INSTALLATION, OPERATION AND MAINTENANCE MANUAL OF SLUICE GATE

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INTRODUCTION -

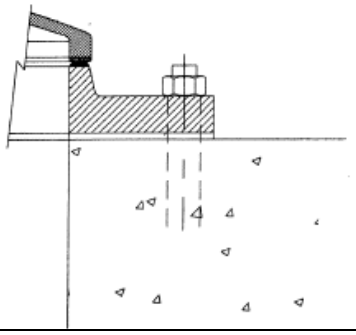
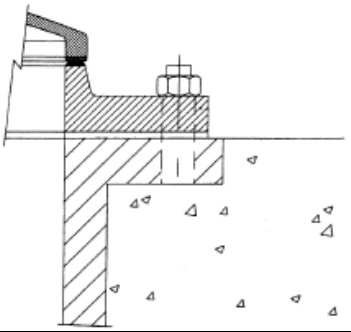
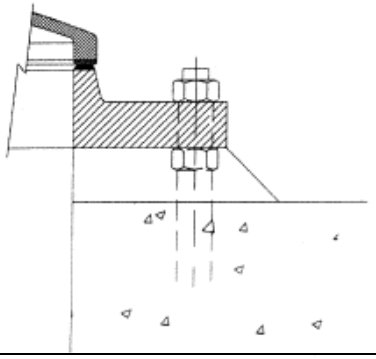
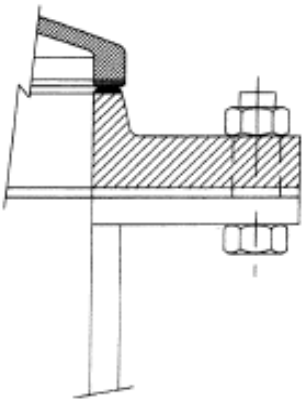
This manual describes the recommended procedures for installation, operation, maintenance and safety precautions for DURGA Sluice Gates. Please read thoroughly all the instructions in the manual prior to installation, and contact DURGA representative in case of any questions. The manual makes reference to the "General Arrangement Drawing" (GAD). The GAD is the drawing that is sent to and approved by the customer prior to the production of the gate. **DURGA assumes no responsibility or liability if the Sluice Gate is not installed, operated and maintained in strict accordance to the procedures described in this manual.**

HANDLING & STORAGE -

Standard safety procedures should be followed to prevent personal injury or equipment damage. Additionally, the following instructions shall be followed during handling and storage to prevent any damage to the product:

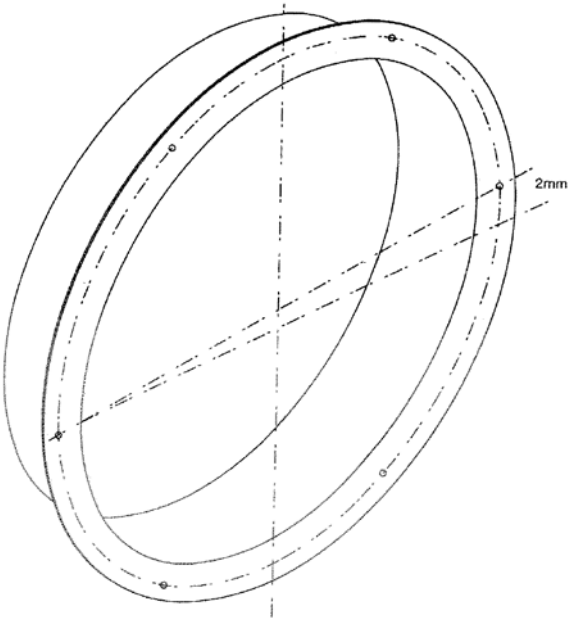
- Special care shall be taken on any machined surface when lifting the gate.
- Equipment shall be stored in a dry, clean and even area.
- Sluice Gates are packed with a wooden strip between both frame guides. Do not remove the strip before the gate is properly installed in order to avoid any damage or distortion to the frame.
- Lift the gate from the frame guides. For bigger gates, the frame guides comes with hoist rings specially arranged for handling purposes.

METHOD OF SLUICE GATE INSTALLATION

Mounting on a smooth, flat concrete wall	
Mounting on a wall thimble	
Mounting on a concrete wall using a grout pad.	
Mount on a pipe flange	

GATE INSTALLATION: WALL THIMBLE MOUNTING

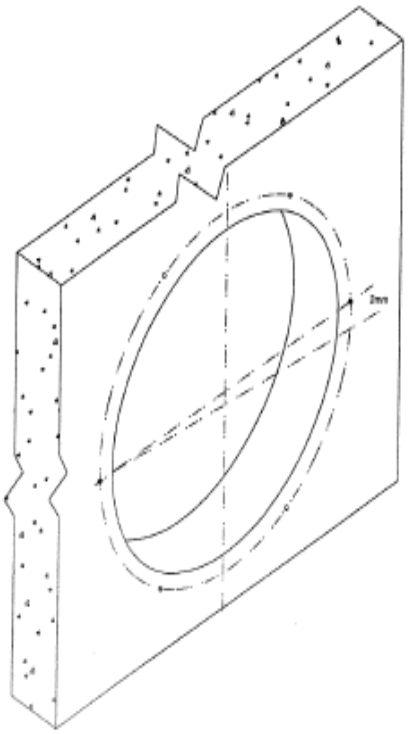
1. Place the wall thimble in the correct position in the forms and block it in this position. The top center line of the thimble is stamped on its front face. The bottom centre line is also marked.
2. Plumb the front face of the thimble using the marks indicating top and bottom center line. This face should be plumbed with respect to final location of the gate, stem and lift.
3. Studs furnished for attachment of the gate thimbles to the forms. If these studs are not used, the threaded holes in the thimble must be plugged to prevent concrete from entering them.



4. Verify that the thimble face is flat. Out of flatness for the thimble face must not exceed 2mm across the diameter in any direction.
5. Pour concrete, using care not to tilt the thimble from its original position in the forms.
6. Remove from and bracing.
7. Clean the front face of the thimble of all foreign materials just before gate installation. Place threaded studs in the holes provided on the face of the thimble.
8. Clean the back of the gate frame thoroughly.
9. Remove the paper backing from the butyl tape and then attach to the back side of the gate.
10. Mount the complete assembled gate on the thimble. Place nuts on the studs and tighten uniformly.
11. Retighten studs nuts after a period of time is allowed for butyl tape compression.
12. See “Lift Installation and Stems” for further assembly information.

GATE INSTALLATION: DIRECT WALL MOUNTING

If cast in anchor bolts have been placed prior to the pouring of concrete, anchors shall be placed to within a tolerance of ±1mm of their specified location. If cinch type or adhesive anchors are being used, install them at this time. (The gate can be used as a template)



1. Prior to gate installation verify that the wall is smooth and flat. Out of flatness for the concrete wall must not exceed 2mm across the diameter in any direction. Verify location and projection of cast-in anchor bolts.
2. If the wall is not within the tolerance specified above then remedial work is required on its surface, or an alternate method of installation should be employed such as the use of a grout pad. Important: Do not warp the gate to conform to an uneven surface.
3. Assuming a smooth wall, the next step is to make sure that the wall and the back of the gate frame are thoroughly cleaned and free of any oil or grease.
4. Remove the paper backing from the butyl tape supplied. Attach the butyl tape to the back of the gate frame.
5. Slide the gate onto the anchor bolts, attach the nuts, and tighten. Allow butyl tape time to compress then retighten anchors.
6. See “Lift Installation and Stems” for further assembly information.

GATE STEM AND GUIDES

It is assumed that cast in anchor bolts have been placed prior to the pouring of concrete. Anchors shall be placed to a tolerance of ±1mm of their specified location. Sufficient threaded projection is required on the anchors to be effective for this type of mounting. Note: If cast in place anchors are not practical, then the only other alternative is the use of adhesive anchors as cinch anchors generally do not have sufficient thread.

1. Prior to installation verify location and projection of anchor bolts. Remedy any problems encountered prior to proceeding.

2. Install one nut on each anchor and adjust these to a point close to the concrete where the nuts from a flat plane that the gate frames can back onto.
3. Clean the back of the gate frame.
4. Install the gate (no gasket material) against a second not to tighten the gate on the anchors.
5. Apply grout mix to the space between the gate and wall and allow to sufficiently harden prior to operation of the gate or filling of the chamber.
6. Retighten nuts after grout has hardened.
7. See “Lift Installation and Stems” for further assembly information.

GATE INSTALLATION: C.S.P. PIPE FLANGE MOUNTING

1. Verify that the flange face is flat. Out of flatness for the flange face must not exceed 2mm across the diameter in any direction.
2. Clean the front face of the flange of all foreign materials just before gate installation.
3. Clean the back of the gate frame thoroughly.
4. Remove the paper backing from the butyl tape, then attach to the back side of the gate.
5. Mount the completely assembled gate on the flange. Place nuts on the bolts supplied and tighten uniformly.
6. Retighten nuts after a period of time is allowed for butyl tape compression. Important: Do not wrap the gate to conform to an uneven surface.
7. See “Lift Installation and Stems” for further assembly information.

GATE STEM & GUIDES

1. Place anchor bolts for lift and stem guides as shown on installation drawing. Check for proper alignment of lift, stem guides and gate. Verify location and threaded projections of cast in place anchors. Anchors shall be placed within ±1mm of their specified location.
2. Provide opening with adequate clearance in lift platform for gate stem (and splice when indicated on installation drawings).
3. Pour concrete as required. Remove forms.
4. Install stem guide brackets on anchors, but do not tighten nuts. Leave them loose enough that the bracket can be moved in later alignment. Loosen all assembly bolts holding collars to brackets. Collars must be placed on each succeeding section of stem as it is installed. After each collar is installed, rebolt it to its bracket, but do not tighten.
5. When more than on gate is to be installed, stems may be of different diameters, lengths, etc. stems are marked and/or tagged for each gate installation. Separate the stems per individual gate installation.

Caution: Extreme care must be taken in handling and installing threaded stems. Nicks or burrs will damage threads in the lift nut.

6. Insert hooked end of stem into stem pocket and retain with bolt supplied. Remove protective wrapping on stem threads. Clean off all foreign material and lubricated threads.
7. Stems may be in more than one piece, both to facilitate shipment and installation. If two or more pieces are furnished for an installation, they must be installed in their proper order. Start from bottom and place splices in their correct locations so that they will not interfere with the stem guides when the gate is opened or closed. The ends of each stem section and connecting components are match marked to ensure proper installation.
8. Place all succeeding stem sections. Double check the installation drawing to make sure that stem guide collars are in place. Join together with splices as provide.
9. Caution: Insert all bolts in each stem splice immediately after stem sections are installed and aligned. Failure to take this safety precaution may cause one section to be disconnected from another when the gate is operated. Breakage of gate parts or serious injury to personnel might result.

LIFT INSTALLATION AND ADJUSTMENT OF STEM

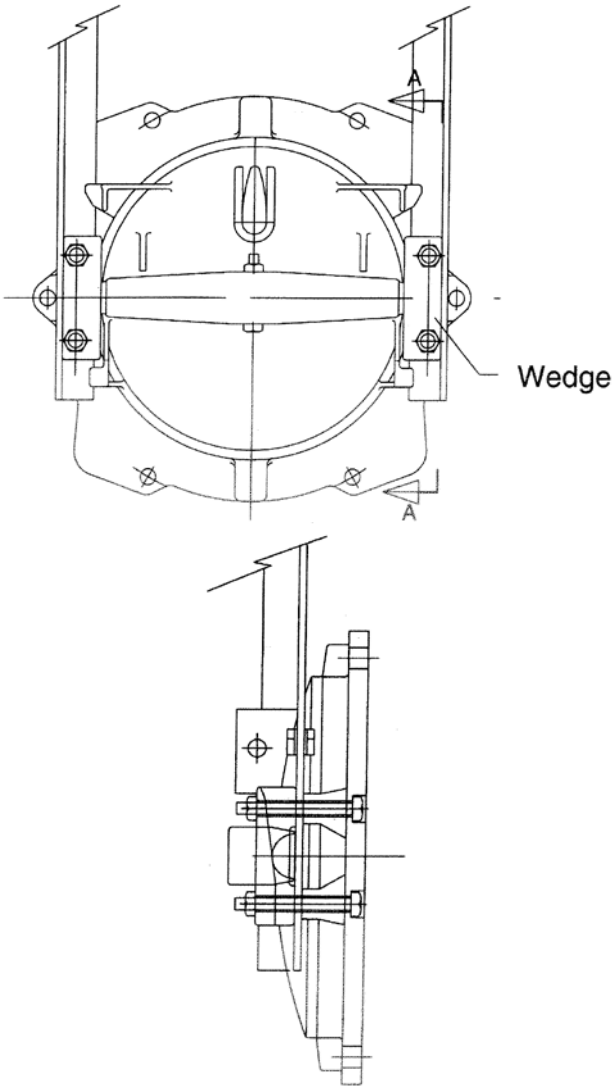
1. Remove the lift unit from its packaging and carefully clean the interior threads of the drive nut. Since any foreign material in these threads may cause damage to them and make the gate harder to operate, each threaded nut should be carefully swabbed out even though it appears to be clean.
2. Lifting devices may have threaded drive nuts match-marked to fit threaded stems. These marks appear on top of the threaded stem. They may be further identified by tags showing the appropriate DVPL drawing numbers. Make certain that these matching parts are used tighter to ensure ease of installation and avoid possible service problems.
3. If electrical or hydraulic powered actuators are used, follow the manufacture's instructions for storage, handling, installation, and start-up. Special precautions must be taken to protect delicate electrical controls until they are connected to their power source. Torque and limit switches must be set after the gate and list installation is complete.
4. Clean the threaded section of stem of all foreign material and lubricated with grease.
5. Raise lift and lower over the previously installed threaded stem section. When starting the threaded stem into the bottom of the list nut, care must be taken to avoid damage to the threads. Rough handling may result in damage to the bottom edge of the threaded lift nut and prevent the stem from being screwed into the lift nut freely. When all parts are thoroughly cleaned, the threaded lift nut will turn onto

the threaded stem with very little effort. Hold the lift to prevent its rotation. Turn the hand wheel or crank to lower the lift onto the pedestal.

6. The gate may be shipped with a wood or steel clip, or clips attached to the frame at the top of the slide. The clip holds the slide in the closed position during shipment and handling. If it hasn't been removed, it must be taken off and discarded prior to any action of the gate.
7. By the use of shims, double nuts on anchors, or other leveling devices under the base of the lift, align the center of the lift nut until it is parallel with the center line of the stem. Snug up the nuts on anchors uniformity. Stem and Lift must be plumbed and centered to allow clear movement of the gate through its full length of travel.
8. If there is any binding during the operation of the lift with the slight vertical movement of the gate slide, stem alignment should be checked. Slight misalignment will cause undue wear to the threaded lift nut. When binding is not caused by misalignment, recheck to make certain all threads on the stem and in the lift nut are clean.
9. Grout under the lift (if required). After the grout has set, tighten the anchor bolts uniformly.
10. Caution: Before opening the gate, clean all grout, stones, or other foreign material from the top of the gate. Also recheck the projection of any anchors or studs across the top of the gate opening. Excess bolt projection will damage the top of the gate slide as it is opened.
11. Turn the lift crank or hand wheel to open the gate until the gate slide is cracked open slightly. The stem is now in tension and should be straight. Check the stem to make certain it is straight. Tighten the nuts on anchors through wall brackets and tighten assembly bolts holding collars in position on brackets.
12. Slowly move the gate to its fully opened position. Check for any obstructions or improper positioning of stem guides or splices. Do not force lift if resistance is encountered. Once the gate is fully raised, apply grease again to the stem.
13. Lower the gate to its fully closed position and check to see if the slide is making full contact with the bottom seal under full gate adjustment. Verify that there is no bowing of the stem when turning force is applied to the lift when the gate is seated. If bowing has occurred, check and recheck tightness and position of stem and guides. Note: bowing can cause permanent deformation of the stem. Run the stop nut up and down on the tip of the projecting threaded stem until it make firm contact with the top of the stem cover adapter flange (screwed into the top of lift housing).
14. Tighten the setscrews the stop not to hold it in place.
15. Install the stem cover by bolting its flange to the adapter flange.

WEDGE ADJUSTMENT

1. All wedging devices were adjusted to make proper metal-to-metal contact before the gates were shopped. Vibration during shipment or normal handling during installation may have caused some loosening or changing of settings.
2. After installation close the gate so that the slide disc is centered on the gate flange.
3. If the slide cannot be centered due to interference with side wedges or if in the closed position the wedges are not in full contact with the crossbar then the wedges must be adjusted.
4. Adjusted individual wedges as required using the following procedure:
   a) Loosen nut on stud through wedge on slide until wedge can be moved by tapping lightly.
   b) Drive wedge up or down as required until firm contact is made with the crossbar and the seating faces are pushed together.
   c) Tighten nut on stud through wedge



If there any complaint retailed to DURGA regarding wrong supply or damage or revise the order kindly Communicate with the JOB NO. That helps us to track cause of the problem.

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