By Authority Of
THE UNITED STATES OF AMERICA
Legally Binding Document

By the Authority Vested By Part 5 of the United States Code § 552(a) and Part 1 of the Code of Regulations § 51 the attached document has been duly INCORPORATED BY REFERENCE and shall be considered legally binding upon all citizens and residents of the United States of America. **HEED THIS NOTICE:** Criminal penalties may apply for noncompliance.

**Document Name:** CI 166: Angle Valve Guidelines for Chlorine Bulk Transportation

**CFR Section(s):** 49 CFR 178.337-9(b)(8) 49 CFR 178.337-9(b)(8)

**Standards Body:** Chlorine Institute

**Official Incorporator:**
THE EXECUTIVE DIRECTOR
OFFICE OF THE FEDERAL REGISTER
WASHINGTON, D.C.
Pamphlet 166
Angle Valve Guidelines for Chlorine Bulk Transportation

Edition 1
October 2002
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1. INTRODUCTION

1.1 PURPOSE & SCOPE

The purpose of this pamphlet is to set forth performance/selection criteria that should be utilized in identifying valves other than the ‘standard’ that are suitable for use on bulk, liquid chlorine, transportation equipment. This pamphlet contains information pertaining to standardization, performance and design criteria as well as an appendix that includes information on valves that meet these criteria.

1.2 RESPONSIBLE CARE

Members of the Chlorine Institute pledge to follow the elements of a responsible care program such as the American Chemistry Council’s or the Canadian Chemical Producers Association’s (CCPA) Responsible Care® initiatives. The Chlorine Institute is a Partner Association in the American Chemistry Council’s Responsible Care® initiative and is committed to the support of a continuing industry effort to ensure the responsible management of chemicals. This pamphlet demonstrates support of these principles.

1.3 BACKGROUND

For over 50 years the Chlorine Institute Standard Angle Valve has effectively served the needs of bulk chlorine shippers throughout North America; helping to ensure safe and efficient transportation of chlorine from the producer to the end user. Nevertheless, over this period of time significant changes in valve technology have been brought to the marketplace. Indeed other valves have been sanctioned by the AAR for use on chlorine tank cars.

For this reason, the Institute has determined that it is best to move away from the concept of a “standard” angle valve. The goal is to develop a performance/selection criteria that individuals and/or corporations can utilize to select a valve that most appropriately meets their needs, while still being confident that the Institute’s collective knowledge and experience supports their choice. Hence the development of this pamphlet.

1.4 DEFINITIONS

In this pamphlet the following meanings apply unless otherwise noted:

- **AAR** Association of American Railroads
- **ASME** American Society of Mechanical Engineers
- **ASTM** American Society for Testing and Materials
- **CFR** Code of Federal Regulations
- **Chlorine** dry chlorine (either gas or liquid)
- **DOT** U.S. Department of Transportation
The information in this pamphlet is drawn from sources believed to be reliable. The Institute and its members, jointly and severally, make no guarantee, and assume no liability in connection with any of this information. Moreover, it should not be assumed that every acceptable procedure is included, or that special circumstances may not warrant modified or additional procedure. The user should be aware that changing technology or regulations may require a change in the recommendations herein. Appropriate steps should be taken to insure that the information is current when used. These suggestions should not be confused with federal, state, provincial, municipal or insurance requirements, nor with national safety codes.

1.6 APPROVALS

1.6.1 Valves

The AAR Tank Car Committee/DOT has approved various angle valves for use on chlorine tank cars.

1.6.2 Pamphlet

The Institute’s Storage and Transport Committee approved Edition 1 of this pamphlet on September 25, 2002.

1.7 REVISION

Suggestions for revision of the contents of this pamphlet should be directed to the Secretary of the Institute.

1.8 REPRODUCTION

The contents of this pamphlet are not to be copied for publication, in whole or in part, without Institute permission.

2. GENERAL INFORMATION

2.1 PERTINENT REGULATIONS

The DOT and TC regulate the packaging and transportation of hazardous materials. Because chlorine is a hazardous material, personnel involved in any aspect of handling
packaging and transportation of chlorine should be knowledgeable of the regulatory requirements pertaining to chlorine. Publications should be readily available for reference. For ordering information, see Section 5. The DOT hazardous material regulations for shipping chlorine are found in Title 49 CFR parts 171 to 180. The regulations for shipping hazardous materials in Canada can be found in TC’s Transportation of Dangerous Goods Regulations. Although the U.S. and Canadian regulations are similar, there are some differences. The concerned reader should consult the references contained in Section 5 for detailed information.

3. DESIGN REQUIREMENTS

3.1 FLOW

The valve flow passages shall be designed so that in a typical chlorine tank car unloading situation, with a differential pressure (tank car pressure - valve outlet pressure) of approximately 20 psig, a nominal unloading rate of 20,000 pounds per hour can be achieved.

3.1.1 Valve Flow Coefficient

Angle valves currently in service have flow coefficients (Cv) in the range of 12 through 23.

3.1.2 Excess Flow Valves

Chlorine bulk transports are currently equipped with excess flow valves that are rated for up to approximately 30,000 lbs of chlorine per hour. For highway applications, regulations state that the excess flow system must be certified to activate when unloading hose shears. Use of high capacity valves, coupled with high capacity excess flow valves, may require unique certification. For more information, see Pamphlet 49 (5.1.3).

3.2 DIMENSIONS

Chlorine angle valves shall have a common set of key dimensions to assure interchangeability and commonality of emergency procedures.

3.2.1 Outline dimensions

Key reference dimensions are given in Figure 1 “Angle Valve Reference Dimensions”.

3.2.2 Emergency Kit application

Chlorine angle valves must be designed to be compatible with device 6 in the Chlorine Institute’s Emergency Kit C (5.1.7).

3.2.3 Tank Car Connection

Chlorine angle valves must fit to bulk transport manway covers as defined with Chlorine Institute Drawing 103 (5.1.9). Attaching hardware shall be consistent with specifications outlined in Chlorine Institute Drawing 102, (5.1.8). Stud lengths may vary depending on valve design. It should be noted that although the flange on a standard ASME B 16.34
VALVE OPEN MAX: 13-5/8 inches

HANDLE DIAMETER: 5-1/2 inches

BASE TO OUTLET CENTERLINE: 3-9/16 inches

FLANGE HOLES: (4) Ø13/16" or 7/8", equally spaced on 3-1/2" bolt circle straddling outlet centerline.

BASE-TONGUE EXTENTION:
1/4 inch depth, 2.245 inch OD, 1.505 ID

Figure 1
NOTES:
1) ACCEPT 3.50" SQUARE WITH Ø4.63" CORNERS
   TO GO 0.63" DEEP MINIMUM.
2) CLEARANCE REQUIRED FOR STEM NUT AND WASHER.

Figure 2
class 300 valve has 7/8" bolt holes, the Chlorine Institute standard angle valve specifies
13/16" bolt holes and valve purchasers may continue to require this dimension on other
valve designs.

3.2.4 Outlet Connection

The valve outlet connection shall be a one inch female NPT. The outlet connection can be
an integral part of the body or built as a replaceable assembly.

3.3 VALVE DESIGN, MATERIALS OF CONSTRUCTION

3.3.1 Design Pressure

Valves shall meet or exceed all requirements for ASME B 16.34 (5.3.1), Class 300 except
flange dimensions (ref. 3.2.1, 3.2.3) and minimum pressure test requirements (ref 3.6.1). The
use of materials not cited in ASME B16.34 should be appropriately documented by the
valve manufacturer.

3.3.2 Design Temperature

Valves shall be rated or qualified by ASME B31.3 (5.3.2) for a process temperature of -
40°F (-40°C) or lower.

3.4 GENERAL REQUIREMENTS

Valves shall be angle-body, hand actuated globe type. Closure sealing can be either soft
seated or metal seated. Soft seated valves shall be designed so that the valves will provide
substantial closure even if the soft seat is damaged or displaced. Stem seals can utilize
bellows or packing/o-rings. In either case, backup packing or o-rings are required.

3.4.1 Materials Table

The following table lists materials which have been successfully used in chlorine angle valve
service. Choice of specific materials depends on a combination of factors, including
chemical resistance, mechanical strength, manufacturing experience and economics.

<table>
<thead>
<tr>
<th>Part</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body*</td>
<td>Low temperature. carbon steel ASTM A352, Gr LCB or ASTM A350, Grade LF2 or Monel casting ASTM A494, M35.1 or ASTM A105 normalized**</td>
</tr>
<tr>
<td>Bonnet</td>
<td>Carbon steel, monel</td>
</tr>
<tr>
<td>Disk</td>
<td>Hastelloy C-276, monel 500, fluorocarbon insert</td>
</tr>
<tr>
<td>Bellows</td>
<td>Hastelloy C-276</td>
</tr>
<tr>
<td>Stem</td>
<td>Hastelloy C-276, monel 500</td>
</tr>
<tr>
<td>Seat</td>
<td>Monel 400, Stellite facing, Hastelloy C-276</td>
</tr>
<tr>
<td>Packing</td>
<td>Fluorocarbon</td>
</tr>
<tr>
<td>O-rings</td>
<td>Viton</td>
</tr>
</tbody>
</table>
### Part Material

<table>
<thead>
<tr>
<th>Part</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuts</td>
<td>ASTM A194 Grade 4, monel</td>
</tr>
<tr>
<td>Bolts/studs</td>
<td>ASTM A320 Grade L7, monel</td>
</tr>
<tr>
<td>Gaskets</td>
<td>See Pamphlet 95</td>
</tr>
<tr>
<td>Handwheel</td>
<td>Cast iron</td>
</tr>
</tbody>
</table>

* All body castings must meet the quality requirements contained in the AAR- Specifications for Tank Cars, Appendix M, Section 4.9. (5.2.1)

** Must be impact tested in accord with paragraph. 323.3 of ASME B31.3 (5.3.2)

### 3.5 Key Components

#### 3.5.1 Marking

All valves will be marked to indicate:

- the name or identifying mark of the manufacturer
- manufacturer’s design or type number
- type of trim
- pressure-temperature limitations
- unique serial number

#### 3.5.2 Handwheel

Handwheel designs should accommodate adapters for remote actuators as shown in Figure 2.

#### 3.5.3 Closing/Turning Torque

Valve designs shall ensure that over-torquing will not result in a failure that will allow a chlorine release. Normal and maximum closing/turning torque shall be stated by the manufacturer.

#### 3.5.4 Lubrication

Lubrication fittings shall be provided for bearing surfaces. Valve components shall be assembled as necessary to facilitate operation and disassembly after a period of three years. Use only non-reactive lubricants for parts in contact with chlorine.

#### 3.5.5 Valve Position Indication

All valves will have a method for determining whether the valve is open or closed.
3.6 MANUFACTURER TEST REQUIREMENTS

3.6.1 Notwithstanding other requirements contained in ASME 16.34, a minimum pressure of 500 psig shall be utilized for the required shell and closure testing.

3.6.2 Test and acceptance criteria Table

All manufacturers should have a quality assurance/quality control (QA/QC) system in place that ensures material documents as well as availability of test data for a minimum of ten years. Upon request valve manufacturers shall provide documents demonstrating the results of the tests required by ASTM, ASME, the valve manufacturers quality assurance program and user requirements.

4. PERFORMANCE REQUIREMENTS

4.1 REGULATORY APPROVAL

Each valve design must pass a regulatory review which shall include a service trial.

4.2 OPERATIONS

Each valve design should remain operable in chlorine service over a minimum three year service cycle. Operable is defined as follows:

- no product leak to atmosphere through all leak paths using aqua ammonia vapor test
- no product leak through the stem-seat area during post loading inspection using aqua ammonia vapor test
- be operable by hand without the use of wrenches
- maintain essentially the original exterior finish

Note: When testing the system for leaks with aqua ammonia, care must be taken that chlorine has diffused throughout the piping system before leak checking with ammonia. The reaction of ammonia vapor with escaping chlorine forms a dense white cloud. The most convenient way to use ammonia for this purpose is to direct the vapor from a plastic squeeze bottle containing 26 degree Baume’ aqua (ammonia solution) at the suspected leak. Do not squirt liquid aqua ammonia on pipe fittings.

4.3 MAINTENANCE

An angle valve service interval shall be defined for each valve design. Valves may be serviced in the field or sent to a designated shop. It is recognized that this service interval will be influenced by the process conditions present at the loading and unloading sites. Member companies must determine the proper maintenance interval for their fleets to prevent service failures. A rebuilt valve will be leak tight at 500 psig using closure procedure in ASME B16.34.
5. REFERENCES

5.1 INSTITUTE PUBLICATIONS

5.1.1 Chlorine Manual, ed. 6; Pamphlet 1; The Chlorine Institute: Arlington, VA, 1997.


5.1.5 Recommended Practices for Handling Chlorine Tank Cars, ed. 3; Pamphlet 66; The Chlorine Institute: Arlington, VA, 2001.

5.1.6 Gaskets for Chlorine Service, ed. 2; Pamphlet 95; The Chlorine Institute: Arlington, VA, 1997.

5.1.7 Instruction Booklet: Chlorine Institute Emergency Kit "C" for Chlorine Tank Cars and Tank Trucks, ed. 8; Pamphlet IB/C; The Chlorine Institute: Arlington, VA, 1996.


5.2 AAR PUBLICATIONS


5.3 ASME STANDARDS

5.3.1 Valves - Flanged, Threaded and Welding End, ASME B16.34, an ANSI standard; The American Society of Mechanical Engineers: New York, NY, 1996.


5.4 DOT REGULATIONS

5.5 **TC REGULATIONS**


5.5.2 *Construction and Maintenance of Tank Car Tanks and Selection and use of Tank Car Tanks, Portable Tanks and Rail Cars for the Transportation of Dangerous Goods by Rail*; CAN/CGSB-43.147-2002; Canadian General Standards Board: Ottawa; 1997.

5.6 **OTHER PUBLICATIONS**

5.6.1 Responsible Care®. Several brochures, pamphlets, videos and merchandise on the six Codes are available and are updated periodically. Lending Library of Audiovisual Training Programs. American Chemistry Council: Arlington, VA.
For further assistance and information on items referenced, contact:

Association of American Railroads (AAR)  
Transportation Technology Center, Inc.  
P.O. Box 11130  
Pueblo, CO 81001  
877-999-8824  
719-584-7157 (Fax)  
http://www.aar.org

American Society of Mechanical Engineers  
United Engineering Center  
345 East 47th Street  
New York, NY 10017  
212-705-7740  
1-800-843-2763 (publications)

Canadian General Standards Board  
Place du Portage  
Phase III, 6B1  
11 Laurier Street  
Hull, Quebec K1A1G6 (CANADA)  
819-956-0425  
1-800-665-2472 (Canada only)  
819-956-5644 (Fax)  
http://www.pwgsc.gc.ca/cgsb

American National Standards Institute (ANSI)  
11 West 42nd Street  
New York, NY 10036  
212-642-4900  
212-302-1286 (Fax)  
http://www.ansi.org

Canadian Government Publishing  
PWGSC  
Ottawa, Ontario K1A OS9 (CANADA)  
819-956-4802 (Regulation Purchases)  
http://publications.pwgsc.gc.ca

American Chemistry Council  
1300 Wilson Boulevard  
Arlington, VA 22209  
703-741-5000  
703-741-6000 (Fax)  
http://www.AmericanChemistry.com

Superintendent of Documents  
Government Printing Office  
Washington, DC 20402  
202-512-1800 (Sales)  
http://www.access.gpo.gov

The Chlorine Institute, Inc.  
1300 Wilson Boulevard  
Arlington, VA 22209  
703-741-5760  
703-741-5768 (Fax)  
http://www.CL2.com
APPENDIX A

This appendix contains information on valves that meet these guidelines and are approved for use on chlorine bulk transportation in North America. The information has been provided by the valve manufacturer. Questions on the content should be sent to the appropriate company.
1. Valve Manufacturer: Beltech Valves
   Address:
   2728 S. Ruby Avenue
   Gonzales, LA 70737
   225-644-6110
   225-644-6118 (fax)

2. 1" Bellows Sealed Angle Valve
   Beltech BMV017 Manually Operated Valve

3. Drawing of Valve: Beltech Assembly Drawing 550017

4. Identify key dimensions (metal thickness): See Drawing 550017

5. Materials of Construction: See Bill of Material on Drawing 550017

6. Flow coefficient, $C_v = 23$

7. Special features (seat type, operation):
   – Field replaceable Hastelloy C276 Seat Insert
   – Field replaceable reinforced PTFE Flat Faced Seat Disc.
   – Metal to Metal seating with 90° seat available
   – Shear Key equipped Handwheel to prevent seat damage and stem bending
   – Handwheel internal design to accept standard air motor operator assembly
   – Split and Keyed Stem Guide to prevent stem rotation
   – Stem Nut equipped with Thrust Needle Bearings for smooth operation
   – All fasteners are of non-ferrous materials to prevent corrosion and ease of maintenance
   – Outlet Plug equipped with a ½" square female socket to accept standard ratchet wrench
   – Valve Body is convertible to accept the BPV024 Pneumatic Operating Cylinder
   – Valve Body standard material is Monel 400 for increased corrosion resistance

8. Approvals (AAR, DOT, USCG, etc.): AAR Approval #E 969029

9. Quality Assurance Program: Conforms to AAR M1003

10. Torque Requirements, Limitations:
    
    Critical Torque Values
    Seating Torque 20 FT-LBS
    Seat Deformation 35 FT-LBS
    Key Shear 88 FT-LBS
    Stem Column Buckling (Monel K500) 98 FT-LBS
**NOTES:**

1. INSTALL PACKING FLANGE NOT UNTIL CONTACTS THE GASKET FLANGE. TURN COUNTERCLOCKWISE ADDITIONAL TURN. THIS IS FOR THE INITIAL ASSEMBLY ONLY. ADDITIONAL TIGHTENING MAY BE REQUIRED AFTER VALVE HAS BEEN IN SERVICE.

2. TURN SETSCREW 1/4 TURN AFTER CONTACTING STEM NUT.

3. APPLY FLUOROCARBON LUBRICANT BETWEEN HANDWHEEL AND STEM NUT.

**HANDWHEEL TOP VIEW**

**VALVE FLOW COEFFICIENT Cv 23**

**BELTECH**

2728 S. Ruby Ave.
Gonzales, LA 70737
Phone: (225) 944-1110

**BELTECH**

1" CLASS 300# MDV

**GENERAL ASSEMBLY AND PARTS LIST**

AAR Approval # E 969029
1. Valve Manufacturer: EKK Eagle America, Inc.
   Address: 33 Plan Way
   Building #5
   Warwick, RI 02886
   401-732-0333
   401-732-2201

2. 1" Bellows Sealed Angle Valve

3. Drawing of Valve: See attached print, No. 305009-100

4. Identify key dimensions (metal thickness): See attached print, No. 305009-100

5. Materials of Construction: See attached print, No. 305009-100

6. Flow coefficient, $C_v = 14.3$

7. Special features (seat type, operation):
   - Industry Standard handwheel design fits pneumatic actuators
   - Emergency "C" kit socket, 1 13/16", can be used to close valve
   - Secondary Seal - Chevron type Teflon packing with male & female adaptors
   - Third Seal - Integral backseat
   - Primary Seal - 2-Ply Hastelloy C276 formed bellows for zero stem leakage
     5 year bellows warranty
   - Valve designed for field repairability and maintenance
   - Grease fitting lubricates yoke sleeve and stem
   - Bolted bonnet design allows ease of disassembly
   - TFE/Hastelloy C spiral wound gaskets
   - Body, Bonnet, and plug material LF2 (handles Temperatures to -50°F)
   - Removable Disc/Bellows assembly
   - Valve body configured to Chlorine Institute Standard Chlorine Angle Valve
   - Twin Viton O-rings; 1) to prevent chlorine liquid from pooling between seat
     and body, 2) to prevent moist air from reacting with liquid chlorine/chlorine
     vapor eliminating corrosion problem on valve body

8. Approvals (AAR, DOT, USCG, etc.): AAR Approval No. E69606


10. Torque Requirements, Limitations:
   - Teflon soft seat provides hand-tight/bubble-tight shutoff (requires only 5 ft-lbs of torque)
   - Breakaway device disengages handwheel at 70-80 ft.lbs
RIGHT ANGLE VALVE
AAR APPROVAL No. E69606

* Industry Standard handwheel design fits pneumatic actuators
* Breakaway device disengages handwheel at 70-80 ft.lbs.
* Emergency "C" kit socket, 1 13/16", can be used to close valve

"Secondary Seal" Chevron type Teflon packing with male & female adaptors
"Third Seal" Integral backseat

"Primary seal" 2-Ply Hastelloy C276 formed bellows for zero stem leakage 5 Year bellows warranty

Grease fitting lubricates yoke sleeve and stem
Bolted bonnet design allows ease of disassembly
TFE/Hastelloy C spiral wound gaskets
Body, bonnet, and plug material LF2 (handles Temperatures to -50°F)

Twin Viton O-rings;
(1) to prevent chlorine liquid from pooling between seat and body
(2) to prevent moist air from reacting with liquid chlorine/chlorine vapor eliminating corrosion problem on valve body

Removable Disc/Bellows assembly
Ease of operation; Teflon soft seat provides hand-tight/bubble-tight shutoff (requires only 5 ft-lbs of torque)
Valve body configured to Chlorine Institute Standard Chlorine Angle Valve

ISO 9002 CERTIFIED
AAR CLASS F, G, L REGISTERED
EAGLE AMERICA, INC.
1. Valve Manufacturer: Midland Manufacturing Corp.  
   Address: PO Box 226  
   Skokie, IL 60076-0226  
   847-677-0333  
   847-677-0138 (fax)

2. 1" Angle Valve

3. Drawing of Valve: See Attached Print, No. A-713-ML

4. Identify key dimensions (metal thickness): Minimum wall thickness in our valve body is 5/16"


6. Flow coefficient, $C_v = 21.7$

7. Special features (seat type, operation):  
   - Seals are mainly elastomers and PTFE sealing against Hastelloy C

8. Approvals (AAR, DOT, USCG, etc.):  
   - AAR E 999002  
   - DOT E 9694  
   - DOT E 10457  
   - US. DOT USCG letter of 3-13-89 for 1" and 2" Angle Valves in Chlorine Service

9. Torque Requirements, Limitations: Handwheel torque to close the valve should be about 20 ft/lbs  
   Minimum torque failure threshold of handwheel - 70 Ft-Lbs.

10. Quality Assurance Program: Midlands quality assurance/quality control information is very comprehensive.
HEX NUTS ACROSS FLATS 11/16 OPEN 15/16 CLOSED P.1/2

PART NAME PART NO.
1 WHEEL CAST IRON 713-1-C
2 STEM HASTELLOY C. 713-2-HC
3 SEAL RETAINER MONEL 713-303-ML
4 BODY MONEL 713-4-ML
5 BONNET MONEL 713-5-ML
6 - -
7 OUTLET FLANGE MONEL 713-7-ML
8 PACKING SCREW MONEL 713-81-ML
9 BODY INSERT HASTELLOY C. 713-9-HC
10 SEAT SEAL PTFE 713-10-T
11 PACKING RING PTFE 713-11-T
12 STEM D-RING VITON 713-12-VL
13 OUTLET E-RING VITON 713-13-VL
14 NYLON INSERT LOCKNUT STAINLESS STL 713-14-SS
15A STUD MONEL 713-151-ML
15B NUT MONEL 713-152-ML
15C LOCKWASHER MONEL 713-153-ML
15D MONEL 713-150-ML
16 PIPE PLUG & CHAIN MONEL/STN 713-162-ML
17 PACKING SPRING INCONEL 713-17-N
18A U-BOLT MONEL 713-16-ML
18B LOCKNUT MONEL 713-161-ML
19 RETAINER PIN HASTELLOY C. 713-19-HC
20 RETAINER NUT INCONEL 713-201-HN
21 PACKING ADAPTER MONEL 713-21-ML
22 OUTLET FLANGE GASKET CYLIND 713-22-GY
23 BODY D-RING VITON 713-23-VL
24 INSERT GASKET LEAD* 713-24-PL
25 NAMEPLATE MONEL 713-25-ML
26 INSERTION PLATE PLASTIC 713-26-PS
27 WIPER PTFE 713-27-T
28 FLAT WASHER STAINLESS STL 713-241-SS

AAAP APPROVAL: F30986
AAAP APPROVED AS AN ALTERNATE TO CHLORINE.
INSTITUTE DRAWINGS 104 AND 105 FOR CHLORINE TANK CARS.
U.S. DOT SPECIAL PERMIT DOT-E-49646 AUTHORIZED USE ON
MC-331 CARGO TANKS.
U.S. DOT USCS APPROVED FOR BARGES CARRYING CHLORINE
PER LTR. 3-13-85.

APPROVED PER LTR. 3-13-85.

MATERIALS
1. WHEEL CAST IRON 713-1-C
2. STEM HASTELLOY C. 713-2-HC
3. SEAL RETAINER MONEL 713-303-ML
4. BODY MONEL 713-4-ML
5. BONNET MONEL 713-5-ML
6. - -
7. OUTLET FLANGE MONEL 713-7-ML
8. PACKING SCREW MONEL 713-81-ML
9. BODY INSERT HASTELLOY C. 713-9-HC
10. SEAT SEAL PTFE 713-10-T
11. PACKING RING PTFE 713-11-T
12. STEM D-RING VITON 713-12-VL
13. OUTLET E-RING VITON 713-13-VL
14. NYLON INSERT LOCKNUT STAINLESS STL 713-14-SS
15A. STUD MONEL 713-151-ML
15B. NUT MONEL 713-152-ML
15C. LOCKWASHER MONEL 713-153-ML
15D. MONEL 713-150-ML
16. PIPE PLUG & CHAIN MONEL/STN 713-162-ML
17. PACKING SPRING INCONEL 713-17-N
18A. U-BOLT MONEL 713-16-ML
18B. LOCKNUT MONEL 713-161-ML
19. RETAINER PIN HASTELLOY C. 713-19-HC
20. RETAINER NUT INCONEL 713-201-HN
21. PACKING ADAPTER MONEL 713-21-ML
22. OUTLET FLANGE GASKET CYLIND 713-22-GY
23. BODY D-RING VITON 713-23-VL
24. INSERT GASKET LEAD* 713-24-PL
25. NAMEPLATE MONEL 713-25-ML
26. INSERTION PLATE PLASTIC 713-26-PS
27. WIPER PTFE 713-27-T
28. FLAT WASHER STAINLESS STL 713-241-SS

* ALTERNATE MATERIAL AVAILABLE
** ALTERNATE MATERIAL: HASTELLOY C, PTAB. 713-7-HC.
MATERIAL SPEC: ASTM A194 Grade CV-2M OR GRADE CV-6M.

** REV F

A-713-ML

MANUFACTURING CORP.
SKOKIE, IL, U.S.A.
1" ANGLE VALVE

DRAWN: CB DATE: 4/1/84 APPROVED

SCALE: 1/2

REVISIONS

CAD FILE NO. SIZE Dwg NO.
3133 B
1. Valve Manufacturer: Tyco/Descote Valves
   Address: 9700 West Gulf Bank Road
            Houston, Texas 77040
            713-744-4505

2. Descote 921

3. Drawing of Valve: See attached Drawing

4. Identify key dimensions (metal thickness): See attached Drawing

5. Materials of Construction: See Bill of Material on attached Drawing

6. Flow coefficient, \( Cv = 18.32 \)

7. Special features (seat type, operation):
   - 1 inch angle valve designed for use in highly hazardous material service
   - Bellow sealed technology with PTFE packing backup
   - Intricate seat reduces leak path potential
   - All major components serialized for full tractability
   - Fits under emergency C-kit hood
   - Changeable outlet port
   - Open close valve position indicator
   - Universal handle fits auto closures
   - Compatible with 15,000 and 30,000 PPH check valves

8. Approvals (AAR, DOT, USCG, etc.): AAR Approved

9. Quality Assurance Program: Meets ANSI 300 lb class design criteria

10. Torque Requirements, Limitations: Low torque operation (14.75 ft-lbs)
     closing requires no wrench opening and closing