INVITATION FOR SEALED BID

Bid 01-528

Description: BUTTERFLY VALVE ASSEMBLIES

Department: PUBLIC WORKS

NIGP Commodity Code(s): 670-71-00-000-0

Total pages including this page is 17

NOTE: FAXED BIDS WILL NOT BE ACCEPTED

Important Instruction – Read Carefully:

If you have obtained these bid specifications from either of:
City of Tulsa's Fax-on-Demand (918-596-1171) or
City of Tulsa's Web-site : www.cityoftulsapurchasing.org

you must notify the buyer Darlene Donica of your intent to bid by e-mail ddonica@ci.tulsa.ok.us in order to receive addenda. The buyer will always acknowledge your e-mail for your records. All addenda will be posted on fax-on-demand and the web-site.

TABLE OF CONTENTS

Pay special attention to those pages with a reference to the following notes:

Note #1: Signature of authorized agent required

Note #2: Signature of an authorized agent and notarized required

Your bid response should follow the same format listed above plus any additional format requested in the body of the bid invitation.

INVITATION FOR SEALED BIDS
TO
City of Tulsa

200 CIVIC CENTER, ROOM 109, TULSA, OKLAHOMA 74103

Bid number and date of bid opening must appear on the lower left outside corner of bid envelopes and all related containers.

DATE OF OPENING: MAY 2, 2002 **BID NUMBER: 01-528**

BID MUST BE IN THE CITY CLERK'S OFFICE AT THE ABOVE ADDRESS BY 5:00 P.M. THE DAY PRECEDING THE "DATE OF OPENING" SHOWN ABOVE.

BIDS WILL BE OPENED AT 8:30 A.M. IN THE CITY COUNCIL ROOM ON THE DAY SPECIFIED UNDER "DATE OF OPENING."

PUBLISHED IN THE TULSA DAILY COMMERCE AND LEGAL NEWS: APRIL 23, 2002

Bid must be accompanied by bidder's bond, cashier's check or certified check in the amount of: **NONE**

PLEASE READ TERMS AND CONDITIONS ON THE NEXT PAGE BEFORE COMPLETING BID DOCUMENTS

********** **THE FOLLOWING SECTION MUST BE COMPLETED BY BIDDER** **********

Delivery will be made in not more than_____ days after receipt of order.

Payment terms _____%_____ days.

City of Tulsa may increase quantity of order at the unit price bid for_____ days. (Bidder to Specify Days) I have examined the terms and specifications and the instructions to bidders herein and agree, provided I am awarded a con - tract, to provide the above described items for the sum shown in accordance with the terms and specifications stated herein. All deviations are in writing and attached hereto.

Enclosed is a [ ] BID BOND ; [ ]CASHIER'S CHECK; [ ] Certified Check in the amount of $_____, which I agree the City of Tulsa may retain as liquidated damages in the event of my failure to comply with the terms of this bid.

MUST BE SIGNED BY AUTHORIZED AGENT TO BE VALID

FIRM NAME _____ **by** _____
(Signature)

STREET _____ **TITLE** _____

CITY STATE_____**ZIP CODE**_____**PHONE NUMBER**_____**DATE**_____

GENERAL TERMS AND CONDITIONS OF BIDS

THESE ITEMS APPLY TO AND BECOME A PART OF THE BID.

NO EXCEPTIONS TO THESE TERMS & CONDITIONS WILL BE CONSIDERED.

1. **BIDS MUST BE SUBMITTED ON THIS FORM ONLY INCLUDING A SIGNATURE OF AN AUTHORIZED AGENT.** Each bid shall be placed in a separate envelope. Be sure envelope is completely and properly identified and sealed, showing the bid number and date in the lower left hand corner. Bids must be time stamped in the office of the City Clerk by 5:00 P.M. on the day before date of opening.

2. No bidder may withdraw his proposal for a period of thirty (30) days after the date and hour set for the opening of bids.

3. All prices shall be quoted F.O.B. Tulsa, Oklahoma, and delivery to City of Tulsa location shall be without additional charge.

4. The bidder shall attach the manufacturer's name of the equipment or material to be furnished, type, model numbers, manufacturer's descriptive bulletins and specifications. All guarantees and warranties should be clearly stated. This data shall be in sufficient detail to describe accurately the equipment or material to be furnished. Manufacturer's specifications, in respect to the successful bidder, shall be considered as part of his contract with the City of Tulsa.

5. The bidder shall show in the proposal both the unit prices and total amount, where required, of each item listed. In the event of error or discrepancy in the mathematics, the unit prices shall prevail.

6. Any exceptions or deviations from written specifications shall be shown in writing and attached to the bid form.

7. Each bidder agrees to comply with the terms of Title 5, Chapter 1, of Tulsa, Oklahoma Charter and revised ordinances relating to equal employment opportunity.

8. **THE ENCLOSED FORMS REGARDING NON-COLLUSION AND FINANCIAL INTEREST MUST BE SIGNED, NOTARIZED, AND RETURNED WITH THE BID.**

9. The City of Tulsa reserves the right to reject any and all bids, to waive any technicalities in the bidding, and to award each item to different bidders or all items to a single bidder.

10. All bids must be accompanied by bidders bond, cash, certified or cashier's check in the amount shown on the face of the bid form. This amount shall be retained by the City of Tulsa as liquidated damages in the event the successful bidder (or bidders) fails to execute a contract, if required. The bidder agrees that said amount is presumed to be the damages sustained by the City due to the impracticability and extreme difficulty in fixing the actual damages. The office of the City Clerk will return the bid deposits to the unsuccessful bidders, after a contract has been awarded or all bids have been rejected.

11. In the event cash discounts are offered by the bidder, the discount date shall begin with the date of invoice, the date of receipt of all material covered by the purchase order, or the date of receipt by the City of Tulsa of the original copy of the purchase order with properly executed Affidavit of Claimant, whichever is the later date.

12. Direct purchase of certain items of equipment or material by the City of Tulsa are exempt from Federal Excise Tax and Oklahoma Sales Tax. In such cases the bidder shall quote prices which do not include Federal Excise Tax and Oklahoma Sales Tax. The City of Tulsa will furnish executed exemption certificates upon presentation by the bidder at the time of purchase.

13. Bid must show number of days required for delivery under normal conditions. Failure to state delivery time obligates bidder to complete delivery in fourteen (14) calendar days. Unrealistically short or long delivery promises may cause bid to be disregarded. Contractor must keep Purchasing Department advised at all times of status of order. Default in promised delivery or failure to meet specifications authorizes the Purchasing Agent to purchase supplies elsewhere and charge full increase of cost and handling to defaulting contractor. Consistent failure to meet delivery promises without valid reason may cause removal from bid list.

14. Bidder agrees to defend and save City of Tulsa from and against all demands, claims, suits, costs, expenses, damages and judgments based upon infringement of any patent relating to goods specified in this order or the ordinary use or operation of such goods by City or use or operation of such goods in accordance with bidders direction.

15. If the bid requires a written contract, the successful bidder shall execute a written contract with the City of Tulsa and return the required bonds and insurance certificates within ten (10) days after submission of contracts to said bidder by the City.

INTEREST AFFIDAVIT

STATE OF _____ }
} ss
COUNTY OF _____ }

_____, of lawful age, being first duly sworn, states that s(he) is the agent authorized by the bidder to submit the attached bid. Affiant further states that no officer or employee of the City of Tulsa either directly or indirectly, owns a twenty-five percent (25%) interest in the bidder's business or such a percentage which constitutes a controlling interest. Affiant further states that the following officers and/or employees of the City of Tulsa have some direct or indirect interest in the bidder's business:

_____

_____

_____

By _____
(Signature)

_____
(Title)

Subscribed and sworn to before me this _____day of _____, 20_____.

_____

NOTARY PUBLIC SIGNATURE

My Commission Expires:

_____

The Interest Affidavit must be completed, signed by an authorized agent, and notarized.

BIDDER AFFIDAVIT - TITLE 74 O.S. (1974 SUPP.) 85.22-85.25

STATE OF _____ COUNTY OF _____

_____, of lawful age, being first duly sworn on oath says
Authorized Agent

1. (s)he is the duly authorized agent of _____, the bidder submitting the competitive bid which is attached to this statement, for the purpose of certifying the facts pertaining to the existence of collusion among bidders and between bidders and municipal officials or employees, as well as facts pertaining to the giving or offering of things of value to government personnel in return for special consideration in the letting of any contract pursuant to the bid to which this statement is attached.

2. (s)he is fully aware of the facts and circumstances surrounding the making of the bid to which this statement is attached and has been personally and directly involved in the proceedings leading to the submission of such bid; and

3. neither the bidder nor anyone subject to the bidder's direction or control has been a party;
   a. to any collusion among bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding,

   b. to any collusion with any municipal official or employee as to quantity, quality or price in the prospective contract, or as to any other terms of such prospective contract, nor

   c. in any discussions between bidders and any municipal official concerning exchange of money or other thing of value for special consideration in the letting of a contract.

_____
SIGNATURE OF AUTHORIZED AGENT

Subscribed and sworn to before me this _____day of _____, 20_____.

_____ _____

Signature of Notary Public **MY COMMISSION EXPIRES**

The Bidder Affidavit must be completed, signed by an authorized agent, and notarized.

CONTRACTOR/BIDDER INFORMATION SHEET
To be completed by all Bidders
For Contracts with the City of Tulsa
(Please print or type)

Project No. or Description _____

_____

Full Name of Bidder _____

Legal Identity
(Corporation, Partnership,
Individual, etc.) _____

Address _____

_____

Telephone No. _____

FAX No. _____

Taxpayer Identification Number _____

Contact Person _____

Phone No. _____

Fax No. _____

E-mail address _____

Webpage Address _____

Price Sheet Summary

Vendor Name:_____ **Signature:**_____
Date:_____

You will be able to obtain a copy of the Bid Summary on the City of Tulsa's Purchase-Net Fax-on-Demand and Website shortly after bid opening.

BID 01-528

Qty.	Description	Unit Cost	Total Cost
12	30" Filter Influent Valve	$_____	$_____
12	36" Filter Washwater Valve	$_____	$_____

For further questions please contact: Kerry Rowland @ 918-596-9847

BID 01-528
BUTTERFLY VALVE ASSEMBLIES
PUBLIC WORKS DEPARTMENT

Minimum Specification
30-Inch and 36-Inch Butterfly Valves Assemblies
April 2002

Intent:

The intent of this specification is to replace twelve **30-inch filter influent butterfly valve assemblies** and twelve **36-inch filter waste wash water butterfly valve assemblies** located at the City of Tulsa, Mohawk Water Treatment Plant.

Contact Information:

The contact for the City of Tulsa is Mr. Larry Hamon, Maintenance Supervisor; Mohawk WTP located at 3600 E. Mohawk Blvd, Tulsa, OK 74115, phone number 918-591-4041.

General:

The equipment supplied by the bidder shall be new, unused, and of current manufacture. The equipment supplied shall meet or exceed these minimum specifications in all cases, and must be delivered fully assembled and operational or the bidder must provide the installation services. All valves required under this contract shall be the same type and furnished by the same manufacturer.

Summary of Equipment:

Valve Nos.:	6-V-1 to 6-V-12
Quantity	Twelve (12)
Service	Filter Influent
Description	Butterfly Valve Assembly
Size	30 inches
Class (minimum)	150B
Maximum Pressure Diff.	4 psi
Maximum Velocity	4.3 ft/s
Actuator Code	Electric Reversing (E-R)

Valve Nos.:	6-V-61 to 6-V-72
Quantity	Twelve (12)
Service	Filter Waste
Description	Butterfly Valve Assembly
Size	36 inches
Class (minimum)	150B
Maximum Pressure Diff.	6 psi

Maximum Velocity 10 ft/s
Actuator Code Electric Reversing (E-R)

Manufacturers, of Equal:

Acceptable manufactures are Henry Pratt Company, or equal engineered approved equipment. Butterfly valves manufactured by Keystone International, Inc, Tyco International, or CMB Industries will not be accepted.

Products:

All butterfly valves shall meet the full requirements of AWWA C504-00, or the latest revision and Section 8, Mechanical Devices of ANSI/NSF 61. The valves shall be of the tight-closing, rubber-seat type with rubber seats that are securely fastened to the valve body. No metal-to-metal seating surfaces will be permitted. Valves shall be bubble-tight at rated pressures with flow in either direction, and shall be satisfactory for applications involving throttling service and/or frequent operation and for applications involving valve operation after long periods of inactivity. Valve discs shall rotate 90° from the full open position to the tight shut position. The valve manufacturer shall have manufactured tight closing; rubber seated butterfly valves for a period of at least ten years. The seat design of the proposed valve manufacturer shall have a minimum 10 years of proven service in the field.

Valve Bodies and Flanges:

Valve bodies shall be constructed of cast iron and shall be flanged. Flange drilling shall be in accordance with ANSI B16.1 standard for cast iron flanged. Two trunnions for shaft bearings shall be integral with each valve body. Body thickness and laying lengths shall be in strict accordance with AWWA C504-00. The use of disc stops cast in the body shall not be allowed. Port diameter shall be within one (1) inch of nominal. External fasteners shall be constructed of 304 stainless steel.

Packing and Packing Gland Assemblies:

The packing shall be a self-adjusting “V” type. The packing assembly must incorporate a nylon-packing retainer accompanied by several rings of packing. Standard O-ring packing will not be accepted.

Valve Discs:

Valve discs shall be constructed of ductile iron with a 316 stainless steel disc edge in accordance with AWWA C504-00. Discs shall not have any hollow cavities that could corrode or entrap water and shall be of the flow-through design eliminating hollow chambers or ribs transverse to flow. The flow-through design shall obtain a Cv value of 59,520 for the 36” Class 150B and Cv value of 39,450 for the 30” Class 150B. Disc and shaft connection shall be made with solid stainless steel or monel through shaft/disc taper pins.

Valve Shafts:

Shafts of all valves shall be turned, ground and polished. Shafts shall be two-pieces subtype shaft constructed of center less ground ASTM A276 type 304 stainless steel. Shaft diameters must meet minimum requirements established by AWWA C504-00, Class 150B.

Valve Seats:

Valve seats shall be made of a synthetic rubber compound compatible with the intended service. Valve seats shall be field adjustable and replaceable without dismantling operator, disc or shaft. Seats shall be retained in the valve body by mechanical means without use of metal retainers or other devices located in the flow stream. The valve must not leak if the angular misposition of the disc is 1° off center. The seat must move against the disc to conform to the exact radius of the disc with uniform contact pressure.

Thrust Bearing Assembly:

The valve must have a two-way thrust bearing. The thrust bearing assembly must consist of a stainless steel or monel stud fastened to the bottom of the valve shaft. The stud must extend beyond the bottom cover. The thrust collar must be threaded to the stud and pinned. The cavity containing the thrust collar must be packed with grease providing lifetime lubrication of the thrust bearing assembly. The cap must be fully gasketed to prevent leakage.

Valve Bearings:

Valves shall be fitted with sleeve-type bearings. Bearings shall be corrosion resistant and self-lubricating. Bearing load shall not exceed 1/5 of the compressive strength of the bearing or shaft material. The bearing material must be Teflon-lined with a special fiberglass backing.

Valve Electric Actuators (provided by the City):

The replacement valve assemblies shall be compatible with the existing electric floor stand actuators provided by the city. Valve and gear actuator assembly shall be designed for continuous, submerged service. External fasteners, actuator input shaft, new universal joints, and couplings shall be 303, 304, or 316 stainless steel material. Stem guide shall be bronze bushed cast iron. The actuator shall provide a 2-inch *square nut in the input shaft. The internal actuator lubricant must be suitable for potable water service. Any modifications required to install the existing electric actuators on the butterfly valves shall be included in the bid price. Dimensions and technical data for the AUMA actuators are provided in Attachment 1.*

Manufacturer:	*AUMA*	*Voltage:*	*480*
Model/Part #:	*SA14.5*	*Phase:*	*3*

SO#:	*9916635*	*Amperage:*	*FLA1.3*
Enclosure:	*NEMA4*		
Torque:	*370*		
Output PRM:	*19*		

Painting

The valve surfaces except for disc, seating, and machine-finished portions shall be painted. All surfaces of the valve shall be clean, dry and free from grease before painting. For above ground service the exterior shall be evenly coated with a suitable primer to inhibit rust. The exterior of buried/submerged service valves and interior of all valves shall be evenly coated with AWWA C550 epoxy, Tnemec Pota-Pox Plus 140F.

Testing:

Hydrostatic and seat leakage tests shall be conducted in strict accordance with AWWA C504-00.
The manufacturer shall submit notarized copies of the factory tests showing compliance with the applicable standards of AWWA, ANSI, and ASTM.

Proof of Design :

The manufacturer furnishing valves under the specification shall be prepared to show proof that the valves proposed meet the design requirements of **AWWA C504-00**. The manufacturer shall also submit certified copies of the hydrostatic factory tests, be prepared to certify performance tests demonstrating that valves of bonded seat design are bubble tight at rated pressure without -adjustment after 100,000 cycles.

ALTERING BIDS:

Bids cannot be altered or amended after submission deadline. Any interlineation, alteration, or erasure made before opening time and date must be initialed by the signer of the bid, guaranteeing authenticity. Bids must be submitted in ink or typewritten. Penciling will not be accepted.

PRICING:

Bid prices, unless otherwise specified, must be net, including transportation and handling charges fully prepaid by vendor to destination and subject only to cash discount for prompt payment of invoice.

DELIVERY:

Delivery time must be stated in days in the appropriate spaces of the cover sheet. Indefinite terms such as “promptly”, “without delay”, etc., will not be given consideration. Failure to indicate delivery time shall be cause for rejection of the bid.

BIDDER AFFIDAVITS:

Each bidder shall accompany his bid with a fully executed and notarized copy of the attached **Non-Collusion Affidavit** and the **Interest Affidavit**. Failure to do so shall be cause for rejection of the bid.

ADDENDA AND INTERPRETATIONS:

If it becomes necessary to revise any part of this bid, a written addendum will be provided to all the bidders. The City of Tulsa is not bound by any oral representations, clarifications, or changes made in the written specifications by City of Tulsa employees unless such clarification or change is provided to bidders in written addendum form from the Purchasing Division.

AWARD OF BID:

The bid shall be awarded to the firm whose proposal is responsive to the bid and is most advantageous to the City, considering the factors identified in the bid and Section 406E of Title 6, The Purchasing Ordinance set forth below:

406E. AWARD OF CONTRACT

1. Authority in the Mayor. The Mayor shall have the authority to award Contracts within the purview of this chapter.
2. Lowest Secure Bidder. Contracts shall be awarded to the lowest secure Bidder meeting specifications. Bid Specifications may include a point System for evaluating the lowest secure bid. In determining "lowest Secure bidder", in addition to price, the following factors shall be considered:
   a. The ability, capacity and skill of the bidder to perform the contract or provide the service required;
   b. whether the bidder can perform the contract or provide the service promptly or within the time specified, without delay or interference;
   c. the character, integrity, reputation, judgment, experience and efficiency of the bidder;
   d. the quality of performance of previous contracts or services;
   e. the previous and existing compliance by the bidder with laws and ordinances relating to the contract or service;
   f. the sufficiency of the financial resources and ability of the bidder to perform the contract or provide the service;
   g. the quality, availability and adaptability of the supplies or contractual services to the particular use required;
   h. the ability of the bidder to provide future maintenance and service for the use of the subject of the contract;
   i. where an earlier delivery date would be of great benefit to the requisitioning agency, the date and terms of delivery may be considered in the bid award, and
   j. the number and scope of conditions attached to the bid.

k. If a point system has been utilized in the bid specifications, the number of points earned by the bidder.

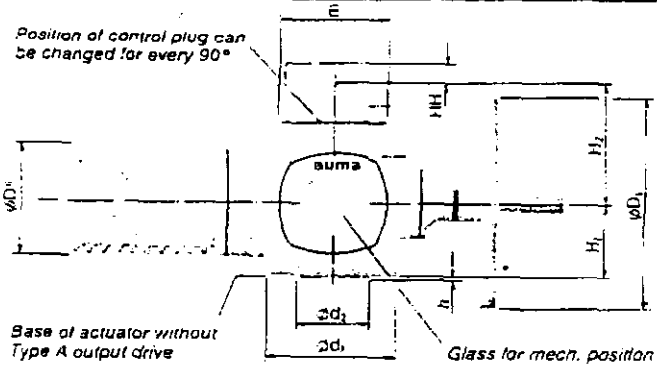
Attachment 1

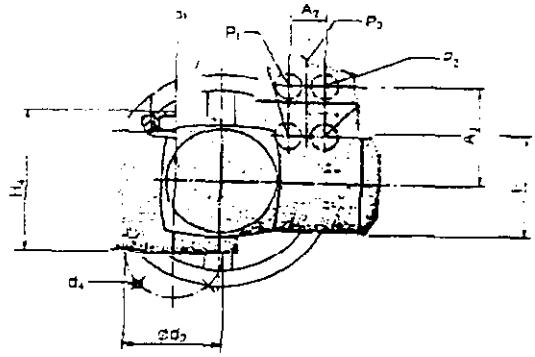
AUMA Actuator Technical Data

auma

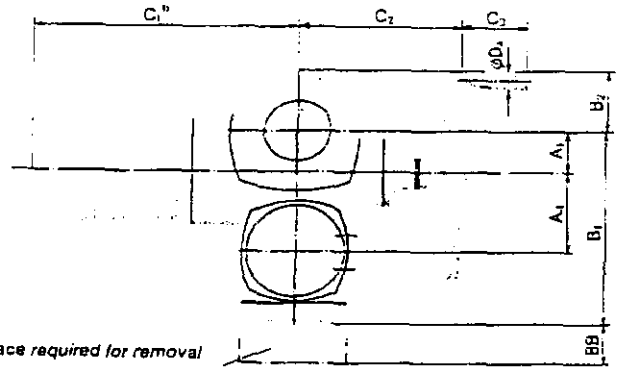
Dimensions

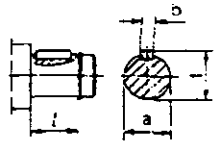
SA 07.1 thru SA 16.1





Output drive dimensions — See reverse side





Handwheel shaft

1) dimensions will vary according to motor furnished
2) furnished only if ordered as option
3) refer to factory for stem protection tube data

Dimensions (Inches)	AUMA Model					
	SA 07.1	SA 07.5	SA 10	SA 14.1	SA 14.5	SA 16.1
A1	1.58	1.58	1.97	2.48	2.48	3.15
A2	1.34	1.34	1.34	1.97	1.97	1.97
A3	5.31	5.31	5.31	5.71	5.71	5.71
A4	4.06	4.06	4.06	4.61	4.61	4.80
B1	9.33	9.33	9.72	11.22	11.22	12.09
B2	2.44	2.44	2.56	3.54	3.54	4.53
C1 max.	10.43	10.43	11.10	15.16	15.16	20.08
C2	7.36	7.36	7.60	9.06	9.33	10.24
C3	1.85	2.48	2.48	3.74	3.74	3.74
∅ D max.	4.13	4.13	4.92	6.02	6.02	7.48
∅ D1	6.30	6.30	7.87	12.40	15.75	19.69
∅ D4	0.59	0.79	0.79	0.98	0.98	0.98
E	4.53	4.53	4.53	5.91	5.91	5.91
F	4.53	4.53	4.53	5.91	5.91	5.91
H1	3.07	3.07	3.15	4.33	4.33	5.12
H2	6.69	6.69	6.69	7.09	7.09	7.09
H4	6.10	6.10	6.61	8.35	8.35	9.96
P1 (NPT)	¾	¾	¾	¾	¾	¾
P2 (NPT)	¾	¾	¾	¾	¾	¾
P3	Pg 13.5	Pg 13.5	Pg 13.5	Pg 13.5	Pg 13.5	Pg 13.5
BB min.	7.09	7.09	7.09	7.09	7.09	7.09
HH min.	1.18	1.18	1.18	1.18	1.18	1.18
a	0.787 e7	0.787 e7	0.787 e7	1.181 f7	1.181 f7	1.181 f7
b	0.24	0.24	0.24	0.31	0.31	0.31
∅ d1	4.92	4.92	4.92	6.89	6.89	8.27
∅ d2 f8	2.312	2.312	2.312	3.75	3.75	5.00
∅ d3	4.00	4.00	4.00	5.50	5.50	6.50
d4	4 x ⅜ - 16	4 x ⅜ - 16	4 x ⅜ - 16	4 x ½ - 11	4 x ½ - 11	4 x ¾ - 10
h	0.12	0.12	0.12	0.16	0.16	0.20
l	0.83	0.83	0.98	1.33	1.53	1.80
t	0.89	0.89	0.89	1.30	1.30	1.30

All data subject to change without notice.

AUMA Actuators, Inc.

Issue 1.97
MA-DS-01-0007

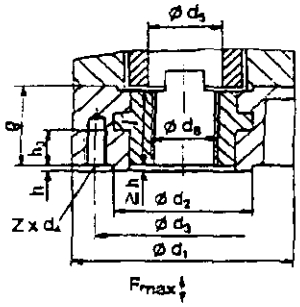
auma®

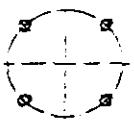
Output Drive Types — SA 07.1 — SA 16.1

Output Drives

Type A
Stem nut

MSS SP102

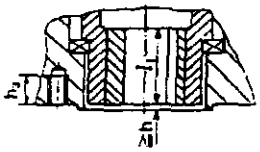


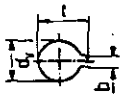


Arrangement of holes d⁴

Type B
Bore with Keyway

ANSI B17.1





Missing dimensions refer to output drive A

Dimensions	AUMA Model SA 07.1	SA 07.5	SA 10.1	SA 14.1	✳ SA 14.5	SA 16.1
F max. thrust (lbs.)	9,000	9,000	15,000	36,000	36,000	56,000
Flange	FA10	FA10	FA10	FA14	FA14	FA16
⌀ d1	4.92	4.92	4.92	6.89	6.89	8.27
⌀ d2 F8	2.312	2.312	2.312	3.75	3.75	5.00
⌀ d3	4.00	4.00	4.00	5.50	5.50	6.50
d4	4 x 3/8 - 16	4 x 3/8 - 16	4 x 3/8 - 16	4 x 5/8 - 11	4 x 5/8 - 11	4 x 3/4 - 10
⌀ d5	1.18	1.18	1.65	2.36	2.36	3.14
⌀ d6 max.	1.02	1.02	1.57	2.25	2.25	3.00
g	1.57	1.57	1.97	2.56	2.56	3.14
h	0.12	0.12	0.12	0.16	0.16	0.20
h3	0.87	0.87	0.87	0.98	0.98	1.18
:	1.46	1.46	1.85	2.36	2.36	3.00
z	4	4	4	4	4	4
wt. lbs.	2.8	2.8	6.2	15.0	15.0	25.7
b	0.25	0.25	0.25	0.50	0.50	0.62
⌀ dy max.	1.18	1.18	1.18	1.77	1.77	2.36
:1 max.	1.77	1.77	1.77	2.56	2.56	3.15
t max.	1.30	1.30	1.30	1.92	1.92	2.65
h3	0.51	0.51	0.59	0.98	0.98	1.18
wt. lbs.	0.2	0.2	0.8	2.4	2.4	5.3

Drive Types and Applications

Type A – Stem Nut
Used when actuator must accept thrust.

Type B – Bore with Keyway
Used when actuator transmits torque only.

Type LE – Linear Drive
Transmits thrust via linear motion.
Dimensions and technical data shown on separate data sheet.

Type AF – Spring Loaded Thrust Compensator
Used when actuator must accept thrust.
Similar to the "A" drive except the drive nut is spring-loaded to allow for thermal expansion of the valve stem or shock loading caused by fast closing.
Dimensions and technical data shown on separate data sheet.

Type D – Output Shaft with Keyway
Used when actuator transmits torque only.
Dimensions and technical data shown on separate data sheet.

Type AK – Stem Nut with Pendular Motion
Used when actuator must accept thrust.
Similar to the "A" drive except the drive nut can move in a pendular motion.
Dimensions and technical data shown on separate data sheet.