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PARTICULAR SPECIFICATION

M34: MECHANICAL SLUICE/CHANNEL GATES, ADJUSTABLE WEIRS, HAND STOPS AND STOP LOGS

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HAND STOPS AND STOP LOGS
CONTENTS**

M34.1	SCOPE.....	2
M34.2	INTERPRETATIONS	2
M34.2.1	Abbreviations	2
M34.2.2	Standards.....	2
M34.2.3	General Requirements.....	2
M34.3	GENERAL REQUIREMENTS.....	2
M34.3.1	Pressure Rating.....	3
M34.3.2	Wastewater Liquids and chemicals	3
M34.3.3	Guarantee.....	3
M34.3.4	Operating and Maintenance Manuals	3
M34.3.6	Jointing Material.....	3
M34.3.7	Contact between Dissimilar Metals.....	3
M34.4	MATERIALS.....	4
M34.5	DESIGN	4
M34.6	SLUICE AND CHANNEL GATES.....	4
M34.7	ADJUSTABLE OVERFLOW TILTING WEIRS.....	5
M34.8	HAND STOPS.....	5
M34.9	OPERATING GEAR.....	6
M34.10	STOPLOGS.....	6
M34.11	RECOMMENDED SPARE PARTS	6
M34.12	OPERATION AND MAINTENANCE MANUAL.....	7
M34.13	DRAWINGS	7
M34.14	INSTALLATION	7
M34.15	INSPECTION, TESTING AND COMMISSIONING.....	7
M34.15.1	Testing by Manufacturer	7
M34.15.2	Witnessed Testing	7
M34.15.3	Testing by an Independent Facility	8
M34.15.4	Failure to Pass Performance Test	8
M34.15.5	Commissioning	8
M34.16	COLOUR CODES.....	8
M34.17	MEASUREMENT AND PAYMENT	8

M34.1 SCOPE

This Specification covers the manufacture, testing and supply of sluice / channel gates, adjustable weirs, hand stops and stop logs for use in waste water and potable water treatment plants at ambient temperatures.

M34.2 INTERPRETATIONS

M34.2.1 Abbreviations

In this Specification the following abbreviations will apply:-

ANSI	:	American National Standards Institute
ASTM	:	American Society for Testing and Materials
BS	:	British Standards Institution
SANS	:	South African National Standards
SIS	:	Swedish Institute of Standards
DIN	:	Deutsch Industry Normen
ISO	:	International Organisation for Standardization
ASME	:	American Society of Mechanical Engineers
SAECC	:	South African Electrolytic Corrosion Committee

M34.2.2 Standards

For the purposes of this Specification the latest issues of the following standard specifications will apply:-

SANS 1700	:	Fasteners
SANS 135	:	Isometric Bold Screws and Nuts (Lexagon & square/coarse thread free fit series)
SANS 136	:	Isometric Precision Hexagon Head Bolts and Screws and Hexagon Nuts (coarse thread medium fit series)
SANS 1431	:	Steel
BS 3100	:	Cast Steel
BS 4504	:	Flange Drilling
SIS 05 59 00	:	Pictorial Surface Preparation Standards for Painting Steel Surfaces
ISO 244	:	Pipe Line Flanges for General use - Shapes and Dimensions of Pressure Tight Surfaces
SANS 1123	:	Steel Pipe Flanges

M34.2.3 General Requirements

This specification must be read in conjunction with the following specifications:-

G01: Particular Specification for Colour Codes

G02: Particular Specification for Corrosion Protection

M34.3 GENERAL REQUIREMENTS

Sluice / channel gates, adjustable weirs, hand stops and stop logs shall be so transported, stored and handled as to prevent damage. Equipment damaged in any way shall be removed

from the site repaired or replaced to the satisfaction of the engineer.

The Contractor shall satisfy the Engineer as to the sufficiency of the place of manufacture regarding manufacturing, testing and inspection equipment to ensure that the production of equipment is strictly in accordance with this Specification.

M34.3.1 Pressure Rating

The design pressure for the sluice / channel gates, adjustable weirs, hand stops and stop logs is specified in the Tender Document in the Project Specification, Drawings and Schedule of Quantities.

M34.3.2 Wastewater Liquids and chemicals

Sluice / channel gates, adjustable weirs, hand stops and stop logs which encounter raw wastewater, treated wastewater and sludge shall be manufactured from corrosive resistant material.

M34.3.3 Guarantee

All sluice / channel gates, adjustable weirs, hand stops and stop logs shall be guaranteed against faulty design, materials and workmanship until the end of the maintenance period on the Main Contract. During this period the Contractor shall be required to attend to and rectify any defects, which occur due to faulty design, materials or workmanship at his own cost.

M34.3.4 Operating and Maintenance Manuals

A copy of the Operating and Maintenance Manual for each equipment type shall be bound in with the Operating and Maintenance Manual for the project. The manual shall be A4 size and properly bound. Drawings larger than A3 size shall be contained in separate plastic pockets.

M34.3.5 Contents

A copy of the signed factory test certificate shall be bound in with the manual, while the original shall be handed to the Engineer.

Operating instructions

Maintenance instructions

Lubrication instructions

Spare parts list

Drawings

Brochures

M34.3.6 Jointing Material

Jointing material shall comply with SANS 1700. sluice / channel gates, adjustable weirs, hand stops and stop logs shall be supplied complete with bolts, nuts, washers (2 per bolt) and gaskets for joining up to adjacent mating flanges and or concrete mounting.

Bolts shall be of stainless steel and shall be long enough to allow at least two screw threads to protrude from the nut when the assembly is fully tightened. A washer must be provided both under the bolt head and the nut.

M34.3.7 Contact between Dissimilar Metals

When flanges of dissimilar metals are bolted together, the internal epoxy coating shall cover the contact area of the flange without any break.

Suitable insulation material shall be used between the contact faces of dissimilar metals of

which the potential difference exceeds 0,3 V. Where corrodible metal is welded to a corrosion resistant metal, the protection coating specified shall overlap onto the latter by at least 5 mm.

M34.4 MATERIALS

The thickness of materials shall be suitable for the duty required.

M34.5 DESIGN

All parts shall be designed for the duty required, but the minimum factor of safety against structural failure shall not be less than 3, based on the working stress of the material. In the design, due consideration shall be given to the thickness of materials with regard to corrosion and operating conditions. The force required at a hand wheel or crank to raise a gate or open a valve shall be in the order of 100 Newton, and the design parameters must be submitted in the Technical Schedule.

The design shall be such as to give a 100% leak free seal when under the full operating head.

M34.6 SLUICE AND CHANNEL GATES

The sliding frames, floor seats and gates of wall mounted as well as channel type gates with head frame shall be made of grade 304L stainless steel or as specified. All gates shall be well guided with no possibility of jamming. The gates shall be held uniformly against the side facings of the frames by the action of adjustable wedges and shall provide drop-tight closure under the operating conditions. Sluice gates shall be of the standard or flush invert type fitted with renewable seals of a non-biodegradable material on the invert.

Channel gates shall be dimensioned such that their installation in the channels and openings shown on the drawings is facilitated. The channel gates shall be standard items and shall be installed so that head frames shall be flush with vertical channel walls and do not project horizontally into the channel. Vertical sliding frames and floor seat to be cast into concrete so as to leave an unobstructed waterway to dimensions indicated in the schedule. Pre-formed recess details for casting in of frames to be submitted by the supplier. Head frame bridge for a channel gate to allow indicated water level to pass under the gate when in UP-position.

All nuts, bolts, washers and other components shall be manufactured from same grade stainless steel specified for gate.

Gates shall be robustly designed and constructed, having vertical and horizontal ribs to withstand pressures from both directions. The matching head frame for channel gates shall be adequately designed to resist distortion, and both the gate and the frame shall have machined seating faces to ensure perfect sealing. The head frame shall extend above the concrete channel, to support the gate in the fully open position.

Seating pressure as well as unseating pressure may act on any channel or circular sluice gate and the sluice gate shall be able to resist these pressures.

Holding down bolts of penstocks fixed against concrete walls shall be made of Grade 304 Stainless Steel.

Channel gates shall be provided with rising spindles as well as approved transparent position

indicators as requested.

M34.7 ADJUSTABLE OVERFLOW TILTING WEIRS

The adjustable overflow tilting weirs shall comply with the following requirements:

- (i) 304L stainless steel manufacture or as specified.
- (ii) Stainless steel indicators showing the degree of adjustment of the weirs in mm enclosed in an approved transparent tube.
- (iii) Be horizontal after installation with a maximum allowable variation from the horizontal not exceeding 1 mm.
- (iv) Be equipped with rounded side plates and be watertight underneath and at the sides of the frame.
- (v) Holding-down bolts, washers, etc. shall be of same grade stainless steel as specified for weir.

M34.8 HAND STOPS

- (i) The following requirements shall be applicable to hand stops:
- (ii) Supplied with an aluminum frame extending to the top of the concrete or masonry. The frame shall be grouted into a recess in the concrete or masonry. Details of such recess to be submitted by supplier. Hand stop shall be capable of sliding in and out of the frame.
- (iii) Hand stop shall seal 100% watertight under all circumstances. This may be achieved with the use of neoprene sealing material.
- (iv) Hand stops and frames shall be manufactured from 6 mm aluminum plate and shall be robust and provided with reinforcing elements designed by the supplier to the approval of the Engineer. The reinforcing elements shall effectively prevent buckling under full static head conditions.

M34.9 OPERATING GEAR

- M34.9.1 Spindles to be extended as required and secured to structure to Engineer's approval.
- M34.9.1.1 Arrows shall be cast on all hand wheels together with the wording "OPEN" or "CLOSE". The closing direction shall be clockwise unless otherwise specified.
- M34.9.1.2 Gates shall be fitted with position indicators. Fully closed, fully open and intermediate positions shall be indicated in corrosive proof and robust design indicators.
- M34.9.2 Channel gate - Head frame bridge across with hand wheel or actuator on rising spindle.
- M34.9.3 Gates and Tilting Weirs
- Hand wheels or actuators installed in the following manner.
- Platform-mounted hand wheel pedestal (PMP)
- Hand wheel pedestal on wall support bracket (HPWB)
- Stub hand wheel pedestal on wall support bracket (SHWB)
- Tee-key on support bracket (TKSB)
- Grid-mounted hand wheel pedestal (GMP)

M34.10 STOPLOGS

A stop log set shall comply with the following requirements:

- (i) Stop log sets shall be supplied with stainless steel frames extending to the top of the concrete or masonry. The frames shall be grouted into the recess in the concrete or masonry in such a way that the stop logs are capable of sliding in and out of the frame. The stop logs sets shall be watertight under all normal operational circumstances.
- (ii) Stop logs and frames shall be manufactured from stainless steel plate. Each stop log shall be provided with reinforcing elements designed by the supplier to the approval of the Engineer. The reinforcing shall effectively prevent buckling under full differential static head conditions.
- (iii) The maximum vertical dimension of any individual stop log shall not exceed 150 mm.
- (iv) Each individual stop log in any one set shall have the same vertical and horizontal dimensions.
- (v) Each individual stop log shall be provided with two lifting lugs.
- (vi) A neat stainless steel stand or pair of stainless steel hooks shall be installed in close proximity to each installed set of stop logs for the storing of stop logs when removed from the frame.
- (vii) Each set of stop logs shall be provided with two portable stainless steel lifting hooks, each fastened with a 200 kg capacity stainless steel anti-loss chain or UV-stabilized 200 kg capacity nylon rope to a suitable bracket on the hand railing or walkway structure. The chain or rope shall be long enough to facilitate easy operation of the lifting hooks. The lifting hooks shall be used to manipulate individual stop logs in to lifting lugs
- (viii) Enough individual stop logs shall be supplied in each set to effectively span a minimum distance

M34.11 RECOMMENDED SPARE PARTS

The Tenderer must submit details of spare parts recommended to be kept in store by the Employer with his Tender.

The detail will include a full description of the parts, part identification, number required, guaranteed delivery time and total price delivered to Site.

M34.12 OPERATION AND MAINTENANCE MANUAL

The Contractor shall hand over to the Engineer four sets of the Operation and Maintenance Manual compiled for each installation not later than at the time of commissioning of the installation. These manuals are a prerequisite for final takeover of the plant.

The Operation and Maintenance Manual will contain the following:

- (a) Brief description of the plant and installation.
- (b) Concise operating instructions.
- (c) Routine maintenance instruction.
- (d) Precautionary measures, elementary trouble location, rectifying measures and emergency actions.
- (e) Detailed information on equipment.
- (f) Lists of spare parts including names and addresses of suppliers.

M34.13 DRAWINGS

The drawings included in the Tender Documents are the Engineer's proposal for the plant layout. Should the Tenderer offer alternative layouts, he shall submit drawings with his Tender in order for it to be evaluated.

Before the Contractor carries out any work, he will submit detailed working drawings to be approved by the Engineer. Approval of these drawings does not relieve the Contractor from his responsibility for the correctness of the drawings.

M34.14 INSTALLATION

The equipment shall be installed, aligned and grouted in to position without distortion of the frame and or gate/weir which may cause damage to the sealing arrangement of the equipment.

M34.15 INSPECTION, TESTING AND COMMISSIONING

M34.15.1 Testing by Manufacturer

The Manufacturer will carry out all tests on materials, quality control tests, dimensional checking and routine tests on parts to ensure that the equipment and materials conform to the requirements of the relevant SANS or BS specifications and to this Specification. The Engineer will not necessarily attend these tests but records must be kept and all test results will be made available to the Engineer.

Test shall include but not be limited to hydraulic testing to ensure 100% leak free. If the equipment offered is not 100% leak free then the percentage should be specified in the data sheets.

M34.15.2 Witnessed Testing

In addition to the above, a number of performance tests will also be carried out in the testing facility of the supplier before equipment is transported to Site. These tests can be carried out in the workshop of the manufacturer/supplier if it is suitably equipped or another approved test facility.

The Engineer may witness these tests and the Contractor will notify the Engineer two weeks in advance of the date and place at which the equipment may be inspected and tested. When tests and inspections have met the satisfaction of the Engineer a certificate of workshop acceptance will be issued. These certificates are a prerequisite before payment for "Materials on Site" can be passed. The Engineer's acceptance will in no way relieve the Manufacturer of any of his obligations to design, manufacture and supply pumps strictly in accordance with the Specification.

M34.15.3 Testing by an Independent Facility

The Employer may require that an independent testing facility or institution such as the South African Bureau of Standards carry out performance tests. A separate item for performance testing will be provided in the Schedule of Quantities to allow for this.

M34.15.4 Failure to Pass Performance Test

Should the equipment fail any test, whether performed at the manufacturer's works or at an independent institution, the Engineer shall authorise any amendments to the equipment which may be considered necessary to meet the specifications and prove with further test that the equipment conform to the specification.

All costs involved in the re-testing of equipment will be borne by the Contractor.

M34.15.5 Commissioning

On completion of the installation the Contractor will check all items for satisfactory functioning. He will then inform the Engineer of his intention to commission the plant.

A detailed programme of his proposed commissioning procedures will be submitted not later than two weeks prior to the commissioning date.

The Completion Certificate will only be issued after the equipment has been in successful operation for 14 consecutive days.

During the first 14 days of operation, the Contractor will rectify any problems with the equipment on Site within 24 hours of being telephonically notified. During the remainder of the maintenance period, the Contractor will, within 14 days of being notified, commence rectifying any possible problems that the Employer may encounter with the equipment supplied under this Contract.

Should the Contractor fail to meet the above requirements, the Employer may appoint others to undertake the necessary repair work at the Contractor's cost.

M34.16 COLOUR CODES

The standard final colour codes for equipment supplied under this Contract shall be in accordance with Particular Specification G01.

M34.17 MEASUREMENT AND PAYMENT

Payment under scheduled items shall be made per complete installation as specified, electrical connections, etc and grouting, etc. Measurement and payment will distinguish between supply / delivery and installation / commissioning of the equipment.

The tendered rates or sums shall cover the cost of design, drawings, manufacture, supply, testing at the manufacturers works, delivery to site, off loading, installation, site testing, setting into operation, the supply of O & M manuals, commissioning and maintenance during the warranty period of all equipment specified and also for anything not specifically mentioned but obviously required, (e.g. all ancillaries, including all bolts, fastenings and brackets, safety guards and any work or material required for the proper installation of such equipment) to enable the equipment to be installed and/or function safely and correctly as specified. No claims whatsoever for extras will be allowed on the grounds that a necessary piece of equipment or a part thereof is not specifically mentioned.