

ROMTEC UTILITIES' SCOPE OF SUPPLY & DESIGN SUBMITTAL

to:

*David Powers
Pacific Hydrotech
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949-923-6211/949-923-6077*

for:

MIRALOMA RECHARGE BASIN REVISION 6

January 12, 2012

In Association with:

*John Doe
Company Name
19 Street Avenue
City, CA 90210
888-111-2211/888-111-1177*



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NOT INCLUDED IN THIS DESIGN

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NOT INCLUDED IN THIS DESIGN

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NOT INCLUDED IN THIS DESIGN

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NOT INCLUDED IN THIS DESIGN

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22. OPERATION & MAINTENANCE (O&M) MANUAL

- 1 HARD COPY & 1 CD ROM TO BE PROVIDED AT START-UP OF THE SYSTEM

23. ADDITIONAL SUPPORTING DOCUMENTS

- NOT INCLUDED IN THIS SYSTEM

1. INTRODUCTION

This section includes:

- 1.01 LETTER OF INTRODUCTION
- 1.02 ABOUT THIS DOCUMENT
- 1.03 HOW TO USE THIS DOCUMENT
- 1.04 HOW TO ORDER THE PUMP STATION AND GET IT INTO PRODUCTION
- 1.05 SUBMITTAL APPROVAL/NOTICE TO PROCEED FORM



1.01 LETTER OF INTRODUCTION

September 14, 2011

To: John Doe
Company Name

From: Romtec Utilities Document Control

Re: Documentation for the proposed pump station project identified as

Project Name: Miraloma Recharge Basin

Based on Design Criteria dated: 9/13/11 Revision #: 6

Romtec Utilities is pleased to offer this Scope of Supply and Design Submittal for the project listed above. All parties with an interest in this project must carefully read and comprehend the information contained herein.

1. Introduction

Includes information on this document and how to use it, submittal approval form, pump station ordering instructions.

2-3. Warranty & Limitations

Includes Romtec Utilities Limited Warranty; information on limitations of Romtec Utilities' responsibilities, products and services.

4-5. Design Criteria & Project Site

Includes data supplied to Romtec Utilities by Romtec Utilities' direct customer or customer's representative.

6. Scope of Supply

Lists products and services to be supplied by Romtec Utilities.

7-19. Design Submittal

Includes detailed drawings, descriptions and specifications of products to be supplied by Romtec Utilities.

20-22. Start-up, Testing & Training Services; O&M Manual

Includes descriptions of services to be supplied by Romtec Utilities.

23. Additional Supporting Documents

Includes additional documents not included in other sections.

Please address questions, comments and requests for changes to this document to:

Romtec Utilities Document Control
541-496-9678
romtec9@romtecutilities.com

1.02 ABOUT THIS DOCUMENT

1. Document Identification

The information in this document is the Scope of Supply and Design Submittal provided by Romtec Utilities, Inc., herein referred to as Romtec Utilities for the project listed below:

Name (herein referred to as "the project"): Miraloma Recharge Basin

Location (herein referred to as "the site"): Anaheim, CA

Document Date: 1/12/12 Revision #: 6

2. The Romtec Utilities Scope of Supply & Design Submittal is defined by Romtec Utilities as follows:

- a. **Complete document** – This document is Romtec Utilities' complete Scope of Supply and Design Submittal for the project referenced above. There is no other document that contains this information. This document supersedes all other documents, correspondence and verbal communication as to Romtec Utilities scope of supply, products and services.
- b. **Supplied to Customer only** – Romtec Utilities supplies this document exclusively to the direct Customer (the entity signing Romtec Utilities' purchase order), herein referred to as the Customer, and not to any other party associated with this specific project. Any other party reviewing any part of this document is informed that the information within it is Romtec Utilities' communication with the Customer and no other party.
- c. **Based on Customer-supplied design criteria** – Romtec Utilities has designed the pump station described herein to meet the specific design criteria provided to Romtec Utilities by the Customer and/or the Customer's representative on the Lift Station Design Form (Tab #4). Romtec Utilities' supply of products and services is related exclusively to these design criteria.
- d. **Entire supply and design for Customer only** – Romtec Utilities' entire supply and design, as described herein, are for the Customer only and no one else. Romtec Utilities will not provide any other products and/or services related to the project to any other party.
- e. **Limited to this supply and design** – Romtec Utilities agrees only to the supply and design described herein. Romtec Utilities expressly states that this document does not meet, and Romtec Utilities does not agree to meet any agency standard, any other specification or any other document and/or statement describing the project.
- f. **Approval is acceptance of this supply and design** – By approving this document, the Customer accepts the products and services identified herein to be supplied by Romtec Utilities.

- g. Change Orders** – The Customer agrees that, following approval of this document, there can be no modification to the products and services described herein without a written Change Order issued to Romtec Utilities by the Customer and/or the Customer’s representative on the standard Romtec Utilities Change Order Form. The Customer acknowledges that Change Orders will incur additional charges to the Customer and may cause delays in Romtec Utilities’ delivery of the products and services described herein as well as any products and services required by the Change Orders.
- 3. This Romtec Utilities Scope of Supply & Design Submittal supersedes all prior design and bid documents related to the project. This document:**
- a. Negates other pump station documents/statements** – Romtec Utilities recognizes that projects often begin with other designs and bid documents, however this document supersedes and makes null and void any other document or statement from any party, including Romtec Utilities’ own prior documents and/or statements, as related to the pump station described herein.
 - b. Does not represent other documents/statements** – This document does not represent any specific standards, bid documents, design drawings or any other document and/or statements by any party other than Romtec Utilities.
- 4. It is not Romtec Utilities’ responsibility to determine the suitability of the pump station to the project’s site plan, electrical plan, influent line and force main profiles and other documents.**
- a. Document analysis is Customer’s responsibility** – This Scope of Supply and Design Submittal is limited to the pump station; however this document must be considered in its relationship with the overall project and site. It must be analyzed along with the project’s site plan, electrical plan, influent line and force main profiles and other documents. Romtec Utilities does not provide this analysis, which is the responsibility of the Customer and/or the Customer’s representative.
 - b. Requested layouts are suggestion only** – At the Customer’s request, Romtec Utilities will provide suggested layouts of the products to be supplied by Romtec Utilities on the Approved Site Plan provided by the Customer. The Customer can choose to accept or reject any suggested layouts.
 - c. No claim or guarantee of site conformance or suitability** – Romtec Utilities makes no claim and provides no guarantee that any of the products to be supplied by Romtec Utilities will fit on project’s site or within any building associated with the project.

1.03 HOW TO USE THIS DOCUMENT

1. Be sure that the Document Date and Revision # are current.

If unsure, contact: **Romtec Utilities Document Control**

18240 North Bank Rd., Roseburg, OR 97470

541-496-9678 (phone) 541-496-0804 (fax)

romtec9@romtecutilities.com

2. Carefully review all sections of this document.

If unsure of any information, contact Romtec Utilities Document Control immediately.

3. How to make comments and request changes

Comments and/or requests for changes to this document must be submitted, **in writing**, to Romtec Utilities Document Control.

Please supply a list of your comments and change requests along with a copy of any marked up drawing, edited specification or any other part of the document to which you are commenting or requesting a change.

Romtec Utilities will promptly review your comments and/or change requests, and will contact you to ensure complete understanding. Revisions to the Scope of Supply and Design Submittal for this project are made at the discretion of Romtec Utilities.

4. How to approve the design

The Submittal Approval Form is included with this document. To approve the design, you must check, initial and sign where requested. Email, fax or mail the completed form to Romtec Utilities Document Control.

1.04 TYPICAL ROMTEC UTILITIES PROCESS

Below are listed the typical steps in the process to design, price, approve, produce, deliver, install and start-up a Romtec Utilities pump station.

1. Customer (or Customer's representative) sends Pump Station Design Criteria to Romtec Utilities.
2. Romtec Utilities produces preliminary pump station design and quotation, sends to Customer.
3. Customer sends Purchase Order to Romtec Utilities.
4. Romtec Utilities produces Scope of Supply and Design Submittal, sends to Customer.
5. Customer reviews Scope of Supply and Design Submittal, sends written comments to Romtec Utilities.
6. Based on Customer comments, Romtec Utilities revises Scope of Supply and Design Submittal and, if necessary, the pump station quotation; sends revised documents to Customer.
7. Customer distributes revised Scope of Supply and Design Submittal to all project Stakeholders, gathers comments from Stakeholders, sends written comments to Romtec Utilities.
8. Based on Stakeholder comments, Romtec Utilities revises Scope of Supply and Design Submittal and, if necessary, the pump station quotation; sends revised documents to Customer.
9. Customer and Stakeholders send Formal Approval of Scope of Supply and Design Submittal to Romtec Utilities.
10. Customer sends Notice to Proceed with Delivery Date to Romtec Utilities.
11. Romtec Utilities begins pump station manufacturing and sends projected delivery date to Customer.
12. Customer's contractor prepares project site for installation of pump station.
13. Romtec Utilities delivers pump station to project site.
14. Customer's contractor installs underground portion of pump station.
15. Customer's electrical contractor performs electrical construction/installation.
16. Romtec Utilities performs pump station start-up and testing.
17. Warranty period commences.
18. Romtec Utilities performs operation and maintenance (O&M) training.
19. Romtec Utilities delivers O&M manuals and as-built documents to Customer.

1.05 SUBMITTAL APPROVAL FORM & NOTICE TO PROCEED PAGE 1 OF 3

1. I, _____, representing _____, have reviewed the Romtec Utilities' Scope of Supply and Design Submittal for the project named Miraloma Recharge Basin, dated 1/12/12, revision #6, purchase order # _____.

2. WARRANTY

_____ I have read the Romtec Utilities, Inc. Limited Warranty (2.01). I agree with its terms conditions and limitations.

3. LIMITATIONS/ PRODUCTS & SERVICES NOT SUPPLIED

_____ I have read and understand the Limitations of Romtec Utilities' Responsibilities (3.01) and the lists of Products & Services Not Supplied by Romtec Utilities (3.02, 3.03). I agree with these documents.

4. DESIGN CRITERIA

_____ I have confirmed that the data listed on the Lift Station Design Form are accurate.

5. PROJECT SITE

_____ If site drawings (by others) are included in this document; I have confirmed they are accurate.

6. SCOPE OF SUPPLY – PRODUCTS & SERVICES

_____ I have read the detailed lists of products and services to be supplied by Romtec Utilities, and I agree that these lists are complete and correct.

_____ I request the following changes: _____

7. DESIGN SUBMITTAL – STRUCTURAL & MECHANICAL DRAWINGS

_____ I have reviewed the structural and mechanical drawings and have confirmed their accuracy. I approve the drawings as submitted.

_____ I request the following changes: _____

8. DESIGN SUBMITTAL – WET WELL & RELATED EQUIPMENT

_____ I have reviewed the wet well documents. I approve the documents as submitted.

_____ I request the following changes: _____

9. DESIGN SUBMITTAL – PUMPS, PUMP ACCESSORIES, LIQUID LEVEL SENSORS

_____ I have reviewed the documents for the pumps, pump accessories and liquid level sensors. I approve the documents as submitted.

_____ I request the following changes: _____

10. DESIGN SUBMITTAL – VAULT(S) FOR VALVES & OTHER MECHANICAL

NOT INCLUDED IN THIS DESIGN

11. DESIGN SUBMITTAL – PRE-ASSEMBLED VALVES & ASSOC. MECHANICAL

NOT INCLUDED IN THIS DESIGN

12. DESIGN SUBMITTAL – PRE-ASSEMBLED FLOW METER & ASSOC. MECHANICAL

NOT INCLUDED IN THIS DESIGN

13. ELECTRICAL INTERCONNECTIONS

_____ If site electrical drawings (by others) are included in this document; I have confirmed they are accurate.

14. DESIGN SUBMITTAL – CONTROL PANEL/ELECTRICAL & COMMUNICATIONS

_____ I have reviewed the documents for the control panel/electrical and communications system. I approve the documents as submitted.

_____ I request the following changes: _____

15. DESIGN SUBMITTAL – PUMP ELECTRICAL CONNECTION ENCLOSURE/PANEL

NOT INCLUDED IN THIS DESIGN

16. DESIGN SUBMITTAL – ELECTRICAL GENERATOR

NOT INCLUDED IN THIS DESIGN

17. DESIGN SUBMITTAL – ODOR CONTROL SYSTEM

NOT INCLUDED IN THIS DESIGN

18. DESIGN SUBMITTAL – INFLUENT GRINDER SYSTEM

NOT INCLUDED IN THIS DESIGN

19. OTHER EQUIPMENT

NOT INCLUDED IN THIS DESIGN

20. INSTALLATION

_____ I have reviewed the document describing the pre-installation requirements. I approve the documents as submitted.

_____ I request the following changes: _____

21. START-UP, TESTING & TRAINING SERVICES OPERATION

_____ I have reviewed the documents describing the start-up, testing & training services. I approve the documents as submitted.

_____ I request the following changes: _____

22. OPERATION & MAINTENANCE (O&M) MANUAL

_____ I have reviewed the operation & maintenance section. I approve the documents as submitted.

_____ I request the following changes: _____

23. ADDITIONAL SUPPORTING DOCUMENTS

NOT INCLUDED IN THIS DESIGN

1.05 SUBMITTAL APPROVAL FORM & NOTICE TO PROCEED PAGE 3 OF 3

Upon receipt of your notice to proceed, Romtec Utilities will produce the pump station and deliver it to the project site on or after the date you specify.

Please fill in the form below.

- Yes, I want Romtec Utilities to produce the specified pump station and deliver it to the project site to be installed on _____.
(delivery date)

- No, I don't want Romtec Utilities to produce and deliver the pump station at this time. I will send a separate written notice to proceed at a later date.

Signature

Date

By signing the Submittal Approval & Notice to Proceed, I approve the products and services as specified in the Romtec Utilities Scope of Supply and Design Submittal for this project. I understand that any change(s) I have requested may change other Romtec Utilities documents, including but not limited to the pump station quote, the scope or supply and design submittal and the O&M manual. I understand that such changes may cause delays to the project.

Please return the form to: Documentation Manager
Romtec Utilities, Inc.
18240 North Bank Rd.
Roseburg, OR 97470
Fax: 541-496-0804
Email: romtec9@romtecutilities.com

2. WARRANTY

This section includes:

2.01 ROMTEC UTILITIES LIMITED WARRANTY

2.01 ROMTEC UTILITIES LIMITED WARRANTY

Romtec Utilities, Inc. (herein referred to as "Romtec") warrants that the equipment supplied will be free from defects in material and workmanship under normal use and service, when used in accordance with Romtec's procedures as set forth below for a period of one year from date of acceptance (acceptance is defined as the date Romtec's "Start-Up" report is completed) or one year and six months from installation of the wet well (or delivery of the wet well or the date that the wet well was ready to deliver), whichever comes first. The obligation of Romtec under this warranty is limited to replacing or repairing any defective part. This warranty extends only to Romtec's direct customer (as named in the Romtec Purchase Order), herein called "CUSTOMER", and not to any person or entity with whom CUSTOMER has business relationships, or any party other than CUSTOMER.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PURPOSE, WHICH IMPLIED WARRANTIES ARE EXCLUDED. ROMTEC SHALL NOT BE LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES.

Components Resold or Supplied with Romtec Materials. Certain components are warrantable directly by the original manufacturer for periods between 90 days and 5 years. Specific details of such warranties are included with the Romtec Scope of Supply and Design Submittal document. Replacement for, repair or refund of defective workmanship or material under normal use shall be remunerated directly with the manufacturer of the component. Examples of components would be generators, manual cranes, pumps, pump controls, valves, etc.

Warranty Voidable. Start-up that is performed without the presence of Romtec's representative shall void all warranties.

Claims of Defective Manufacture. Claims that the merchandise was incorrectly manufactured or that is defective in any way must be made directly to Romtec on a product-by-product basis. All claims must be made within 72 hours of the defective condition, or the time when the defect should have been discovered, whichever is earlier. All claims must include the following:

1. A detailed description of the specific problem, failure, or other event giving rise to the claim; and
2. Supporting photographs or videos; and
3. Specific location; and
4. Names and phone numbers of individuals who can substantiate the claim, but who do not work for Contractor.

Failure of Pump Station

Romtec Utilities pump stations pump all types of water containing all kinds of materials. Sometimes pumps may clog or power may be lost and the pump station will fail to operate. If your station fails to operate, Romtec Utilities will suggest a local service company to evaluate the problem. If it is a warranty issue, Romtec Utilities will repair and/or replace per the terms of this warranty. If however, the pumps are simply "clogged" or the power is simply lost Romtec Utilities will advise you that it is not a warranty issue and you will simply pay for the service call and the associated services.

Action in Event of Established Claim. In the event it is determined that goods have been incorrectly manufactured or are defective, the liability of Romtec shall be limited to, at its option, repair or replacement of the goods. Romtec also reserves the right to establish reasonable time limits for completion of any specific installation tasks resulting from the replacement of defective merchandise.

No Third Party Claims. Under no circumstances shall Romtec be responsible for any damage claims by any party other than claims by Romtec direct customers.

Release and Hold Harmless. Contractor releases and agrees to defend, indemnify, and hold Romtec harmless from and against any and all claims, demands, actions, and causes of action for any matters arising out of or connected with the Materials whereby the Contractor is responsible for errors or omissions.

FURTHER LIMITATIONS ON ROMTEC LIABILITY

1. Specific Limitations.

Romtec's liability under the foregoing warranty and under the transaction of which this document is a part is limited as follows:

- a. Romtec has designed the lift station supplied under this project to meet a specific design standard and specific set of parameters as dictated to Romtec by its CUSTOMER as set forth in the "Lift Station Design Form" located Tab 4 of the Romtec Utilities Scope of Supply and Design Submittal.
- b. Romtec's Scope of Supply & Design Submittal is a part of and limited by CUSTOMER'S site civil and electrical plans.
- c. Romtec makes no guarantees that any of its supply will fit on CUSTOMER'S site and/or building. However, at CUSTOMER'S request, Romtec will provide suggested layouts for the CUSTOMER'S project. Ultimately, the CUSTOMER decides to accept or reject any given layout.
- d. Romtec cannot make final layout or equipment placement judgments at the site (i.e. generator or control panel "fit" in or out of a building). It is the responsibility of CUSTOMER'S site engineer and contractor to check dimensions, etc. If CUSTOMER has not accepted (or received) final dimensions, etc., please request further definition before approval. Romtec is not responsible for items that do not fit on the site.
- e. It is Romtec's CUSTOMER'S responsibility and obligation to review Romtec's Scope of Supply & Design Submittal to insure it meets with CUSTOMER approval relative to any CUSTOMER third party agreements.
- f. Romtec Utilities is not responsible for any aspect of the construction/installation of the Romtec Utilities lift station. The Contractor bears sole responsibility for installation of products manufactured by Romtec Utilities. The Romtec Utilities Scope of Supply and Design Submittal defines Romtec Utilities scope of supply relative to equipment, documentation, start-up services and warranty.
- g. If Romtec Utilities is on site during the construction/installation of the Romtec Utilities lift station it is only as an advisor. Romtec Utilities is never on site to perform any construction and/or installation tasks.

Romtec Utilities designs and prefabricates its lift station system to enable contractors to install the Romtec Utilities system quickly and completely. However, Romtec Utilities has made no representation and/or claims as to "how long" it will take to construct/install the Romtec Utilities system.

Note: If any Romtec Utilities-supplied part is found to be defective and/or has been manufactured in error relative to this document, Romtec Utilities will repair and/or replace that part at Romtec Utilities' expense. Romtec Utilities does not offer, nor will Romtec Utilities accept, any charges and/or claims by anyone relative to the time it takes to install/construct the Romtec Utilities system and or claims for delays relative to a part that has to be repaired and/or replaced by Romtec Utilities.

- h. Romtec Utilities' responsibility is to its direct customer. We want to help all parties, but we are ultimately responsible only to our direct customer.

If Romtec Utilities' direct customer has hired a sub-contractor Romtec Utilities will communicate with that sub-contractor through a representative of Romtec Utilities' direct customer. In other words, Romtec Utilities will not direct and/or advise any sub-contractor. Instead, Romtec Utilities will communicate directly with its "direct customer" and they will communicate with their sub-contractors, engineers, and/or owners.

- i. The Romtec Utilities design reflects all elevations and/or orientations to an accuracy of and/or minus .10'. Romtec Utilities does not claim to manufacture any aspect of its lift station systems to absolute elevations. It is simply not possible in the general underground construction world to meet absolutes. Therefore, any owner and/or installer of a Romtec Utilities system is accepting the Romtec Utilities system proposed herein to the plus or minus .10' offered by Romtec Utilities.

2. Performance Characteristics and Start-Up

- a. The lift station is a sophisticated device that can be operated in many different ways. The Romtec Scope of Supply & Design Submittal defines Romtec's approach to the operation of the lift station.

Note: While there are many ways to vary and/or adjust "operational parameters" within the overall lift station, Romtec is only prepared to start-up per its own parameters (as specified in the CUSTOMER'S design criteria, see attached).

- b. Romtec's obligation is to show that the station can run as designed to meet specific design criteria as shown in its Scope of Supply & Design Submittal. It is understood that the regulating agency may want to test many other scenarios. This will not be part of the standard Romtec's start-up procedures and training. At start-up, Romtec will only prove that the station can run at the pre-specified design parameters.
- c. Romtec is not an operator, installer or an electrical interconnector for the lift stations and equipment it supplies.
- d. During start-up, Romtec is completely in charge. Romtec's start-up technician will start-up and "prove" the station per the approved Romtec Scope of Supply & Design Submittal. After the lift station is accepted other parties may choose to adjust and/or vary the operational parameters to suit their specific preference. However, Romtec will not be involved with these issues either during or after start-up, and is not responsible for problems arising from any adjustments or variations by such other parties.

3. Training

- a. Romtec will perform start-up and training at no additional cost as part of its scope of supply if the training is scheduled for the day after start-up and CUSTOMER wants training at no additional cost. If training is scheduled for any other time other than the day after start-up, Romtec will require prepayment of the additional costs incurred as a result of the need to reschedule.

3. LIMITATIONS/PRODUCTS & SERVICES NOT SUPPLIED BY ROMTEC UTILITIES

This section includes:

- 3.01 LIMITATIONS OF ROMTEC UTILITIES' RESPONSIBILITIES
- 3.01 PRODUCTS NOT SUPPLIED BY ROMTEC UTILITIES
- 3.02 SERVICES NOT SUPPLIED BY ROMTEC UTILITIES

3.01 LIMITATIONS OF ROMTEC UTILITIES' RESPONSIBILITIES

1. Romtec Utilities is the equipment supplier only.

Unless specified otherwise in this document, Romtec Utilities is not a subcontractor and does not perform any installation or construction tasks at the project site, unless those duties are specified in this document.

Romtec Utilities staff persons at the project site are there strictly to observe and advise.

2. Romtec Utilities' responsibilities are to its direct Customer only.

Romtec Utilities will communicate with project subcontractors, engineers, owners and any other parties only through a designated representative of the Customer.

3. The pump station design is based, solely, on information supplied to Romtec Utilities and listed in the Lift Station Design Form.

All site-related data are the responsibility of the Customer, not Romtec Utilities.

4. Complete review of this document will require information contained in other documents not supplied by Romtec Utilities.

Romtec Utilities does not supply various documents related to the project, such as: the pump station site plan, the area plan, the influent line and force main plan and profile, the electrical plan and many other documents.

Thorough understanding of the environment in which the pump station will be installed and operated requires complete knowledge of information included in these related documents.

Romtec Utilities does not know any information included in any of these other documents, except those specific design details included in the Lift Station Design Form.

5. Romtec Utilities is not responsible for the review or understanding of this document by the Customer, the Customer's representatives or agents, engineers and installation contractor/subcontractors.

The Customer, engineers, installation contractor/subcontractors, owner and all other parties interested in the project are urged to contact Romtec Utilities Document Control, at any time, with any questions they may have about the system described herein, or about Romtec Utilities' responsibilities related to the project.

Romtec Utilities will make every effort to ensure that all parties have access to complete information about the pump station; however, Romtec Utilities is not responsible for the distribution of this document and/or misunderstandings, errors and costs that arise from an incomplete understanding, by any party, of the information contained in this document.

6. Sealing of documents will incur additional charges.

Romtec Utilities has not offered to “seal” the Scope of Supply and Design Submittal, including drawings contained herein.

Sealing of this document and/or the providing of sealed plans and/or sealed calculations are available from Romtec Utilities, if required, at additional cost.

7. Installation/construction time is not specified.

Romtec Utilities designs and manufactures its pump station systems for quick and complete installation. However, Romtec Utilities makes no representation as to how long it will take to prepare the site, install the system described herein, connect the system to other equipment not supplied by Romtec Utilities or to start-up and complete the system.

Note: By approving the Romtec Utilities’ Scope of Supply and Design Submittal, the Customer agrees to reimburse Romtec Utilities for any cost incurred, whether by Romtec Utilities directly or through a related vendor, due to on-site delays caused by inaccurate representation herein.

8. Installation time and/or defective or incorrect parts do not justify delay claims.

If, at the time of installation, any part supplied by Romtec Utilities is found to be defective or incorrect, relative to this document, Romtec Utilities will repair and/or replace said part at Romtec Utilities’ expense.

Romtec Utilities does not accept any charge and/or claim by anyone, related to the time it takes to install/construct the Romtec Utilities system and/or claims for delays related replacement or repair of any part of the system by Romtec Utilities.

9. Final (As Built) Size for the Control Panel Enclosure

The size of the final (as built) enclosure for the control panel may change! In other words, the size of the panel enclosure (as proposed) in this Romtec Utilities’ Scope of Supply and Design Submittal may not be the actual size and/or mounting style of the final (as built) panel and enclosure.

Note: The final as built drawings will not be available until at least 3 to 4 weeks following Romtec Utilities’ receipt of Notice to Proceed from its direct customer. Any changes to the enclosure size will result in notification from Romtec Utilities to its direct customer.

10. Romtec Utilities Pre-construction Checklist has suggestions only.

All references to installation preparations, methods and/or equipment contained in the Romtec Utilities Pre-construction Checklist or any other Romtec Utilities document are only suggestions, not directions.

11. Romtec Utilities is not responsible for determining the methods and equipment used in site preparation and/or installation/construction.

All methods and equipment used at the site are the responsibility of the installation contractor/subcontractors, not Romtec Utilities. The contractor/subcontractor bears sole responsibility for installation of products manufactured by Romtec Utilities.

Romtec Utilities does not know or specify what site preparation methods should or will be used, for example: whether or not excavated areas will require shoring or dewatering, what backfill methods will be required or any other site-related aspects of the project.

Romtec Utilities does not specify and does not know what types of equipment the installation/construction contractor and/or subcontractors plan to use at the site.

Romtec Utilities does not know the suitability of any equipment for installation of products supplied by Romtec Utilities.

12. Romtec Utilities is not responsible for structural testing done after backfill.

The customer is responsible for any water or vacuum testing conducted on underground vessels.

Romtec Utilities recommends any and all testing of the underground structures occur prior to backfill. Romtec Utilities is available to assist with any repairs after testing is done, prior to backfilling the structures.

If testing takes place after backfilling has occurred, Romtec Utilities ability to assist with repairs is severely limited. Romtec Utilities will not assume costs caused by testing after backfill.

13. Installing a level and “plumb” wet well that will not “settle”

The specification for and the process for creating a stable compacted “footing” or “base” for the Romtec Utilities wet well to be placed on is by others.

In other words, creating a compacted base that will not allow the Romtec Utilities wet well to “settle” and/or “tilt” during or after installation is not the responsibility of Romtec Utilities.

Romtec Utilities wants every installation contractor to be successful. We want every wet well to be plumb, level and to never settle. Romtec Utilities however is not responsible for any of these “installation” related problems if they occur.

14. A Romtec Utilities Advisor will be at the project site during installation of the pump station's underground components.

Any Romtec Utilities personnel at the project site during installation of the pump station's underground components are there only in an advisory capacity. Romtec Utilities does not perform work during this phase of the project, unless such work is specified in the Scope of Supply.

To facilitate communication about the project, the Romtec Utilities Advisor may be at the project site or available by telephone or other electronic means.

15. Getting ready for the Romtec Utilities Construction Advisor and the Delivery of the Romtec Utilities System for Installation

Typically the Romtec Utilities delivery of the underground portion of the Romtec Utilities system is done in conjunction with its installation. In other words, the Romtec Utilities system is unloaded from the Romtec Utilities trucks and installed directly into the prepared hole.

Our goal is to save you (or your Contractor) time and money. One way to do this is to deliver and install the underground portion of the Romtec Utilities system on the same day (from the Romtec Utilities' delivery truck to the prepared excavation).

Therefore, when Romtec Utilities schedules its construction advisor to be on-site we assume that the hole will be dug, the base of the hole prepared and any shoring will be installed.

Note: The Romtec Utilities "Pre-Construction Checklist", located in Tab 20 of this Romtec Utilities' Scope of Supply and Design Submittal, is the document that Romtec Utilities is relying on. We assume that all of the work on the Pre-Construction Checklist will be done and all equipment, etc will be on site and ready to install on the day Romtec Utilities arrives.

Note: Normally our trucks will arrive the night before and along with our construction advisor, we will be "ready to go" on the day of the scheduled delivery and installation.

Special Note: If the job as scheduled and as defined in the Romtec Utilities' Pre-Construction Checklist located in Tab 20 of this Romtec Utilities' Scope of Supply and Design Submittal is not really "ready to install", Romtec Utilities will require a change order to reschedule its construction advisor at a later date.

16. Delivery/Installation/Start-up delays.

When the Customer schedules delivery of the system and/or Romtec Utilities and its suppliers to be on-site for either the "construction" and/or the "start-

up and training”, the customer agrees to additional charges if any of the following occur.

- a. In the event that the shipment is cancelled after the truck has been loaded, there will be a cancellation fee, unless the shipment is rescheduled for the same day.
- b. Any undue delay in unloading of trucks (over 2 hours per truck) will result in a waiting time fee.
- c. If Romtec Utilities discovers upon arrival that the customer is not ready to construct or start-up.

Note: Romtec Utilities works very hard to confirm the customers “readiness” to construct and/or start-up. If we ultimately find (upon arrival) that the system is not ready for either, we will leave the site and reschedule at a later date for an additional charge.

Special Note: Having the Romtec Utilities construction advisor and start-up technician on-site helps everyone complete the project without difficulty. We provide these on-site services as part of our price, but we rely on the customer to confirm that they are ready for us to perform.

- d. The customer chooses to cancel or reschedule the construction and/or changes the date after Romtec Utilities and/or its vendor have purchased tickets for travel, etc.
- e. If the installation and/or start-up is delayed for any reason and runs into a weekend or holiday, keep in mind that the Romtec Utilities offices will be closed and there will be no one available for technical support.

17. Romtec Utilities does not perform or advise on performance of any electrical installation work.

All electrical installation work on the project site must be performed by a licensed electrical contractor. Romtec Utilities personnel are generally not on the project site during electrical installation.

18. Start-up Preparation Form must be completed by the Customer and returned to Romtec Utilities before start-up and testing day will be scheduled.

To expedite timely and efficient completion of the pump station, Romtec Utilities will schedule start-up and testing approximately two weeks after receipt of the completed Start-up Preparation Form from the Customer indicating all work has been done to prepare for station start-up and testing.

19. Romtec Utilities directs the pump station start-up and testing.

The Romtec Utilities Technician directs all station start-up and testing procedures. No other party shall operate the station until after the start-up and testing procedures are completed by Romtec Utilities.

Romtec Utilities requests the presence of the licensed electrical contractor who installed the pump station's electrical system at the project site during pump station start-up and testing.

20. System start-up, testing and training services are limited to the operational parameters described in this Scope of Supply and Design Submittal.

The pump station described herein is a sophisticated device that can be operated in many different ways; however this document defines only a specific set of operational parameters.

Romtec Utilities' standard start-up, testing and training services are based solely on these pre-specified operational parameters. Additional start-up, testing and/or training services requested or required by the regulatory agency or any other party will not be conducted by Romtec Utilities, unless those services are included in this Scope of Supply and Design Submittal.

21. Additional start-up/training time by Romtec Utilities and/or any Romtec Utilities supplier.

Any additional time required of Romtec Utilities (other than the time and/or services outlined in this Scope of Supply document and/or as part of the purchase order) must be ordered and contracted separately from this purchase order. Romtec Utilities will require a change order or a separate purchase order for any additional time.

If more time is required of any Romtec Utilities supplier (other than the time and/or services outlined in this Scope of Supply document and/or as part of the purchase order) the Customer must order it directly from that supplier, not Romtec Utilities.

22. The schedule for standard pump station start-up and operation and maintenance training is limited.

Romtec Utilities has provided two (2) contiguous days (not including holidays or weekends) for pump station start-up and operation and maintenance training as part of the standard services included in this Scope of Supply.

Note: This is only if the operation and maintenance training is scheduled for the day after the pump station start-up is conducted.

If training is scheduled for any time other than the day after start-up, Romtec Utilities will charge \$1,900.00 per day (from the time our technician leaves Romtec Utilities) plus travel and per diem, for the service with a

minimum charge of two days. This will result in a change order or additional purchase order.

Note: If you have purchased a Romtec Utilities' system and for whatever reason have not elected to have Romtec Utilities "start-up" the system prior to the end of the warranty, start-up services will need to be scheduled and purchased separately.

In other words, our "free start-up" services are included with the purchase of the Romtec Utilities' system. We will withdraw the free start-up if you elect to not start-up the system prior to the end of warranty. We will however, be glad to start-up the system at a fee to be quoted when you are ready.

23. Pump station owner and/or owner's designated station operator must receive training for warranty to be in place.

The Customer must designate, in advance, the persons who will participate in the pump station operation and maintenance training provided by Romtec Utilities.

The Romtec Utilities Limited Warranty will not be in place until after the pump station owner and/or the owner's designated station operator have participated in and passed the operation and maintenance training supplied by Romtec Utilities unless Romtec Utilities has not started the system.

Romtec Utilities does not train the installation contractor in the operation and maintenance of the pump station, unless this installation contractor is designated by the owner as the party responsible for station operation.

24. Ongoing operation and maintenance training is the responsibility of the station owner/operator, not Romtec Utilities.

Romtec Utilities does not provide ongoing operation and maintenance training, except for the training specified in this Scope of Supply. It is the responsibility of the pump station owner and/or operator to conduct ongoing operation and maintenance of the pump station and its components.

25. Failure of Pump Station-Warranty

Pump station function is a complex combination of parameters. Sometimes pumps may clog or power may be lost and the pump station will fail to operate. Sometimes the failure is caused by mechanical or sometimes it's electrical. A pump station failure does not constitute a warranty issue. In order to make a warranty claim follow this procedure:

- a. Trouble-shoot the problem with the help of Romtec Utilities over the phone.

- b. If you cannot provide trouble shooting assistance Romtec Utilities can recommend a local company to provide trouble-shooting assistance at your cost.
- c. Once the cause of the failure has been determined then a warranty claim can be made. Warranty claims extend to defective parts only. Romtec Utilities does not warranty trouble shooting, service calls, installation or re-installation associated with defective parts or their failure. Romtec Utilities will repair and/or replace per the terms of the Romtec Utilities warranty.

Note: If however no parts have failed and let's say that the pumps are simply "clogged" or the power was simply lost, Romtec Utilities will advise the owner that this is not a warranty issue and the owner will be responsible for payment of the service call and the associated services.

26. Start-up after the Warranty Expires

If the pump station Warranty has expired and the initial "start-up" has not been performed by Romtec Utilities, then there will be an additional fee charged by Romtec Utilities for the start-up services.

27. Storage of Electrical Components and/or Pumps Prior to Start-Up

Romtec Utilities will keep the lift station electrical components and/or pumps at its facility prior to start-up. However if the customer does not scheduled start-up within 4 months after the installation of the underground components, and all components are fully paid for, Romtec Utilities will ship these components to the customer.

3.02 PRODUCTS & MATERIALS NOT SUPPLIED BY ROMTEC UTILITIES

Each Romtec Utilities pump station is designed and supplied for the specific pumping requirement, as determined by the design criteria provided to Romtec Utilities by the Customer or the Customer's representative.

The specific products and materials to be supplied by Romtec Utilities are unique to this pump station and are listed in the Scope of Supply-Products list. Any component not on the list will not be supplied by Romtec Utilities.

Unless otherwise specified, products and materials NOT supplied by Romtec Utilities include:

1. Any item not listed in the Scope of Supply-Products.

NOTE: Any fasteners not associated with the pre-assembled systems or components not listed in the Scope of Supply-Products list are NOT supplied.

2. Site drawings

Any site drawing included in this Scope of Supply and Design Submittal has been supplied by others.

3. Construction equipment, materials and labor for:

Unloading trucks, traffic control, site safety

Securing materials delivered to project site: dunnage, fencing, storage

Excavation, shoring, dewatering, sub-base rock, backfill material

Installation of supplied pump station systems and components

Piping to and from pump station

Piping between pump station systems (i.e. between wet well and valve vault)

Electrical conduit and wiring (except wires attached to supplied components)

Concrete poured in place, crushed rock, asphalt paving

Site lighting, signage, fencing, bollards

Site drainage control

3.03 SERVICES NOT SUPPLIED BY ROMTEC UTILITIES

The services to be supplied by Romtec Utilities are unique to this pump station and are listed in the Scope of Supply-Services list. Any service not on the list will not be supplied by Romtec Utilities.

Unless otherwise specified, services NOT supplied by Romtec Utilities include:

- 1. Any item not listed in the Scope of Supply-Services.**
- 2. Sealing of the Scope of Supply and Design Submittal, including drawings contained herein.**

If required, sealing of this document and/or supply of sealed plans and/or calculations are available from Romtec Utilities at additional cost.

- 3. Design and engineering services for aspects of the project not included in this Scope of Supply and Design Submittal**

Site engineering, site drawings, electrical service design and plans

Construction meetings not directly related to the pump station

Design/specification of delivery or installation space, equipment, safety

Review of any documents supplied by any party other than Romtec Utilities

- 4. Construction services**

Romtec Utilities personnel at the project site during installation of underground components are there only in an advisory capacity. Romtec Utilities does not perform work during this phase of the project, unless such work is specified in the Scope of Supply.

- 5. Electrical services**

Romtec Utilities does not perform or advise on the performance of any electrical services that must be performed by a licensed electrical contractor.

- 6. Start-up, testing & training services**

Romtec Utilities' standard start-up, testing and training services are based solely on the pre-specified operational parameters contained in this Scope of Supply and Design Submittal. Additional start-up, testing and/or training services requested or required by the regulatory agency or any other party will not be conducted by Romtec Utilities.

4. DESIGN CRITERIA

This section includes:

- 4.01 INTRODUCTION TO DESIGN CRITERIA
- 4.02 LIFT STATION DESIGN FORM



4.01 INTRODUCTION TO DESIGN CRITERIA

Romtec Utilities has created this Scope of Supply and Design Submittal solely on the basis of the design criteria listed on the attached Lift Station Design Form. The design criteria are identified as:

Project Name: Miraloma Recharge Basin

Design criteria supplied by: John Doe, Company Name

Design criteria date: 9/13/11

CAUTION! By approval of and/or use of this Romtec Utilities Scope of Supply and Design Submittal, the Customer and/or the Customer's representative agrees that Romtec Utilities has correctly based this scope of supply and this design of the pump station on the exact design criteria listed on the attached Lift Station Design Form.

Romtec Utilities has not checked the information listed on the Lift Station Design Form. Romtec Utilities does not have responsibility for checking this information or confirming its accuracy. This information has been accepted as fact by Romtec Utilities.

NOTE: The pump station will perform as designed, only if the design criteria stated in the Lift Station Design Form represent the actual conditions at the project site. If the project site's actual conditions are, in any way, different from the design criteria supplied to Romtec Utilities, then the pump station could perform differently than stated or not perform at all.

IMPORTANT! Romtec Utilities has relied on the design criteria supplied by the Customer and/or the Customer's representative (listed on the Lift Station Design Form) as the only information forming the basis for design of the pump station described herein.

Additional information about this project, including agencies' standards, bid documents, design drawings and other documents, may have been available to and/or supplied to Romtec Utilities. Romtec Utilities may have studied such information; however the pump station design represented by this Scope of Supply and Design Submittal is based solely on the design criteria listed on the attached Lift Station Design Form.

Romtec Utilities makes no claim as to whether or not the pump station described herein will meet any agency's standard, any bid document or any other document. Romtec Utilities is not responsible for making such a determination.

Romtec Utilities, Inc.

18240 North Bank Rd. • Roseburg, OR 97470

541-496-9678 • www.romtecutilities.com



LIFT STATION DESIGN CRITERIA FORM

Romtec Utilities, Inc.

info@romtecutilities.com ■ 541-496-9678 ■ Fax: 541-496-0804

Romtec Utilities has designed this 1/12/12 dated Scope of Supply and Design Submittal based on the following information:

PART 1: PROJECT CONTACT INFORMATION

Today's Date: 9/13/2011

Information here in provided by:

Company Name

Company/Agency Type:

Engineer Engineer Developer Gov't. Agency Other

First Name:

John

Last Name:

Doe

Title:

SENIOR PROJECT MANAGER

Email Address:

name@company.com

Address:

19 Street Avenue

City:

City

State/Province:

State _____ Zip Code: 92618

Country:

USA

Telephone:

888-111-1122 Phone Ext: _____

Mobile/Other Phone:

_____ Fax: 888-111-1177

Project Name:

MIRALOMA RECHARGE BASIN

Your Client for this project is:

Public Agency Public Agency Private Co.

Project Type:

Stormwater Wastewater Stormwater Other

Project City:

ANAHEIM, CA Project Zip: _____

Project Engineer:

John Doe

Reviewing Entity who reviews/approves this Scope of Supply & Design Submittal:

ORANGE COUNTY WATER DISTRICT

Final Project Owner and/or Operator:

ORANGE COUNTY WATER DISTRICT

Governing Sewer or Water Authority:

ORANGE COUNTY WATER DISTRICT

Does Authority have a lift station standard?

SELECT ONE Yes No N/A

Who should Romtec contact about the lift station design standard?

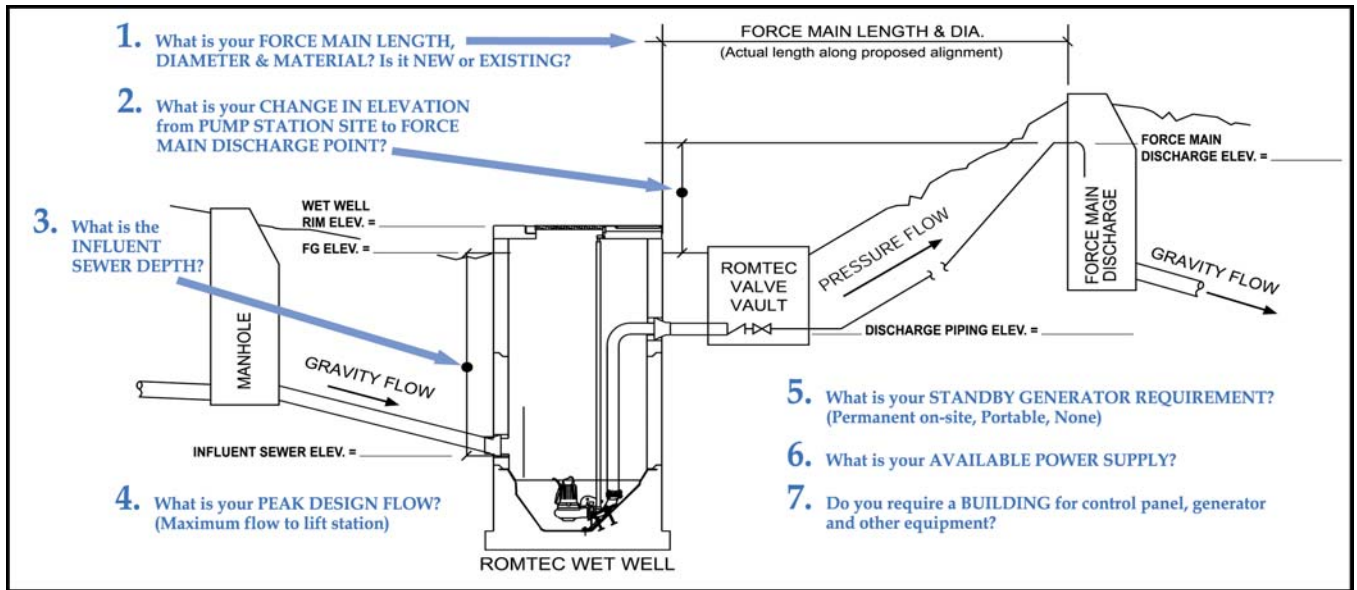
John Doe

What is the Expected Project Bid Date?

_____ Sep-11 Project Completion Date: _____ Nov-11

PART 2: DESIGN DATA

If using assumed elevations, note this in Additional Information.



1. Force main length: 30/1850/2545 ft. (actual length along proposed alignment)

Force main diameter (inside): 12"/42"/72" in. inside dia.
 Force main material (i.e., PVC C-900 class 150, ductile iron class 52, HDPE DR17 class 100, etc.):

Force Main is:

New Existing

2. Elevation change from lift station site to force main discharge point: 3.8 ft.

Finish grade elevation at wet well: 224 ft.

Discharge piping elevation at valve vault: 227.83 ft.

Force main discharge elevation: 224 ft.

3. Influent sewer elevation: 208.17 ft.

4. Peak design flow (maximum flow to lift station): 2300 g.p.m. @ 32.5' TDH each pump

5. Standby generator requirement: None Permanent Portable None Don't Know

Standby generator fuel: SELECT ONE Diesel Natural Gas Propane

6. Available power supply: 480V 208V 240V 480V

3-phase Single-phase 3-phase

Additional loads on site (besides the lift station) to be powered by generator:

 KVA

7. Electrical controls weather protection: None Enclosed Building Shelter Structure None

Weather protection structure is for:

SELECT ONE Electrical Controls Only

Electrical Controls & Generator

Controls, Generator, Chemical Feed

5. PROJECT SITE

This section includes:

5.01 SITE DRAWINGS (by others) WITH SUGGESTED PUMP STATION LAYOUT

IMPORTANT!

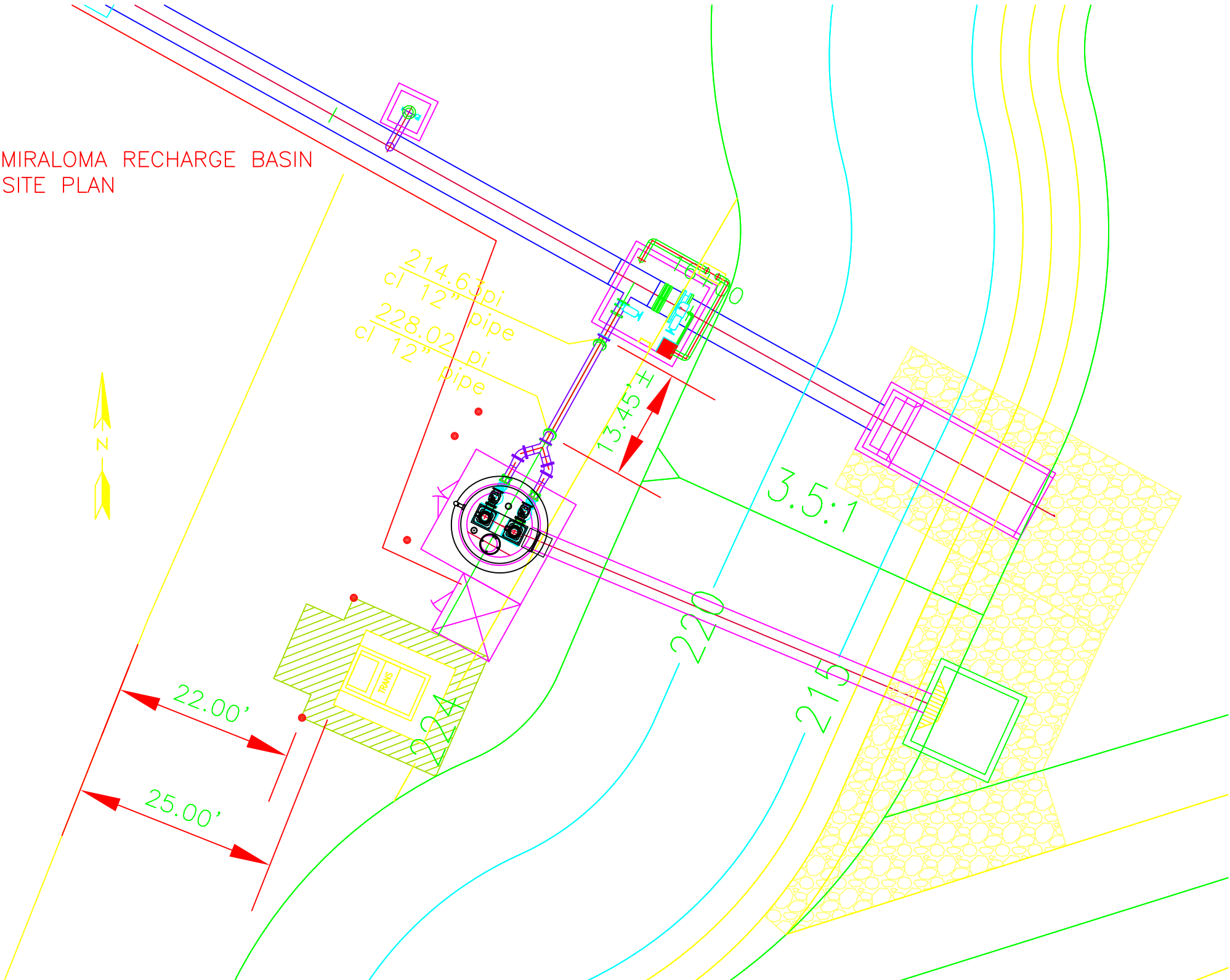
Romtec Utilities has not produced drawings of the project site. Any site drawings in this Scope of Supply and Design Submittal have been produced by others. Romtec Utilities has not checked the site drawings for their accuracy.

Romtec Utilities makes no claim as to the accuracy of information contained in these site drawings.

The layout of the pump station on the site plan is only a suggestion by Romtec Utilities. Receiving final approval of the pump station layout on the approved site plan is the responsibility of the Customer or the Customer's representative.

Romtec Utilities makes no claim as to the suitability of the suggested pump station layout for the project.

MIRALOMA RECHARGE BASIN
SITE PLAN



6. SCOPE OF SUPPLY – PRODUCTS & SERVICES

This section includes:

6.01 SCOPE OF SUPPLY- PRODUCTS (TO BE SUPPLIED BY ROMTEC UTILITIES)

6.02 SCOPE OF SUPPLY- SERVICES (TO BE SUPPLIED BY ROMTEC UTILITIES)

IMPORTANT!

Various products and services NOT supplied by Romtec Utilities are listed in the Warranty & Limitations section of this Scope of Supply and Design Submittal.

6.01 SCOPE OF SUPPLY PRODUCTS (Supplied by Romtec Utilities)

COMPLETE PUMP STATION INCLUDES:

WET WELL & RELATED EQUIPMENT

QTY ITEM

CONTROL PANEL & RELATED EQUIPMENT

QTY ITEM

6.02 SCOPE OF SUPPLY-SERVICES (supplied by Romtec Utilities)

ADMINISTRATIVE & DESIGN SERVICES

Receive pump station design criteria from Customer or Customer's representative.

Design pump station to meet the design criteria and perform as specified.

Produce all drawings and other documents included in this Scope of Supply and Design Submittal.

Only if ordered by Customer or Customer's representative, provide optional sealing of drawings, calculations and/or the entire Design Submittal at additional cost to Customer.

Receive submittal approval from Customer or Customer's representative.

Receive purchase order and notice to proceed from Customer's installation contractor.

PRODUCTION SERVICES

Produce the complete pump station as specified in Scope of Supply-Products.

DELIVERY SERVICES

Deliver pump station to project site on date(s) specified by Customer or Customer's representative. Provide information on weights of parts and lifting devices.

PRE-INSTALLATION & INSTALLATION ADVISORY SERVICES -One day provided by Romtec Utilities

Provide advisory services to our Customer or Customer's representative and/or their contractor(s) and others who will install/construct this pump station on the site.

ELECTRICAL ADVISORY SERVICES

Provide advisory services through Customer or Customer's representative to the licensed electrical contractor installing electrical service to the pump station.

START-UP SERVICES – One day provided by Romtec Utilities

Direct all pump station start-up activities at the project site on the designated start-up day. One day is provided.

TESTING & TRAINING SERVICES-One day provided by Romtec Utilities, contiguous with start-up date

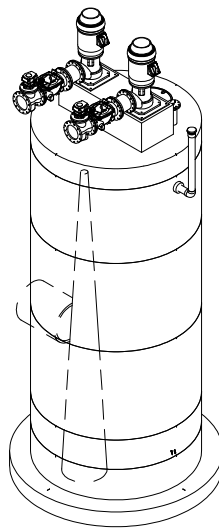
Perform all pump station tests specified in Field Start-Up Report for the project, report test results to the Customer or Customer's representative, deliver O&M Manuals and train any and all owners. One day is provided contiguous to the start-up date. If the testing and training is not scheduled and/or completed the day following start-up, there will be additional charges for Romtec Utilities to return and complete the testing and training services.

7. DESIGN SUBMITTAL

STRUCTURAL & MECHANICAL DRAWINGS

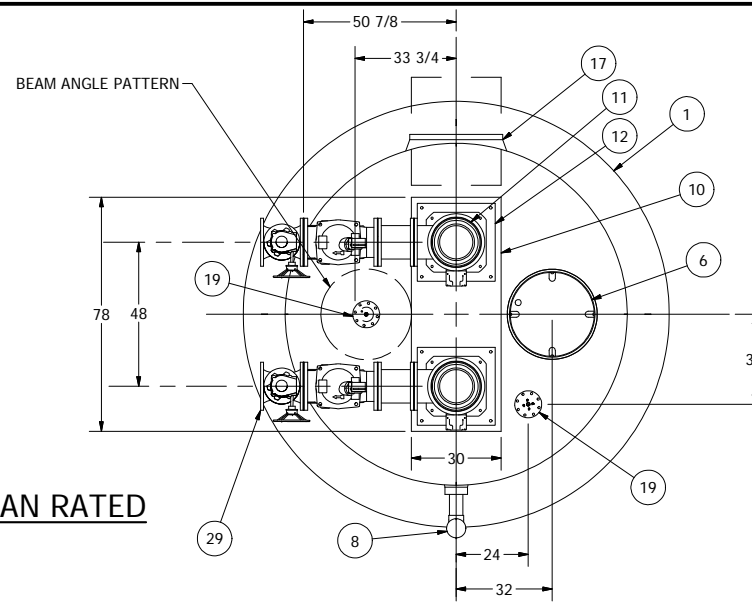
This section includes:

7.01 DRAWINGS – STRUCTURAL & MECHANICAL

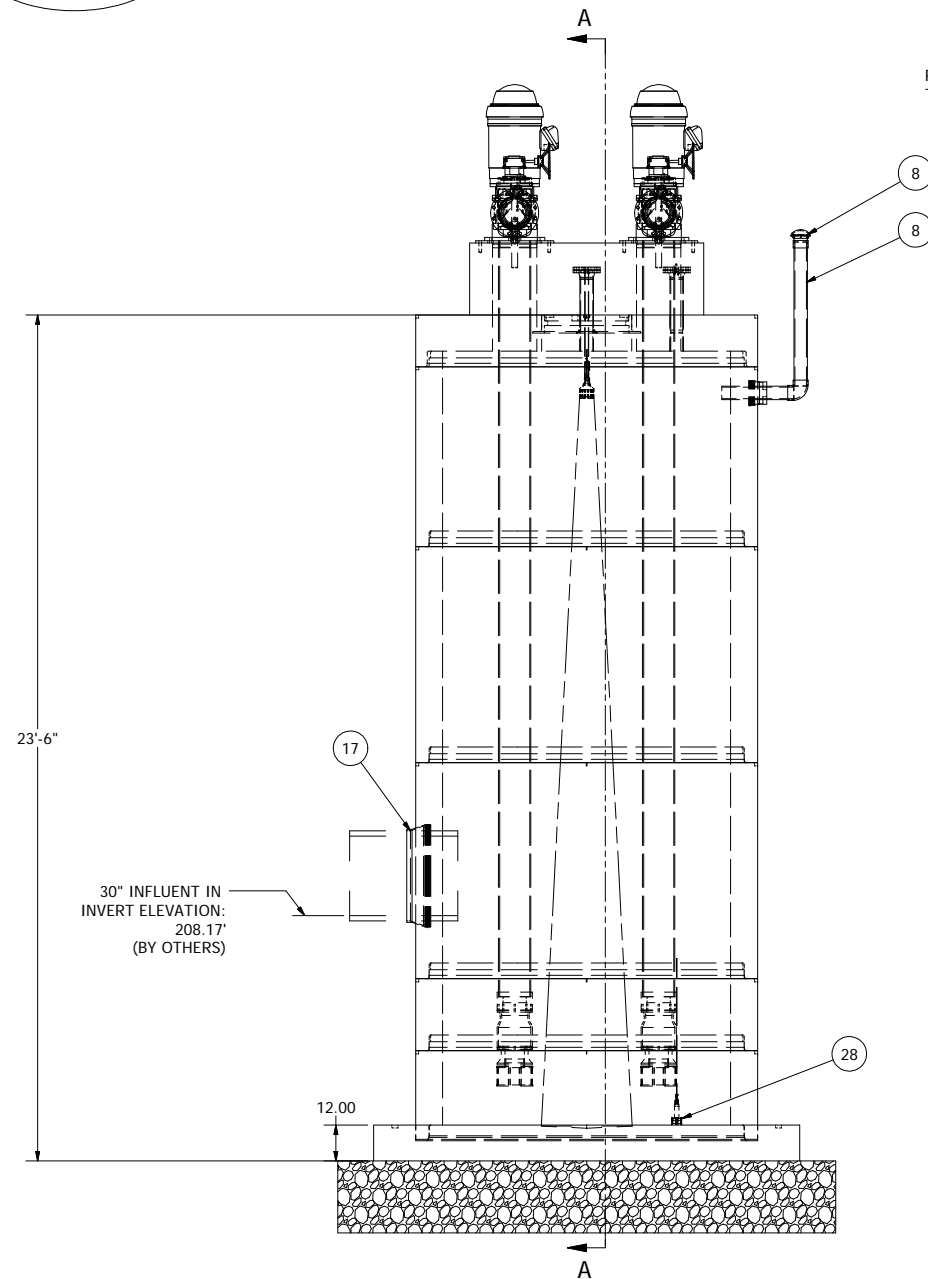
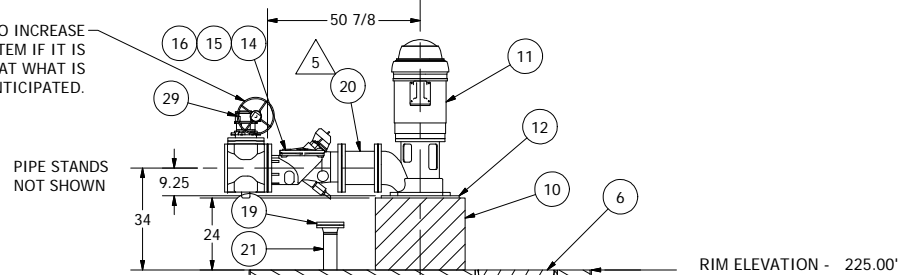


SENSOR AND ELEVATION TABLE		
LEVEL ELEVATION	DISTANCE BETWEEN POINTS	SET POINT DESCRIPTION
208.17		WATER INVERT IN
221.00		HIGH LEVEL ALARM
	0.50	SENSOR SPACING
220.50		LAG PUMP START
	0.50	SENSOR SPACING
220.00		LEAD PUMP START
	14.00	SENSOR SPACING
206.00		PUMP STOP
	3.50	DISTANCE TO FLOOR
202.50		FLOOR ELEVATION

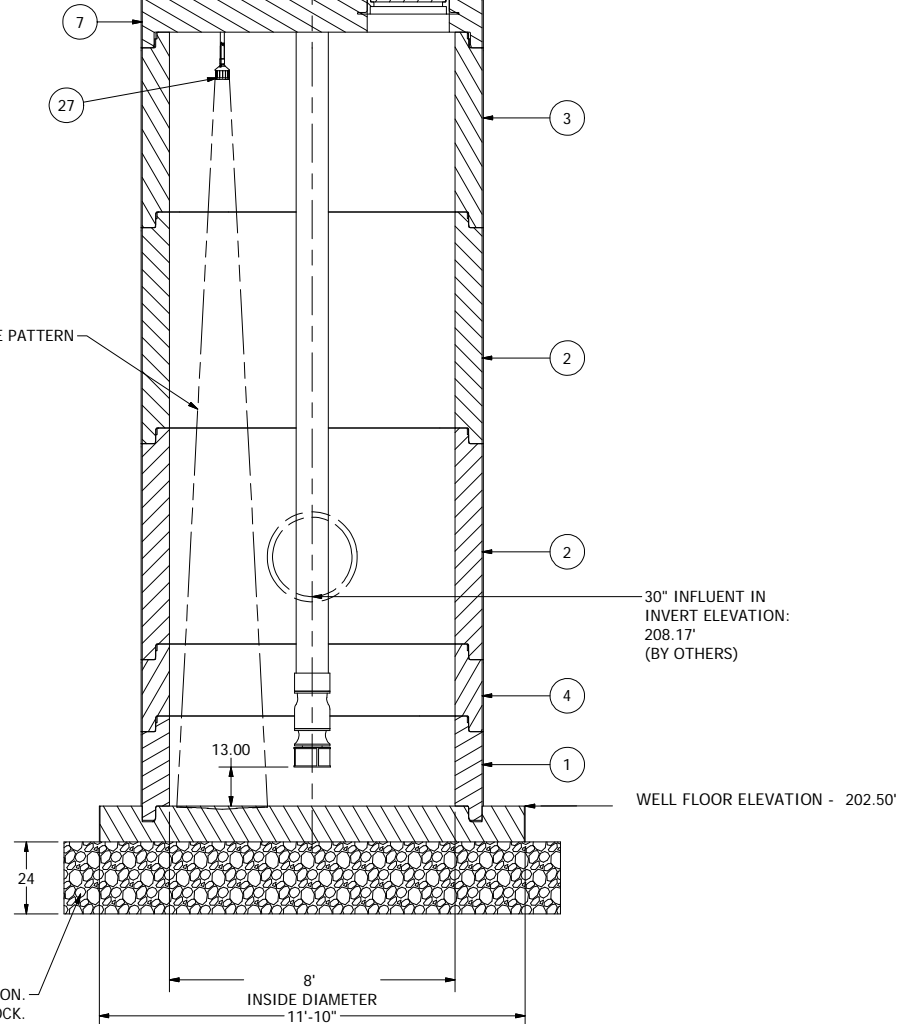
NOTE: WET WELL TOP SLAB IS PEDESTRIAN RATED



PLUG VALVE IS USED TO INCREASE THE TDH FOR THE SYSTEM IF IT IS ACTUALLY LOWER THAN WHAT IS ANTICIPATED.



TRANSDUCER BEAM ANGLE PATTERN



BASE ROCK COMPACTED TO 95% COMPACTION. 1" CRUSHED ROCK. ROCK IS SUPPLIED BY OTHERS NOT ROMTEC UTILITIES.

SECTION A-A
SCALE 1/32

NOTE: ALL DIMENSIONS AND ELEVATIONS SHOWN ARE NOMINAL DIMENSIONS. IT IS THE RESPONSIBILITY OF THE ON-SITE CONTRACTOR OR ROMTEC UTILITIES CUSTOMER (NOT ROMTEC UTILITIES) TO VERIFY THE ACCURACY OF ANY CRITICAL DIMENSIONS OR ELEVATIONS PRIOR TO SETTING OR INSTALLING ANY EQUIPMENT.

8' DIAMETER WET WELL
10" DISCHARGE PIPING

REV	DESCRIPTION	DATE	APPROV
7	REVISED QTY FOR SEALANT FOR PRODUCTION	2/7/12	AD
6	ADDED PLUG VALVE TO ASSEMBLY	1/11/12	AD
5	REVISED PER 12/20/11 COMMENTS	12-21-11	AD
4	PUMP CHANGED TO 30HP	9-16-11	AD
3	REVISED PER 9/8/11 COMMENTS	9-9-11	AD
2	REVISED P.T. AND ADDED POWER CABLE NOTE	9-1-11	AD
1	COMPONENT DRAWING	8-25-11	AD
REV			

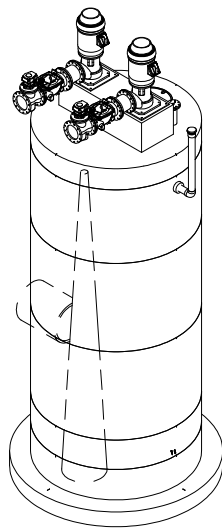
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
1"
0
IF NOT ONE INCH ON THIS SHEET ADJUST SIZES PROPORTIONALLY
DSN - AD
DRN - AD
CKD - AD
DATE - 8-25-11

COMPONENT DRAWING

ROMTEC UTILITIES
18240 NORTH BANK ROAD
ROSEBURG, OREGON 97470
(541) 496-9678
FAX (541) 496-0804

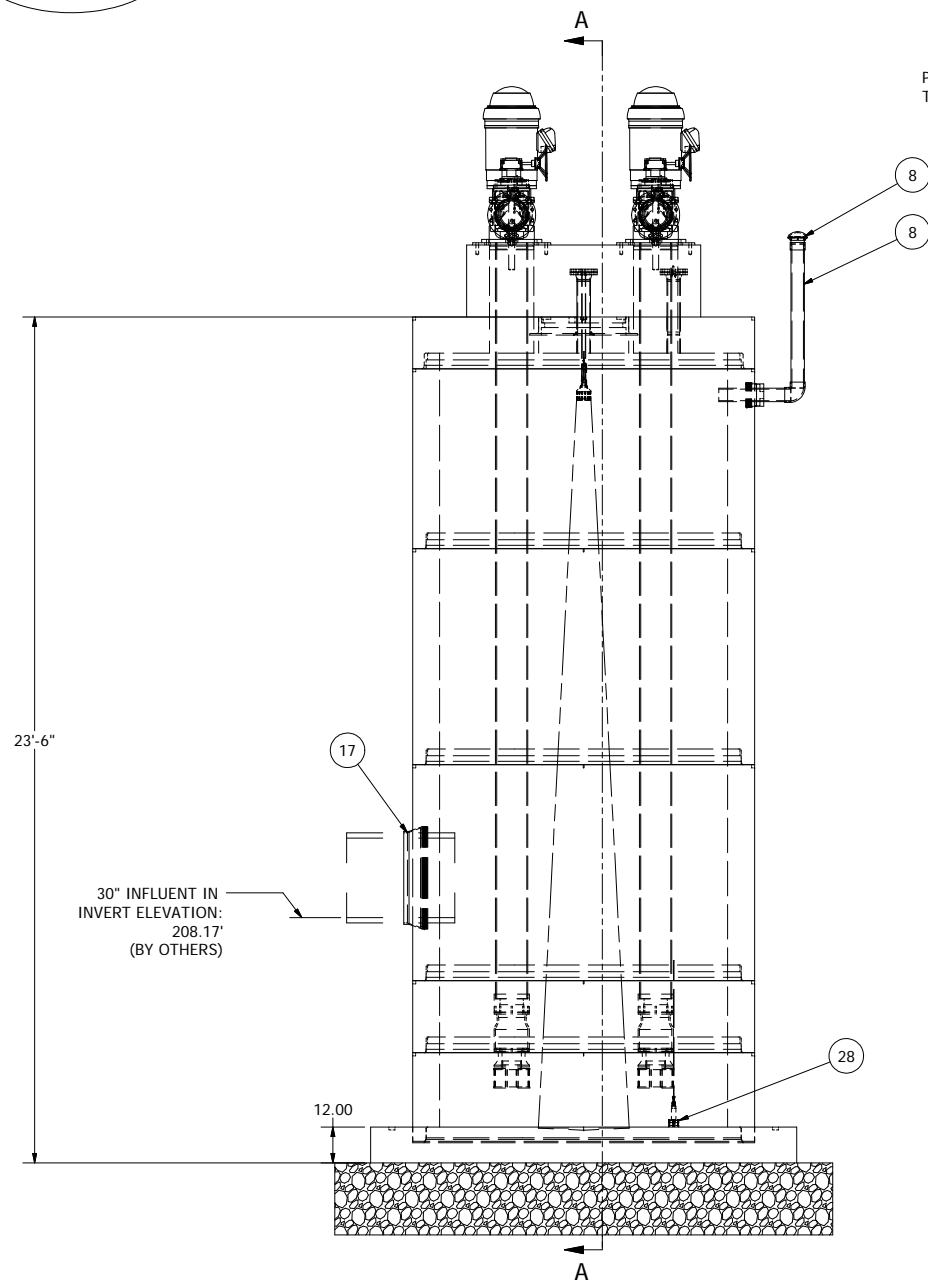
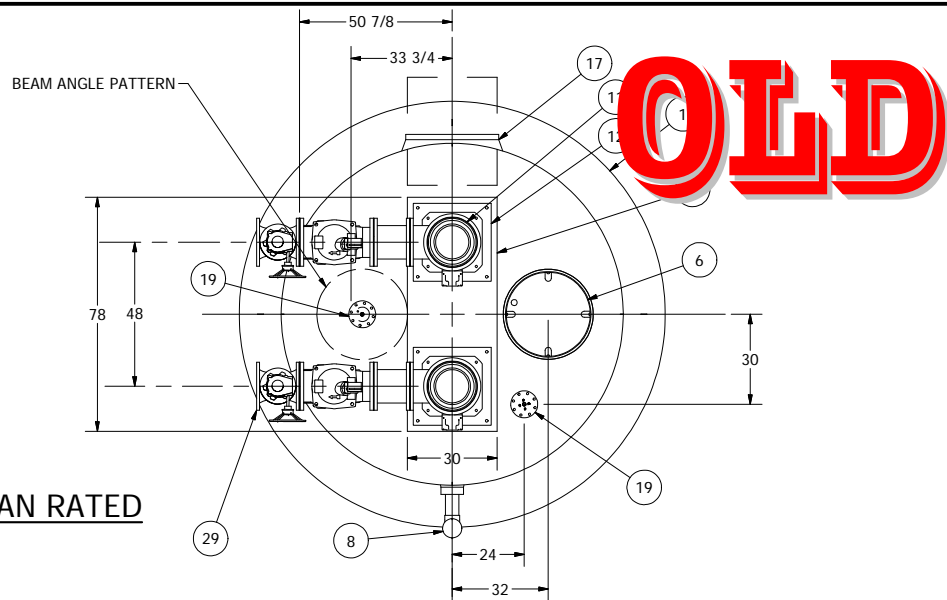
KEVIN BRANDT
MIRALOMA RECHARGE BASIN
8' WET WELL W/ TURBINE PUMPS

SHEET
1 OF 2
JOB NUMBER
RMTC
0000

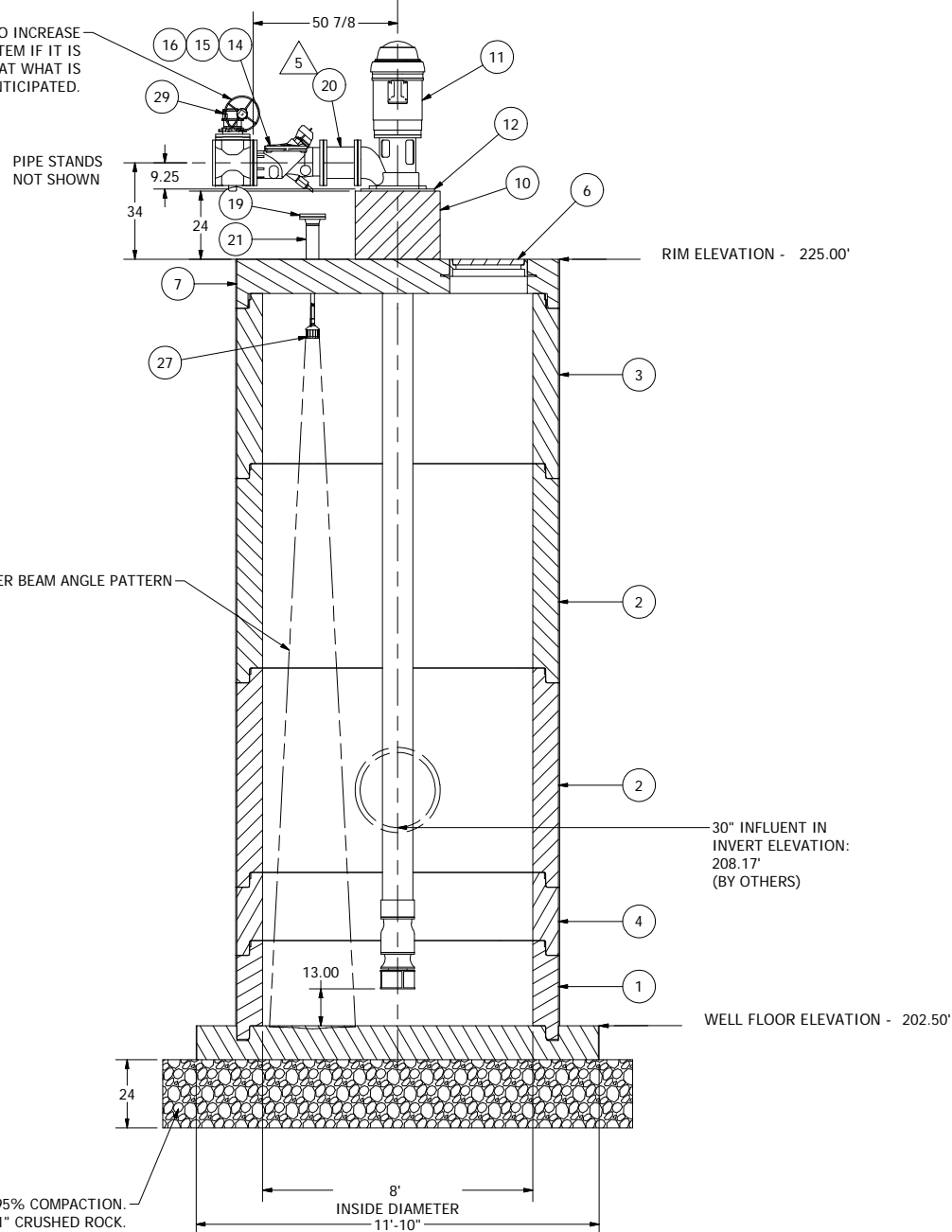


SENSOR AND ELEVATION TABLE		
LEVEL ELEVATION	DISTANCE BETWEEN POINTS	SET POINT DESCRIPTION
208.17		WATER INVERT IN
221.00		HIGH LEVEL ALARM
220.50	0.50	SENSOR SPACING
		LAG PUMP START
220.00	0.50	SENSOR SPACING
		LEAD PUMP START
206.00	14.00	SENSOR SPACING
		PUMP STOP
202.50	3.50	DISTANCE TO FLOOR
		FLOOR ELEVATION

NOTE: WET WELL TOP SLAB IS PEDESTRIAN RATED



PLUG VALVE IS USED TO INCREASE THE TDH FOR THE SYSTEM IF IT IS ACTUALLY LOWER THAN WHAT IS ANTICIPATED.



BASE ROCK COMPACTED TO 95% COMPACTION. 1\"/>

SECTION A-A
SCALE 1/32

NOTE: ALL DIMENSIONS AND ELEVATIONS SHOWN ARE NOMINAL DIMENSIONS. IT IS THE RESPONSIBILITY OF THE ON-SITE CONTRACTOR OR ROMTEC UTILITIES CUSTOMER (NOT ROMTEC UTILITIES) TO VERIFY THE ACCURACY OF ANY CRITICAL DIMENSIONS OR ELEVATIONS PRIOR TO SETTING OR INSTALLING ANY EQUIPMENT.

8' DIAMETER WET WELL
10" DISCHARGE PIPING

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REV	DESCRIPTION	DATE	APPROV
1	COMPONENT DRAWING	8-25-11	AD
2	REVISED P.T. AND ADDED POWER CABLE NOTE	9-1-11	AD
3	REVISED PER 9/8/11 COMMENTS	9-9-11	AD
4	PUMP CHANGED TO 30HP	9-16-11	AD
5	REVISED PER 12/20/11 COMMENTS	12-21-11	AD
6	ADDED PLUG VALVE TO ASSEMBLY	1/11/12	AD

REVISION HISTORY

VERIFY SCALE
1" = 1'-0"
BAR IS ONE INCH ON ORIGINAL DRAWING
0 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES PROPORTIONALLY

DATE - 8-25-11

COMPONENT DRAWING

ROMTEC UTILITIES
18240 NORTH BANK ROAD
ROSEBURG, OREGON 97470
(541) 496-9678
FAX (541) 496-0804

KEVIN BRANDT
MIRALOMA RECHARGE BASIN
8' WET WELL W/ TURBINE PUMPS

SHEET
1 OF 2
JOB NUMBER
RMTC
0000

8. DESIGN SUBMITTAL

WET WELL & RELATED EQUIPMENT

This section includes:

- 8.01 WET WELL WEIGHTS & LIFTING DEVICES
- 8.02 DRAWINGS – WET WELL
- 8.03 DRAWINGS – WET WELL HATCH
- 8.04 DATA SHEETS – WET WELL COMPONENTS



STRUCTURAL DESIGN AND WET WELL WEIGHTS

All Romtec Utilities concrete wet well pre-cast components conform to ASTM C 478. Wet Well components are pre-cast with 4,000 psi. concrete and 60,000 psi. steel.

Romtec Utilities has not done any site specific structural calculations for this project.

Romtec Utilities has not done any site specific up-lift calculations for this project. General uplift calculations for fully saturated soil have been completed and are available upon request.

Romtec Utilities has provided the following structural drawings and concrete weights:

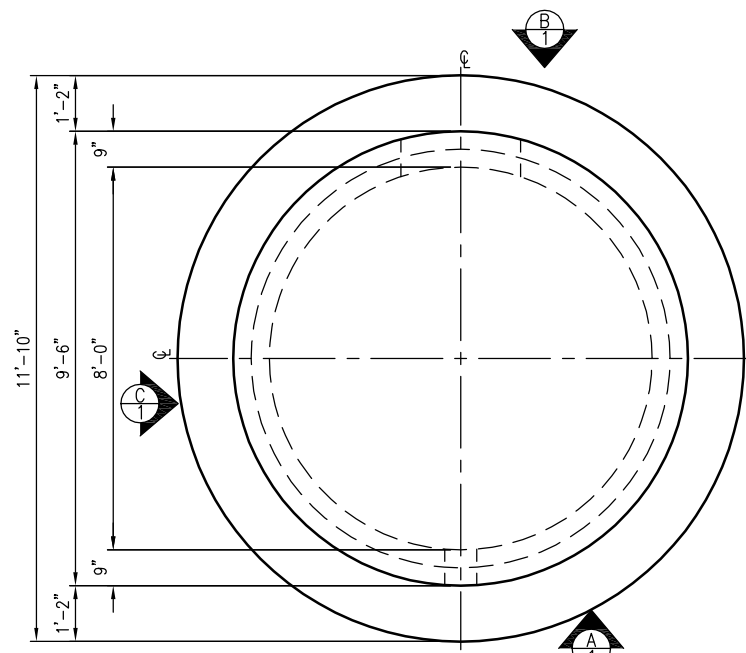
ITEM	SIZE	WEIGHT
96" Manhole Base	12' Outside Dimension	36,000 lbs.
96" Manhole Riser	9'-6" Outside Diameter	3,100 lbs. Per Foot
96" Manhole Top Slab	9'-6" Outside Diameter	9,000 lbs.

8' DIA. WET WELL FOR ROMTEC UTILITIES –
DRAWING NO. 03-S18973-014

96" DIA. REINFORCED MANHOLE BASE SLAB WITH 2' RISER –
DRAWING NO. 08-ROM-C-96BASE

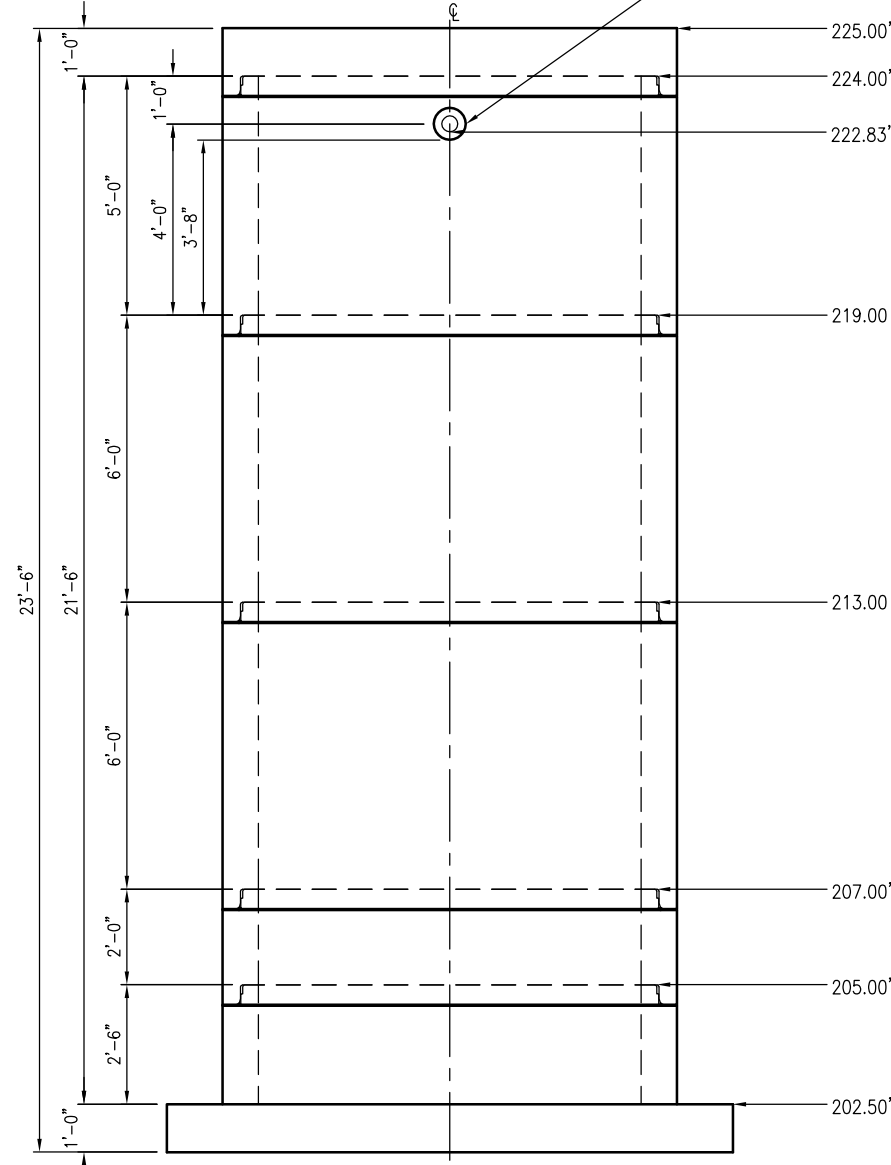
96" DIA. REINFORCED MANHOLE RISER –
DRAWING NO. MH-96

96" DIA. REINFORCED MANHOLE TOP SLAB –
09-ROM-DUP-H20-96FT

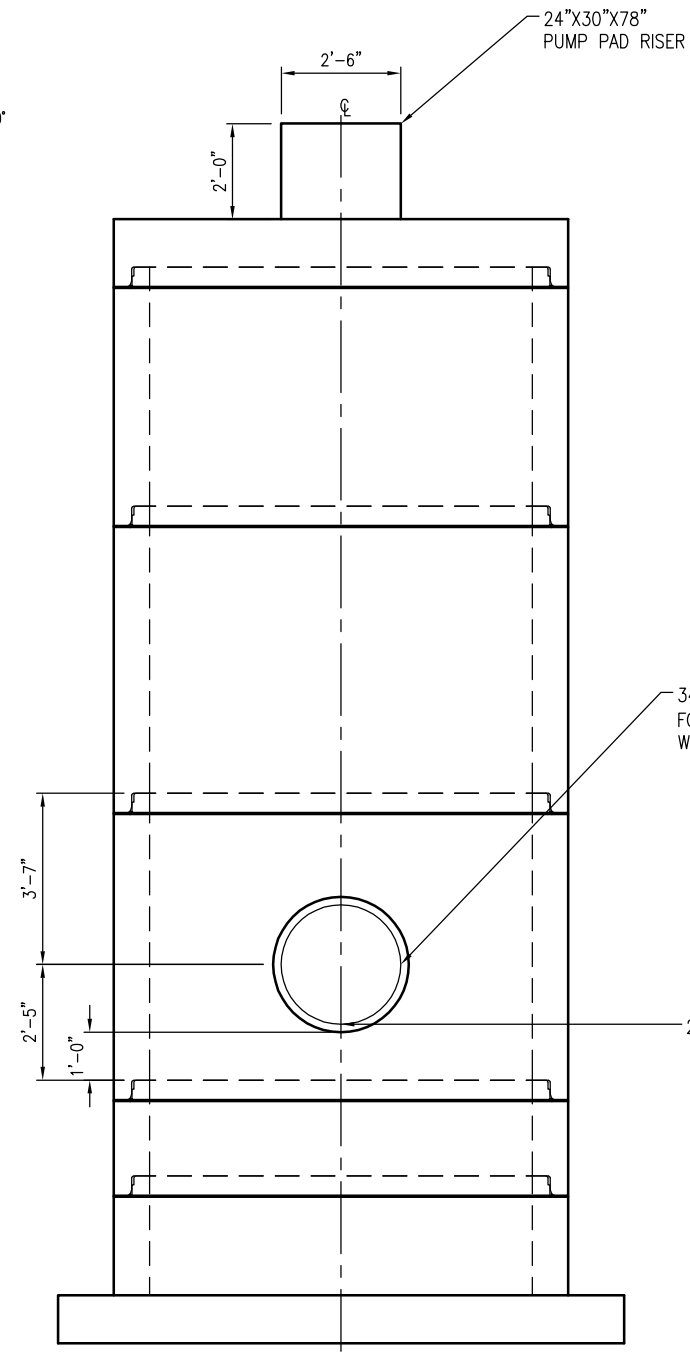


PLAN VIEW
SCALE: 1/4" = 1'-0"

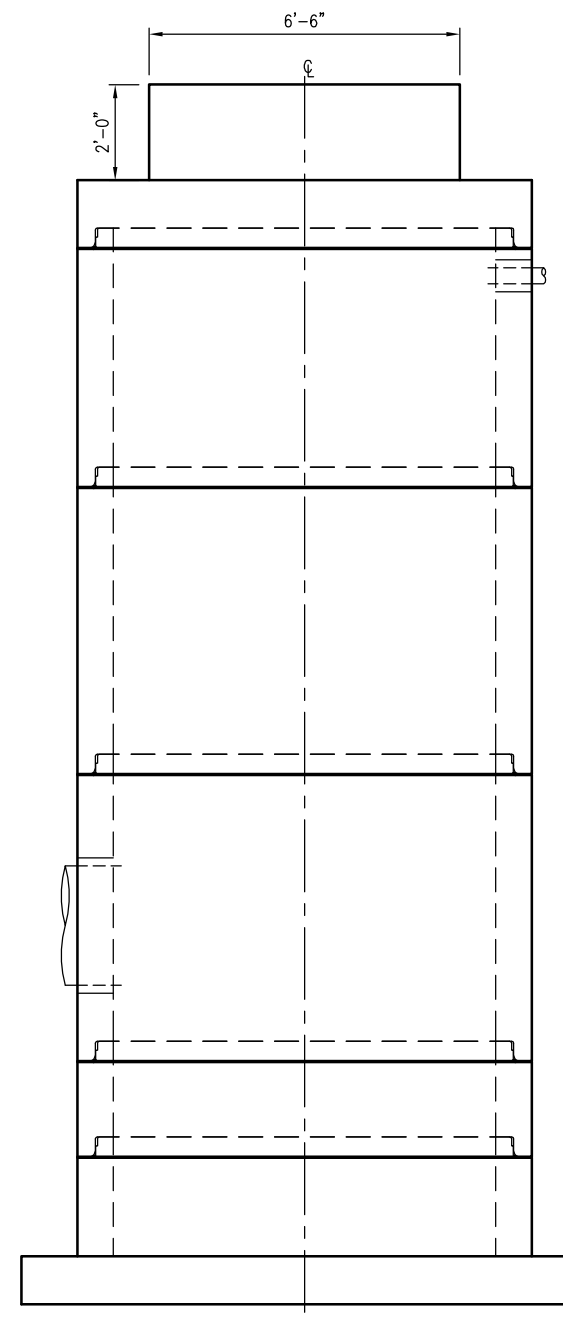
8"Ø CORED HOLE
FOR 4"Ø PVC PIPE @ 90°
WITH S106-8S BOOT



VIEW A
SCALE: 1/4" = 1'-0"



VIEW B
SCALE: 1/4" = 1'-0"



VIEW C
SCALE: 1/4" = 1'-0"

STRUCTURAL NOTES:

- LOADS:**
- H2O TRAFFIC
 - 150 PCF CONCRETE DENSITY; 120 PCF SOIL DENSITY
 - H2O SURCHARGE: 128 PSF TO 8 FT BELOW GRADE
 - DRY SOIL LATERAL LOAD - 40 PCF
 - WET SOIL LATERAL LOAD - 80 PCF
 - WATER TABLE - 5 FT

DESIGN SPECIFICATIONS

- ACI-318-08 BUILDING CODE
- ASTM C 478 STANDARD SPECIFICATIONS FOR REINFORCED CONCRETE MANHOLE SECTIONS

MATERIALS:

- CONCRETE - 28 DAY COMPRESSIVE STRENGTH f_c = 6000 PSI
- REBAR - ASTM A 706 GRADE 60
- CEMENT - ASTM C150
- FLYASH - ASTM C618

GENERAL NOTES:

- 1) CONTRACTOR TO: VERIFY ALL DIMENSIONS AND OPENING LOCATIONS
- 2) REBAR MAY BE TACK WELDED OR TIED
- 3) TOLERANCES PER ASTM C 478 STANDARD SPECIFICATIONS FOR REINFORCED CONCRETE MANHOLE SECTIONS
- 4) ALUMINUM HATCH INTENDED FOR OFF STREET LOCATIONS THAT MAY OCCASIONALLY RECEIVE AASHTO H20 WHEEL LOAD

WEIGHTS / CONCRETE YD³

SECTION	WEIGHT
TOP SLAB	10,840 LBS / 2.624 CYD
5'-0" RISER	15,770 LBS / 3.817 CYD
6'-0" RISER	18,930 LBS / 4.582 CYD
6'-0" RISER	18,930 LBS / 4.582 CYD
2'-0" RISER	6,310 LBS / 1.527 CYD
BASE	24,720 LBS / 5.984 CYD
TOTAL LBS	95,500 LBS
TOTAL CYD	23.116 CYD



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96"ØX21'-6" (I.D.) PRECAST WET WELL

MIRALOMA RECHARGE BASIN
LOCATION-UNSPECIFIED

CUSTOMER
ROMTEC

DATE	SALES	DRAWN	ENGINEER	CHECKED	SALES ORDER
8/31/11	BD	VK	JM	JM	S18973
DRAWING NUMBER				REVISION	SHEET
030-S18973-19				REV DATE	1 OF 1

Design Criteria

ID	Wetwell Inside Diameter	8	ft		
Tts	Top Slab Thickness	13	inch		
	Top Slab Weight	9,000	lb		
Tw	Wall Thickness	9	inch		
OD	Barrel Outside Diameter	9.5	ft		
	Barrel volume/ft based on OD	70.88	ft^3		
	Wall Volume/ft	20.62	ft^3		
	Wall Weight/ft	3,100	lb		
Tbs	Base Slab Thickness	12	inch		
Hbi	Base Inside Height	30.00	in (sump height)		
	Base Weight	28,000	lb		
	Overhang type	Round			
Elat	Base Overhang (lateral)	0	inch		
Elong	Base Overhang (long.)		inch		
	Overhang width	14.00	ft		
Ao	Overhang Area	39.08	ft^2		
	Concrete Unit Weight	150	lb/ft^3		
	Soil Unit Weight (dry)	100	lb/ft^3	Assumed SG	2.50
	Equiv Soil Unit Wt (saturated)	60.0	lb/ft^3		

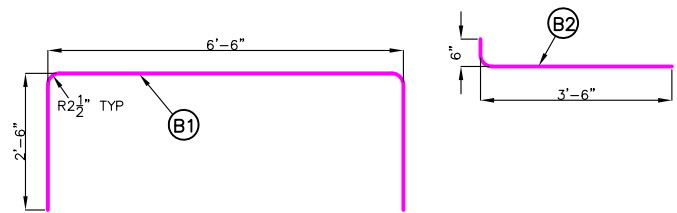
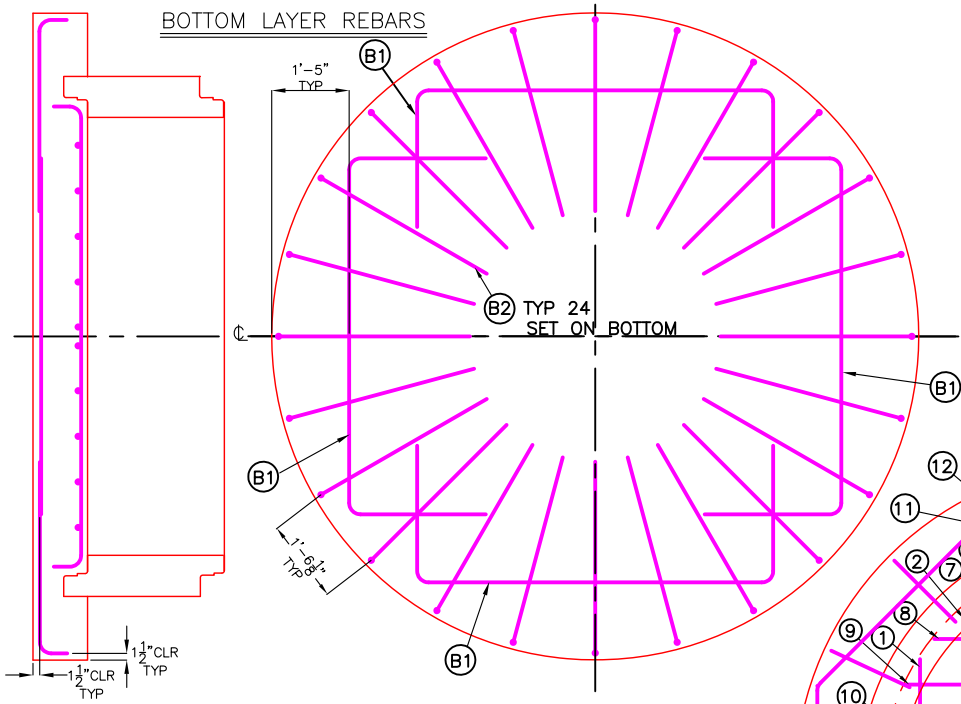
Bouyant Force: Assumes groundwater to surface

	Wetwell Depth (ground level to sump invert, assuming lid set flush)					
	9.5	15	22.5	25	30	35
Uplift Vol (ft^3), barrel + base	744.3	1,134.1	1,665.7	1,842.9	2,197.3	2,551.8
Uplift Force (lb), total	46,442	70,769	103,942	114,999	137,114	159,230

Downward Force:

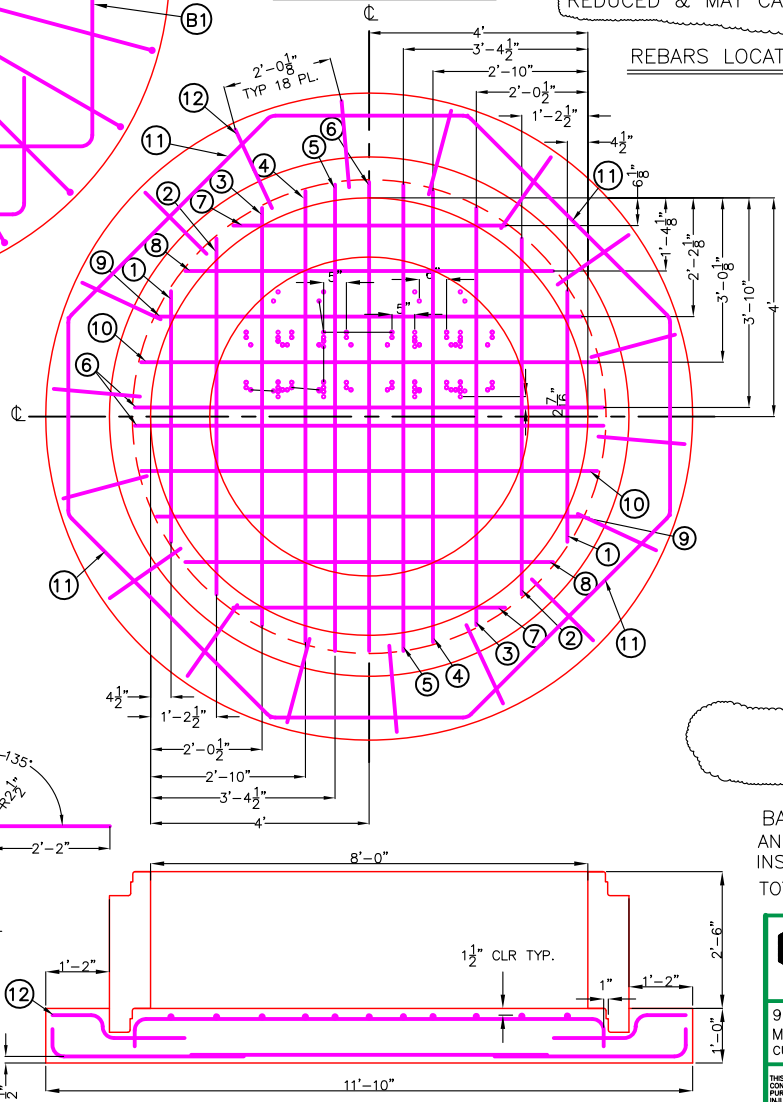
	Wetwell Depth (ground level to sump invert, assuming lid set flush)					
	9.5	15.0	22.5	25	30	35
Barrel height, top of extended base to underside of top slab (ft)	5.92	11.42	18.92	21.42	26.42	31.42
Top Slab Weight (lb)	9,000	9,000	9,000	9,000	9,000	9,000
Barrel Weight (lb)	18,342	35,392	58,642	66,392	81,892	97,392
Base Slab Weight (lb)	28,000	28,000	28,000	28,000	28,000	28,000
Total Wetwell Weight (lb)	55,342	72,392	95,642	103,392	118,892	134,392
Soil Vol above Overhang (ft^3)	371.3	586.2	879.3	977.0	1,172.4	1,367.8
Soil Wt above Overhang (lb)	22,276	35,172	52,758	58,620	70,344	82,068
Total Downward Weight	77,617	107,564	148,400	162,012	189,236	216,460
SF w/out skin friction/soil shear	1.67	1.52	1.43	1.41	1.38	1.36

NO.	Revision Description	BY	DATE
1	ADDED TOP REBAR (12) & DELETED INSIDE SLOP PART	QLG	8/18/08



MARK THE TOP REBARS LOCATION ON TOP OF CONCRETE TO ENSURE THE REBARS ARE NOT DAMAGED WHEN DRILLING BOLT-HOLES.
IF REBAR IS DAMAGED THE BASE SLAB LOAD CAPACITY WILL BE REDUCED & MAY CAUSE BASE FAILURE.

TOP LAYER REBARS



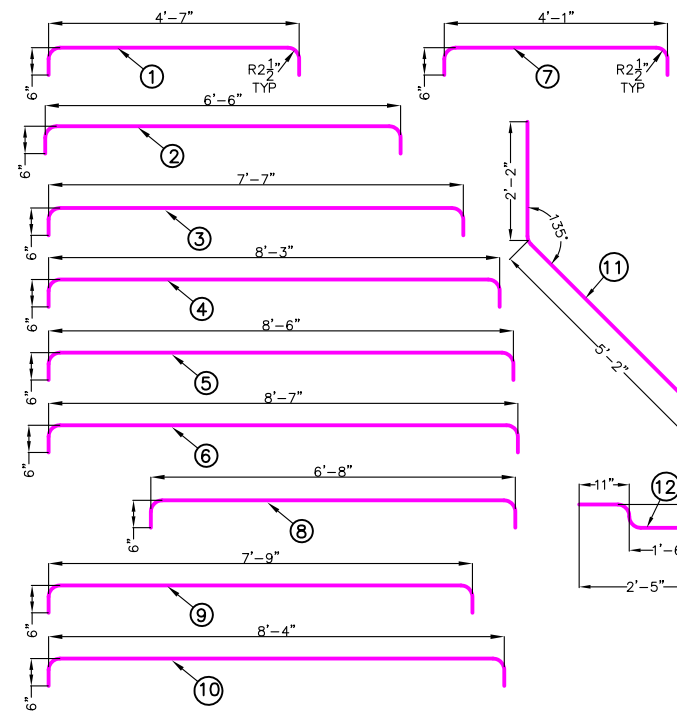
REBARS LOCATION MAXIMUM TOLARENCE IS 1/4"

ASTM GRADE 60 STEEL #5 REBAR

	ITEM NO.	BAR LENGTH	QTY.	TOTAL LENGTH	TOTAL WEIGHT
BOTTOM ONLY	B1	11'-6"	4	46'-0"	48.0#
	B2	4'-0"	24	96'-0"	100.1#
TOP ONLY	1	5'-7"	2	11'-2"	11.7#
	2	7'-6"	2	15'-0"	15.6#
	3	8'-7"	2	17'-2"	17.9#
	4	9'-3"	2	18'-6"	19.3#
	5	9'-6"	2	19'-0"	19.8#
	6	9'-7"	3	28'-9"	30.0#
	7	5'-11"	2	11'-10"	12.3#
	8	7'-8"	2	15'-4"	16.0#
	9	8'-9"	2	17'-6"	18.3#
	10	9'-4"	2	18'-8"	19.5#
	11	9'-6"	4	38'-0"	39.6#
	12	2'-10"	18	51'-0"	53.2#
TOTAL			71	403'-11"	421.3#

NOTE: LIFTING ANCHORS ARE MEADOW BURKE RL-24, #79042 (4 PLACES) W/ (4) #4 X 18" REBAR

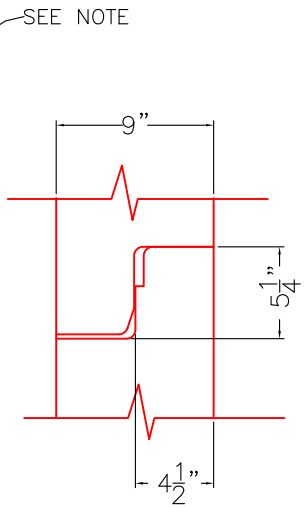
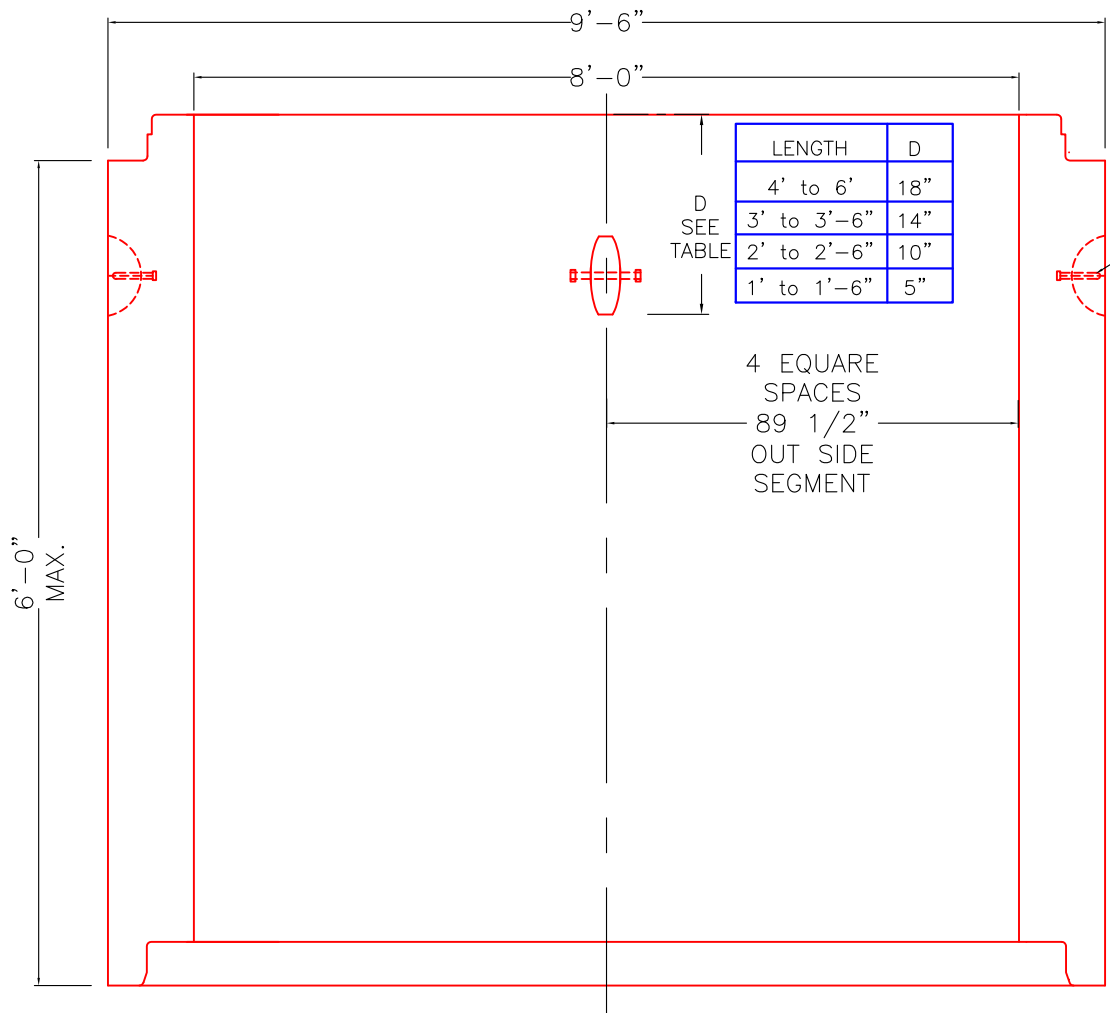
BASE SLAB CONCRETE QUANTITY = 4.1 C.Y.
AND 2'-6" LONG 96" RISER CONCRETE = 2.0 C.Y.
INSIDE OF RISER CONCRETE = 0.7 C.Y.
TOTAL CONCRETE = 6.8 C.Y.



Oldcastle PRECAST
CALIFORNIA CONCRETE PIPE 2960 S. HIGHWAY 99 (209) 466-4212
STOCKTON, CA. 95215 FAX: (209) 466-2552

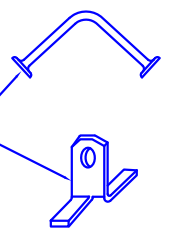
96" DIA. REINFORCED MANHOLE BASE FOR ROMTEC-C CLASS
MAXIMUM DEPTH 30', 9" WALL, CONFORMS TO ASTM C478
CUSTOMER RESPONSIBILITY FOR SOIL CAPACITY & WATER FLOATING STABILITY

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	REVISED: QLG	8/18/08	REVISION NO. 1	08-ROM-C-96BASE
			SCALE NO SCALE	SHEET 1 OF 1

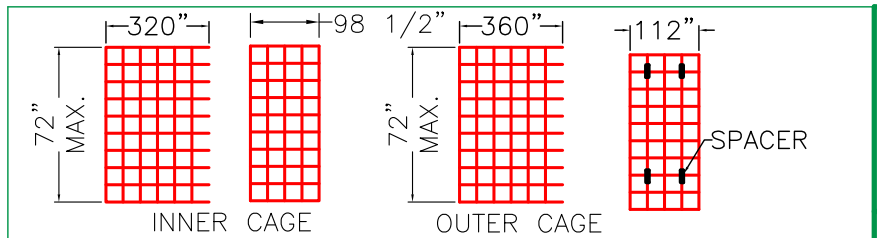


JOINT DETAIL

NOTE: 4 LIFTING INSERTS --
 (1) CONAC 8CA18 FOR ORDINARY CUSTOMER.
 (2) CONAC FFA 0806 FOR ROMTEC UTILITIES.



CONCRETE VOLUME = 0.764 C.Y./Ft.
 6' TOTAL = 4.6 C.Y. WEIGHT = 18800#



CAGE	MESH	SPACES	GAP	SPACER	QTY.	CON. STRENGTH (psi)
outer	3x8-d3.5xw2.0	45	0"			4000
inner	3x8-d3.5xw2.0	40	2 1/2" OVER	A7.0	5/ft.	

789

2960 S. HIGHWAY 99
 STOCKTON, CA. 95215-8047

(209) 466-4212
 FAX: (209) 466-2552

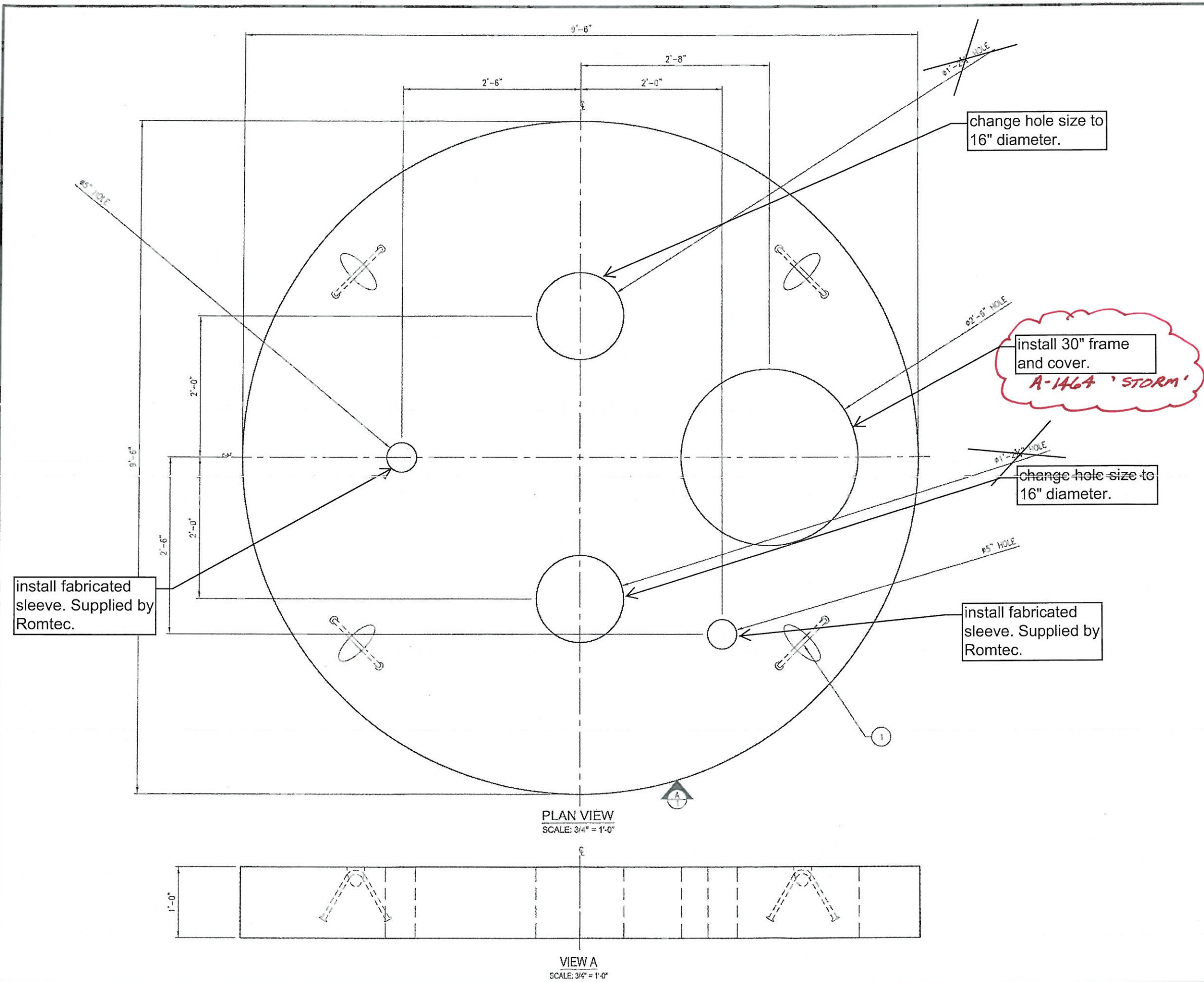


A DIVISION OF
Oldcastle™
 PRECAST, INC.

96" DIA. REINFORCED MANHOLE RISER
 9" WALL , UP TO 6' LONG
 CONFORMS TO: ASTM C478

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DRAWN RAS	DATE 04/30/01	WT. 3100#/ft.	DRAWING NO.
REVISED QLG	8/23/07	REVISION NO. 5	MH-96
SCALE NO SCALE			SHEET 1 OF 1



STRUCTURAL NOTES:
LOADS:
 - H2O TRAFFIC
 - 150 PCF CONCRETE DENSITY; 140 PCF SOIL DENSITY
 - H2O SURCHARGE - 128 PSF TO 8 FT BELOW GRADE
 - SOIL LATERAL LOAD - 140 PCF
 - WATER TABLE - 5 FT
 - MINIMUM ALLOWABLE SOIL BEARING PRESSURE - 4000 PSF

DESIGN SPECIFICATIONS:
 - AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES"
 - ACI-318-08 BUILDING CODE
 - ASTM C 478 STANDARD SPECIFICATIONS FOR REINFORCED CONCRETE MANHOLE SECTIONS
 - CALTRANS BDS SECTION 5 - CULVERTS

MATERIALS:
 - CONCRETE - 28 DAY COMPRESSIVE STRENGTH: $f_c = 8000$ PSI
 - REBAR - ASTM A 706 GRADE 60
 - CEMENT - ASTM C150
 - FLASH - ASTMA661
 - WIRE MESH - ASTM A497
 - WATER TIGHT GASKETS BETWEEN SECTIONS - ASTM C443

GENERAL NOTES:
 1) CONTRACTOR TO:
 2) VERIFY ALL DIMENSIONS AND OPENING LOCATIONS
 3) REBAR MAY BE TACK WELDED OR TIED
 4) TOLERANCES PER ASTM C 478 STANDARD SPECIFICATIONS FOR REINFORCED CONCRETE MANHOLE SECTIONS
 5) ALUMINUM HATCH INTENDED FOR OFF STREET LOCATIONS THAT MAY OCCASIONALLY RECEIVE AASHTO H20 WHEEL LOAD

BOM		
#	QTY.	DESCRIPTION
1	4 EA	MEADOW BURKE A-ANCHOR MBA10871
2		A 706 #4@40 REBAR
3		A 706 #6@40 REBAR
4		6,000psi STD CONCRETE

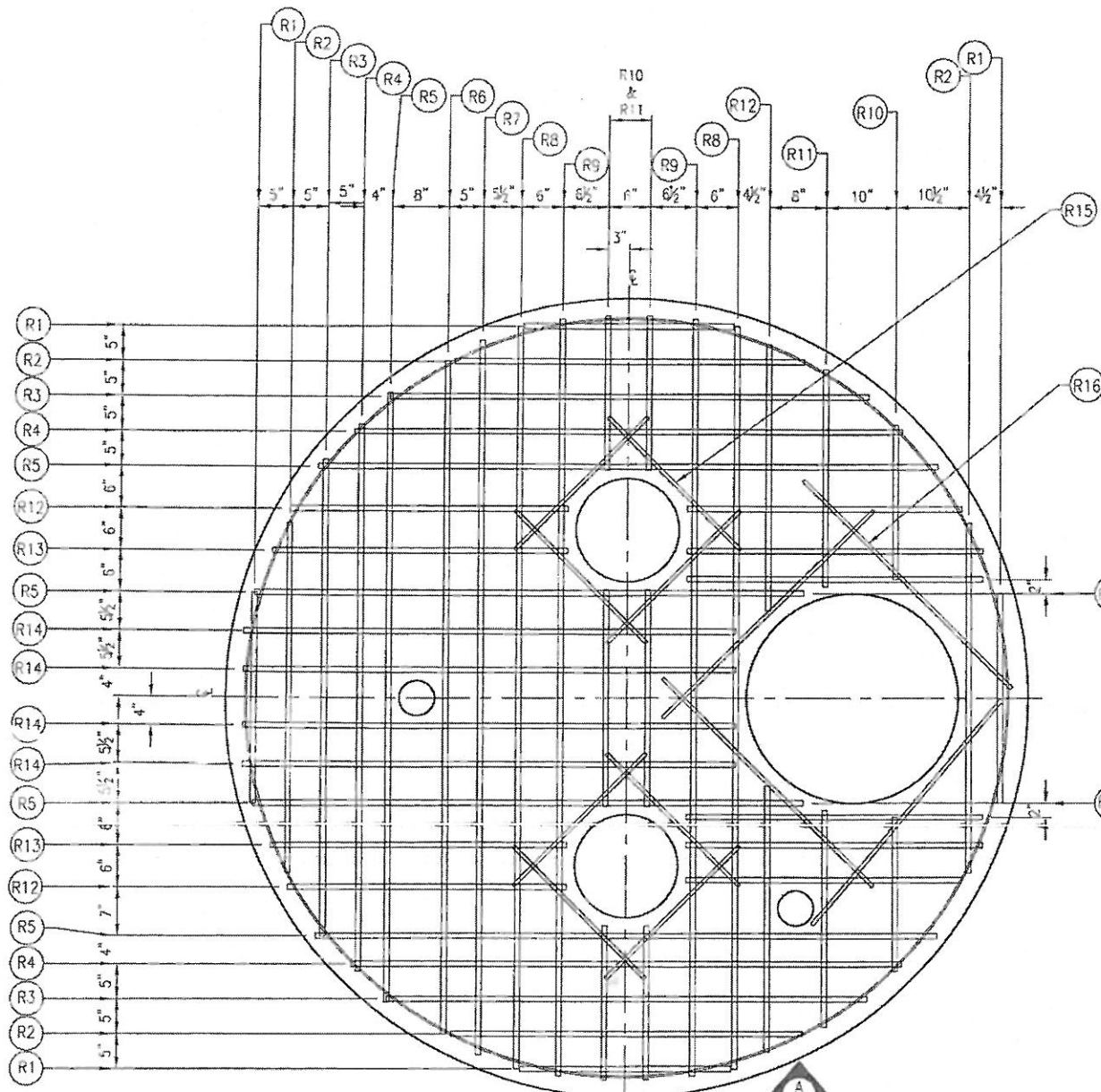
WEIGHTS / CONCRETE YD ³	
SECTION	WEIGHT
TOP SLAB	9,830 LBS / 2.379 CYD



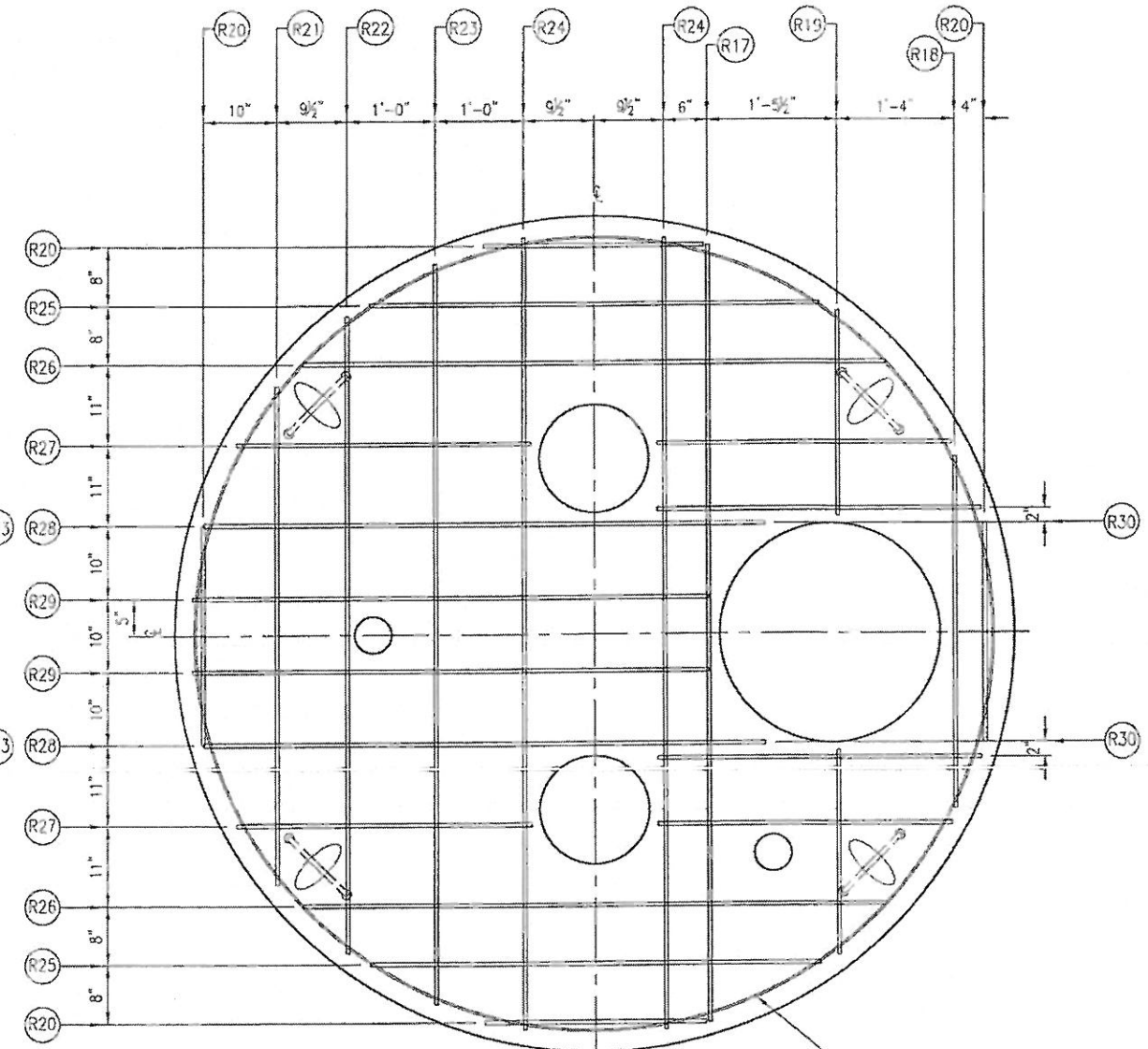
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9'-6"Ø (O.D.) PRECAST TOP SLAB
 SLAB FOR 8'Ø WET WELL
 MIRALOMA RECHARGE BASIN
 MIRALOMA, CA

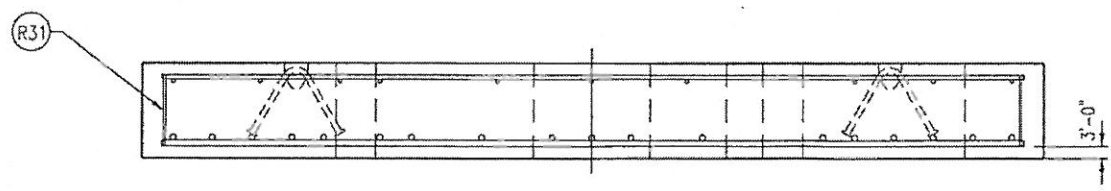
CUSTOMER					
ROMTEC					
DATE	SALES	DESIGN	ENGINEER	CHECKED	SALES ORDER
3/14/11	SD	VK	JM	JM	S144443
DRAWING NUMBER				REVISION	SHEET
000-S144443-001				REV DATE	1 OF 1



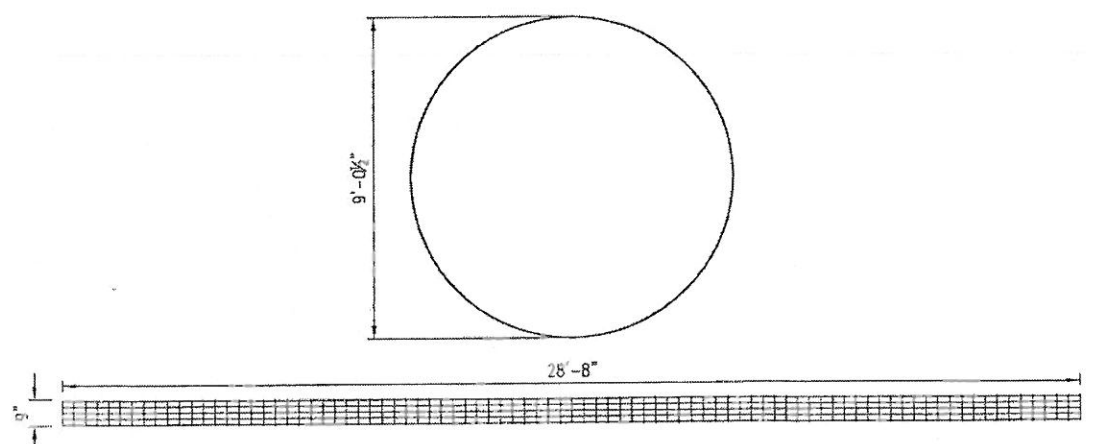
PLAN VIEW BOTTOM MAT
SCALE: 1/2" = 1'-0"



PLAN VIEW TOP MAT
SCALE: 1/2" = 1'-0"



VIEW A
SCALE: 1/2" = 1'-0"



R31 DETAIL
SCALE: 3/16" = 1'-0"

REBAR CUT LIST

R#	QTY.	MATERIAL	LENGTH
R1	4	#6 REBAR	2'-6"
R2	4	#6 REBAR	4'-2"
R3	3	#6 REBAR	5'-8"
R4	5	#6 REBAR	6'-6"
R5	3	#6 REBAR	7'-3"
R6	1	#6 REBAR	8'-0"
R7	1	#6 REBAR	8'-6"
R8	2	#6 REBAR	8'-10"
R9	2	#6 REBAR	9'-0"
R10	6	#6 REBAR	1'-10"
R11	4	#6 REBAR	2'-7"
R12	6	#6 REBAR	3'-3"
R13	5	#6 REBAR	3'-5"
R14	4	#6 REBAR	5'-11"
R15	8	#4 REBAR	2'-3"
R16	4	#4 REBAR	3'-6"
R17	1	#4 REBAR	8'-10"
R18	1	#4 REBAR	4'-0"
R19	2	#4 REBAR	2'-4"
R20	4	#4 REBAR	2'-6"
R21	1	#4 REBAR	5'-8"
R22	1	#4 REBAR	7'-3"
R23	1	#4 REBAR	8'-5"
R24	2	#4 REBAR	9'-0"
R25	2	#4 REBAR	5'-1"
R26	2	#4 REBAR	6'-7"
R27	4	#4 REBAR	3'-4"
R28	2	#4 REBAR	6'-4"
R29	2	#4 REBAR	5'-10"
R30	2	#4 REBAR	3'-8"
R31	1	2X2 MESH	21.5 SQ FT

BAR SIZE	WEIGHT
#4	112 LBS
#6	354 LBS
2X2-D3.5XW2	27 LBS



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9'-6"Ø (O.D.) PRECAST TOP SLAB

MIRALOMA RECHARGE BASIN
MIRALOMA, CA
CUSTOMER
ROMTEC

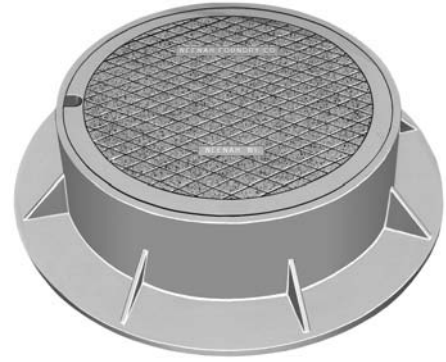
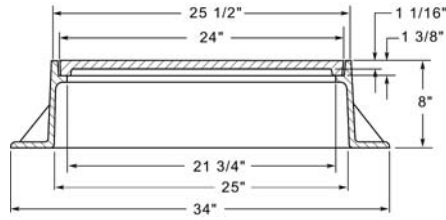
DATE	SALES	DRAWN	ENGINEER	CHECKED	BY/LOCATION
8/14/11	SD	VK	JM	JM	S144443
DRAWING NUMBER					REVISION
030-S144443-001					REV DATE
					7 OF 1

R-1555
Manhole Frame, Solid Lid

Heavy Duty



Available Grate: R-2555

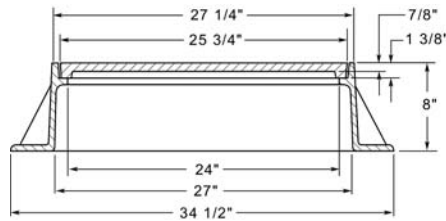


R-1556
Manhole Frame, Solid Lid

Heavy Duty



Available Grate: R-2556

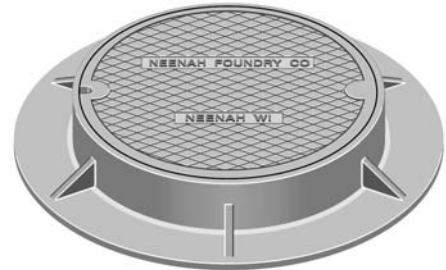
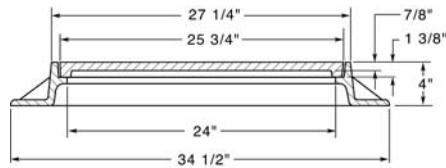


R-1556-A
Manhole Frame, Solid Lid

Heavy Duty



Available Grate: R-2556-A

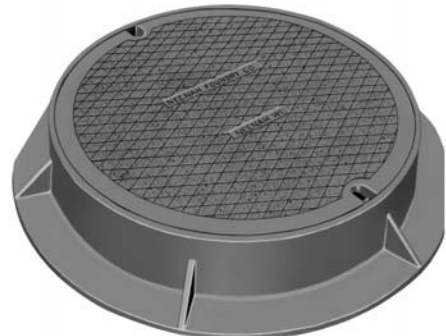
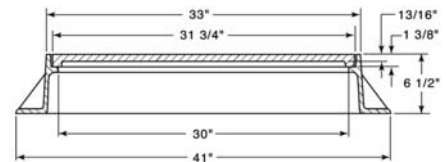


R-1557
Manhole Frame, Solid Lid

Heavy Duty



Available Grate: R-2557

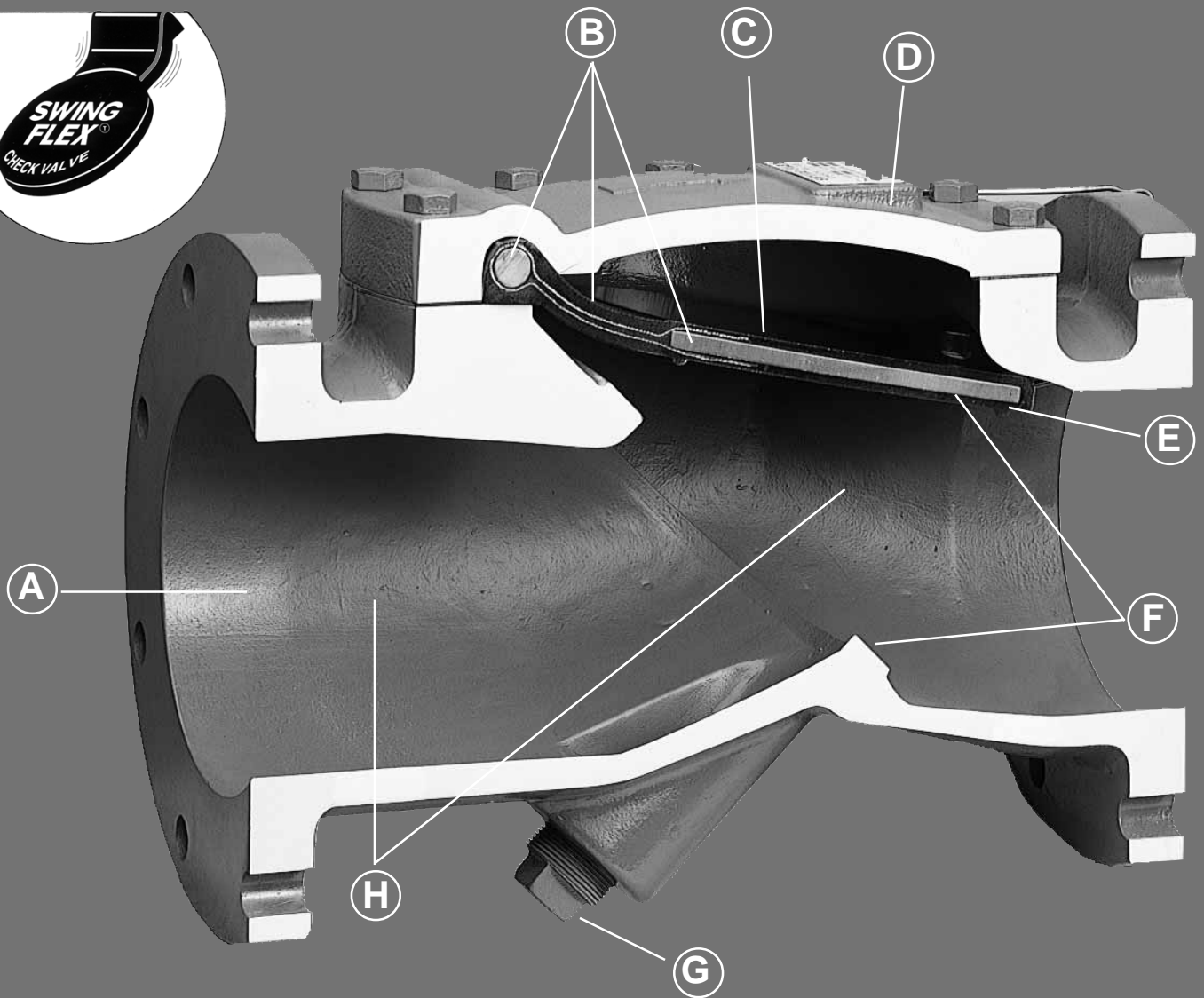


VAL-MATIC®



**EFFICIENCY &
RELIABILITY
THROUGH
SIMPLICITY
OF DESIGN**





A. 100% FLOW AREA

For improved flow characteristics and lower head loss, the Val-Matic *Swing Flex*™ Check Valve provides 100% unrestricted flow area.

B. REINFORCED DISC

The one piece precision molded disc is steel and nylon reinforced to provide years of trouble free performance. (Tested for proof of design—see page 4).

C. ONE MOVING PART

The *Memory-Flex*™ disc, the only moving part, assures long life with minimal maintenance. No packing or O-rings, mechanical hinges, pivot pins or bearings to wear out.

D. DOMED ACCESS PORT

Full size top access port allows removal of disc without removing valve from line.

E. DROP TIGHT SEATING

The synthetic reinforced disc, with its integral O-ring type seal design, assures positive seating at high and low pressures.

F. NON-SLAM CLOSURE

“Short Disc Stroke” combined with *Memory-Flex*™ Disc Action reduces potentially destructive water hammer.

G. BACKFLOW ACTUATOR

The body is drilled and tapped for field installation of the optional backflow actuator (see options).

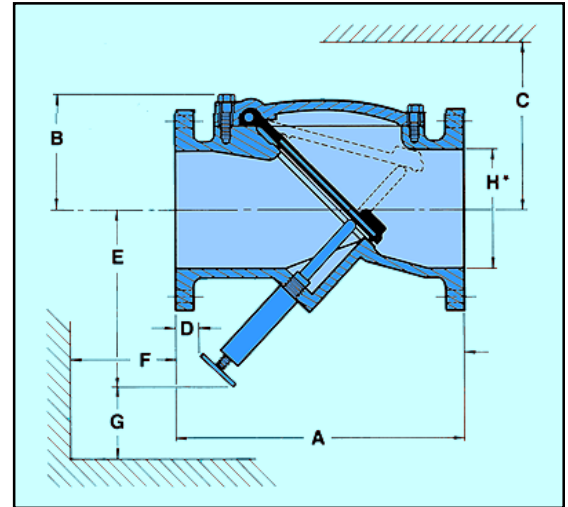
H. NON-CLOG DESIGN

The unrestricted full flow area combined with smooth streamlined contouring allows passage of large solids minimizing the potential for clogging.

INSTALLATION DIMENSIONS AND CONSTRUCTION

VALVE SIZE	MODEL NO.	A	B	C	D	E	F	G
2	502	8	3 ³ / ₈	8 ³ / ₈	-1 ¹ / ₂	6 ³ / ₈	7 ¹ / ₈	1 ¹ / ₂
2 ¹ / ₂	525	8 ¹ / ₂	3 ³ / ₈	8 ³ / ₈	-1 ¹ / ₂	6 ³ / ₈	5 ⁵ / ₈	1 ¹ / ₂
3	503	9 ¹ / ₂	3 ⁷ / ₈	9	-3 ³ / ₈	7 ¹ / ₂	3 ³ / ₄	1 ³ / ₄
4	504	11 ¹ / ₂	4 ⁵ / ₈	9 ⁵ / ₈	1 ¹ / ₂	7 ¹ / ₄	2 ⁵ / ₈	2 ⁵ / ₈
5	505	13 ³ / ₄	5 ¹ / ₈	10 ¹ / ₄	1 ³ / ₄	10 ⁷ / ₈	5 ¹ / ₄	2 ³ / ₄
6	506	15	5 ⁷ / ₈	11	2	13	6 ¹ / ₄	3 ³ / ₄
8	508	19 ¹ / ₂	7 ⁵ / ₈	13 ³ / ₄	3	16 ¹ / ₂	7 ¹ / ₂	4 ¹ / ₄
10	510	24 ¹ / ₂	9 ⁷ / ₈	16	4	19 ¹ / ₄	8	5 ³ / ₄
12	512	27 ¹ / ₂	11 ³ / ₈	18 ¹ / ₂	3 ¹ / ₂	22 ¹ / ₂	10	6 ¹ / ₂
14	514	31	13 ³ / ₈	20 ¹ / ₂	4	26 ¹ / ₄	11 ⁵ / ₈	7 ¹ / ₂
16	516	32	15 ³ / ₈	23 ¹ / ₂	4 ⁵ / ₈	30	13 ¹ / ₄	8 ⁵ / ₈
18	518	36	17 ¹ / ₈	25 ¹ / ₄	5 ¹ / ₄	33 ³ / ₄	15	9 ³ / ₄
20	520	40	19 ¹ / ₈	29 ¹ / ₄	5 ⁷ / ₈	37 ¹ / ₂	16 ⁵ / ₈	10 ⁷ / ₈
24	524	48	22 ³ / ₄	32 ³ / ₄	7	45	20	13

- Dimension "C" represents the clearance required to remove access cover.
- ▽ Dimension "D" extends PAST flange on valve sizes 4" thru 24".
- Dimensions "F" & "G" represent the clearance required to remove backflow actuator.



*Dimension "H" represents nominal valve size.

Note: Flanged ends conform to ANSI B16.1 Class 125.

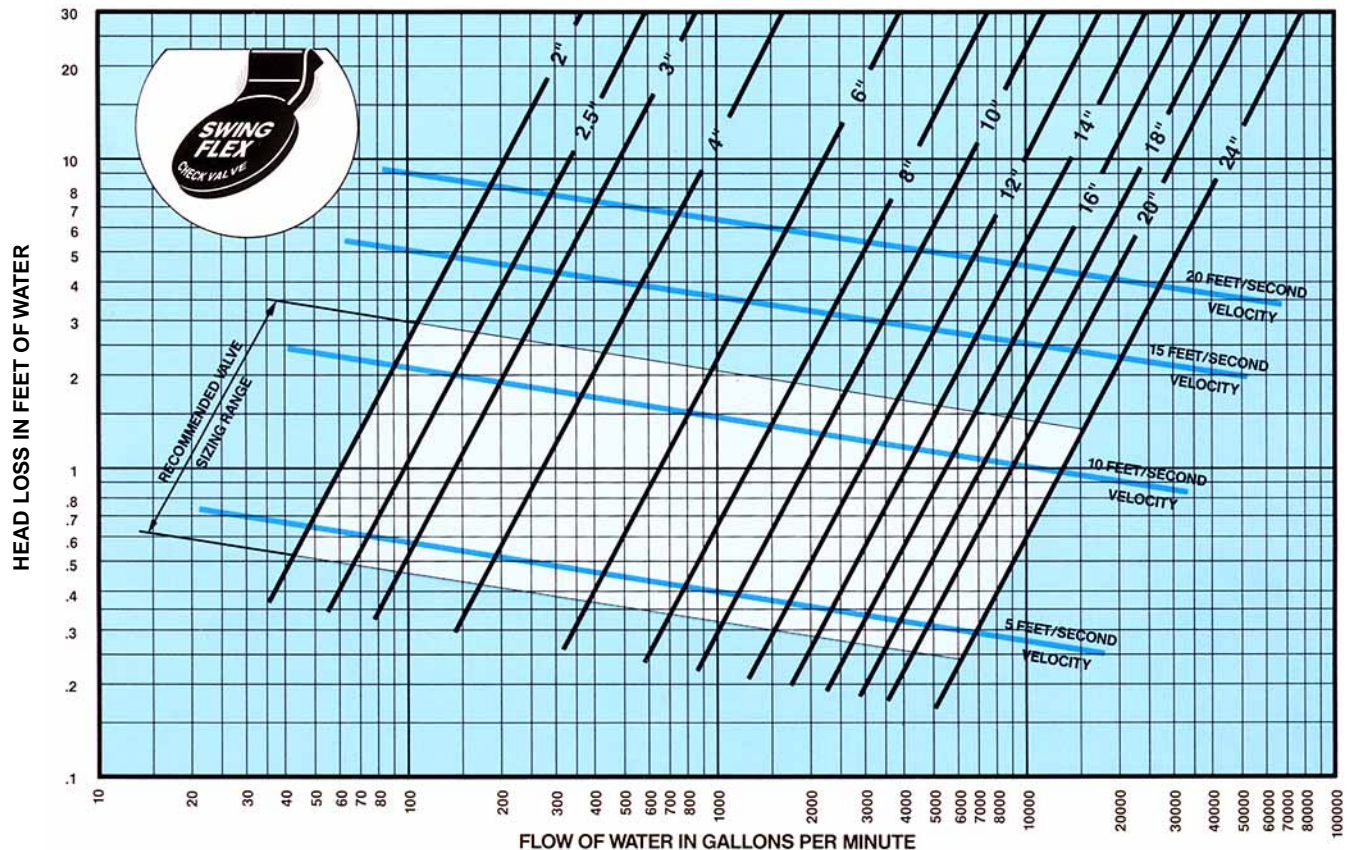
MATERIALS OF CONSTRUCTION		
Component	Standard	Optional
Body and Cover	Cast Iron ASTM A126, Class B	Ductile Iron, Bronze
Disc	Buna-N (NBR), ASTM D2000-BG	Viton (FPM), ASTM D2000-HK
Coatings	Interior	Epoxy
	Exterior	Universal Primer
		Rubber Lining
		Consult Factory

Consult factory for additional material and coating options.

ANSI MAXIMUM PRESSURE-TEMPERATURE RATING		
Maximum Non-Shock Working Pressure (P.S.I.) ANSI Class 125		
Temperature ° F	2" - 12"	14" - 24"
100°	200	150
150°		
200°	190	135
Hydrostatic Test Pressures	300	230

For Higher Temperatures Consult Factory

HEAD LOSS CHART



(Consult Factory for Air or Gas Service)

SAMPLE SPECIFICATIONS

The check valve shall be of the **Swing Flex™** full body flanged type, with a domed access cover and only one moving part, the valve disc.

The valve body shall have full flow equal to nominal pipe diameter at any point, through the valve. The seating surface shall be on a 45° angle to minimize disc travel. The top access port shall be full size, allowing removal of the disc without removing the valve from the pipeline. The access cover shall be domed in shape, to allow the disc to be fully operational in lines containing a high solids content.

The disc shall be of one piece construction, precision molded with an

integral O-ring type sealing surface and contain steel and nylon reinforcements in both the **Memory-Flex™** and central disc areas. The flex portion of the disc shall be warranted for twenty-five years. Non-slam closing characteristic shall be provided through a short 35° disc stroke and a **Memory-Flex™** disc return action.

Backflow capabilities shall be available by means of an optional screw type backflow actuator. The actuator shall be field installable without modification to the valve, a need for special tools or removal of the valve from line.

The valve body and cover shall be ASTM A126, Class B cast iron.

The disc shall be Buna-N (NBR), ASTM D2000-BG.

The interior of the valve shall be coated with an epoxy suitable for potable water. The exterior shall be coated with a universal primer.

The valve shall be cycle tested 1,000,000 times with no signs of wear or distortion to the valve disc or seat and shall remain drop tight at both high and low pressures. The test results shall be independently certified.

The valve shall be series 500 as manufactured by Val-Matic Valve and Manufacturing Corporation or approved equal.

QUALITY ASSURANCE

Quality Assurance at Val-Matic is the sum total of imaginative design, solid engineering, careful manufacturing and dedicated people, all combining to

insure customer satisfaction. We recognize the need for, and encourage, individual pride and the self-satisfaction which is gained in

producing sound, durable valves. This quality attitude permeates the corporation from the president through our newest employee.

INDEPENDENT PROOF OF DESIGN TEST

In the case of the Val-Matic **Swing Flex™** Check Valve, we have taken quality assurance one step further by having the valve cycle tested. Utilizing an eight-inch **Swing Flex™** with optional signal switch, the valve was cycled over 1,000,000 (one million) times. To place one million (1,000,000) cycles in perspective, it would take an average of 100 cycles per day for more than twenty-seven years to

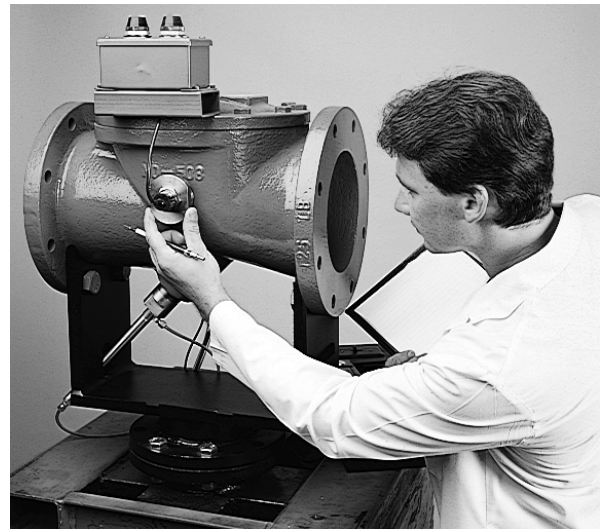
equal 1,000,000 cycles. Upon conclusion, PSI/Pittsburgh Testing Laboratory Division reported the following results:

1. After 1,000,000 cycles the valve's disc showed no signs of wear or distortion. The flexible hinge area showed no signs of fatigue or stress cracks.
2. After 1,000,000 cycles the valve seating areas showed no signs of

wear or distortion. The valve seating remained drop tight during the low and high pressure hydrostatic tests.

3. After 1,000,000 cycles the signal switch continued to function as designed.

Copies of the PSI/Pittsburgh Testing Laboratory Division report are available upon request.



EFFICIENCY... RELIABILITY ...BY DESIGN

Providing efficiency and reliability through simplicity of design is the key to the superior performance and long life of the Val-Matic **Swing Flex™** Check Valve.

ENERGY EFFICIENT...BY DESIGN

The streamline contour of the **Swing Flex™** body provides 100% flow area with no restrictions at any point through the valve (Figure 1). Flow tests performed by an independent laboratory have shown that this unique body design produces minimal head loss through the valve.

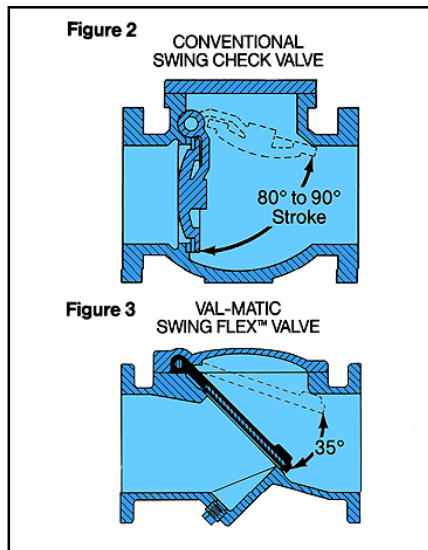
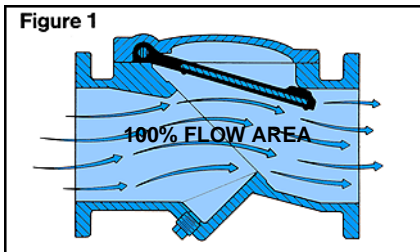
Flow and head loss charts, developed from the test data, are shown on page 3.

DISC STABILIZATION...BY DESIGN

In the full open position, the disc is stabilized by using body contouring to ease the direction of flow towards the disc assuring long disc life (Figure 1).

NON-CLOGGING... BY DESIGN

Clog resistant performance is achieved by maintaining an unobstructed 100% flow area, smooth streamline body contouring and the



simplicity of one moving part. The entrapment or hang-up of solids and stringy materials is minimized by the elimination of mechanical devices in the valve design.

NON-SLAM CLOSING...BY DESIGN

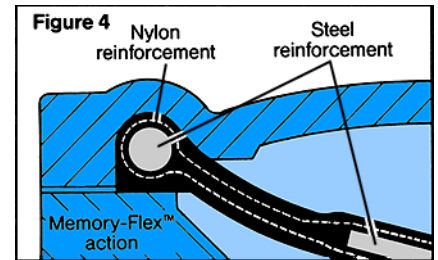
The non-slam closing characteristic of the **Swing Flex™** Check Valve is achieved by utilizing a "Short Disc Stroke" in conjunction with the unique "**Memory-Flex™** action" of the valve's disc. The 35° stroke, resulting from the angled seat, is less than half the typical 80° to 90° stroke of a conventional swing check valve (Figures 2 & 3). This feature is similar to that found in high performance tilted disc check valves. The considerable shorter disc stroke of the **Swing Flex™** valve, combined with the inherent "**Memory-Flex™** action" of the disc (Figure 4), acts to reduce the closing time of the valve. This reduced closing time

minimizes flow reversal and the resultant water hammer normally associated with the sudden stop of a reverse flow.

RELIABILITY... BY DESIGN

Operational reliability is achieved by utilizing only one moving part, the **Memory-Flex™** disc.

Extended life is designed into the disc by the inclusion of steel and nylon reinforcements. The steel and nylon are precision molded into the disc, providing a tough durable disc with a twenty-five year warranty* (Figure 4).

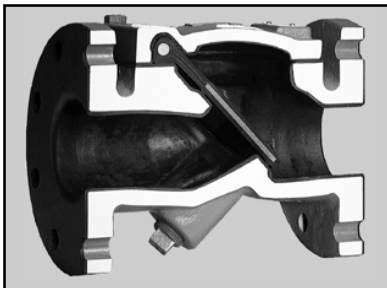


Unlike a conventional horizontal swing check valve, the **Swing Flex™** has no packing or O-rings, mechanical hinges, shafts, pivot pins, or bearings to wear out (Figure 4). To prove the point, we had the valve cycle tested 1,000,000 (one million) times. Upon conclusion of the test, the independent testing laboratory reported that the valve had no visible signs of wear and remained drop tight. (See page 4.)

POSITIVE SHUT OFF...BY DESIGN

The **Memory-Flex™** disc with its integral O-ring type seal design assures drop tight seating at both high and low working pressures. Each and every valve is tested to this standard. A certified report is available upon request.

OPTIONAL ACCESSORIES



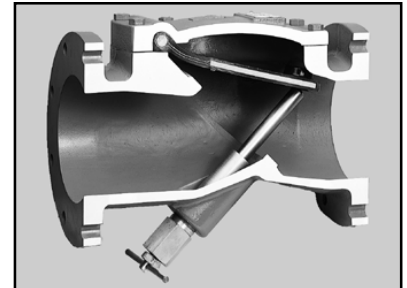
RUBBER LINING

The Val-Matic **Swing Flex™** Check Valve is designed to accept synthetic or natural rubber lining unlike conventional swing check valves. Body lining coupled with the synthetic **Memory-Flex™** disc makes the **Swing Flex™** ideally suited for systems containing abrasive or corrosive fluids.



SIGNAL SWITCH

A SCADA (Supervisory Control and Data Acquisition) compatible signal switch is available for applications requiring open/ close indication. The switch can be connected to optional signal lights on the valve, to a pump control panel, or to a SCADA system.



BACKFLOW ACTUATOR

A backflow actuator is available for use when manual backflow operation is required. It is most commonly used for priming pumps, backflushing, draining lines, and system testing. The Val-Matic Backflow Actuator can be installed at the factory or easily field mounted by system operators without the need for special tools or removal of the valve from the line.

*The Val-Matic warranty and its remedies are available for 25 years covering the flex portion of the disc.

SWING-FLEX[®] CHECK VALVE

SERIES NO. 500BFMI & 500ABFMI ANSI CLASS 125

STANDARD MATERIALS OF CONSTRUCTION

<u>PART NO.</u>	<u>PART NAME</u>	<u>MATERIAL</u>
1	BODY BODY	DUCTILE IRON ASTM A536, GRADE 65-45-12 (SERIES 500A) CAST IRON ASTM A126, CLASS B (SERIES 500)
2	COVER COVER	DUCTILE IRON ASTM A536, GRADE 65-45-12 (SERIES 500A) CAST IRON ASTM A126, CLASS B (SERIES 500)
3	DISC	BUNA-N W/ ALLOY STEEL & NYLON REINFORCEMENT
4	COVER SEAL (4"-12") COVER SEAL (2"-3", 14"-42")	BUNA-N COMPRESSED NON-ASBESTOS FIBER
5A	COVER BOLT	ALLOY STEEL SAE GRADE 5, PLATED
5B	COVER BOLT NUT (4"-12")	ALLOY STEEL, PLATED
5C	WASHER	ALLOY STEEL, PLATED
6	BACKFLOW ACTUATOR (OPTIONAL)	BRASS
14	MECHANICAL INDICATOR (OPTIONAL, SIZES 3"-42")	STAINLESS STEEL, TYPE 316

NOTE: ALL SPECIFICATIONS AS
LAST REVISED.

MATERIALS OF CONSTRUCTION

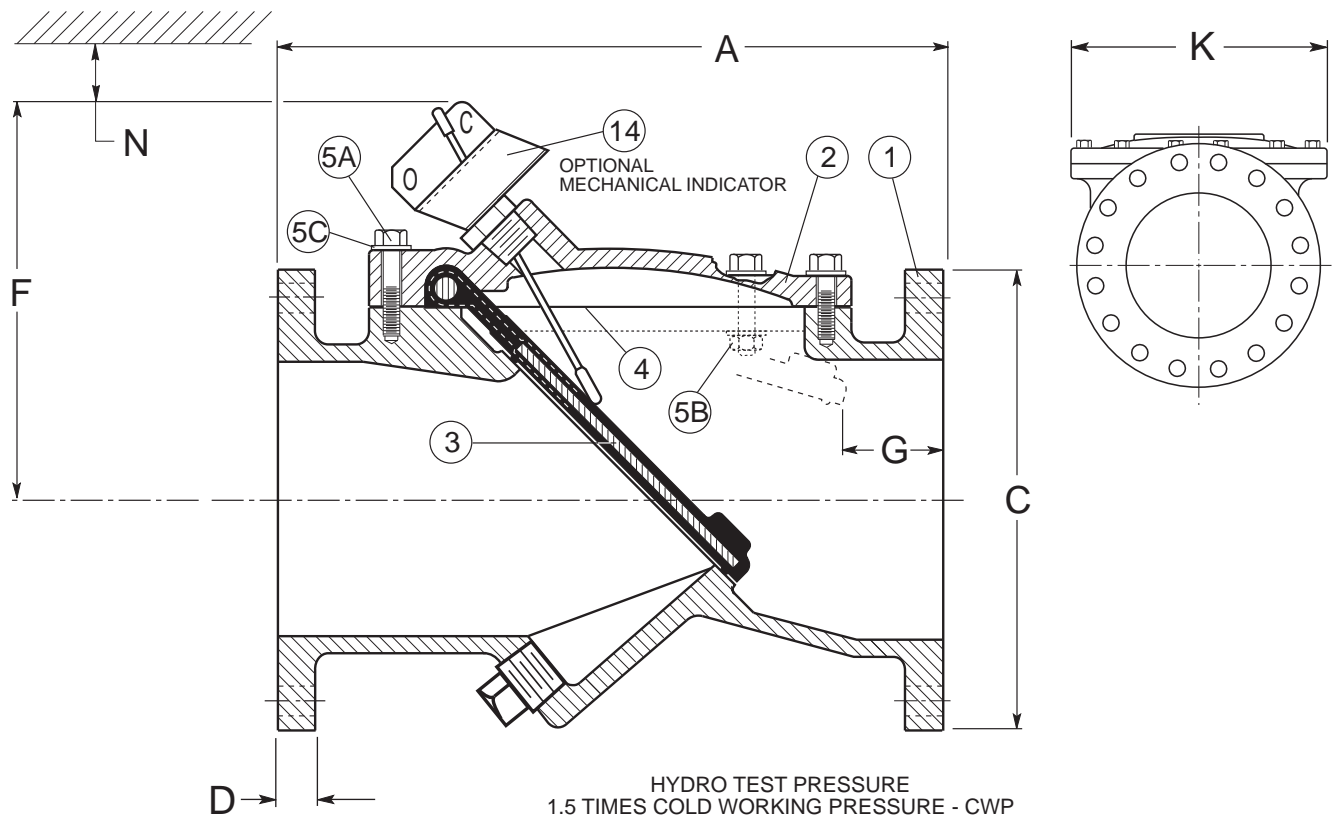
DATE 11/17/08

VAL-MATIC[®]

VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-502ABFMI-M



NOTE

DIMENSION "N" REPRESENTS THE MINIMUM CLEARANCE REQUIRED TO REMOVE OR INSTALL MECHANICAL INDICATOR.

SEE DRAWING NO. VM-503AMI-M FOR STANDARD MATERIALS OF CONSTRUCTION.

ANSI CLASS 125												
VALVE SIZE	MODEL NO.	CWP (PSI)	A	C	D	F	G	K	N	BOLT SIZE	NO. OF BOLTS	SHPG WT.
3	503AMI	250	9.50	7.50	0.75	7.63	1.63	7.50	2.00	5/8	4	45
4	504AMI	250	11.50	9.00	0.93	8.25	2.12	8.25	2.00	5/8	8	70
6	506AMI	250	15.00	11.00	1.00	9.38	2.12	11.12	2.00	3/4	8	130
8	508AMI	250	19.50	13.50	1.12	11.00	2.88	16.00	3.25	3/4	8	250
10	510AMI	250	24.50	16.00	1.18	13.38	3.12	21.00	3.25	7/8	12	430
12	512AMI	250	27.50	19.00	1.25	15.00	3.43	24.00	4.50	7/8	12	660
14	514AMI	250	31.00	21.00	1.38	17.63	3.63	23.25	4.50	1	12	750
16	516AMI	250	32.00	23.50	1.43	18.88	3.25	25.25	4.50	1	16	900
18	518AMI	250	36.00	25.00	1.56	20.00	3.12	28.25	4.50	1 1/8	16	1230
20	520AMI	250	40.00	27.50	1.68	21.38	3.50	30.63	7.75	1 1/8	20	1750
24	524AMI	250	48.00	32.00	1.88	23.88	5.00	36.00	7.75	1 1/4	20	2400
30	530MI	150	56.00	38.75	2.13	27.63	5.75	45.88	8.00	1 1/4	28	5110
30	530AMI	250	56.00	38.75	2.13	27.63	5.75	45.88	8.00	1 1/4	28	5110
36	536MI	150	63.00	46.00	2.38	31.00	3.88	55.00	8.00	1 1/2	32	6700
36	536AMI	250	63.00	46.00	2.38	31.00	3.88	55.00	8.00	1 1/2	32	6700
42	542MI	150	70.00	53.00	2.63	39.12	0.12	60.18	8.00	1 1/2	36	9110
42	542AMI	250	70.00	53.00	2.63	39.12	0.12	60.18	8.00	1 1/2	36	9110

Revised 2-10-09

SWING-FLEX® CHECK VALVE W/ INDICATOR

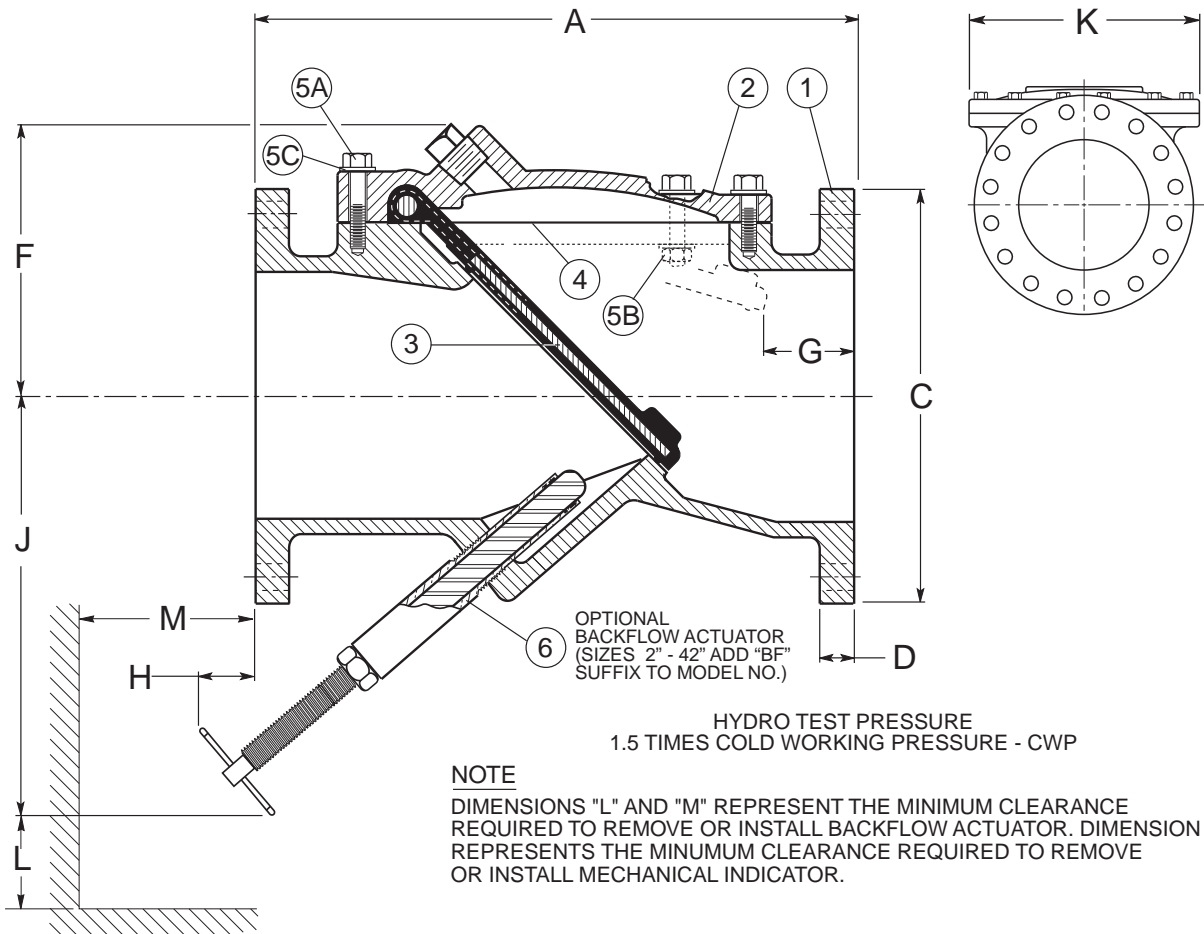
DATE 8-13-08



VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-503AMI



NOTE

DIMENSIONS "L" AND "M" REPRESENT THE MINIMUM CLEARANCE REQUIRED TO REMOVE OR INSTALL BACKFLOW ACTUATOR. DIMENSION "N" REPRESENTS THE MINIMUM CLEARANCE REQUIRED TO REMOVE OR INSTALL MECHANICAL INDICATOR.

SEE DRAWING NO. VM-502ABF-M FOR STANDARD MATERIALS OF CONSTRUCTION.

ANSI CLASS 125

VALVE SIZE	MODEL NO.	CWP (PSI)	A	C	D	F	G	*H	J	K	L	M	BOLT SIZE	NO. OF BOLTS	SHPG. WT.
2	502ABF	250	8.00	6.00	0.63	3.38	1.63	-0.50	6.75	5.18	1.50	1.50	5/8	4	27
2 1/2	525ABF	250	8.50	7.00	0.68	3.38	1.63	-0.50	7.00	5.18	1.50	1.50	5/8	4	32
3	503ABF	250	9.50	7.50	0.75	5.12	1.63	-0.38	7.50	7.50	1.50	1.50	5/8	4	45
4	504ABF	250	11.50	9.00	0.93	5.75	2.12	3.38	10.75	8.25	2.50	2.50	5/8	8	70
6	506ABF	250	15.00	11.00	1.00	6.88	2.12	1.38	11.38	11.12	3.00	3.00	3/4	8	130
8	508ABF	250	19.50	13.50	1.12	8.38	2.88	2.00	15.75	16.00	5.75	5.75	3/4	8	250
10	510ABF	250	24.50	16.00	1.18	10.75	3.12	0.50	17.00	21.00	5.75	5.75	7/8	12	430
12	512ABF	250	27.50	19.00	1.25	12.50	3.43	3.50	22.50	24.00	8.50	8.50	7/8	12	680
14	514ABF	250	31.00	21.00	1.38	13.00	3.63	4.00	26.25	23.25	6.50	6.50	1	12	750
16	516ABF	250	32.00	23.50	1.43	14.25	3.25	4.63	30.00	25.25	6.50	6.50	1	16	900
18	518ABF	250	36.00	25.00	1.56	15.25	3.12	5.25	33.75	28.25	6.50	6.50	1 1/8	16	1230
20	520ABF	250	40.00	27.50	1.68	16.88	3.50	5.88	37.50	30.63	8.00	8.00	1 1/8	20	1750
24	524ABF	250	48.00	32.00	1.88	19.25	5.00	7.00	45.00	36.00	8.00	8.00	1 1/4	20	2400
30	530BF	150	56.00	38.75	2.12	23.00	5.75	-0.63	41.25	45.88	8.00	8.00	1 1/4	28	5110
30	530ABF	250	56.00	38.75	2.12	23.00	5.75	-0.63	41.25	45.88	8.00	8.00	1 1/4	28	5110
36	536BF	150	63.00	46.00	2.38	27.38	3.88	-.38	49.00	55.00	9.75	9.75	1 1/2	32	6700
36	536ABF	250	63.00	46.00	2.38	27.38	3.88	-.38	49.00	55.00	9.75	9.75	1 1/2	32	6700
42	542BF	150	70.00	53.00	2.63	36.88	0.12	-5.50	53.50	60.18	9.75	9.75	1 1/2	36	9110
42	542ABF	250	70.00	53.00	2.63	36.88	0.12	-5.50	53.50	60.18	9.75	9.75	1 1/2	36	9110

* DIMENSION "H" DOES NOT EXTEND PAST FLANGE ON VALVE SIZES 2" THRU 3", 30" THRU 42"

Revised 2-10-09

SWING-FLEX® CHECK VALVE W/ BACKFLOW ACTUATOR

DATE 8-13-08

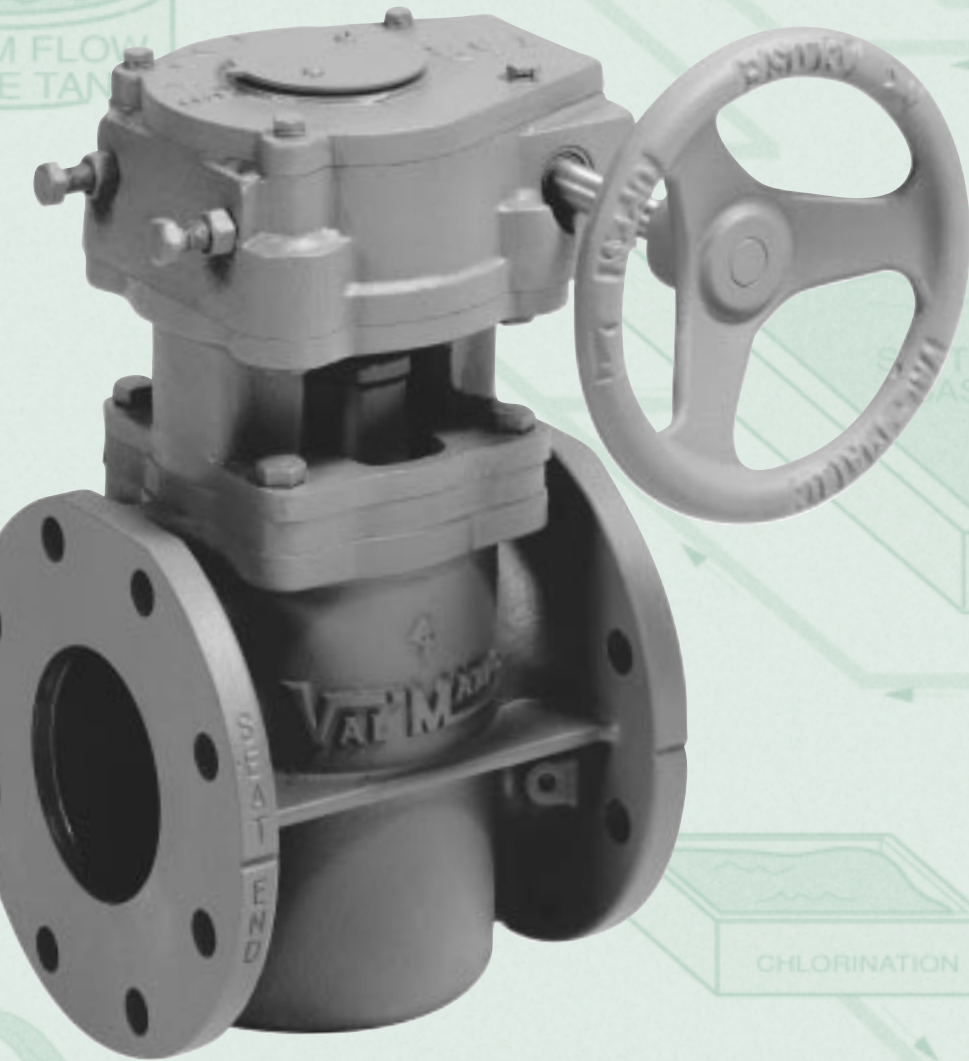


VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-502ABF

VAL-MATIC®



**TRADITIONAL
FEATURES**



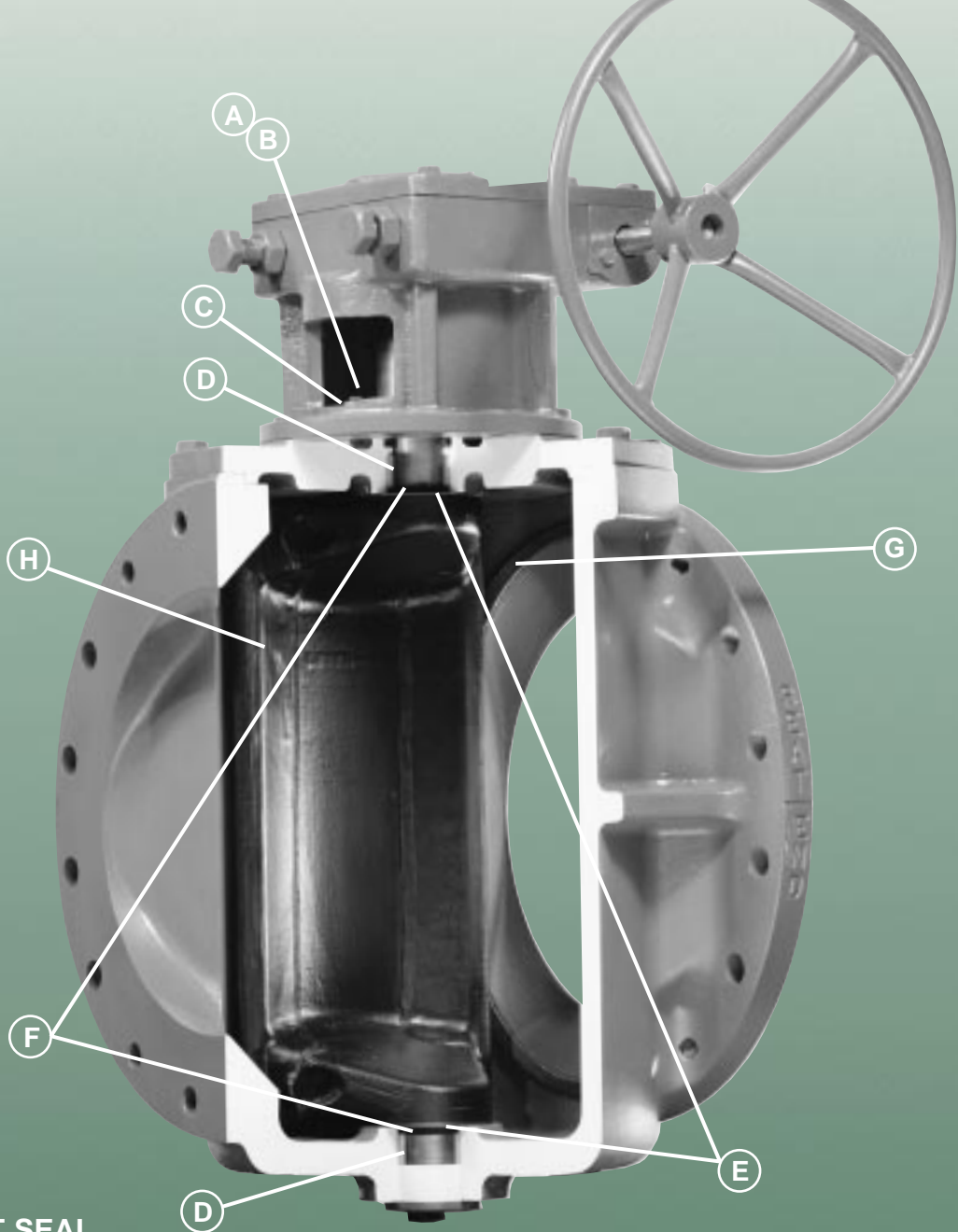
**ADVANCED
TECHNOLOGY**

EFFLUENT



**TRADITIONAL
FEATURES**

■
**ADVANCED
TECHNOLOGY**



**VAL-MATIC® SHAFT SEAL
SYSTEM WITH EXCLUSIVE
POP™ SHIMS (PACKING
OVERLOAD PROTECTION)**

- A. ADJUSTABLE PACKING FOLLOWER**
Meets recommended requirements for adjustment of Vee type packing.
- B. VEE TYPE PACKING**
Field adjustable and replaceable without removal of actuator.
- C. REMOVABLE POP™ SHIMS**
Packing Overload Protection Shims protect packing by preventing overloading by field personnel. (Patent applied for)

**VAL-MATIC®
BEARING PACKAGE**

- D. RADIAL BEARINGS**
Heavy Duty, Stainless Steel, Permanently Lubricated.
- E. THRUST BEARING**
Lower: Stainless Steel
Upper: Teflon®

**VAL-MATIC® GRIT-GUARD™
BEARING AND PACKING
PROTECTOR**

- F. A VAL-MATIC® EXCLUSIVE**
The Grit-Guard™ shaft seal extends packing and bearing life by minimizing contact with line media.

**VAL-MATIC®
SEATING SYSTEM**

*Performance Enhanced
Technology*

- G. SEAT**
Welded overlay of 99% pure nickel applied directly to the body using a state-of-the art robotic welding system for a consistent, high quality weld. (2 1/2" and larger)
- H. PLUG**
Resilient facing formulated by Val-Matic® and leading industry rubber experts to assure a tight seal and long life.

Teflon is a registered trademark of DuPont.

Technical papers discussing the technical enhancements of the Val-Matic® seating and shaft seal systems is available. Please contact Val-Matic® for complimentary copies.

WHY AN ECCENTRIC PLUG VALVE?

Installed in thousands of applications the world over, the eccentric plug valve has proven itself as the valve of choice in wastewater and water applications. Unlike a multi-turn gate valve, the eccentric plug valve is a 1/4 turn valve allowing cost effective, low torque actuation for shut-off and throttling service. And while the gate valve leaves its operating stem exposed to the flow, the plug valve shaft and gear are both removed from the flow and protected from the media. Slurries and sewage are easily handled without clogging and with minimal headloss due to the valves linear flow path. The valve's eccentric action rotates the plug in and out of the seat without scraping or binding. The combination of the eccentric action and heavy duty nickel seat assures long life with minimal maintenance.

WHY CAM-CENTRIC?

TRADITIONAL FEATURES...

of the Cam-Centric include the features engineers and operators have come to expect in a plug valve. Adjustable and replaceable Vee-Type packing is standard as are stainless steel, permanently lubricated radial bearings and a welded nickel seat. Val-Matic has been able to enhance the performance of these features through

...ADVANCED TECHNOLOGY

By incorporating the latest in design, material and manufacturing technologies, Val-Matic has significantly improved upon these time proven features.

SHAFT SEAL SYSTEM

Vee-Type packing leaks for two reasons. It's worn, or the gland follower has been over tightened destroying the packing's sealing capabilities. Val-Matic has enhanced the traditional design of Vee-Type packing systems to reduce wear and prevent over tightening of the follower.

Wear is reduced by the Grit-Guard™ seal which prevents grit, the prime cause of wear, from reaching the

bearings and packing. The seals are supplied standard in both the upper and lower journals. (Figure 1 & 2)

To prevent the packing from being over tightened, the shaft seal incorporates POP™ (Packing Overload Protection) Shims. Adjustment is easily accomplished by removing shims as necessary by utilizing the pull tab feature. (Figure 1) Any minimal maintenance required to the Cam-Centric shaft seal can be done without removal of the actuator. This includes removal/ replacement of the packing as well as removal of shims. The shaft seal fully complies with ANSI/AWWA C504.

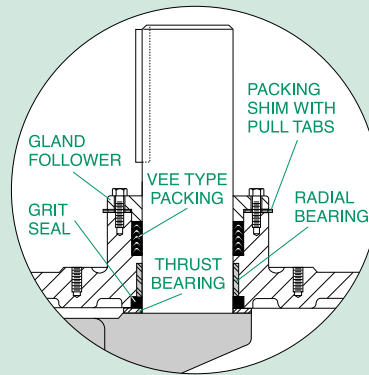


Figure 1: Upper Bearing Journal

CAM-CENTRIC BEARING PACKAGE

The Cam-Centric bearing package consists of T316 stainless steel, permanently lubricated Radial Bearings in both the upper and lower journals. Thrust bearing of Teflon (upper journal) and T316 Stainless Steel (lower journal) are also provided. Like the packing, the bearings are protected from grit related wear by the Grit-Guard™ grit seal. (Figure 1 & 2)

CAM-CENTRIC SEATING SYSTEM

The Cam-Centric utilizes a resilient faced plug formulated by Val-Matic



Robotic welding of nickel seat

in conjunction with leading industry rubber experts to assure a tight seal and long life. Its mating surface, the nickel seat is applied directly to a machined surface on the valve body using a state-of-the-art robotic welding system for a consistent, high quality weld.

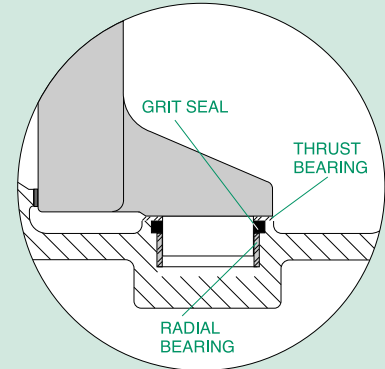


Figure 2: Lower Bearing Journal

PROOF OF DESIGN TESTING

The Cam-Centric has been subjected to rigorous testing per the requirements of ANSI/AWWA C504. All valve and actuation tests were third party witnessed and were successfully completed. Copies of the test reports are available from Val-Matic.

INCREASED PORT AREA FOR INCREASED FLOW

Cam-Centric® plug valves are designed to provide low headloss to maximize flow and reduce operating costs. 100% port areas are standard on valves 4" and smaller, optional on valves 6" and larger. Standard port areas for 6" and larger valves are larger than traditional rectangular ported valves.

A WORD ABOUT ANSI/AWWA COMPLIANCE

While most plug valve shaft seal and testing specifications refer to ANSI/AWWA C504, it should be remembered that C504 is a butterfly valve standard written for rubber seated butterfly valves for use in raw or potable water service. It was not written for plug valves, nor was it written for untreated wastewater to which plug valves are typically subjected. The reason the plug valve exists is because other valves, like the butterfly, are unable to handle solids bearing flow. For this reason, it is suggested that the specifier look at the requirements of ANSI/AWWA C504 as minimal requirements. Specify a valve that not only meets the requirements of C504 but exceeds them.



**TRADITIONAL
FEATURES**

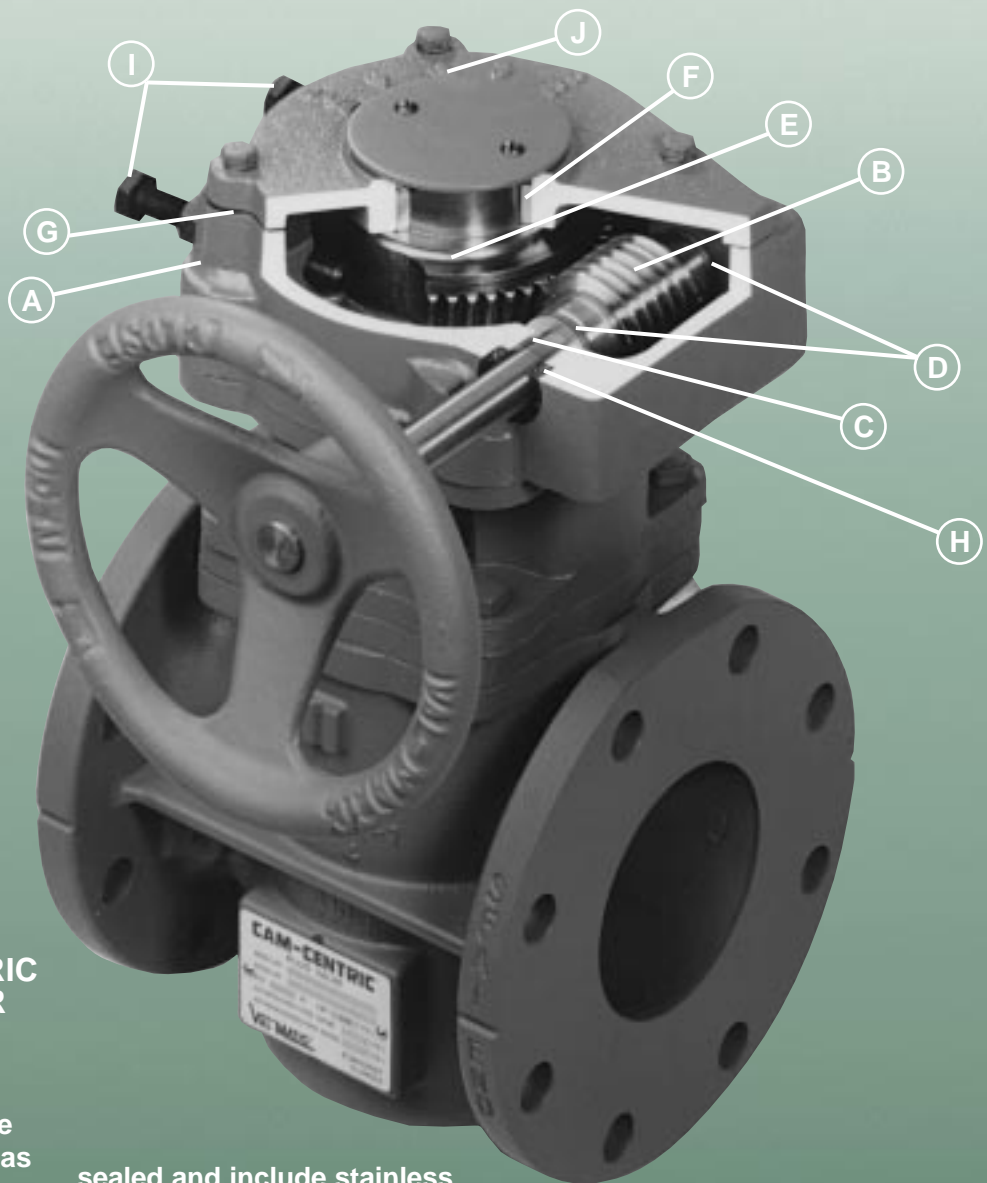


**ADVANCED
TECHNOLOGY**

**VAL-MATIC® CAM-CENTRIC
WORM GEAR ACTUATOR**

*A QUALITY GEAR FOR A
QUALITY VALVE*

A valve actuator must be able to perform to the same level as the valve. The Cam-Centric worm gear is designed and built to provide the same long term service as the Cam-Centric Valve. The exclusive bearing package in the Cam-Centric worm gear includes four bronze sleeve bearings and two roller thrust bearings. This exclusive package assures smooth operation and long life regardless of the valve's orientation or application. The ductile iron segment gear coupled with upper and lower bronze radial bearings exceeds the requirements of AWWA C504 for strength and durability. All worm gears are designed to exceed, without damage, a rim pull of 200 pounds on handwheels and input torques of 300 foot pounds for operator nuts. Buried service worm gears are grease packed and



sealed and include stainless steel shafts. Worm gears can be provided with handwheels, chainwheels or 2" operator nuts.

- A. HOUSING**
Heavy duty, totally enclosed and sealed.
- B. WORM**
Hardened steel for durability and long life
- C. RADIAL SHAFT BEARINGS**
Bronze shaft bearings extend life and provide ease of operation (rear shaft bearing not visible).
- D. ROLLER THRUST BEARINGS**
Provides smooth operation and extends life.
- E. SEGMENT GEAR**
Heavy duty ductile iron for high strength. Provided with precision bore and keyway for connection to the valve shaft in multiple positions.
- F. SEGMENT GEAR RADIAL BEARINGS**
Upper and lower bronze bearings provide ease of operation and extend life (lower bearing not visible).
- G. COVER GASKET**
Seals housing and prevents foreign matter from entering valve.
- H. SHAFT SEAL**
Prevents foreign matter from entering the valve.
- I. EXTERNAL STOPS**
Both open and closed stops are adjustable without removal of the valve cover.
- J. POSITION INDICATOR**
Above ground only

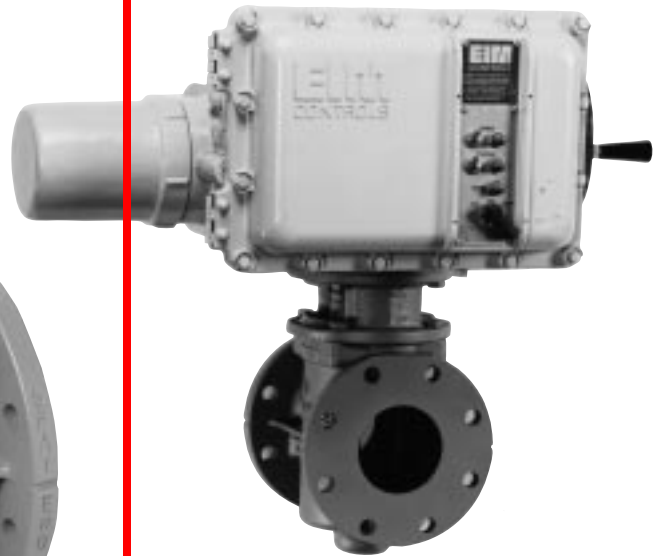
ACTUATORS

The Cam-Centric is available with a wide range of actuation options. From pump check to lever operated, Val-Matic is well prepared to meet your specification requirements. Options include 2" operator nuts, worm gears, chain wheels, electric and cylinder actuation. A wide variety of mounting options such as floor stands and extension bonnets are also available

(see accessories on page 7). Val-Matic Engineering personnel meet on a regular basis with cylinder and electric actuation manufacturers to assure actuator/valve compatibility. This helps assure the actuator you specify will deliver the performance you expect when coupled with a Cam-Centric Plug Valve.

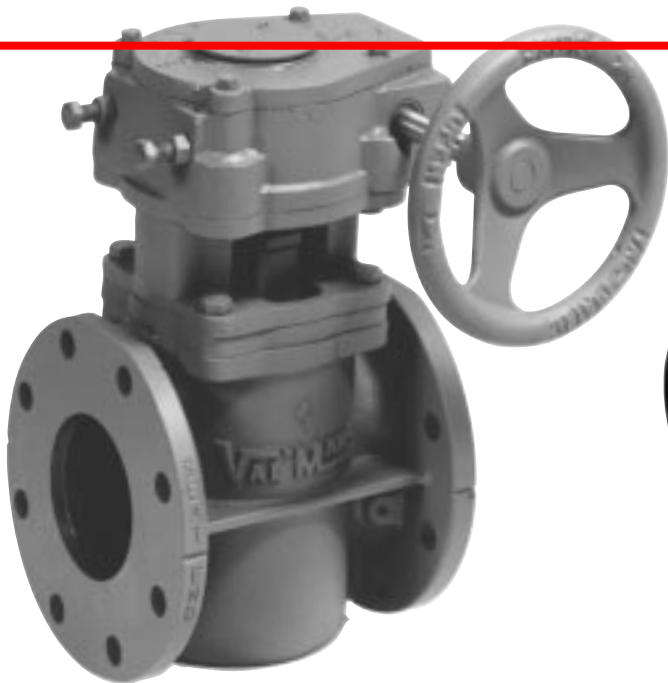
Direct nut operated valve with memory stop:

- Use with tee handles, levers, chain handles and extension stems. Supplied standard with memory stop for HVAC applications.



Electric Actuation Including:

- 110 Single Phase, 230/460 Three Phase
- Compliance with AWWA C540 for Power Actuation
- Modulating Service
- Throttling Service
- Remote push button control and indication
- Torque Switches, Limit Switches
- De-clutchable hand wheels



Val-Matic Worm Gears:

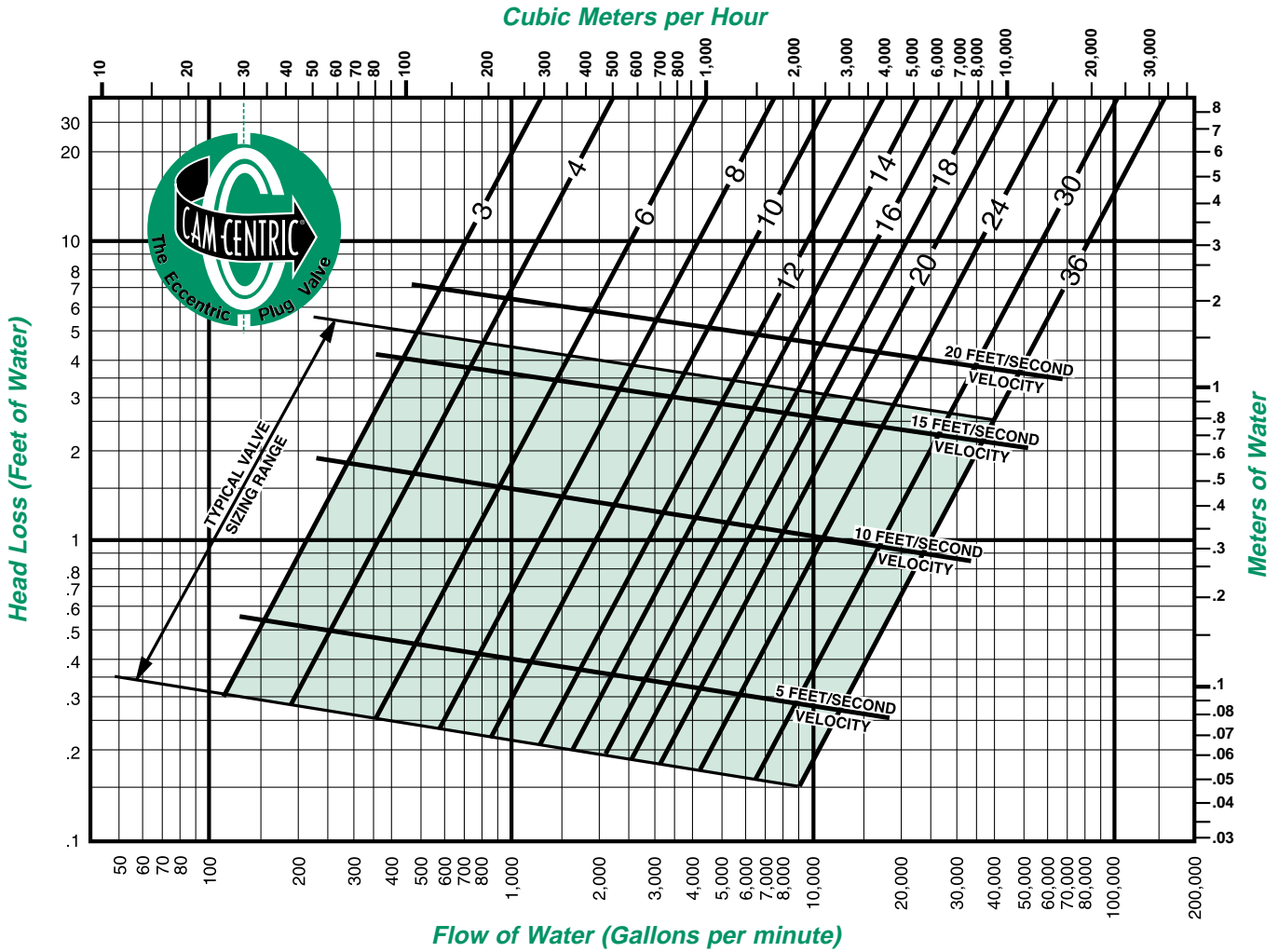
- Heavy Duty, totally enclosed and sealed
- Designed and built by Val-Matic
- For above ground and buried service applications
- Bronze radial bearings and roller thrust bearings provide smooth operations and extended life



Cylinder Actuation Including:

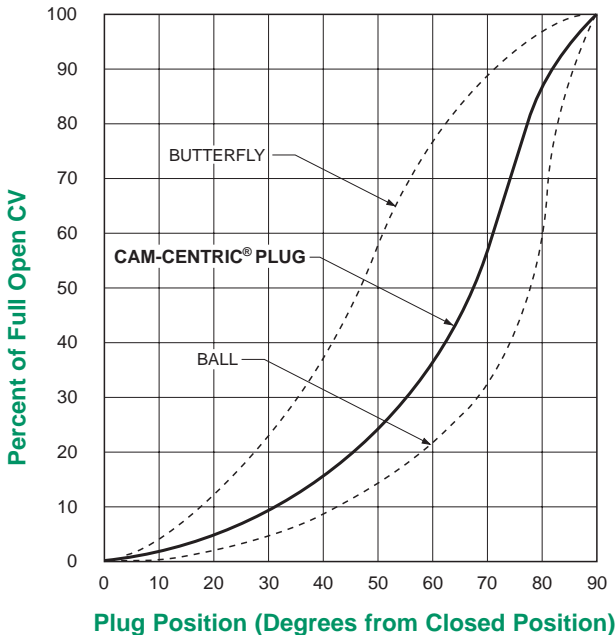
- Pneumatic/Hydraulic
- Air/Oil
- Single Acting or Double Acting
- Fail Open/Closed for power failure
- Modulating Service
- Throttling Service
- Limit Switches, Solenoid Valves, Positioners
- Manual Overrides
- Pump Check

FLOW CHARACTERISTICS



FLOW COEFFICIENTS															
Valve Size	1"	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"
C_V^*	37	150	320	570	1,200	2,070	3,250	4,750	6,150	8,050	10,200	12,600	18,100	28,300	40,700

* C_V = the number of U.S. Gallons/Minute of 60° F water that will flow through the valve with a 1 psi pressure drop.



INHERENT FLOW CHARACTERISTICS

To control pressure surges and provide good controllability, the flow characteristics of valves should be considered.

The graph at left shows the inherent flow characteristics at a constant ΔP for various valves.

The Plug valve has an inherent flow characteristic similar to a ball valve. When installed in a pipeline, the plug valve will approximate a linear flow characteristic because the piping system pressure losses will shift the flow curve to the left. A linear installed flow characteristic will help control surges and provide a wide range of controllability.

MATERIALS OF CONSTRUCTION PRESSURE/TEMPERATURE RATINGS

MATERIALS OF CONSTRUCTION	
COMPONENT	STANDARD
Body, Cover and Plug	Cast Iron ASTM A126 Class B
Seating Surfaces	*Welded Nickel Overlay Resilient Plug Facing
Exterior Coating	Universal Primer

NOTE: Val-Matic offers a variety of optional materials, coatings and linings. Please consult factory for available options.
*2-1/2" and larger.

MAXIMUM NON-SHOCK PRESSURE-TEMPERATURE RATING, PSIG		
TEMPERATURE °F / VALVE SIZE	1" - 12"	14" - 36"
100	175	150
150	175	150
200	150	135
Hydrostatic Test Pressure	263	225

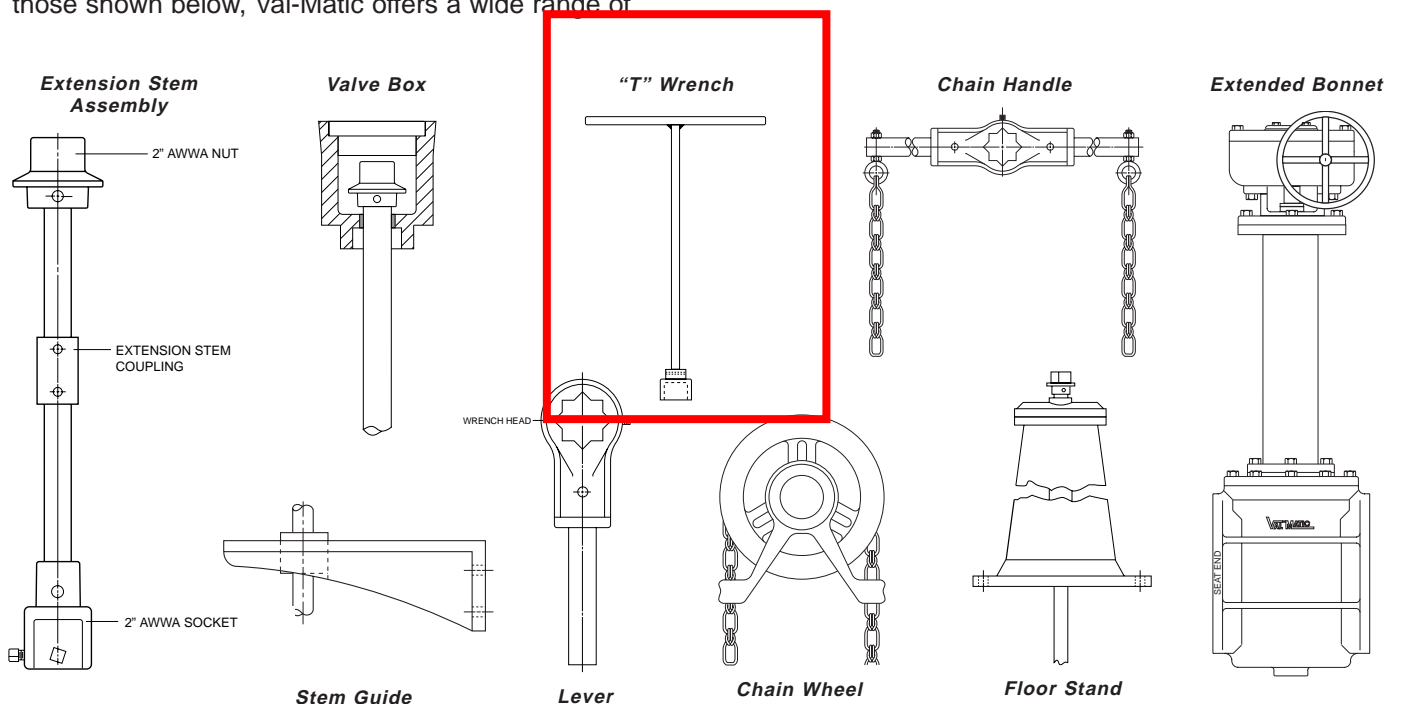
NOTES:

- Above ratings are valve ratings. Actuator ratings (shut-off differential pressure) are included under Valve Dimensions and Actuator Selection on page 9.
- Gas service applications require a worm gear, cylinder or power actuator. Valve orders for gas service should specify the application.
- Worm gear actuation is recommended for all buried service valves.

ACCESSORIES

Space limitations and applications such as submerged service often require special accessories. In addition to those shown below, Val-Matic offers a wide range of

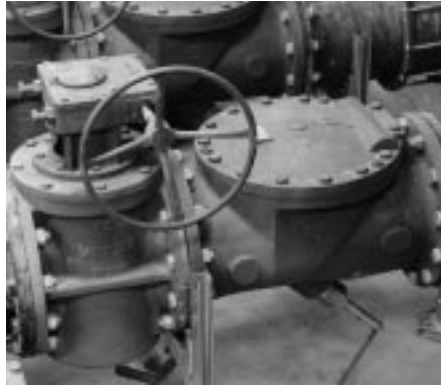
accessories to meet your application requirements. Please consult the factory for assistance.



APPLICATIONS / FEATURES



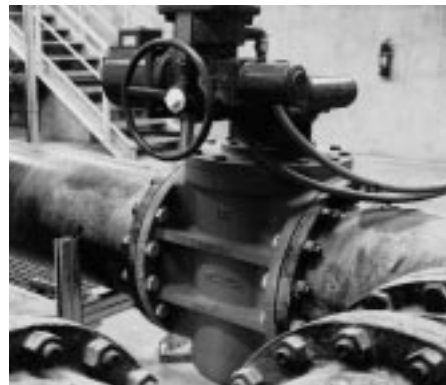
18" Cam-Centric® plug valve with motor actuator.



14" Cam-Centric® plug valve with Val-Matic® Swing-Flex® Check Valve.



20" and 16" Cam-Centric® plug valves with worm gears and motor actuators.



18" motor actuated Cam-Centric® plug valve.



16" Cam-Centric® plug valve with extension stem and motor actuator.



16" Cam-Centric® plug valve. Cylinder actuated with hydraulic, manual override.

APPLICATIONS			
Potable Water	✓	Sludge	✓
Raw Water	✓	Primary Effluent	✓
Secondary Wastewater Effluent	✓	Salt Water, Sea Water, Brine, Brackish Water	✓
Raw Sewage	✓	Ozone Treatment	✓
Screened Sewage	✓	Irrigation	✓
Abrasive Slurries	✓	Buried Service	✓
Air Service	✓	Industrial Process Applications	✓
Corrosive Service	✓	Low Pressure Gas Service, Digester Gas	✓
Vertical Flow Up	✓	Throttling Service	✓
Vertical Flow Down	✓	Pump Check Service	✓
Non-Abrasive Slurries	✓	Modulating Service	✓

FEATURES			
Vee Type Packing with Exclusive POP™ Shims	✓	Gear, Hydraulic and Power Actuation	✓
Integral Nickel Welded Seat	✓	Port areas for valves 4" and smaller ≥ 100%	✓
Exclusive Stainless Steel/Teflon Bearing Package	✓	Port areas for valves 6" - 16" ≥ 85%	✓
Grit-Guard™ Bearing and Packing Protector	✓	Port areas for valves 18" - 24" ≥ 80%	✓

CAM-CENTRIC PLUG VALVE SPECIFICATIONS

2 1/2" AND LARGER

SCOPE

- 1.1 This specification covers the design, manufacture, and testing of 2 1/2 in. (60 mm) through 36 in. (900 mm) Cast Iron Eccentric Plug Valves suitable for water or wastewater service with pressures up to 175 psig (1200 kPa).
- 1.2 Plug Valves shall be quarter-turn, non-lubricated, eccentric type with resilient faced plug.

CONNECTIONS

- 2.1 Flanged valves shall have flanges with drilling to ANSI B16.1, Class 125.
- ~~2.2 Mechanical Joint valves shall fully comply with ANSI/AWWA C111/A21.11.~~
- ~~2.3 Threaded valves shall have NPT full size inlets. The connection shall be hexagonal for a wrench connection.~~

DESIGN

- 3.1 Port areas of not less than 100% of pipe area shall be supplied on valves 4" (75 mm) and smaller, 85% on 16" (400 mm) and smaller, 80% on 18"-24" (150 mm - 600 mm), and 70% on 30" (800 mm) and larger.
- 3.2 The valve seat shall be a welded overlay of 99% pure nickel applied directly to the body on a pre-machined, cast seating surface and machined to a smooth finish.
- 3.3 Shaft seals shall conform to ANSI/AWWA C504 and consist of V-type packing in a fixed gland with an adjustable follower designed to prevent over compression of the packing and to meet design parameters of the packing manufacturer. Removable, slotted shims shall be provided under the follower flanges to provide for adjustment and prevent over tightening.
- 3.4 Permanently lubricated, radial shaft bearings shall be supplied in the upper and lower bearing journals. Thrust bearings shall be provided in the upper and lower journal areas.
- 3.5 Both the packing and bearings in the upper and lower journals shall be protected by a Grit-Guard™ shaft seal located on the valve shaft to minimize the entrance of grit into the bearing journal and shaft seal areas.

MATERIALS

- 4.1 The valve body and cover shall be constructed of ASTM A126 Class B cast iron for working pressures up to 175 psig (1200 kPa). The words "SEAT END" shall be cast on the exterior of the body seat end.
- 4.2 The plug shall be of one-piece construction and made of ASTM A126 Class B cast iron with a resilient facing per ASTM D2000-BG and ANSI/AWWA C504 requirements.
- 4.3 Radial shaft bearings shall be constructed of self-lubricating type 316 stainless steel. The top thrust bearing shall be Teflon. The bottom thrust bearing shall be Type 316 stainless steel. Cover bolts shall be corrosion resistant with zinc plating.

ACTUATORS

- 5.1 8 in. (200 mm) and smaller valves shall be equipped with a 2 inch square nut for direct quarter turn operation. The packing gland shall include a friction collar and an open position memory stop. The friction collar shall include a nylon sleeve to produce friction without exerting pressure on the valve packing.
- 5.2 When specified, 4 in. (100 mm) and larger valves shall include a totally enclosed and sealed worm gear actuator with position indicator (above ground service only) and externally adjustable open and closed stops. The worm segment gear shall be ASTM A536 Grade 64-45-12 ductile iron with a precision bore and keyway for connection to the valve shaft. Bronze radial bearings shall be provided for the segment gear and worm shaft. Alloy steel roller thrust bearings shall be provided for the hardened worm.
- 5.3 All gear actuators shall be designed to withstand, without damage, a rim pull of 200 lb (890 N) on the handwheel and an input torque of 300 foot pounds (406 N-m) for nuts.
- 5.4 Buried service actuators shall be packed with grease and sealed for temporary submergence to 20 feet of water. Exposed worm shafts shall be stainless steel.

OPTIONS

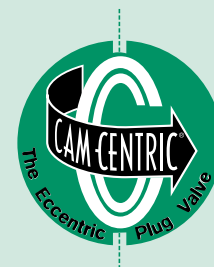
- 6.1 When specified, the port area shall have not less than 100% of pipe area.
- ~~6.2 Open and closed limit switches shall be provided on the actuator when specified.~~

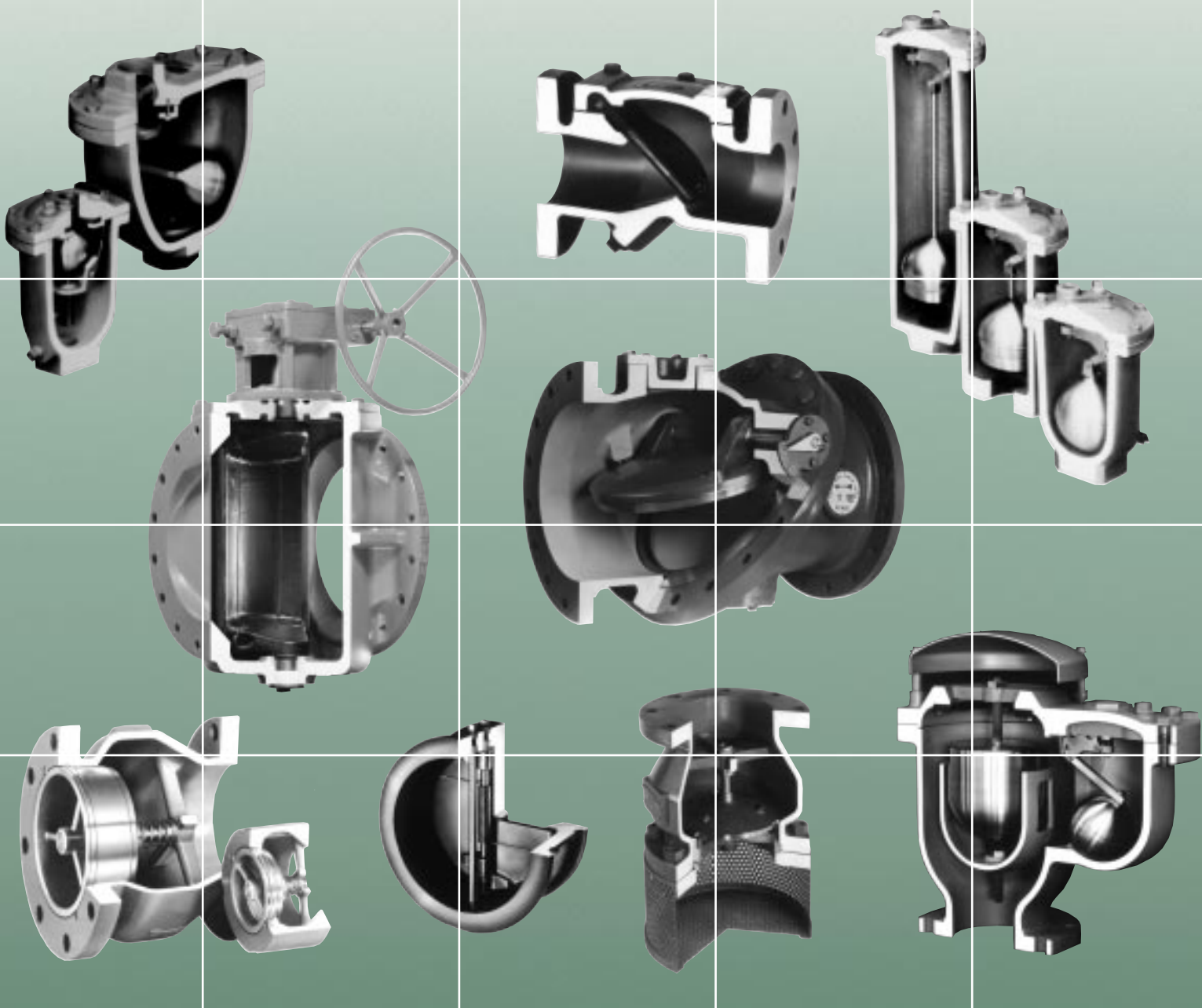
MANUFACTURE

- 7.1 The manufacturer shall demonstrate a minimum of five (5) years experience in the manufacture of plug valves. The valves shall be proof of design tested in accordance with ANSI/AWWA C504. When requested, the manufacturer shall provide test certificates, dimensional drawings, parts list drawings, and operation and maintenance manuals.
- 7.2 The exterior of the valve shall be coated with a universal alkyd primer.
- 7.3 Valves shall be marked with the Serial Number, Manufacturer, Size, Cold Working Pressure (CWP) and the Direct and Reverse Actuator Pressure Ratings on a corrosion resistant nameplate.
- 7.4 Eccentric Plug Valves shall be Series 5800R (Flanged), ~~5800RT (Threaded) or 5900R (Mechanical Joint)~~ as manufactured by Val-Matic® Valve & Mfg. Corporation, Elmhurst, IL. USA. or approved equal.

NOTE: CONSULT FACTORY FOR 1/2" - 2" SPECIFICATIONS.

VAL-MATIC®





Make the change to **QUALITY!**

Specify **VAL-MATIC®**

For over thirty years, Val-Matic's quality of design and meticulous workmanship has set the standards by which all others are measured. Quality design features such as stainless steel trim as standard on Air Release, Air/Vacuum and Combination Air Valves...combined resilient/metal to metal seating for Silent Check Valves...stabilized components that provide extended life of the Dual Disc® Check Valves...high strength and wear resistant aluminum bronze trim as standard for

Tilted Disc® Check Valves...unrestricted full flow area through Swing-Flex® Check Valves...heavy duty stainless steel screened inlet on Sure Seal Foot Valves...and a Cam-Centric® Plug Valve with more requested features than any other eccentric plug valve, put Val-Matic valves in a class by themselves.

Val-Matic is totally committed to providing highest quality valves and outstanding service to our customers. Complete customer satisfaction is our goal.

VAL-MATIC®

VAL-MATIC VALVE AND MANUFACTURING CORP.

905 RIVERSIDE DRIVE • ELMHURST, IL 60126
630/941-7600 • FAX: 630/941-8042

Kor-N-Seal® II

306 Series Pipe-to-Manhole Connector



- *Allows you to fit large diameter pipe into the smallest possible manhole structures*
- *Can be used in cored or formed holes*



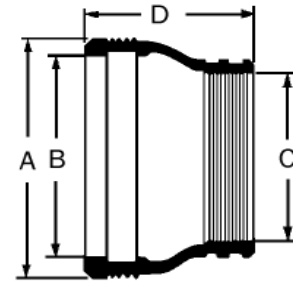
The Patented 4" wide Stainless Steel Korbond is able to overcome the curvature of smaller sized manholes



306 Series Connector Sizing Chart



P/N	Suggested Pipe O.D. Range	Hole Size Range	Connector Dimensions				Pipe Clamp		Minimum Manhole Size
		A	B	C	D	Qty	P/N		
S306-22	17.625 - 18.500	21.98 - 22.13	19.875	19	10.5	2	I-318	36/4	
S306-22L	18.500 - 19.625			20		2	I-348		
S306-24	19.625 - 20.500	23.98 - 24.13	21.875	21	10.5	4	I-180	36/4	
S306-24L	20.500 - 21.625			22		4			
S306-26	21.625 - 22.500	26.00 - 26.20	23.875	23	10.5	4	I-190	36/4	
S306-26L	22.500 - 23.625			24		4	I-218		
S306-28	23.625 - 24.500	28.00 - 28.20	25.875	25	10.5	4	I-218	48/5	
S306-28L	24.500 - 25.625			26		4			
S306-30	25.625 - 26.500	30.00 - 30.20	27.875	27	10.5	4	I-218	48/5	
S306-30L	26.500 - 27.625			28		4	I-242		
S306-32	27.625 - 28.500	32.00 - 32.20	29.875	29	10.5	4	I-242	48/5	
S306-32L	28.500 - 29.625			30		4			
S306-34	29.625 - 30.500	34.00 - 34.20	31.875	31	10.5	4	I-258	48/5	
S306-34L	30.500 - 31.625			32		4			
S306-36	31.625 - 32.500	36.00 - 36.20	33.875	33	10.5	4	80667 Power Gear	60/6	
S306-36L	32.500 - 33.000			34		4			
S306-36-STORM	31.625 - 32.500	36.00 - 36.20	33.875	33	10.5	4	I-282	60/6	
S306-36L-STORM	32.500 - 33.625			34		4			
S306-38	33.625 - 34.500	38.00 - 38.20	35.875	35	10.5	4	80667 Power Gear	60/6	
S306-38L	34.500 - 35.000			36		4			
S306-38-STORM	33.625 - 34.500	38.00 - 38.20	35.875	35	10.5	4	I-282	60/6	
S306-38L-STORM	34.500 - 35.625			36		4			I-306
S306-40	35.625 - 36.500	40.00 - 40.20	37.875	37	10.5	4	80667 Power Gear	60/6	
S306-40L	36.500 - 37.000			38		4			
S306-40-STORM	35.625 - 36.500	40.00 - 40.20	37.875	37	10.5	4	I-306	60/6	
S306-40L-STORM	36.500 - 37.625			38		4			
S306-42	37.625 - 38.500	42.00 - 42.20	39.875	39	10.5	4	80667 Power Gear	72/7	
S306-42L	38.500 - 39.000			40		6			
S306-42-STORM	37.625 - 38.500	42.00 - 42.20	39.875	39	10.5	4	I-318	72/7	
S306-42L-STORM	38.500 - 39.625			40		4			I-348
S306-44	39.625 - 40.500	44.00 - 44.20	41.875	41	10.5	6	80667 Power Gear	72/7	
S306-44L	40.500 - 41.000			42		6			
S306-44-STORM	39.625 - 40.500	44.00 - 44.20	41.875	41	10.5	4	I-348	72/7	
S306-44L-STORM	40.500 - 41.625			42		4			
S306-46	41.625 - 42.500	46.00 - 46.20	43.875	43	10.5	6	80667 Power Gear	72/7	
S306-46L	42.500 - 43.000			44		6			
S306-46-STORM	41.625 - 42.500	46.00 - 46.20	43.875	43	10.5	4	I-348	72/7	
S306-46L-STORM	42.500 - 43.625			44		4			
S306-48	43.625 - 44.500	48.00 - 48.20	45.875	45	10.5	6	80667 Power Gear	72/7	
S306-48L	44.500 - 45.000			46		6			
S306-48-STORM	43.625 - 44.500	48.00 - 48.20	45.875	45	10.5	6	I-242	72/7	
S306-48L-STORM	44.500 - 45.625			46		6			I-258



*Adapters are required when using corrugated pipe. Refer to the Corrugated Pipe Adapter Data Sheet for details.

Covered under U.S. Patent No. 6,641,176



Kor-N-Seal® II

306 Series Connector

Installation Instructions

Korband Installation (If not already installed)

1. Install Korband into Connector by first fitting Wedge Expander into center of cutout provided, then installing remainder of Korband. Make sure that head of bolt on Wedge Expander is located to the outside of Connector/inside of manhole.
2. Using pipe lubricant, lightly lube at least three to four sections of Korband by bending back rubber one section at a time. *Do not lube wedge area.*
3. Check to be sure Korband is properly located in Connector groove.

Connector Installation

1. Inspect the inside surface of the hole. If there is porosity or wire-to-concrete separation, use patching or hydraulic cement to smooth the surface.
2. Position the connector in the hole making sure that the wedge is located at 10:30 and that the top and the bottom of the connector are at the correct overhang position (see reverse side). The position of the wedge and the overhang are critical for proper performance.
3. Using a 1/2" torque wrench with a 3/8" hex bit socket (P/N 80718), tighten Single Wedge Bands to 75 foot pounds. Tighten Double Wedge Bands to 55 foot pounds. Double Wedge Bands must be tightened incrementally.
4. Place plastic cap over end of bolt(s).
5. Retorquing prior to shipping is recommended but not required.

Pipe Installation

1. Be sure sealing area of pipe is smooth and free of defects. Repair if needed.
2. Center pipe in Connector opening.
(Pipe must not rest on Connector Korband)
3. Position the Pipe Clamp(s) in the Connector's Pipe Clamp groove.
4. Tighten the standard Pipe Clamp screws to 60 inch pounds with a T-handle Torque Wrench, P/N 80090. Power gear clamps torque to 120 inch pounds.

Note: On minimum pipe O.D. installations, lift the rubber up underneath the Pipe Clamp screw so that the Connector contacts the bottom surface of the pipe while the Pipe Clamp screw is being tightened. Application of pipe lubrication on the underside of the clamp will also help ensure that an even contraction of rubber is maintained throughout the clamping area.

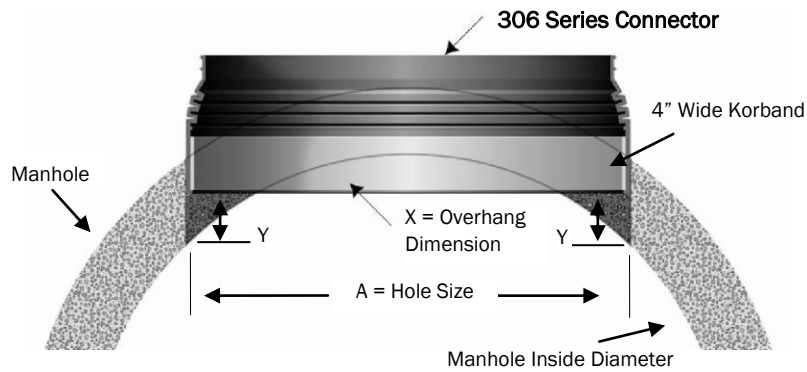
Caution: Do not use impact wrench for installation.
All pipe stubs must be restrained.

Using Corrugated Pipe:
Adapters are required when using Corrugated Pipe.
Refer to the Corrugated Pipe Adapter Data Sheet for details.

Kor-N-Seal[®] II

306 Series Connector

Overhang Chart



Note Y dimension: Boot must be square in hole (even on both sides).

Hole Size	Manhole I.D.					
	48/4.75"	48/5"	60/5"	60/6"	72/6"	72/7"
"A"	X	X	X	X	X	X
28	1 1/2					
30	1 7/8	2				
32	2 1/4	2 1/4	1			
34	—	2 5/8	1 1/4			
36	—	—	1 1/2	1 3/4		
38	—	—	1 7/8	2 1/8		
40	—	—	2 1/8	2 3/8	1 1/2	
42	—	—	2 1/2	—	2	
44	—	—	—	—	2 1/4	1 7/8
46	—	—	—	—	2 1/2	2 1/4
48	—	—	—	—	—	2 1/2

All dimensions are in inches



OLD

KOR-N-SEAL® I & II FLEXIBLE PIPE-TO-MANHOLE CONNECTORS

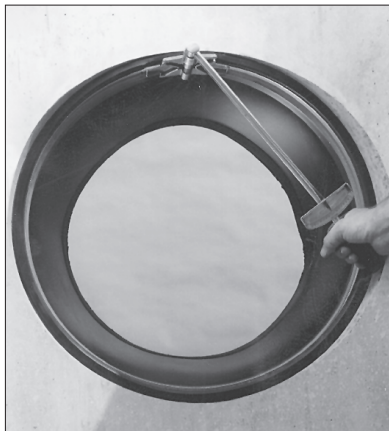
SPECIFICATION SHEET



KOR-N-SEAL I - WEDGE KORBAND CONNECTOR ASSEMBLY



Install Kor-N-Seal I - Wedge Korbond with Socket Wrench & Torque Limiter



Install Kor-N-Seal II - Wedge Korband with Standard Torque Wrench



Install Pipe Clamp(s) with T-Handle Torque Wrench





KOR-N-SEAL® I & II

Flexible Pipe-to-Manhole Connectors

SPECIFICATION SHEET

PERFORMANCE

Test	ASTM Method	Test Requirements	Kor-N-Seal® I & II
Head Pressure	C923 - 7.1	0° - 13 psi (30 ft) for 10 min. 7° - 10 psi (23 ft) for 10 min.	+13 psi for 10 min. +10 psi for 10 min.
Deflection Test	C923 - 7.2.2	7° in any direction	Over 7° in any direction
Load Test	C923 - 7.2.3	150 lbs/in. pipe dia.	Over 150 lbs/in. pipe dia.

Performed on all standard sizes of Kor-N-Seal Connectors.

RESILIENT EPDM OR POLYISOPRENE RUBBER

Conforms to ASTM C923

Test	ASTM Method	Test Requirements	TEST RESULTS Kor-N-Seal® I & II
Chemical Resistance	D543, at 22°C for 48 h		
1 N Sulfuric Acid		No weight loss	No weight loss
1 N Hydrochloric Acid		No weight loss	No weight loss
Tensile Strength	D412	1200 psi	1580 psi
Elongation at Break		350% min.	500%
Hardness	D2240 (shore A durometer)	± 5 from the manufacturer's specified hardness	48 ± 5
Accelerated Oven-Aging	D573 70 ± 1°C for 7 days	Decrease of 15%, max. of original tensile strength, decrease of 20% max. of elongation	10.1% tensile decrease 14.0% elongation decrease
Compression Set	D395, method B, at 70°C for 22 h	Decrease of 25%, max. of original deflection	13% decrease
Water Absorption	D471, immerse 0.75 by 2-in. specimen in distilled water at 70°C for 48 h	Increase of 10%, max. of original by weight	.8% increase
Ozone Resistance	D1171	Rating 0	Rating 0
Low-temperature Brittle Point	D746	No fracture at -40°C	No fracture at -40°C
Tear Resistance	D624, method B	200 lbf/in.	No tear at 210 lbf/in.

INTERNAL KORBAND

Conforms to ASTM C923, ASTM A666, and A240

- Korband Assembly is manufactured of 300 series stainless steel.
- Toggle Expander is made of 300 series stainless steel.
- The 106/406 series Wedge Expander is made from reinforced nylon or 300 series stainless steel.
- The 206/306 series Wedge Expander is made from 300 series stainless steel.

EXTERNAL PIPE CLAMP

Conforms to ASTM C923, ASTM A666, and A240

External take-up clamps are manufactured of 300 series stainless steel.

www.npc.com

250 Elm Street • P.O. Box 301
Milford, NH 03055, U.S.A.

Tel: 603-673-8680 • 800-626-2180 • Fax: 603-673-7271



NPC Kor-N-Seal Pipe-to-Manhole Connector

Technical Specification

Scope:

This specification describes the function of the NPC Kor-N-Seal pipe-to-manhole connector, its principle of operation, and the component materials that constitute the Kor-N-Seal connector, and their physical properties.

Product Application:

NPC Kor-N-Seal connectors are designed and manufactured to meet or exceed the requirements of ASTM C-923 "Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals". This specification requires the connector to provide a watertight seal under the following conditions:

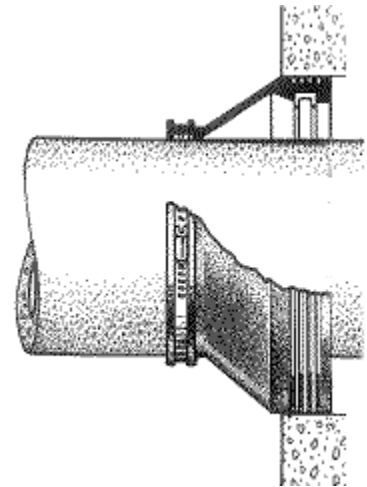
- 10 PSI (23 feet head) of groundwater pressure
- Minimum 7 Degrees of pipe articulation in any direction
- Radial loading test of 150 pounds per inch diameter of pipe

Principle of Operation:

The Kor-N-Seal connector creates a watertight seal between the pipe and manhole by first sealing to the inside of the cored or formed hole in the manhole and then sealing to the outside of the pipe. See illustration at right.

The seal at the inside of the manhole is created by the stainless steel Korband. The Korband is located inside of the end of the Kor-N-Seal connector that fits into the manhole. Once the Kor-N-Seal connector is located in the manhole, the diameter of the Korband is increased. This compresses the Kor-N-Seal connector against the inside wall of the hole in the manhole creating a watertight seal at the manhole.

The seal at the outside of the pipe is created by the stainless steel pipe clamp(s). The pipe clamp is located on the outside of the Kor-N-Seal connector. Once the pipe has been positioned in the connector the diameter of the pipe clamp is decreased. This compresses the Kor-N-Seal connector against the outside wall of the pipe creating a watertight seal at the pipe.



Reference the [Kor-N-Seal Recommended Installation Instructions](#) for a detailed explanation of the preparation and installation of the Kor-N-Seal connector.



OLD

KOR-N-SEAL – STAINLESS STEEL WEDGE Recommended Installation Procedure

Refer to reverse side *Kor-N-Seal I - Wedge Korband Installation Chart* for Hole Size Range, Connector Dimensions, and Suggested Pipe O.D. Range.

CONNECTOR INSTALLATION:

1. Check to be sure Korband is properly located in Connector groove. (Fig. 1)
2. Insert Connector Assembly into hole with Wedge Expander at top of hole. (Fig. 2)
3. Position Connector so it is square to manhole both vertically and horizontally. (Fig. 3)
4. Tighten Wedge Expander using 1/2" [13 mm] socket with a preset torque limiter for each. For each size connector use torque limiter preset to proper torque. (Fig. 4) Retorquing is not required prior to shipment.

CAUTION: DO NOT USE IMPACT WRENCH.

IMPORTANT

RECOMMENDED TORQUE		TORQUE LIMITER
Connector Inches [mm]	Foot Pounds [Newton Meters]	P/N
10 – 24 [254 – 610]	12 [16]	91440-12

Fig. 4

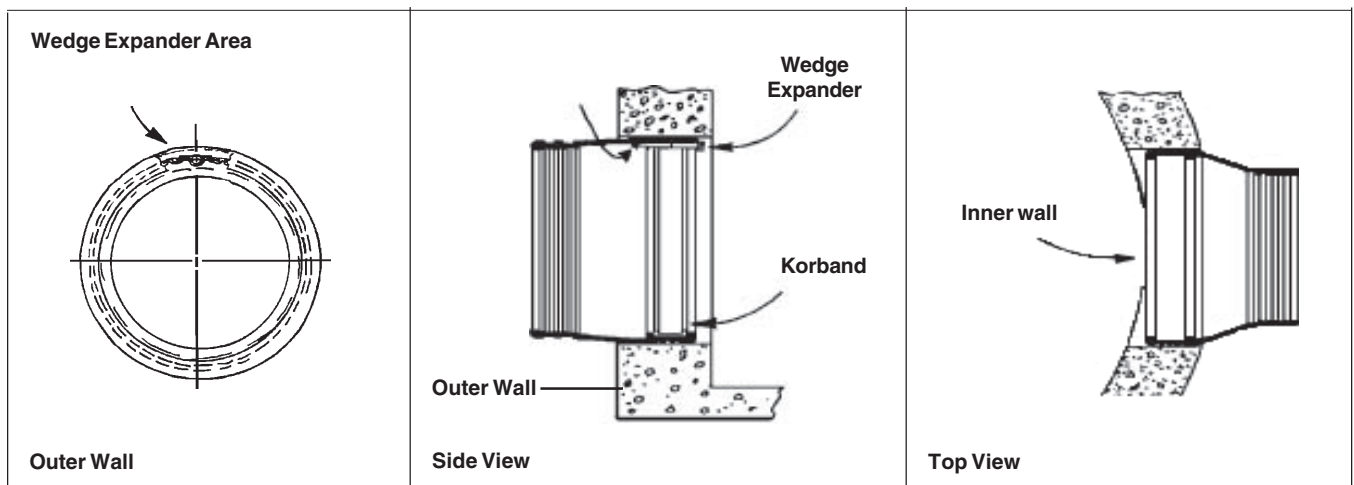


Fig. 1

Fig. 2

Fig. 3

PIPE INSTALLATION:

1. Center pipe in Connector opening.
2. On maximum pipe O.D. installations, use a pipe lubricant on the outside barrel of the pipe and/or the inside ridges of the Connector (under the Pipe Clamp area) to allow the pipe to slide into place more easily.
3. Position the Pipe Clamp in the Connector's Pipe Clamp groove with the screw at the top.
4. Tighten the Pipe Clamp screw to 60 inch pounds [7 Newton Meters] with a T-handle Torque Wrench, P/N 80090.
5. On minimum pipe O.D. installations, lift the rubber up underneath the Pipe Clamp screw so that the Connector contacts the bottom surface of the pipe while the Pipe Clamp screw is being tightened. Application of pipe lubrication on the underside of the clamp will also help assure that an even contraction of rubber is maintained throughout the clamping area.
6. After the Pipe Clamp has been tightened down firmly, move the pipe horizontally and/or vertically to bring it to grade.

CAUTION: Pipe must **NOT** rest on Connector Korband.

CAUTION:

All capped stubs awaiting pipe installation at a later date must be restrained. Assure that a proper backfill material is used in adverse conditions. Prior to any critical usage, contact NPC Customer service at 1-800-626-2180.



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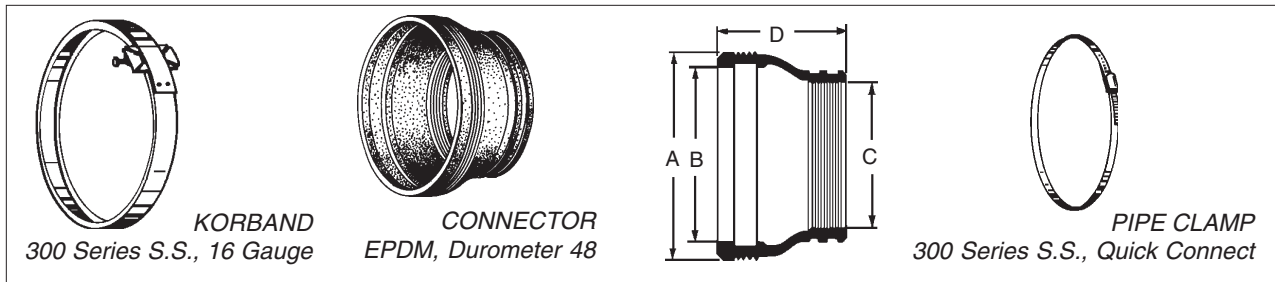
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OLD

KOR-N-SEAL – STAINLESS STEEL WEDGE

Recommended Installation Procedure



Kor-N-Seal S106 Series

Connector P/N	Suggested Pipe O.D. Range Inches	Hole Size Range Inches	Connector Dimensions Inches			Pipe Clamp P/N
		A	B	C	D	
S106-12BWS	5.75 — 7.00	12.00 — 12.20	10.30	6.50	8	I-128
S106-12AWS	7.00 — 8.50	12.00 — 12.20	10.30	8.00	8	I-180
S106-12WS	8.25 — 9.75	12.00 — 12.20	10.30	9.25	8	I-180
S106-14AWS	9.50 — 11.25	14.00 — 14.20	12.25	10.50	8	I-190
S106-16BWS	9.50 — 11.25	15.95 — 16.15	14.30	10.50	8	I-190
S106-16AWS	11.25 — 13.00	15.95 — 16.15	14.30	12.25	8	I-218
S106-16WS	13.00 — 14.20	15.95 — 16.15	14.30	14.00	8	I-242
S106-20BWS	14.00 — 15.50	19.95 — 20.10	18.25	15.00	8	I-306
S106-20AWS	15.50 — 17.00	19.95 — 20.10	18.25	16.50	8	I-306
S106-20WS	17.00 — 18.15	19.95 — 20.10	18.25	18.00	8	I-306
S106-22WS	17.75 — 19.25	21.95 — 22.10	20.25	18.75	8	I-318
S106-24WS	19.60 — 21.10	23.95 — 24.10	22.25	20.60	8	I-348

Kor-N-Seal S406 Series

S406-10AWS	6.00 — 6.75	10.00 — 10.20	8.30	6.50	6	I-128
S406-10WS	7.50 — 8.20	10.00 — 10.20	8.30	8.50	6	I-180
S406-10.5AWS	6.00 — 6.75	10.50 — 10.70	8.80	6.50	6	I-128
S406-10.5WS	7.50 — 8.70	10.50 — 10.70	8.80	8.50	6	I-180
S406-11BWS	6.00 — 7.00	11.00 — 11.20	9.30	6.00	6	I-128
S406-11AWS	7.50 — 9.00	11.00 — 11.20	9.30	8.00	6	I-180
S406-12CWS	6.00 — 7.00	12.00 — 12.20	10.30	6.50	6	I-128
S406-12BWS	6.25 — 7.50	12.00 — 12.20	10.30	7.00	6	I-128
S406-12AWS	7.50 — 9.00	12.00 — 12.20	10.30	8.50	6	I-180
S406-12WS	9.00 — 10.20	12.00 — 12.20	10.30	10.00	6	I-180

Suggested pipe O.D. range comes from field experience. Refer to *Recommended Pipe Installation Procedure*.



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08/06

Say *Goodbye* to the lube bucket and brush
 Say *Hello* to fast, clean, simple installation

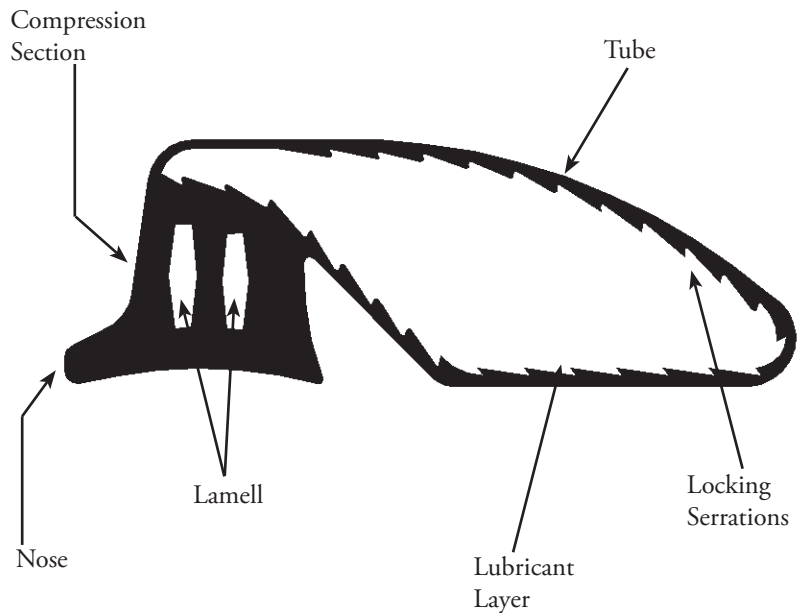
Requiring no field lubrication, the Tylox[®] SuperSeal[™] gasket* has a layer of silicone lubricant installed on the inner surface of the tube during the manufacturing process; saving you time, and money, on the job-site.

Self-contained Lubricant. Sealed within the tube, the lube is impervious to mud, dirt and debris. If you drop it in the trench, simply wipe the gasket surface clean and you're ready to install. No special handling or packaging is required.

Easier installation, without equalization, is made possible due to the reduced gasket stretch required by the unique lamell/rolling tube design. Quick and easy to install means you save even more time.

No gasket "roll" or "twist" during coupling is another benefit of the unique lamell/rolling tube design, which reduces the insertion force required. Manual coupling of up to 36" pipe is possible.

For Single Offset Joints ...



... in Round or Elliptical Pipe, Man-Holes and Boxes

Self-Centering of the Spigot within the Bell is carried out as the tube rolls into the annular space during the homing process.

Elimination of Joint Kick Back, is caused by the rearward locking action of the serrations as the tube rolls forward

Bell and Spigot protection under deflection is accomplished by the cushioning effect of the tube, as it rests within the annular space.

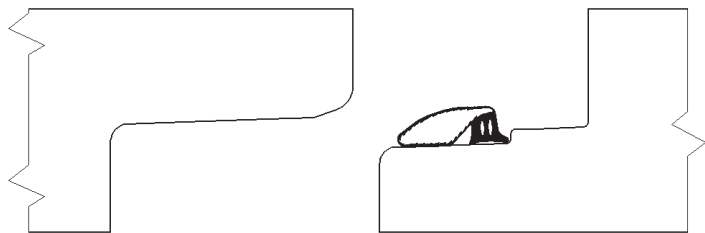
ASTM C361, ASTM C425, ASTM C443, AASHTO M198.4 and CSA A-257 material requirement compliance.

Pipe sizes to 144" can be accommodated.

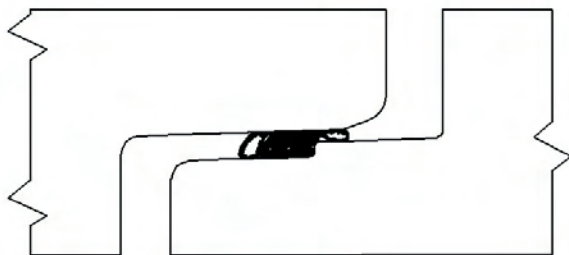
INSTALLATION

Ensure Bell, Spigot and Gasket are free from loose debris or foreign material.

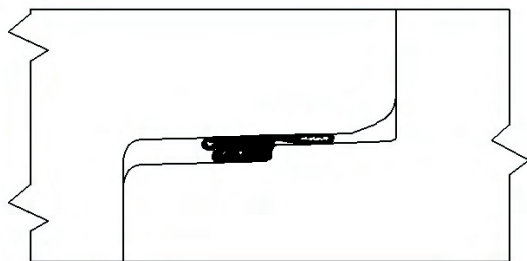
Stretch the gasket around the spigot, with the nose against the step, and the tube laying flat against the spigot. **DO NOT LUBRICATE.**



Align the spigot with the bell, and thrust the spigot home using suitable mechanical means. The homing process will cause the lubricated tube to “roll” over itself, above the compression section, allowing the pipe to slide forward.



Once fully homed, the compression section seals the total annular space; the rolling tube comes to rest within the small annular space - acting as a cushion against side loads, and the serrations act to resist pipe pull-out.



MATERIALS

Tylox® SuperSeal™ gaskets* are available in the following materials:

- Isoprene

Optional Materials

- Nitrile (Oil Resistant)
- Isoprene / EPDM blend (Green Book & C425)
- Neoprene (Oil and Ozone Resistant)

Other materials may be available as special order.

Consult your Hamilton Kent agent for your specific requirements.

SPECIFICATIONS

Tylox® SuperSeal™ gaskets* are manufactured to meet the material requirements of the following specifications:

- ASTM C361, C425, & C443
- AASHTO M198.4
- CSA A257
- “Green Book”

Other specifications may be available as special order. Please consult your Hamilton Kent agent for your specific requirements.

CONTACT US

Hamilton Kent

77, Carlingview Drive
Toronto, Ontario, Canada.
M9W 5J6

Phone (800) 268-8479
Fax (888) 674-6960

Web-Site www.hamiltonkent.com
E-Mail sales@hamiltonkent.com

*Tylox SuperSeal Gaskets are patented under US Patent 4934716

All Tylox® SuperSeal™ gaskets are warranted for 12 months from date of purchase (Invoice Date) in accordance with the details as outlined in Hamilton Kent's Standard Terms and Conditions of Sale.

**NO
LUBRICANT
REQUIRED**

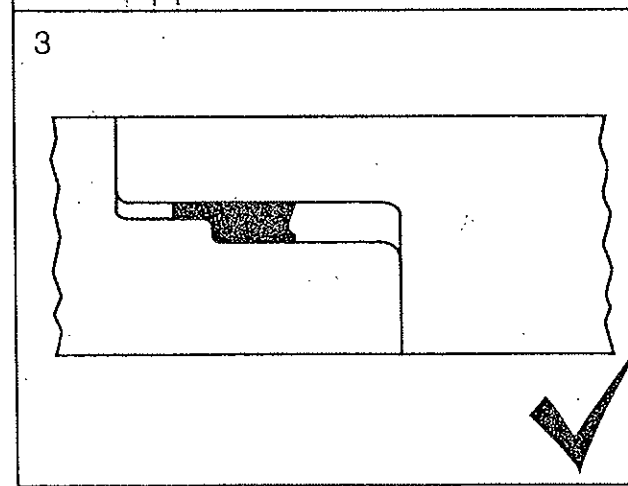
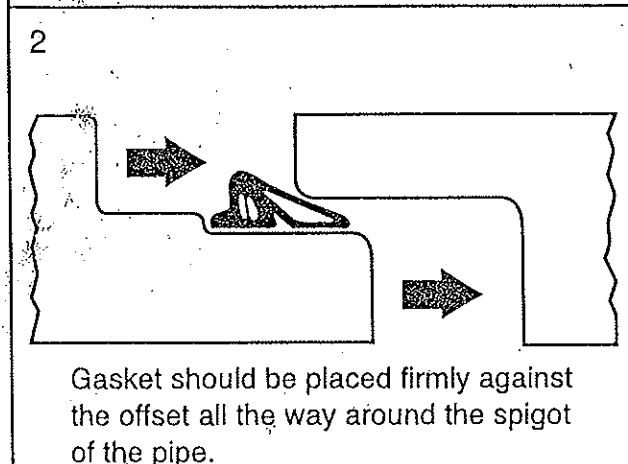
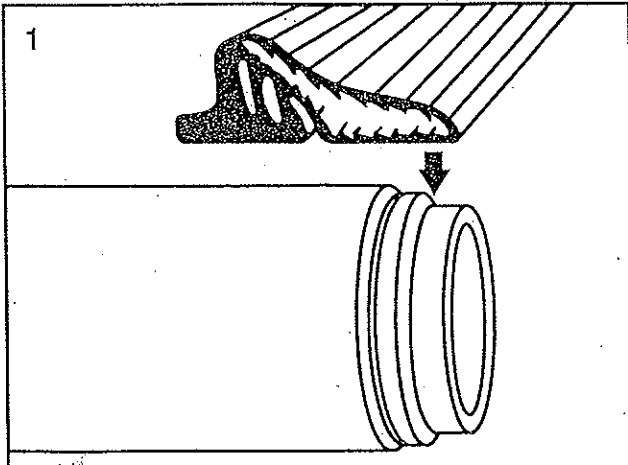
**TYLOX
SuperSeal**

***HK* Hamilton Kent**

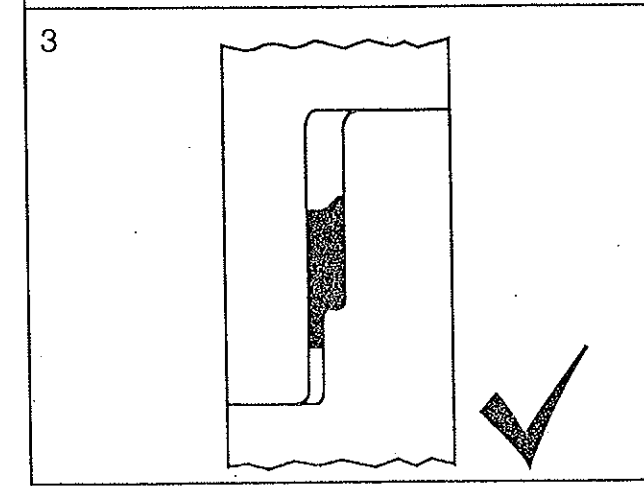
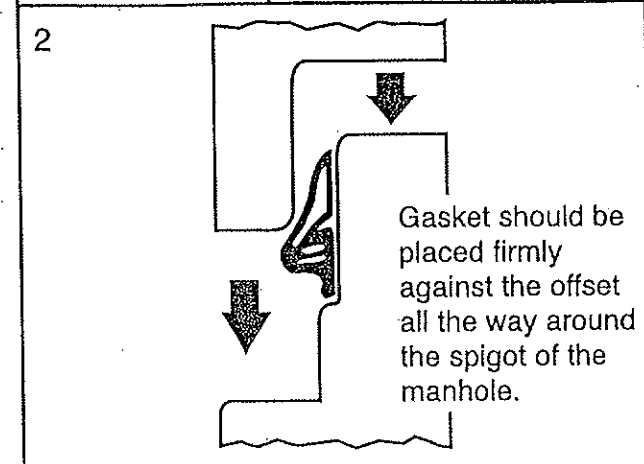
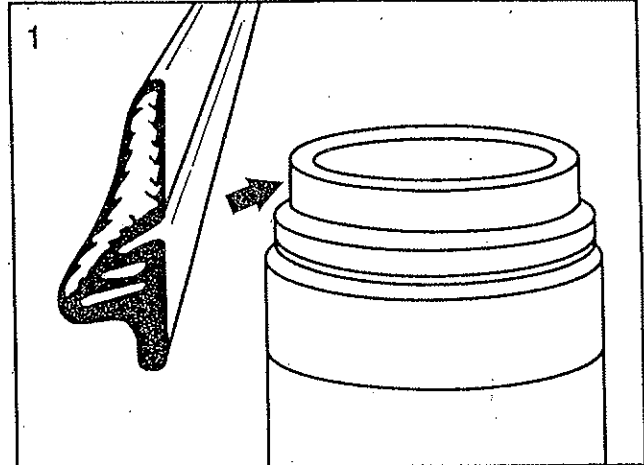
make the connection

Pipe & Manhole Pre-lubricated Gasket Installation

Pipe



Manhole



**CONSEAL™**
Concrete Sealants INC.**CS-202**

Butyl Rubber Sealant

APPLICATIONS

For self-sealing joints in: Manholes, Concrete Vaults, Septic Tanks, Concrete Pipe, Box Culverts, Utility Vaults, Burial Vaults, and Vertical Panel Structures.

SEALING PROPERTIES

- Provides permanently flexible watertight joints.
- Low to high temperature workability: 0°F to 120°F (-12°C to 48°C)
- Rugged service temperature: -30°F to +200°F (-34°C to +93°C)
- Excellent chemical and mechanical adhesion to clean, dry surfaces.
- Sealed Joints will not shrink, harden or oxide upon aging.
- No priming normally necessary. When confronted with difficult installation conditions, such as wet concrete or temperatures below 40°F (4°C), priming the concrete will improve the bonding action. Consult Concrete Sealants for the proper primer to meet your application.

HYDROSTATIC STRENGTH

ConSeal CS-202 meets the hydrostatic performance requirement as set forth in ASTM C-990 section 10.1 (Performance requirement: 10psi for 10 minutes in straight alignment – in plant, quality control test for joint materials.)

SPECIFICATIONS

ConSeal CS-202 meets or exceeds the requirements of Federal Specification SS-S-210 (210-A), AASHTO M-198B, and ASTM C-990-91.



CONSEAL™
Concrete Sealants INC.

CS-202

Butyl Rubber Sealant

PHYSICAL PROPERTIES

	Spec	Required*	CS-202
Hydrocarbon blend content % by weight	ASTM D4 (mod.)	50% min.	52%
Inert mineral filler % by weight	AASHTO T111	30% min.	35%
Volatile Matter % by weight	ASTM D6	2% max.	1.2
Specific Gravity, 77°F	ASTM D71	1.15-1.50	1.20
Ductility, 77°F	ASTM D113	5.0 min.	12
Penetration, cone 77°F, 150 gm. 5 sec.	ASTM D217	50-100	60-65
Penetration, cone 32°F, 150 gm. 5 sec.	ASTM D217	40 mm	50-55
Flash Point, C.O.C., °F	ASTM D92	350°F min.	425°F
Fire point, C.O.C., °F	ASTM D92	375°F min.	450°F

IMMERSION TESTING

- 30-Day Immersion Testing: No visible deterioration when tested in 5% Caustic Potash, 5% Hydrochloric Acid, 5% Sulfuric Acid, and 5% saturated Hydrogen Sulfide. *
- One Year Immersion Testing: No visible deterioration when tested in 5% Formaldehyde, 5% Formic Acid, 5% Sulfuric Acid, 5% Hydrochloric Acid, 5% Sodium Hydroxide, 5% Hydrogen Sulfide and 5% Potassium Hydroxide.

* Requirements of ASTM C-990 Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.

LIMITED WARRANTY

This information is presented in good faith, but we cannot anticipate all conditions under which this information and our products, or the products of other manufacturers in combination with our products, may be used. We accept no responsibility for results obtained by the application of this information or the safety and suitability of our products, either alone or in combination with other products. Users are advised to make their own tests to determine the safety and suitability of each such product or product combinations for their own purposes. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for this own particular use. We sell this product without warranty, and buyers and users assume all responsibility and liability for loss or damage arising from the handling and use of this product, whether used alone or in combination with other products.

TAPECOAT® M860 PAVEMENT REPAIR COATING

Protection for Concrete and Asphalt Surfaces



Tapecoat M860 provides quick and easy repair of cracks in concrete and asphalt surfaces. This cold-applied, self-adhering tape is effective as a temporary patching material and also offers excellent bonding for repair of the substrate prior to a complete asphalt overlay. Tapecoat M860 solves maintenance problems in paving material on city streets, highways, and parking structures. This puncture-resistant coating can also protect transducer and sensor wiring from tire damage, prevent pavement deterioration due to deformation in heavy-traffic areas, and provide quick temporary repair to paved surfaces on bridges and airport runways and tarmacs. Tapecoat M860 retains its ability to bond under pressure at temperatures as low as 0° F, making this coating ideal for temporary repairs during the cold winter months.



Tapecoat® M860 Pavement Repair Coating

- *Excellent bond to concrete and asphalt surfaces*
- *Applies easily in long lengths or short pieces*
- *Cold-applied tape with quick release liner*
- *Impermeable to water and salt*
- *Puncture-resistant*
- *Prefabricated to provide uniform thickness*
- *Environment-friendly*

Features/Specifications/Application

Tapecoat® M860

A pre-formed, cold-applied, self-adhering material that is impermeable to water and salt.

Composition

Tapecoat M860 is a pre-formed, cold-applied coating. The adhesive is manufactured from specially formulated elastomer and resins bonded to a woven highly puncture-resistant polymer.

Technical Data

Color:	Black
Shelf life:	Rotate stock yearly
Low temp flex:	Excellent
Bacteria resistance:	Excellent
Thickness:	.060" Nominal
Water Vapor	
Transmission Rate,	0.01 perms(grams/sq.ft.hr./in.
Permeance:	Hg) Maximum
Tensile Strength:	50 lb.in. Minimum
Puncture Resistance:	200 lb. Minimum
(Mesh)	
Pliability-1/4" Mandrel	
180° bend -30°F:	No cracks in mesh or adhesive

Surface Preparation

Tapecoat M860 should be applied over dry pavement that is free of dirt, debris or other foreign matter. Pavement cracks wider than 3/8" should be pre-filled with hot or cold crack material prior to applying Tapecoat M860 to assure longer protection of the crack filling material against surface wear.

Option

If the application is taking place in extreme cold (below 32°F/0°C) a liquid primer will enhance the immediate bond. TC Omniprime is the compatible primer for use with this product.



PO Box 631, Evanston, IL 60204-0631 • 1527 Lyons St. Evanston, IL 60201-3551 USA
800/758-6041 847/866-8500 Fax: 800/332-8273 Fax: 847/866-8596 www.tapecoat.com

9. DESIGN SUBMITTAL

PUMPS, PUMP ACCESSORIES, LIQUID LEVEL SENSORS

This section includes:

9.01 PERFORMANCE CURVES – PUMPS

9.02 SPECIFICATIONS – PUMPS

9.03 SPECIFICATIONS – LIQUID LEVEL SENSOR

PUMP DATA SHEET Turbine 60 Hz



Company: ITT
 Name:
 Date: 09/14/11

Customer:
 Order No:

Pump:

Size: 12FDHC (1 stages)
 Type: Lineshaft
 Synch speed: 1800 rpm
 Curve: E6412FDPC0
 Specific Speeds:

Speed: 1770 rpm
 Dia: 6.875 in
 Ns: 4238

Pump Notes for Standard Sizes:
 Suction Size-10" Discharge Sizes-6",8",10". Curves are certified for water at 60°F only. Consult factory for performance with any other fluid.

Vertical Turbine:
 Bowl size: 11.6 in
 Max lateral: 0.75 in
 Thrust K factor: 15 lb/ft

Search Criteria:

Flow: 2300 US gpm Head: 32.5 ft

Fluid:

Water
 Density: 62.25 lb/ft³
 Viscosity: 1.105 cP
 NPSHa: --- ft
 Temperature: 60 °F
 Vapor pressure: 0.2563 psi a
 Atm pressure: 14.7 psi a

Motor:

Standard: NEMA
 Size: 30 hp
 Speed: 1800

Sizing criteria: Max Power on Design Curve

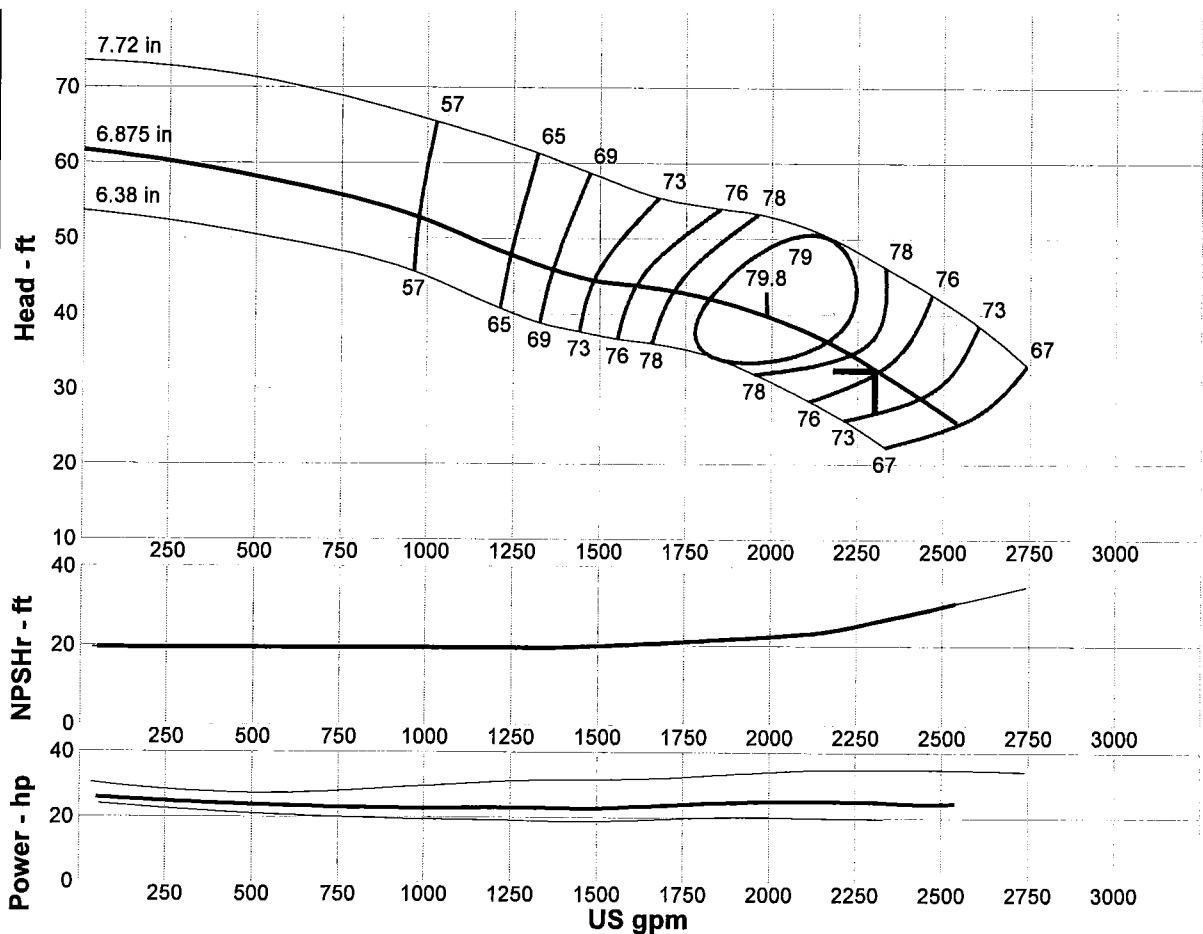
Pump Limits for Standard Construction:

Temperature: 120 °F
 Sphere size: 0.81 in
 Pressure: 440 psi g

--- Data Point ---
 Flow: 2300 US gpm
 Head: 32.7 ft
 Eff: 76.3%
 Power: 24.9 hp
 NPSHr: 26.2 ft

-- Design Curve --
 Shutoff Head: 61.7 ft
 Shutoff dP: 26.7 psi
 Min Flow: --- US gpm
 BEP: 79.8% eff
 @ 1985 US gpm
 NOL Pwr: 26 hp
 @ 46.9 US gpm

-- Max Curve --
 Max Pwr: 34.9 hp
 @ 2465 US gpm



Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
2760	1770	---	---	---	---
2300	1770	32.7	76.3	24.9	26.2
1840	1770	41.7	79.1	24.5	21.6
1380	1770	45.7	69.6	22.9	19.6
920	1770	53.4	54	22.9	19.5

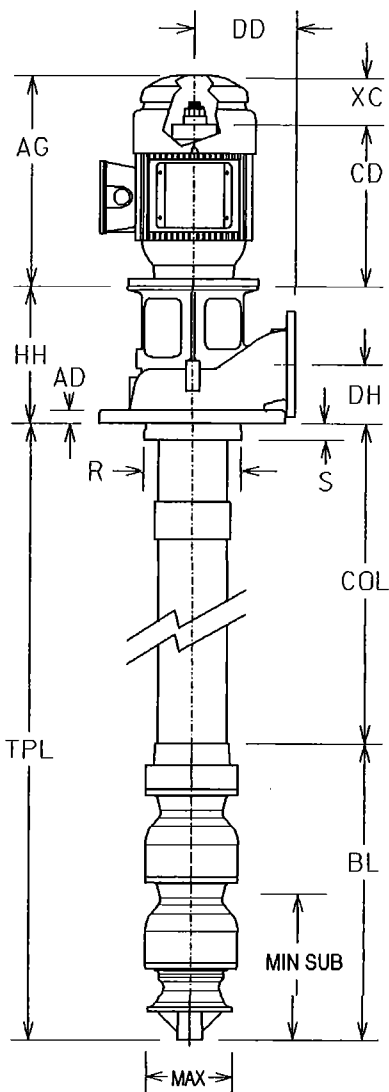
DIMENSIONAL OUTLINE

VIT-CATM

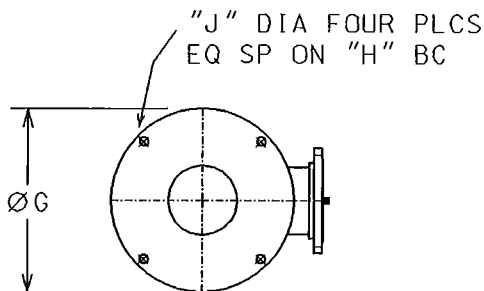
1 Stage 10x12FDHC



Pump Data



AD:	1.13	Size:	12FDHC
AG:	28.13	Stages:	1
BD:	16.5		
BL:	28.38		
CD:	24.75	BowlShaft:	1.94"
CL:	N/A	LineShaft:	1.19"
COL:	253.62"	LineShaft Type:	Open
DD:	14.00	Column:	Standard
MIN SUB:	29.9	Column:	10" Threaded
DH:	9.25	Bearing Spacing:	10 feet
G:	25.00	Section Length:	10 feet
H:	22.75	Head:	A:Cast
HH:	19.00	Flange (Disch.):	10"-125# FF
J:	0.75	Suct.:	
R:	14.60	Seal:	Packing
S:	2.38	Strainer:	None
TPL:	282.0"	SubBase:	None
UG:	N/A		
V:			
W:			
X:			
XC:	3.22		
Y:			
Z:			
MAX:	11.60		



DISC HEAD

Hydraulic Data

Flow (gpm):	2300
Pump Head (ft):	29.9
TDH (ft):	32.7
Speed (rpm):	1770
Fluid:	Water
Temperature (F):	60
Viscosity:	1.105
Spec.Grav:	1

Miscellaneous

Thrust At Design (lb):	600
Thrust At Shutoff (lb):	1035
Pumping Level(in):	12

Weight

Pump (lb):	1660
Motor (lb):	325
Total (lb):	1985

Motor Data

Model:	HO30S2BLG
Make:	Goulds Choice
HP:	30
RPM:	1800
Type:	AU
Efficiency:	90.2
Frame:	286TPH
Ratchet:	NRR

MOTOR THERMAL SENSORS INCLUDED.

**Overall Pump Parameters**

Size and Model:	12FDHC	Pump Operating Speed, RPM:	1770
Capacity, GPM:	2300	Total Dynamic Head, Ft.:	32.7
Total Pump Length, In.:	282.0	Impeller Trim, In.:	6.9
Pump Type:	OpenSump	Head Type:	A:Cast
Pump K-Factor:	15	Number of Stages:	1
		Pumping Level, In.:	12.0

LineShaft-Related Data

Shaft Diameter, In.:	1.19	Shaft Limit, HP:	106
Shaft Material:	C-1045	Matl Correction Fact:	1
LineShaft Length, In.:	253.62	Shaft Elongation, w/o Adder:	0.00
LineShaft Type:	Open	Impeller Running Clearance:	0.13

Bowl Data

Total Bowl Length, In.:	28.38	Bowl Diameter, In.:	11.6
Bowl Shaft Dia, In.:	1.94	Bowl Shaft Limit, HP:	588
		Bowl Shaft Material:	416SS

Column Data

Column Diameter, In.:	10	Column Load, Lb.:	484.3
Wall Thickness, In.:	0.365	Column Elongation, In.:	0.00
		Shutoff Column Elongation, In.:	0.00

HorsePower Data

Shaft Friction Loss, Hp.:	0.15	Thrust Load Loss, Hp.:	0.08
Bowl HP At Design, Hp.:	24.9	Motor HorsePower, Hp.:	30

Other Data

Hydraulic Thrust, Lb.:	490.5	Thrust at Design, Lb.:	600.0
Thrust at Shutoff, Lb.:	1035.4	Actual Head above Grade, Ft.:	29.87
Available Lateral, In.:	0.75	Design Lateral, In.:	0.13
Shutoff Lateral, In.:	0.14		
Suction Pressure, psi:	0.0	Shutoff Disc Pressure, psi:	26.3
Column Loss, Ft.:	0.83	NPSHa, Ft.:	54.86
Head Loss, Ft.:	1.01	NPSHr, Ft.:	26.20
Total Loss, Ft.:	1.83	NPSH margin, Ft.:	28.66

Efficiency Data (Efficiencies estimated not guaranteed)

Bowl Efficiency:	76.30	Pump Efficiency:	71.35
Motor Efficiency:	90.20	Overall Efficiency:	64.36
		KWH/1000 gallons:	0.16

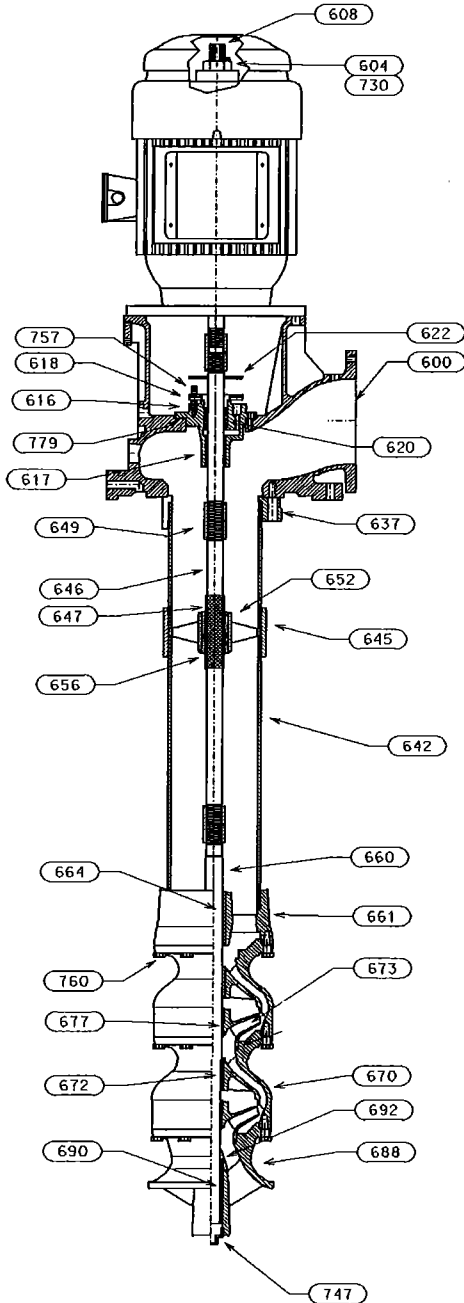
Component Weights

Bowl Weight, Lbs.:	275	Column Weight,Lbs.:	845
Head Weight, Lbs.:	540	Can Weight,Lbs.:	0
Motor Weight, Lbs.:	325	Total Pump Weight,Lbs.:	1985



ITT

**SECTIONAL
VIT-CATM
1 Stage 10x12FDHC**



DISCHARGE HEAD ASSEMBLY

ITEM	NAME	Code	MATERIAL	ASTM
600	HEAD- DISCHARGE	8533	ENGARD 480 ON IRON	A48
604	NUT- ADJUSTING	2130	BRASS C36000	B16M-00
608	HEADSHAFT	2205	CARBON STEEL 1045	A108-99
616	HOUSING	1003	CAST IRON CL30	A48-94ae1
617	BEARING- HOUSING	1109	FEDERALLOY BISMUTH BRZ	B584-00
618	GLAND- SPLIT	1203	SST 316	A744M-00
620	PACKING	5026	GRAPHITE PACKING	ML402-99
622	SLINGER	5121	RUBBER EPDM	D3568-98
637	COLUMN FLANGE	8533	ENGARD 480 ON IRON	A48
730	KEY- MOTOR GIB	2242	CARBON STEEL 1018	A108-99
757	SCREW- GLAND ADJUSTING	2229	SST 316	A276-00a
779	GASKET- HOUSING	5136	ACRYLIC/NITRILE	5136 REV 4

COLUMN AND LINESHAFT ASSEMBLY

ITEM	NAME	Code	MATERIAL	ASTM
642	COLUMN PIPE	8535	ENGARD 480 ON STEEL	A536
645	COLUMN COUPLING	8535	ENGARD 480 ON STEEL	A536
646	LINESHAFT	2205	CARBON STEEL 1045	A108-99
647	LINESHAFT SLEEVE	4203	SST 304	A269-00
649	LINESHAFT COUPLING	2242	CARBON STEEL 1018	A108-99
652	RETAINER- BEARING	1102	SILICON BRONZE C87600	B584-00
656	LINESHAFT BEARING	5121	RUBBER EPDM	D3568-98

BOWL ASSEMBLY

ITEM	NAME	Code	MATERIAL	ASTM
660	SHAFT- BOWL	2227	SST 416	A582M-95b
661	BOWL- DISCHARGE	8533	ENGARD 480 ON IRON	A48
664	BEARING- DISC BOWL	1109	FEDERALLOY BISMUTH BRZ	B584-00
670	BOWL- INTERMEDIATE	8533	ENGARD 480 ON IRON	A48
672	BEARING- INT BOWL	1109	FEDERALLOY BISMUTH BRZ	B584-00
673	IMPELLER	1102	SILICON BRONZE C87600	B584-00
677	COLLET- IMPELLER	2242	CARBON STEEL 1018	A108-99
688	BOWL/BELL- SUCTION	8533	ENGARD 480 ON IRON	A48
690	BEARING- SUCTION	1109	FEDERALLOY BISMUTH BRZ	B584-00
692	SANDCOLLAR	1109	FEDERALLOY BISMUTH BRZ	B584-00
747	PLUG- PIPE	1046	MALLEABLE IRON	A197
760	CAPSCREW- HEX	2298	STEEL BOLTING GR 8	J429-99

Protective Coatings

A. Potable Water (drinking water) where no odor or contamination is allowed, such as in the food processing industry.

Type I/III Tnemec 140 (Epoxy applied at 4-6 mils per coat. Total minimum thickness is 8 mils. for Type I and 20 mils for Type III. Maximum service temperature 130° F.)

Type IV ScotchKote 134 (Fusion banded power epoxy applied at 10-12 mils, Maximum service temperature of 160° F.)

Note: These coatings are certified by NSF International in accordance with ANSI/NSF Std. 61.

B. Sea Water, Brackish Water and Brine

Type I Carboline Bitumastic 300M (Coal tar epoxy applied at 9 mils per coat, maximum 18 mils. Maximum service temperature 120° F.)

Type I/III Engard 460 (Epoxy applied at 10 mils per coat. Maximum 20 mils. Maximum service temperature 140° F.)

Type II Carbozinc 11 (Inorganic zinc at 2-3 mils per coat. DO NOT use this coating for acid or alkali solution without a suitable topcoat. Maximum service temperature 200° F.)

Type IV ScotchKote 134 (Fusion banded power epoxy applied at 12 mils, Maximum service temperature of 160° F.)

Note: If moderate amounts of sand are present in the pumpage, these coatings, applied at recommended maximum mils, also provide good wear protection for the interior of steel column and discharge head, and exterior surface of enclosing tubing.

Coatings for these liquids require pinhole-free surface, and smoothly ground welds, refer to factory for pricing of steel surfaces preparation.

C. River Water with Abrasives (silt and sand)

Type I Carboline Bitumastic 300M (Coal tar epoxy applied at 9 mils per coat, maximum 18 mils. Maximum service temperature 120° F.)

Type I/III Engard 460 (Epoxy applied at 10 mils per coat. Maximum thickness 20 mils. Maximum service temperature 140° F.)

Type IV ScotchKote 134 (Fusion banded power epoxy applied at 12 mils, Maximum service temperature of 160° F.)

Note: If moderate amounts of sand are present in the pumpage, these coatings, applied at recommended maximum mils, also provide good wear protection for the interior of steel column and discharge head, and exterior surface of enclosing tubing.

Design pipe system

Project: Miraloma - c factor 130 & new pipe - Case1

9/20/2011

Customer:

Andy Dake

Station Piping 1

				No of	
Length	23.4	ft	Discharge conn.	0.50	0
Material	Ductile Iron		90° elbow	0.30	1
Pressure class	CL53		Valve	1.00	0
Dimension	10	inch	Tee	0.60	0
C-factor	130.000		Check valve	1.50	0
Inner diam.	10.3	inch	Outlet	1.00	0
			Own	0.00	0
			Total:	0.30	
Water velocity:	8.6	ft /s		Loss in pipe section:	0.9 ft

Station Piping 2

				No of	
Length	10.0	ft	Discharge conn.	0.50	0
Material	Ductile Iron		90° elbow	0.30	1
Pressure class	CL53		Valve	1.00	1
Dimension	10	inch	Tee	0.60	1
C-factor	130.000		Check valve	1.50	1
Inner diam.	10.3	inch	Outlet	1.00	0
			Own	0.00	0
			Total:	3.40	
Water velocity:	8.6	ft /s		Loss in pipe section:	4.1 ft

Design pipe system

Project: Miraloma - c factor 130 & new pipe - Case1

9/20/2011

Customer:

Andy Dake

Force Main 1

					No of
Length	30.0	ft	Discharge conn.	0.50	0
Material	Steel		90° elbow	0.30	1
Pressure class	SCH40		Valve	1.00	0
Dimension	12	inch	Tee	0.60	1
C-factor	130.000		Check valve	1.50	0
Inner diam.	11.9	inch	Outlet	1.00	0
			Own	0.20	1
			Total:	1.10	
Water velocity:	12.9	ft /s		Loss in pipe section:	4.1 ft

Force Main 2

					No of
Length	1850.0	ft	Discharge conn.	0.50	0
Material			90° elbow	0.30	1
Pressure class			Valve	1.00	0
Dimension		inch	Tee	0.60	1
C-factor	130.000		Check valve	1.50	0
Inner diam.	48.0	inch	Outlet	1.00	0
			Own	0.20	1
			Total:	1.10	
Water velocity:	0.8	ft /s		Loss in pipe section:	0.1 ft

Design pipe system

Project: Miraloma - c factor 130 & new pipe - Case1

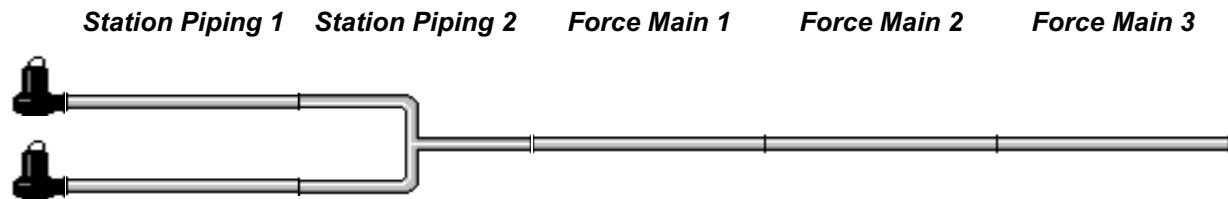
9/20/2011

Customer:

Andy Dake

Force Main 3

				No of	
Length	2545.0	ft	Discharge conn.	0.50	0
Material			90° elbow	0.30	1
Pressure class			Valve	1.00	0
Dimension		inch	Tee	0.60	0
C-factor	130.000		Check valve	1.50	0
Inner diam.	72.0	inch	Outlet	1.00	1
			Own	0.20	1
			Total:	1.50	
Water velocity:	0.4	ft /s	Loss in pipe section:		0.0 ft



Total flow:	4500.0	USgpm	No of	Head losses:	Total head:
Static Head:	21.8	ft	2	9.3 ft	31.1 ft

Hazen-Williams

Design pipe system

Project: MIRALOMA RECHARGE BASIN - Case1

9/13/2011

Customer:

Andy Dake

Station Piping 1 suction piping

					No of
Length	21.8	ft	Discharge conn.	0.50	0
Material	Steel		90° elbow	0.30	1
Pressure class	SCH40		Valve	1.00	0
Dimension	10	inch	Tee	0.60	0
C-factor	100.000		Check valve	1.50	0
Inner diam.	10.0	inch	Outlet	1.00	0
			Own	0.00	0
			Total:	0.30	
Water velocity:	9.2	ft /s	Loss in pipe section:		1.4 ft

Station Piping 2 manifold piping

					No of
Length	10.0	ft	Discharge conn.	0.50	0
Material	Ductile Iron		90° elbow	0.30	1
Pressure class	CL53		Valve	1.00	1
Dimension	10	inch	Tee	0.60	1
C-factor	110.000		Check valve	1.50	1
Inner diam.	10.3	inch	Outlet	1.00	0
			Own	0.00	0
			Total:	3.40	
Water velocity:	8.6	ft /s	Loss in pipe section:		4.2 ft

Design pipe system

Project: MIRALOMA RECHARGE BASIN - Case1

9/13/2011

Customer:

Andy Dake

Force Main 1

					No of
Length	30.0	ft	Discharge conn.	0.50	0
Material	Steel		90° elbow	0.30	1
Pressure class	SCH40		Valve	1.00	0
Dimension	12	inch	Tee	0.60	1
C-factor	100.000		Check valve	1.50	0
Inner diam.	11.9	inch	Outlet	1.00	0
			Own	0.20	1
			Total:	1.10	
Water velocity:	12.9	ft /s		Loss in pipe section:	4.9 ft

Force Main 2

					No of
Length	1850.0	ft	Discharge conn.	0.50	0
Material			90° elbow	0.30	1
Pressure class			Valve	1.00	0
Dimension		inch	Tee	0.60	1
C-factor	110.000		Check valve	1.50	0
Inner diam.	48.0	inch	Outlet	1.00	0
			Own	0.20	1
			Total:	1.10	
Water velocity:	0.8	ft /s		Loss in pipe section:	0.1 ft

Design pipe system

Project: MIRALOMA RECHARGE BASIN - Case1

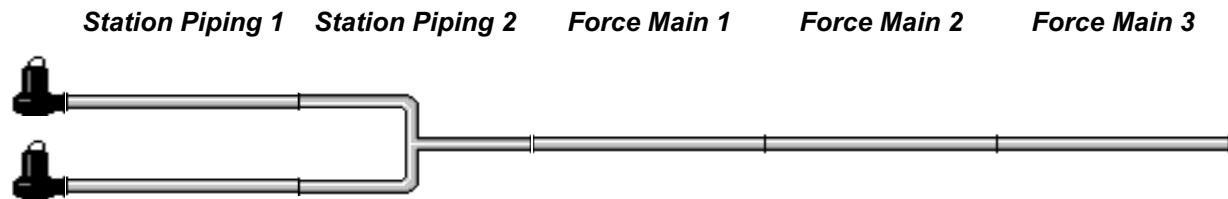
9/13/2011

Customer:

Andy Dake

Force Main 3

				No of
Length	2545.0	ft	Discharge conn.	0.50 0
Material			90° elbow	0.30 1
Pressure class			Valve	1.00 0
Dimension		inch	Tee	0.60 0
C-factor	110.000		Check valve	1.50 0
Inner diam.	72.0	inch	Outlet	1.00 1
			Own	0.20 1
			Total:	1.50
Water velocity:	0.4	ft /s	Loss in pipe section:	0.0 ft



Total flow:	4500.0	USgpm	No of	Head losses:	Total head:
Static Head:	21.8	ft	2	10.7 ft	32.5 ft

Hazen-Williams

NIDEC MOTOR CORPORATION

8050 WEST FLORISSANT AVE.
ST. LOUIS, MO 63136



DATE: 12/15/2011

P.O. NO.:
Order/Line NO.: 17166 MN

TO:

Model Number: BF42
Catalog Number: HO30S2BLG
HO30S2BLG,WPI,STD,AC MTR
60,230/460V
AU,30HP,4P,A286TPH,NRR

REVISIONS:
(NONE)

**ALL DOCUMENTS HEREIN ARE CONSIDERED CERTIFIED BY NIDEC MOTOR CORPORATION.
THANK YOU FOR YOUR ORDER AND THE OPPORTUNITY TO SERVE YOU.**

Features:

HorsePower	30
Enclosure	WPI
Poles	04
RPM (Full Load)	1760
Motor Frame Size	286TPH
Phase	3
Frequency	60
Voltage	460-230
Motor Type Code	AU
Rotor Inertia (LB-FT ²)	2.36 LB-FT ²
Qty. of Bearings PE (Shaft)	1
Qty. of Bearings SE (OPP)	1
Bearing Number PE (Shaft)	7310 BEP
Bearing Number SE (OPP)	6210-2Z-J/C3

Nidec trademarks followed by the ® symbol are registered with the U.S. Patent and Trademark Office.

NAMEPLATE DATA

CATALOG NUMBER: <input style="width: 150px;" type="text" value="HO30S2BLG"/>		NAMEPLATE PART #: <input style="width: 150px;" type="text" value="422703-004"/>	
MODEL <input style="width: 60px;" type="text" value="BF42"/>	FR <input style="width: 60px;" type="text" value="286TPH"/>	TYPE <input style="width: 60px;" type="text" value="AU"/>	ENCL <input style="width: 60px;" type="text" value="WPI"/>
SHAFT END BRG <input style="width: 150px;" type="text" value="7310 BEP - QTY 1"/>		OPP END BRG <input style="width: 150px;" type="text" value="6210-2Z-J/C3 - QTY 1"/>	
PH <input style="width: 40px;" type="text" value="3"/>	MAX AMB <input style="width: 60px;" type="text" value="40 C"/>	ID# <input style="width: 150px;" type="text"/>	
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VOLTS <input style="width: 40px;" type="text" value="460"/>	<input style="width: 40px;" type="text" value="230"/>	VOLTS <input style="width: 60px;" type="text"/>	<input style="width: 60px;" type="text"/>
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SF <input style="width: 40px;" type="text" value="1.15"/>	DESIGN <input style="width: 40px;" type="text" value="B"/>	CODE <input style="width: 40px;" type="text" value="F"/>	
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GUARANTEED EFFICIENCY <input style="width: 40px;" type="text" value="88.5"/>	MAX KVAR <input style="width: 40px;" type="text" value="8.1"/>	HZ <input style="width: 40px;" type="text" value="60"/>	

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DIVISION <input style="width: 100px;" type="text"/>	CLASS I <input style="width: 100px;" type="text"/>	GROUP I <input style="width: 100px;" type="text"/>
TEMP CODE <input style="width: 100px;" type="text"/>	CLASS II <input style="width: 100px;" type="text"/>	GROUP II <input style="width: 100px;" type="text"/>

VFD DATA (IF APPLICABLE):

VOLTS <input style="width: 150px;" type="text"/>	
AMPS <input style="width: 150px;" type="text"/>	
TORQUE 1 <input style="width: 150px;" type="text"/>	TORQUE 2 <input style="width: 150px;" type="text"/>
VFD LOAD TYPE 1 <input style="width: 150px;" type="text"/>	VFD LOAD TYPE 2 <input style="width: 150px;" type="text"/>
VFD HERTZ RANGE 1 <input style="width: 150px;" type="text"/>	VFD HERTZ RANGE 2 <input style="width: 150px;" type="text"/>
VFD SPEED RANGE 1 <input style="width: 150px;" type="text"/>	VFD SPEED RANGE 2 <input style="width: 150px;" type="text"/>
SERVICE FACTOR <input style="width: 150px;" type="text"/>	FL SLIP <input style="width: 150px;" type="text"/>
NO. POLES <input style="width: 60px;" type="text" value="4"/>	MAGNETIZING AMPS <input style="width: 150px;" type="text" value="11.9"/>
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Radians / Seconds <input style="width: 150px;" type="text" value="1"/>	Encoder Volts <input style="width: 150px;" type="text"/>

TEAO DATA (IF APPLICABLE):

HP (AIR OVER) <input style="width: 100px;" type="text"/>	HP (AIR OVER M/S) <input style="width: 100px;" type="text"/>	RPM (AIR OVER) <input style="width: 100px;" type="text"/>	RPM (AIR OVER M/S) <input style="width: 100px;" type="text"/>
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MOTOR THERMAL SENSORS INCLUDED.

ADDITIONAL NAMEPLATE DATA:

Decal / Plate	WD=109145	Customer PN	
Notes		Non Rev Ratchet	NRR
Max Temp Rise		OPP/Upper Oil Cap	GREASE
Thermal (WDG)		SHAFT/Lower Oil Cap	GREASE
Altitude			
Regulatory Notes		Regulatory Compliance	
COS		Marine Duty	
Balance	0.08 IN/SEC	Arctic Duty	
3/4 Load Eff.	91.8	Inrush Limit	
Motor Weight (LBS)	325	Direction of Rotation	
Sound Level		Special Note 1	
Vertical Thrust (LBS)	3300	Special Note 2	
Thrust Percentage		Special Note 3	
Bearing Life		Special Note 4	
Starting Method		Special Note 5	
Number of Starts		Special Note 6	
200/208V 60Hz Max Amps		SH Max. Temp.	
190V 50 hz Max Amps		SH Voltage	SH VOLTS=115V
380V 50 Hz Max Amps		SH Watts	SH WATTS= 48W
NEMA Inertia		Load Inertia	
Sumpheater Voltage		Sumpheater Wattage	
Special Accessory Note 1		Special Accessory Note 16	
Special Accessory Note 2		Special Accessory Note 17	
Special Accessory Note 3		Special Accessory Note 18	
Special Accessory Note 4		Special Accessory Note 19	
Special Accessory Note 5		Special Accessory Note 20	
Special Accessory Note 6		Special Accessory Note 21	
Special Accessory Note 7		Special Accessory Note 22	
Special Accessory Note 8		Special Accessory Note 23	
Special Accessory Note 9		Special Accessory Note 24	
Special Accessory Note 10		Special Accessory Note 25	
Special Accessory Note 11		Special Accessory Note 26	
Special Accessory Note 12		Special Accessory Note 27	
Special Accessory Note 13		Special Accessory Note 28	
Special Accessory Note 14		Special Accessory Note 29	
Special Accessory Note 15		Special Accessory Note 30	

**NIDEC MOTOR CORPORATION
ST. LOUIS, MO**



TYPICAL NAMEPLATE DATA
ACTUAL MOTOR NAMEPLATE LAYOUT MAY VARY
SOME FIELDS MAY BE OMITTED

Nidec trademarks followed by the ® symbol are registered with the U.S. Patent and Trademark Office.

MOTOR PERFORMANCE

MODEL NO.	CATALOG NO.	PHASE	TYPE	FRAME
BF42	HO30S2BLG	3	AU	286TPH

ORDER NO.	17166	LINE NO.

MPI:	128806	128807
HP:	30	30
POLES:	4	4
VOLTS:	460	230
HZ:	60	60
SERVICE FACTOR:	1.15	1.15
EFFICIENCY (%):		
S.F.	88.8	88.8
FULL	90.2	90.2
3/4	91.8	91.8
1/2	91.9	91.9
1/4	88.8	88.8
POWER FACTOR (%):		
S.F.	85.8	85.8
FULL	85.3	85.3
3/4	82.7	82.7
1/2	75.2	75.2
1/4	54.9	54.9
NO LOAD	6.1	6.1
LOCKED ROTOR	47.5	47.5
AMPS:		
S.F.	42	85
FULL	37	73
3/4	27.8	56
1/2	20.3	41
1/4	14.4	28.8
NO LOAD	11.9	23.7
LOCKED ROTOR	204	408
NEMA CODE LETTER	F	F
NEMA DESIGN LETTER	B	B
FULL LOAD RPM	1760	1760
NEMA NOMINAL EFFICIENCY (%)	90.2	90.2
GUARANTEED EFFICIENCY (%)	88.5	88.5
MAX KVAR	8.1	8
AMBIENT (°C)	40	40
ALTITUDE (FASL)	3300	3300
SAFE STALL TIME-HOT (SEC)	0	0
SOUND PRESSURE (DBA @ 1M)	70	70
TORQUES:		
BREAKDOWN{% F.L.}	246	246
LOCKED ROTOR{% F.L.}	197	197
FULL LOAD{LB-FT}	89.5	89.5

The Above Data Is Typical, Sinewave Power Unless Noted Otherwise

NIDEC MOTOR CORPORATION
ST. LOUIS, MO

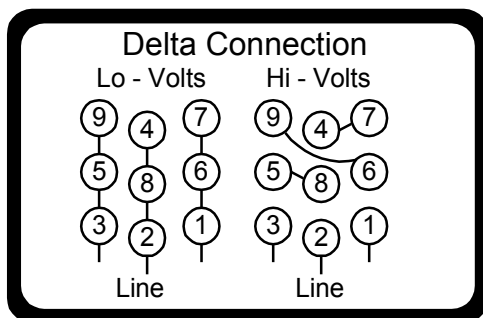
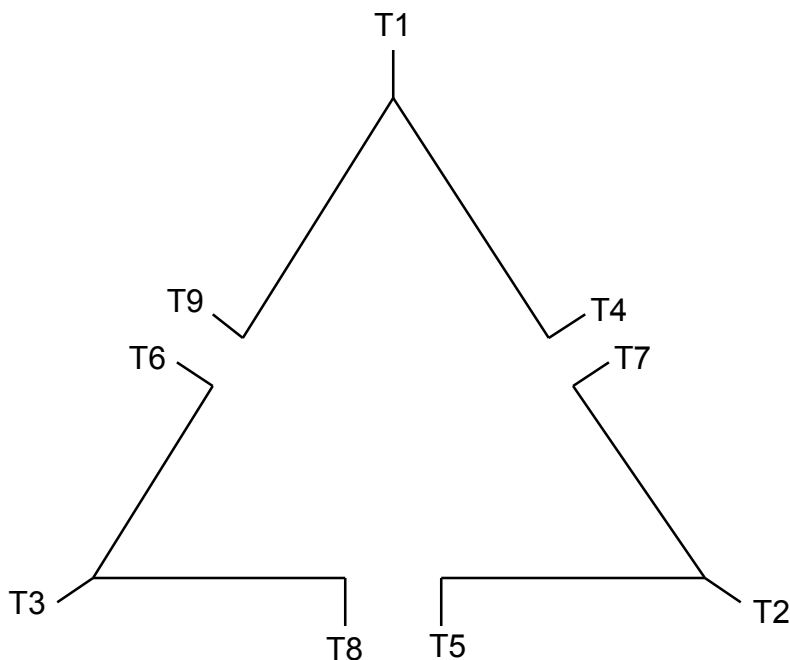


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A109145

Motor Wiring Diagram 9 Lead, Dual Voltage (DELTA Conn.)



To reverse direction of rotation interchange connections L1 and L2.

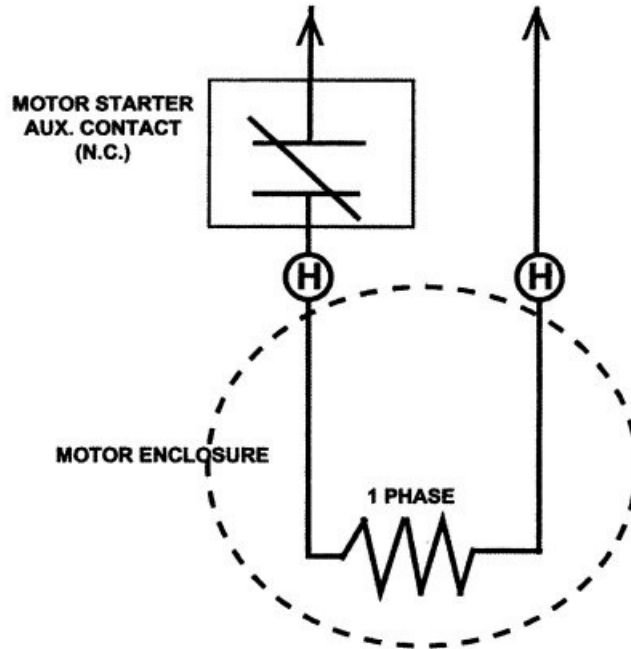
Each lead may have one or more cables comprising that lead.
In such case each cable will be marked with the appropriate lead number.



970798

SPACE HEATER CONNECTION DIAGRAM

SPACE HEATER LEADS MAY BE LOCATED IN EITHER THE MAIN OUTLET BOX
OR IF SO EQUIPPED, AN AUXILIARY BOX



THIS EQUIPMENT IS SUPPLIED WITH ANTI-
CONDENSATION HEATERS. HEATERS
SHOULD BE ENERGIZED WHEN EQUIPMENT
IS NOT OPERATING TO PROTECT UNIT BY
PREVENTING INTERNAL CONDENSATION.
CONNECT THE "H" OR HEATER
LEADS TO

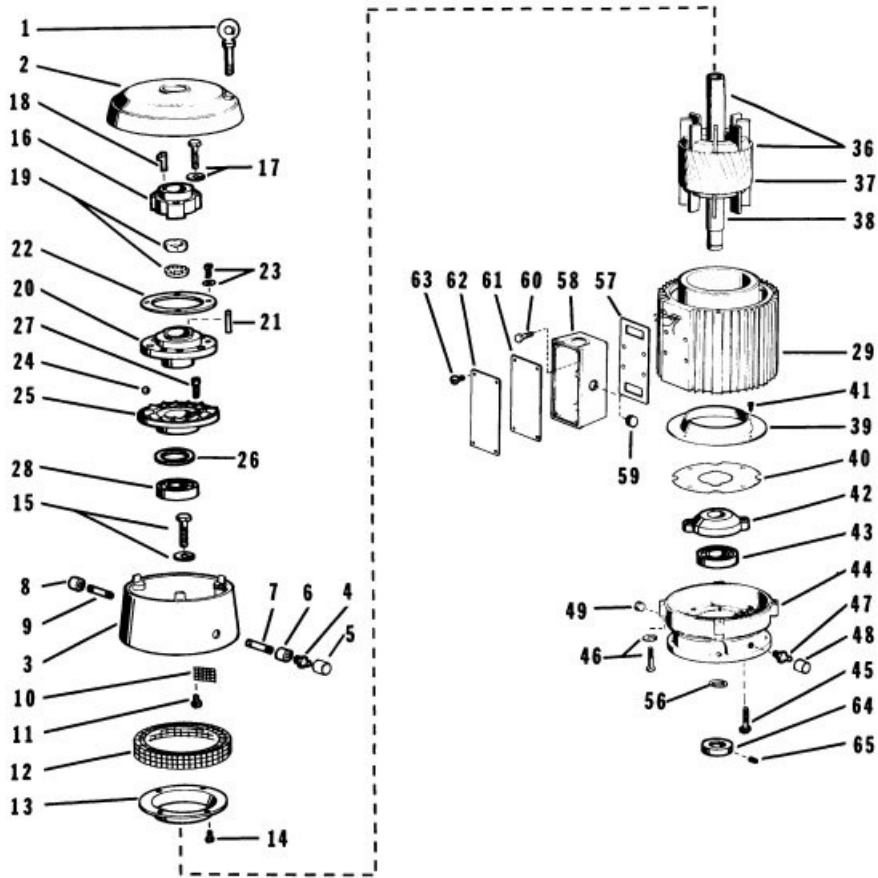
115V VOLTS | **48W** WATTS RATING

SPACE HEATER NAMEPLATE (ON MOTOR)

Revision: 7/30/2008
Mike Cullen

RENEWAL PARTS

FRAMES 254 THRU 286 - OPEN DRIPPROOF
 TYPES: AU, AUE, AUJ, AV, AV4, AV9, AVE, AVE4, AVI, AV14, AU, AUE, AUJ, AV, AV4, AVE, AVE4, AVI, AV14
 HIGH THRUST HOLLOSHAFT AND SOLIDSHAFT MOTORS



ITEM NO.	QTY	NAME OF PART
1	2	Eyebolt
2	1	Canopy Cap
3	1	Upper Bracket
4	1	Grease Fitting
5	1	Plastic Cap (Grease Fitting)

WARNING:
 Any disassembly or repair work on explosionproof motors will void the Underwriters Laboratories, Inc. label unless done by the manufacturer, or a facility approved by the Underwriters Laboratories, Inc. Refer to your nearest sales office for assistance.

BEARINGS:
 Refer to motor nameplate for the bearing numbers.

PRICES:
 Parts stocking distributors: refer to renewal parts numerical index. All Others: refer to your nearest parts distributor.

reference: Renewal Parts Section 700, Pages 147 & 148

RENEWAL PARTS

FRAMES 254 THRU 286 - OPEN DRIPPROOF
 TYPES: AU, AUE, AUI, AV, AV4, AV9, AVE, AVE4, AM, AM4, AU, AUE, AUI, AV, AV4, AVE, AVE4, AM, AM4

HIGH THRUST HOLLOSHAFT AND SOLIDSHAFT MOTORS

ITEM NO.	QTY	NAME OF PART
6	1	Pipe Coupling
7	1	Nipple Fitting
8	1	Pipe Cap (Plug)
9	1	Nipple Fitting
10	4	Bracket Screen (Intake)
11	4	Screws & Washers (Intake Screen)
12	1	Bracket Screen (Exhaust)
13	1	Air Deflector (Upper)
14	4	Screw (Air Deflector & Screen)
15	4	Screw & Lockwasher (Bracket to Stator)
16	1	Drive Coupling
17	3	Screw & Lockwasher (Drive Coupling)
18	1	Gib Key
19	1	Locknut & Lockwasher
20	1	Rotating Ratchet
21	1	Square Key
22	1	Ball Retaining Ring
23	4	Screw & Lockwasher (Ring)
24	10	Steel Balls (Optional)
25	1	Stationary Ratchet
26	As Req	Shims
27	3	Socket Head Cap Screw (Stationary Ratchet)
28	1	Ball Bearing (Upper) (Refer to Section 775)
29	1	Wound Stator Assembly
30-35	-	NOT USED IN THIS ASSEMBLY

ITEM NO.	QTY	NAME OF PART
36	1	Rotor Assembly (Includes Items 37 & 38)
37	1	Rotor Core
38	1	Rotor Shaft
39	1	Air Deflector (Lower)
40	1	Bracket Screen
41	4	Screw (Air Deflector)
42	1	Bearing Cap (Lower)
43	1	Ball Bearing (Lower) (Refer to Section 775)
44	1	Lower Bracket
45	2	Screw & Lockwasher (Bearing Cap)
46	4	Screw & Lockwasher (Bracket to Stator)
47	1	Grease Fitting
48	1	Plastic Cap (Grease Fitting)
49	1	Pipe Plug
50-55	-	NOT USED IN THIS ASSEMBLY
56	1	Water Deflector
57	1	Gasket (Outlet Box to Base)
58	1	Outlet Box Base
59	1	Pipe Plug
60	4	Screw
61	1	Gasket (Outlet Box Cover)
62	1	Outlet Box Cover
63	4	Screw
64	1	Stabilizer Bushing (Optional)
65	1	Screw (Optional)

* With optional Stabilizer Bushing, delete Item No. 56 and add Items 64 & 65

WARNING:

Any disassembly or repair work on explosionproof motors will void the Underwriters Laboratories, Inc. label unless done by the manufacturer, or a facility approved by the Underwriters Laboratories, Inc. Refer to your nearest sales office for assistance.

BEARINGS:

Refer to motor nameplate for the bearing numbers.

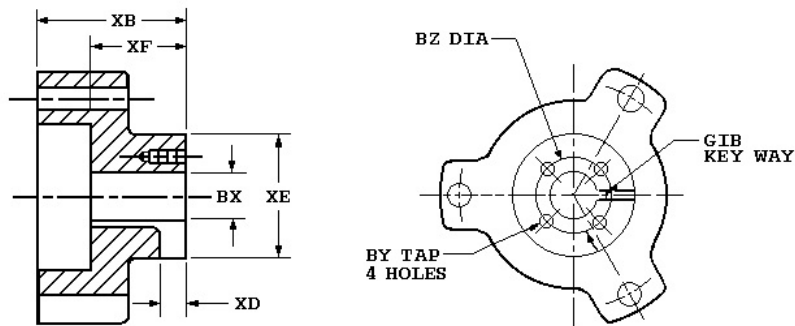
PRICES:

Parts stocking distributors: refer to renewal parts numerical index. All Others: refer to your nearest parts distributor.

reference: Renewal Parts Section 700, Pages 147 & 148

Vertical HOLLOSHAFT Coupling Dimensions

Standard Coupling Dimensions



Coupling Part Number	102999
BX Nominal	1
Actual Bore	1.001
BY	10-32
BZ	1 3/8
XB	2 9/16
XD	13/32
XE	2 1/4
XF	1 5/8
SQ. KEY	1/4

Notes:

1. All Rough casting dimensions may vary by 0.25" due to casting variations.
2. All tapped holes are Unified National Course, Right Hand thread.
3. Coupling bore dimension "BX" is machined with a tolerance of $-.000"$, $+.001"$ up to 1.50" bore inclusive. Larger bores: $-.000"$, $+.002"$.



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TYPICAL REED CRITICAL FREQUENCY DATA

USEM MODEL NO: BF42
USEM CATALOG NO: HO30S2BLG

Frame: 286TPH Type: AU

REED CRITICAL FREQUENCY:	75	HZ
CENTER OF GRAVITY:	11	IN
DEFLECTION @ CENTER OF GRAVITY:	0.0017	IN
UNIT WEIGHT:	350	LBS.
BASE DIAMETER:	ALL	IN.
MAXIMUM MOTOR DIAMETER:	14.00	IN.
DATE:	12/15/2011	



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Suitability of Integral Horsepower (IHP)* Motors on Variable Frequency Drives

Variable Frequency Drives (VFD)

Nidec Motor Corporation's Inverter Grade® insulated motors exceeded NEMA® MG-1 Part 30 & 31 before the standards were established.

We are a leader in the development of electric motors to withstand pulse width modulated (PWM) drives evolution from power transistors to higher switching frequency insulated gate bipolar transistors (IGBTs).

Today, as the need for light and medium duty motor inverter applications grows, Nidec Motor Corporation provides products to meet these demands.

Through continued research and development, Nidec Motor Corporation has included the insulation wire from its Inverter Grade® motors on all Premium, Energy and Standard Efficient motors, enhancing their potential inverter compatibility.

Inverter compatibility with motors is complex. As a result, many variables must be considered when determining the suitability of certain types of motors. These variables include:

- Torque requirements (Constant or Variable)
- Speed Range
- Line/System Voltage
- Cable Length between VFD & Motor
- Drive Switching (Carrier) Frequency
- Motor Construction

Wider speed ranges, higher voltages, higher switching frequencies and increased cable lengths all add to the severity of the application and therefore the potential for premature motor failure. Nidec Motor Corporation has differentiated its products into families for your ease of selection for various inverter applications.

Warranty Guidelines

The information within this section refers to the motor and drive application guidelines and limitations for warranty.

Hazardous Location Motors

Use of a variable frequency drive with the motors in this catalog, intended for use in hazardous locations, is only approved for Division 1, Class I, Group D hazardous location motors with a T2B temperature code, with a limitation of 2:1 constant torque or 10:1 variable torque output. No other stock hazardous location motors are inherently suitable for operation with a variable frequency drive. If other requirements are needed, including non-listed Division 2, please contact your Nidec Motor Corporation territory manager to conduct an engineering inquiry.

Applying Inverter Grade® Insulated Motors on Variable Frequency Drives

The products within this catalog labeled "Inverter Duty" or "Vector Duty" are considered Inverter Grade® insulated motors. Inverter Grade® motors exceed the NEMA® MG-1 Part 31 standard.

Nidec Motor Corporation provides a three-year limited warranty (see page ix) on all Inverter Grade® insulated motors and allows long cable runs between the motor and the VFD (limited to 400 feet without output filters). These motors may be appropriate for certain severe inverter application or when the factors relating to the end use application are undefined (such as spares).

Nidec Motor Corporation's U.S. Motors® brand is available in the following Inverter Grade® insulated motors:

- Inverter Duty motors good for 10:1 Variable Torque & 5:1 Constant Torque, including Vertical Type RUSI
- Inverter Duty motors good for 10:1 Constant Torque
- ACCU-Torq® and Vector Duty Motors with full torque to 0 Speed & 1024 PPR, 5-28VDC Encoder
- 841 Plus® motors that meet IEEE® 841 Standards and are suitable for 5:1 Constant Torque

Applying Premium Efficient Motors on Variable Frequency Drives

Meet NEMA® MG-1, Section IV, Part 31.4.4.2. They can be used with adjustable frequency drives under the following parameters: Up to 4:1 speed range on constant torque loads, standard two-year limited warranty (see page ix).

Cable Distances for Applying Premium Motors			
Maximum Cable Distance VFD to Motor			
Switching Frequency	460 Volt	230 Volt	380 Volt
3 KHz	196 ft	481 ft	295 ft
6 KHz	168 ft	340 ft	209 ft
9 KHz	113 ft	278 ft	170 ft
12 KHz	98 ft	241 ft	148 ft
15 KHz	88 ft	215 ft	132 ft
20 KHz	76 ft	186 ft	114 ft

Applying Standard & Energy Efficient Motors on Variable Frequency Drives

Meet NEMA® MG-1, Section IV, Part 30.2.2.8. They can be used with adjustable frequency drives under the following parameters: Up to 2:1 speed range on constant torque loads, one year limited warranty (see page ix).

Cable Distances for Applying EPAct & Standard Motors			
Maximum Cable Distance VFD to Motor			
Switching Frequency	460 Volt	230 Volt	380 Volt
3 KHz	103 ft	435 ft	218 ft
6 KHz	73 ft	307 ft	154 ft
9 KHz	59 ft	251 ft	126 ft
12 KHz	51 ft	217 ft	109 ft
15 KHz	46 ft	194 ft	98 ft
20 KHz	40 ft	168 ft	85 ft

All Nidec Motor Corporation motors have 40°C ambient, 1.0 SF on Inverter Power, 3300 ft. max altitude, 460 voltage or less line power, up to 10:1 speed range on Variable Torque and Class F Insulation. 575-volt motors can be applied on inverters when output filters are used.

*This information applies only to Integral Horsepower (IHP) motors as defined on the Agency Approval page, under UL® & CSA® listings where indicated.

† All marks shown within this document are properties of their respective owners



Motor/ Inverter Compatibility

Thermal Overloads and Single Phase Motors

Motors with thermal overloads installed may not operate properly on a VFD. The current carrying thermal overload is designed for sine wave power. Operation on a VFD may cause nuisance tripping or potentially not protect the motor as would be expected on line power. Thermostats or thermistors installed in the motor and connected properly to the VFD may provide suitable thermal overload protection when operating on a VFD. (Consult Codes)

Single phase motors and other fractional horsepower ratings are not designed to be operated on a VFD. Within Nidec Motor Corporation standard products, all motors NEMA[®] 48 frame (5.5" diameter) and smaller are not suitable for VFD applications. Three phase 56 and 143/145 frame applications should be noted on the catalog price page; or if in doubt ask a Nidec Motor Corporation technical representative for recommendations on compatibility with a VFD.

Slow Speed Motors

Motors with a base design of slower than six poles require special consideration regarding VFD sizing and minimizing harmonic distortion created at the motor terminals due to cable installation characteristics. Additional external PWM waveform filters and shielded motor cables designed for PWM power may be required to provide acceptable motor life. Harmonic distortion on the output waveform should be kept to a minimum level (less than 10%).

690V Applications

Motors that will be applied to 690Vac PWM VFDs require the use of an external filter to limit peak voltage spikes and the use of an Inverter Grade[®] motor. Where available, an alternative to using an output filter is to upgrade to a 2300V insulation system.

Low Voltage TITAN[®] Motors

The use of 449 frame and larger motors on PWM type VFDs should use the cable length limits of the second chart from the previous page as a guide for inverter application or consider the use of an external filter and shielded motor cables designed for PWM power to minimize harmonic distortion and peak voltages at the motor terminals. Harmonic distortion on the output waveform should be kept to a minimum level (less than 10%).

Bearing Currents related to PWM waveform

Due to the uniqueness of this condition occurring in the field, protection of the motor bearings from shaft currents caused by common mode voltages is not a standard feature on sinewave or Inverter Duty motor products, unless explicitly noted. Some installations may be prone to a voltage discharge condition through the motor bearings called fluting.

Fluting damage is related to characteristics of the PWM waveform, VFD programming and characteristics and installation.

Bearing fluting as a result of VFD sine wave characteristics may be prevented by the installation of a shaft grounding device such as a brush or ring and/or correction of the installation characteristics causing the shaft voltage condition.

Multiple Motors on a Single VFD

Special considerations are required when multiple motors are powered from a single VFD unit. Most VFD manufacturers can provide guidelines for proper motor thermal considerations and starting/stopping of motors. Cable runs from the VFD and each motor can create conditions that will cause extra stress on the motor winding. Filters may be required at the motor to provide maximum motor life.

Grounding and Cable Installation Guidelines

Proper output winding and grounding practices can be instrumental in minimizing motor related failures caused by PWM waveform characteristics and installation factors. VFD manufacturers typically provide detailed guidelines on the proper grounding of the motor to the VFD and output cable routing. Cabling manufacturers provide recommended cable types for PWM installations and critical information concerning output wiring impedance and capacitance to ground.

Vertical Motors on VFDs

Vertical motors operated on VFD power present unique conditions that may require consideration by the user or installation engineer:

- Slowest rpm that can be utilized and not cause the non-reversing ratchet to operate properly (in the range of 200 –300 rpm)
- Unexpected / unacceptable system vibration and or noise levels caused by the torque pulsation characteristics of the PWM waveform, a system critical frequency falling inside the variable speed range of the process or the added harmonic content of the PWM waveform exciting a system component
- Application related problems related to the controlled acceleration/deceleration and torque of the motor on VFD power and the building of system pressure/ load.
- The impact the reduction of pump speed has on the down thrust reflected to the pump motor and any minimum thrust requirements of the motor bearings
- Water hammer during shutdown damaging the non-reversing ratchet

Humidity and Non-operational Conditions

The possible build-up of condensation inside the motor due to storage in an uncontrolled environment or non-operational periods in an installation, can lead to an increased rate of premature winding or bearing failures when combined with the stresses associated with PWM waveform characteristics. Moisture and condensation in and on the motor winding over time can provide tracking paths to ground, lower the Megohm resistance of the motor winding to ground and lower the Corona Inception Voltage level of the winding.

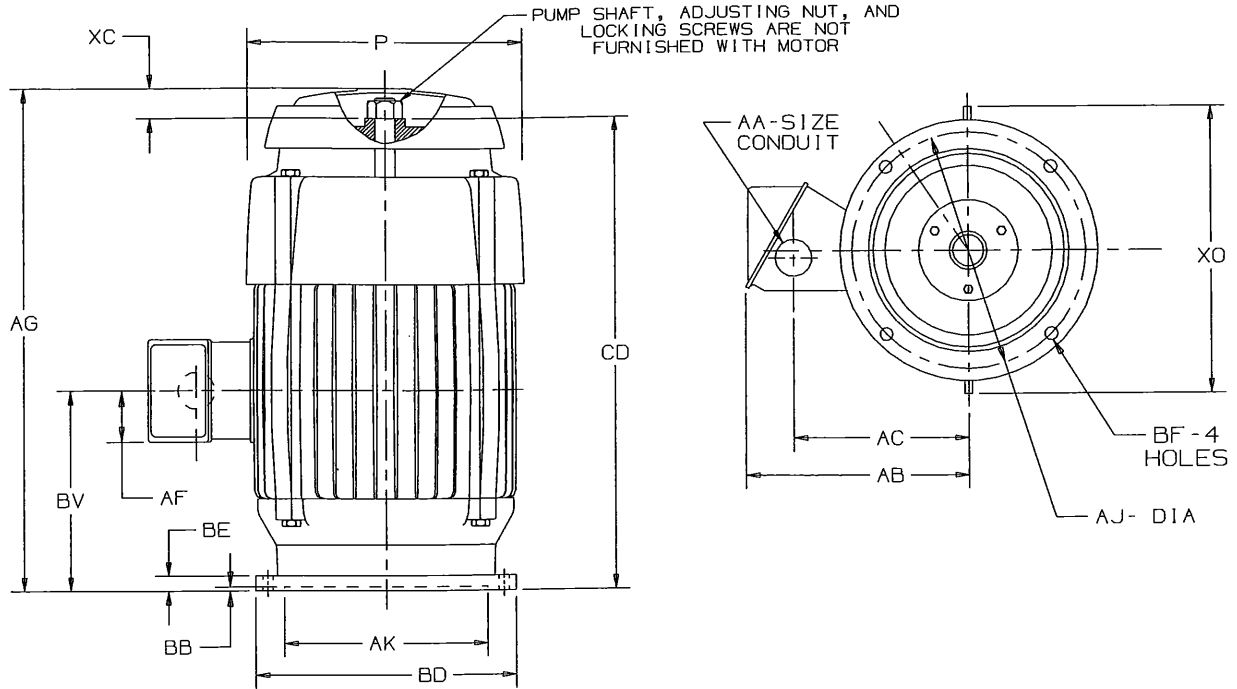
Proper storage and maintenance guidelines are important to minimize the potential of premature failures. Space heaters or trickle voltage heating methods are the preferred methods for drying out a winding that has low megaohm readings. Damage caused by these factors are not covered by the limited warranty provided unless appropriate heating methods are properly utilized during non-operational periods and prior to motor start-up.

NEMA[®] Application Guide for AC Adjustable Speed Drive Systems:
<http://www.nema.org/stds/acadjustable.cfm#download>

*This information applies only to Integral Horsepower (IHP) motors as defined on the Agency Approval page, under UL[®] & CSA[®] listings where indicated.

† All marks shown within this document are properties of their respective owners

DIMENSIONS
THREE PHASE HOLLOSHAFT® MOTORS
WEATHER PROTECTED TYPE I
FRAME 284 THRU 286



ALL DIMENSIONS ARE IN INCHES & MILLIMETERS

BASIC FRAME	UNITS	P 2	AA	AB	AC	AF	AG	BV	CD	XC	XO
280	IN	14.00	1.50	11.07	8.32	2.59	28.13	12.25	24.75	3.22	16.88
	mm	356		281	211	66	715	311	629	82	429

FRAME	UNITS	AJ	AK	BB MIN	BD MAX	BE	BF
284, 286TP	IN	9.125	8.250	.25	10.00	.94	.44
	mm	231.78	209.55	6	254	24	11
284, 286TPH	IN	14.750	13.500	.25	16.50	.94	.69
	mm	375.65	342.90	6	419	24	18
284, 286TPA	IN	9.125	8.250	.25	12.00	.94	.44
	mm	231.78	209.55	6	305	24	11

TOLERANCES	8.250 AK	13.500 AK
FACE RUNOUT	.004 F.I.R.	.007 F.I.R.
PERMISSIBLE ECCENTRICITY OF MOUNTING RABBET	.004 F.I.R.	.007 F.I.R.
"AK" DIMENSION	-.000; +.003	-.000; +.005

- 1: ALL ROUGH CASTING DIMENSIONS MAY VARY BY .25" DUE TO CASTING VARIATIONS.
- 2: LARGEST MOTOR WIDTH.
- 3: CONDUIT BOX MAY BE LOCATED IN STEPS OF 90° STANDARD AS SHOWN WITH CONDUIT OPENING DOWN.
- 4: TOLERANCES SHOWN ARE IN INCHES ONLY.

PTX/PMP 1290

Wastewater Submersible Pressure Transmitters/Transducers

- All-titanium construction backed by 5 year corrosion warranty
- Accuracy: $\pm 0.25\%$ FS BSL
- Flush teflon-coated elastomeric diaphragm
- Intrinsically safe approved
- Outputs: 4-20mA, 1-5 Vdc
- Submersible with vented polyurethane cable



The 1290 Series submersible/depth pressure transducers are specifically designed for the wastewater, pump/lift station application. The all-titanium construction assures excellent life in the most hostile environments, including corrosive and hazardous chemical applications. Druck backs its titanium construction with a 5 year corrosion warranty. Standard vented cable is polyurethane.

The 1290 Series pressure transmitter is similar to Druck's field proven submersible sensors with the exception of the pressure port. It is equipped with a flush teflon-coated elastomeric diaphragm that reduces the likelihood of grease or biosolids buildup. The pressure transfer medium is a silicone grease that maintains its elasticity between -40 and $+250^{\circ}\text{F}$.

An advanced micro-machined silicon piezoresistive pressure sensor provides excellent performance and resistance to shock and vibration. A tough, polyurethane cable is molded to the transducer body, providing a high integrity, waterproof assembly. The cable is strengthened with kevlar so that there is no measurable elongation when the cable is lowered into deep wells.

The fully isolated, all-titanium design ensures long term reliable measurements in water and wastewater management, industrial, process and marine applications.

STANDARD SPECIFICATION

Operating Ranges
Any range from 6 Ft H₂O to 46 Ft H₂O with elastomeric diaphragm. Higher ranges to 500 psi g available with plastic screen in place of elastomeric diaphragm.

Overpressure
4X minimum

Pressure Media
Fluids compatible with Titanium and polyurethane

Transduction Principle
Piezoresistive-micromachined silicon strain gauge

Combined Non-linearity, Hysteresis and Repeatability
<±0.25% FS BSL

Temperature Effects
±1.5% FS TEB 10 psig and up
Ranges 5 psig and below prorated

Resolution
Infinite

Insulation Resistance
100 megOhms @ 500 Vdc

Relative Humidity
0 to 100%

Operating Temperature Range
-5°F to +140°F

Compensated Temperature Range
30°F to 86°F

Electrical Characteristics

PTX 1290
2-wire, 4-20mA
9-32 Vdc excitation

PMP 1290
3-wire, 1-5 Vdc
8-30 Vdc excitation
<2 mA current @80°F

Mechanical Characteristics

Sensor Body
Titanium

Measurement Diaphragm
Internal-Titanium
External-Teflon coated Nitrile Rubber

Pressure Connection
Flush elastomeric diaphragm with titanium retaining ring

Electrical Connection
Vented polyurethane cable (specify length)

Diameter
1.20" max O.D.

Weight
5 oz. nominal (excluding cable)

Compatible Fluids
Any fluids compatible with titanium, polyurethane and teflon coated nitrile rubber

Safety Classification
UL, cUL, intrinsically safe; Class I, Div 1
Groups A, B, C and D
Class II, Groups E, F and G
Class III

Ingress Protection
NEMA 6 (IP68)

Caution
Do not remove the retaining ring that holds elastomeric diaphragm in place. This will void the calibration and could result in a loss of the silicone pressure transfer compound.

ASSOCIATED PRODUCTS

1230 Series	Submersible sensor
DPI 280	Digital display w/ alarms
STE 110	Sensor termination enclosure w/ desiccant
Lightning Arrestors	
	MDK-24 2 wire
	MDK-LV 3 wire
	MDK-LC 4 wire
SCU-220	Din rail mountable sensor termination enclosure w/ desiccant and 4-20mA electronics
DPI 610	Portable pressure calibrator
TRX II	Portable temperature and pressure calibrator

ORDERING INFORMATION

Please state the following:
(1) Type number
(2) Pressure range
(3) Cable length

For non-standard requirements please specify in detail.

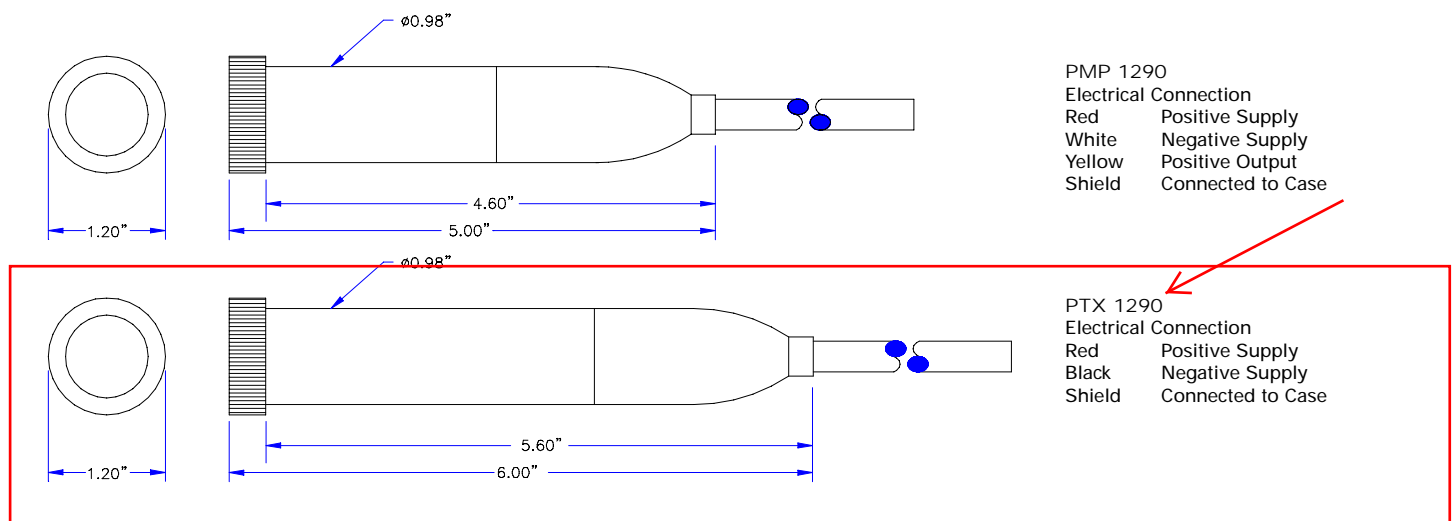
Shipping, Storage and Handling
Each transmitter is purged with clean dry nitrogen and shipped with desiccant to prevent moisture ingress during transit.

Continuing development sometimes necessitates specification changes without notice.

Druck is an ISO 9001 registered company.



INSTALLATION DRAWINGS: Dimensions in inches



Druck Incorporated

Representative

GE Druck PTX / PMP 1290

Distributor: ThermX Southwest 800-284-3769

www.thermx.com

Druck

100' OF 1/8" SS CABLE

PDS-A063 8/00

SITRANS L Level instruments

Continuous measurement - Ultrasonic transducers

Echomax XPS and XCT

Overview



Echomax[®] XPS/XCT transducers use ultrasonic technology to measure level in a wide range of liquids and solids.

Benefits

- Integral temperature compensation
- Low ringing effect reduces blanking distance
- Optional foam facing for dusty applications
- Self-cleaning and low-maintenance
- Chemically resistant
- Hermetically sealed

Application

The transducers can be fully immersed, are resistant to steam and corrosive chemicals and can be installed without flanges.

The XPS series offers versions for various measuring ranges up to 40 m (130 ft) and up to a max. temperature of +95 °C (+203 °F).

The XCT series can be used in applications at higher temperatures to measure level up to a distance of 12 m (40 ft) and at a max. temperature of +145 °C (+293 °F).

During operation, the Echomax transducers emit acoustic pulses in a narrow beam. The level monitor measures the propagation time between pulse emission and its reflection (echo) to calculate the distance.

SITRANS L Level instruments

Continuous measurement - Ultrasonic transducers

Echomax XPS and XCT

Technical specifications

Input	XPS-10 (standard and F models)	XPS-15 (standard and F models)	XPS-30	XPS-40	XCT-8 (standard and sanitary models)	XCT-12
Measuring range	0.3 to 10 m (1 to 33 ft)	Standard: 0.3 to 15 m (1 to 50 ft) Flanged: 0.45 to 15 m (1.5 to 50 ft)	0.6 to 30 m (2 to 100 ft)	0.9 to 40 m (3 to 130 ft)	0.6 to 8 m (2 to 26 ft)	0.6 to 12 m (2 to 40 ft)
Output						
Frequency	44 kHz	44 kHz	30 kHz	22 kHz	44 kHz	44 kHz
Beam angle	12°	6°	6°	6°	12°	6°
Environmental						
Location	Indoors/outdoors					
Ambient temperature	-40 to +95 °C (-40 to +203 °F)				Standard: -40 to +145 °C (-40 to +293 °F) Sanitary: -40 to +125 °C (-40 to +260 °F)	-40 to +145 °C (-40 to +293 °F)
Pollution degree	4					
Pressure	8 bar (120 psi) Flanged: 0.5 bar (7.25 psi)	8 bar (120 psi) Flanged: 0.5 bar (7.25 psi)	0.5 bar (7.25 psi) Flanged: 0.5 bar (7.25 psi)	0.5 bar (7.25 psi)	Standard: 4 bar (60 psi): -40 to +138 °C (-40 to +280 °F) Standard: 8 bar (120 psi): -40 to +95 °C (-40 to +203 °F) Flanged: 0.5 bar (7.25 psi) Sanitary: XCT-8: 0.5 bar (7.25 psi)	
Design						
Weight	0.8 kg (1.8 lbs)	1.3 kg (2.8 lbs) Flanged: 2 kg (4.4 lbs)	4.3 kg (9.5 lbs)	8 kg (18 lbs)	0.8 kg (1.7 lbs)	1.3 kg (2.8 lbs)
Power supply	Operation of transducer only with approved Siemens Milltronics controllers					
Material	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange	PVDF	Standard: PVDF Options: DERAKANE® flange; PTFE face with uni- versal PVDF flange	
Color	Standard: blue F: gray	Standard: blue F: gray	blue	blue	white	
Process connection	Standard: 1" NPT or 1" BSPT F: 1" NPT	Standard: 1" NPT or 1" BSPT F: 1" NPT	1.5" universal thread (NPT or BSPT)		1" NPT or 1" BSPT	
Cable	2 wire twisted pair/braided and foil shielded 0.5 mm ² (20 AWG) PVC jacket				2 wire twisted pair/braided and foil shielded 0.5 mm ² (20 AWG) silicone jacket	
Separation	Max. 365 m (1200 ft)					
Certificates and approvals	Standard: CE ¹ , CSA, FM, ATEX II 2GD F: FM Class I, Div 1, Groups A, B, C and D, Class II Div 1, Groups E, F and G, Class III	Standard: CE ¹ , CSA, FM, ATEX II 2GD F: FM Class I, Div 1, Groups A, B, C and D, Class II Div 1, Groups E, F and G, Class III	CE ¹ , CSA, FM, ATEX II 2G 1D	CE ¹ , CSA, FM, ATEX II 2G 1D	Standard: CE ¹ , CSA, FM, ATEX II 2G Sanitary: CSA, 3A	CE ¹ , CSA, FM, ATEX II 2G

¹) EMC certificate available on request.

® DERAKANE is a registered trademark of Ashland Inc.

SITRANS L Level instruments

Continuous measurement - Ultrasonic transducers

Echomax XPS and XCT

Selection and Ordering data	Order No.
Echomax XPS-10 ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 10 m	C) 7ML1115-0
Mounting thread and facing 1" NPT (ANSI/ASME B1.20.1) 1" NPT (ANSI/ASME B1.20.1) with foam facing ¹⁾ 1" NPT (ANSI/ASME B1.20.1) with PTFE facing ²⁾ 1" BSPT (EN 10226-1) 1" BSPT (EN 10226-1) with foam facing ¹⁾ 1" BSPT (EN 10226-1) with PTFE facing ²⁾	0 1 2 3 4 5
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C E F K
Mounting flange None 3" ASME, 150 lb, flat faced 4" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced DN 80, PN 10/16, Type A, flat faced DN 100, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced JIS10K3B Style JIS10K4B Style JIS10K6B Style (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2238 standard.)	A C D E F G J L M P R
Approvals ATEX II 2 GD, FM Class I Div. 2, SAA Class I CSA Class I Div. 1 ³⁾	3 4
Further designs Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 mm x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Order code Y15

Selection and Ordering data	Order No.
Instruction Manual Quick Start guide, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.	C) 7ML1998-5QM82 C) 7ML1998-5HV61
Accessories Submergence shield kit Easy Aimer 2, with 3/4" x 1" NPT PVC coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1 1/2" BSPT aluminum couplings Easy Aimer 304, with stainless steel coupling Easy Aimer 304, with M20 adapter and 1" and 1 1/2" BSPT 304 SS couplings Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (See Mounting Brackets on page 5/118 for more information.) 1" NPT locknut, plastic 1" BSPT locknut, plastic	7ML1830-1BH 7ML1830-1AQ 7ML1830-1AX 7ML1830-1AU 7ML1830-1GN 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS 7ML1830-1DR
Split flanges 3", aluminum 3", 304 stainless steel Gasket Kit 3", neoprene 4", aluminum 4", 304 stainless steel Gasket Kit 4", neoprene 6", aluminum 6", 304 stainless steel Gasket Kit 6", neoprene Instruction manual	7ML1830-1AV 7ML1830-1AW 7ML1930-1BF 7ML1830-1BA 7ML1830-1BB 7ML1930-1BG 7ML1830-1BC 7ML1830-1BD 7ML1930-1BH 7ML1998-1EP01

- 1) Not available with flanged versions
 2) Available with flanged versions only
 3) Valid with mounting thread and facing options 0, 1 and 2 only
 C) Subject to export regulations AL: N, ECCN: EAR99
 Refer to page 5/117 for split flanges for XPS-10 transducers.

SITRANS L Level instruments

Continuous measurement - Ultrasonic transducers

Echomax XPS and XCT

Ordering data	Order No.
Echomax XPS-10F ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 10 m	C) 7ML1170-0
Mounting thread and facing 1" NPT (ANSI/ASME B1.20.1)	1
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C D E F
Mounting flange, flush mount None 3" ASME, 150 lb, flat faced 4" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2238 standard.)	A B C D E
Approvals FM Class I Div. 1	1
Further designs Please add "-Z" to Order No. and specify Order code(s).	Order code
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Instruction manual English Note: The Instruction manual should be ordered as a separate line item on the order. Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.	C) 7ML1998-1DU01 C) 7ML1998-5HV61
Accessories Submergence shield kit Easy Aimer 2, with ¾" x 1" NPT PVC coupling Easy Aimer 304, with stainless steel coupling Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (See Mounting Brackets on page 5/118 for more information.) 1" NPT locknut, plastic	7ML1830-1BH 7ML1830-1AQ 7ML1830-1AU 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS
Split flanges 3", aluminum 3", 304 stainless steel Gasket Kit 3", neoprene 4", aluminum 4", 304 stainless steel Gasket Kit 4", neoprene 6", aluminum 6", 304 stainless steel Gasket Kit 6", neoprene Instruction manual	7ML1830-1AV 7ML1830-1AW 7ML1930-1BF 7ML1830-1BA 7ML1830-1BB 7ML1930-1BG 7ML1830-1BC 7ML1830-1BD 7ML1930-1BH 7ML1998-1EP01

Refer to page 5/117 for split flanges for XPS-10 transducers.
 C) Subject to export regulations AL: N, ECCN: EAR99

SITRANS L Level instruments

Continuous measurement - Ultrasonic transducers

Echomax XPS and XCT

Selection and Ordering data	Order No.
Echomax XPS-15 ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 15 m	C) 7ML1118-0
Mounting thread and facing 1" NPT (ANSI/ASME B1.20.1) 1" NPT (ANSI/ASME B1.20.1) with foam facing ¹⁾ 1" NPT (ANSI/ASME B1.20.1) with PTFE facing ²⁾ 1" BSPT (EN 10226-1) 1" BSPT (EN 10226-1) with foam facing ¹⁾ 1" BSPT (EN 10226-1) with PTFE facing ²⁾	0 1 2 3 4 5
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C E F K
Mounting flange None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced DN 150, PN 10/16, Type A, flat faced DN 200, PN 10/16, Type A, flat faced JIS10K 6B JIS10K 8B (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2238 standard.)	A D E J K N P
Approvals ATEX II 2 GD, FM Class I Div. 2, SAA Class I CSA Class I Div. 1, available with mounting options 0, 1, 2 only	3 4
Further designs Please add "-Z" to Order No. and specify Order code(s).	Order code
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Instruction manual Quick Start Manual, multi-language Note: Due to ATEX regulations, one Quick Start Manual is included with every transducer. Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.	C) 7ML1998-5QM82 C) 7ML1998-5HV61

Selection and Ordering data	Order No.
Accessories Submergence shield kit Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (See Mounting Brackets on page 5/118 for more information.) 1" NPT locknut, plastic 1" BSPT locknut, plastic Easy Aimer 2, with ¾" x 1" NPT PVC coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304 with stainless steel coupling Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	7ML1830-1BJ 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS 7ML1830-1DR 7ML1830-1AQ 7ML1830-1AX 7ML1830-1AU 7ML1830-1GN
Split flanges 6" aluminum 6" 304 stainless steel Gasket Kit 6", neoprene Split Flanges Instruction manual	7ML1830-1BE 7ML1830-1BF 7ML1930-1BH 7ML1998-1EP01

¹⁾ Not available with flanged versions

²⁾ Available with flanged versions only

C) Subject to export regulations AL: N, ECCN: EAR99

Refer to page 5/117 for split flanges for XPS-15 transducers.

SITRANS L Level instruments

Continuous measurement - Ultrasonic transducers

Echomax XPS and XCT

Selection and Ordering data	Order No.
Echomax XPS-15F ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 15m	C) 7ML1171-0
Mounting thread and facing 1" NPT (ANSI/ASME B1.20.1)	1
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C D E F
Mounting flange, flush mount None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2238 standard.)	A B C
Approvals FM Class I Div. 1	1
Further designs Please add "-Z" to Order No. and specify Order code(s).	Order code
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Instruction manual English Note: The Instruction manual should be ordered as a separate line item on the order.	C) 7ML1998-1DU01
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	C) 7ML1998-5HV61
This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.	
Accessories Submergence shield kit Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (See Mounting Brackets on page 5/118 for more information.) 1" NPT locknut, plastic Easy Aimer 2, with ¾" x 1" NPT PVC coupling Easy Aimer 304 with stainless steel coupling Split Flanges 6" aluminum Split Flanges 6" stainless steel Split Flanges Gasket kit 6" Split Flanges Instruction manual	7ML1830-1BJ 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS 7ML1830-1AQ 7ML1830-1AU 7ML1830-1BE 7ML1830-1BF 7ML1930-1BH 7ML1998-1EP01

Refer to page 5/117 for split flanges for XPS-15 transducers.

Selection and Ordering data	Order No.
Echomax XPS-30 ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. 1½" universal thread compatible with 1½" NPT and 1½" BSPT Measuring range: min. 0.6 m (1.97 ft), max. 30 m (98.43 ft)	C) 7ML1123-0
Mounting thread and facing 1½" universal thread 1½" universal thread, foam facing ¹⁾ 1½" universal thread, PTFE facing ²⁾	0 1 2
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C E F K
Mounting flange None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced DN 150, PN 10/16, Type A, flat faced DN 200, PN 10/16, Type A, flat faced JIS10K 6B JIS10K 8B (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2238 standard.)	A D E J K N P
Approvals ATEX II 2G 1D, FM Class I Div 2, SAA	5
Further designs Please add "-Z" to Order No. and specify Order code(s).	Order code
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Instruction manual Quick Start Manual, multi-language Note: Due to ATEX regulations, one Quick Start Manual is included with every transducer. Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.	C) 7ML1998-5QM82 C) 7ML1998-5HV61
Accessories 1½" BSPT locknut, plastic Easy Aimer 2, 1½" NPT galvanized coupling Easy Aimer 2, 1½" NPT with stainless steel coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	7ML1830-1DP 7ML1830-1AN 7ML1830-1AT 7ML1830-1AX 7ML1830-1GN

¹⁾ Not available with flanged versions

²⁾ Available with flanged versions only

C) Subject to export regulations AL: N, ECCN: EAR99.

5

SITRANS L Level instruments

Continuous measurement - Ultrasonic transducers

Echomax XPS and XCT

Selection and Ordering data	Order No.
Echomax XPS-40 ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. 1½" universal thread compatible with 1½" NPT and 1½" BSPT Measuring range: min. 0.9 m (2.95 ft), max. 40 m (131.23 ft)	C) 7ML1127-0
Mounting thread and facing 1½" universal thread 1½" universal thread, foam facing	0 1
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C E F K
Mounting flange None	A
Approvals ATEX II 2G 1D, FM Class I Div 2, SAA	5
Further designs Please add "-Z" to Order No. and specify Order code(s).	Order code
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Instruction manual Quick Start Manual, multi-language Note: Due to ATEX regulations, one Quick Start Manual is included with every transducer. Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.	C) 7ML1998-5QM82 C) 7ML1998-5HV61
Accessories 1½" BSPT locknut, plastic Easy Aimer 2, 1½" NPT galvanized coupling Easy Aimer 2, 1½" NPT with stainless steel coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	7ML1830-1DP 7ML1830-1AN 7ML1830-1AT 7ML1830-1AX 7ML1830-1GN

C) Subject to export regulations AL: N, ECCN: EAR99

5

SITRANS L Level instruments

Continuous measurement - Ultrasonic transducers

Echomax XPS and XCT

Selection and Ordering data	Order No.
Echomax XCT-8 ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Ambient temperatures up to +145 °C Measuring range: min. 0.6 m (2 ft), max. 8 m (26 ft)	C) 7ML1132-0
Mounting thread and facing 1" NPT (ANSI/ASME B1.20.1) 1" NPT (ANSI/ASME B1.20.1), PTFE facing ¹⁾ 1" BSPT (EN 10226-1) 1" BSPT (EN 10226-1), PTFE facing ¹⁾	0 1 2 3
Cable length 1 m (3.28 ft) 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	A B C E F K
Mounting flange None 3" ASME, 150 lb, flat faced 4" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced DN 80, PN 10/16, Type A, flat faced DN 100, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced JIS10K 3B JIS10K 4B JIS10K 6B (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 or JIS B 2238 standard.) 3" universal ²⁾ 4" universal ³⁾ 6" universal ⁴⁾ 4" sanitary flange, available with approval option 6 and PTFE facing only	A C D E G J L M P R S T U V
Approvals ATEX II 2G, FM Class I, Div. 2, SAA CSA Class I Div. 1, available with mounting thread and facing option 0 3A Sanitary (only with 4" sanitary flange, option V)	4 5 6
Further designs Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 mm x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Order code Y15

Selection and Ordering data	Order No.
Instruction manual Quick start manual, multi-language Note: Due to ATEX regulations, one Quick start manual is included with every transducer. XCT-8 with Sanitary Flange, multi-language Note: This manual should be ordered as a separate line item with Mounting Option V. Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.	C) 7ML1998-5QM82 C) 7ML1998-5HX61 C) 7ML1998-5HV61
Accessories Submersible hood Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (See Mounting Brackets on page 5/118 for more information.) 1" NPT locknut, plastic 1" BSPT locknut, plastic Easy Aimer 304 with stainless steel coupling Easy Aimer, aluminum, with M20 adapter and ¾ to 1" and 1½" BSPT couplings Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings Sanitary, 4" mounting clamp Sanitary, isolating gasket	7ML1830-1BH 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS 7ML1830-1DR 7ML1830-1AU 7ML1830-1AX 7ML1830-1GN 7ML1830-1BR C) 7ML1830-1KC
Split flanges 3", aluminum 3", 304 stainless steel Gasket Kit 3", neoprene 4", aluminum 4", 304 stainless steel Gasket Kit 4", neoprene 6", aluminum 6", 304 stainless steel Gasket Kit 6", neoprene Instruction manual	7ML1830-1AV 7ML1830-1AW 7ML1930-1BF 7ML1830-1BA 7ML1830-1BB 7ML1930-1BG 7ML1830-1BC 7ML1830-1BD 7ML1930-1BH 7ML1998-1EP01

- 1) Available with flange versions S, T, U and V only
 2) Universal fits 3" ASME, DN80, JIS 10K3B style
 3) Universal fits 4" ASME, DN100, JIS 10K4B style
 4) Universal fits 6" ASME, DN150, JIS 10K6B style
 C) Subject to export regulations AL: N, ECCN: EAR99
 Refer to page 5/117 for split flanges for XCT-8 transducers.

SITRANS L Level instruments

Continuous measurement - Ultrasonic transducers

Echomax XPS and XCT

Selection and Ordering data	Order No.
Echomax XCT-12 ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Ambient temperatures up to +145 °C Measuring range: min. 0.6 m (2 ft), max. 12 m (40 ft)	C) 7ML1136-0
Mounting thread and facing 1" NPT (ANSI/ASME B1.20.1) 1" NPT (ANSI/ASME B1.20.1), PTFE facing, available for flange options U only 1" BSPT (EN 10226-1) 1" BSPT (EN 10226-1), PTFE facing, available for flange options U only	0 1 2 3
Cable length 1 m (3.28 ft) 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	A B C E F K
Mounting flange None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced DN 150, PN 10/16, Type A, flat faced DN 200, PN 10/16, Type A, flat faced JIS10K 6B JIS10K 8B (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 or JIS B 2238 standard.) 6" universal for 6" ASME, DIN 150 or JIS 10K6B style	A D E J K N P U
Approvals ATEX II 2G, FM Class I, Div. 2, SAA CSA Class I, Div. 1, available with mounting thread and facing option 0 only	3 4
Further designs Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 mm x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Order code Y15
Instruction manual Quick Start Manual, multi-language Note: Due to ATEX regulations, one Quick Start Manual is included with every transducer. Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.	C) 7ML1998-5QM82 C) 7ML1998-5HV61

Selection and Ordering data	Order No.
Accessories Submergence shield kit Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (See Mounting Brackets on page 5/118 for more information.) 1" NPT locknut, plastic 1" BSPT locknut, plastic Easy Aimer 304 with stainless steel coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings Split Flanges 6" aluminum Split Flanges 6" stainless steel Split Flanges Gasket Kit 6", neoprene Split Flanges Instruction manual	7ML1830-1BJ 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS 7ML1830-1DR 7ML1830-1AU 7ML1830-1AX 7ML1830-1GN 7ML1830-1BE 7ML1830-1BF 7ML1930-1BH 7ML1998-1EP01

C) Subject to export regulations AL: N, ECCN: EAR99

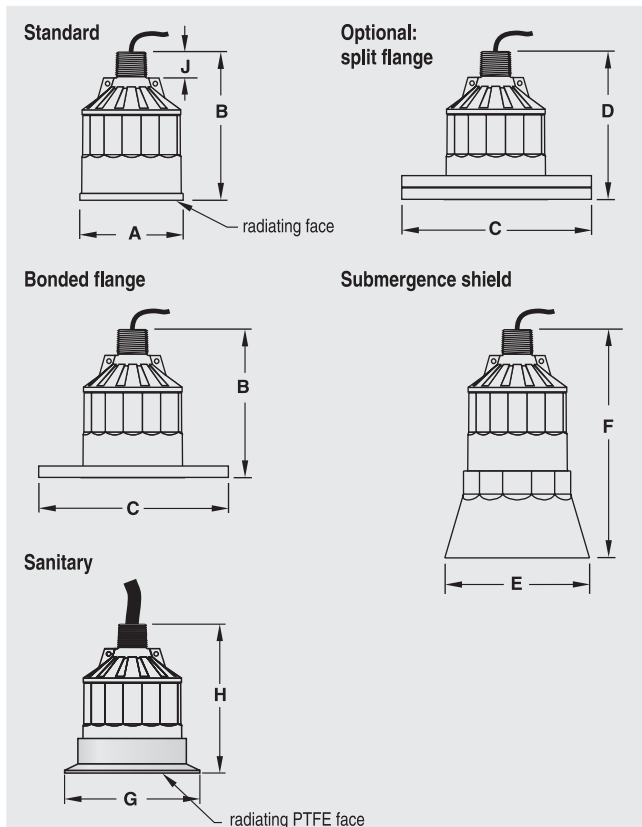
Refer to page 5/117 for split flanges for XCT-12 transducers.

SITRANS L Level instruments

Continuous measurement - Ultrasonic transducers

Echomax XPS and XCT

Dimensional drawings

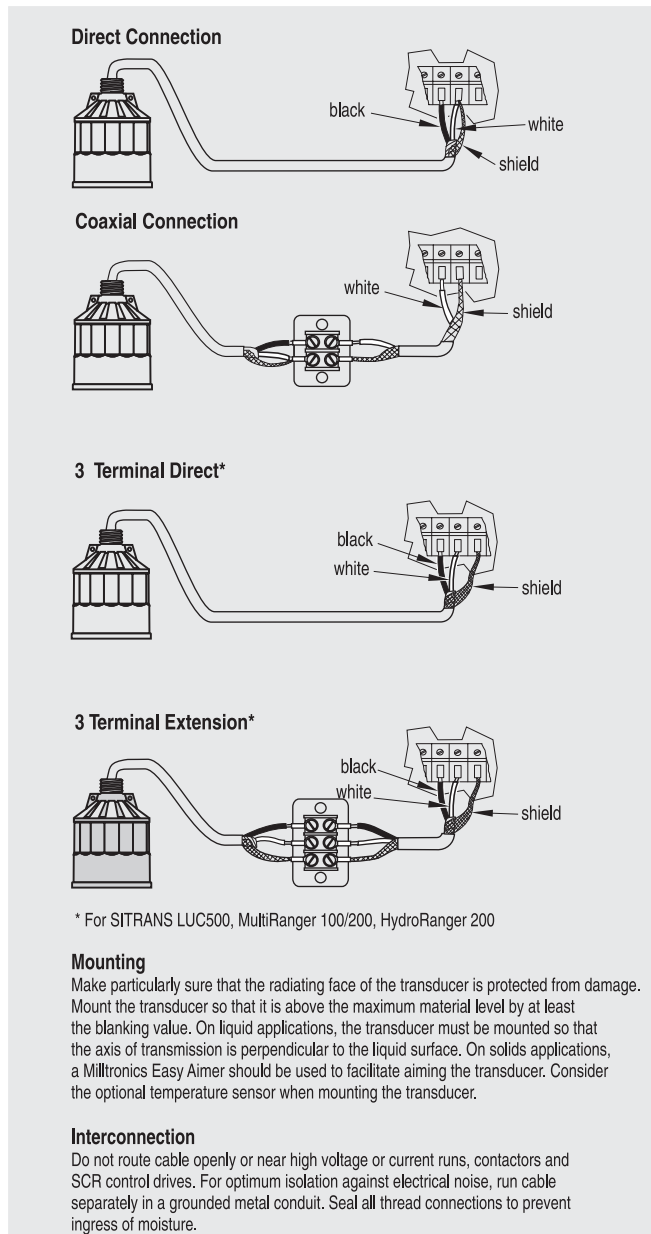


XPS and XCT ultrasonic transducer dimensions

Version				
Dimen.	XPS-10	XPS-15	XPS-30	XPS-40
A	88 mm (3.464")	121 mm (4.764")	175 mm (6.890")	206 mm (8.110")
B	122 mm (4.803")	132 mm (5.197")	198 mm (7.795")	229 mm (9.016")
C	According to ASME, DIN and JIS	n/a		
D	128 mm (5.039")	138 mm (5.433")	204 mm (8.031")	n/a
E	124 mm (4.882")	158 mm (6.220")	n/a	n/a
F	152 mm (5.984")	198 mm (7.795")	n/a	n/a
J	28 mm (1.1")	28 mm (1.1")	28 mm (1.1")	28 mm (1.1")

Version		
Dimen.	XCT-8	XCT-12
A	88 mm (3.464")	121 mm (4.764")
B	122 mm (4.803")	132 mm (5.197")
C	According to ASME, DIN and JIS	
D	128 mm (5.039")	138 mm (5.433")
E	n/a	n/a
F	n/a	n/a
G	sanitary version: 119 mm (4.68")	n/a
H	sanitary version: 122 mm (4.8")	n/a
J	28 mm (1.1")	28 mm (1.1")

Schematics



* For SITRANS LUC500, MultiRanger 100/200, HydroRanger 200

Mounting

Make particularly sure that the radiating face of the transducer is protected from damage. Mount the transducer so that it is above the maximum material level by at least the blanking value. On liquid applications, the transducer must be mounted so that the axis of transmission is perpendicular to the liquid surface. On solids applications, a Milltronics Easy Aimer should be used to facilitate aiming the transducer. Consider the optional temperature sensor when mounting the transducer.

Interconnection

Do not route cable openly or near high voltage or current runs, contactors and SCR control drives. For optimum isolation against electrical noise, run cable separately in a grounded metal conduit. Seal all thread connections to prevent ingress of moisture.

XPS and XCT ultrasonic transducer connections

10. DESIGN SUBMITTAL

VAULT(S) FOR VALVES & OTHER MECHANICAL

NOT INCLUDED IN THIS DESIGN

11. DESIGN SUBMITTAL

PRE-ASSEMBLED VALVES & ASSOCIATED MECHANICAL

NOT INCLUDED IN THIS DESIGN

12. DESIGN SUBMITTAL

**PRE-ASSEMBLED FLOW METER & ASSOCIATED
MECHANICAL**

NOT INCLUDED IN THIS DESIGN

13. DESIGN SUBMITTAL

ELECTRICAL INTERCONNECTIONS/ELECTRICAL CORED HOLES

This section includes:

13.01 TYPICAL FIELD WIRING PLAN

IMPORTANT!

Romtec Utilities has not produced site electrical drawings. Any site electrical drawings in this Scope of Supply and Design Submittal have been produced by others. Romtec Utilities has not checked the site electrical drawings for their accuracy.

Romtec Utilities makes no claim as to the accuracy of information contained in these site electrical drawings.

The typical field wiring plan is only a suggestion by Romtec Utilities. Receiving final approval of the field wiring on the approved site plan and/or site electrical drawings is the responsibility of the Customer or the Customer's representative.

Romtec Utilities makes no claim as to the suitability of the typical field wiring plan for the project.

IMPORTANT!

Romtec Utilities does not provide cored holes into the wet well for electrical conduit ports or conduit runs. The electrically related cored holes into the wet well are the responsibility of the contractor and electrician.

Wet well electrically related cored holes' final size, orientation, height and number are best determined after installation of the wet well and other electrical components.

14. DESIGN SUBMITTAL

CONTROL PANEL/ELECTRICAL & COMMUNICATIONS

This section includes:

14.01 STANDARD TEMPERATURE SPECIFICATIONS

14.02 SYSTEM DESIGN VOLTAGE

14.03 SPECIFICATIONS – CONTROL PANEL

14.04 DRAWINGS – ONE-LINE DRAWING

14.05 DRAWINGS – CONTROL PANEL LAYOUT



Standard Temperature Specifications for Electrical Control Panels Without VFDs:

Operating Temperature Ranges Tmin ¹ All = -5°F (-20C)	NEMA 4 Painted Gray	NEMA 4 Painted White	NEMA 4X Stainless Steel	NEMA 3R With Fans
Direct Sun Exposure	Tmax 96°F (35.6°C)	Tmax 109°F (42.8°C)	Tmax 106°F (41.1°C)	Tmax 118°F (41.1°C)
No Sun Exposure (Completely Shaded)	Tmax 109°F (42.8°C)	Tmax 109°F (42.8°C)	Tmax 109°F (42.8°C)	Tmax 120°F (42.8°C)
Direct Sun Exposure Air Conditioned Enclosure	Tmax 112°F (44.4°C)	Tmax 122°F (50°C)	Tmax 118°F (47.8°C)	Not Applicable

1. If lower temperature ranges are required a larger than standard heater can be added at additional cost.
2. If higher temperature ranges are required an air conditioner unit can be added at Additional cost.

Application Notes Regarding Temperature:

- Romtec Utilities recommends adding sunshades to all enclosure installations.
- Direct sunlight doubles heat loading in gray painted cabinets as reflected in the above temperature specifications. Romtec Utilities does not recommend using gray painted cabinets in direct sunlight applications.
- Where large temperature swings (less than -5°F to greater than 96°F) are common, consider purchasing a Romtec Utilities shelter or building.
- The above operating temperatures do not reflect cabinets containing VFDs. When VFDs are required the Romtec Utilities suggested enclosure is NEMA 3R with fans. Romtec Utilities can accommodate other VFD enclosure configurations but this will require full design analysis including expected site temperature ranges provide by the customer.
- Romtec Utilities will not warranty panels that are operating outside of the stated temperature ranges.
- Panels that are partially shaded fall into the Direct Sun Exposure temperature ranges listed above. Romtec Utilities cannot quantify the effect of partial shading related to temperature performance.
- Designs do not include air-conditioning unless specifically requested.

14.02



12/19/2011
MIRALOMA RECHARGE BASIN, CALIFORNIA

Electrical System Design Voltage

This system has been designed to operate on 480V, 3 Phase supplied power.

Please verify that this is the correct voltage configuration available on-site



Control Panel Scope of Supply
12/19/2011
MIRALOMA RECHARGE BASIN, CALIFORNIA

General information

- ELECTRICAL SERVICE - 480V, 3 Phase
- PUMPS - (2) 30HP, 480V, 3 PH, 37FLA, DUPLEX configuration
- PUMPS - MODEL GOULDS , 12FDHC, HEAD-CA10-125# x 16.5
- PUMP MOTORS - H030S2BLG
- PRIMARY CONTROLLER - HydroRanger configured for DUPLEX

Liquid level sensing

- PRIMARY LEVEL SENSING - SIEMENS HYDRORANGER ULTRASONIC
- BACKUP LEVEL SENSING - DRUCK PTX1290

Station Control Panel

Qty.	Description
1	NEMA 3R PAINTED STEEL, 48"H X 36"W X 16"D enclosure with 3 point latch.
1	24" Leg Kit
1	Controls are mounted on inside dead front swing door
1	Filtered fan kit
1	Main Circuit Breaker with lockable operator handle on dead front, service entrance rated.
1	Phase Monitoring device to detect incoming power to the pump station and prevent the pumps from running if a voltage problem exists. This device should be protected by a monitoring circuit breaker.
1	Siemens HydroRanger 200 mounted in dead front door.
1	Transient Voltage Surge Suppression device to protect controls and associated equipment.
2	Pump motor circuit breakers, MCP style, operable by lockable handles through dead front door.
2	Soft Starters. These starters will have illuminated pushbutton reset mounted on the control front for each overload for electric reset.
1	Primary pump control of type HydroRanger configured for DUPLEX
2	HAND-OFF-AUTO switches for operation of the pump station in conjunction with liquid level indications
1	120V control transformer. The transformer should be protected by overload on the input and output stage of the coil.
1	There will be separate circuit breakers mounted on the operator interface to control the following functions:
	1. Convenience outlet 5A
1	A caged flashing alarm beacon mounted on panel for local alarm notification
1	Designated terminal positions for general alarm conditions and pump status as well for 120VAC protected by a circuit breaker.
1	Enclosure light will be activated by an enclosure door switch
1	Enclosure heater and thermostat if low Ambient temperature is below 40 degrees F
2	Pump Green Pump Call Pilot lights

- 1 Stahl IS Barrier P/N 9002/13-280-110-0001 for pressure transducer
- 2 Thermal motor detection circuits for embedded thermal PTC sensors.
- 2 120V motor heater circuits with thermostat control

System Data Acquisition

Control points to the terminal strip for customer connection

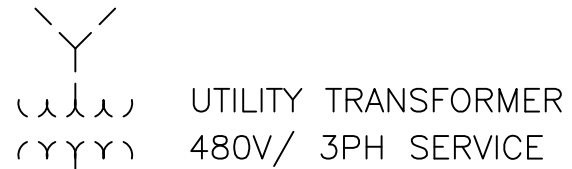
10 Form "A" dry contacts

- TO1 Pump 1 Run
- TO2 Pump 1 Hand
- TO3 Pump 1 Auto
- TO4 Pump 2 Run
- TO5 Pump 2 Hand
- TO6 Pump 2 Auto
- TO7 Pump 1 Fail
- TO8 Pump 2 Fail
- TO9 Power Fail
- TO10 Common Alarm

- T11 Pump 1 Run Command
- T12 Pump 2 Run Command

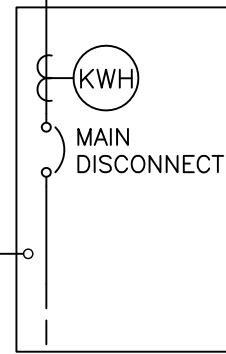
- AO1 HydroRanger Wet Well Level
- AO2 Druck Pressure Transducer

① INCOMING POWER
480V/ 3PH/ SERVICE



NOTE:
THE ONE-LINE DRAWINGS AID IN THE UNDERSTANDING AND INSTALLATION OF THE CONTROL SYSTEM. COMPLETE FIELD WIRING AND INSTALLATION INSTRUCTIONS ARE NOT INCLUDED HERE. THE CORRECT INSTALLATION AND CONFORMANCE TO ALL APPLICABLE CODES IS THE RESPONSIBILITY OF THE INSTALLER.

② METER MAIN (BY OTHERS)



GROUNDING ELECTRODE

▶ SHEET 2-01

EMERGENCY POWER BACK-UP SYSTEM:
AN EMERGENCY POWER BACK-UP SYSTEM HAS NOT BEEN SPECIFIED BY ROMTEC UTILITIES FOR THIS PROJECT.

REV	DATE	DESCRIPTION	BY
1			

E0106D02
DSN. KAS
DRN. KAS
CKD. KAS
9/12/11

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(541)-496-9678
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MIRALOMA
RECHARGE BASIN
DUPLEX LIFT STATION SYSTEM
ONE LINE DIAGRAM
DRAWING

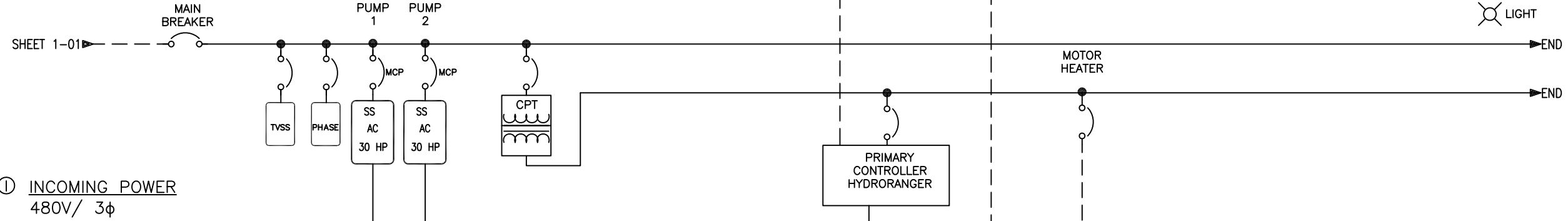
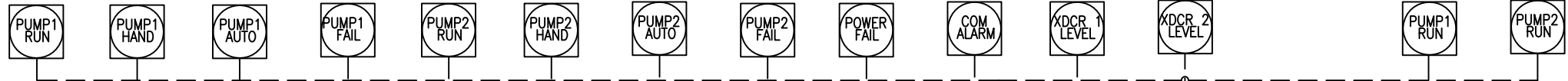
SHEET
1 OF 5
JOB NUMBER

SCADA

CONTROL PANEL

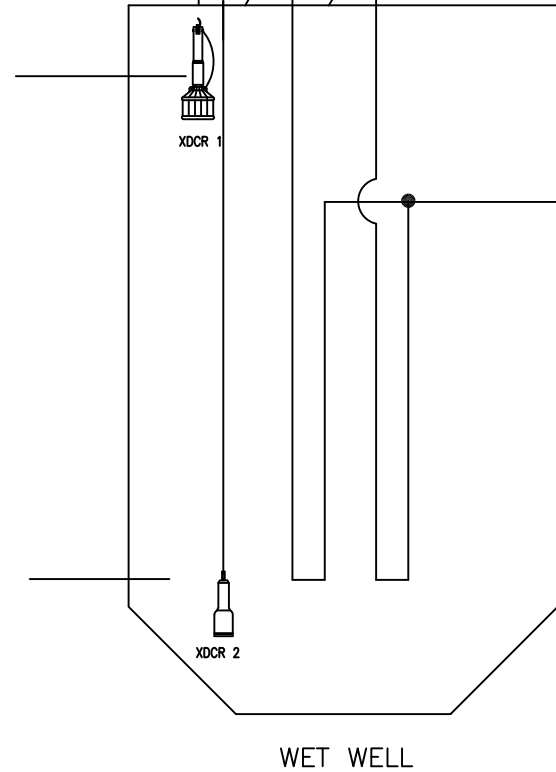
FIELD

TELEMETRY CONTACTS



⑨ PRIMARY LEVEL CONTROL

⑧ BACK-UP LEVEL CONTROL



⑩ DUPLEX PUMP CONFIGURATION
 GOULDS / 12FDHC-CA10-125# X 16.5

REV	DATE	DESCRIPTION	BY
1	12/13/11	ADDED MOTOR HEATERS	KAS

E0108D02

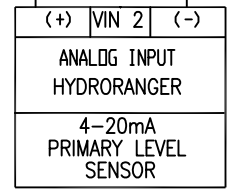
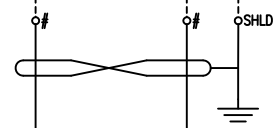
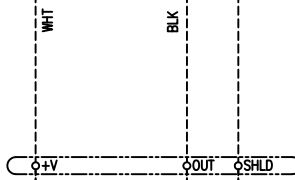
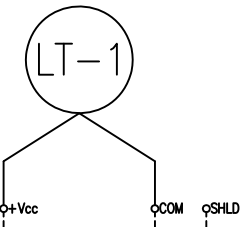
DSN: KAS
 DRN: KAS
 CKD: KAS
 9/12/11

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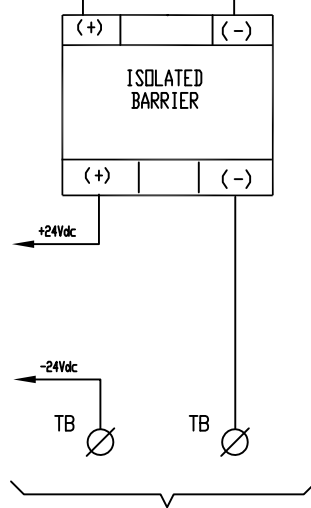
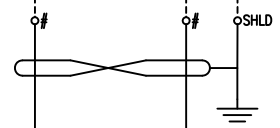
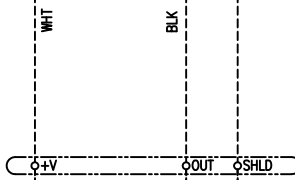
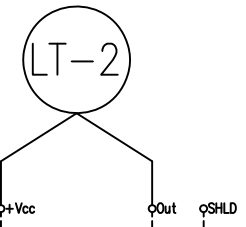
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MIRALOMA
 RECHARGE BASIN
 DUPLEX LIFT STATION SYSTEM
 ONE LINE DIAGRAM
 DRAWING

LEVEL TRANSMITTER
PRIMARY LEVEL
SIEMENS XPS-15



LEVEL TRANSMITTER
SECONDARY LEVEL
DRUCK PTX1290



FOR CUSTOMER USE

DSN: KAS	REV	DATE	DESCRIPTION	BY
DRN: KAS	1			
CKD: KAS				
9/12/11				

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MIRALOMA
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 DUPLEX LIFT STATION SYSTEM
 ONE LINE DIAGRAM
 DRAWING

GENERAL NOTES:

1. THE ELECTRICAL CONTRACTOR SHALL SUPPLY POWER TO AND MAKE ALL CONNECTIONS TO THE EQUIPMENT SHOWN ON THE ELECTRICAL ENGINEER'S ELECTRICAL SITE PLAN. IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO REVIEW ALL THE DRAWINGS FOR THE LOCATION AND SIZE OF EQUIPMENT. IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO FAMILIARIZE HIM/HERSELF WITH THE PLANS AND SPECIFICATIONS AND ASK FOR CLARIFICATION, IF ANY IS REQUIRED, BEFORE INSTALLATION BEGINS.
2. THE ELECTRICAL CONTRACTOR SHALL SUPPLY THE INCOMING POWER.
3. ALL ITEMS RELATED TO THE ELECTRICAL SERVICE SUCH AS SERVICE CONDUIT, CONDUCTORS, DUCTS, PAD MOUNT, RISERS, PULL BOXES, PERMITS, FEES, AND PROTECTIVE COVERING FROM THE SERVICE POINT LOCATION SHALL BE VERIFIED WITH THE SERVING UTILITY. THE ELECTRICAL CONTRACTOR SHALL INSTALL THE SERVICE IN COMPLIANCE WITH THE SERVING UTILITY, NATIONAL ELECTRICAL CODE, STATE AND LOCAL ELECTRICAL CODES.
4. THE ELECTRICAL CONTRACTOR SHALL SUPPLY AND INSTALL THE METER BASE AND MEANS OF MAIN DISCONNECT (A METER MAIN IS THE PREFERRED EQUIPMENT).
5. THE ELECTRICAL CONTRACTOR SHALL SUPPLY AND INSTALL ALL REQUIRED CONDUIT AND WIRE TO INSTALL THE ROMTEC UTILITIES SUPPLIED EQUIPMENT.
6. IT SHALL BE THE ELECTRICAL CONTRACTOR'S RESPONSIBILITY TO SIZE AND INSTALL ALL CONDUIT AND CONDUCTORS AS PER THE ELECTRICAL ENGINEER'S ELECTRICAL SITE PLAN, NEC, STATE AND LOCAL ELECTRICAL CODES.
7. INSTALLATION OF EQUIPMENT INCLUDING ANY GROUNDING ARRANGEMENT TO BE IN ACCORDANCE WITH NEC ARTICLES 501, 502, 504 AND ANSI/ISA-RP12.06.01-2003 RECOMMENDED PRACTICE FOR WIRING METHODS FOR HAZARDOUS (CLASSIFIED) LOCATIONS INSTRUMENTATION WHEN APPLICABLE.

ELECTRIC NOTES:

1. INCOMING POWER
480V THREE PHASE POWER
2. METER MAIN
POWER UTILITY METER BASE AND METHOD OF MAIN DISCONNECT. METER BASE MUST CONFORM TO THE LOCAL SERVICE PROVIDERS REQUIREMENTS. PROVIDE METHOD OF MAIN DISCONNECT, (A METER MAIN IS PREFERRED).
MOUNTED AS A SEPARATE ENCLOSURE IN COMPLIANCE WITH NEC, STATE, AND LOCAL ELECTRICAL CODES.
3. AUTOMATIC TRANSFER SWITCH
N/A

4. GENERATOR N/A
5. LIFT STATION CONTROL PANEL
POWER CONFIGURATION:
THREE PHASE INCOMING POWER WITHOUT VFD'S
DUPLIX PUMP CONTROL PANEL
PRIMARY CONTROLLER:
- HYDRORANGER 200

BACK-UP LEVEL AND PUMP CONTROLLER:
- DRUCK TRANSDUCER

CONTROL PANELS ARE UL 508A LISTED AS A COMPLETE CONTROL PANEL.
ENCLOSURE:
- NEMA 3R ENCLOSURE
- 24" LEG KIT.

OPTIONAL EQUIPMENT:
N/A
6. COMMUNICATIONS
PRIMARY COMMUNICATION UNIT.
- N/A W/-----
BACK-UP COMMUNICATION UNIT.
- ----- W/-----
7. PUMP DISCONNECT PANEL
N/A

E0106002	DSN: KAS DRN: KAS CKD: KAS 9/12/11	1	REV	DATE	DESCRIPTION	BY
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<p>MIRALOMA RECHARGE BASIN DUPLIX LIFT STATION SYSTEM ONE LINE DIAGRAM DRAWING</p>						
<p>SHEET 4 OF 5</p>						
<p>JOB NUMBER</p>						

ELECTRIC NOTES CONTINUED:

8. BACK-UP LEVEL CONTROL
 - TRANSDUCER
 BACK-UP LEVEL SYSTEM WILL OPERATE THE PUMPS IN THE EVENT OF A FAILURE OF THE PRIMARY LEVEL CONTROL SYSTEM AND PUMP CONTROLLER.
 THE BACK-UP SYSTEM IS A COMPLETELY REDUNDANT SYSTEM TO THE PRIMARY SYSTEM AND INCLUDES REDUNDANT HIGH ALARM, PUMPS STOP, AND PUMPS START.
9. PRIMARY LEVEL CONTROL
 - SIEMENS HYDRORANGER (XPS-15 ULTRASONIC)
 PRIMARY LEVEL CONTROL IS USED FOR ALL OPERATIONAL POINTS WITHIN THE WET WELL.
 - ALARMS POINTS
 - LEAD PUMP STOP POINT
 - LAG PUMP STOP POINT
 - LEAD PUMP START POINT
 - LAG PUMP START POINT
10. DUPLEX PUMP CONFIGURATION
 GOULDS TURBINE PUMPS.
 - 12FDHC-CA10-125# X 16.5
 - 460V/3PH/60HZ
 - 30HP

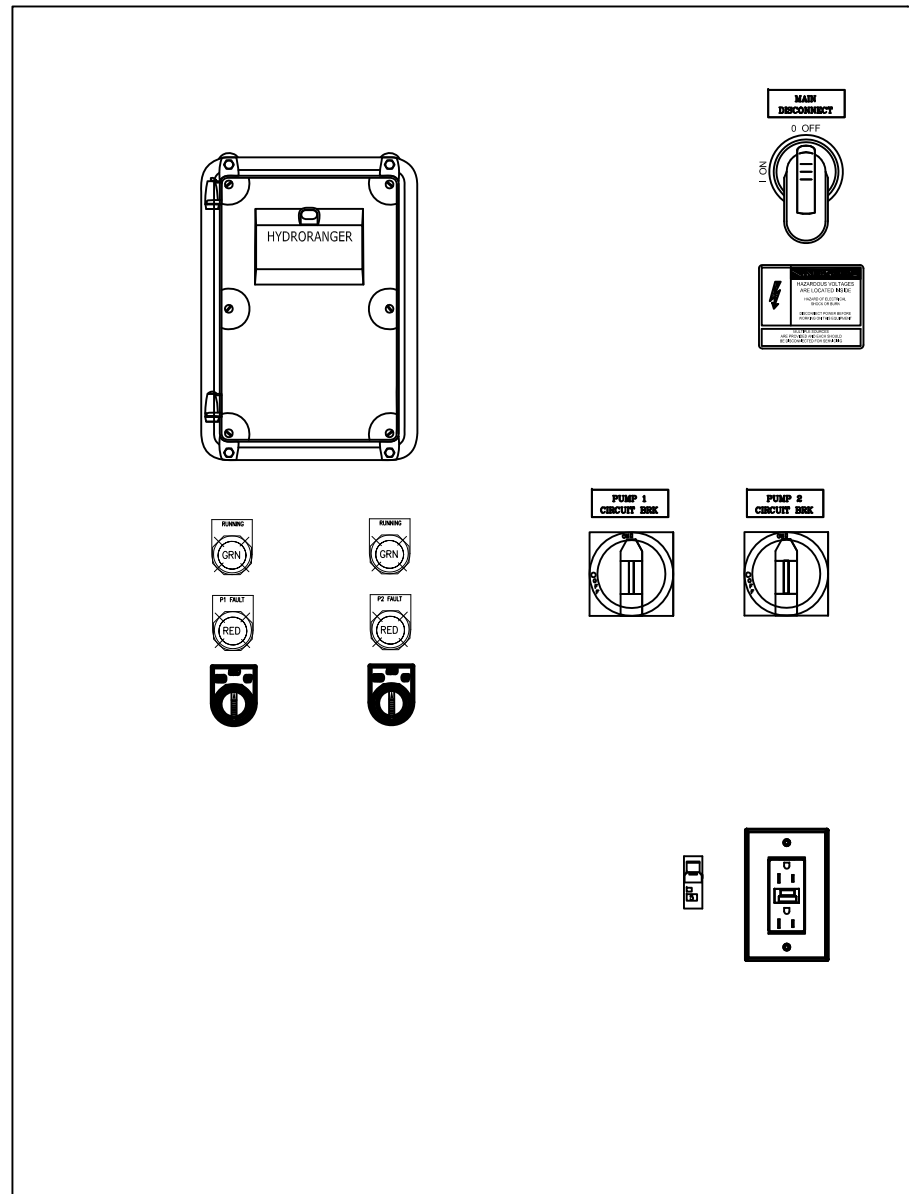
PIPING AND VALVE NOTES:

11. VALVE VAULT
 N/A
12. METER VAULT
 N/A

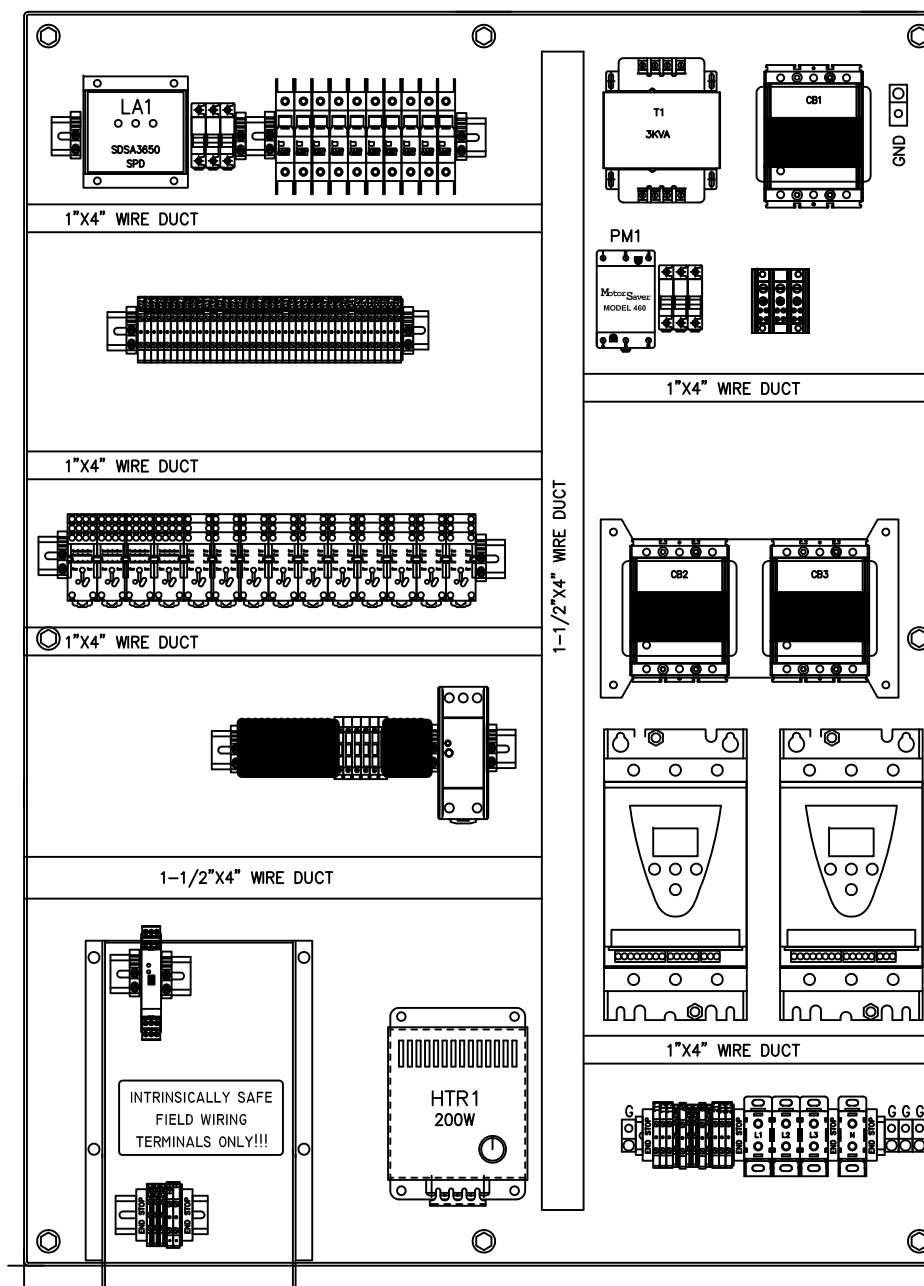
SPECIAL NOTES:

1. THE PROJECT SITE ENGINEER AND ELECTRICAL ENGINEER ARE RESPONSIBLE FOR ALL ASPECTS OF THIS PROJECT. ROMTEC UTILITIES OFFERS THIS INFORMATION TO CLARIFY OUR PRODUCT OFFERING. THIS INFORMATION REFLECTS A TYPICAL PROJECT. DASHED LINES SHOW TYPICAL SITE WIRING/CONDUIT SUPPLIED AND INSTALLED BY ELECTRICIAN OR CONTRACTOR. PLEASE REFER TO THE PROJECT ENGINEER'S SITE PLANS AND ELECTRICAL LAYOUT FOR THE SPECIFIC DETAILS. THE PROJECT ENGINEER'S PLANS, SPECIFICATIONS AND THE APPROVED SUBMITTAL DOCUMENTS SHALL GOVERN ALL WORK.
2. ALL COMMUNICATION DEVICES FOR REMOTE ANNUNCIATION OR SYSTEM CONTROL AND DATA ACQUISITION (SCADA) ARE TO BE CONFIGURED, TESTED, AND MAINTAINED BY OWNER/CONTRACTOR. ROMTEC UTILITIES WILL INSTALL CUSTOMER SPECIFIED COMMUNICATION DEVICES IN OUR CONTROL PANEL IF REQUESTED.

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<p>SHEET 5 OF 5</p>	<p>JOB NUMBER</p>								
<p>E0106002</p>	<table border="1"> <tr> <th>REV</th> <th>DATE</th> <th>DESCRIPTION</th> <th>BY</th> </tr> <tr> <td>1</td> <td>9/12/11</td> <td></td> <td></td> </tr> </table>	REV	DATE	DESCRIPTION	BY	1	9/12/11		
REV	DATE	DESCRIPTION	BY						
1	9/12/11								



SWING PANEL
(DOOR REMOVED)



FRONT VIEW PANEL
(DOOR/SWING OUT PANEL REMOVED)

THE ENCLOSURE SHOWN REPRESENTS THE INTENT OF THE DESIGN. OFTEN THE ENCLOSURE SIZE AND LAYOUT MUST CHANGE TO ACCOMMODATE THE REQUIRED COMPONENTS AND FINAL DESIGN. PLEASE CONTACT ROMTEC UTILITIES TO OBTAIN ACTUAL AS-BUILT DRAWINGS BEFORE INSTALLATION.

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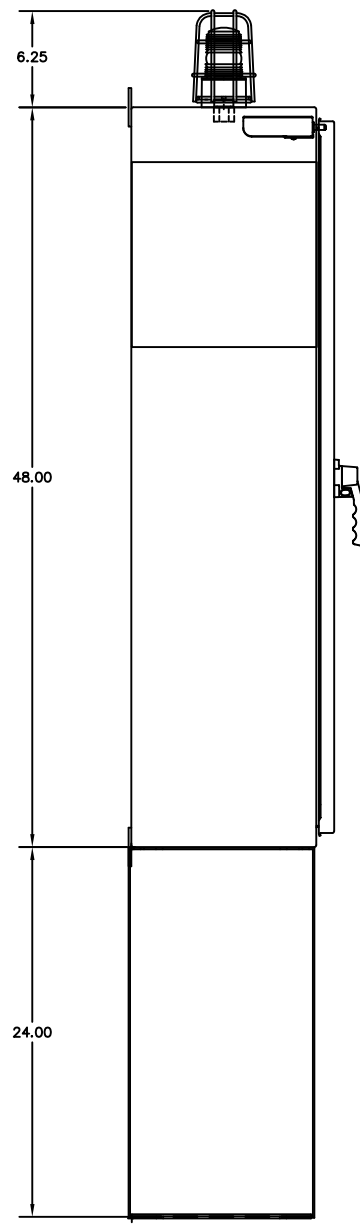
MIRALOMA
RECHARGE BASIN
CONTROL PANEL LAYOUT
ELECTRICAL CONTROLS
DUPLEX LIFT STATION SYSTEM

SHEET
1 of 2
DRAWING #

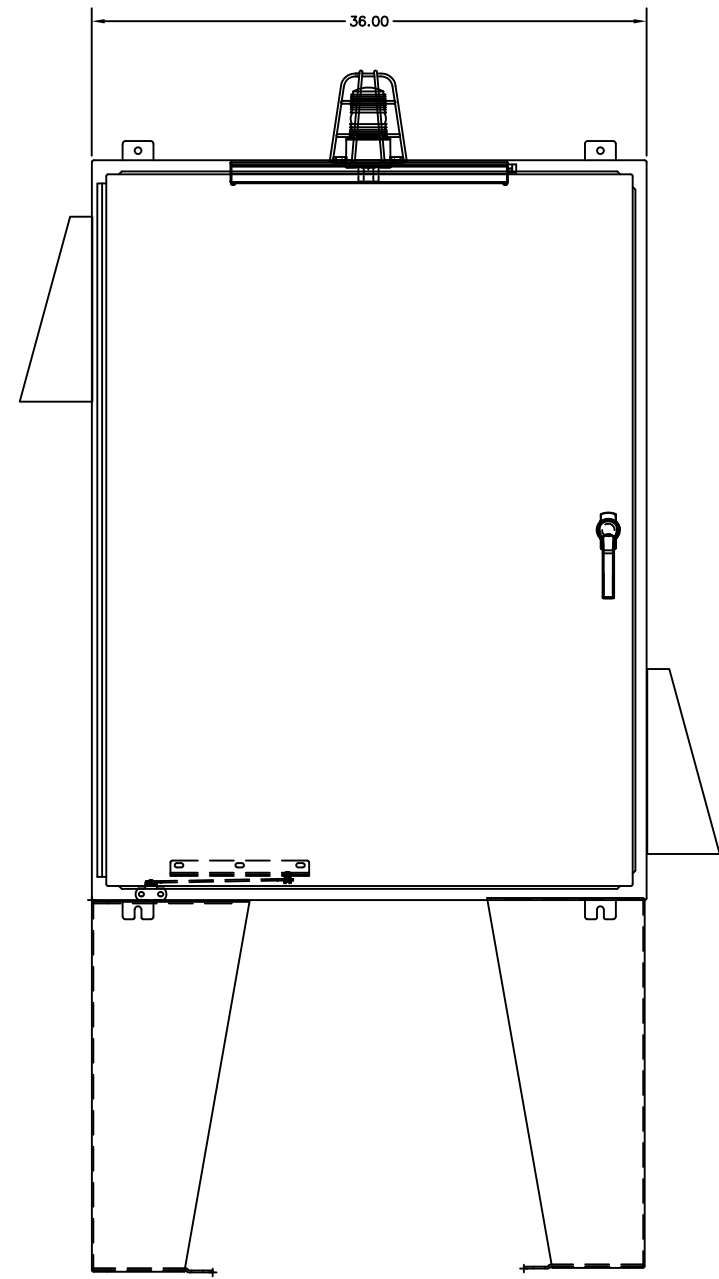
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1	8/29/11		REMOVED MINICAS RELAYS	KAS
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REVISIONS

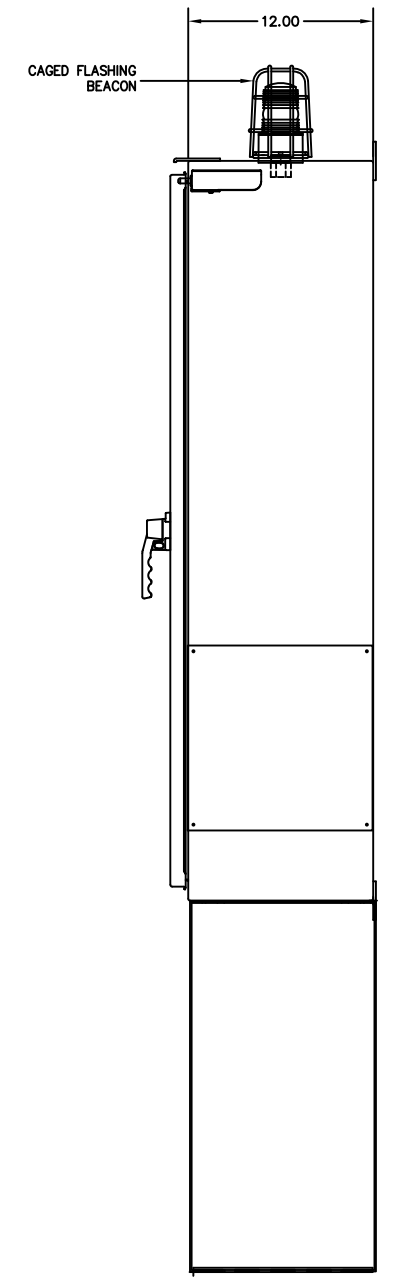
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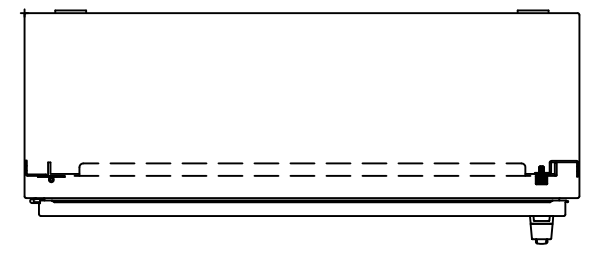
LEFT SIDE VIEW



FRONT VIEW PANEL



RIGHT SIDE VIEW



TOP VIEW

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CONTROL PANEL LAYOUT ELECTRICAL CONTROLS DUPLEX LIFT STATION SYSTEM		18240 NORTH BANK ROAD ROSEBURG, OR 97470 (541)-496-9678 FAX (541)-496-0804 WWW.romtecutilities.com		DSN: KAS DRN: KAS CKD: KAS	7/27/11
SHEET 2 OF 2		REV DATE DESCRIPTION REVISIONS		BY	
DRAWING #					

1032A Multi-Conductor - 300V Power-Limited Tray Cable



For more Information
please call

1-800-Belden1



Description:

18 AWG pairs stranded (7x26) bare copper conductors, twisted pairs, PVC insulation, overall Beldfoil® shield (100% coverage), PVC jacket.

Physical Characteristics (Overall)

Conductor

AWG:

# Pairs	AWG	Stranding	Conductor Material	Dia. (in.)
1	18	7x26	BC - Bare Copper	.047

Insulation

Insulation Material:

Insulation Material
PVC - Polyvinyl Chloride

Outer Shield

Outer Shield Material:

Outer Shield Trade Name	Type	Outer Shield Material	Coverage (%)
Beldfoil®	Tape	Aluminum Foil-Polyester Tape	100

Outer Shield Drain Wire AWG:

AWG	Stranding	Drain Wire	Conductor Material
20	7x28	TC - Tinned Copper	

Outer Jacket

Outer Jacket Material:

Outer Jacket Material	Nom. Wall Thickness (in.)
PVC - Polyvinyl Chloride	.037

Outer Jacket Ripcord: Yes

Overall Cabling

Overall Nominal Diameter: 0.233 in.

Pair

Pair Color Code Chart:

Number	Color
1	Black & White

Pair Lay Length & Direction:

Lay Length (in.)	Twists/ft. (twist/ft)
2.000	6.000

Mechanical Characteristics (Overall)

Operating Temperature Range: -30°C To +105°C

Bulk Cable Weight: 32.500 lbs/1000 ft.

Max. Recommended Pulling Tension: 67.200 lbs.

Min. Bend Radius (Install)/Minor Axis: 2.300 in.

Applicable Specifications and Agency Compliance (Overall)

Applicable Standards & Environmental Programs

NEC/(UL) Specification:	PLTC
CEC/C(UL) Specification:	CMG
EU CE Mark:	Yes
EU Directive 2000/53/EC (ELV):	Yes
EU Directive 2002/95/EC (RoHS):	Yes
EU RoHS Compliance Date (mm/dd/yyyy):	04/01/2005
EU Directive 2002/96/EC (WEEE):	Yes
EU Directive 2003/11/EC (BFR):	Yes
CA Prop 65 (CJ for Wire & Cable):	Yes
MII Order #39 (China RoHS):	Yes

Flame Test

UL Flame Test:	UL1685 FT4 Loading
CSA Flame Test:	FT4
IEEE Flame Test:	1202

Suitability

Suitability - Burial:	No
Sunlight Resistance:	Yes

Plenum/Non-Plenum

Plenum (Y/N):	No
---------------	----

Surface Printing (Overall)

Electrical Characteristics (Overall)

Nom. Inductance:

Inductance (µH/ft)

.19

Nom. Capacitance Conductor to Conductor:

Capacitance (pF/ft)

51

Nom. Capacitance Cond. to Other Conductor & Shield:

Capacitance (pF/ft)

95

Nom. Conductor DC Resistance:

DCR @ 20°C (Ohm/1000 ft)

5.86

Nominal Outer Shield DC Resistance:

DCR @ 20°C (Ohm/1000 ft)

5.07

Max. Operating Voltage - UL:

Voltage

300 V RMS

Max. Recommended Current:

Current

8 Amps per conductor @ 25°C

Notes (Overall)

1032A Multi-Conductor - 300V Power-Limited Tray Cable

Notes: Alternate color coding available upon request.

Related Documents:

No related documents are available for this product

Put Ups and Colors:

Item #	Putup	Ship Weight	Color	Notes	Item Desc
1032A 0061000	1,000 FT	32.000 LB	BLUE, LIGHT	C	2 #18 PVC FS PVC
1032A 00610000	10,000 FT	350.000 LB	BLUE, LIGHT	C	2 #18 PVC FS PVC
1032A 0065000	5,000 FT	160.000 LB	BLUE, LIGHT	C Z	2 #18 PVC FS PVC
1032A 010S1000	1,000 FT	32.000 LB	BLACK		2 #18 PVC FS PVC
1032A 0101000	1,000 FT	32.000 LB	BLACK	C	2 #18 PVC FS PVC
1032A 01010000	10,000 FT	390.000 LB	BLACK	C Z	2 #18 PVC FS PVC
1032A 0102500	2,500 FT	92.500 LB	BLACK		2 #18 PVC FS PVC

Notes:

C = CRATE REEL PUT-UP.

Z = FINAL PUT-UP LENGTH MAY VARY (+ OR -) 10% FOR SPOOLS OR REELS AND(+ OR -) 5% FOR UNREEL CARTONS FROM LENGTH SHOWN.

Revision Number: 2 Revision Date: 02-24-2010

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Belden declares this product to be in compliance with EU LVD (Low Voltage Directive 73/23/EEC), as amended by directive 93/68/EEC.

15. DESIGN SUBMITTAL

PUMP ELECTRICAL CONNECTION ENCLOSURE/PANEL

NOT INCLUDED IN THIS DESIGN

16. DESIGN SUBMITTAL
ELECTRICAL GENERATOR

NOT INCLUDED IN THIS DESIGN

17. DESIGN SUBMITTAL
ODOR CONTROL SYSTEM

NOT INCLUDED IN THIS DESIGN

18. DESIGN SUBMITTAL
INFLUENT GRINDER SYSTEM

NOT INCLUDED IN THIS DESIGN

19. DESIGN SUBMITTAL
OTHER EQUIPMENT

NOT INCLUDED IN THIS DESIGN

20. PRE-INSTALLATION

This section includes:

20.01 INSTALLATION CHECKLIST

Contractor / Romtec Utilities Installation Checklist

Jobsite Address:

Name of person in charge of safety: _____

Name and Contact Information of Person in Charge of Field Installation:

SCHEDULING INSTALLATION

LEAD TIME: Romtec Utilities and all associated technical personnel require two (2) weeks' advance notice to schedule an installation date.

DURATION: Installation begins at 8 am and will take one full day (as stated in the approved Romtec Utilities Scope of Supply and Design Submittal dated 1/12/12).

ATTENTION

- 1. The specification for and the process for creating a stable compacted "footing" or "base" for the Romtec Utilities wet well to be placed on, is by others. Creating a compacted base that will not allow the Romtec Utilities wet well to "settle" and/or "tilt" during or after installation is not the responsibility of Romtec Utilities.**

The listing below includes all items that will be delivered for installation.

PLEASE REVIEW

The shipment includes the following:

1. Pre-cast Base Slab
 - a. Ready to set
 - b. Pump discharge elbows attached
 - c. Lifting methodology included

WARNING! WEIGHTS OF CONCRETE VARY!

SEE APPROVED SCOPE OF SUPPLY AND DESIGN SUBMITTAL TAB 8, DATED 1/12/12.

THE CONTRACTOR MUST PROVIDE A CRANE CAPABLE OF LIFTING THE BASE.

LIFTING STRAP RECOMMENDATIONS

8' Base, barrels and vault – Four (4) 16' straps.

PAY ATTENTION!

Check the alignment marks on all concrete pieces.
Check that all pieces are numbered, in order, bottom to top.

IMPORTANT IF YOU ARE USING SHORING!

THE BASE AND FIRST BARREL ARE ONE SOLID PIECE. THE BASE SLAB IS
RECTANGULAR!

THE SHORING MUST BE WIDE ENOUGH TO ALLOW ROTATION OF THE BASE 360 DEGREES
TO BE ABLE TO ALIGN THE GRAVITY SEWER AND FORCE MAIN.

**SEE THE APPROVED SCOPE OF SUPPLY AND DESIGN SUBMITTAL, TAB 8, DATED
1/12/12, SPECIFYING CONCRETE DIMENSIONS.**

2. Pre-cast Barrels

NOTE: All discharge and inlet holes pre-cored plus Kor-n-Seals installed.

NOTE: Romtec Utilities does not provide cored holes into the wet well for electrical conduit ports or conduit runs. The electrically related cored holes in the wet well are the responsibility of the contractor and electrician. Wet well electrically related cored holes' final size, orientation, height and number are best determined after installation of the wet well and other electrical components.

3. Pre-cast/Pre-Fabricated Top Slab

This is the last concrete piece.

4. Accessory Pallet

- a. Wet well gaskets and sealers
- b. Discharge pipe (pre-fabricated)
- c. Level sensing devices (store for installation at start-up)

WARNING! Trim to fit installation dimensions

NOTE: Discharge pipe intentionally too long, the contractor must measure and trim to fit.

NOTE: Contractor must plumb discharge pipe and secure to wet well using the pre-installed bracket.

NOTE: On the accessory pallet there are going to be items that you will NEED to complete Start up of your pump station. Please keep track of these items for start up. Your pump station will not be able to be completed without them.

5. Guiderails

WARNING! Trim to fit

NOTE: Guiderails are produced too long intentionally; the contractor must measure and trim to fit.

6. Upper Guiderail Brackets

NOTE: Mounting hardware included.

NOTE: Contractor must plumb guide rails before tightening the supplied bolts.

PLEASE! Install in provided nut rail already built into top slab hatch.

THE FOLLOWING ARE STRONGLY RECOMMENDED ON SITE:

1. Two (2) six-foot ladders.

2. One (1) six-foot level.
3. Shoring for safe working space in the hole and shoring of adequate size for room around the base slab.
4. Crane to off load and set all concrete components.
5. Forklift to offload accessory pallet and control panel (may be shipped separately at a later date).
6. Secure site for accessory pallet (and control panel with pumps, when they arrive). These items may need to be hauled to a secure site. Please provide a truck to transfer these items to a separate site if necessary.
7. Review the site and **LOOK** for overhead obstructions before delivery.
8. A person on-site whose sole purpose is 'to be in charge of safety'.

-PLEASE COMPLETE THE FOLLOWING TO CONFIRM YOU ARE READY FOR INSTALLATION-

The delivery date and time that hole will be ready for the lift station installation is:

All equipment and manpower will be on-site ready for the truck on _____.

- | | |
|--|---|
| <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> | <p>Will the site be prepared by the delivery date established?</p> |
| <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> | <p>Is the contractor ready to begin construction?</p> |
| <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> | <p>Is the hole dug and prepared per site engineer specifications?
If not, when will it be ready? _____</p> |
| <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> | <p>Will the crane will be on-site on the delivery day to unload the Romtec Utilities' supplied items off of the delivery trucks?</p> |
| <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> | <p>Has the contractor confirmed that the crane to be used has the capacity to lift and install the lift station?</p> |
| <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> | <p>Has the contractor confirmed that the crane has appropriately stable ground from which to work from?</p> |
| <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> | <p>Has the contractor confirmed that the crane will be adequately anchored?</p> |
| <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> | <p>Can a fully loaded semi truck and trailer (up to 70 ft in length) park adjacent to the crane?</p> |
| <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> | <p>Will the contractor and contractor's crew be ready to stack the wet well and possibly install the valve vault & related piping on the delivery date?</p> |

Yes No

Will the hole be shored? Is the shoring wide enough to be able to rotate the base 360 degrees? Check the approved Scope of Supply and Design Submittal dated 1/12/12 for base dimensions. Remember the base may not be round.

Yes No

Will the contractor have adequate dewatering on-site?

Yes No

Will the bottom of the hole have the base rock installed and compacted and level as per site engineer's requirements, prior to 8:00 AM on _____?
NOTE: Construction should not occur on the same day the hole is being dug.

Yes No

Will someone from the contractor's company review and verify our packing list and our supply of all equipment? Please scan and e-mail or fax to Romtec Utilities after this has been completed, if there is not a Romtec Utilities' construction advisor on-site.

Who will review and verify? _____

Yes No

Will the contractor provide at least one laborer exclusively for unloading the truck and prepping concrete parts per our direction?

Yes No

Does the contractor recognize that the elevations below are the elevations in the Romtec Utilities' system drawing, and these are the governing elevations?
NOTE: Please list the elevations you have in the table below, and mark any elevations that do not match.

Yes No

Does the contractor agree that these are the correct elevations?
NOTE: These elevations are based on our approved Scope of Supply and Design Submittal dated 1/12/12. Please call our office immediately if your elevations do not match ours.

	RU ELEV.	YOUR ELEV.	DO THEY MATCH?
WET WELL RIM ELEVATION	225.00'	_____	_____
WET WELL INFLUENT PIPE ELEVATION	208.17'	_____	_____
WET WELL FLOOR ELEVATION	200.50'	_____	_____
WET WELL BASE ELEVATION	199.50'	_____	_____
WET WELL DISCHARGE INVERT ELEVATION	227.83'	_____	_____

Yes No

Has a safety plan for installation been developed and implemented in conformance with OSHA requirements?

Yes

No

Does the safety plan include components for confined spaces, climbing, high voltage (underground and overhead) and shoring?

Yes

No

Has contractor's employees been or will contractor's employees be instructed with respect to the safety plan?

Comments:

AUTHORIZED SIGNATURE

PROPOSED CONSTRUCTION DATE

PRINT NAME

SAFETY DISCLOSURE AND ACKNOWLEDGMENT

1. Installation Safety Threats.

Installation of the equipment to be supplied may implicate five (5) specific potential safety threats, among others:

- 1.1. Work in confined spaces, particularly within the wet wells, valve vaults and meter vault.
- 1.2. Inadequate shoring of dirt walls in the installation well.
- 1.3. Work at heights, relative to the base of the lift station in the bottom of the excavated hole.
- 1.4. Misuse of machinery, such as cranes, used in installation.
- 1.5. High voltage.

2. Acknowledgment of Responsibility.

Your signature below signifies your acceptance of the following:

- 2.1 You (including, but not limited to, you, your employees, or your Contractor), and not Romtec Utilities, assume full responsibility for installation of the equipment.
- 2.2 You are **not** an agent of Romtec Utilities in any capacity.
- 2.3 Romtec Utilities will provide fundamental instruction regarding installation by a Romtec Utilities advisor, but any such advisor will have no authority or obligation to supervise or direct your personnel in the course of installation.

2.3.1 You are solely responsible for ensuring safety in all facets of installation.

By signing this form you are agreeing to each of the above. Please contact our office with any questions or concerns you may have.

Signature

Date

21. START-UP, TESTING & TRAINING SERVICES

This section includes:

21.01 START-UP, TESTING & TRAINING OUTLINE

21.02 START-UP PREPARATION CHECKLIST

21.03 FIELD START-UP REPORT



Start-up, testing & training outline

1. Understanding the Complete System (Wet Well-Bottom up)
 - a) Pumps, Guide Rails, Elbows
 - b) Deflector Panel or Drop Bowl Structure
 - c) Level devices
 - d) Hatches
2. Disconnect Panel
 - a) Meltrics
 - b) Panel (I.S. Barrier, Heater, etc.)
3. Valve Vault
 - a) Plug Valves
 - b) Check Valves
 - c) Pressure Gauges/ISO Rings
4. Flow Meter Vault
 - a) Bypass Pumping Port
 - b) Flow Meter
5. Control panel (Overview/Power Up)
 - a) Overview (Front Panel)
 - b) Procedure of operating panel
 - c) Overview (inside panel)
 - d) Power up Procedure with Panel Doors Open
 - e) Back-up System Operations
 - f) Primary Level Operation/Lead-lag, Alternations, Starts/Stops.
 - g) Controller Operation
6. System Protection Methods/Devices
 - a) Seal Thermal-Moisture Seals
 - b) Phase Monitor
 - i. Surge Suppression
7. Alarms
 - a) Critical Alarms
 - b) Non-critical Alarms
8. Trouble Shooting
 - a) Hands On
 - b) Who to call first (ex. Flygt service, our designated 'long term maintenance contact').

This outline is not specific to the system specified in this 1/12/12 dated Scope of Supply and Design Submittal. This outline may vary depending upon what components are included in this 1/12/12 dated Scope of Supply and Design Submittal.

Please see the "Field Start-Up Report" & the "Start-up Checklist" following this page for a more detailed example of what is covered on the day of start-up.

Start-Up Checklist

Contractor / Romtec Utilities

OVERVIEW

This document is a checklist. It ensures that all necessary components have been installed and that your lift station is prepared and ready for start-up. We have outlined below, the tasks that need to be completed before start-up and training can occur.

1. Scheduling a Start-Up Advisor
2. Review of Underground Components
3. Review of Electrical Construction
4. Back-up generator procedures
5. Installation of communication equipment
6. Water availability
7. Review of the Wet Well
8. Required photos
9. Personnel required for start-up

All activities and requirements stated in this document have been approved in the Scope of Supply and Design Submittal dated 1/12/12.

Please follow this checklist to ensure that all appropriate actions have been taken in preparation for the start-up, and training of personnel, for your lift station.

1. SCHEDULING FOR START-UP AND TRAINING

A. LEAD TIME TO SCHEDULE START UP

- Romtec Utilities and all associated technical personnel require four (4) weeks' advance notice to schedule a start-up date.

B. DURATION OF START-UP AND TRAINING

- Start-up begins at **8 am** and will take one full day.
- Training begins the following day at **8 am** and the advisor will be available all day.
- These days must be contiguous weekdays. Romtec Utilities does not schedule start-ups over Saturdays or Sundays.
- Please see attached document outlining events performed at start-up and training.

Note: These timelines are stated in the approved Romtec Utilities Scope of Supply and Design Submittal dated 1/12/12.

C. SCHEDULING PUMP AND GENERATOR SERVICES

If Romtec Utilities is providing services from a generator or pump supplier to its customer during start-up and training, these vendors will only be available the same days that Romtec Utilities' personnel are on-site.

Note: Any additional time required of these Romtec Utilities suppliers must Be directly ordered and contracted from the supplier by the customer.

ATTENTION

HAVE PROPER EQUIPMENT ON-SITE ON DAY OF START-UP. You must provide equipment to safely lower the pumps into the wet well. Romtec Utilities will not proceed with start-up if there is not equipment to lower the pumps.

2. REVIEW OF PREVIOUSLY COMPLETED UNDERGROUND CONSTRUCTION

Yes No

Are all the below components for the wet well and valve vault installed and approved?

- ❖ Discharge Pipes
 - 1) Are connected to elbows
 - 2) Are plumb and connected to discharge pipe brackets
 - 3) Are connected to valve vault
- ❖ Valve Vault
 - 1) Is connected to force main
 - 2) Upstream valves are open for wet well discharge
- ❖ Guide Bars
 - 1) All stainless steel guide bars installed
 - 2) Upper guide bar brackets are installed and tight
 - 3) Intermediate guide bar brackets (if equipped) are installed

ATTENTION!

DO NOT LOWER THE PUMPS INTO THE WET WELL. A Romtec Utilities' start-up advisor will do this at start-up in accordance with the pump warranty or risk voiding the warranty.

3. REVIEW OF ELECTRICAL CONSTRUCTION – (DIRECT CONNECTION TO THE WET WELL)

Note that high voltage is in use. Only licensed and qualified personnel should perform electrical services in preparation for and during start-up.

Yes No

Have the conduits been installed between the wet well and the main control panel? (At least one (1) for each pump cable, and at least one (1) for the level control device).

***Note:* Romtec Utilities does not provide cored holes into the wet well for electrical conduit ports or conduit runs. The electrically related cored holes in the wet well are the responsibility of the contractor and electrician. Wet well electrically**

related cored holes' final size, orientation, height, and number are best determined after installation of the wet well and other electrical components.

CAUTION

All Cored holes into the wet well shall be made 8" above or 3" below any barrel joints in such a manner as not to impact the integrity of the barrel joint and seal.

Yes No

Have the level control wires been pulled between the pump control panel and the wet well?

Yes No

Have the level control wires been landed on the appropriate terminals inside the control panel?

Note: The pump power cables will be pulled through the conduit at the time of start-up. The pump power cord standard length vary between pump manufacturers. Typical lengths range between 30' to 50'; if more is needed, custom lengths can be ordered at an additional cost.

Yes No

Have the "meter base" and main disconnect been installed and inspected?

Yes No

Have the panel power wires been installed between the main disconnect, automatic transfer switch (if present) and the pump control panel?

Yes No

Has the power company energized the meter?

Note: Permanent utility power to the job site is required in order to perform start-up, testing and training.

ATTENTION

If all necessary field wiring is not completed at the time of start-up, Romtec Utilities reserves the right to charge for our time required to complete the wiring.

4. BACK UP POWER GENERATOR (if applicable)

Yes No

Has the generator been delivered and installed?

Yes No

Is the fuel for the generator on-site?

Yes No

Has the Automatic Transfer Switch been wired into the electrical system (if applicable)?

5. COMMUNICATION EQUIPMENT

Yes **No**
 Has all required communication equipment (radio, phone, cellular) been installed and confirmed to be operational?

6. WATER AVAILABILITY

Yes **No**
 Is enough water available to fill the wet well 1 and ½ times?

7. WET WELL

Yes **No**
 Is the wet well clean and free of any debris?

Yes **No**
 Has the incoming sewer line(s) and upstream man holes been flushed of all debris?

Yes **No**
 Do you have permission from the appropriate parties to pump water out of the pump station into the treatment plant?

IMPORTANT

All debris must be flushed from all inlet lines and man holes prior to starting the system.

8. REQUIRED PHOTOS

Yes **No**
 Have all the required photos listed below been taken?

- A. Photo of the inside of the control panel (specifically the terminal blocks at the base of the panel).
- B. Photo of the control and disconnect panel from about 5ft away.
- C. Photo of the inside of the wet well.

9. PERSONNEL REQUIRED FOR START-UP

*It is the Contractor's responsibility to invite and schedule all appropriate parties.

NAME _____
(Print Name & Company) Who is in charge of safety?
CELL# _____

NAME _____
(Print Name & Company) Who will represent the Site Engineer?
CELL# _____

NAME _____
(Print Name & Company)

Who will represent the Owner/Sewer Agency?

CELL# _____

NAME _____
(Print Name & Company)

Who is the Electrical Inspector(s)?

CELL# _____

IMPORTANT!

This form must be completed before Romtec Utilities can schedule and set up traveling for your start-up advisor. Your project start-up date can be set with Romtec Utilities at any time. As you complete this Start-Up Preparation documents you are acknowledging the following:

2. Romtec Utilities has provided its customer with two contiguous days for start-up, testing and training. If you say you are ready for Romtec Utilities to come to the site and perform this start-up, testing & training, when in fact you are not ready, Romtec Utilities will charge its customer for another trip and the time (two days) on the job site to perform this start-up, testing and training.
3. The Romtec Utilities system warranty is not provided to its customer and/or the owner unless, and until, the Romtec Utilities system start-up, testing and training has been completed.
4. By signing this document you agree to reimburse Romtec Utilities for any costs incurred, whether by Romtec Utilities directly or through a related vendor, due to on-site delays caused by inaccurate representations herein. Typical costs attributed to delays include labor, travel and lodging. However, this list is not meant to be exclusive, and other costs may apply.

Please send this Checklist and the required photos back to Romtec Utilities (2) weeks before the scheduled start-up and training dates.

AUTHORIZED SIGNATURE

PROPOSED START-UP & TRAINING DATES: _____

PRINT NAME

STOP: BEFORE YOU POWER THE PANEL TIGHTEN ALL LUGS AND FIELD WIRING IN THE DISCONNECT AND CONTROL PANEL.

FIELD START-UP REPORT

(SITE OVERVIEW)

DATE:

STRUCTURAL / MECHANICAL CONSTRUCTION

Yes No Are all the components for the wet well and valve vault installed and approved?

ELECTRICAL CONSTRUCTION

Yes No Have the conduits been installed between the wet well and the main control panel (one (1) for each pump, one (1) for level control)?

Yes No Have the "pump power" wires been pulled between the main control panel and the wet well?

Yes No Have the level control signal wires been pulled between the pump control panel and the wet well?

Yes No Have the level control wires been landed on the appropriate terminals inside the control panel?

Yes No Have the panel power wires been installed between the main disconnect, automatic transfer switch (if present) and the pump control panel?

Yes No Have the "meter base" and main disconnect been installed and inspected?

Yes No Has the power company energized the meter?

BACK UP POWER GENERATOR (IF APPLICABLE)

Yes No Has the generator been delivered and installed?

Yes No Is the fuel for the generator on-site?

Yes No Has the Automatic Transfer Switch been wired into the electrical system (if applicable)?

COMMUNICATION EQUIPMENT

Yes No Has all required communication equipment (radio, phone, cellular) been installed and tested and operational?

WATER AVAILABILITY

Yes No Is there enough water available for a minimum of ½ hour of pumping?

PUMP DATA

Pump: **P-1** Model: _____ Serial No.: _____ Imp.: ____ HP: ____ FLA: _____

Pump: **P-2** Model: _____ Serial No.: _____ Imp.: ____ HP: ____ FLA: _____

Pump: **P-3** Model: _____ Serial No.: _____ Imp.: ____ HP: ____ FLA: _____

***DOES THE ABOVE MEET THE APPROVED SCOPE OF SUPPLY? YES ___ NO ___ EXPLAIN IN COMMENTS.**

PUMP CONTROL DATA

1. Level Control: Primary Type/Mfg./Model: _____

2. Level Control: Redundant Type/Mfg./Model: _____

***DOES THE ABOVE MEET THE APPROVED SCOPE OF SUPPLY? YES ___ NO ___ EXPLAIN IN COMMENTS.**

PHYSICAL INSPECTION

1. Inspected pumps and cable for damage: P-1 _____, P-2 _____, P-3 _____

2. Check oil in seal chamber for condition and quantity: P-1 _____, P-2 _____, P-3 _____

3. Does impeller spin freely when rotated by hand: P-1 _____, P-2 _____, P-3 _____

4. Discharge connection level and tight (verify with contractor): P-1 _____, P-2 _____, P-3 _____

5. Guide bars vertical and tight (verify with contractor): P-1 _____, P-2 _____, P-3 _____

6. Lifting cable free of damage and connected securely: P-1 _____, P-2 _____, P-3 _____

7. Electrical connections tight and connected correctly: P-1 _____, P-2 _____, P-3 _____

8. Pump station free of debris: _____

9. Junction boxes, conduits, seals installed correctly. _____

10. Is the system properly grounded and bonded? _____

11. Are cord grips properly installed? _____

12. Are the working clearance requirements maintained as per code? _____

13. Are these devices functioning properly? _____

14. Are all level sensing devices installed as designed & properly documented? _____

15. Are the schematics on the door accurate? _____

PRE-START-UP PUMP ELECTRICAL CHECKS

Resistance of Motor & Cable: Pump: P-1 R(2)~W(3) _____Ω W(3)~B(1) _____Ω B(1)~R(2) _____Ω
 Pump: P-2 R(2)~W(3) _____Ω W(3)~B(1) _____Ω B(1)~R(2) _____Ω
 Pump: P-3 R(2)~W(3) _____Ω W(3)~B(1) _____Ω B(1)~R(2) _____Ω

Sensor Loop Resistance: Pump: P-1 Thermal _____Ω Seal Test _____Ω
 Pump: P-2 Thermal _____Ω Seal Test _____Ω
 Pump: P-3 Thermal _____Ω Seal Test _____Ω

Insulation Resistance to ground (YEL/GRN-FLYGT PUMPS ONLY): Note: This value should exceed 10 MΩ
 Pump: P-1 R(2)~GRD _____MΩ W(3)~GRD _____MΩ B(1)~GRD _____MΩ
 Pump: P-2 R(2)~GRD _____MΩ W(3)~GRD _____MΩ B(1)~GRD _____MΩ
 Pump: P-3 R(2)~GRD _____MΩ W(3)~GRD _____MΩ B(1)~GRD _____MΩ

OPERATIONAL CHECKS

1. Supply Voltage, Pumps Off: L1~ L2 _____ V L2 ~ L3 _____ V L1~ L3 _____ V

***DOES THE ABOVE MEET THE APPROVED SCOPE OF SUPPLY? YES ___ NO ___ EXPLAIN IN COMMENTS.**

2. Phase monitor settings: Voltage: _____, Delay: _____, % Imbalance: _____

3. Starter Type/Mfg./Model: _____

4. O.L. Type/Setting: _____ Amp _____

5. Direction of Impeller Rotation (viewed from pump suction): P-1 CW/CCW, P-2 CW/CCW, P-3 CW/CCW

6. Volts, Pump Operating in System: Pump: P-1 T1~T2 _____V T2~T3 _____V T3~T1 _____V
 Pump: P-2 T1~T2 _____V T2~T3 _____V T3~T1 _____V
 Pump: P-3 T1~T2 _____V T2~T3 _____V T3~T1 _____V

7. Amps, Pump Operating in System: Pump: P-1 T-1 _____A T-2 _____A T-3 _____A
 Pump: P-2 T-1 _____A T-2 _____A T-3 _____A
 Pump: P-3 T-1 _____A T-2 _____A T-3 _____A

8. Abnormal noise/vibration: P-1 _____, P-2 _____, P-3 _____

9. Does pump shut down and lockout when sensor lead is disconnected: P-1 _____, P-2 _____, P-3 _____

10. Have VFD's been programmed and do they work correctly? _____

11. List of VFD parameters provided to _____
12. Has controller been programmed and it works correctly? _____
13. List of controller parameters provided to _____
14. Does the primary level control system work correctly? Pump On/Off Points _____
15. Hi Level Warning _____
16. Does the redundant level control system work correctly? _____
17. Does flow meter work correctly? _____
18. Has the auto dialer been powered up and does it work correctly? _____
19. Has disconnect panel been installed and does it work correctly? _____
20. Has all I/O been checked out and verified? _____
21. Have all communication issues been tested & signed off by owner/contractor? _____

DRAW DOWN TEST:

Gallons per foot – 4’ diameter 94 gallons, 5’ 146.88 gallons, 6’ diameter 211.51 gallons,
8’ diameter 376.01 gallons, 10’ diameter 587.52 gallons

Draw down: **P-1** _____ FT, **P-2** _____ FT, **P-3** _____ FT

Pump flow: **P-1** _____ GPM, **P-2** _____ GPM, **P-3** _____ GPM

***DOES THE ABOVE MEET THE APPROVED SCOPE OF SUPPLY? YES ___ NO ___ EXPLAIN IN COMMENTS**

PRESSURE READINGS (IF AVAILABLE):

Pump 1 - Pump off _____ psi. Pumping _____ psi. Pump on with valve closed _____ psi.

Pump 2 - Pump off _____ psi. Pumping _____ psi. Pump on with valve closed _____ psi.

Pump 3 - Pump off _____ psi. Pumping _____ psi. Pump on with valve closed _____ psi.

WET WELL PRIMARY LEVEL SETTINGS:

High/high level alarm Elevation _____ ft. Distance _____ ft. (if 4-20mA) Probe # _____

High level alarm Elevation _____ ft. Distance _____ ft. (if 4-20mA) Probe # _____

Lag/third pump start Elevation _____ ft. Distance _____ ft. (if 4-20mA) Probe # _____

Lag/second pump start Elevation _____ ft. Distance _____ ft. (if 4-20mA) Probe # _____

Lead pump start Elevation _____ ft. Distance _____ ft. (if 4-20mA) Probe # _____

Lag/third pump stop Elevation _____ ft. Distance _____ ft. (if 4-20mA) Probe # _____

Lag/second pump stop Elevation _____ ft. Distance _____ ft. (if 4-20mA) Probe # _____

Lead pump stop Elevation _____ ft. Distance _____ ft. (if 4-20mA) Probe # _____

Low level alarm Elevation _____ ft. Distance _____ ft. (if 4-20mA) Probe # _____

***DOES THE ABOVE MEET THE APPROVED SCOPE OF SUPPLY? YES ___ NO ___ EXPLAIN IN COMMENTS**

WET WELL SECONDARY LEVEL SETTINGS:

Pumps Start Elevation _____ ft. Distance _____ ft. (if 4-20mA) Probe # _____

Pumps stop Elevation _____ ft. Distance _____ ft. (if 4-20mA) Probe # _____

High level alarm Elevation _____ ft. Distance _____ ft. (if 4-20mA) Probe # _____

Do all level settings match worksheet values? _____

***DOES THE ABOVE MEET THE APPROVED SCOPE OF SUPPLY? YES ___ NO ___ EXPLAIN IN COMMENTS**
COMMENTS

LIST ANY CORRECTIVE ACTION REQUIRED

ROMTEC UTILITIES' TECHNICIAN PERFORMED ALL THE FOLLOWING START-UP ACTIVITIES

1. Verify electrical supply voltage.
2. Field check control panel.
3. Perform start-up procedure for pumps.
4. Set level controls per approved scope of supply.
5. Testing of pumping rate to the expected performance curve.
6. Field check and set back up power (generators) by Romtec Utilities (IF APPLICABLE).

All parties agree that Romtec Utilities has fulfilled all requirements (1-6) for this lift station, and the station is fully approved and commissioned.

Startup performed by: _____, _____ Date: _____
 (Print name, Start-Up Technician)(Signature)

NAME _____ Who represented the Contractor at start-up?
 PRINT NAME _____(SIGNATURE)

CELL# _____

NAME _____ Who represented the Electrical Sub-contractor at start-up?
 PRINT NAME _____(SIGNATURE)

CELL# _____

NAME _____ Who represented the Site Engineer?
 PRINT NAME _____(SIGNATURE)

CELL# _____

NAME _____ Who represented the Owner/Sewer Agency?
 PRINT NAME _____(SIGNATURE)

CELL# _____

Startup witnessed by: _____, _____ Date: _____
 (Print name, Company) (Signature)

Startup witnessed by: _____, _____ Date: _____
 (Print name, Company) (Signature)

*** Upon approval in the form of the above signatures this lift station is now in the warranty period.**

22. OPERATION & MAINTENANCE (O&M) MANUAL

This section includes:

TO BE DELIVERED AT START-UP OF SYSTEM

Note: One (1) hard copy and one (1) CD Rom will be provided to the customer at start-up of the system. Any request for additional copies will result in additional fees and a change order.

23. ADDITIONAL SUPPORTING DOCUMENTS

NOT INCLUDED IN THIS DESIGN