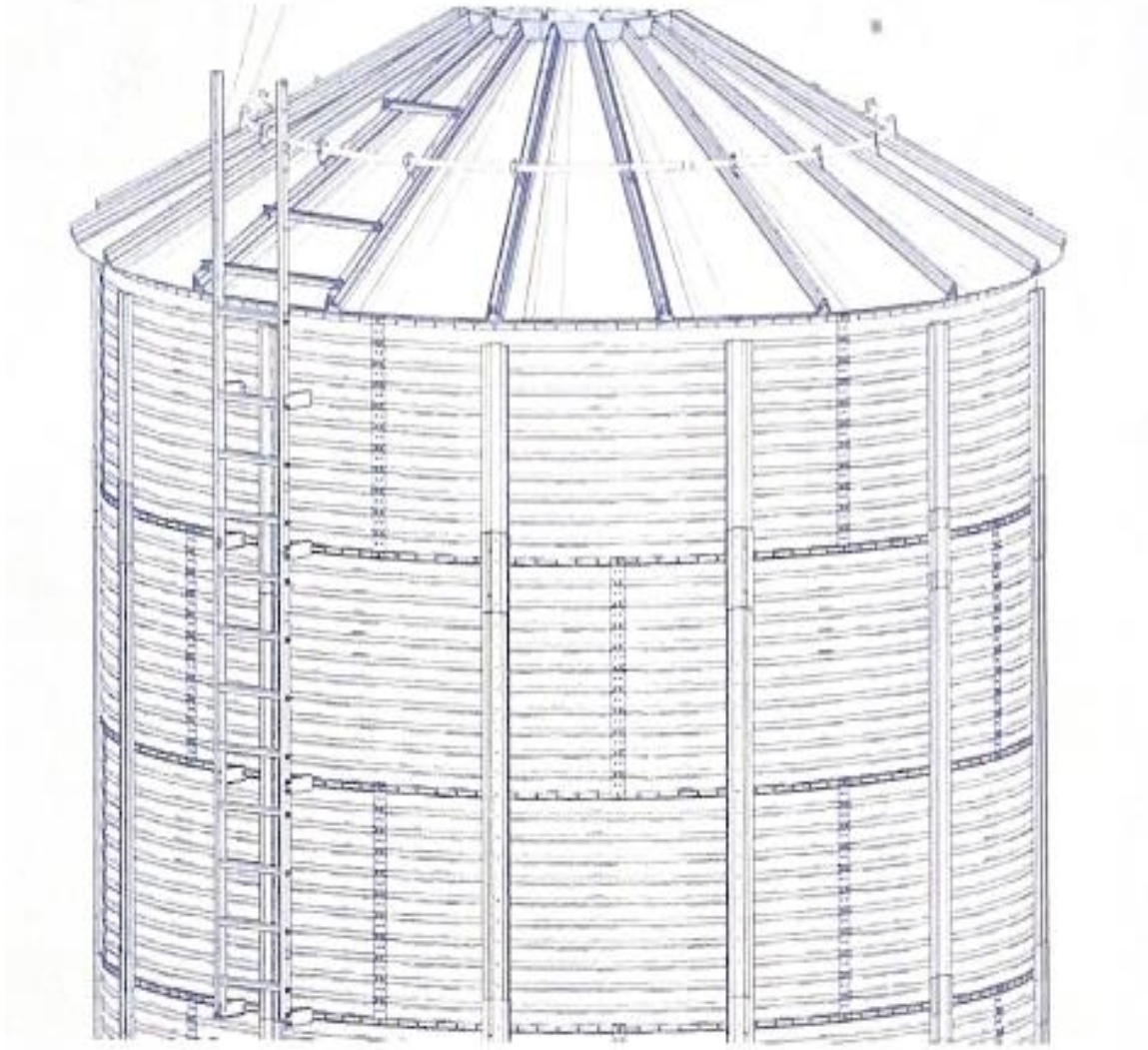


Figure 23 – Continued Ladder Assembly

APPENDIX 1 – RECOMMENDED BOLT ASSEMBLY

Check that all bolts have been tightened to the proper torque values and recommended assembly procedure has been followed.

Bolt Diameter	Bolt Grade	Recommended Torque		
		In-lb	Ft-lb	N-m
5/16"	Grade 8.2			
3/8"	Grade 8.2	300	25	34
7/16"	Grade 8.2	540	45	61
1/2	Grade 8.2	840	70	95
	Grade 8.2	1320	110	150

Periodically check bolt assembly with an accurate torque wrench to ensure that the above torque specifications are maintained. A properly tightened bolt will compress sealing washer noticeably.

ALWAYS TIGHTEN THE NUT, NOT THE BOLT! – Hold bolt head securely when tightening the nut to prevent damage to the sealing washer.

APPENDIX II – WALL SHEET LAYOUT

COLOR CODING

SHEETS		
SIDE WALL SHEETS		
GAUGE	TYPE	COLOR
20	STIFFENED	RED
20	UNSTIFFENED	RED
17	STIFFENED MIDDLE	BLUE/PINK
17	UNSTIFFENED	BLUE/RED
17	STIFFENED BOTTOM	BLUE/WHITE
17	STIFFENED DOOR	YELLOW
17	STIFFENED SHORT	PINK
17	WIDE DOOR	ORANGE
17	WIDE DOOR SHORTS	WHITE
15	UNSTIFFENED	PINK
15	UNSTIFFENED BOTTOM	PINK/WHITE
14	INSTIFFENED	GREEN
14	UNSTIFFENED BOTTOM	GREEN/WHITE
13	UNSTIFFENED BOTTOM	GREY
12	BOTTOM	LIGHT BLUE
12	OLD DOOR	GREEN
12	OLD SHORTS	ORANGE/YELLOW
12	NEW DOOR	GREY
12	NEW SHORTS	BLACK

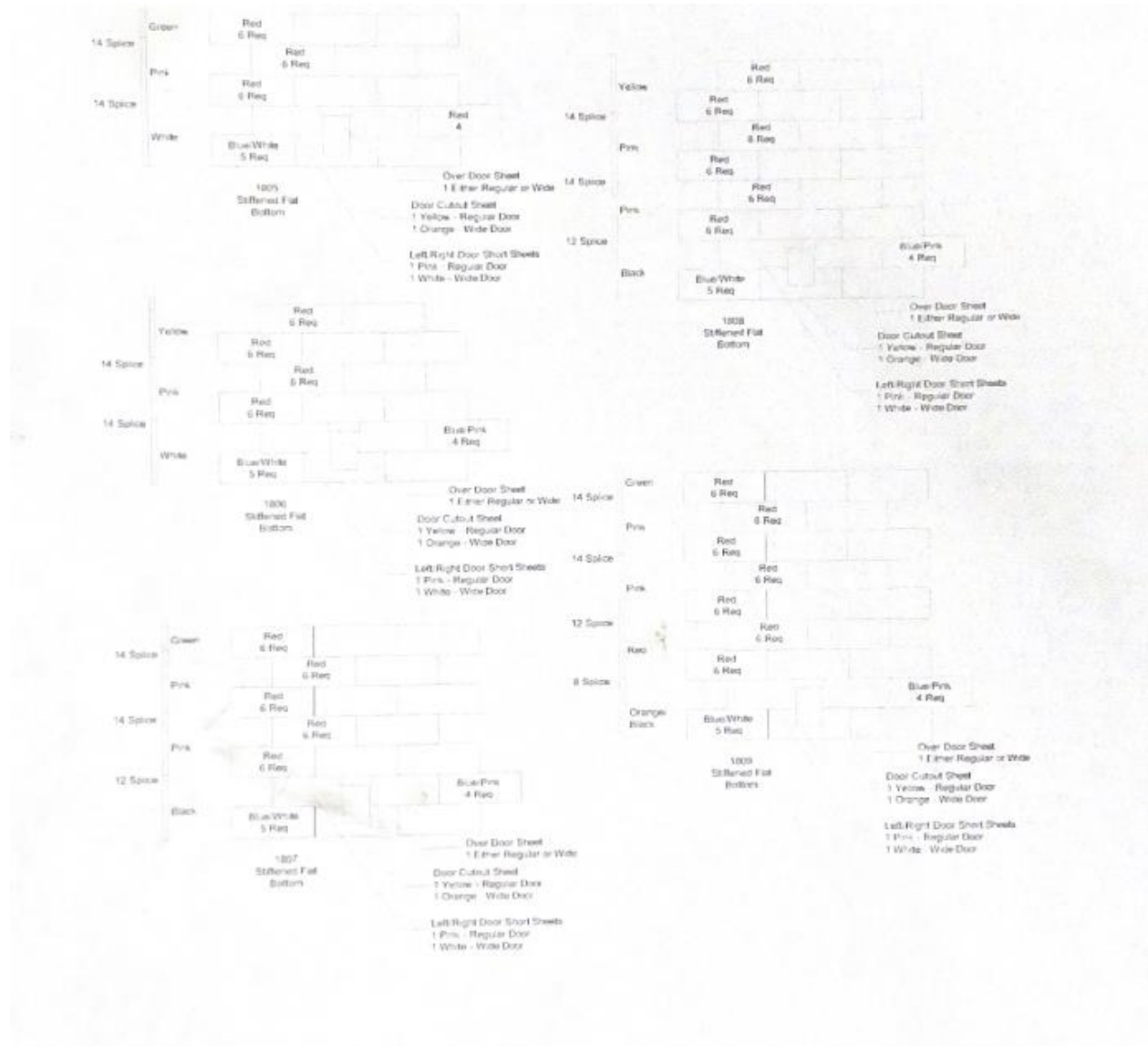
Stiffeners

GAUGE	TYPE	LENGTH	COLOUR
8	BOTTOM	91	ORANGE/BLACK
12	BOTTOM	91	BLACK
14	BOTTOM	91	WHITE
8	BOTTOM	97	ORANGE
12	BOTTOM	97	DARK BLUE
14	BOTTOM	97	PURPLE
12	MIDDLE	88	RED
14	MIDDLE	88	PINK
14	TOP	83	YELLOW
14	TOP	39	GREEN

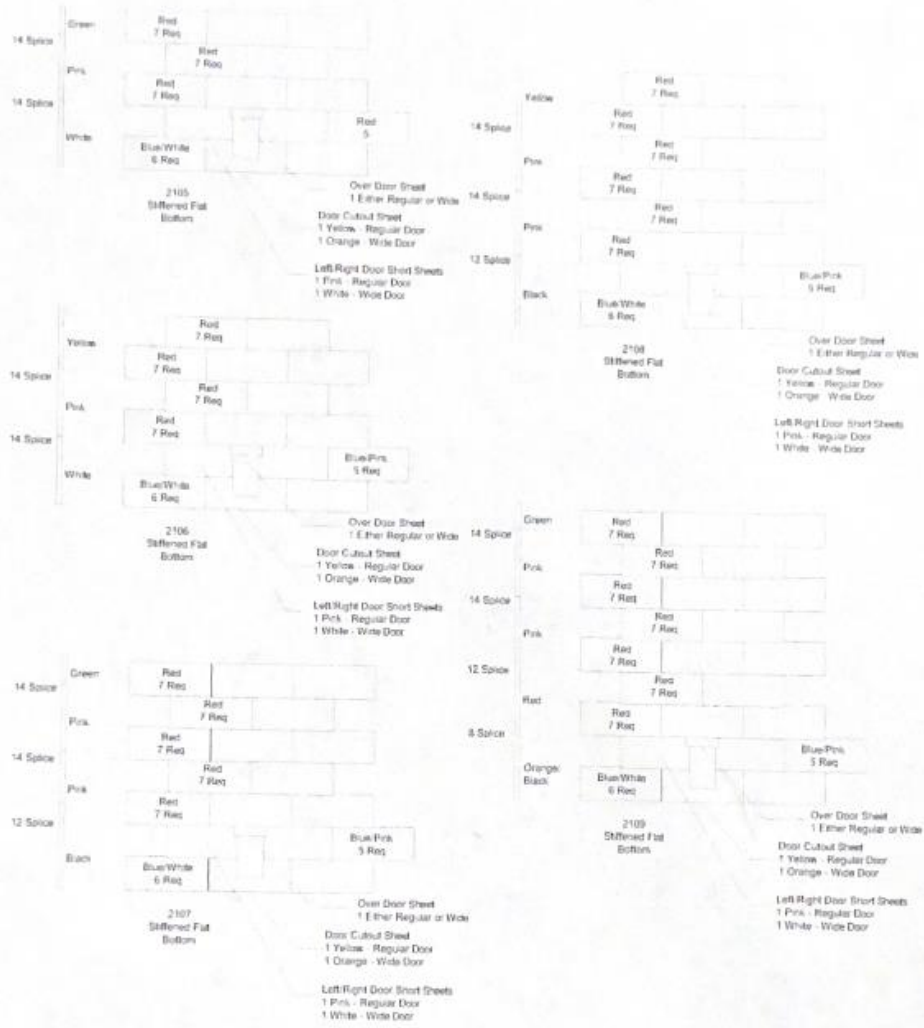
PEAK RINGS

SIZE	COLOUR
18'	RED
21'	BLUE
24'	GREY
27'	GREEN
30'	YELLOW
18'/36'	PINK

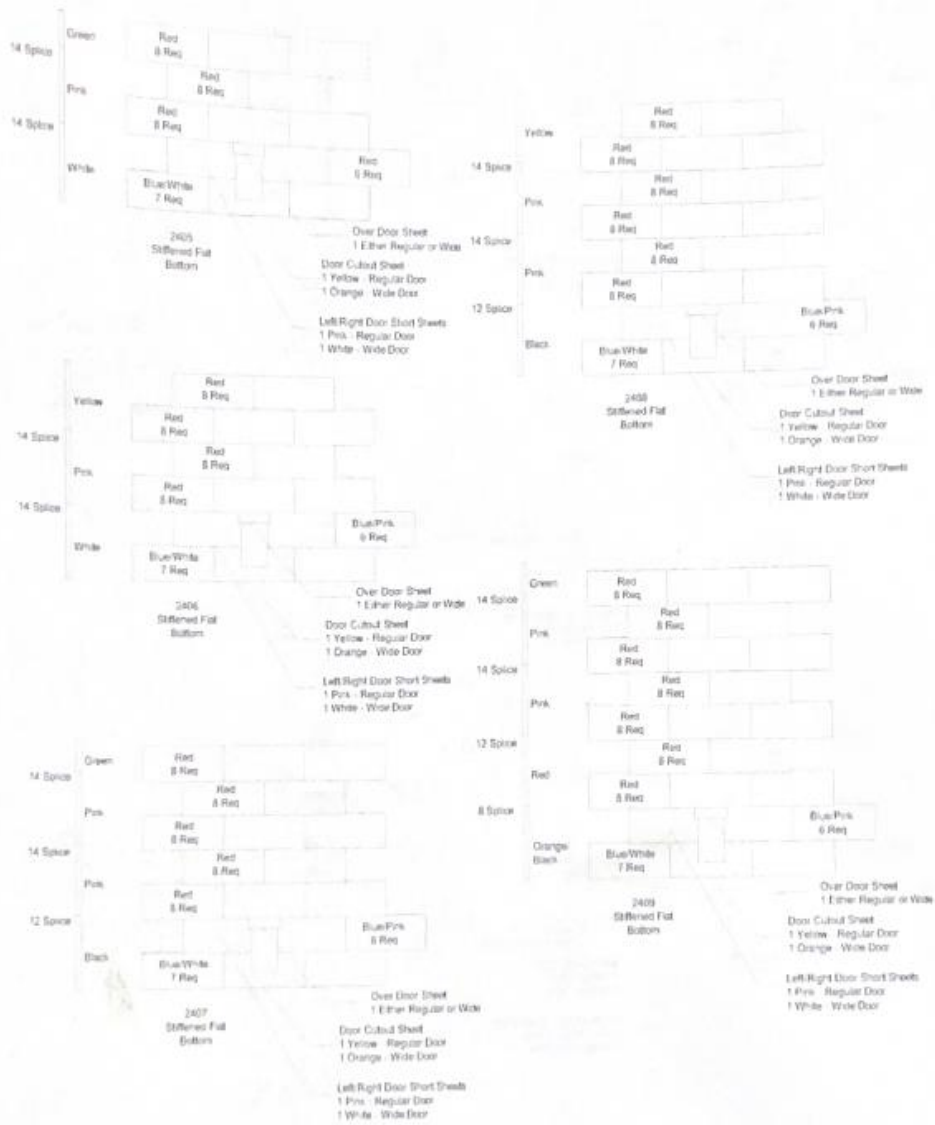
18 FOOT STIFFENEED BINS



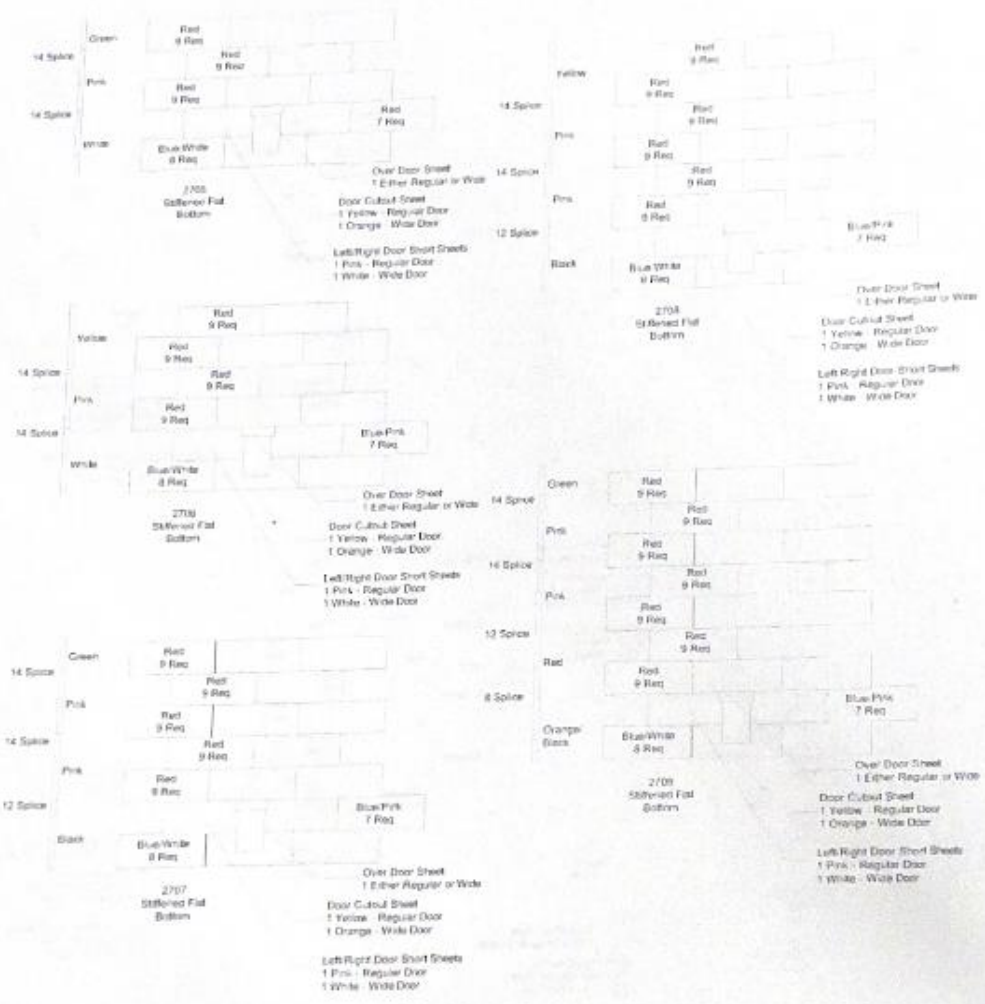
21 FOOT STIFFENED BINS



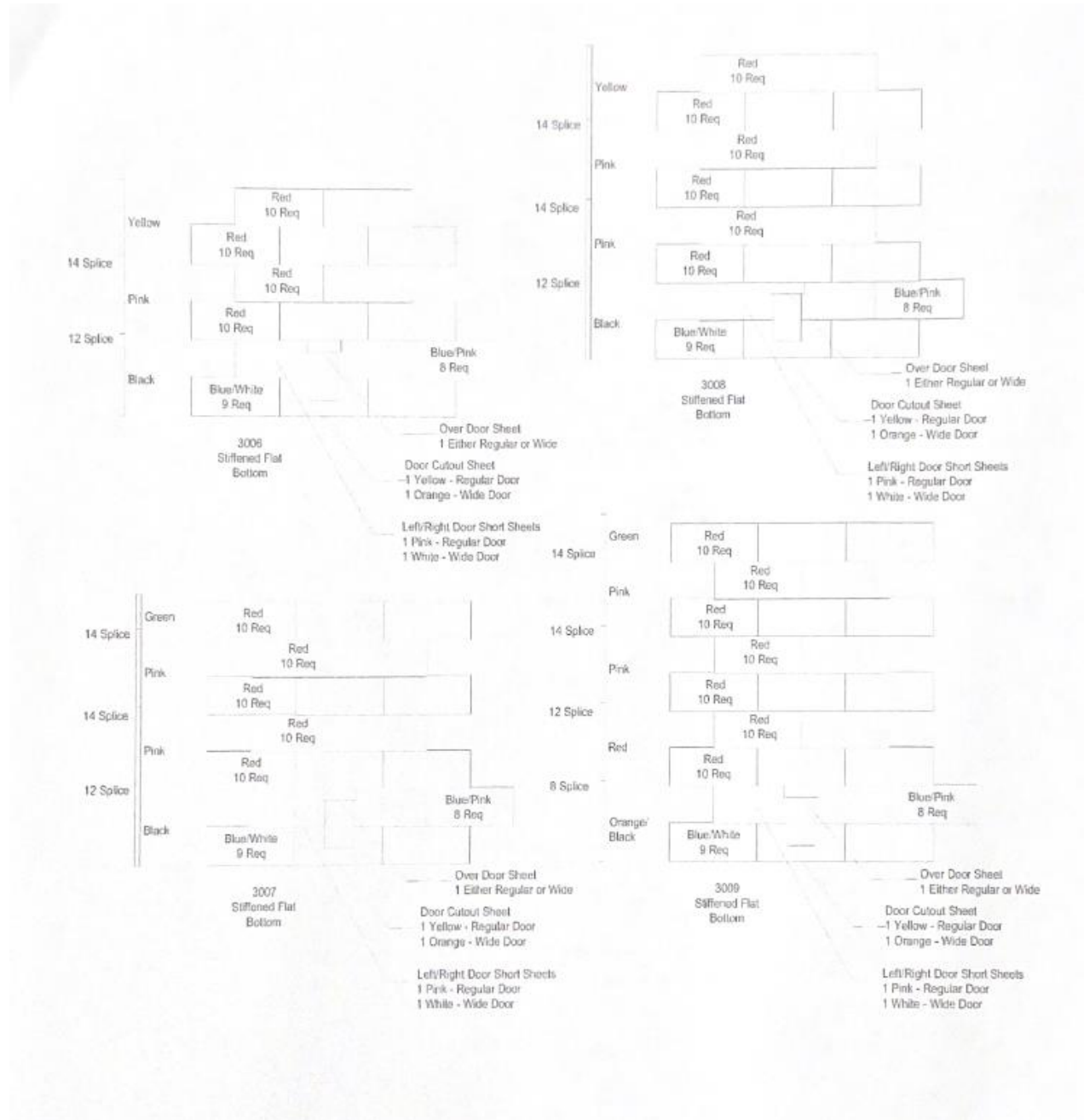
24 FOOT STIFFENED BINS



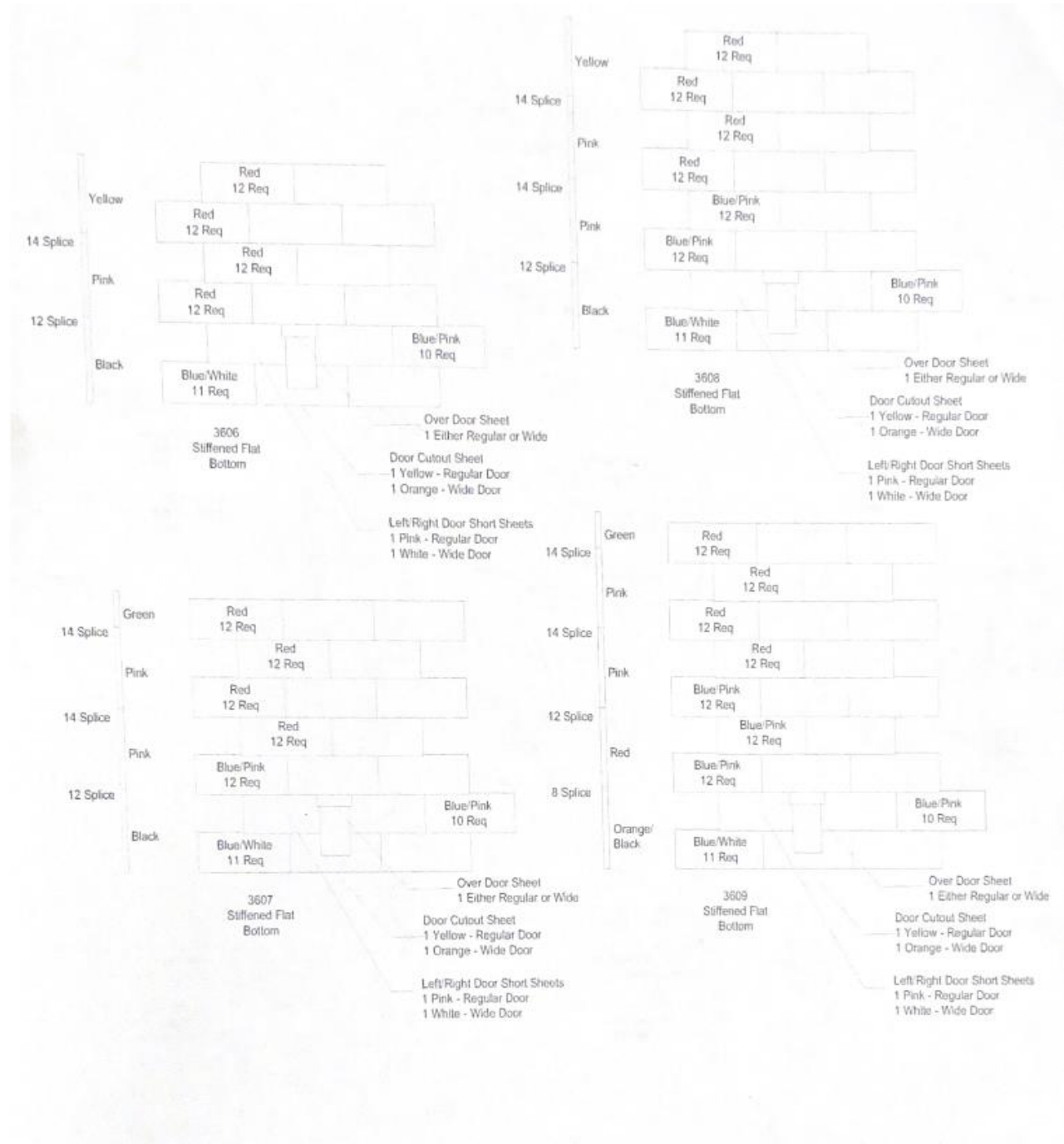
27 FOOT STIFFENED BINS



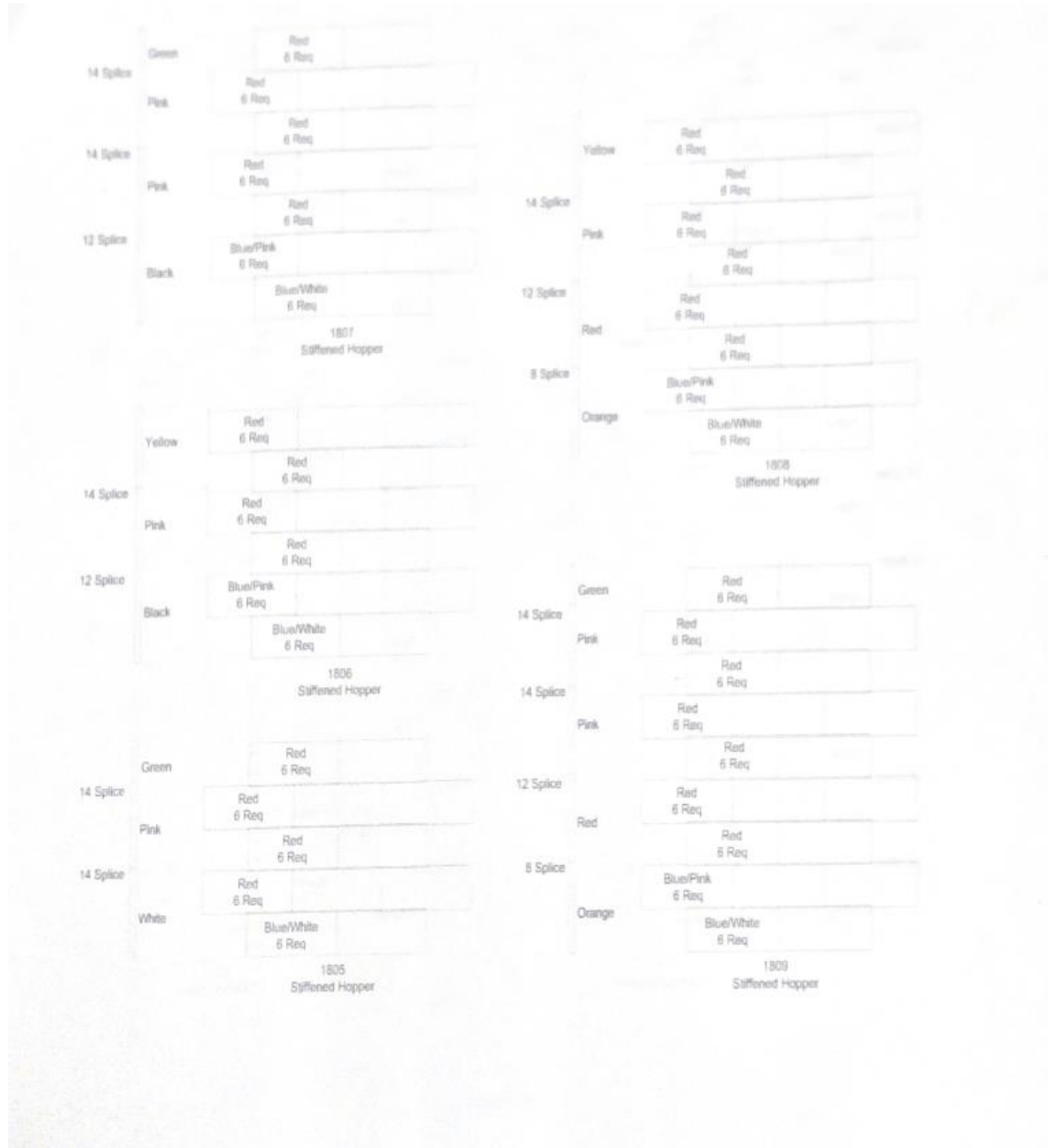
30 FOOT STIFFENED BINS



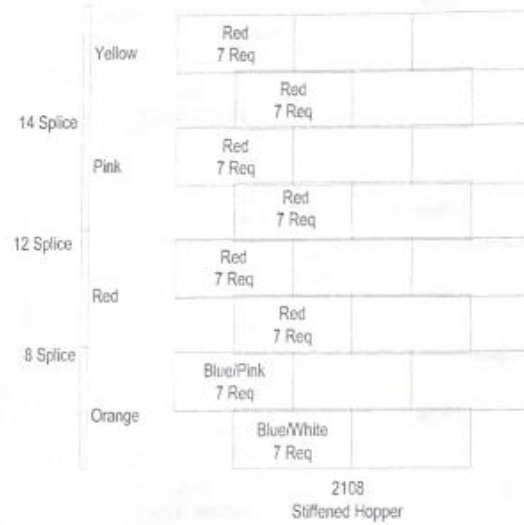
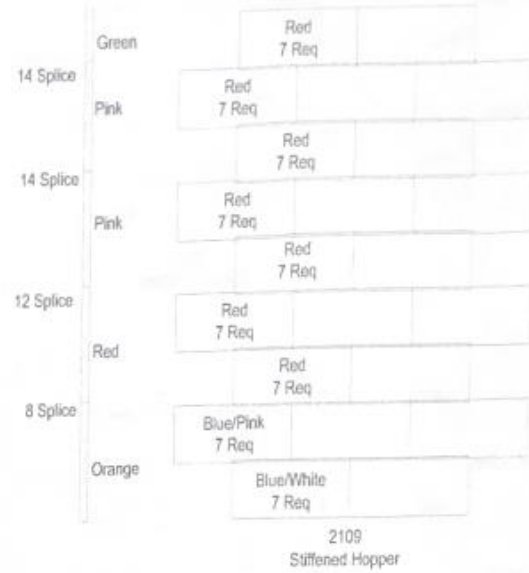
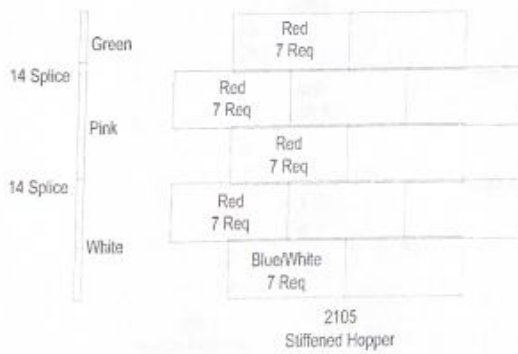
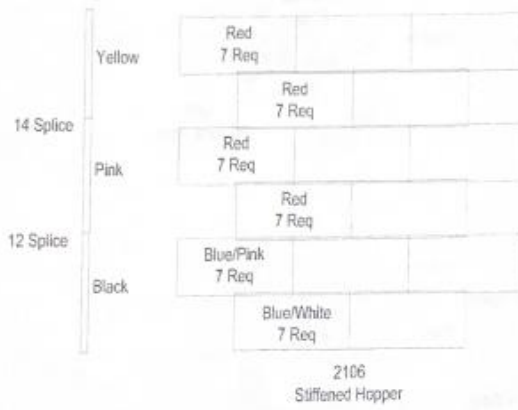
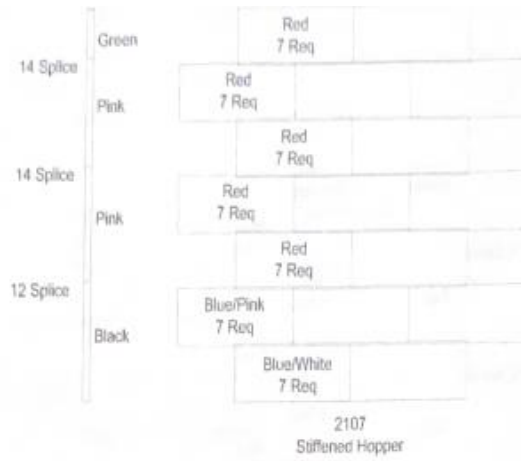
36 FOOT STIFFENED BINS



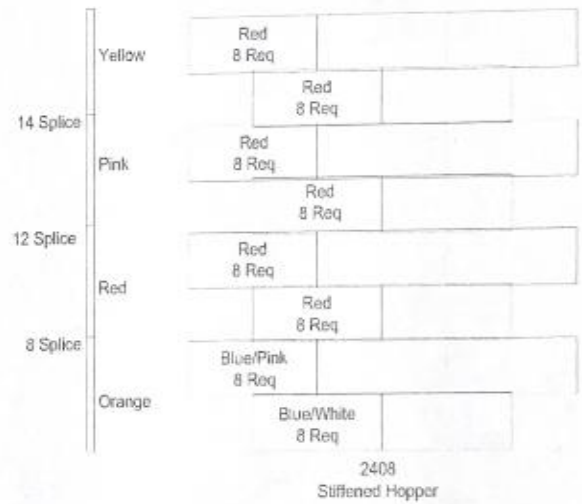
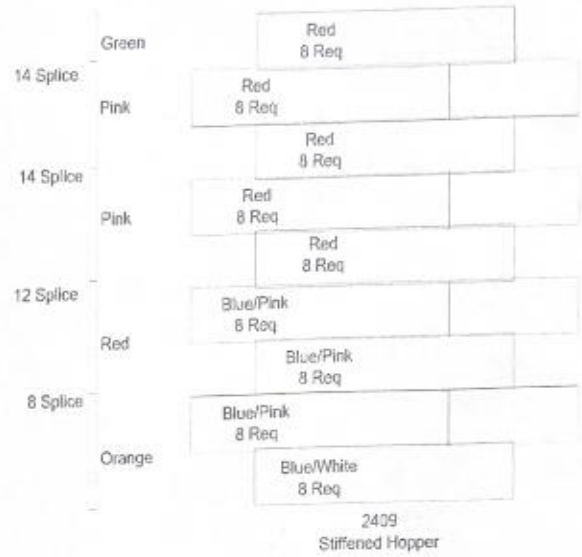
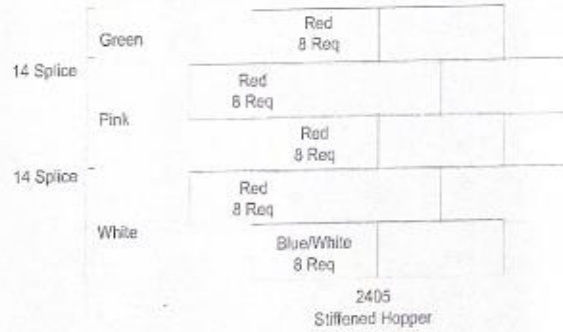
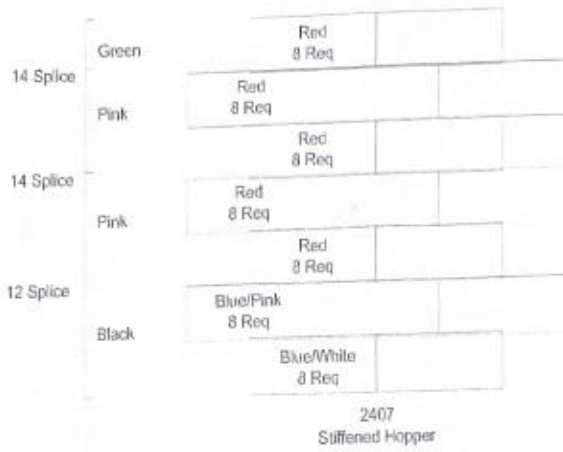
18 FOOT STIFFENED HOPPER BINS



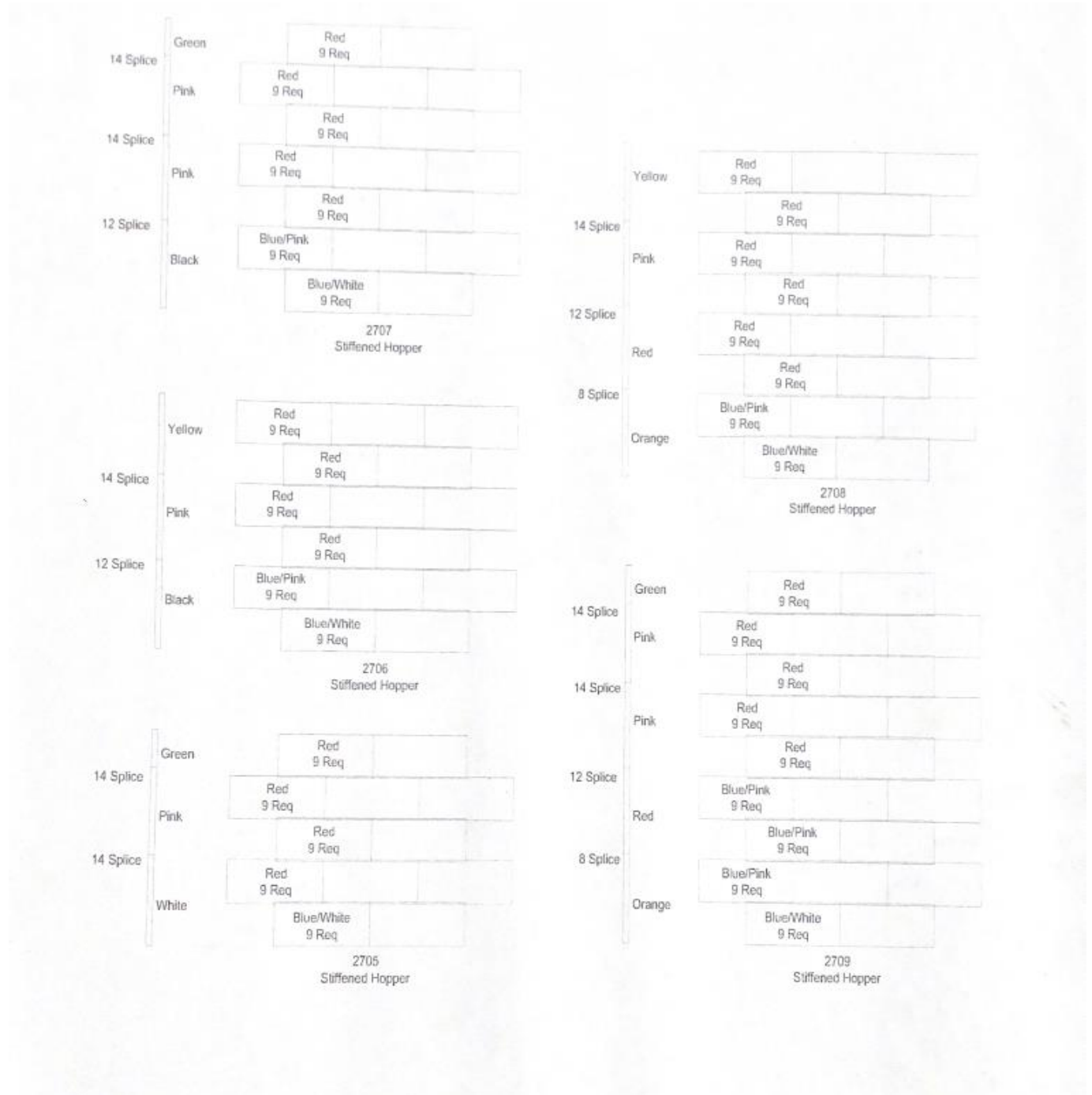
21 FOOT STIFFENED HOPPER BINS



24 FOOT STIFFENED BINS

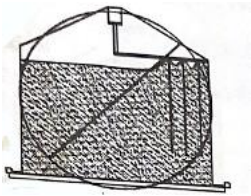


27 FOOT STIFFENED HOPPER BINS

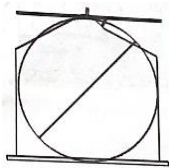


EQUIPMENT LOADS

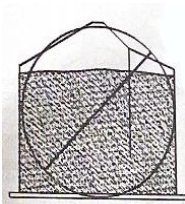
INCORRECT



Do not start up stirring machine with augers near wall. Shut down the system when down augers are near the center. Down augers should be “free” prior to start up. Failure to do so could cause excessive vertical wall load which could result in the sidewall buckling.



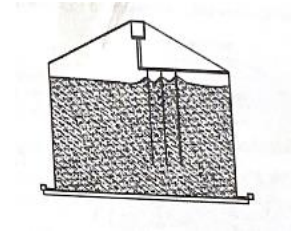
downspout off center and concentrated load on roof



IMPROPERLY ATTACHED TEMP. CABLE.

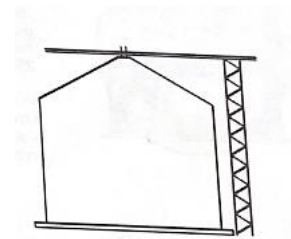
STIRRING AND RECIRCULATING DEVICES

Are additional wall stiffeners required? Are additional floor supports required? Consult your Darmani dealer.



LOADS ON BIN ROOF

All concentrated loads on the roof must be uniformly distributed to the peak ring. You may need to use a separate support tower to properly distribute the load.



Consult Darmani for support requirements and necessary accessories for the support cable.

