



TO MARK PROGRESS

**LADISH**

*Controlled Quality*

**FITTINGS**

CATALOG NO. 55

SEAMLESS  
WELDING  
FITTINGS

FORGED  
STEEL  
FLANGES

LARGE  
DIAMETER  
FLANGES

LONG  
WELDING  
NECKS

FORGED  
STEEL  
FITTINGS



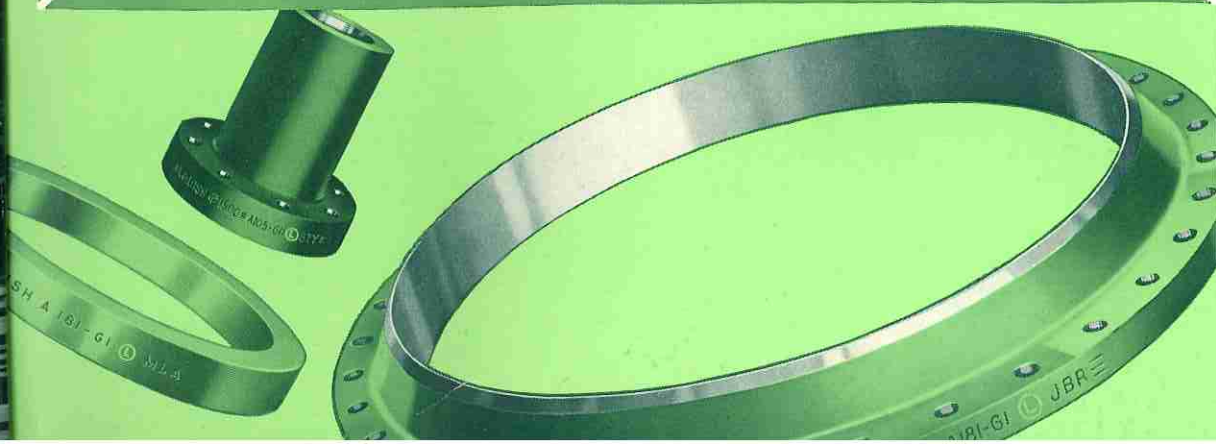
# LADISH

*Controlled Quality*

**LARGE DIAMETER FLANGES,  
T.E.M.A. FLANGES,  
LONG NECKS  
and ROLLED RINGS**



TO MARK PROGRESS



**1** SEAMLESS  
WELDING  
FITTINGS

**2** FORGED  
STEEL  
FLANGES

**3** LARGE O. D.  
& TEMA FLANGES,  
LONG NECKS,  
ROLLED RINGS

**4** FORGED  
STEEL  
FITTINGS

**5** STAINLESS  
AND ALLOY  
FITTINGS

**6** ENGINEERING  
AND  
TECHNICAL DATA

**7** GENERAL INDEX  
AND  
PART NUMBERS

LONG NECKS, RINGS

# LADISH

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### HOW TO ORDER INFORMATION

#### EXAMPLE OF INFORMATION REQUESTED

QUANTITY	NOMINAL PIPE SIZE	NOMINAL PRESSURE RATING	DESCRIPTION	MATERIAL SPEC.*	PART NUMBER
5	42"	125 lb.	American Standard Slip-On Flanges† per Ladish Catalog 55, Page 176. Bored for 42" O.D., 3/8" wall pipe.	ASTM A181 Grade I	512A
8	14"	1500 lb.	Long Welding Necks 16" long‡ faced and drilled.	ASTM A105 Grade I	150L
10	75" O.D. x 65" I.D. x 5" in thickness		Seamless Rolled Rings‡	ASTM A182 F5	....
6	29" Shell I.D.	150 lb.	T.E.M.A., Class R, Hub Type, Shell Flanges at cover end per Ladish Catalog 55, Page 188, for 29" I.D. x 30" O.D. Shell.▲	ASTM A181 Grade I	701

#### NOTES

- \* Always specify material by standard, grade and symbol. See pages 225-236 and page 243.
  - † Always specify O.D. and wall thickness of pipe to which either Welding Neck or Slip-On flange is to be joined. Bore of Slip-On Flange is normally 3/16" larger than pipe O.D. Also refer to proper page in catalog.
  - ‡ Furnish drawings giving finish machined dimensions to facilitate producing most economical ring or finished forging.
  - † Specify length on Long Welding Necks, particularly on those sizes where a choice of lengths is indicated in the footnotes. Unless otherwise indicated cataloged length will be furnished on those sizes where only one length is cataloged.
  - ▲ Always specify I.D. and O.D. of shell or vessel to which flange is to be joined.
- Flanges will be furnished with facings and other dimensions as cataloged unless otherwise specified. When shipment is made, a shipping notice is forwarded to the destination of the shipment. For this reason correct post office address should be given.
- "Delivery required by ....." This information proves helpful to Ladish in processing orders. If order is based on quotation, Ladish quotation number should be made part of the order.
- Orders should be placed with your Authorized Ladish Distributor. His ample stocks mean prompt service.

Always Supply Complete Information on Order



# LADISH

## LARGE DIAMETER FLANGES, LONG WELDING NECKS, T.E.M.A. FLANGES AND ROLLED RINGS PICTORIAL INDEX



LARGE DIAMETER FLANGES

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ROLLED RINGS

<b>ROLLED RINGS</b>	
¾ inch through 240 inches in diameter	199 through 203

Always Supply Complete Information on Order



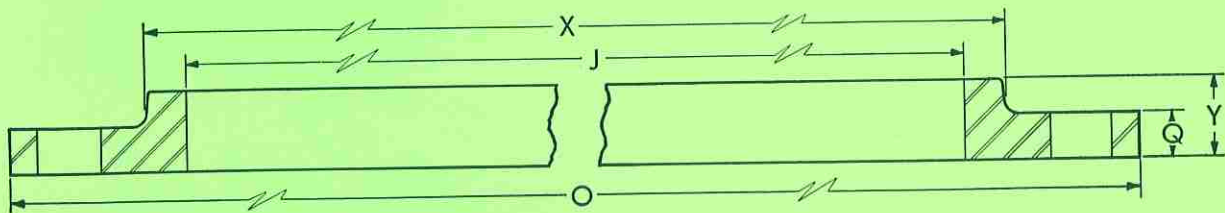
TO MARK PROGRESS

**LIGHT TYPE FLANGES**

**With 125 lb. ASA Diameter and Drilling**

FORGED AND ROLLED STEEL  
FOR LIGHTWEIGHT PIPE\*

TYPE	SIZE	OUTSIDE DIAMETER OF FLANGE O	THICKNESS OF FLANGE Q	HUB DIAMETER X	LENGTH THROUGH HUB Y	DIAMETER OF BORE J	DRILLING TEMPLATE			APPROX. WEIGHT IN POUNDS	LIST PRICE
							NUMBER OF HOLES	DIAMETER OF HOLES	BOLT CIRCLE		
S L I P  O N	3	7½	½	4¼	⅞	TO BE SPECIFIED BY PURCHASER	4	¾	6	6	PRICES  ON  APPLI-  CATION
	4	9	½	5⅝	⅞		8	¾	7½	8	
	5	10	⅞	6⅞	⅞		8	⅞	8½	10	
	6	11	⅞	7⅞	1¼		8	⅞	9½	13	
	8	13½	⅞	9⅞	1¼		8	⅞	11¾	18	
	10	16	1⅞	12	1¼		12	1	14¼	26	
	12	19	1⅞	14⅞	1¼		12	1	17	42	
	14	21	¾	15¾	1¼		12	1⅞	18¾	44	
	16	23½	¾	18	1¼		16	1⅞	21¼	58	
	18	25	¾	19⅞	1¼		16	1¼	22¾	59	
	20	27½	¾	22	1¼		20	1¼	25	69	
	22	29½	1	24¼	1¾		20	1⅞	27¼	76	
	24	32	1	26⅞	1¾		20	1⅞	29½	113	
	26	34¼	1	28½	1¾		24	1⅞	31¾	126	
	28	36½	1	30½	1¾		28	1⅞	34	139	
	30	38¾	1	32½	1¾		28	1⅞	36	152	
	32	41¾	1⅞	34¾	1¾		28	1⅞	38½	206	
	34	43¾	1⅞	36¾	1¾		32	1⅞	40½	217	
	36	46	1⅞	38¾	1¾		32	1⅞	42¾	234	
	38	48¾	1⅞	40¾	1¾		32	1⅞	45¼	264	
	40	50¾	1⅞	43	1¾		36	1⅞	47¼	280	
	42	53	1¼	45	1¾		36	1⅞	49½	328	
	44	55¼	1¼	47	2¼		40	1⅞	51¾	349	
	46	57¼	1¼	49	2¼		40	1⅞	53¾	363	
	48	59½	1⅞	51	2½		44	1⅞	56	426	
	50	61¾	1⅞	53	2½		44	1⅞	58¼	451	
	52	64	1⅞	55	2½		44	1⅞	60½	477	
	54	66¼	1⅞	57	2½		44	1⅞	62¾	504	
60	73	1½	63	2¾	52	1⅞	69¼	643			
66	80	1½	69	2¾	52	1⅞	76	754			
72	86½	1½	75	2¾	60	1⅞	82½	846			



**Slip-On Part No. 501A**

Furnished to ASTM Specification A181 Grade I.

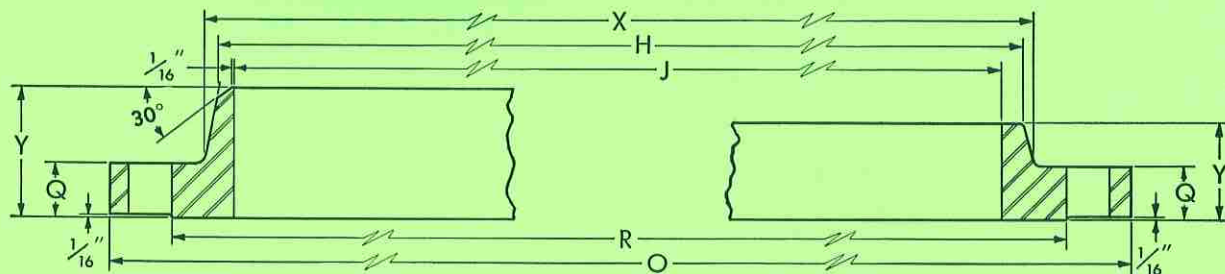
These flanges have flat faces and are designed for use with full face gaskets.

\* Light type Forged Steel Flange with diameter and drillings of 125 lb. American Standard Cast Iron Flange.

FORGED AND ROLLED STEEL  
ASTM A181—Grade I<sup>▲</sup>

**LARGE DIAMETER FLANGES**  
**50 lb. Pressure at 100° F.**

TYPE	SIZE	OUTSIDE DIAMETER OF FLANGE O	THICKNESS OF FLANGE Q	OUTSIDE DIAMETER OF RAISED FACE R	COMPRESSED ASBESTOS GASKET SIZE	HUB DIAMETER		LENGTH THROUGH HUB Y	DIAMETER OF BORE J	DRILLING TEMPLATE			APPROX. WEIGHT IN POUNDS	LIST PRICE
						X	H			NUMBER OF HOLES	DIAMETER OF HOLES	BOLT CIRCLE		
WELDING NECK	26	31½	1¼	28⅝	27¾x28⅝	27⅞	26½	3	TO BE SPECIFIED BY PURCHASER	32	1	29⅝	98	PRICES ON APPLICATION
	28	33½	1¼	30⅝	29¾x30⅝	29⅞	28½	3		36	1	31⅝	105	
	30	35½	1¼	32⅝	31¾x32⅝	31⅞	30½	3		36	1	33⅝	112	
	32	38¼	1¼	35	33⅞x35	33⅞	32⅝	3¼		36	1⅞	36⅞	140	
	34	40¼	1¼	37	35⅞x37	35⅞	34⅝	3¼		40	1⅞	38⅞	149	
	36	42¼	1¼	39	37⅞x39	37⅞	36⅝	3¼		40	1⅞	40⅞	157	
	42	49	1¼	45½	44⅞x45½	43¾	42¾	3½		48	1¼	46¾	209	
	48	55	1¼	51½	50⅞x51½	49¾	48¾	3¾		52	1¼	52¾	241	
	54	61¼	1⅜	57¾	56¼x57¾	56	54⅞	4		64	1¼	59	312	
	60	67¼	1⅝	63¾	62¼x63¾	62	60⅞	4⅜		72	1¼	65	398	
	66	74	1⅞	70⅞	68⅞x70⅞	68	67	4⅞		72	1⅜	71½	556	
72	80	2¼	76⅞	74⅞x76⅞	74	73	5¼	80	1⅞	77½	705			
SLIP-ON	26	33	1¼	30	29⅞x30	28½	28	2¼	TO BE SPECIFIED BY PURCHASER	32	1	31	122	PRICES ON APPLICATION
	28	35	1¼	32	31⅞x32	30½	30	2¼		36	1	33	140	
	30	37	1¼	34	33⅞x34	32½	32	2¼		36	1	35	148	
	32	39½	1¼	36¼	35⅞x36¼	34⅝	34⅞	2½		40	1⅞	37⅞	171	
	34	41½	1¼	38¼	37⅞x38¼	36⅝	36⅞	2½		40	1⅞	39⅞	181	
	36	43½	1¼	40¼	39⅞x40¼	38⅝	38⅞	2½		44	1⅞	41⅞	191	
	42	50	1¼	46½	45⅞x46½	44¾	44¼	2¾		48	1¼	47¾	234	
	48	56	1¼	52½	51⅞x52½	50¾	50¼	2⅞		56	1¼	53¾	269	
	54	62½	1⅜	59	57½x59	57¼	56½	3⅞		68	1¼	60¼	335	
	60	68½	1⅝	65	63½x65	63¼	62½	3⅝		72	1¼	66¼	451	
	66	75½	1¾	71⅝	69⅞x71⅝	69½	68¾	4		72	1⅜	73	591	
72	81½	2	77⅝	75⅞x77⅝	75½	74¾	4½	80	1⅞	79	728			



**Welding Neck Part No. 503**

**Slip-On Part No. 504**

These flanges comply with the A.S.M.E. Code (1949) or A.P.I.-A.S.M.E. Code (1951).

▲ Also furnished to ASTM A181—Grade II and A105—Grades I or II as specified by purchaser. Also available in any alloy or material which can be forged or rolled.

30° bevel is standard, 37½° bevel optional when specified.

When ordering please specify thickness and outside diameter of pipe or shell to which flange is to be welded.

Other facings or joints can be furnished, but designs on this page

are applicable only to indicated facing, gasket, hub and bolting details.

Lap Joint and Blind Flanges can also be supplied for these services, necessitating some variations in thickness and other dimensions because of changed design conditions.

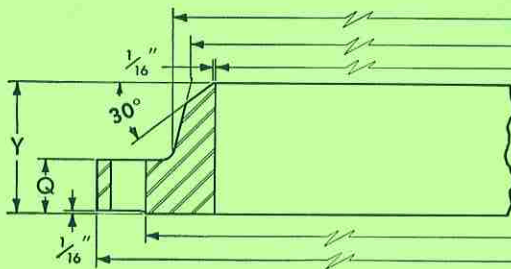
The use of carbon steel bolts is intended.

Larger or intermediate sizes are also available and dimensions may be varied without die expense.

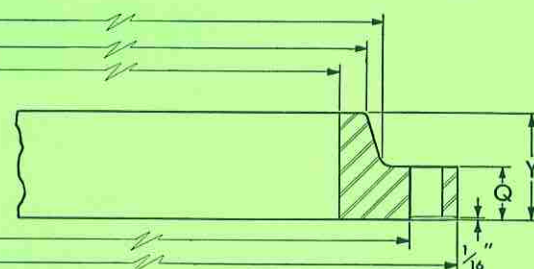
**LARGE DIAMETER FLANGES**  
**150 lb. W.S.P. at 750° F.**

FORGED AND ROLLED STEEL  
 ASTM A105—Grade 1A

TYPE	SIZE	OUTSIDE DIAMETER OF FLANGE O	THICKNESS OF FLANGE Q	OUTSIDE DIAMETER OF RAISED FACE R	COMPRESSED ASBESTOS GASKET SIZE	HUB DIAMETER		LENGTH THROUGH HUB Y	DIAMETER OF BORE J	DRILLING TEMPLATE			APPROX. WEIGHT IN POUNDS	LIST PRICE
						X	H			NUMBER OF HOLES	DIAMETER OF HOLES	BOLT CIRCLE		
WELDING NECK	26	31½	1¾	29	28x29	27⅝	26¾	3⅜	TO BE SPECIFIED BY PURCHASER	28	⅞	29⅞	119	PRICES ON APPLICATION
	28	33½	1¾	31	30x31	29⅝	28¾	3⅜		28	⅞	31⅞	128	
	30	35¾	1¾	33¼	32x33¼	31⅞	31	3⅝		36	⅞	34⅞	152	
	32	37¾	1¾	35¼	34x35¼	33⅞	33	3⅝		36	⅞	36⅞	162	
	34	40¼	1½	37⅜	35⅞x37⅜	35⅞	35	3¾		36	1	38⅜	193	
	36	42¼	1½	39⅜	37⅞x39⅜	37⅞	37	3¾		36	1	40⅜	204	
	38	44¼	1¾	41⅜	39⅞x41⅜	39⅞	39	4⅞		36	1	42⅜	245	
	40	46¼	1¾	43⅜	41⅞x43⅜	41⅞	41	4⅞		40	1	44⅜	257	
	42	49	2	45¾	44x45¾	44⅞	43¼	4½		40	1⅞	46⅞	342	
	44	51	2	47¾	46x47¾	46⅞	45¼	4½		40	1⅞	48⅞	359	
	46	53	2	49¾	48x49¾	48⅞	47¼	4½		40	1⅞	50⅞	375	
	48	55	2¼	51¾	50x51¾	50⅞	49¼	4⅞		44	1⅞	52⅞	430	
	50	57	2¼	53¾	52x53¾	52⅞	51¼	4⅞		44	1⅞	54⅞	448	
	52	59½	2⅝	56	54x56	54¼	53¼	5⅝		44	1¼	57¼	562	
54	61½	2⅝	58	56x58	56¼	55¼	5⅝	44	1¼	59¼	584			
60	67½	2¾	64	62x64	62¼	61¼	5¾	48	1¼	65¼	682			
66	73½	3⅞	70	68x70	68¼	67¼	6⅞	56	1¼	71¼	809			
72	80	3⅞	76½	74x76½	74½	73⅜	6⅝	64	1¼	77¾	1153			
SLIP-ON	26	31½	1¾	29	28x29	27⅝	27⅞	2¾	TO BE SPECIFIED BY PURCHASER	28	⅞	29⅞	115	PRICES ON APPLICATION
	28	33½	1¾	31	30x31	29⅝	29⅞	2¾		28	⅞	31⅞	122	
	30	35¾	1¾	33¼	32x33¼	31⅞	31⅝	2¾		36	⅞	34⅞	138	
	32	37¾	1¾	35¼	34x35¼	33⅞	33⅝	2¾		36	⅞	36⅞	147	
	34	40¼	1¾	37⅜	35⅞x37⅜	35⅞	35⅞ <sub>16</sub>	3⅜		36	1	38⅜	209	
	36	42¼	1¾	39⅜	37⅞x39⅜	37⅞	37⅞ <sub>16</sub>	3⅜		36	1	40⅜	248	
	38	44¼	2	41⅜	39⅞x41⅜	39⅞	39⅞ <sub>16</sub>	3¾		36	1	42⅜	263	
	40	46¼	2	43⅜	41⅞x43⅜	41⅞	41½	4		40	1	44⅜	282	
	42	49	2⅜	45¾	44x45¾	44⅞	43¾	4⅜		40	1⅞	46⅞	377	
	44	51	2⅜	47¾	46x47¾	46⅞	45¾	4⅜		40	1⅞	48⅞	416	
	46	53	2⅜	49¾	48x49¾	48⅞	47¾	4⅝		40	1⅞	50⅞	423	
	48	55	2⅝	51¾	50x51¾	50⅞	49¾	4⅞		44	1⅞	52⅞	485	
	50	57	2⅝	53¾	52x53¾	52⅞	51¾	4⅞		44	1⅞	54⅞	501	
	52	59½	3	56	54x56	54¼	53¼ <sub>16</sub>	5⅝		44	1¼	57¼	629	
54	61½	3	58	56x58	56¼	55¼ <sub>16</sub>	5⅝	44	1¼	59¼	649			
60	67½	3⅞	64	62x64	62¼	61¾	5⅝	48	1¼	65¼	746			
66	73½	4	70	68x70	68½	68	6⅝	56	1¼	71¼	1051			
72	80	5	76½	74x76½	74½	74	8	64	1¼	77¾	1491			



**Welding Neck Part No. 505**



**Slip-On Part No. 506**

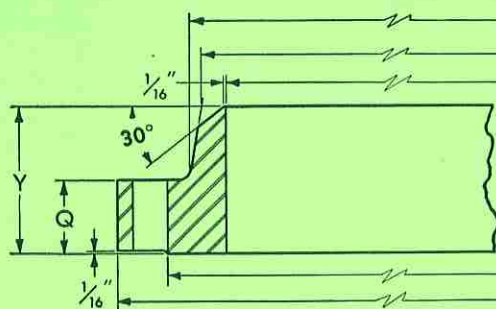
See footnotes on opposite page.

# L A D I S H C O N T R O L L E D Q U A L I T Y

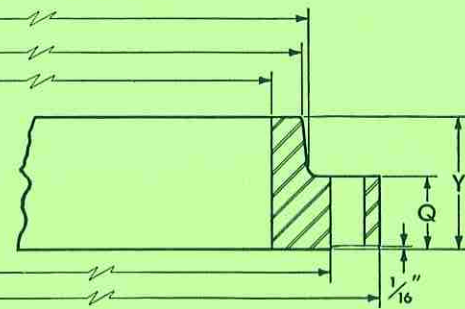
FORGED AND ROLLED STEEL  
ASTM A105—Grade I<sup>▲</sup>

**LARGE DIAMETER FLANGES**  
**300 lb. W.S.P. at 750° F.**

TYPE	SIZE	OUTSIDE DIAMETER OF FLANGE O	THICKNESS OF FLANGE Q	OUTSIDE DIAMETER OF RAISED FACE R	COMPRESSED ASBESTOS GASKET SIZE	HUB DIAMETER		LENGTH THROUGH HUB Y	DIAMETER OF BORE J	DRILLING TEMPLATE			APPROX. WEIGHT IN POUNDS	LIST PRICE
						X	H			NUMBER OF HOLES	DIAMETER OF HOLES	BOLT CIRCLE		
WELDING NECK	26	32 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>	29 <sup>1</sup> / <sub>2</sub>	28 <sup>1</sup> / <sub>2</sub> x29 <sup>1</sup> / <sub>2</sub>	27 <sup>7</sup> / <sub>8</sub>	27	5	TO BE SPECIFIED BY PURCHASER	28	1 <sup>1</sup> / <sub>8</sub>	30 <sup>5</sup> / <sub>8</sub>	244	PRICES ON APPLICATION
	28	34 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>	31 <sup>1</sup> / <sub>2</sub>	30 <sup>1</sup> / <sub>2</sub> x31 <sup>1</sup> / <sub>2</sub>	29 <sup>7</sup> / <sub>8</sub>	29	5		28	1 <sup>1</sup> / <sub>8</sub>	32 <sup>5</sup> / <sub>8</sub>	262	
	30	37	2 <sup>5</sup> / <sub>8</sub>	33 <sup>3</sup> / <sub>4</sub>	32 <sup>1</sup> / <sub>2</sub> x33 <sup>3</sup> / <sub>4</sub>	32 <sup>1</sup> / <sub>8</sub>	31	5 <sup>1</sup> / <sub>4</sub>		32	1 <sup>1</sup> / <sub>8</sub>	34 <sup>7</sup> / <sub>8</sub>	307	
	32	39	2 <sup>3</sup> / <sub>4</sub>	35 <sup>3</sup> / <sub>4</sub>	34 <sup>1</sup> / <sub>2</sub> x35 <sup>3</sup> / <sub>4</sub>	34 <sup>1</sup> / <sub>8</sub>	33	5 <sup>1</sup> / <sub>2</sub>		36	1 <sup>1</sup> / <sub>8</sub>	36 <sup>7</sup> / <sub>8</sub>	338	
	34	41	2 <sup>7</sup> / <sub>8</sub>	37 <sup>3</sup> / <sub>4</sub>	36 <sup>1</sup> / <sub>2</sub> x37 <sup>3</sup> / <sub>4</sub>	36 <sup>1</sup> / <sub>8</sub>	35	5 <sup>3</sup> / <sub>4</sub>		40	1 <sup>1</sup> / <sub>8</sub>	38 <sup>7</sup> / <sub>8</sub>	373	
	36	43 <sup>3</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>8</sub>	40 <sup>1</sup> / <sub>4</sub>	38 <sup>3</sup> / <sub>4</sub> x40 <sup>1</sup> / <sub>4</sub>	38 <sup>1</sup> / <sub>2</sub>	37 <sup>1</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>8</sub>		40	1 <sup>1</sup> / <sub>4</sub>	41 <sup>1</sup> / <sub>2</sub>	479	
	38	45 <sup>3</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>8</sub>	42 <sup>1</sup> / <sub>4</sub>	40 <sup>3</sup> / <sub>4</sub> x42 <sup>1</sup> / <sub>4</sub>	40 <sup>1</sup> / <sub>2</sub>	39 <sup>1</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>8</sub>		40	1 <sup>1</sup> / <sub>4</sub>	43 <sup>1</sup> / <sub>2</sub>	506	
	40	47 <sup>3</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>4</sub>	44 <sup>1</sup> / <sub>4</sub>	42 <sup>1</sup> / <sub>2</sub> x44 <sup>1</sup> / <sub>4</sub>	42 <sup>1</sup> / <sub>2</sub>	41 <sup>1</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>4</sub>		44	1 <sup>1</sup> / <sub>4</sub>	45 <sup>1</sup> / <sub>2</sub>	545	
	42	50	3 <sup>1</sup> / <sub>2</sub>	46 <sup>1</sup> / <sub>2</sub>	44 <sup>1</sup> / <sub>2</sub> x46 <sup>1</sup> / <sub>2</sub>	44 <sup>3</sup> / <sub>4</sub>	43 <sup>1</sup> / <sub>2</sub>	6 <sup>1</sup> / <sub>2</sub>		48	1 <sup>1</sup> / <sub>4</sub>	47 <sup>3</sup> / <sub>4</sub>	637	
	44	52 <sup>3</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>4</sub>	48 <sup>7</sup> / <sub>8</sub>	46 <sup>7</sup> / <sub>8</sub> x48 <sup>7</sup> / <sub>8</sub>	46 <sup>3</sup> / <sub>4</sub>	45 <sup>1</sup> / <sub>2</sub>	6 <sup>3</sup> / <sub>4</sub>		44	1 <sup>3</sup> / <sub>8</sub>	50 <sup>1</sup> / <sub>4</sub>	764	
46	54 <sup>3</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>4</sub>	50 <sup>7</sup> / <sub>8</sub>	48 <sup>7</sup> / <sub>8</sub> x50 <sup>7</sup> / <sub>8</sub>	48 <sup>3</sup> / <sub>4</sub>	47 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>4</sub>	48	1 <sup>3</sup> / <sub>8</sub>	52 <sup>1</sup> / <sub>4</sub>	884			
48	56 <sup>3</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>4</sub>	52 <sup>7</sup> / <sub>8</sub>	50 <sup>7</sup> / <sub>8</sub> x52 <sup>7</sup> / <sub>8</sub>	50 <sup>3</sup> / <sub>4</sub>	49 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>4</sub>	48	1 <sup>3</sup> / <sub>8</sub>	54 <sup>1</sup> / <sub>4</sub>	920			
SLIP-ON	26	32 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>	29 <sup>1</sup> / <sub>2</sub>	28 <sup>1</sup> / <sub>2</sub> x29 <sup>1</sup> / <sub>2</sub>	27 <sup>7</sup> / <sub>8</sub>	27 <sup>1</sup> / <sub>2</sub>	4 <sup>1</sup> / <sub>2</sub>	TO BE SPECIFIED BY PURCHASER	28	1 <sup>1</sup> / <sub>8</sub>	30 <sup>5</sup> / <sub>8</sub>	238	PRICES ON APPLICATION
	28	34 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>	31 <sup>1</sup> / <sub>2</sub>	30 <sup>1</sup> / <sub>2</sub> x31 <sup>1</sup> / <sub>2</sub>	29 <sup>7</sup> / <sub>8</sub>	29 <sup>1</sup> / <sub>2</sub>	4 <sup>1</sup> / <sub>2</sub>		28	1 <sup>1</sup> / <sub>8</sub>	32 <sup>5</sup> / <sub>8</sub>	258	
	30	37	2 <sup>5</sup> / <sub>8</sub>	33 <sup>3</sup> / <sub>4</sub>	32 <sup>1</sup> / <sub>2</sub> x33 <sup>3</sup> / <sub>4</sub>	32 <sup>1</sup> / <sub>8</sub>	31 <sup>3</sup> / <sub>4</sub>	4 <sup>3</sup> / <sub>4</sub>		32	1 <sup>1</sup> / <sub>8</sub>	34 <sup>7</sup> / <sub>8</sub>	303	
	32	39	2 <sup>3</sup> / <sub>4</sub>	35 <sup>3</sup> / <sub>4</sub>	34 <sup>1</sup> / <sub>2</sub> x35 <sup>3</sup> / <sub>4</sub>	34 <sup>1</sup> / <sub>8</sub>	33 <sup>3</sup> / <sub>4</sub>	5		36	1 <sup>1</sup> / <sub>8</sub>	36 <sup>7</sup> / <sub>8</sub>	336	
	34	41	2 <sup>7</sup> / <sub>8</sub>	37 <sup>3</sup> / <sub>4</sub>	36 <sup>1</sup> / <sub>2</sub> x37 <sup>3</sup> / <sub>4</sub>	36 <sup>1</sup> / <sub>8</sub>	35 <sup>3</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>8</sub>		40	1 <sup>1</sup> / <sub>8</sub>	38 <sup>7</sup> / <sub>8</sub>	364	
	36	43 <sup>3</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>8</sub>	40 <sup>1</sup> / <sub>4</sub>	38 <sup>3</sup> / <sub>4</sub> x40 <sup>1</sup> / <sub>4</sub>	38 <sup>1</sup> / <sub>2</sub>	38 <sup>1</sup> / <sub>16</sub>	5 <sup>5</sup> / <sub>8</sub>		40	1 <sup>1</sup> / <sub>4</sub>	41 <sup>1</sup> / <sub>2</sub>	472	
	38	45 <sup>3</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>8</sub>	42 <sup>1</sup> / <sub>4</sub>	40 <sup>3</sup> / <sub>4</sub> x42 <sup>1</sup> / <sub>4</sub>	40 <sup>1</sup> / <sub>2</sub>	40 <sup>1</sup> / <sub>16</sub>	5 <sup>5</sup> / <sub>8</sub>		40	1 <sup>1</sup> / <sub>4</sub>	43 <sup>1</sup> / <sub>2</sub>	501	
	40	47 <sup>3</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>4</sub>	44 <sup>1</sup> / <sub>4</sub>	42 <sup>1</sup> / <sub>2</sub> x44 <sup>1</sup> / <sub>4</sub>	42 <sup>1</sup> / <sub>2</sub>	42 <sup>1</sup> / <sub>16</sub>	5 <sup>7</sup> / <sub>8</sub>		44	1 <sup>1</sup> / <sub>4</sub>	45 <sup>1</sup> / <sub>2</sub>	544	
	42	50	3 <sup>1</sup> / <sub>2</sub>	46 <sup>1</sup> / <sub>2</sub>	44 <sup>1</sup> / <sub>2</sub> x46 <sup>1</sup> / <sub>2</sub>	44 <sup>3</sup> / <sub>4</sub>	44 <sup>5</sup> / <sub>16</sub>	6 <sup>1</sup> / <sub>8</sub>		48	1 <sup>1</sup> / <sub>4</sub>	47 <sup>3</sup> / <sub>4</sub>	638	
	44	52 <sup>3</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>4</sub>	48 <sup>7</sup> / <sub>8</sub>	46 <sup>7</sup> / <sub>8</sub> x48 <sup>7</sup> / <sub>8</sub>	46 <sup>3</sup> / <sub>4</sub>	46 <sup>1</sup> / <sub>4</sub>	6 <sup>3</sup> / <sub>4</sub>		44	1 <sup>3</sup> / <sub>8</sub>	50 <sup>1</sup> / <sub>4</sub>	782	
46	54 <sup>3</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>4</sub>	50 <sup>7</sup> / <sub>8</sub>	48 <sup>7</sup> / <sub>8</sub> x50 <sup>7</sup> / <sub>8</sub>	48 <sup>3</sup> / <sub>4</sub>	48 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>4</sub>	48	1 <sup>3</sup> / <sub>8</sub>	52 <sup>1</sup> / <sub>4</sub>	899			
48	56 <sup>3</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>4</sub>	52 <sup>7</sup> / <sub>8</sub>	50 <sup>7</sup> / <sub>8</sub> x52 <sup>7</sup> / <sub>8</sub>	50 <sup>3</sup> / <sub>4</sub>	50 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>4</sub>	48	1 <sup>3</sup> / <sub>8</sub>	54 <sup>1</sup> / <sub>4</sub>	944			



**Welding Neck Part No. 508**



**Slip-On Part No. 509**

These flanges comply with the A.S.M.E. Code (1949) or A.P.I.-A.S.M.E. Code (1951).

▲ Also furnished to ASTM A105—Grade II and A181—Grades I or II as specified by purchaser. Also available in any alloy or material which can be forged or rolled.

30° bevel is standard, 37<sup>1</sup>/<sub>2</sub>° bevel optional when specified.

When ordering please specify thickness and outside diameter of

pipe or shell to which flange is to be welded.

Other facings or joints can be furnished, but designs on this page are applicable only to indicated facing, gasket, hub and bolting details. Lap Joint and Blind Flanges can also be supplied for these services.

The use of alloy steel bolts is intended.

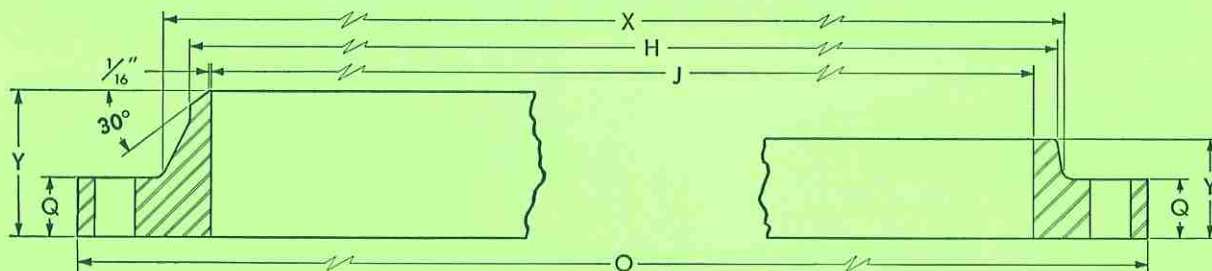
Larger or intermediate sizes are also available and dimensions may be varied without die expense.



**LARGE DIAMETER FLANGES**  
**125 lb. American Standard\***

FORGED AND ROLLED STEEL  
 ASTM A181—Grade 1<sup>▲</sup>

TYPE	SIZE	OUTSIDE DIAMETER OF FLANGE O	THICKNESS OF FLANGE Q	HUB DIAMETER		LENGTH THROUGH HUB Y	DIAMETER OF BORE J	DRILLING TEMPLATE			APPROX. WEIGHT IN POUNDS	LIST PRICE
				X	H			NUMBER OF HOLES	DIAMETER OF HOLES	BOLT CIRCLE		
WELDING NECK	26	34 <sup>1</sup> / <sub>4</sub>	2	28 <sup>1</sup> / <sub>2</sub>	26 <sup>3</sup> / <sub>4</sub>	5	TO BE SPECIFIED BY PURCHASER	24	1 <sup>3</sup> / <sub>8</sub>	31 <sup>3</sup> / <sub>4</sub>	260	PRICES ON APPLICATION
	28	36 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>4</sub>	28 <sup>3</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>16</sub>		28	1 <sup>3</sup> / <sub>8</sub>	34	296	
	30	38 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>8</sub>	32 <sup>3</sup> / <sub>4</sub>	31	5 <sup>1</sup> / <sub>8</sub>		28	1 <sup>3</sup> / <sub>8</sub>	36	338	
	32	41 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>4</sub>	35	33	5 <sup>1</sup> / <sub>4</sub>		28	1 <sup>5</sup> / <sub>8</sub>	38 <sup>1</sup> / <sub>2</sub>	412	
	34	43 <sup>3</sup> / <sub>4</sub>	2 <sup>5</sup> / <sub>16</sub>	37	35	5 <sup>5</sup> / <sub>16</sub>		32	1 <sup>5</sup> / <sub>8</sub>	40 <sup>1</sup> / <sub>2</sub>	440	
	36	46	2 <sup>3</sup> / <sub>8</sub>	39 <sup>1</sup> / <sub>4</sub>	37	5 <sup>3</sup> / <sub>8</sub>		32	1 <sup>5</sup> / <sub>8</sub>	42 <sup>3</sup> / <sub>4</sub>	495	
	38	48 <sup>3</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>8</sub>	41 <sup>3</sup> / <sub>4</sub>	39	5 <sup>3</sup> / <sub>8</sub>		32	1 <sup>5</sup> / <sub>8</sub>	45 <sup>1</sup> / <sub>4</sub>	573	
	40	50 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>	43 <sup>3</sup> / <sub>4</sub>	41	5 <sup>1</sup> / <sub>2</sub>		36	1 <sup>5</sup> / <sub>8</sub>	47 <sup>1</sup> / <sub>4</sub>	620	
	42	53	2 <sup>5</sup> / <sub>8</sub>	46	43 <sup>1</sup> / <sub>4</sub>	5 <sup>5</sup> / <sub>8</sub>		36	1 <sup>5</sup> / <sub>8</sub>	49 <sup>1</sup> / <sub>2</sub>	707	
	44	55 <sup>1</sup> / <sub>4</sub>	2 <sup>5</sup> / <sub>8</sub>	48	45 <sup>1</sup> / <sub>4</sub>	5 <sup>5</sup> / <sub>8</sub>		40	1 <sup>5</sup> / <sub>8</sub>	51 <sup>3</sup> / <sub>4</sub>	752	
	46	57 <sup>1</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>16</sub>	50	47 <sup>1</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>16</sub>		40	1 <sup>5</sup> / <sub>8</sub>	53 <sup>3</sup> / <sub>4</sub>	799	
	48	59 <sup>1</sup> / <sub>2</sub>	2 <sup>3</sup> / <sub>4</sub>	52 <sup>1</sup> / <sub>4</sub>	49 <sup>1</sup> / <sub>4</sub>	5 <sup>3</sup> / <sub>4</sub>		44	1 <sup>5</sup> / <sub>8</sub>	56	868	
	50	61 <sup>3</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	54 <sup>1</sup> / <sub>4</sub>	51 <sup>1</sup> / <sub>4</sub>	5 <sup>3</sup> / <sub>4</sub>		44	1 <sup>7</sup> / <sub>8</sub>	58 <sup>1</sup> / <sub>4</sub>	900	
	52	64	2 <sup>7</sup> / <sub>8</sub>	56 <sup>1</sup> / <sub>2</sub>	53 <sup>1</sup> / <sub>4</sub>	5 <sup>7</sup> / <sub>8</sub>		44	1 <sup>7</sup> / <sub>8</sub>	60 <sup>1</sup> / <sub>2</sub>	998	
	54	66 <sup>1</sup> / <sub>4</sub>	3	58 <sup>3</sup> / <sub>4</sub>	55 <sup>1</sup> / <sub>4</sub>	6		44	1 <sup>7</sup> / <sub>8</sub>	62 <sup>3</sup> / <sub>4</sub>	1104	
60	73	3 <sup>1</sup> / <sub>8</sub>	65 <sup>1</sup> / <sub>4</sub>	61 <sup>1</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>8</sub>	52	1 <sup>7</sup> / <sub>8</sub>	69 <sup>1</sup> / <sub>4</sub>	1346			
SLIP-ON	26	34 <sup>1</sup> / <sub>4</sub>	2	28 <sup>1</sup> / <sub>2</sub>	...	3 <sup>3</sup> / <sub>8</sub>	TO BE SPECIFIED BY PURCHASER	24	1 <sup>3</sup> / <sub>8</sub>	31 <sup>3</sup> / <sub>4</sub>	236	PRICES ON APPLICATION
	28	36 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>4</sub>	...	3 <sup>7</sup> / <sub>16</sub>		28	1 <sup>3</sup> / <sub>8</sub>	34	269	
	30	38 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>8</sub>	32 <sup>3</sup> / <sub>4</sub>	...	3 <sup>1</sup> / <sub>2</sub>		28	1 <sup>3</sup> / <sub>8</sub>	36	304	
	32	41 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>4</sub>	35	...	3 <sup>5</sup> / <sub>8</sub>		28	1 <sup>5</sup> / <sub>8</sub>	38 <sup>1</sup> / <sub>2</sub>	375	
	34	43 <sup>3</sup> / <sub>4</sub>	2 <sup>5</sup> / <sub>16</sub>	37	...	3 <sup>1</sup> / <sub>16</sub>		32	1 <sup>5</sup> / <sub>8</sub>	40 <sup>1</sup> / <sub>2</sub>	400	
	36	46	2 <sup>3</sup> / <sub>8</sub>	39 <sup>1</sup> / <sub>4</sub>	...	3 <sup>3</sup> / <sub>4</sub>		32	1 <sup>5</sup> / <sub>8</sub>	42 <sup>3</sup> / <sub>4</sub>	452	
	38	48 <sup>3</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>8</sub>	41 <sup>3</sup> / <sub>4</sub>	...	3 <sup>3</sup> / <sub>4</sub>		32	1 <sup>5</sup> / <sub>8</sub>	45 <sup>1</sup> / <sub>4</sub>	527	
	40	50 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>	43 <sup>3</sup> / <sub>4</sub>	...	3 <sup>7</sup> / <sub>8</sub>		36	1 <sup>5</sup> / <sub>8</sub>	47 <sup>1</sup> / <sub>4</sub>	573	
	42	53	2 <sup>5</sup> / <sub>8</sub>	46	...	4		36	1 <sup>5</sup> / <sub>8</sub>	49 <sup>1</sup> / <sub>2</sub>	648	
	44	55 <sup>1</sup> / <sub>4</sub>	2 <sup>5</sup> / <sub>8</sub>	48	...	4		40	1 <sup>5</sup> / <sub>8</sub>	51 <sup>3</sup> / <sub>4</sub>	694	
	46	57 <sup>1</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>16</sub>	50	...	4 <sup>1</sup> / <sub>16</sub>		40	1 <sup>5</sup> / <sub>8</sub>	53 <sup>3</sup> / <sub>4</sub>	733	
	48	59 <sup>1</sup> / <sub>2</sub>	2 <sup>3</sup> / <sub>4</sub>	52 <sup>1</sup> / <sub>4</sub>	...	4 <sup>1</sup> / <sub>8</sub>		44	1 <sup>5</sup> / <sub>8</sub>	56	799	
	50	61 <sup>3</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	54 <sup>1</sup> / <sub>4</sub>	...	4 <sup>1</sup> / <sub>8</sub>		44	1 <sup>7</sup> / <sub>8</sub>	58 <sup>1</sup> / <sub>4</sub>	828	
	52	64	2 <sup>7</sup> / <sub>8</sub>	56 <sup>1</sup> / <sub>2</sub>	...	4 <sup>1</sup> / <sub>4</sub>		44	1 <sup>7</sup> / <sub>8</sub>	60 <sup>1</sup> / <sub>2</sub>	923	
	54	66 <sup>1</sup> / <sub>4</sub>	3	58 <sup>3</sup> / <sub>4</sub>	...	4 <sup>3</sup> / <sub>8</sub>		44	1 <sup>7</sup> / <sub>8</sub>	62 <sup>3</sup> / <sub>4</sub>	1024	
	60	73	3 <sup>1</sup> / <sub>8</sub>	65 <sup>1</sup> / <sub>4</sub>	...	4 <sup>1</sup> / <sub>2</sub>		52	1 <sup>7</sup> / <sub>8</sub>	69 <sup>1</sup> / <sub>4</sub>	1254	
	66	80	3 <sup>3</sup> / <sub>8</sub>	71 <sup>1</sup> / <sub>2</sub>	...	4 <sup>7</sup> / <sub>8</sub>		52	1 <sup>7</sup> / <sub>8</sub>	76	1623	
	72	86 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	78 <sup>1</sup> / <sub>2</sub>	...	5		60	1 <sup>7</sup> / <sub>8</sub>	82 <sup>1</sup> / <sub>2</sub>	1922	
84	99 <sup>3</sup> / <sub>4</sub>	3 <sup>7</sup> / <sub>8</sub>	90 <sup>1</sup> / <sub>2</sub>	...	5 <sup>3</sup> / <sub>8</sub>	64	2 <sup>1</sup> / <sub>8</sub>	95 <sup>1</sup> / <sub>2</sub>	2588			
96	113 <sup>1</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>4</sub>	102 <sup>3</sup> / <sub>4</sub>	...	5 <sup>3</sup> / <sub>4</sub>	68	2 <sup>3</sup> / <sub>8</sub>	108 <sup>1</sup> / <sub>2</sub>	3284			



**Welding Neck Part No. 511A**

**Slip-On Part No. 512A**

\* Flanges have same pressure ratings, general dimensions and drillings of 125 lb. American Standard Cast Iron Flanges.

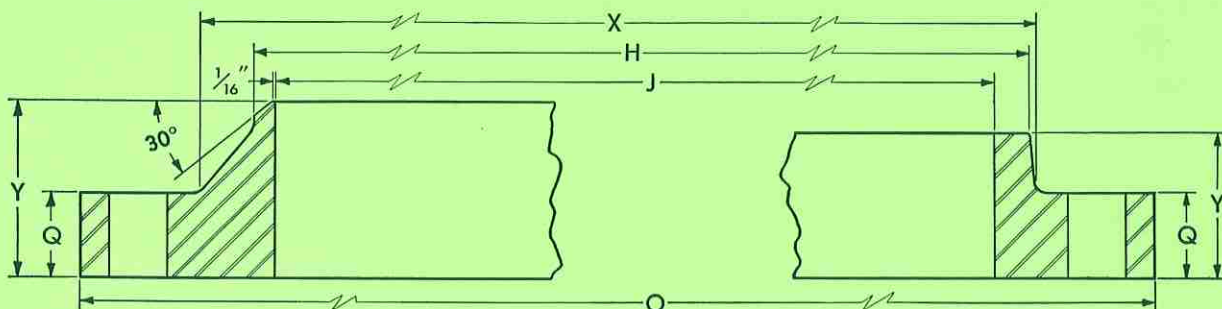
▲ See other footnotes on opposite page, except note identified by (\*) asterisk.

# L A D I S H C O N T R O L L E D Q U A L I T Y

FORGED AND ROLLED STEEL  
ASTM A181—Grade I<sup>▲</sup>

**LARGE DIAMETER FLANGES**  
**250 lb. American Standard\***

TYPE	SIZE	OUTSIDE DIAMETER OF FLANGE O	THICKNESS OF FLANGE Q	HUB DIAMETER		LENGTH THROUGH HUB Y	DIAMETER OF BORE J	DRILLING TEMPLATE			APPROX. WEIGHT IN POUNDS	LIST PRICE
				X	H			NUMBER OF HOLES	DIAMETER OF HOLES	BOLT CIRCLE		
WELDING NECK	26	38 <sup>1</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>16</sub>	30 <sup>1</sup> / <sub>2</sub>	27	5 <sup>1</sup> / <sub>16</sub>	TO BE SPECIFIED BY PURCHASER	28	1 <sup>7</sup> / <sub>8</sub>	34 <sup>1</sup> / <sub>2</sub>	534	PRICES ON APPLICATION
	28	40 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>16</sub>	33	29	5 <sup>5</sup> / <sub>16</sub>		28	1 <sup>7</sup> / <sub>8</sub>	37	629	
	30	43	3	35 <sup>1</sup> / <sub>4</sub>	31	6		28	1 <sup>7</sup> / <sub>8</sub>	39 <sup>1</sup> / <sub>4</sub>	702	
	32	45 <sup>1</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>8</sub>	37 <sup>1</sup> / <sub>2</sub>	33	6 <sup>1</sup> / <sub>8</sub>		28	1 <sup>7</sup> / <sub>8</sub>	41 <sup>1</sup> / <sub>2</sub>	793	
	34	47 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>4</sub>	39 <sup>1</sup> / <sub>2</sub>	35	6 <sup>1</sup> / <sub>4</sub>		28	1 <sup>7</sup> / <sub>8</sub>	43 <sup>1</sup> / <sub>2</sub>	882	
	36	50	3 <sup>3</sup> / <sub>8</sub>	41 <sup>1</sup> / <sub>2</sub>	37 <sup>1</sup> / <sub>4</sub>	6 <sup>3</sup> / <sub>8</sub>		32	2 <sup>1</sup> / <sub>8</sub>	46	969	
	38	52 <sup>1</sup> / <sub>4</sub>	3 <sup>7</sup> / <sub>16</sub>	43 <sup>1</sup> / <sub>2</sub>	39 <sup>1</sup> / <sub>4</sub>	6 <sup>7</sup> / <sub>16</sub>		32	2 <sup>1</sup> / <sub>8</sub>	48	1057	
	40	54 <sup>1</sup> / <sub>2</sub>	3 <sup>9</sup> / <sub>16</sub>	45 <sup>3</sup> / <sub>4</sub>	41 <sup>1</sup> / <sub>4</sub>	6 <sup>9</sup> / <sub>16</sub>		36	2 <sup>1</sup> / <sub>8</sub>	50 <sup>1</sup> / <sub>4</sub>	1158	
	42	57	3 <sup>1</sup> / <sub>16</sub>	47 <sup>3</sup> / <sub>4</sub>	43 <sup>1</sup> / <sub>2</sub>	6 <sup>5</sup> / <sub>16</sub>		36	2 <sup>1</sup> / <sub>8</sub>	52 <sup>3</sup> / <sub>4</sub>	1318	
	44	59 <sup>1</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>4</sub>	49 <sup>3</sup> / <sub>4</sub>	45 <sup>1</sup> / <sub>2</sub>	7		36	2 <sup>1</sup> / <sub>8</sub>	55	1423	
	46	61 <sup>1</sup> / <sub>2</sub>	3 <sup>7</sup> / <sub>8</sub>	51 <sup>3</sup> / <sub>4</sub>	47 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>8</sub>		40	2 <sup>1</sup> / <sub>8</sub>	57 <sup>1</sup> / <sub>4</sub>	1536	
48	65	4	54	49 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>4</sub>	40	2 <sup>1</sup> / <sub>8</sub>	60 <sup>3</sup> / <sub>4</sub>	1824			
SLIP-ON	26	38 <sup>1</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>16</sub>	30 <sup>1</sup> / <sub>2</sub>	...	4 <sup>3</sup> / <sub>4</sub>	TO BE SPECIFIED BY PURCHASER	28	1 <sup>7</sup> / <sub>8</sub>	34 <sup>1</sup> / <sub>2</sub>	531	PRICES ON APPLICATION
	28	40 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>16</sub>	33	...	5		28	1 <sup>7</sup> / <sub>8</sub>	37	637	
	30	43	3	35 <sup>1</sup> / <sub>4</sub>	...	5		28	1 <sup>7</sup> / <sub>8</sub>	39 <sup>1</sup> / <sub>4</sub>	707	
	32	45 <sup>1</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>8</sub>	37 <sup>1</sup> / <sub>2</sub>	...	5 <sup>1</sup> / <sub>8</sub>		28	1 <sup>7</sup> / <sub>8</sub>	41 <sup>1</sup> / <sub>2</sub>	801	
	34	47 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>4</sub>	39 <sup>1</sup> / <sub>2</sub>	...	5 <sup>1</sup> / <sub>4</sub>		28	1 <sup>7</sup> / <sub>8</sub>	43 <sup>1</sup> / <sub>2</sub>	889	
	36	50	3 <sup>3</sup> / <sub>8</sub>	41 <sup>1</sup> / <sub>2</sub>	...	5 <sup>3</sup> / <sub>8</sub>		32	2 <sup>1</sup> / <sub>8</sub>	46	970	
	38	52 <sup>1</sup> / <sub>4</sub>	3 <sup>7</sup> / <sub>16</sub>	43 <sup>1</sup> / <sub>2</sub>	...	5 <sup>1</sup> / <sub>2</sub>		32	2 <sup>1</sup> / <sub>8</sub>	48	1062	
	40	54 <sup>1</sup> / <sub>2</sub>	3 <sup>9</sup> / <sub>16</sub>	45 <sup>3</sup> / <sub>4</sub>	...	5 <sup>1</sup> / <sub>2</sub>		36	2 <sup>1</sup> / <sub>8</sub>	50 <sup>1</sup> / <sub>4</sub>	1172	
	42	57	3 <sup>1</sup> / <sub>16</sub>	47 <sup>3</sup> / <sub>4</sub>	...	5 <sup>5</sup> / <sub>8</sub>		36	2 <sup>1</sup> / <sub>8</sub>	52 <sup>3</sup> / <sub>4</sub>	1288	
	44	59 <sup>1</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>4</sub>	49 <sup>3</sup> / <sub>4</sub>	...	5 <sup>3</sup> / <sub>4</sub>		36	2 <sup>1</sup> / <sub>8</sub>	55	1397	
	46	61 <sup>1</sup> / <sub>2</sub>	3 <sup>7</sup> / <sub>8</sub>	51 <sup>3</sup> / <sub>4</sub>	...	5 <sup>7</sup> / <sub>8</sub>		40	2 <sup>1</sup> / <sub>8</sub>	57 <sup>1</sup> / <sub>4</sub>	1510	
48	65	4	54	...	6	40	2 <sup>1</sup> / <sub>8</sub>	60 <sup>3</sup> / <sub>4</sub>	1797			



**Welding Neck Part No. 513A**

**Slip-On Part No. 514A**

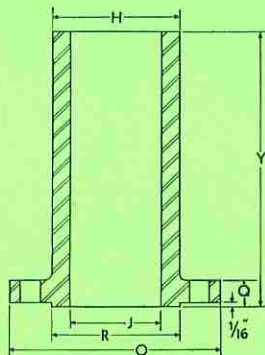
▲ Also furnished to ASTM A181—Grade II and A105—Grades I or II as specified by purchaser. Also available in any alloy or material which can be forged or rolled.  
30° bevel is standard, 37<sup>1</sup>/<sub>2</sub>° bevel optional when specified.  
When ordering please specify thickness and outside diameter of pipe or shell to which flange is to be welded.  
Other facings or joints can be furnished.

\* Flanges have same pressure ratings, general dimensions and drillings of 250 lb. American Standard Cast Iron Flanges.  
The use of carbon steel bolts is intended.  
Lap Joint and Blind Flanges can also be supplied for these services.  
Larger or intermediate sizes are also available and dimensions may be varied without die expense.

**150 lb. SEAMLESS LONG WELDING NECKS**

AMERICAN STANDARD  
FORGED STEEL ASTM A181

NOMINAL SIZE AND BORE J	OUTSIDE DIAMETER O	MINIMUM FLANGE THICKNESS Q	DIAM. OF RAISED FACE R	NOMINAL WALL THICKNESS	DIAM. OF HUB H♦	LENGTH THROUGH HUB Y	DRILLING TEMPLATE				APPROX. WEIGHT IN POUNDS	LIST PRICE
							NUMBER OF HOLES	DIAM. OF HOLES	DIAM. OF BOLTS	DIAM. BOLT CIRCLE		
1	4¼	9/16	2	½	2	9	4	5/8	½	3⅞	8	PRICES ON APPLI- CATION
1¼	45/8	5/8	2½	9/16	23/8	9	4	5/8	½	3½	10	
1½	5	11/16	27/8	9/16	25/8	9	4	5/8	½	37/8	12	
2	6	¾	35/8	5/8	3¼	9	4	¾	5/8	4¾	16	
2½	7	7/8	41/8	5/8	3¾	9	4	¾	5/8	5½	21	
3	7½	15/16	5	5/8	4¼	9	4	¾	5/8	6	24	
3½	8½	15/16	5½	11/16	47/8	9	8	¾	5/8	7	31	
4	9	15/16	63/16	¾	5½	12	8	¾	5/8	7½	47	
5	10	15/16	75/16	¾	6½	12	8	7/8	¾	8½	57	
6	11	1	8½	7/8	7¾	12	8	7/8	¾	9½	77	
8	13½	11/8	105/8	7/8	9¾	12	8	7/8	¾	11¾	103	
10	16	13/16	12¾	1	12	12	12	1	7/8	14¼	150	
12	19	1¼	15	13/16	143/8	12	12	1	7/8	17	215	
14	21	13/8	16¼	1	16	12	12	11/8	1	18¾	221	
16	23½	17/16	18½	1	18	12	16	11/8	1	21¼	254	
18	25	19/16	21	1	20	12	16	1¼	11/8	22¾	278	
20	27½	111/16	23	1	22	12	20	1¼	11/8	25	324	
24	32	17/8	27¼	11/8	26¼	12	20	13/8	1¼	29½	439	



**150 lb. SEAMLESS LONG WELDING NECKS**

*Part No. 15L*

All dimensions given in inches. Necks are furnished bored, faced, and spot faced or back faced. Standard Flange Facings—pages 160-161. Unless otherwise specified, 150-lb. Seamless Long Welding Necks will be furnished drilled and with a 1/16" raised face which is included in Thickness "Q" and Length "Y." They can also be furnished undrilled and of sufficient thickness to take refacing.

♦ Seamless Long Welding Necks with a nominal size of 12" and smaller have a corrosion allowance equal to the wall thickness of Standard Iron Pipe of corresponding size. For larger sizes the allowance should be provided by specifying a smaller bore.

Sizes 12" and larger are available in lengths up to 20" on special order. Ring Type Joint details—pages 162-164. Dimensional Tolerances—page 240. Pressure-Temperature Ratings—pages 263-268.

Ladish Seamless Long Welding Necks conform in every particular to the requirements of the latest API-ASME Code.

For information on stainless steel, alloy steel and non-ferrous metal long necks, refer to pages 225-236. Material Specifications—page 243.

AMERICAN STANDARD  
FORGED STEEL ASTM A181

**300 lb. SEAMLESS LONG WELDING NECKS**

NOMINAL SIZE AND BORE J	OUTSIDE DIAMETER O	MINIMUM FLANGE THICKNESS Q	DIAM. OF RAISED FACE R	NOMINAL WALL THICKNESS	DIAM. OF HUB H+	LENGTH THROUGH HUB Y	DRILLING TEMPLATE				APPROX. WEIGHT IN POUNDS	LIST PRICE
							NUMBER OF HOLES	DIAM. OF HOLES	DIAM. OF BOLTS	DIAM. BOLT CIRCLE		
1	4 7/8	1 1/16	2	9/16	2 1/8	9	4	3/4	5/8	3 1/2	10	PRICES ON APPLI- CATION
1 1/4	5 1/4	3/4	2 1/2	5/8	2 1/2	9	4	3/4	5/8	3 7/8	14	
1 1/2	6 1/8	1 3/16	2 7/8	5/8	2 3/4	9	4	7/8	3/4	4 1/2	17	
2	6 1/2	7/8	3 5/8	5/8	3 1/4	9	8	3/4	5/8	5	19	
2 1/2	7 1/2	1	4 1/8	23/32	3 15/16	9	8	7/8	3/4	5 7/8	28	
3	8 1/4	1 1/8	5	13/16	4 5/8	9	8	7/8	3/4	6 5/8	36	
3 1/2	9	1 3/16	5 1/2	7/8	5 1/4	9	8	7/8	3/4	7 1/4	45	
4	10	1 1/4	6 3/16	7/8	5 3/4	12	8	7/8	3/4	7 7/8	54	
5	11	1 3/8	7 5/16	1	7	12	8	7/8	3/4	9 1/4	86	
6	12 1/2	1 7/16	8 1/2	1 1/16	8 1/8	12	12	7/8	3/4	10 5/8	108	
8	15	1 5/8	10 5/8	1 1/8	10 1/4	12	12	1	7/8	13	150	
10	17 1/2	1 7/8	12 3/4	1 5/16	12 5/8	12	16	1 1/8	1	15 1/4	218	
12	20 1/2	2	15	1 3/8	14 3/4	12	16	1 1/4	1 1/8	17 3/4	289	
14	23	2 1/8	16 1/4	1 3/8	16 3/4	12	20	1 1/4	1 1/8	20 1/4	342	
16	25 1/2	2 1/4	18 1/2	1 1/2	19	12	20	1 3/8	1 1/4	22 1/2	426	
18	28	2 3/8	21	1 1/2	21	12	24	1 3/8	1 1/4	24 3/4	493	
20	30 1/2	2 1/2	23	1 9/16	23 1/8	12	24	1 3/8	1 1/4	27	575	
24	36	2 3/4	27 1/4	1 13/16	27 5/8	12	24	1 5/8	1 1/2	32	823	

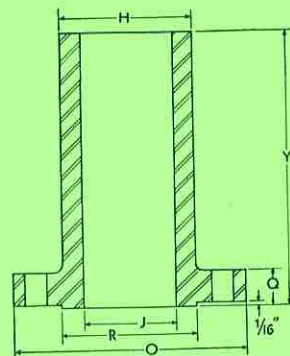
All dimensions given in inches. Necks are furnished bored, faced, and spot faced or back faced. Standard Flange Facings—pages 160-161. Unless otherwise specified, 300-lb. Seamless Long Welding Necks will be furnished drilled and with a 1/16" raised face which is included in Thickness "Q" and Length "Y." They can also be furnished undrilled and of sufficient thickness to take refacing.

♦ Seamless Long Welding Necks with a nominal size of 12" and smaller have a corrosion allowance equal to the wall thickness of Standard Iron Pipe of corresponding size. For larger sizes the allowance should be provided by specifying a smaller bore.

Sizes 12" and larger are available in lengths up to 20" on special order. Ring Type Joint details—pages 162-164. Dimensional Tolerances—page 240. Pressure-Temperature Ratings—pages 263-268.

Ladish Seamless Long Welding Necks conform in every particular to the requirements of the latest API-ASME Code.

For information on stainless steel, alloy steel and non-ferrous metal long necks, refer to pages 225-236. Material Specifications—page 243.

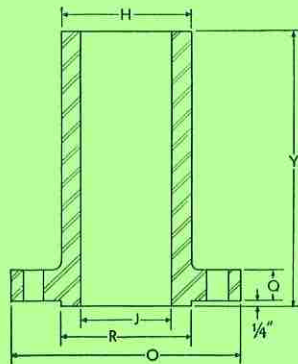


**300 lb. SEAMLESS LONG WELDING NECKS**  
**Part No. 30L**

400 lb. SEAMLESS LONG WELDING NECKS

AMERICAN STANDARD FORGED STEEL ASTM A-105

NOMINAL SIZE AND BORE J	OUTSIDE DIAMETER O	MINIMUM FLANGE THICKNESS Q	DIAM. OF RAISED FACE R	NOMINAL WALL THICKNESS	DIAM. OF HUB H*	LENGTH THROUGH HUB Y	DRILLING TEMPLATE				APPROX. WEIGHT IN POUNDS	LIST PRICE
							NUMBER OF HOLES	DIAM. OF HOLES	DIAM. OF BOLTS	DIAM. BOLT CIRCLE		
‡1	4 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>16</sub>	2	<sup>9</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>8</sub>	9	4	<sup>3</sup> / <sub>4</sub>	<sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	11	PRICES ON APPLI- CATION
‡1 <sup>1</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>4</sub>	1 <sup>3</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>2</sub>	<sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	9	4	<sup>3</sup> / <sub>4</sub>	<sup>5</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>8</sub>	14	
‡1 <sup>1</sup> / <sub>2</sub>	6 <sup>1</sup> / <sub>8</sub>	<sup>7</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	<sup>5</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>4</sub>	9	4	<sup>7</sup> / <sub>8</sub>	<sup>3</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>2</sub>	17	
‡2	6 <sup>1</sup> / <sub>2</sub>	1	3 <sup>5</sup> / <sub>8</sub>	<sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>	9	8	<sup>3</sup> / <sub>4</sub>	<sup>5</sup> / <sub>8</sub>	5	21	
‡2 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>32</sub>	3 <sup>15</sup> / <sub>16</sub>	9	8	<sup>7</sup> / <sub>8</sub>	<sup>3</sup> / <sub>4</sub>	5 <sup>7</sup> / <sub>8</sub>	29	
‡3	8 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>	5	1 <sup>3</sup> / <sub>16</sub>	4 <sup>5</sup> / <sub>8</sub>	9	8	<sup>7</sup> / <sub>8</sub>	<sup>3</sup> / <sub>4</sub>	6 <sup>5</sup> / <sub>8</sub>	38	
‡3 <sup>1</sup> / <sub>2</sub>	9	1 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>2</sub>	<sup>7</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	9	8	1	<sup>7</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>4</sub>	48	
4	10	1 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>16</sub>	<sup>7</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	12	8	1	<sup>7</sup> / <sub>8</sub>	7 <sup>7</sup> / <sub>8</sub>	67	
5	11	1 <sup>1</sup> / <sub>2</sub>	7 <sup>5</sup> / <sub>16</sub>	1	7	12	8	1	<sup>7</sup> / <sub>8</sub>	9 <sup>1</sup> / <sub>4</sub>	90	
6	12 <sup>1</sup> / <sub>2</sub>	1 <sup>5</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>8</sub>	12	12	1	<sup>7</sup> / <sub>8</sub>	10 <sup>5</sup> / <sub>8</sub>	115	
8	15	1 <sup>7</sup> / <sub>8</sub>	10 <sup>5</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>4</sub>	12	12	1 <sup>1</sup> / <sub>8</sub>	1	13	140	
10	17 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>8</sub>	12 <sup>3</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	12 <sup>5</sup> / <sub>8</sub>	12	16	1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>8</sub>	15 <sup>1</sup> / <sub>4</sub>	230	
12	20 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>4</sub>	15	1 <sup>3</sup> / <sub>8</sub>	14 <sup>3</sup> / <sub>4</sub>	12	16	1 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	17 <sup>3</sup> / <sub>4</sub>	301	
14	23	2 <sup>3</sup> / <sub>8</sub>	16 <sup>1</sup> / <sub>4</sub>	1 <sup>3</sup> / <sub>8</sub>	16 <sup>3</sup> / <sub>4</sub>	†	20	1 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	20 <sup>1</sup> / <sub>4</sub>	336	
16	25 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	18 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	19	†	20	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	22 <sup>1</sup> / <sub>2</sub>	416	
18	28	2 <sup>5</sup> / <sub>8</sub>	21	1 <sup>1</sup> / <sub>2</sub>	21	†	24	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	24 <sup>3</sup> / <sub>4</sub>	481	
20	30 <sup>1</sup> / <sub>2</sub>	2 <sup>3</sup> / <sub>4</sub>	23	1 <sup>9</sup> / <sub>16</sub>	23 <sup>1</sup> / <sub>8</sub>	†	24	1 <sup>5</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	27	563	
24	36	3	27 <sup>1</sup> / <sub>4</sub>	1 <sup>13</sup> / <sub>16</sub>	27 <sup>5</sup> / <sub>8</sub>	†	24	1 <sup>7</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>4</sub>	32	799	



400 lb. SEAMLESS LONG WELDING NECKS

Part No. 40L

All dimensions given in inches. Necks are furnished bored, faced, and spot faced or back faced. Standard Flange Facings—pages 160-161.

‡ These dimensions are the same as for 600-lb. flanges.

Unless otherwise specified, 400-lb. Seamless Long Welding Necks will be furnished drilled and with a 1/4" raised face which is not included in Thickness "Q" but is included in Length "Y." They can also be furnished undrilled and of sufficient thickness to take refacing.

\* Seamless Long Welding Necks with a nominal size of 12" and smaller have a corrosion allowance equal to the wall thickness of Standard Iron Pipe of corresponding size. For larger sizes the allowance should be provided by specifying a smaller bore.

Ring Type Joint details—pages 162-164. Dimensional Tolerances—page 240. Pressure-Temperature Ratings—pages 263-268.

Ladish Seamless Long Welding Necks conform in every particular to the requirements of the latest API-ASME Code.

† Furnished 12", 14", 16", 18" or 20" long. Weights listed are for 12" length. Long Welding Necks with necks longer than listed are available on special order.

For information on stainless steel, alloy steel and non-ferrous metal long necks, refer to pages 225-236. Material Specifications—page 243.

AMERICAN STANDARD  
FORGED STEEL ASTM A-105

600 lb. SEAMLESS LONG WELDING NECKS

NOMINAL SIZE AND BORE J	OUTSIDE DIAMETER O	MINIMUM FLANGE THICKNESS Q	DIAM. OF RAISED FACE R	NOMINAL WALL THICKNESS	DIAM. OF HUB H*	LENGTH THROUGH HUB Y	DRILLING TEMPLATE				APPROX. WEIGHT IN POUNDS	LIST PRICE
							NUMBER OF HOLES	DIAM. OF HOLES	DIAM. OF BOLTS	DIAM. BOLT CIRCLE		
1	4 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>16</sub>	2	9 <sup>1</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>8</sub>	9	4	3 <sup>3</sup> / <sub>4</sub>	5 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	11	PRICES ON APPLI- CATION
1 <sup>1</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>4</sub>	1 <sup>3</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>2</sub>	5 <sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	9	4	3 <sup>3</sup> / <sub>4</sub>	5 <sup>5</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>8</sub>	14	
1 <sup>1</sup> / <sub>2</sub>	6 <sup>1</sup> / <sub>8</sub>	7 <sup>5</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	5 <sup>5</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>4</sub>	9	4	7 <sup>5</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>2</sub>	17	
2	6 <sup>1</sup> / <sub>2</sub>	1	3 <sup>5</sup> / <sub>8</sub>	5 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>	9	8	3 <sup>3</sup> / <sub>4</sub>	5 <sup>5</sup> / <sub>8</sub>	5	21	
2 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>32</sub>	3 <sup>15</sup> / <sub>16</sub>	9	8	7 <sup>5</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>	5 <sup>7</sup> / <sub>8</sub>	29	
3	8 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>	5	1 <sup>3</sup> / <sub>16</sub>	4 <sup>5</sup> / <sub>8</sub>	9	8	7 <sup>5</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>	6 <sup>5</sup> / <sub>8</sub>	38	
3 <sup>1</sup> / <sub>2</sub>	9	1 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>2</sub>	7 <sup>5</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	9	8	1	7 <sup>5</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>4</sub>	48	
4	10 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	6 <sup>3</sup> / <sub>16</sub>	1	6	12	8	1	7 <sup>5</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>2</sub>	80	
5	13	1 <sup>3</sup> / <sub>4</sub>	7 <sup>5</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>	12	8	1 <sup>1</sup> / <sub>8</sub>	1	10 <sup>1</sup> / <sub>2</sub>	128	
6	14	1 <sup>7</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	8 <sup>3</sup> / <sub>4</sub>	12	12	1 <sup>1</sup> / <sub>8</sub>	1	11 <sup>1</sup> / <sub>2</sub>	158	
8	16 <sup>1</sup> / <sub>2</sub>	2 <sup>3</sup> / <sub>16</sub>	10 <sup>5</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>8</sub>	10 <sup>3</sup> / <sub>4</sub>	12	12	1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>8</sub>	13 <sup>3</sup> / <sub>4</sub>	215	
10	20	2 <sup>1</sup> / <sub>2</sub>	12 <sup>3</sup> / <sub>4</sub>	1 <sup>3</sup> / <sub>4</sub>	13 <sup>1</sup> / <sub>2</sub>	12	16	1 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	17	324	
12	22	2 <sup>5</sup> / <sub>8</sub>	15	1 <sup>7</sup> / <sub>8</sub>	15 <sup>3</sup> / <sub>4</sub>	12	20	1 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	19 <sup>1</sup> / <sub>4</sub>	500	
14	23 <sup>3</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	16 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	17	†	20	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	20 <sup>3</sup> / <sub>4</sub>	417	
16	27	3	18 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>4</sub>	19 <sup>1</sup> / <sub>2</sub>	†	20	1 <sup>5</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	23 <sup>3</sup> / <sub>4</sub>	564	
18	29 <sup>1</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>4</sub>	21	1 <sup>3</sup> / <sub>4</sub>	21 <sup>1</sup> / <sub>2</sub>	†	20	1 <sup>3</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>8</sub>	25 <sup>3</sup> / <sub>4</sub>	654	
20	32	3 <sup>1</sup> / <sub>2</sub>	23	2	24	†	24	1 <sup>3</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>8</sub>	28 <sup>1</sup> / <sub>2</sub>	840	
24	37	4	27 <sup>1</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>8</sub>	28 <sup>1</sup> / <sub>4</sub>	†	24	2	1 <sup>7</sup> / <sub>8</sub>	33	1100	

All dimensions given in inches. Necks are furnished bored, faced, and spot faced or back faced. Standard Flange Facings—pages 160-161. Unless otherwise specified, 600-lb. Seamless Long Welding Necks will be furnished drilled and with a 1/4" raised face which is not included in Thickness "Q" but is included in Length "Y." They can also be furnished undrilled and of sufficient thickness to take refacing.

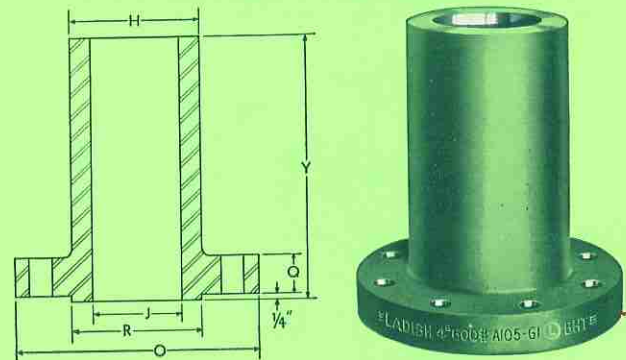
♦ Seamless Long Welding Necks with a nominal size of 12" and smaller have a corrosion allowance equal to the wall thickness of Standard Iron Pipe of corresponding size. For larger sizes the allowance should be provided by specifying a smaller bore.

Ring Type Joint details—pages 162-164. Dimensional Tolerances—page 240. Pressure-Temperature Ratings—pages 263-268.

Ladish Seamless Long Welding Necks conform in every particular to the requirements of the latest API-ASME Code.

† Furnished 12", 14", 16", 18" or 20" long. Weights listed are for the 12" length. Long Welding Necks with necks longer than listed are available on special order.

For information on stainless steel, alloy steel and non-ferrous metal long necks, refer to pages 225-236. Material Specifications—page 243.



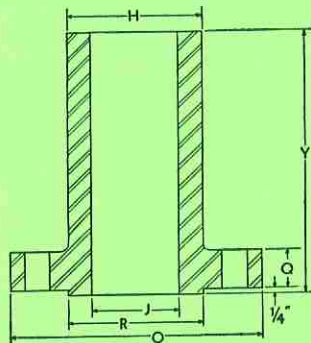
600 lb. SEAMLESS LONG  
WELDING NECKS

Part No. 60L

900 lb. SEAMLESS LONG WELDING NECKS

AMERICAN STANDARD FORGED STEEL ASTM A-105

NOMINAL SIZE AND BORE J	OUTSIDE DIAMETER O	MINIMUM FLANGE THICKNESS Q	DIAM. OF RAISED FACE R	NOMINAL WALL THICKNESS	DIAM. OF HUB H+	LENGTH THROUGH HUB Y	DRILLING TEMPLATE				APPROX. WEIGHT IN POUNDS	LIST PRICE
							NUMBER OF HOLES	DIAM. OF HOLES	DIAM. OF BOLTS	DIAM. BOLT CIRCLE		
‡1	5 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>8</sub>	2	1 <sup>7</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>16</sub>	9	4	1	7 <sup>7</sup> / <sub>8</sub>	4	15	PRICES ON APPLI- CATION
‡1 <sup>1</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	5 <sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	9	4	1	7 <sup>7</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>8</sub>	18	
‡1 <sup>1</sup> / <sub>2</sub>	7	1 <sup>1</sup> / <sub>4</sub>	2 <sup>7</sup> / <sub>8</sub>	5 <sup>5</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>4</sub>	9	4	1 <sup>1</sup> / <sub>8</sub>	1	4 <sup>7</sup> / <sub>8</sub>	23	
‡2	8 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	3 <sup>5</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>8</sub>	9	8	1	7 <sup>7</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	44	
‡2 <sup>1</sup> / <sub>2</sub>	9 <sup>5</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>16</sub>	4 <sup>7</sup> / <sub>8</sub>	12	8	1 <sup>1</sup> / <sub>8</sub>	1	7 <sup>1</sup> / <sub>2</sub>	72	
3	9 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	5	1	5	12	8	1	7 <sup>7</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>2</sub>	65	
4	11 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>4</sub>	6 <sup>3</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>4</sub>	12	8	1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>8</sub>	9 <sup>1</sup> / <sub>4</sub>	98	
5	13 <sup>3</sup> / <sub>4</sub>	2	7 <sup>5</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>	12	8	1 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	11	143	
6	15	2 <sup>3</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>2</sub>	1 <sup>5</sup> / <sub>8</sub>	9 <sup>1</sup> / <sub>4</sub>	12	12	1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>8</sub>	12 <sup>1</sup> / <sub>2</sub>	199	
8	18 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	10 <sup>5</sup> / <sub>8</sub>	1 <sup>7</sup> / <sub>8</sub>	11 <sup>3</sup> / <sub>4</sub>	12	12	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	15 <sup>1</sup> / <sub>2</sub>	310	
10	21 <sup>1</sup> / <sub>2</sub>	2 <sup>3</sup> / <sub>4</sub>	12 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>4</sub>	14 <sup>1</sup> / <sub>2</sub>	16	16	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	18 <sup>1</sup> / <sub>2</sub>	385	
12	24	3 <sup>1</sup> / <sub>8</sub>	15	2 <sup>1</sup> / <sub>4</sub>	16 <sup>1</sup> / <sub>2</sub>	16	20	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	21	667	
14	25 <sup>1</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>8</sub>	16 <sup>1</sup> / <sub>4</sub>	1 <sup>7</sup> / <sub>8</sub>	17 <sup>3</sup> / <sub>4</sub>	†	20	1 <sup>5</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	22	558	
16	27 <sup>3</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>2</sub>	18 <sup>1</sup> / <sub>2</sub>	2	20	†	20	1 <sup>3</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>8</sub>	24 <sup>1</sup> / <sub>4</sub>	670	
18	31	4	21	2 <sup>1</sup> / <sub>8</sub>	22 <sup>1</sup> / <sub>4</sub>	†	20	2	1 <sup>7</sup> / <sub>8</sub>	27	949	
20	33 <sup>3</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>4</sub>	23	2 <sup>1</sup> / <sub>4</sub>	24 <sup>1</sup> / <sub>2</sub>	†	20	2 <sup>1</sup> / <sub>8</sub>	2	29 <sup>1</sup> / <sub>2</sub>	1040	
24	41	5 <sup>1</sup> / <sub>2</sub>	27 <sup>1</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	29 <sup>1</sup> / <sub>2</sub>	†	20	2 <sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	35 <sup>1</sup> / <sub>2</sub>	1775	



900 lb. SEAMLESS LONG WELDING NECKS  
Part No. 90L

All dimensions given in inches. Necks are furnished bored, faced, and spot faced or back faced. Standard Flange Facings—pages 160-161.

‡ These dimensions are the same as for 1500-lb. flanges.

Unless otherwise specified, 900-lb. Seamless Long Welding Necks will be furnished drilled and with a 1/4" raised face which is not included in Thickness "Q" but is included in Length "Y." They can also be furnished undrilled and of sufficient thickness to take refacing.

♦ Seamless Long Welding Necks with a nominal size of 12" and smaller have a corrosion allowance equal to the wall thickness of Standard Iron Pipe of corresponding size. For larger sizes the allowance should be provided by specifying a smaller bore.

Ring Type Joint details—pages 162-164. Dimensional Tolerances—page 240. Pressure-Temperature Ratings—pages 263-268.

Ladish Seamless Long Welding Necks conform in every particular to the requirements of the latest API-ASME Code.

† Furnished 12", 14", 16", 18" or 20" long. Weights listed are for the 12" length. Long Welding Necks with necks longer than listed are available on special order.

For information on stainless steel, alloy steel and non-ferrous metal long necks, refer to pages 225-236. Material Specifications—page 243.

AMERICAN STANDARD  
FORGED STEEL ASTM A-105

1500 lb. SEAMLESS LONG WELDING NECKS

NOMINAL SIZE AND BORE J	OUTSIDE DIAMETER O	MINIMUM FLANGE THICKNESS Q	DIAM. OF RAISED FACE R	NOMINAL WALL THICKNESS	DIAM. OF HUB H+	LENGTH THROUGH HUB Y	DRILLING TEMPLATE				APPROX. WEIGHT IN POUNDS	LIST PRICE
							NUMBER OF HOLES	DIAM. OF HOLES	DIAM. OF BOLTS	DIAM. BOLT CIRCLE		
1	5 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>8</sub>	2	1 <sup>7</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>16</sub>	9	4	1	7 <sup>7</sup> / <sub>8</sub>	4	15	PRICES ON APPLI- CATION
1 <sup>1</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	5 <sup>7</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	9	4	1	7 <sup>7</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>8</sub>	18	
1 <sup>1</sup> / <sub>2</sub>	7	1 <sup>1</sup> / <sub>4</sub>	2 <sup>7</sup> / <sub>8</sub>	5 <sup>7</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>4</sub>	9	4	1 <sup>1</sup> / <sub>8</sub>	1	4 <sup>7</sup> / <sub>8</sub>	23	
2	8 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	3 <sup>5</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>8</sub>	9	8	1	7 <sup>7</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	44	
2 <sup>1</sup> / <sub>2</sub>	9 <sup>5</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>16</sub>	4 <sup>7</sup> / <sub>8</sub>	12	8	1 <sup>1</sup> / <sub>8</sub>	1	7 <sup>1</sup> / <sub>2</sub>	72	
3	10 <sup>1</sup> / <sub>2</sub>	1 <sup>7</sup> / <sub>8</sub>	5	1 <sup>1</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	12	8	1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>8</sub>	8	84	
4	12 <sup>1</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>16</sub>	1 <sup>3</sup> / <sub>16</sub>	6 <sup>3</sup> / <sub>8</sub>	12	8	1 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	9 <sup>1</sup> / <sub>2</sub>	118	
5	14 <sup>3</sup> / <sub>4</sub>	2 <sup>7</sup> / <sub>8</sub>	7 <sup>5</sup> / <sub>16</sub>	1 <sup>3</sup> / <sub>8</sub>	7 <sup>3</sup> / <sub>4</sub>	12	8	1 <sup>5</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	11 <sup>1</sup> / <sub>2</sub>	195	
6	15 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>4</sub>	8 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	9	12	12	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	12 <sup>1</sup> / <sub>2</sub>	235	
8	19	3 <sup>5</sup> / <sub>8</sub>	10 <sup>5</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>4</sub>	11 <sup>1</sup> / <sub>2</sub>	12	12	1 <sup>3</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>8</sub>	15 <sup>1</sup> / <sub>2</sub>	366	
10	23	4 <sup>1</sup> / <sub>4</sub>	12 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>4</sub>	14 <sup>1</sup> / <sub>2</sub>	16	12	2	1 <sup>7</sup> / <sub>8</sub>	19	610	
12	26 <sup>1</sup> / <sub>2</sub>	4 <sup>7</sup> / <sub>8</sub>	15	2 <sup>7</sup> / <sub>8</sub>	17 <sup>3</sup> / <sub>4</sub>	16	16	2 <sup>1</sup> / <sub>8</sub>	2	22 <sup>1</sup> / <sub>2</sub>	1028	
14	29 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>4</sub>	16 <sup>1</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	19 <sup>1</sup> / <sub>2</sub>	†	16	2 <sup>3</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>4</sub>	25	1030	
16	32 <sup>1</sup> / <sub>2</sub>	5 <sup>3</sup> / <sub>4</sub>	18 <sup>1</sup> / <sub>2</sub>	2 <sup>7</sup> / <sub>8</sub>	21 <sup>3</sup> / <sub>4</sub>	†	16	2 <sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	27 <sup>3</sup> / <sub>4</sub>	1335	
18	36	6 <sup>3</sup> / <sub>8</sub>	21	2 <sup>3</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>2</sub>	†	16	2 <sup>7</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>4</sub>	30 <sup>1</sup> / <sub>2</sub>	1750	
20	38 <sup>3</sup> / <sub>4</sub>	7	23	2 <sup>5</sup> / <sub>8</sub>	25 <sup>1</sup> / <sub>4</sub>	†	16	3 <sup>1</sup> / <sub>8</sub>	3	32 <sup>3</sup> / <sub>4</sub>	2130	
24	46	8	27 <sup>1</sup> / <sub>4</sub>	3	30	†	16	3 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	39	3180	

All dimensions given in inches. Necks are furnished bored, faced, and spot faced or back faced. Standard Flange Facings—pages 160-161. Unless otherwise specified, 1500-lb. Seamless Long Welding Necks will be furnished drilled and with a 1/4" raised face which is not included in Thickness "Q" but is included in Length "Y." They can also be furnished undrilled and of sufficient thickness to take refacing.

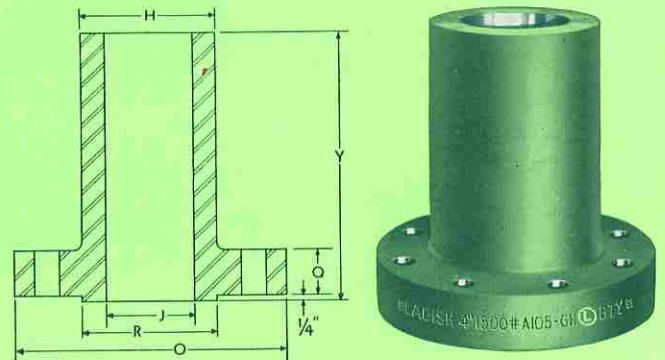
♦ Seamless Long Welding Necks with a nominal size of 12" and smaller have a corrosion allowance equal to the wall thickness of Standard Iron Pipe of corresponding size. For larger sizes the allowance should be provided by specifying a smaller bore.

Ring Type Joint details—pages 162-164. Dimensional Tolerances—page 240. Pressure-Temperature Ratings—pages 263-268.

Ladish Seamless Long Welding Necks conform in every particular to the requirements of the latest API-ASME Code.

† Furnished 12", 14", 16", 18" or 20" long. Weights listed are for the 12" length. Long Welding Necks with necks longer than listed are available on special order.

For information on stainless steel, alloy steel and non-ferrous metal long necks, refer to pages 225-236. Material Specifications—page 243.



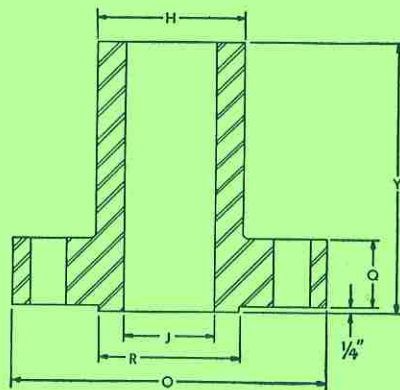
1500 lb. SEAMLESS LONG  
WELDING NECKS  
Part No. 150L



**2500 Ib. SEAMLESS LONG WELDING NECKS**

AMERICAN STANDARD  
FORGED STEEL ASTM A105

NOMINAL SIZE AND BORE J	OUTSIDE DIAMETER O	MINIMUM FLANGE THICKNESS Q	DIAM. OF RAISED FACE R	NOMINAL WALL THICKNESS	DIAM. OF HUB H	LENGTH THROUGH HUB Y	DRILLING TEMPLATE				APPROX. WEIGHT IN POUNDS	LIST PRICE
							NUMBER OF HOLES	DIAM. OF HOLES	DIAM. OF BOLTS	DIAM. BOLT CIRCLE		
1	6¼	1¾	2	⅝	2¼	9	4	1	⅞	4¼	20	PRICES ON APPLI- CATION
1¼	7¼	1½	2½	13/16	2⅞	9	4	1⅛	1	5⅛	30	
1½	8	1¾	2⅞	13/16	3⅛	9	4	1¼	1⅛	5¾	38	
2	9¼	2	3⅝	⅞	3¾	9	8	1⅛	1	6¾	55	
2½	10½	2¼	4⅛	1	4½	12	8	1¼	1⅛	7¾	85	
3	12	2⅝	5	1⅛	5¼	12	8	1⅜	1¼	9	125	
4	14	3	6¾	1¼	6½	12	8	1⅝	1½	10¾	185	
5	16½	3⅝	7⅝	1½	8	12	8	1⅞	1¾	12¾	300	
6	19	4¼	8½	1⅝	9¼	12	8	2⅛	2	14½	450	
8	21¾	5	10⅝	2	12	12	12	2⅛	2	17¼	600	
10	26½	6½	12¾	2⅜	14¾	16	12	2⅝	2½	21¼	1150	
12	30	7¼	15	2⅛	17⅞	16	12	2⅞	2¾	24⅜	1560	



**2500 lb. SEAMLESS LONG WELDING NECKS**  
**Part No. 250L**

All dimensions given in inches. Necks are furnished bored, faced, and spot faced or back faced. Standard Flange Facings—pages 160-161.

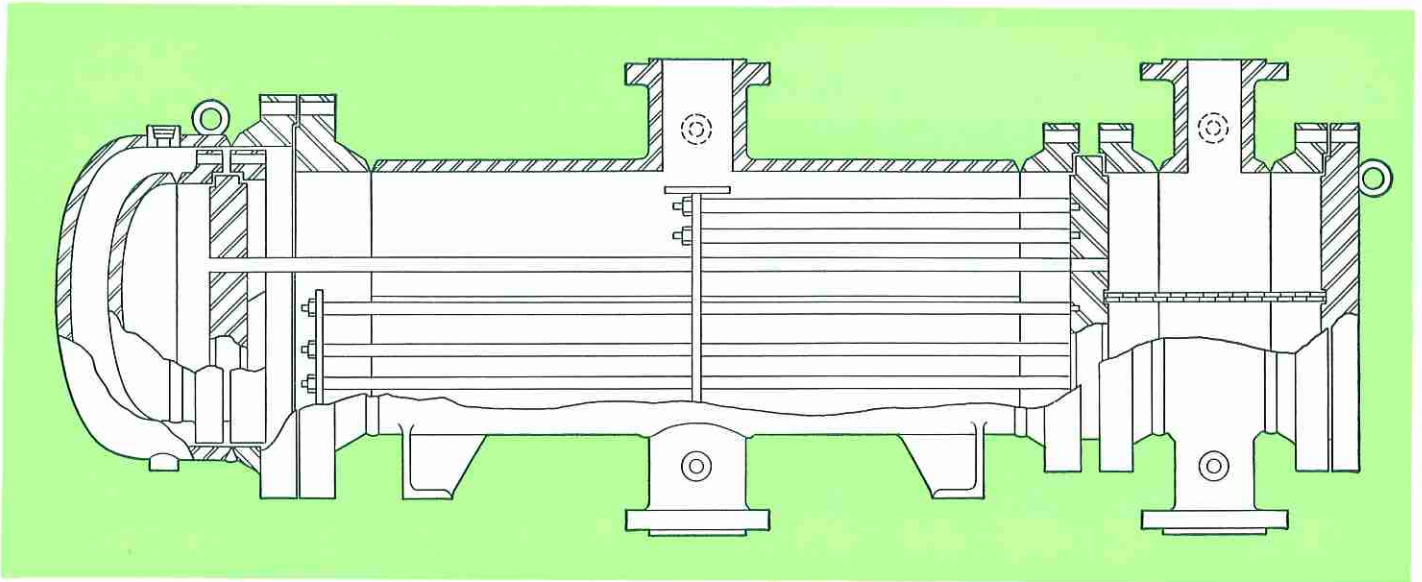
Unless otherwise specified, 2500-lb. Seamless Long Welding Necks will be furnished drilled and with a ¼" raised face which is not included in Thickness "Q" but is included in Length "Y." They can also be furnished undrilled and of sufficient thickness to take refacing.

Seamless Long Welding Necks with a nominal size of 12" and smaller have a corrosion allowance equal to the wall thickness of Standard Iron Pipe of corresponding size. For larger sizes the allowance should be provided by specifying a smaller bore.

Ring Type Joint details—pages 162-164. Dimensional Tolerances—page 240. Pressure-Temperature Ratings—pages 263-268.

Ladish Seamless Long Welding Necks conform in every particular to the requirements of the latest API-ASME Code. For information on stainless steel, alloy steel and non-ferrous metal long necks, refer to pages 225-236. Material Specifications—page 243.

## TUBULAR EXCHANGER MANUFACTURERS ASSOCIATION FORGED AND ROLLED STEEL FLANGES



In the following section are tabulated the dimensions of flanges for use with TEMA Class R, C and A heat exchangers. This data has been derived from the 1952 edition of the Standards of Tubular Exchanger Manufacturers Association and is presented with the permission of that Association.

The Standards of the Tubular Exchanger Manufacturers Association classify heat exchangers as follows:

**CLASS R** heat exchangers are designed to meet the safety and severe requirements of petroleum refineries and similar applications.

**CLASS C** heat exchangers are designed for maximum economy and overall compactness to meet the safety and service requirements of commercial and general process applications.

**CLASS A** heat exchangers are designed for maximum economy and overall compactness to meet the safety and service requirements of heat exchangers incorporating alloys and special materials of construction.

The flange dimension tables have been arranged to show the dimensions of the various flanges according to the size shell with which they are intended to be used.

As a guide to the designer, maximum values for the hub diameter at base and at welding end have been established in the tables that follow. The hub diameter at base of the Channel End Shell Flange is based on maintaining minimum required wrench clearance. This maximum diameter in combination with the hub slope, that has been set in the design of each flange, establishes the maximum hub diameter at the welding end. Although wrench clearance does not limit the hub diameter at base of the Cover End Shell Flange, the maximum diameter is set by maintaining the established hub slope.

Dimensions for flanges having inside diameters other than those listed in the tables may be determined by interpolation on the following basis:

- (a) The cross sectional dimensions of the flange shall be the same as that of the nearest standard size, the half-way point to be governed by the next larger size.
- (b) The number and size of bolts shall be the same as those of the nearest standard size, the half-way point to be governed by the next larger size.

The design of these flanges is also based on the gasket characteristics and the corrosion allowances, which are tabulated on pages 186 and 187.

## GASKET DATA FOR TEMA FLANGES

The type and diametral dimensions of the gaskets that are intended for use with the T.E.M.A. flanges listed on the following pages are tabulated below. The gasket compression factors used in the design are: 3.75 for metal

jacketed asbestos, 2.50 for compressed asbestos, and 1.25 for the rubber type. The minimum design seating stresses are: 9000 psi for the metal jacketed asbestos, 4500 psi for the compressed asbestos, and 400 psi for the rubber type.

### GASKET DIMENSIONS FOR TEMA FLANGES

NOMINAL I.D. OF SHELL	METAL JACKETED ASBESTOS GASKETS												
	CLASS R 150 LB.		CLASS R 300 LB.		CLASSES R, C, and A 450 LB.		CLASSES R, C, and A 600 LB.		CLASSES C and A 75 LB. & 150 LB.		CLASSES C and A 300 LB.		
	I.D.	O.D.	I.D.	O.D.	I.D.	O.D.	I.D.	O.D.	I.D.	O.D.	I.D.	O.D.	
<b>HUB FLANGES</b>	6	...	...	...	...	7 1/2	8 1/2	7 1/2	8 1/4	7 1/8	7 7/8	7 1/8	7 7/8
	8	9 5/8	10 3/8	9 5/8	10 3/8	9 5/8	10 3/8	9 1/2	10 1/4	9 1/8	9 7/8	9 1/8	9 7/8
	10	11 3/4	12 1/2	11 3/4	12 1/2	11 3/4	12 1/2	11 5/8	12 3/8	11 1/4	12	11 1/4	12
	12	13 3/4	14 1/2	13 3/4	14 1/2	13 3/4	14 1/2	13 3/4	14 1/2	13 1/4	14	13 1/4	14
	13	15	15 3/4	15	15 3/4	15	15 3/4	15 1/8	15 7/8	14 1/2	15 1/4	14 1/2	15 1/4
	15	17	17 3/4	17	17 3/4	17	17 3/4	17 1/8	17 7/8	16 1/2	17 1/4	16 1/2	17 1/4
	17	19	19 3/4	19	19 3/4	19	19 3/4	19 1/8	19 7/8	18 5/8	19 3/8	18 5/8	19 3/8
	19	21 1/4	22	21 1/4	22	21 1/4	22	21 1/8	21 7/8	20 5/8	21 3/8	20 5/8	21 3/8
	21	23 1/4	24	23 1/4	24	23 1/4	24	23 1/8	24 1/8	22 3/4	23 1/2	22 3/4	23 1/2
	23	25 1/4	26	25 1/4	26	25 1/4	26	25 1/4	26 1/4	24 3/4	25 1/2	24 3/4	25 1/2
	25	26 3/4	27 1/2	27 5/8	28 3/8	28	29	28 1/8	29 3/8	26 3/4	27 3/4	27	28
	27	28 7/8	29 7/8	29 1/2	30 1/2	30	31	30 1/8	31 3/8	28 3/4	29 3/4	29 1/8	30 1/8
	29	30 7/8	31 7/8	31 1/2	32 1/2	32 1/4	33 1/4	32 1/2	34	30 3/4	31 3/4	31 1/8	32 1/8
	31	32 7/8	33 3/8	33 1/2	34 1/2	34 1/4	35 1/4	34 1/2	36	32 3/4	33 3/4	33 3/8	34 3/8
	33	34 7/8	35 7/8	35 3/4	36 3/4	36 3/8	37 3/8	36 3/4	38 1/4	34 3/4	35 3/4	35 3/8	36 3/8
	35	36 7/8	37 7/8	37 3/4	38 3/4	38 1/2	39 3/4	38 7/8	40 5/8	36 7/8	37 7/8	37 3/8	38 3/8
	37	39	40 1/4	39 5/8	40 7/8	40 3/4	42	40 7/8	42 5/8	38 7/8	39 7/8	39 5/8	40 5/8
	39	41	42 1/4	41 3/4	43	42 7/8	44 1/8	43 1/4	45	40 7/8	41 7/8	41 5/8	42 5/8
	42	44	45 1/4	44 3/4	46	46	47 1/4	46	48	44 1/8	45 1/8	45	46
	44*	46	47 1/4	47	48 1/4	48	49 1/2	48 3/8	50 3/8	45 1/8	46 1/8	46	47
47*	49	50 1/2	49 3/4	51 1/4	51 1/8	52 5/8	51 5/8	53 5/8	48 1/8	49 1/8	49	50	

NOMINAL I.D. OF SHELL	RUBBER †		COMPRESSED ASBESTOS				METAL JACKETED ASBESTOS					
	CLASS A 75 LB. & 150 LB.		CLASSES C and A 75 LB.		CLASSES C and A 150 LB.		CLASS A 300 LB.		CLASSES C and A 300 LB.			
	I.D.	O.D.	I.D.	O.D.	I.D.	O.D.	I.D.	O.D.	I.D.	O.D.		
6	6 7/8	7 7/8	7 1/8	7 7/8	7 1/8	7 7/8	7 1/8	7 7/8	7 1/8	7 7/8		
8	8 7/8	9 7/8	9 1/8	9 7/8	9 1/8	9 7/8	9 1/8	9 7/8	9 1/8	9 7/8		
10	11	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12		
12	13	14	13 1/4	14	13 1/4	14	13 1/4	14	13 1/4	14		
13	14 1/4	15 1/4	14 1/2	15 1/4	14 1/2	15 1/4	14 1/2	15 1/4	14 1/2	15 1/4		
15	16 1/4	17 1/4	16 1/2	17 1/4	16 1/2	17 1/4	16 1/2	17 1/4	16 1/2	17 1/4		
17	18 3/8	19 3/8	18 5/8	19 3/8	18 5/8	19 3/8	18 5/8	19 3/8	18 5/8	19 3/8		
19	20 3/8	21 3/8	20 5/8	21 3/8	20 5/8	21 3/8	20 5/8	21 3/8	20 5/8	21 3/8		
21	22 1/2	23 1/2	22 3/4	23 1/2	22 3/4	23 1/2	22 3/4	23 1/2	22 3/4	23 1/2		
23	24 1/2	25 1/2	24 3/4	25 1/2	24 3/4	25 1/2	24 3/4	25 1/2	24 3/4	25 1/2		
25	26 1/4	27 3/4	26 3/4	27 3/4	26 3/4	27 3/4	27	28	...	...		
27	28 1/4	29 3/4	28 3/4	29 3/4	28 3/4	29 3/4	29 1/8	30 1/8	...	...		
29	30 1/4	31 3/4	30 3/4	31 3/4	30 3/4	31 3/4	31 1/8	32 1/8	...	...		
31	32 1/4	33 3/4	32 3/4	33 3/4	32 3/4	33 3/4	33 3/8	34 3/8	...	...		
33	34 1/4	35 3/4	34 3/4	35 3/4	34 3/4	35 3/4	35 3/8	36 3/8	...	...		
35	36 3/8	37 7/8	36 7/8	37 7/8	36 7/8	37 7/8	37 3/8	38 3/8	...	...		
37	...	...	38 7/8	39 7/8	...	...	...	...	...	...		
39	...	...	40 7/8	41 7/8	...	...	...	...	...	...		
42	...	...	44 1/8	45 1/8	...	...	...	...	...	...		
43	...	...	45 1/8	46 1/8	...	...	...	...	...	...		
46	...	...	48 1/8	49 1/8	...	...	...	...	...	...		

\*Inside diameters for the Shell Cover Flange for the 75 lb., 150 lb., and 300 lb. Class C and Class A Exchangers are 43" and 46" instead of 44" and 47" respectively.

†Rubber or similar (Durometer "C" not to exceed 60").

## CORROSION ALLOWANCES

Corrosion allowances listed below are equal to the difference between the minimum hub thicknesses, as established in the T.E.M.A. Standard, and the hub thicknesses which have been determined from the diameters at the welding end in the flange tables that follow.

Since these corrosion allowances are applicable only to the flanges as tabulated, the following table has been prepared to enable the designer to readily determine the allowance when either the I.D. or O.D. of the hub of a flange is varied from the tabulated values. The actual corrosion allowances for any flange of lesser or greater hub thickness can be determined by adjusting the tabulated corrosion allowance by the difference between the tabulated hub thickness and

the desired hub thickness.

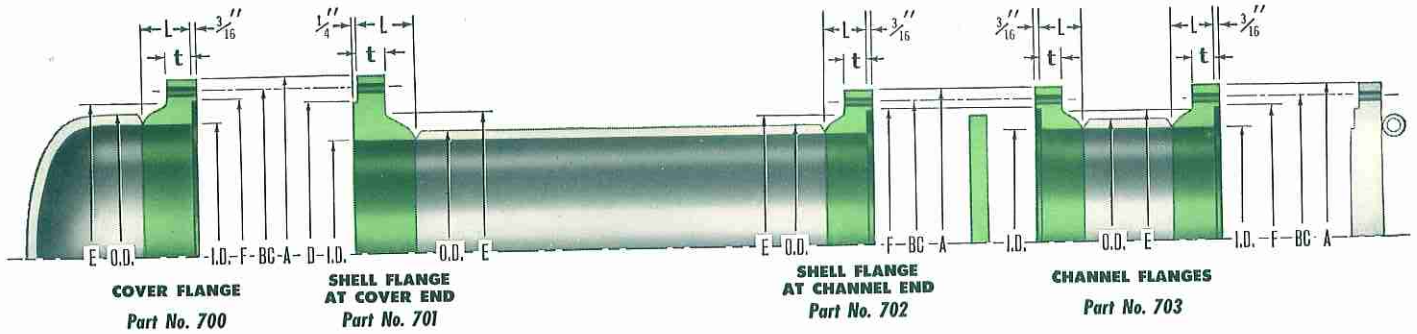
It should be noted that lesser hub thickness (or lesser corrosion allowance) can be achieved by increasing the I.D. for use with either pipe or plate shells, or by decreasing the hub O.D. for use with plate shells only. If the hub O.D. is decreased, the hub diameter at the base should be equally decreased, maintaining the original hub slope. Greater hub thickness (or greater corrosion allowance) can be achieved only by decreasing the tabulated inside diameter, except on 150 lb., 300 lb. and 450 lb. Class R and 450 lb. Class C and A hub flanges of 19", 21" and 23" nominal size plate shells, where the outside diameters of the hub can be increased by 1/4".

SHELL SIZE	CLASS R						CLASSES R, C, and A						CLASSES C and A						
	150 LB.			300 LB.			450 LB.		600 LB.		75 LB. and 150 LB.			300 LB.					
	HUB THICKNESS WELDING END		CORROSION ALLOWANCE	HUB THICKNESS WELDING END		CORROSION ALLOWANCE	HUB THICKNESS WELDING END		CORROSION ALLOWANCE	HUB THICKNESS WELDING END		CORROSION ALLOWANCE	HUB THICKNESS WELDING END		CORROSION ALLOWANCE				
	MIN. PER T.E.M.A. STDS.	CALCULATED FROM TABLES*		MIN. PER T.E.M.A. STDS.	CALCULATED FROM TABLES*		MIN. PER T.E.M.A. STDS.	CALCULATED FROM TABLES*		MIN. PER T.E.M.A. STDS.	CALCULATED FROM TABLES*		MIN. PER T.E.M.A. STDS.	CALCULATED FROM TABLES*		MIN. PER T.E.M.A. STDS.	CALCULATED FROM TABLES*		
PIPE SHELLS	6	....	...	....	....	....	....	5/16	.174	....	5/16	.151	.155	5/16	.158	.155	5/16	.158	
	8	.141	5/16	.172	.141	5/16	.172	.165	5/16	.148	.215	5/16	.098	.160	5/16	.153	.160	5/16	.153
	10	.143	3/8	.232	.143	3/8	.232	.199	3/8	.176	.270	3/8	.105	.175	3/8	.200	.180	3/8	.195
	12	.146	3/8	.229	.162	3/8	.213	.234	3/8	.141	.325	3/8	.050	.190	3/8	.185	.206	3/8	.169
	13	.148	1/2	.352	.175	1/2	.325	.255	1/2	.245	.352	1/2	.148	.200	1/2	.300	.220	1/2	.280
	15	.150	1/2	.350	.199	1/2	.301	.288	1/2	.212	.408	1/2	.092	.215	1/2	.285	.242	1/2	.258
	17	.153	1/2	.347	.221	1/2	.279	.311	1/2	.189	.460	1/2	.040	.230	1/2	.270	.264	1/2	.236
	19	.155	1/2	.345	.244	1/2	.256	.357	1/2	.143	.515	.515*	0*	.245	1/2	.255	.286	1/2	.214
	21	.157	1/2	.343	.267	1/2	.233	.390	1/2	.110	.570	.570*	0*	.260	1/2	.240	.308	1/2	.192
	23	.159	1/2	.341	.289	1/2	.211	.424	1/2	.076	.625	.625*	0*	.275	1/2	.225	.330	1/2	.170
PLATE SHELLS	19	.155	5/8	.470	.244	5/8	.381	.357	5/8	.268	.515	.515*	0*	.245	1/2	.255	.286	1/2	.214
	21	.157	5/8	.468	.267	5/8	.358	.390	5/8	.235	.570	.570*	0*	.260	1/2	.240	.308	1/2	.192
	23	.159	5/8	.466	.289	5/8	.336	.424	5/8	.201	.625	.625*	0*	.275	1/2	.225	.330	1/2	.170
	25	3/16	7/16	.250	3/8	5/8	.250	1/2	3/4	.250	.684	1	.316	.290	1/2	.210	.355	5/8	.270
	27	1/4	1/2	.250	3/8	5/8	.250	1/2	3/4	.250	.739	1	.261	.305	1/2	.195	.383	5/8	.242
	29	1/4	1/2	.250	3/8	5/8	.250	9/16	1 3/16	.250	.794	1 1/8	.331	.320	1/2	.180	.412	5/8	.213
	31	1/4	1/2	.250	3/8	5/8	.250	9/16	1 3/16	.250	.849	1 1/8	.276	.335	1/2	.165	.440	3/4	.310
	33	1/4	1/2	.250	7/16	1 1/16	.250	5/8	7/8	.250	.903	1 1/8	.222	.350	1/2	.150	.468	3/4	.282
	35	1/4	1/2	.250	7/16	1 1/16	.250	5/8	7/8	.250	.958	1 1/4	.292	.365	1/2	.135	.497	3/4	.253
	37	5/16	9/16	.250	7/16	1 1/16	.250	1 1/16	1 5/16	.250	1.012	1 1/4	.238	.380	1/2	.120	.525	3/4	.225
39	5/16	9/16	.250	1/2	3/4	.250	3/4	1	.250	1.068	1 3/8	.307	.395	1/2	.105	.553	3/4	.197	
42	5/16	9/16	.250	1/2	3/4	.250	3/4	1	.250	1.150	1 3/8	.225	.415	5/8	.210	.597	7/8	.278	
SHELL COVER	44‡	5/16	9/16	.250	9/16	1 3/16	.250	1 3/16	1 1/16	.250	1.200	1 1/2	.300	.425	5/8	.200	.610	7/8	.265
	47‡	3/8	5/8	.250	9/16	1 3/16	.250	7/8	1 1/8	.250	1.285	1 5/8	.340	.445	5/8	.180	.653	7/8	.222

\* These thicknesses are equal to one-half the difference between the hub O.D. and flange I.D. as tabulated on pages 188 through 196 except for the 600 lb. flanges for 19", 21", and 23" shells. On these sizes, 18.97", 20.86", and 22.75" inside diameters respectively were used in the calculations of this table to eliminate the negative values that

would result with the 19", 21", and 23" inside diameters.

‡ Inside diameters for the Shell Cover Flange for the 75 lb., 150 lb., and 300 lb. Class C and Class A Exchangers are 43" and 46" instead of 44" and 47" respectively.



**TEMA CLASS R HUB FLANGES**  
**150 lb. Standard** (150 PSI AT 0° TO 650° F.)

Forged and Rolled Steel  
 ASTM A181-1 and A105-1<sup>Ⓞ</sup>

SHELL SIZE NOMINAL I. D.*	COVER FLANGE							SHELL FLANGE AT COVER END*							
	I. D.	MAX. O. D. OF HUB		DIAM. OF FEMALE FACE F	FLANGE THICKNESS t	LENGTH THROUGH HUB L	COMMON DIMENSIONS			MAX. O. D. OF HUB†		DIAM. OF MALE FACE D	FLANGE THICKNESS t	LENGTH THROUGH HUB L	
		AT WELDING END O. D.	AT BASE E				FLANGE O. D. A	NUMBER AND SIZE OF BOLTS BC	BOLT CIRCLE BC	AT WELDING END O. D.	AT BASE E				
PIPE SHELLS	8	12	12 3/4	13 1/2	14 5/8	1 1/4	2 3/4	17 3/8	16-3/4	15 3/4	8 5/8	9 3/8	14 1/2	17 1/16	2 15/16
	10	13	14	14 3/4	15 7/8	1 5/16	2 13/16	18 5/8	16-3/4	17	10 3/4	11 1/2	15 3/4	1 1/2	3
	12	15	16	16 3/4	17 7/8	1 3/8	3	20 5/8	20-3/4	19	12 3/4	13 1/2	17 3/4	1 9/16	3 1/16
	13	17	18	18 3/4	19 7/8	1 1/2	3 1/8	22 5/8	20-3/4	21	14	14 3/4	19 3/4	1 11/16	3 3/16
	15	19	20 1/4	21	22 1/8	1 9/16	3 5/16	24 7/8	24-3/4	23 1/4	16	16 3/4	22	1 13/16	3 7/16
	17	21	22 1/4	23	24 1/8	1 5/8	3 3/8	26 7/8	24-3/4	25 1/4	18	18 3/4	24	1 15/16	3 9/16
	19	23	24 1/4	25	26 1/8	1 3/4	3 5/8	28 7/8	28-3/4	27 1/4	20	20 3/4	26	2 1/16	3 13/16
PLATE SHELLS	25	29	30	30 3/4	32	2	4	35 1/8	28-7/8	33 1/4	25 7/8	26 1/2	31 7/8	2 5/8	4 1/2
	27	31	32	32 3/4	34	2 1/8	4 1/4	37 1/8	32-7/8	35 1/4	28	28 3/4	33 7/8	2 11/16	4 9/16
	29	33	34	34 3/4	36	2 1/4	4 3/8	39 1/8	32-7/8	37 1/4	30	30 3/4	35 7/8	2 3/4	4 3/4
	31	35	36	36 3/4	38	2 3/8	4 5/8	41 1/8	36-7/8	39 1/4	32	32 3/4	37 7/8	3	5 1/8
	33	37	38 1/8	39	40 3/8	2 1/2	4 7/8	43 7/8	36-1	41 3/4	34	34 3/4	40 1/4	3 1/4	5 3/8
	35	39	40 1/8	41	42 3/8	2 5/8	5 1/8	45 7/8	36-1	43 3/4	36	36 3/4	42 1/4	3 3/8	5 5/8
	37	42	43 1/8	44	45 3/8	2 3/4	5 3/8	48 7/8	40-1	46 3/4	38 1/8	39	45 1/4	3 1/2	5 7/8
	39	44	45 1/8	46	47 3/8	2 13/16	5 7/16	50 7/8	40-1	48 3/4	40 1/8	41	47 1/4	3 5/8	6 1/8
42	47	48 1/4	49 1/4	50 5/8	2 7/8	5 5/8	54 1/8	48-1	52	43 1/8	44	50 1/2	3 3/4	6 3/8	

SHELL SIZE NOMINAL I. D.*	SHELL FLANGE AT CHANNEL END AND CHANNEL FLANGES*									
	MAX. O. D. OF HUB†		DIAM. OF FEMALE FACE F	FLANGE THICKNESS t	LENGTH THROUGH HUB L	FLANGE OUTSIDE DIAM. A	NUMBER AND SIZE OF BOLTS	BOLT CIRCLE BC		
	AT WELDING END O. D.	AT BASE E								
PIPE SHELLS	8	8 5/8	9 3/8	10 1/2	1 1/8	2 5/8	13 1/4	12-3/4	11 5/8	
	10	10 3/4	11 1/2	12 5/8	1 3/16	2 11/16	15 3/8	16-3/4	13 3/4	
	12	12 3/4	13 1/2	14 5/8	1 1/4	2 3/4	17 3/8	16-3/4	15 3/4	
	13	14	14 3/4	15 7/8	1 5/16	2 13/16	18 5/8	16-3/4	17	
	15	16	16 3/4	17 7/8	1 3/8	3	20 5/8	20-3/4	19	
	17	18	18 3/4	19 7/8	1 1/2	3 1/8	22 5/8	20-3/4	21	
	19	20	20 3/4	22 1/8	1 9/16	3 5/16	24 7/8	24-3/4	23 1/4	
PLATE SHELLS	25	25 7/8	26 1/2	27 5/8	1 7/8	3 3/4	30 3/8	28-3/4	28 3/4	
	27	28	28 3/4	30	1 15/16	3 13/16	33 1/8	28-7/8	31 1/4	
	29	30	30 3/4	32	2	4	35 1/8	28-7/8	33 1/4	
	31	32	32 3/4	34	2 1/8	4 1/4	37 1/8	32-7/8	35 1/4	
	33	34	34 3/4	36	2 1/4	4 3/8	39 1/8	32-7/8	37 1/4	
	35	36	36 3/4	38	2 3/8	4 5/8	41 1/8	36-7/8	39 1/4	
	37	38 1/8	39	40 3/8	2 1/2	4 7/8	43 7/8	36-1	41 3/4	
	39	40 1/8	41	42 3/8	2 5/8	5 1/8	45 7/8	36-1	43 3/4	
42	43 1/8	44	45 3/8	2 3/4	5 3/8	48 7/8	40-1	46 3/4		

\*The nominal I.D. of the shell is also the nominal I.D. of Shell Flanges and the Channel Flanges.

†If shells of 19", 21", and 23" are made from plate, the O.D. max. and E max. can each be greater by 1/4".

‡The diameters of the Tubesheets are equal to the female face diameters, F, less 1/8".

ⓄMaterial: ASTM A181-1 for flange thickness less than 3".

ASTM A105-1 for flange thickness 3" and greater.

Flanges also furnished of alloys as listed on page 243.

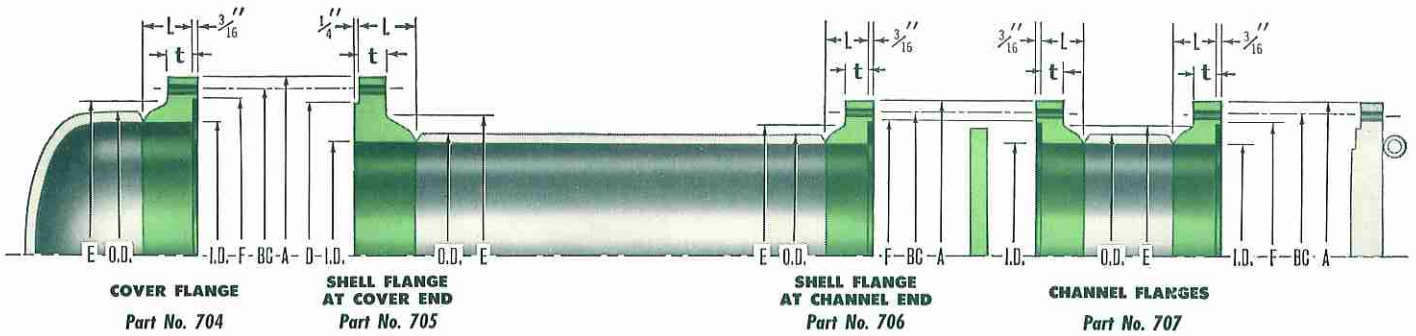
Note: The actual outside and inside diameter of the shell must be specified by the purchaser. The hub diameters will be adjusted accordingly, maintaining the hub slopes established in the TEMA Standard.

Hub thicknesses and Corrosion Allowances—page 187.

Bolt hole diameters are 1/8" larger than respective bolt sizes.

Unless otherwise specified by the purchaser, flanges are furnished with welding bevel according to details shown on page 239.

Alloy steel bolts and metal-jacketed asbestos gaskets are intended. See page 186 for gasket details.



Forged and Rolled Steel  
ASTM A181-1 and A105-10

**TEMA CLASS R HUB FLANGES**  
**300 lb. Standard (300 PSI AT 0° TO 650° F.)**

SHELL SIZE NOMINAL I.D.*	COVER FLANGE						SHELL FLANGE AT COVER END*								
	I. D.	MAX. O. D. OF HUB		DIAM. OF FEMALE FACE	FLANGE THICKNESS	LENGTH THROUGH HUB	COMMON DIMENSIONS			MAX. O. D. OF HUB†		DIAM. OF MALE FACE	FLANGE THICKNESS	LENGTH THROUGH HUB	
		AT WELDING END O.D.	AT BASE				F	t	L	FLANGE O. D.	NUMBER AND SIZE OF BOLTS				BOLT CIRCLE
PIPE SHELLS	8	12	12 <sup>3</sup> / <sub>4</sub>	13 <sup>1</sup> / <sub>2</sub>	14 <sup>5</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	17 <sup>3</sup> / <sub>8</sub>	16- <sup>3</sup> / <sub>4</sub>	15 <sup>3</sup> / <sub>4</sub>	8 <sup>5</sup> / <sub>8</sub>	9 <sup>3</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>4</sub>
	10	13	14	14 <sup>3</sup> / <sub>4</sub>	15 <sup>7</sup> / <sub>8</sub>	1 <sup>7</sup> / <sub>16</sub>	2 <sup>15</sup> / <sub>16</sub>	18 <sup>5</sup> / <sub>8</sub>	16- <sup>3</sup> / <sub>4</sub>	17	10 <sup>3</sup> / <sub>4</sub>	11 <sup>1</sup> / <sub>2</sub>	15 <sup>3</sup> / <sub>4</sub>	1 <sup>7</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>8</sub>
	12	15	16	16 <sup>3</sup> / <sub>4</sub>	17 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>8</sub>	20 <sup>5</sup> / <sub>8</sub>	20- <sup>3</sup> / <sub>4</sub>	19	12 <sup>3</sup> / <sub>4</sub>	13 <sup>1</sup> / <sub>2</sub>	17 <sup>3</sup> / <sub>4</sub>	1 <sup>15</sup> / <sub>16</sub>	3 <sup>7</sup> / <sub>16</sub>
	13	17	18	18 <sup>3</sup> / <sub>4</sub>	19 <sup>7</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>	22 <sup>5</sup> / <sub>8</sub>	20- <sup>3</sup> / <sub>4</sub>	21	14	14 <sup>3</sup> / <sub>4</sub>	19 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>8</sub>	3 <sup>5</sup> / <sub>8</sub>
	15	19	20 <sup>1</sup> / <sub>4</sub>	21	22 <sup>1</sup> / <sub>8</sub>	1 <sup>11</sup> / <sub>16</sub>	3 <sup>7</sup> / <sub>16</sub>	24 <sup>7</sup> / <sub>8</sub>	24- <sup>3</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>4</sub>	16	16 <sup>3</sup> / <sub>4</sub>	22	2 <sup>1</sup> / <sub>4</sub>	3 <sup>7</sup> / <sub>8</sub>
	17	21	22 <sup>1</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>8</sub>	24 <sup>1</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>2</sub>	27 <sup>1</sup> / <sub>2</sub>	24- <sup>7</sup> / <sub>8</sub>	25 <sup>5</sup> / <sub>8</sub>	18	18 <sup>3</sup> / <sub>4</sub>	24	2 <sup>1</sup> / <sub>2</sub>	4 <sup>1</sup> / <sub>8</sub>
	19	23	24 <sup>1</sup> / <sub>4</sub>	25 <sup>1</sup> / <sub>8</sub>	26 <sup>1</sup> / <sub>8</sub>	1 <sup>7</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>	29 <sup>1</sup> / <sub>2</sub>	24- <sup>7</sup> / <sub>8</sub>	27 <sup>5</sup> / <sub>8</sub>	20	20 <sup>3</sup> / <sub>4</sub>	26	2 <sup>11</sup> / <sub>16</sub>	4 <sup>7</sup> / <sub>16</sub>
PLATE SHELLS	21	25	26 <sup>1</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>4</sub>	28 <sup>1</sup> / <sub>2</sub>	2	4 <sup>1</sup> / <sub>8</sub>	31 <sup>5</sup> / <sub>8</sub>	28- <sup>7</sup> / <sub>8</sub>	29 <sup>3</sup> / <sub>4</sub>	22	22 <sup>7</sup> / <sub>8</sub>	28 <sup>3</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	4 <sup>5</sup> / <sub>8</sub>
	23	27	28 <sup>1</sup> / <sub>4</sub>	29 <sup>1</sup> / <sub>4</sub>	30 <sup>5</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>16</sub>	4 <sup>5</sup> / <sub>16</sub>	34 <sup>1</sup> / <sub>8</sub>	28-1	32	24	24 <sup>7</sup> / <sub>8</sub>	30 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>16</sub>	4 <sup>15</sup> / <sub>16</sub>
	25	29	30 <sup>1</sup> / <sub>4</sub>	31 <sup>1</sup> / <sub>4</sub>	32 <sup>5</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>8</sub>	4 <sup>5</sup> / <sub>8</sub>	36 <sup>1</sup> / <sub>8</sub>	28-1	34	26 <sup>1</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>4</sub>	32 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>
	27	31	32 <sup>1</sup> / <sub>4</sub>	33 <sup>1</sup> / <sub>4</sub>	34 <sup>5</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>16</sub>	4 <sup>13</sup> / <sub>16</sub>	38 <sup>1</sup> / <sub>8</sub>	32-1	36	28 <sup>1</sup> / <sub>4</sub>	29 <sup>1</sup> / <sub>4</sub>	34 <sup>1</sup> / <sub>2</sub>	3 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>2</sub>
	29	33	34 <sup>3</sup> / <sub>8</sub>	35 <sup>1</sup> / <sub>2</sub>	36 <sup>7</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	5	40 <sup>3</sup> / <sub>8</sub>	36-1	38 <sup>1</sup> / <sub>4</sub>	30 <sup>1</sup> / <sub>4</sub>	31 <sup>1</sup> / <sub>4</sub>	36 <sup>3</sup> / <sub>4</sub>	3 <sup>5</sup> / <sub>8</sub>	5 <sup>7</sup> / <sub>8</sub>
	31	35	36 <sup>3</sup> / <sub>8</sub>	37 <sup>1</sup> / <sub>2</sub>	38 <sup>7</sup> / <sub>8</sub>	2 <sup>13</sup> / <sub>16</sub>	5 <sup>5</sup> / <sub>16</sub>	42 <sup>3</sup> / <sub>8</sub>	40-1	40 <sup>1</sup> / <sub>4</sub>	32 <sup>1</sup> / <sub>4</sub>	33 <sup>1</sup> / <sub>4</sub>	38 <sup>3</sup> / <sub>4</sub>	3 <sup>13</sup> / <sub>16</sub>	6 <sup>3</sup> / <sub>16</sub>
	33	37	38 <sup>3</sup> / <sub>8</sub>	39 <sup>1</sup> / <sub>2</sub>	41	3 <sup>1</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	44 <sup>3</sup> / <sub>4</sub>	36-1 <sup>1</sup> / <sub>8</sub>	42 <sup>1</sup> / <sub>2</sub>	34 <sup>3</sup> / <sub>8</sub>	35 <sup>1</sup> / <sub>2</sub>	40 <sup>7</sup> / <sub>8</sub>	4	6 <sup>1</sup> / <sub>2</sub>
	35	39	40 <sup>1</sup> / <sub>2</sub>	41 <sup>5</sup> / <sub>8</sub>	43 <sup>1</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>	5 <sup>7</sup> / <sub>8</sub>	46 <sup>7</sup> / <sub>8</sub>	36-1 <sup>1</sup> / <sub>8</sub>	44 <sup>5</sup> / <sub>8</sub>	36 <sup>3</sup> / <sub>8</sub>	37 <sup>1</sup> / <sub>2</sub>	43	4 <sup>5</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>
	37	42	43 <sup>1</sup> / <sub>2</sub>	44 <sup>5</sup> / <sub>8</sub>	46 <sup>1</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	6 <sup>1</sup> / <sub>4</sub>	49 <sup>7</sup> / <sub>8</sub>	44-1 <sup>1</sup> / <sub>8</sub>	47 <sup>5</sup> / <sub>8</sub>	38 <sup>3</sup> / <sub>8</sub>	39 <sup>1</sup> / <sub>2</sub>	46	4 <sup>5</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>4</sub>
	39	44	45 <sup>5</sup> / <sub>8</sub>	46 <sup>7</sup> / <sub>8</sub>	48 <sup>3</sup> / <sub>8</sub>	3 <sup>5</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	52 <sup>1</sup> / <sub>8</sub>	44-1 <sup>1</sup> / <sub>8</sub>	49 <sup>7</sup> / <sub>8</sub>	40 <sup>1</sup> / <sub>2</sub>	41 <sup>5</sup> / <sub>8</sub>	48 <sup>1</sup> / <sub>4</sub>	4 <sup>3</sup> / <sub>4</sub>	7 <sup>3</sup> / <sub>8</sub>
42	47	48 <sup>5</sup> / <sub>8</sub>	49 <sup>7</sup> / <sub>8</sub>	51 <sup>3</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>	6 <sup>3</sup> / <sub>4</sub>	55 <sup>1</sup> / <sub>8</sub>	52-1 <sup>1</sup> / <sub>8</sub>	52 <sup>7</sup> / <sub>8</sub>	43 <sup>1</sup> / <sub>2</sub>	44 <sup>5</sup> / <sub>8</sub>	51 <sup>1</sup> / <sub>4</sub>	5	7 <sup>3</sup> / <sub>4</sub>	

SHELL SIZE NOMINAL I.D.*	SHELL FLANGE AT CHANNEL END AND CHANNEL FLANGES*								
	MAX. O. D. OF HUB†		DIAM. OF FEMALE FACE	FLANGE THICKNESS	LENGTH THROUGH HUB	FLANGE OUTSIDE DIAM.	NUMBER AND SIZE OF BOLTS	BOLT CIRCLE	
	AT WELDING END O.D.	AT BASE							F
PIPE SHELLS	8	8 <sup>5</sup> / <sub>8</sub>	9 <sup>3</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	13 <sup>1</sup> / <sub>4</sub>	12- <sup>3</sup> / <sub>4</sub>	11 <sup>5</sup> / <sub>8</sub>
	10	10 <sup>3</sup> / <sub>4</sub>	11 <sup>1</sup> / <sub>2</sub>	12 <sup>5</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>16</sub>	2 <sup>13</sup> / <sub>16</sub>	15 <sup>3</sup> / <sub>8</sub>	16- <sup>3</sup> / <sub>4</sub>	13 <sup>3</sup> / <sub>4</sub>
	12	12 <sup>3</sup> / <sub>4</sub>	13 <sup>1</sup> / <sub>2</sub>	14 <sup>5</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	17 <sup>3</sup> / <sub>8</sub>	16- <sup>3</sup> / <sub>4</sub>	15 <sup>3</sup> / <sub>4</sub>
	13	14	14 <sup>3</sup> / <sub>4</sub>	15 <sup>7</sup> / <sub>8</sub>	1 <sup>7</sup> / <sub>16</sub>	2 <sup>15</sup> / <sub>16</sub>	18 <sup>5</sup> / <sub>8</sub>	16- <sup>3</sup> / <sub>4</sub>	17
	15	16	16 <sup>3</sup> / <sub>4</sub>	17 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>8</sub>	20 <sup>5</sup> / <sub>8</sub>	20- <sup>3</sup> / <sub>4</sub>	19
PLATE SHELLS	17	18	18 <sup>3</sup> / <sub>4</sub>	19 <sup>7</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>	22 <sup>5</sup> / <sub>8</sub>	20- <sup>3</sup> / <sub>4</sub>	21
	19	20	20 <sup>3</sup> / <sub>4</sub>	22 <sup>1</sup> / <sub>8</sub>	1 <sup>11</sup> / <sub>16</sub>	3 <sup>7</sup> / <sub>16</sub>	24 <sup>7</sup> / <sub>8</sub>	24- <sup>3</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>4</sub>
	21	22	22 <sup>7</sup> / <sub>8</sub>	24 <sup>1</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>2</sub>	27 <sup>1</sup> / <sub>2</sub>	24- <sup>7</sup> / <sub>8</sub>	25 <sup>5</sup> / <sub>8</sub>
	23	24	24 <sup>7</sup> / <sub>8</sub>	26 <sup>1</sup> / <sub>8</sub>	1 <sup>7</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>	29 <sup>1</sup> / <sub>2</sub>	24- <sup>7</sup> / <sub>8</sub>	27 <sup>5</sup> / <sub>8</sub>
	25	26 <sup>1</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>4</sub>	28 <sup>1</sup> / <sub>2</sub>	2	4 <sup>1</sup> / <sub>8</sub>	31 <sup>5</sup> / <sub>8</sub>	28- <sup>7</sup> / <sub>8</sub>	29 <sup>3</sup> / <sub>4</sub>
	27	28 <sup>1</sup> / <sub>4</sub>	29 <sup>1</sup> / <sub>4</sub>	30 <sup>5</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>16</sub>	4 <sup>5</sup> / <sub>16</sub>	34 <sup>1</sup> / <sub>8</sub>	28-1	32
	29	30 <sup>1</sup> / <sub>4</sub>	31 <sup>1</sup> / <sub>4</sub>	32 <sup>5</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>8</sub>	4 <sup>5</sup> / <sub>8</sub>	36 <sup>1</sup> / <sub>8</sub>	28-1	34
	31	32 <sup>1</sup> / <sub>4</sub>	33 <sup>1</sup> / <sub>4</sub>	34 <sup>5</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>16</sub>	4 <sup>13</sup> / <sub>16</sub>	38 <sup>1</sup> / <sub>8</sub>	32-1	36
	33	34 <sup>3</sup> / <sub>8</sub>	35 <sup>1</sup> / <sub>2</sub>	36 <sup>7</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	5	40 <sup>3</sup> / <sub>8</sub>	36-1	38 <sup>1</sup> / <sub>4</sub>
	35	36 <sup>3</sup> / <sub>8</sub>	37 <sup>1</sup> / <sub>2</sub>	38 <sup>7</sup> / <sub>8</sub>	2 <sup>13</sup> / <sub>16</sub>	5 <sup>5</sup> / <sub>16</sub>	42 <sup>3</sup> / <sub>8</sub>	40-1	40 <sup>1</sup> / <sub>4</sub>
37	38 <sup>3</sup> / <sub>8</sub>	39 <sup>1</sup> / <sub>2</sub>	41	3 <sup>1</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	44 <sup>3</sup> / <sub>4</sub>	36-1 <sup>1</sup> / <sub>8</sub>	42 <sup>1</sup> / <sub>2</sub>	
39	40 <sup>1</sup> / <sub>2</sub>	41 <sup>5</sup> / <sub>8</sub>	43 <sup>1</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>	5 <sup>7</sup> / <sub>8</sub>	46 <sup>7</sup> / <sub>8</sub>	36-1 <sup>1</sup> / <sub>8</sub>	44 <sup>5</sup> / <sub>8</sub>	
42	43 <sup>1</sup> / <sub>2</sub>	44 <sup>5</sup> / <sub>8</sub>	46 <sup>1</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	6 <sup>1</sup> / <sub>4</sub>	49 <sup>7</sup> / <sub>8</sub>	44-1 <sup>1</sup> / <sub>8</sub>	47 <sup>5</sup> / <sub>8</sub>	

\*The nominal I.D. of the shell is also the nominal I.D. of Shell Flanges and the Channel Flanges.

†If shells of 19", 21", and 23" are made from plate, the O.D. max. and E max. can each be greater by 1/4".

‡The diameters of the Tubesheets are equal to the female face diameters, F, less 1/8".

ⓄMaterial: ASTM A181-1 for flange thickness less than 3".

ASTM A105-1 for flange thickness 3" and greater.

Flanges also furnished of alloys as listed on page 243.

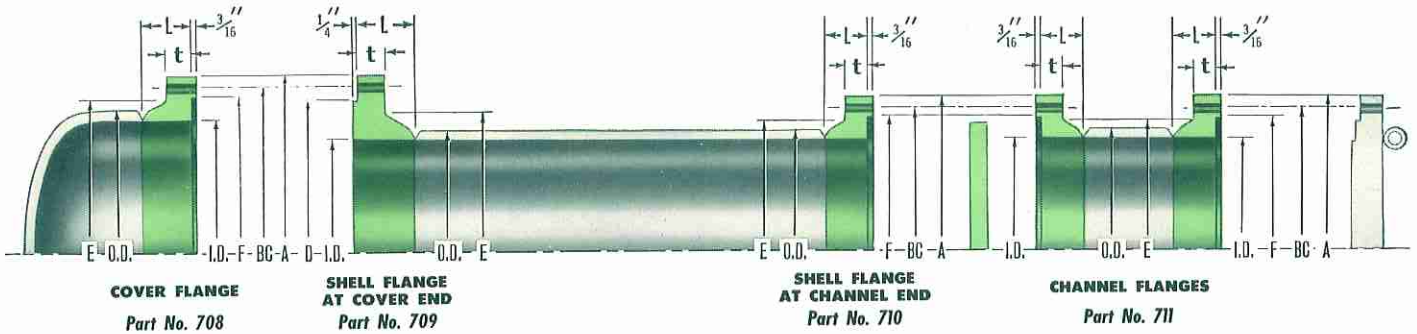
Note: The actual outside and inside diameter of the shell must be specified by the purchaser. The hub diameters will be adjusted accordingly, maintaining the hub slopes established in the TEMA Standard.

Hub thicknesses and Corrosion Allowances—page 187.

Bolt hole diameters are 1/8" larger than respective bolt sizes.

Unless otherwise specified by the purchaser, flanges are furnished with welding bevel according to details shown on page 239.

Alloy steel bolts and metal-jacketed asbestos gaskets are intended. See page 186 for gasket details.



**TEMA CLASS R HUB FLANGES**  
**450 lb. Standard** (450 PSI AT 0° TO 650° F.)

Forged and Rolled Steel  
 ASTM A181-1 and A105-10

SHELL SIZE NOMINAL I. D.*	COVER FLANGE							SHELL FLANGE AT COVER END*							
	I. D.	MAX. O. D. OF HUB		DIAM. OF FEMALE FACE F	FLANGE THICKNESS t	LENGTH THROUGH HUB L	COMMON DIMENSIONS			MAX. O. D. OF HUB†		DIAM. OF MALE FACE D	FLANGE THICKNESS t	LENGTH THROUGH HUB L	
		AT WELDING END O. D.	AT BASE E				FLANGE O. D. A	NUMBER AND SIZE OF BOLTS	BOLT CIRCLE BC	AT WELDING END O. D.	AT BASE E				
PIPE SHELLS	8	12	12 3/4	13 1/2	1 1/2	3	17 3/8	16-3/4	15 3/4	8 5/8	9 3/8	14 1/2	1 15/16	3 7/16	
	10	13	14	14 3/4	1 5/8	3 1/8	19 1/8	16-7/8	17 1/4	10 3/4	11 1/2	15 3/4	2 1/8	3 5/8	
	12	15	16	16 7/8	1 3/4	3 1/2	21 1/4	20-7/8	19 3/8	12 3/4	13 1/2	17 3/4	2 5/16	3 13/16	
	13	17	18	18 7/8	1 7/8	3 5/8	23 1/4	24-7/8	21 3/8	14	14 3/4	19 3/4	2 5/8	4 1/8	
	15	19	20 1/4	21 1/4	2 21/8	2	4	26 1/8	20-1	24	16	16 7/8	22	2 7/8	4 5/8
	17	21	22 1/4	23 1/4	2 41/8	2 3/16	4 3/16	28 1/8	24-1	26	18	18 7/8	24	3 1/16	4 13/16
PLATE SHELLS	19	23	24 1/4	25 1/4	2 61/8	4 3/8	30 1/8	28-1	28	20	21	26	3 1/4	5 1/4	
	21	25	26 1/2	27 5/8	2 91/8	4 7/8	32 7/8	28-1 1/8	30 5/8	22	23	29	3 1/2	5 1/2	
	23	27	28 1/2	29 5/8	3 11/8	2 11/16	4 5/16	34 7/8	32-1 1/8	32 5/8	24	25	31	3 13/16	5 13/16
	25	29	30 5/8	31 7/8	3 33/8	2 3/4	5 1/4	37 1/8	32-1 1/8	34 7/8	26 1/2	27 5/8	33 1/4	3 7/8	6 1/8
	27	31	32 5/8	33 3/8	3 53/8	2 5/16	5 7/16	39 1/8	36-1 1/8	36 7/8	28 1/2	29 5/8	35 1/4	4 1/16	6 5/16
	29	33	34 3/4	36	3 71/2	3 1/8	5 5/8	41 1/4	40-1 1/8	39	30 5/8	31 7/8	37 3/8	4 1/4	6 3/4
	31	35	36 3/4	38	3 97/8	3 7/16	6 1/16	44	40-1 1/4	41 1/2	32 5/8	33 7/8	39 3/4	4 5/8	7 1/8
	33	37	38 7/8	40 1/4	4 21/8	3 3/4	6 1/2	46 1/4	40-1 1/4	43 3/4	34 3/4	36	42	5	7 1/2
35	39	41	42 3/8	4 41/4	4	6 3/4	48 3/8	44-1 1/4	45 7/8	36 3/4	38	44 1/8	5 5/16	7 15/16	
37	42	44	45 3/8	4 73/8	4 1/4	7 1/8	51 7/8	40-1 3/8	49 1/8	38 7/8	40 1/4	47 1/4	5 5/8	8 3/8	
39	44	46 1/8	47 5/8	4 95/8	4 1/2	7 1/2	54 1/8	48-1 3/8	51 3/8	41	42 3/8	49 1/2	6	8 3/4	
42	47	49 1/4	50 3/4	5 23/4	4 3/4	7 7/8	57 1/4	52-1 3/8	54 1/2	44	45 3/8	52 5/8	6 3/8	9 1/4	

SHELL SIZE NOMINAL I. D.*	SHELL FLANGE AT CHANNEL END AND CHANNEL FLANGES*									
	MAX. O. D. OF HUB†		DIAM. OF FEMALE FACE F	FLANGE THICKNESS t	LENGTH THROUGH HUB L	FLANGE OUTSIDE DIAM. A	NUMBER AND SIZE OF BOLTS	BOLT CIRCLE BC		
	AT WELDING END O. D.	AT BASE E								
PIPE SHELLS	8	8 5/8	9 3/8	10 1/2	1 1/4	2 3/4	13 1/4	12-3/4	11 5/8	
	10	10 3/4	11 1/2	12 5/8	1 3/8	2 7/8	15 3/8	16-3/4	13 3/4	
	12	12 3/4	13 1/2	14 5/8	1 1/2	3	17 3/8	16-3/4	15 3/4	
	13	14	14 3/4	15 7/8	1 5/8	3 1/8	19 1/8	16-7/8	17 1/4	
	15	16	16 7/8	17 7/8	1 3/4	3 1/2	21 1/4	20-7/8	19 3/8	
	17	18	18 7/8	19 7/8	1 7/8	3 5/8	23 1/4	24-7/8	21 3/8	
PLATE SHELLS	19	20	21	22 1/8	2	4	26 1/8	20-1	24	
	21	22	23	24 1/8	2 3/16	4 3/16	28 1/8	24-1	26	
	23	24	25	26 1/8	2 3/8	4 3/8	30 1/8	28-1	28	
	25	26 1/2	27 5/8	29 1/8	2 5/8	4 7/8	32 7/8	28-1 1/8	30 5/8	
	27	28 1/2	29 5/8	31 1/8	2 11/16	4 5/16	34 7/8	32-1 1/8	32 5/8	
	29	30 5/8	31 7/8	33 3/8	2 3/4	5 1/4	37 1/8	32-1 1/8	34 7/8	
	31	32 5/8	33 7/8	35 3/8	2 5/16	5 7/16	39 1/8	36-1 1/8	36 7/8	
	33	34 3/4	36	37 1/2	3 1/8	5 5/8	41 1/4	40-1 1/8	39	
35	36 3/4	38	39 7/8	3 7/16	6 1/16	44	36-1 1/4	41 1/2		
37	38 7/8	40 1/4	42 1/8	3 3/4	6 1/2	46 1/4	40-1 1/4	43 3/4		
39	41	42 3/8	44 1/4	4	6 3/4	48 3/8	44-1 1/4	45 7/8		
42	44	45 3/8	47 3/8	4 1/4	7 1/8	51 7/8	40-1 3/8	49 1/8		

\*The nominal I.D. of the shell is also the nominal I.D. of Shell Flanges and the Channel Flanges.

†If shells of 19", 21", and 23" are made from plate, the O.D. max. and E max. can each be greater by 1/4".

‡The diameters of the Tubesheets are equal to the female face diameters, F, less 1/8".

ⓄMaterial: ASTM A181-1 for flange thickness less than 3".

ASTM A105-1 for flange thickness 3" and greater.

Flanges also furnished of alloys as listed on page 243.

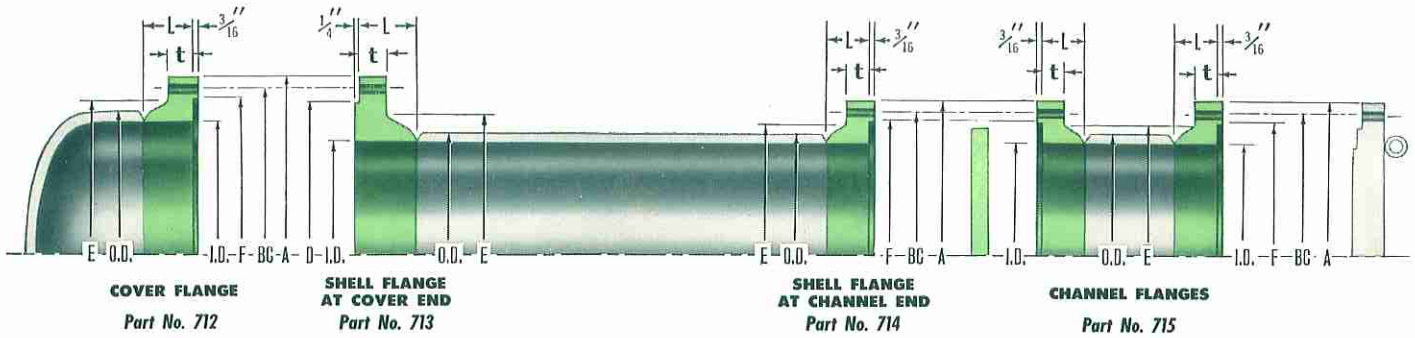
Note: The actual outside and inside diameter of the shell must be specified by the purchaser. The hub diameters will be adjusted accordingly, maintaining the hub slopes established in the TEMA Standard.

Hub thicknesses and Corrosion Allowances—page 187.

Bolt hole diameters are 1/8" larger than respective bolt sizes.

Unless otherwise specified by the purchaser, flanges are furnished with welding bevel according to details shown on page 239.

Alloy steel bolts and metal-jacketed asbestos gaskets are intended. See page 186 for gasket details.



Forged and Rolled Steel  
ASTM A181-1 and A105-10

**TEMA CLASS R HUB FLANGES**  
**600 lb. Standard** (600 PSI AT 0° TO 650° F.)

SHELL SIZE NOMINAL I. D.*	COVER FLANGE							SHELL FLANGE AT COVER END*							
	I. D.	MAX. O. D. OF HUB		DIAM. OF FEMALE FACE F	FLANGE THICKNESS t	LENGTH THROUGH HUB L	COMMON DIMENSIONS			MAX. O. D. OF HUB AT WELDING END O. D.	AT BASE E	DIAM. OF MALE FACE D	FLANGE THICKNESS t	LENGTH THROUGH HUB L	
		AT WELDING END O. D.	AT BASE E				FLANGE O. D. A	NUMBER AND SIZE OF BOLTS	BOLT CIRCLE BC						
PIPE SHELLS	8	12	12 3/4	13 7/16	1 5/8	1 11/16	3 1/16	1 7 3/8	2 4-3/4	1 5 3/4	8 5/8	9 1/4	1 4 1/2	2 3/8	3 5/8
	10	13	14	1 4 1 1/16	1 6	1 7/8	3 1/4	1 9 1/8	2 0-7/8	1 7 1/4	1 0 3/4	1 1 3/8	1 5 7/8	2 1/2	3 3/4
	12	15	16	1 6 3/4	1 8	2	3 1/2	2 1 1/8	2 4-7/8	1 9 1/4	1 2 3/4	1 3 7/16	1 7 7/8	2 1 1/16	4 1/16
	13	17	18	1 8 3/4	2 0	2 1/4	3 3/4	2 3 1/8	2 8-7/8	2 1 1/4	1 4	1 4 1 1/16	1 9 7/8	2 1 5/16	4 5/16
	15	19	20	2 0 1 3/16	2 2 1/4	2 7/16	4 1/16	2 5 3/4	2 8-1	2 3 5/8	1 6	1 6 3/4	2 2 1/8	3 1/2	5
	17	21	22	2 2 7/8	2 4 1/4	2 7/16	4 3/16	2 7 3/4	3 2-1	2 5 5/8	1 8	1 8 3/4	2 4 1/8	3 9/16	5 1/16
	19	23	24	2 4 7/8	2 6 3/8	2 3/4	4 1/2	3 0 1/8	2 8-1 1/8	2 7 7/8	2 0	2 0 1 3/16	2 6 1/4	3 3/4	5 3/8
21	25	27	2 7 1 5/16	2 9 1/2	3	4 7/8	3 3 1/4	3 6-1 1/8	3 1	2 2	2 2 7/8	2 9 3/8	4 5/16	6 1/16	
23	27	29	2 9 1 5/16	3 1 1/2	3 1/8	5	3 5 1/4	4 0-1 1/8	3 3	2 4	2 4 7/8	3 1 3/8	4 9/16	6 5/16	
PLATE SHELLS	25	29	3 1 1/4	3 2 1/4	3 4 1/8	3 1/2	5 1/2	3 8 1/4	3 6-1 1/4	3 5 3/4	2 7	2 7 1 5/16	3 4	4 1 3/16	6 1 1/16
	27	31	3 3 1/4	3 4 1/4	3 6 1/8	3 1 1/16	5 1 1/16	4 0 1/4	4 0-1 1/4	3 7 3/4	2 9	2 9 1 5/16	3 6	5 1/16	6 1 5/16
	29	33	3 5 1/4	3 6 5/16	3 8 3/8	3 7/8	6	4 2 7/8	3 6-1 3/8	4 0 1/8	3 1 1/4	3 2 1/4	3 8 1/4	5 5/16	7 5/16
	31	35	3 7 1/2	3 8 5/8	4 0 3/4	4 1/4	6 1/2	4 5 5/8	3 6-1 1/2	4 2 5/8	3 3 1/4	3 4 1/4	4 0 5/8	5 1 1/16	7 1 1/16
	33	37	3 9 1/2	4 0 5/8	4 2 3/4	4 9/16	6 1 3/16	4 7 5/8	4 0-1 1/2	4 4 5/8	3 5 1/4	3 6 5/16	4 2 5/8	5 7/8	8
	35	39	4 1 3/4	4 2 1 5/16	4 5 1/8	4 9/16	6 1 5/16	5 0	4 0-1 1/2	4 7	3 7 1/2	3 8 5/8	4 5	6 1/8	8 3/8
	37	42	4 4 3/4	4 6	4 8 1/8	4 9/16	7 1/16	5 3	4 8-1 1/2	5 0	3 9 1/2	4 0 5/8	4 8	6 1 3/16	9 1/16
	39	44	4 7	4 8 1/4	5 0 1/2	5	7 1/2	5 5 3/4	4 4-1 5/8	5 2 1/2	4 1 3/4	4 2 1 5/16	5 0 3/8	7 1/16	9 7/16
42	47	5 0 1/4	5 1 1/2	5 3 3/4	5 1/4	7 3/4	5 9	4 8-1 5/8	5 5 3/4	4 4 3/4	4 6	5 3 5/8	7 3/8	9 7/8	

SHELL SIZE NOMINAL I. D.*	SHELL FLANGE AT CHANNEL END AND CHANNEL FLANGES*									
	MAX. O. D. OF HUB		DIAM. OF FEMALE FACE F	FLANGE THICKNESS t	LENGTH THROUGH HUB L	FLANGE OUTSIDE DIAM. A	NUMBER AND SIZE OF BOLTS	BOLT CIRCLE BC		
	AT WELDING END O. D.	AT BASE E								
PIPE SHELLS	8	8 5/8	9 1/4	1 0 3/8	1 3/8	2 5/8	1 3 1/8	1 2-3/4	1 1 1/2	
	10	1 0 3/4	1 1 3/8	1 2 1/2	1 5/8	2 7/8	1 5 1/4	2 0-3/4	1 3 5/8	
	12	1 2 3/4	1 3 7/16	1 4 5/8	1 1 1/16	3 1/16	1 7 3/8	2 4-3/4	1 5 3/4	
	13	1 4	1 4 1 1/16	1 6	1 7/8	3 1/4	1 9 1/8	2 0-7/8	1 7 1/4	
	15	1 6	1 6 3/4	1 8	2	3 1/2	2 1 1/8	2 4-7/8	1 9 1/4	
	17	1 8	1 8 3/4	2 0	2 1/4	3 3/4	2 3 1/8	2 8-7/8	2 1 1/4	
	19	2 0	2 0 1 3/16	2 2 1/4	2 7/16	4 1/16	2 5 3/4	2 8-1	2 3 5/8	
21	2 2	2 2 7/8	2 4 1/4	2 7/16	4 3/16	2 7 3/4	3 2-1	2 5 5/8		
23	2 4	2 4 7/8	2 6 3/8	2 3/4	4 1/2	3 0 1/8	2 8-1 1/8	2 7 7/8		
PLATE SHELLS	25	2 7	2 7 1 5/16	2 9 1/2	3	4 7/8	3 3 1/4	3 6-1 1/8	3 1	
	27	2 9	2 9 1 5/16	3 1 1/2	3 1/8	5	3 5 1/4	4 0-1 1/8	3 3	
	29	3 1 1/4	3 2 1/4	3 4 1/8	3 1/2	5 1/2	3 8 1/4	3 6-1 1/4	3 5 3/4	
	31	3 3 1/4	3 4 1/4	3 6 1/8	3 1 1/16	5 1 1/16	4 0 1/4	4 0-1 1/4	3 7 3/4	
	33	3 5 1/4	3 6 5/16	3 8 3/8	3 7/8	6	4 2 7/8	3 6-1 3/8	4 0 1/8	
	35	3 7 1/2	3 8 5/8	4 0 3/4	4 1/4	6 1/2	4 5 5/8	3 6-1 1/2	4 2 5/8	
	37	3 9 1/2	4 0 5/8	4 2 3/4	4 9/16	6 1 3/16	4 7 5/8	4 0-1 1/2	4 4 5/8	
39	4 1 3/4	4 2 1 5/16	4 5 1/8	4 9/16	6 1 5/16	5 0	4 0-1 1/2	4 7		
42	4 4 3/4	4 6	4 8 1/8	4 9/16	7 1/16	5 3	4 8-1 1/2	5 0		

\*The nominal I.D. of the shell is also the nominal I. D. of Shell Flanges and the Channel Flanges. The maximum corroded I.D. for 19", 21", and 23" Pipe Shells cannot exceed 18.97", 20.86", and 22.75" respectively for the flanges tabulated on this page.

†The diameters of the Tubesheets are equal to the female face diameters, F, less 1/8".

ⓂMaterial: ASTM A 181-1 for flange thickness less than 3".

ASTM A105-1 for flange thickness 3" and greater.

Flanges also furnished of alloys as listed on page 243.

Note: The actual outside and inside diameter of the shell must be specified by the purchaser. The hub diameters will be adjusted accordingly, maintaining the hub slopes established in the TEMA Standard.

Hub thicknesses and Corrosion Allowances—page 187.

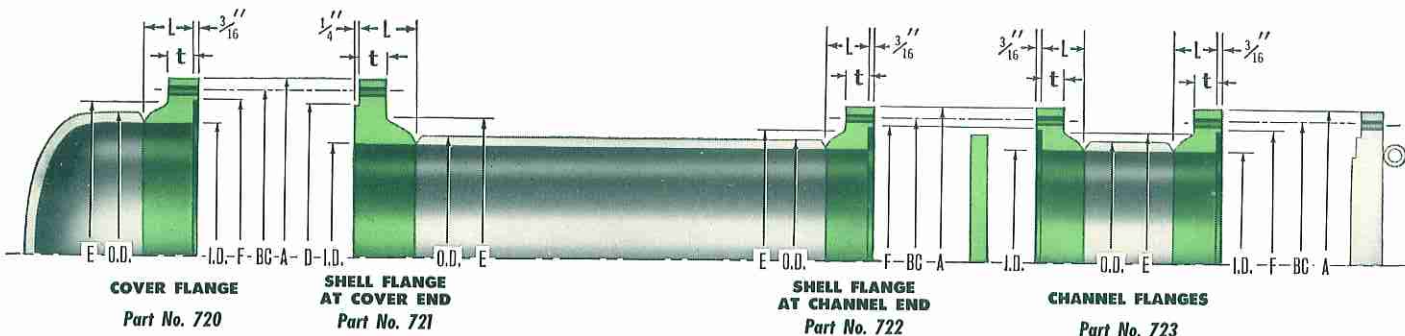
Bolt hole diameters are 1/8" larger than respective bolt sizes.

Unless otherwise specified by the purchaser, flanges are furnished with welding bevel according to details shown on page 239.

Alloy steel bolts and metal-jacketed asbestos gaskets are intended. See page 186 for gasket details.







Forged and Rolled Steel  
ASTM A181-1 and A105-1⊖

**TEMA CLASS C & A HUB FLANGES**  
**150 lb. Standard** (150 PSI AT 0° TO 650° F.)

SHELL SIZE NOMINAL I. D.*	I. D.	COVER FLANGE						SHELL FLANGE AT COVER END*								
		MAX. O. D. OF HUB		DIAM. OF FEMALE FACE F	FLANGE THICKNESS t	LENGTH THROUGH HUB L	COMMON DIMENSIONS			MAX. O. D. OF HUB		DIAM. OF MALE FACE D	FLANGE THICKNESS t	LENGTH THROUGH HUB L		
		AT WELDING END O. D.	AT BASE E				FLANGE O. D. A	NUMBER AND SIZE OF BOLTS	BOLT CIRCLE BC	AT WELDING END O. D.	AT BASE E					
PIPE SHELLS	6	10	10 3/4	11 5/16	12 1/8	1	2 1/8	14 5/8	16-5/8	13 1/8	6 5/8	7 1/8	12	1 5/16	2 5/16	
	8	12	12 3/4	13 5/16	14 1/8	1	2 1/8	16 5/8	20-5/8	15 1/8	8 5/8	9 3/16	14	1 3/8	2 1/2	
	10	13	14	14 9/16	15 3/8	1	2 1/8	17 7/8	20-5/8	16 3/8	10 3/4	11 5/16	15 1/4	1 7/16	2 9/16	
	12	15	16	16 5/8	17 3/8	1 1/16	2 5/16	19 7/8	24-5/8	18 3/8	12 3/4	13 5/16	17 1/4	1 7/16	2 9/16	
	13	17	18	18 5/8	19 1/2	1 3/16	2 7/16	22	28-5/8	20 1/2	14	14 9/16	19 3/8	1 11/16	3 1/16	
	15	19	20	20 3/8	21 1/2	1 1/4	2 1/2	24	28-5/8	22 1/2	16	16 5/8	21 3/8	1 3/4	3	
	17	21	22	22 1 1/16	23 5/8	1 1/4	2 5/8	26 1/8	32-5/8	24 5/8	18	18 5/8	23 1/2	1 15/16	3 3/16	
PLATE SHELLS	19	23	24	24 1 1/16	25 5/8	1 3/8	2 3/4	28 1/8	36-5/8	26 5/8	20	20 5/8	25 1/2	2 1/16	3 5/16	
	21	25	26	26 1 1/16	27 7/8	2	3 3/8	30 5/8	32-3/4	29	22	22 1 1/16	27 3/4	2 7/16	3 13/16	
	23	27	28	28 1 1/16	29 7/8	2 1/16	3 7/16	32 5/8	36-3/4	31	24	24 1 1/16	29 3/4	2 9/16	3 5/16	
	25	29	30	30 3/4	31 7/8	2 1/16	3 9/16	34 5/8	40-3/4	33	26	26 1 1/16	31 3/4	2 11/16	4 1/16	
	27	31	32	32 3/4	33 7/8	2 1/16	3 9/16	36 5/8	40-3/4	35	28	28 1 1/16	33 3/4	2 13/16	4 3/16	
	29	33	34	34 3/4	35 7/8	2 1/8	3 5/8	38 5/8	44-3/4	37	30	30 3/4	35 3/4	2 15/16	4 7/16	
	31	35	36	36 1 3/16	38	2 3/16	3 13/16	40 3/4	44-3/4	39 1/8	32	32 3/4	37 7/8	3 1/16	4 9/16	
	33	37	38	38 1 3/16	40	2 1/4	3 7/8	42 3/4	48-3/4	41 1/8	34	34 3/4	39 7/8	3 3/16	4 1 1/16	
	35	39	40	40 1 3/16	42	2 5/16	3 15/16	44 3/4	52-3/4	43 1/8	36	36 13/16	41 7/8	3 5/16	4 5/16	
	37	42	43 1/4	44 1/8	45 1/4	2 5/16	4 1/16	48	52-3/4	46 3/8	38	38 13/16	45 1/8	3 5/8	5 1/4	
39	43	44 1/4	45 1/8	46 1/4	2 3/8	4 1/8	49	56-3/4	47 3/8	40	40 13/16	46 1/8	3 5/8	5 1/4		
42	46	47 1/4	48 1/8	49 1/4	2 1/2	4 1/4	52	60-3/4	50 3/8	43 1/4	44 1/8	49 1/8	3 3/4	5 1/2		

SHELL SIZE NOMINAL I. D.*	SHELL FLANGE AT CHANNEL END AND CHANNEL FLANGES*								
	MAX. O. D. OF HUB		DIAM. OF FEMALE FACE F	FLANGE THICKNESS t	LENGTH THROUGH HUB L	FLANGE OUTSIDE DIAM. A	NUMBER AND SIZE OF BOLTS	BOLT CIRCLE BC	
	AT WELDING END O. D.	AT BASE E							
PIPE SHELLS	6	6 5/8	7 1/8	8	1 5/16	11 5/16	10 1/2	12-5/8	9
	8	8 5/8	9 3/16	10	1	2 1/8	12 1/2	16-5/8	11
	10	10 3/4	11 5/16	12 1/8	1	2 1/8	14 5/8	16-5/8	13 1/8
	12	12 3/4	13 5/16	14 1/8	1	2 1/8	16 5/8	20-5/8	15 1/8
	13	14	14 9/16	15 3/8	1	2 1/8	17 7/8	20-5/8	16 3/8
	15	16	16 5/8	17 3/8	1 1/16	2 5/16	19 7/8	24-5/8	18 3/8
	17	18	18 5/8	19 1/2	1 3/16	2 7/16	22	28-5/8	20 1/2
PLATE SHELLS	19	20	20 5/8	21 1/2	1 1/4	2 1/2	24	28-5/8	22 1/2
	21	22	22 1 1/16	23 5/8	1 1/4	2 5/8	26 1/8	32-5/8	24 5/8
	23	24	24 1 1/16	25 7/8	1 3/8	2 3/4	28 1/8	36-5/8	26 5/8
	25	26	26 1 1/16	27 7/8	2	3 3/8	30 5/8	32-3/4	29
	27	28	28 1 1/16	29 7/8	2 1/16	3 7/16	32 5/8	36-3/4	31
	29	30	30 3/4	31 7/8	2 1/16	3 9/16	34 5/8	40-3/4	33
	31	32	32 3/4	33 7/8	2 1/16	3 9/16	36 5/8	40-3/4	35
	33	34	34 3/4	35 7/8	2 1/8	3 5/8	38 5/8	44-3/4	37
	35	36	36 1 3/16	38	2 3/16	3 13/16	40 3/4	44-3/4	39 1/8
	37	38	38 1 3/16	40	2 1/4	3 7/8	42 3/4	48-3/4	41 1/8
39	40	40 1 3/16	42	2 5/16	3 15/16	44 3/4	52-3/4	43 1/8	
42	43 1/4	44 1/8	45 1/4	2 5/16	4 1/16	48	52-3/4	46 3/8	

\*The nominal I.D. of the shell is also the nominal I.D. of Shell Flanges and the Channel Flanges.

†The diameters of the Tubesheets are equal to the female face diameters, F, less 1/8".

⊖Material: ASTM A181-1 for flange thickness less than 3".  
ASTM A105-1 for flange thickness 3" and greater.  
Flanges also furnished of alloys as listed on page 243.

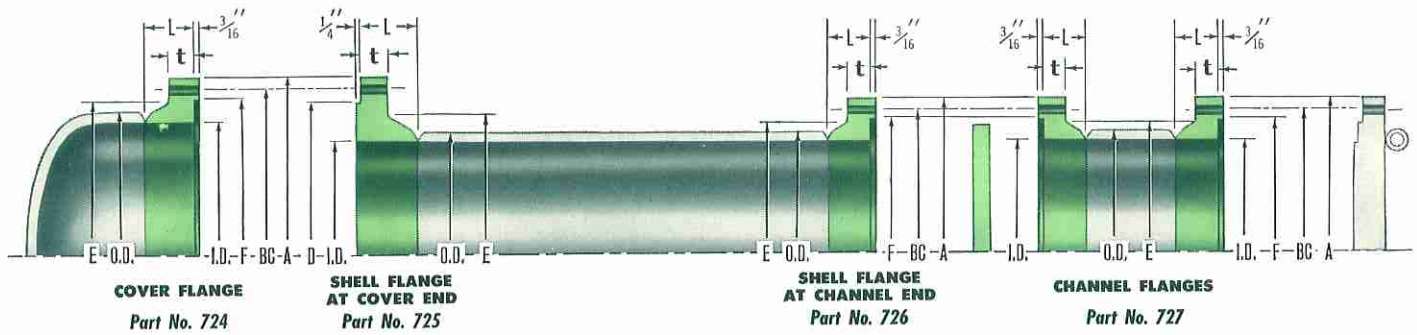
Note: The actual outside and inside diameter of the shell must be specified by the purchaser. The hub diameters will be adjusted accordingly, maintaining the hub slopes established in the TEMA Standard.

Hub thicknesses and Corrosion Allowances—page 187.

Bolt hole diameters are 1/8" larger than respective bolt sizes.

Unless otherwise specified by the purchaser, flanges are furnished with welding bevel according to details shown on page 239.

Alloy steel bolts and metal-jacketed asbestos gaskets are intended. See page 186 for gasket details.



**TEMA CLASS C & A HUB FLANGES**  
**300 lb. Standard** (300 PSI AT 0° TO 650° F.)

Forged and Rolled Steel  
 ASTM A181-1 and A105-1⊙

SHELL SIZE NOMINAL I. D.*	COVER FLANGE						SHELL FLANGE AT COVER END*								
	I. D.	MAX. O. D. OF HUB		DIAM. OF FEMALE FACE F	FLANGE THICKNESS t	LENGTH THROUGH HUB L	COMMON DIMENSIONS			MAX. O. D. OF HUB		DIAM. OF MALE FACE D	FLANGE THICKNESS t	LENGTH THROUGH HUB L	
		AT WELDING END O. D.	AT BASE E				FLANGE O. D. A	NUMBER AND SIZE OF BOLTS	BOLT CIRCLE BC	AT WELDING END O. D.	AT BASE E				
PIPE SHELLS	6	10	10 3/4	11 5/16	12 1/8	1 1/16	2 5/16	14 5/8	16-5/8	13 1/8	6 5/8	7 1/8	12	1 9/16	2 1/16
	8	12	12 3/4	13 5/16	14 1/8	1 1/16	2 5/16	16 5/8	20-5/8	15 1/8	8 5/8	9 3/16	14	1 5/8	2 3/4
	10	13	14	14 9/16	15 3/8	1 1/16	2 5/16	17 7/8	20-5/8	16 3/8	10 3/4	11 5/16	15 1/4	1 3/4	3
	12	15	16	16 5/8	17 3/8	1 1/8	2 1/2	19 7/8	24-5/8	18 3/8	12 3/4	13 5/16	17 1/4	1 13/16	3 1/16
	13	17	18	18 5/8	19 1/2	1 1/4	2 5/8	22	28-5/8	20 1/2	14	14 9/16	19 3/8	2	3 1/4
	15	19	20	20 5/8	21 1/2	1 3/8	2 3/4	24	36-5/8	22 1/2	16	16 5/8	21 3/8	2 3/16	3 9/16
	17	21	22	22 3/4	23 5/8	1 1/2	3	26 1/8	40-5/8	24 5/8	18	18 5/8	23 1/2	2 7/16	3 3/16
	19	23	24	24 3/4	25 5/8	1 5/8	3 1/8	28 1/4	48-5/8	26 5/8	20	20 5/8	25 1/2	2 11/16	4 1/16
21	25	26 1/4	27	28 1/8	2 1/8	3 5/8	30 7/8	40-3/4	29 1/4	22	22 3/4	28	3	4 1/2	
23	27	28 1/4	29 1/16	30 1/4	2 1/4	3 7/8	33	44-3/4	31 3/8	24	24 3/4	30 1/8	3 3/16	4 11/16	
PLATE SHELLS	25	29	30 1/4	31 1/16	32 1/4	2 3/8	4	35	52-3/4	33 3/8	26 1/4	27	32 1/8	3 7/16	4 5/16
	27	31	32 1/2	33 5/16	34 1/2	2 1/2	4 1/8	37 1/4	56-3/4	35 5/8	28 1/4	29 1/16	34 3/8	3 11/16	5 5/16
	29	33	34 1/2	35 3/8	36 1/2	2 9/16	4 5/16	39 1/4	64-3/4	37 5/8	30 1/4	31 1/16	36 3/8	3 7/8	5 1/2
	31	35	36 1/2	37 3/8	38 1/2	2 5/8	4 3/8	41 1/4	68-3/4	39 5/8	32 1/2	33 5/16	38 3/8	4	5 7/8
	33	37	38 1/2	39 7/16	40 3/4	2 13/16	4 11/16	43 7/8	56-7/8	42	34 1/2	35 3/8	40 5/8	4 1/8	5 7/8
	35	39	40 1/2	41 7/16	42 3/4	2 5/16	4 13/16	45 7/8	60-7/8	44	36 1/2	37 3/8	42 5/8	4 1/4	6
	37	42	43 3/4	44 3/4	46 1/8	3 3/16	5 3/16	49 5/8	52-1	47 1/2	38 1/2	39 7/16	46	4 7/8	6 3/4
39	43	44 3/4	45 3/4	47 1/8	3 5/16	5 5/16	50 5/8	56-1	48 1/2	40 1/2	41 7/16	47	4 7/8	6 3/4	
42	46	47 3/4	48 3/4	50 1/8	3 9/16	5 9/16	53 5/8	64-1	51 1/2	43 3/4	44 3/4	50	5 1/8	7 1/8	

SHELL SIZE NOMINAL I. D.*	SHELL FLANGE AT CHANNEL END AND CHANNEL FLANGES*									
	MAX. O. D. OF HUB		DIAM. OF FEMALE FACE F	FLANGE THICKNESS t	LENGTH THROUGH HUB L	FLANGE OUTSIDE DIAM. A	NUMBER AND SIZE OF BOLTS	BOLT CIRCLE BC	AT WELDING END O. D.	AT BASE E
	AT WELDING END O. D.	AT BASE E								
PIPE SHELLS	6	6 5/8	7 1/8	8	1	2 1/8	10 1/2	12-5/8	9	9
	8	8 5/8	9 3/16	10	1 1/16	2 3/16	12 1/2	16-5/8	11	11
	10	10 3/4	11 5/16	12 1/8	1 1/16	2 5/16	14 5/8	16-5/8	13 1/8	13 1/8
	12	12 3/4	13 5/16	14 1/8	1 1/16	2 5/16	16 5/8	20-5/8	15 1/8	15 1/8
	13	14	14 9/16	15 3/8	1 1/16	2 5/16	17 7/8	20-5/8	16 3/8	16 3/8
	15	16	16 5/8	17 3/8	1 1/8	2 1/2	19 7/8	24-5/8	18 3/8	18 3/8
	17	18	18 5/8	19 1/2	1 1/4	2 5/8	22	28-5/8	20 1/2	20 1/2
	19	20	20 5/8	21 1/2	1 3/8	2 3/4	24	36-5/8	22 1/2	22 1/2
21	22	22 3/4	23 5/8	1 1/2	3	26 1/8	40-5/8	24 5/8	24 5/8	
23	24	24 3/4	25 5/8	1 5/8	3 1/8	28 1/8	48-5/8	26 5/8	26 5/8	
PLATE SHELLS	25	26 1/4	27	28 1/8	2 1/8	3 5/8	30 7/8	40-3/4	29 1/4	29 1/4
	27	28 1/4	29 1/16	30 1/4	2 1/4	3 7/8	33	44-3/4	31 3/8	31 3/8
	29	30 1/4	31 1/16	32 1/4	2 3/8	4	35	52-3/4	33 3/8	33 3/8
	31	32 1/2	33 5/16	34 1/2	2 1/2	4 1/8	37 1/4	56-3/4	35 5/8	35 5/8
	33	34 1/2	35 3/8	36 1/2	2 9/16	4 5/16	39 1/4	64-3/4	37 5/8	37 5/8
	35	36 1/2	37 3/8	38 1/2	2 5/8	4 3/8	41 1/4	68-3/4	39 5/8	39 5/8
	37	38 1/2	39 7/16	40 3/4	2 13/16	4 11/16	43 7/8	56-7/8	42	42
39	40 1/2	41 7/16	42 3/4	2 15/16	4 13/16	45 7/8	60-7/8	44	44	
42	43 3/4	44 3/4	46 1/8	3 3/16	5 3/16	49 5/8	52-1	47 1/2	47 1/2	

\*The nominal I.D. of the shell is also the nominal I.D. of Shell Flanges and the Channel Flanges.

†The diameters of the Tubesheets are equal to the female face diameters, F, less 1/8".

⊙Material: ASTM A181-1 for flange thickness less than 3".  
 ASTM A105-1 for flange thickness 3" and greater.  
 Flanges also furnished of alloys as listed on page 243.

Note: The actual outside and inside diameter of the shell must be specified by the purchaser. The hub diameters will be adjusted accordingly, maintaining the hub slopes established in the TEMA Standard.

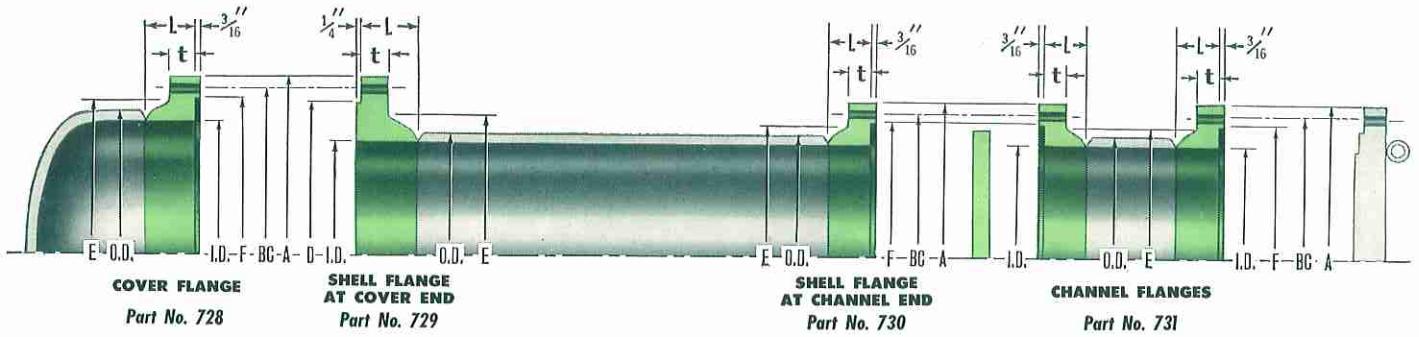
Hub thicknesses and Corrosion Allowances—page 187.

Bolt hole diameters are 1/8" larger than respective bolt sizes.

Unless otherwise specified by the purchaser, flanges are furnished with welding bevel according to details shown on page 239.

Alloy steel bolts and metal-jacketed asbestos gaskets are intended. See page 186 for gasket details.

L A D I S H C O N T R O L L E D Q U A L I T Y



Forged and Rolled Steel  
ASTM A181-1 and A105-10

**TEMA CLASS C & A HUB FLANGES**  
**450 lb. Standard** (450 PSI AT 0° TO 650° F.)

SHELL SIZE NOMINAL I. D.*	COVER FLANGE						SHELL FLANGE AT COVER END*								
	I. D.	MAX. O. D. OF HUB		DIAM. OF FEMALE FACE		FLANGE THICK-NESS	LENGTH THROUGH HUB	COMMON DIMENSIONS			MAX. O. D. OF HUB†		DIAM. OF MALE FACE	FLANGE THICK-NESS	LENGTH THROUGH HUB
		AT WELDING END O. D.	AT BASE E	F	t	L	FLANGE O. D. A	NUMBER AND SIZE OF BOLTS	BOLT CIRCLE BC	AT WELDING END O. D.	AT BASE E	D	t	L	
PIPE SHELLS	6	10 3/4	11 1/2	12 5/8	1 3/8	2 7/8	15 3/8	16-3/4	13 3/4	6 5/8	7 1/4	12 1/2	1 3/4	3	
	8	12 3/4	13 1/2	14 5/8	1 1/2	3	17 3/8	16-3/4	15 3/4	8 5/8	9 3/8	14 1/2	1 5/16	3 7/16	
	10	13	14 3/4	15 7/8	1 5/8	3 1/8	19 1/8	16-7/8	17 1/4	10 3/4	11 1/2	15 3/4	2 1/8	3 5/8	
	12	15	16	16 7/8	1 7/8	3 1/2	21 1/4	20-7/8	19 3/8	12 3/4	13 1/2	17 3/4	2 5/16	3 13/16	
	13	17	18	18 7/8	1 7/8	3 5/8	23 1/4	24-7/8	21 3/8	14	14 3/4	19 3/4	2 5/8	4 1/8	
	15	19	20 1/4	21 1/4	22 1/8	2	4	26 1/8	20-1	24	16	16 7/8	22	2 7/8	4 5/8
	17	21	22 1/4	23 1/4	24 1/8	2 3/16	4 3/16	28 1/8	24-1	26	18	18 7/8	24	3 1/16	4 13/16
PLATE SHELLS	19	23	24 1/4	25 1/4	2 3/8	4 3/8	30 1/8	28-1	28	20	21	26	3 1/4	5 1/4	
	21	25	26 1/2	27 5/8	2 5/8	4 7/8	32 7/8	28-1 1/8	30 5/8	22	23	29	3 1/2	5 1/2	
	23	27	28 1/2	29 5/8	3 1/8	5 1/16	34 7/8	32-1 1/8	32 5/8	24	25	31	3 3/16	5 13/16	
	25	29	30 5/8	31 7/8	3 3/8	5 1/4	37 1/8	32-1 1/8	34 7/8	26 1/2	27 5/8	33 1/4	3 7/8	6 1/8	
	27	31	32 5/8	33 7/8	3 5/8	5 7/16	39 1/8	36-1 1/8	36 7/8	28 1/2	29 3/8	35 1/4	4 1/16	6 5/16	
	29	33	34 3/4	36	3 7/2	5 5/8	41 1/4	40-1 1/8	39	30 5/8	31 7/8	37 3/8	4 1/4	6 3/4	
	31	35	36 3/4	38	3 9/8	6 1/16	44	36-1 1/4	41 1/2	32 5/8	33 7/8	39 3/4	4 5/8	7 1/8	
33	37	38 3/8	40 1/4	4 2 1/8	6 1/2	46 1/4	40-1 1/4	43 3/4	34 3/4	36	42	5	7 1/2		
35	39	41	42 3/8	4 4 1/4	4	6 3/4	44-1 1/4	45 7/8	36 3/4	38	44 1/8	5 5/16	7 5/16		
37	42	44	45 3/8	4 7 3/8	4 1/4	7 1/8	51 7/8	40-1 3/8	49 1/8	38 7/8	40 1/4	47 1/4	5 5/8	8 3/8	
39	44	46 1/8	47 5/8	4 9 5/8	4 1/2	7 1/2	54 1/8	48-1 3/8	51 3/8	41	42 3/8	49 1/2	6	8 3/4	
42	47	49 1/4	50 3/4	5 2 3/4	4 3/4	7 7/8	57 1/4	52-1 3/8	54 1/2	44	45 3/8	52 5/8	6 3/8	9 1/4	

SHELL SIZE NOMINAL I. D.*	SHELL FLANGE AT CHANNEL END AND CHANNEL FLANGES*								
	MAX. O. D. OF HUB†		DIAM.‡ OF FEMALE FACE	FLANGE THICK-NESS	LENGTH THROUGH HUB	FLANGE OUTSIDE DIAM.	NUMBER AND SIZE OF BOLTS	BOLT CIRCLE	
	AT WELDING END O. D.	AT BASE E	F	t	L	A		BC	
PIPE SHELLS	6	6 5/8	7 1/4	8 3/8	1 1/4	2 1/2	11 1/8	12-3/4	9 1/2
	8	8 5/8	9 3/8	10 1/2	1 1/4	2 3/4	13 1/4	12-3/4	11 5/8
	10	10 3/4	11 1/2	12 5/8	1 3/8	2 7/8	15 3/8	16-3/4	13 3/4
	12	12 3/4	13 1/2	14 5/8	1 1/2	3	17 3/8	16-3/4	15 3/4
	13	14	14 3/4	15 7/8	1 5/8	3 1/8	19 1/8	16-7/8	17 1/4
	15	16	16 7/8	17 7/8	1 3/4	3 1/2	21 1/4	20-7/8	19 3/8
	17	18	18 7/8	19 7/8	1 7/8	3 5/8	23 1/4	24-7/8	21 3/8
PLATE SHELLS	19	20	21	22 1/8	2	4	26 1/8	20-1	24
	21	22	23	24 1/8	2 3/16	4 3/16	28 1/8	24-1	26
	23	24	25	26 1/8	2 3/8	4 3/8	30 1/8	28-1	28
	25	26 1/2	27 5/8	29 1/8	2 5/8	4 7/8	32 7/8	28-1 1/8	30 5/8
	27	28 1/2	29 5/8	31 1/8	2 5/16	4 5/16	34 7/8	32-1 1/8	32 5/8
	29	30 5/8	31 7/8	33 3/8	2 3/4	5 1/4	37 1/8	32-1 1/8	34 7/8
	31	32 5/8	33 7/8	35 3/8	2 15/16	5 7/16	39 1/8	36-1 1/8	36 7/8
33	34 3/4	36	37 1/2	3 1/8	5 5/8	41 1/4	40-1 1/8	39	
35	36 3/4	38	39 7/8	3 7/16	6 1/16	44	36-1 1/4	41 1/2	
37	38 7/8	40 1/4	42 1/8	3 3/4	6 1/2	46 1/4	40-1 1/4	43 3/4	
39	41	42 3/8	44 1/4	4	6 3/4	48 3/8	44-1 1/4	45 7/8	
42	44	45 3/8	47 3/8	4 1/4	7 1/8	51 7/8	40-1 3/8	49 1/8	

\*The nominal I.D. of the shell is also the nominal I.D. of Shell Flanges and the Channel Flanges.

†If shells of 19", 21", and 23" are made from plate, the O.D. max. and E max. can each be greater by 1/4".

‡The diameters of the Tubesheets are equal to the female face diameters, F, less 1/8".

ⓄMaterial: ASTM A181-1 for flange thickness less than 3".

ASTM A105-1 for flange thickness 3" and greater.

Flanges also furnished of alloys as listed on page 243.

Note: The actual outside and inside diameter of the shell must be specified by the purchaser. The hub diameters will be adjusted accordingly, maintaining the hub slopes established in the TEMA Standard.

Hub thicknesses and Corrosion Allowances—page 187.

Bolt hole diameters are 1/8" larger than respective bolt sizes.

Unless otherwise specified by the purchaser, flanges are furnished with welding bevel according to details shown on page 239.

Alloy steel bolts and metal-jacketed asbestos gaskets are intended. See page 186 for gasket details.







## TABLE FOR DETERMINING WEIGHTS FOR WELDLESS FORGED AND ROLLED STEEL RINGS AND DISCS

3/4 INCH THROUGH 195 INCHES IN DIAMETER

Dependent on the cross section and thickness, Ladish weldless forged and rolled steel rings can be produced in sizes up to approximately 20 feet in diameter. These rings can be produced in virtually any cross section in those materials which can be forged and rolled.

Complete specifications as to requirements in size and material must be specified by the purchaser.

The following table can be used in determining approximate weights of rectangular rings in sizes up through 195 inches in diameter.

EXAMPLE—To determine the weight of a ring 75" O.D. x 65" I.D. x 5" in thickness: From the weight of 75" diameter disc, subtract the weight of 65" diameter disc, and then multiply difference by 5", the thickness of the desired ring. (1251.59 lbs. less 940.07 lbs. x 5" = 1557.60 lbs.)

WEIGHTS OF STEEL DISCS PER INCH OF THICKNESS													
DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS
		<b>4</b>	3.56	<b>8</b>	14.24	<b>12</b>	32.04	<b>16</b>	56.96	<b>20</b>	89.00	<b>24</b>	128.16
		1/8	3.78	1/8	14.69	1/8	32.71	1/8	57.86	1/8	90.12	1/8	129.50
		1/4	4.02	1/4	15.14	1/4	33.39	1/4	58.76	1/4	91.24	1/4	130.85
		3/8	4.26	3/8	15.61	3/8	34.08	3/8	59.66	3/8	92.37	3/8	132.20
		1/2	4.50	1/2	16.08	1/2	34.77	1/2	60.58	1/2	93.51	1/2	133.57
		5/8	4.76	5/8	16.55	5/8	35.47	5/8	61.50	5/8	94.65	5/8	134.93
3/4	.12	3/4	5.02	3/4	17.04	3/4	36.17	3/4	62.43	3/4	95.80	3/4	136.30
7/8	.17	7/8	5.29	7/8	17.53	7/8	36.88	7/8	63.36	7/8	96.96	7/8	137.68
<b>1</b>	.22	<b>5</b>	5.56	<b>9</b>	18.02	<b>13</b>	37.60	<b>17</b>	64.30	<b>21</b>	98.13	<b>25</b>	139.07
1/8	.28	1/8	5.84	1/8	18.53	1/8	38.33	1/8	65.25	1/8	99.30	1/8	140.46
1/4	.35	1/4	6.13	1/4	19.04	1/4	39.06	1/4	66.21	1/4	100.48	1/4	141.86
3/8	.42	3/8	6.43	3/8	19.56	3/8	39.80	3/8	67.17	3/8	101.66	3/8	143.27
1/2	.50	1/2	6.73	1/2	20.08	1/2	40.55	1/2	68.14	1/2	102.85	1/2	144.68
5/8	.59	5/8	7.04	5/8	20.61	5/8	41.31	5/8	69.12	5/8	104.05	5/8	146.11
3/4	.69	3/4	7.36	3/4	21.15	3/4	42.07	3/4	70.10	3/4	105.26	3/4	147.54
7/8	.78	7/8	7.68	7/8	21.70	7/8	42.84	7/8	71.09	7/8	106.47	7/8	148.97
<b>2</b>	.89	<b>6</b>	8.01	<b>10</b>	22.25	<b>14</b>	43.62	<b>18</b>	72.09	<b>22</b>	107.69	<b>26</b>	150.41
1/8	1.00	1/8	8.35	1/8	22.81	1/8	44.39	1/8	73.10	1/8	108.92	1/8	151.86
1/4	1.12	1/4	8.69	1/4	23.38	1/4	45.18	1/4	74.11	1/4	110.15	1/4	153.32
3/8	1.25	3/8	9.04	3/8	23.95	3/8	45.98	3/8	75.13	3/8	111.40	3/8	154.78
1/2	1.39	1/2	9.40	1/2	24.53	1/2	46.78	1/2	76.15	1/2	112.64	1/2	156.25
5/8	1.53	5/8	9.77	5/8	25.12	5/8	47.59	5/8	77.19	5/8	113.90	5/8	157.73
3/4	1.68	3/4	10.14	3/4	25.71	3/4	48.41	3/4	78.22	3/4	115.16	3/4	159.22
7/8	1.84	7/8	10.52	7/8	26.32	7/8	49.23	7/8	79.27	7/8	116.43	7/8	160.71
<b>3</b>	2.00	<b>7</b>	10.90	<b>11</b>	26.92	<b>15</b>	50.06	<b>19</b>	80.32	<b>23</b>	117.71	<b>27</b>	162.21
1/8	2.17	1/8	11.30	1/8	27.54	1/8	50.90	1/8	81.39	1/8	118.99	1/8	163.71
1/4	2.35	1/4	11.70	1/4	28.16	1/4	51.75	1/4	82.45	1/4	120.28	1/4	165.22
3/8	2.53	3/8	12.10	3/8	28.79	3/8	52.60	3/8	83.53	3/8	121.58	3/8	166.74
1/2	2.75	1/2	12.52	1/2	29.43	1/2	53.46	1/2	84.61	1/2	122.88	1/2	168.27
5/8	2.92	5/8	12.94	5/8	30.07	5/8	54.32	5/8	85.70	5/8	124.19	5/8	169.80
3/4	3.13	3/4	13.36	3/4	30.72	3/4	55.20	3/4	86.79	3/4	125.51	3/4	171.34
7/8	3.34	7/8	13.80	7/8	31.38	7/8	56.08	7/8	87.89	7/8	126.83	7/8	172.89



# SEAMLESS FORGED AND ROLLED STEEL RINGS

WEIGHTS OF STEEL DISCS PER INCH OF THICKNESS													
DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS
<b>28</b>	174.44	<b>34</b>	257.22	<b>40</b>	355.99	<b>46</b>	470.82	<b>52</b>	601.64	<b>58</b>	748.51	<b>64</b>	911.38
1/8	176.01	1/8	259.11	1/8	358.23	1/8	473.37	1/8	604.53	1/8	751.74	1/8	914.95
1/4	177.57	1/4	261.01	1/4	360.47	1/4	475.94	1/4	607.45	1/4	754.97	1/4	918.52
3/8	179.15	3/8	262.92	3/8	362.71	3/8	478.52	3/8	610.37	3/8	758.22	3/8	922.08
1/2	180.73	1/2	264.84	1/2	364.95	1/2	481.10	1/2	613.29	1/2	761.45	1/2	925.68
5/8	182.32	5/8	266.76	5/8	367.21	5/8	483.71	5/8	616.21	5/8	764.71	5/8	929.25
3/4	183.91	3/4	268.69	3/4	369.48	3/4	486.28	3/4	619.12	3/4	768.00	3/4	932.85
7/8	185.52	7/8	270.63	7/8	371.75	7/8	488.89	7/8	622.07	7/8	771.26	7/8	936.48
<b>29</b>	187.13	<b>35</b>	272.57	<b>41</b>	374.04	<b>47</b>	491.50	<b>53</b>	625.02	<b>59</b>	774.54	<b>65</b>	940.07
1/8	188.74	1/8	274.52	1/8	376.31	1/8	494.13	1/8	627.96	1/8	777.83	1/8	943.70
1/4	190.37	1/4	276.48	1/4	378.60	1/4	496.76	1/4	630.91	1/4	781.11	1/4	947.33
3/8	192.00	3/8	278.44	3/8	380.90	3/8	499.37	3/8	633.88	3/8	784.40	3/8	950.95
1/2	193.64	1/2	280.41	1/2	383.22	1/2	502.04	1/2	636.86	1/2	787.72	1/2	954.61
5/8	195.28	5/8	282.39	5/8	385.51	5/8	504.67	5/8	639.83	5/8	791.03	5/8	958.23
3/4	196.93	3/4	284.38	3/4	387.84	3/4	507.33	3/4	642.84	3/4	794.34	3/4	961.89
7/8	198.59	7/8	286.37	7/8	390.16	7/8	509.97	7/8	645.81	7/8	797.69	7/8	965.54
<b>30</b>	200.25	<b>36</b>	288.37	<b>42</b>	392.48	<b>48</b>	512.66	<b>54</b>	648.81	<b>60</b>	801.00	<b>66</b>	969.23
1/8	201.93	1/8	290.38	1/8	394.84	1/8	515.32	1/8	651.82	1/8	804.35	1/8	972.91
1/4	203.61	1/4	292.39	1/4	397.19	1/4	518.01	1/4	654.85	1/4	807.69	1/4	976.59
3/8	205.29	3/8	294.41	3/8	399.54	3/8	520.68	3/8	657.85	3/8	811.06	3/8	980.27
1/2	206.99	1/2	296.42	1/2	401.89	1/2	523.40	1/2	660.88	1/2	814.43	1/2	983.96
5/8	208.69	5/8	298.46	5/8	404.27	5/8	526.09	5/8	663.91	5/8	817.77	5/8	987.67
3/4	210.39	3/4	300.50	3/4	406.65	3/4	528.78	3/4	666.97	3/4	821.17	3/4	991.38
7/8	212.11	7/8	302.56	7/8	409.03	7/8	531.50	7/8	670.00	7/8	824.54	7/8	995.09
<b>31</b>	213.83	<b>37</b>	304.60	<b>43</b>	411.41	<b>49</b>	534.22	<b>55</b>	673.06	<b>61</b>	827.94	<b>67</b>	998.83
1/8	215.56	1/8	306.67	1/8	413.82	1/8	536.97	1/8	676.12	1/8	831.34	1/8	1002.54
1/4	217.29	1/4	308.74	1/4	416.20	1/4	539.69	1/4	679.21	1/4	834.74	1/4	1006.28
3/8	219.03	3/8	310.81	3/8	418.60	3/8	542.43	3/8	682.27	3/8	838.14	3/8	1010.02
1/2	220.78	1/2	312.90	1/2	421.04	1/2	545.18	1/2	685.36	1/2	841.57	1/2	1013.79
5/8	222.54	5/8	314.97	5/8	423.45	5/8	547.96	5/8	688.45	5/8	845.00	5/8	1017.53
3/4	224.30	3/4	317.07	3/4	425.88	3/4	550.71	3/4	691.56	3/4	848.43	3/4	1021.30
7/8	226.07	7/8	319.19	7/8	428.32	7/8	553.48	7/8	694.65	7/8	851.85	7/8	1025.06
<b>32</b>	227.85	<b>38</b>	321.29	<b>44</b>	430.76	<b>50</b>	556.26	<b>56</b>	697.77	<b>62</b>	855.31	<b>68</b>	1028.86
1/8	229.63	1/8	323.42	1/8	433.22	1/8	559.04	1/8	700.88	1/8	858.77	1/8	1032.63
1/4	231.42	1/4	325.54	1/4	435.69	1/4	561.84	1/4	704.00	1/4	862.22	1/4	1036.42
3/8	233.22	3/8	327.66	3/8	438.15	3/8	564.65	3/8	707.15	3/8	865.68	3/8	1040.22
1/2	235.02	1/2	329.82	1/2	440.62	1/2	567.45	1/2	710.29	1/2	869.16	1/2	1044.05
5/8	236.83	5/8	331.94	5/8	443.08	5/8	570.25	5/8	713.43	5/8	872.65	5/8	1047.84
3/4	238.65	3/4	334.10	3/4	445.57	3/4	573.06	3/4	716.58	3/4	876.13	3/4	1051.67
7/8	240.48	7/8	336.25	7/8	448.07	7/8	575.89	7/8	719.75	7/8	879.62	7/8	1055.49
<b>33</b>	242.31	<b>39</b>	338.43	<b>45</b>	450.56	<b>51</b>	578.73	<b>57</b>	722.92	<b>63</b>	883.10	<b>69</b>	1059.34
1/8	244.15	1/8	340.61	1/8	453.08	1/8	581.56	1/8	726.10	1/8	886.62	1/8	1063.17
1/4	245.99	1/4	342.79	1/4	455.60	1/4	584.42	1/4	729.27	1/4	890.13	1/4	1067.02
3/8	247.85	3/8	344.97	3/8	458.10	3/8	587.28	3/8	732.44	3/8	893.67	3/8	1070.87
1/2	249.71	1/2	347.16	1/2	460.65	1/2	590.14	1/2	735.65	1/2	897.18	1/2	1074.75
5/8	251.57	5/8	349.37	5/8	463.17	5/8	593.00	5/8	738.85	5/8	900.72	5/8	1078.61
3/4	253.45	3/4	351.58	3/4	465.72	3/4	595.86	3/4	742.08	3/4	904.27	3/4	1082.49
7/8	255.33	7/8	353.79	7/8	468.27	7/8	598.75	7/8	745.28	7/8	907.81	7/8	1086.37

SEAMLESS FORGED AND ROLLED STEEL RINGS

WEIGHTS OF STEEL DISCS PER INCH OF THICKNESS													
DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM-ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS
<b>70</b>	1090.28	<b>76</b>	1285.19	<b>82</b>	1496.11	<b>88</b>	1723.06	<b>94</b>	1966.05	<b>100</b>	2225.04	<b>106</b>	2500.32
1/8	1094.16	1/8	1289.41	1/8	1500.67	1/8	1727.96	1/8	1971.26	1/8	2230.84	1/8	2506.22
1/4	1098.07	1/4	1293.66	1/4	1505.26	1/4	1732.86	1/4	1976.50	1/4	2236.41	1/4	2512.13
3/8	1101.98	3/8	1297.88	3/8	1509.82	3/8	1737.79	3/8	1981.77	3/8	2242.00	3/8	2518.04
1/2	1105.89	1/2	1302.13	1/2	1514.41	1/2	1742.69	1/2	1987.01	1/2	2247.58	1/2	2523.96
5/8	1109.83	5/8	1306.41	5/8	1519.00	5/8	1747.62	5/8	1992.28	5/8	2253.18	5/8	2529.89
3/4	1113.77	3/4	1310.66	3/4	1523.62	3/4	1752.55	3/4	1997.55	3/4	2258.77	3/4	2535.83
7/8	1117.70	7/8	1314.94	7/8	1528.21	7/8	1757.51	7/8	2002.82	7/8	2264.38	7/8	2541.77
<b>71</b>	1121.64	<b>77</b>	1319.21	<b>83</b>	1532.82	<b>89</b>	1762.44	<b>95</b>	2008.09	<b>101</b>	2270.01	<b>107</b>	2547.71
1/8	1125.58	1/8	1323.52	1/8	1537.44	1/8	1767.40	1/8	2013.38	1/8	2275.61	1/8	2553.67
1/4	1129.55	1/4	1327.80	1/4	1542.09	1/4	1772.35	1/4	2018.68	1/4	2281.25	1/4	2559.64
3/8	1133.51	3/8	1332.10	3/8	1546.70	3/8	1777.34	3/8	2023.98	3/8	2286.89	3/8	2565.61
1/2	1137.51	1/2	1336.41	1/2	1551.35	1/2	1782.30	1/2	2029.28	1/2	2292.54	1/2	2571.58
5/8	1141.47	5/8	1340.72	5/8	1556.00	5/8	1787.28	5/8	2034.60	5/8	2298.18	5/8	2577.57
3/4	1145.47	3/4	1345.05	3/4	1560.64	3/4	1792.27	3/4	2039.93	3/4	2303.84	3/4	2583.56
7/8	1149.46	7/8	1349.39	7/8	1565.32	7/8	1797.28	7/8	2045.26	7/8	2309.50	7/8	2589.56
<b>72</b>	1153.46	<b>78</b>	1353.72	<b>84</b>	1569.99	<b>90</b>	1802.27	<b>96</b>	2050.58	<b>102</b>	2315.18	<b>108</b>	2595.56
1/8	1157.48	1/8	1358.06	1/8	1574.67	1/8	1807.28	1/8	2055.94	1/8	2320.86	1/8	2601.57
1/4	1161.47	1/4	1362.39	1/4	1579.34	1/4	1812.30	1/4	2061.29	1/4	2326.54	1/4	2607.59
3/8	1165.50	3/8	1366.75	3/8	1584.04	3/8	1817.34	3/8	2066.65	3/8	2332.23	3/8	2613.62
1/2	1169.52	1/2	1371.12	1/2	1588.72	1/2	1822.36	1/2	2072.00	1/2	2337.93	1/2	2619.65
5/8	1173.57	5/8	1375.48	5/8	1593.42	5/8	1827.40	5/8	2077.38	5/8	2343.63	5/8	2625.69
3/4	1177.62	3/4	1379.87	3/4	1598.15	3/4	1832.44	3/4	2082.76	3/4	2349.35	3/4	2631.74
7/8	1181.67	7/8	1384.26	7/8	1602.85	7/8	1837.48	7/8	2088.15	7/8	2355.07	7/8	2637.79
<b>73</b>	1185.72	<b>79</b>	1388.65	<b>85</b>	1607.59	<b>91</b>	1842.55	<b>97</b>	2093.53	<b>103</b>	2360.80	<b>109</b>	2643.84
1/8	1189.78	1/8	1393.04	1/8	1612.32	1/8	1847.63	1/8	2098.94	1/8	2366.53	1/8	2649.91
1/4	1193.85	1/4	1397.43	1/4	1617.05	1/4	1852.70	1/4	2104.35	1/4	2372.27	1/4	2655.99
3/8	1197.93	3/8	1401.85	3/8	1621.81	3/8	1857.77	3/8	2109.76	3/8	2378.02	3/8	2662.07
1/2	1202.01	1/2	1406.27	1/2	1626.57	1/2	1862.84	1/2	2115.17	1/2	2383.77	1/2	2668.16
5/8	1206.12	5/8	1410.69	5/8	1631.33	5/8	1867.94	5/8	2120.59	5/8	2389.53	5/8	2674.26
3/4	1210.20	3/4	1415.14	3/4	1636.09	3/4	1873.04	3/4	2126.02	3/4	2395.29	3/4	2680.36
7/8	1214.31	7/8	1419.59	7/8	1640.85	7/8	1878.17	7/8	2131.46	7/8	2401.07	7/8	2686.47
<b>74</b>	1218.42	<b>80</b>	1424.01	<b>86</b>	1645.63	<b>92</b>	1883.27	<b>98</b>	2136.93	<b>104</b>	2406.85	<b>110</b>	2692.58
1/8	1222.55	1/8	1428.48	1/8	1650.42	1/8	1888.39	1/8	2142.37	1/8	2412.63	1/8	2698.41
1/4	1226.66	1/4	1432.93	1/4	1655.21	1/4	1893.52	1/4	2147.84	1/4	2418.44	1/4	2704.03
3/8	1230.80	3/8	1437.41	3/8	1660.02	3/8	1898.65	3/8	2153.31	3/8	2424.24	3/8	2710.68
1/2	1234.96	1/2	1441.88	1/2	1664.81	1/2	1903.80	1/2	2158.77	1/2	2430.05	1/2	2716.82
5/8	1239.10	5/8	1446.36	5/8	1669.63	5/8	1908.93	5/8	2164.27	5/8	2435.87	5/8	2722.97
3/4	1243.26	3/4	1450.84	3/4	1674.47	3/4	1914.09	3/4	2169.77	3/4	2441.69	3/4	2729.13
7/8	1247.40	7/8	1455.34	7/8	1679.29	7/8	1919.27	7/8	2175.26	7/8	2447.53	7/8	2735.29
<b>75</b>	1251.59	<b>81</b>	1459.84	<b>87</b>	1684.13	<b>93</b>	1924.43	<b>99</b>	2180.76	<b>105</b>	2453.37	<b>111</b>	2741.44
1/8	1255.76	1/8	1464.35	1/8	1688.98	1/8	1929.61	1/8	2186.25	1/8	2459.21	1/8	2747.62
1/4	1259.95	1/4	1468.88	1/4	1693.82	1/4	1934.80	1/4	2191.78	1/4	2465.06	1/4	2753.80
3/8	1264.14	3/8	1473.39	3/8	1698.67	3/8	1939.98	3/8	2197.30	3/8	2470.92	3/8	2760.02
1/2	1268.33	1/2	1477.92	1/2	1703.54	1/2	1945.17	1/2	2202.83	1/2	2476.78	1/2	2766.24
5/8	1272.53	5/8	1482.45	5/8	1708.41	5/8	1950.38	5/8	2208.38	5/8	2482.65	5/8	2772.42
3/4	1276.75	3/4	1487.01	3/4	1713.29	3/4	1955.59	3/4	2213.93	3/4	2488.53	3/4	2778.60
7/8	1280.94	7/8	1491.55	7/8	1718.19	7/8	1960.80	7/8	2219.49	7/8	2494.42	7/8	2784.84

## SEAMLESS FORGED AND ROLLED STEEL RINGS

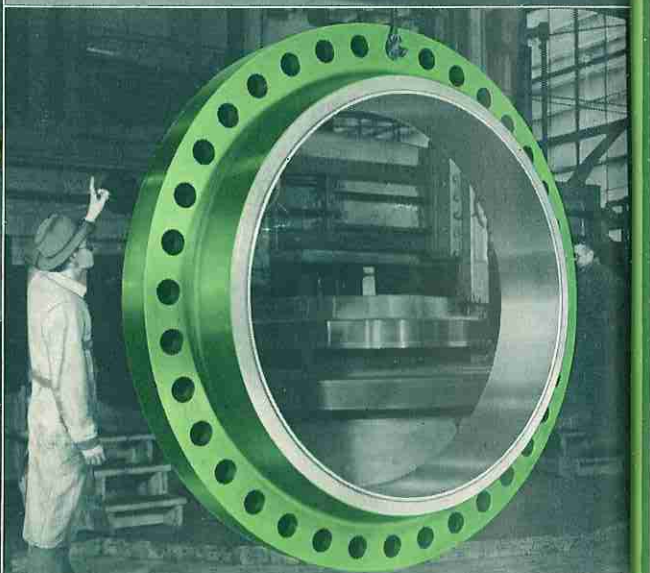
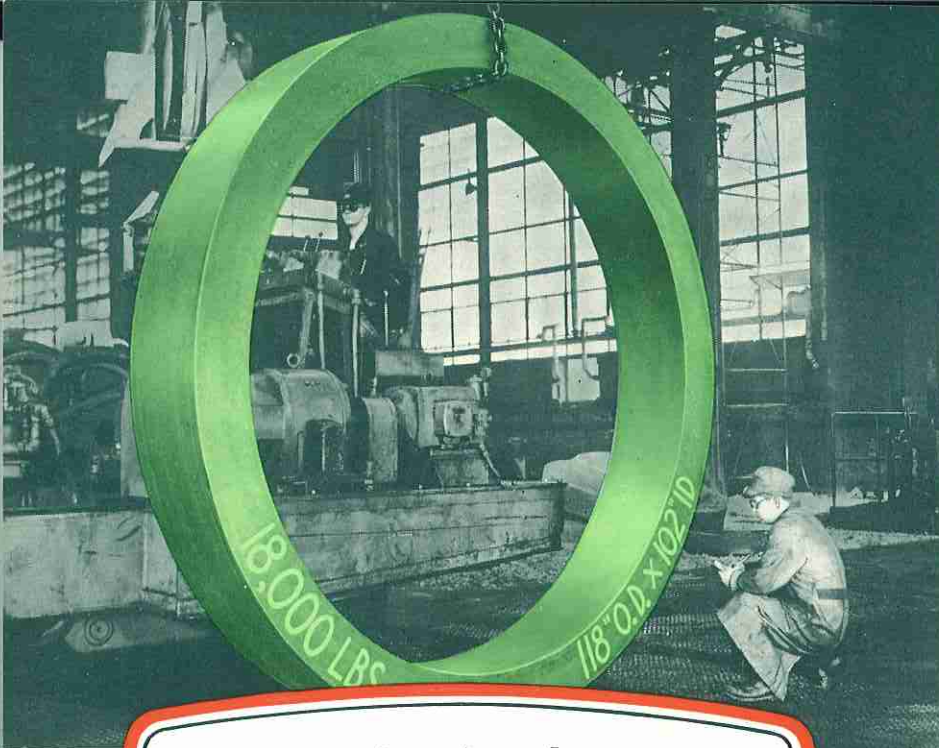
### WEIGHTS OF STEEL DISCS PER INCH OF THICKNESS

DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAMETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS
<b>112</b>	2791.08	<b>118</b>	3098.14	<b>124</b>	3421.22	<b>130</b>	3760.30	<b>136</b>	4115.44	<b>142</b>	4486.57	<b>148</b>	4873.73
1/8	2797.30	1/8	3104.69	1/8	3427.94	1/8	3767.55	1/8	4123.01	1/8	4494.50	1/8	4881.95
1/4	2803.52	1/4	3111.27	1/4	3434.84	1/4	3774.79	1/4	4130.60	1/4	4502.38	1/4	4890.19
3/8	2809.76	3/8	3117.85	3/8	3441.75	3/8	3782.04	3/8	4138.18	3/8	4510.30	3/8	4898.44
1/2	2816.00	1/2	3124.43	1/2	3448.67	1/2	3789.30	1/2	4145.77	1/2	4518.22	1/2	4906.70
5/8	2822.30	5/8	3131.03	5/8	3455.59	5/8	3796.56	5/8	4153.37	5/8	4526.14	5/8	4914.96
3/4	2828.60	3/4	3137.63	3/4	3462.52	3/4	3803.83	3/4	4160.98	3/4	4534.08	3/4	4923.23
7/8	2834.88	7/8	3144.23	7/8	3469.46	7/8	3811.10	7/8	4168.59	7/8	4542.03	7/8	4931.51
<b>113</b>	2841.13	<b>119</b>	3150.86	<b>125</b>	3476.60	<b>131</b>	3818.39	<b>137</b>	4176.21	<b>143</b>	4549.98	<b>149</b>	4939.80
1/8	2847.42	1/8	3157.47	1/8	3483.35	1/8	3825.67	1/8	4183.84	1/8	4557.93	1/8	4948.09
1/4	2853.72	1/4	3164.10	1/4	3490.31	1/4	3832.98	1/4	4191.47	1/4	4565.90	1/4	4956.39
3/8	2860.02	3/8	3170.73	3/8	3497.27	3/8	3840.28	3/8	4199.12	3/8	4573.87	3/8	4964.69
1/2	2866.33	1/2	3177.37	1/2	3504.25	1/2	3847.59	1/2	4206.76	1/2	4581.85	1/2	4973.00
5/8	2872.65	5/8	3184.02	5/8	3511.22	5/8	3854.91	5/8	4214.42	5/8	4589.83	5/8	4981.32
3/4	2878.97	3/4	3190.68	3/4	3518.21	3/4	3862.24	3/4	4222.08	3/4	4597.83	3/4	4989.65
7/8	2885.30	7/8	3197.34	7/8	3525.20	7/8	3869.57	7/8	4229.75	7/8	4605.83	7/8	4997.98
<b>114</b>	2891.64	<b>120</b>	3204.04	<b>126</b>	3532.47	<b>132</b>	3876.90	<b>138</b>	4237.43	<b>144</b>	4613.84	<b>150</b>	5006.34
1/8	2897.89	1/8	3210.26	1/8	3539.20	1/8	3884.28	1/8	4245.12	1/8	4621.85	1/8	5014.67
1/4	2904.34	1/4	3217.37	1/4	3546.22	1/4	3891.73	1/4	4252.81	1/4	4630.00	1/4	5023.03
3/8	2910.70	3/8	3224.06	3/8	3553.24	3/8	3898.96	3/8	4260.51	3/8	4638.04	3/8	5031.39
1/2	2917.07	1/2	3230.75	1/2	3560.26	1/2	3906.32	1/2	4268.21	1/2	4646.09	1/2	5039.75
5/8	2923.44	5/8	3237.46	5/8	3567.29	5/8	3913.70	5/8	4275.92	5/8	4654.15	5/8	5048.13
3/4	2929.82	3/4	3244.17	3/4	3574.33	3/4	3921.08	3/4	4283.64	3/4	4662.02	3/4	5056.51
7/8	2936.21	7/8	3250.89	7/8	3581.38	7/8	3928.46	7/8	4291.37	7/8	4670.07	7/8	5064.90
<b>115</b>	2942.61	<b>121</b>	3257.67	<b>127</b>	3588.76	<b>133</b>	3935.85	<b>139</b>	4299.11	<b>145</b>	4678.14	<b>151</b>	5073.30
1/8	2949.01	1/8	3264.34	1/8	3595.49	1/8	3943.26	1/8	4306.85	1/8	4686.20	1/8	5081.70
1/4	2955.42	1/4	3271.08	1/4	3602.56	1/4	3950.67	1/4	4314.60	1/4	4694.28	1/4	5090.11
3/8	2961.84	3/8	3277.82	3/8	3609.63	3/8	3958.08	3/8	4322.35	3/8	4702.36	3/8	5098.53
1/2	2968.26	1/2	3284.57	1/2	3616.72	1/2	3965.50	1/2	4330.11	1/2	4710.45	1/2	5106.95
5/8	2974.69	5/8	3291.33	5/8	3623.80	5/8	3972.94	5/8	4337.88	5/8	4718.55	5/8	5115.38
3/4	2981.13	3/4	3298.10	3/4	3630.90	3/4	3980.37	3/4	4345.66	3/4	4726.65	3/4	5123.82
7/8	2987.58	7/8	3304.87	7/8	3638.00	7/8	3987.82	7/8	4353.44	7/8	4734.76	7/8	5132.26
<b>116</b>	2994.00	<b>122</b>	3311.75	<b>128</b>	3645.50	<b>134</b>	3995.27	<b>140</b>	4361.23	<b>146</b>	4742.89	<b>152</b>	5140.73
1/8	3000.49	1/8	3318.44	1/8	3652.63	1/8	4002.72	1/8	4369.06	1/8	4751.01	1/8	5149.18
1/4	3007.04	1/4	3325.28	1/4	3659.76	1/4	4010.19	1/4	4376.84	1/4	4759.14	1/4	5157.64
3/8	3013.39	3/8	3332.03	3/8	3666.89	3/8	4017.66	3/8	4384.65	3/8	4767.28	3/8	5166.11
1/2	3019.87	1/2	3338.83	1/2	3674.04	1/2	4025.14	1/2	4392.47	1/2	4775.42	1/2	5174.59
5/8	3026.35	5/8	3345.65	5/8	3681.19	5/8	4032.63	5/8	4400.29	5/8	4783.57	5/8	5183.08
3/4	3032.84	3/4	3352.47	3/4	3688.35	3/4	4040.12	3/4	4408.13	3/4	4791.73	3/4	5191.57
7/8	3039.34	7/8	3359.29	7/8	3695.51	7/8	4047.62	7/8	4415.97	7/8	4799.90	7/8	5200.07
<b>117</b>	3045.84	<b>123</b>	3366.26	<b>129</b>	3702.67	<b>135</b>	4055.13	<b>141</b>	4423.81	<b>147</b>	4808.08	<b>153</b>	5208.58
1/8	3052.35	1/8	3372.97	1/8	3709.87	1/8	4062.64	1/8	4431.67	1/8	4816.25	1/8	5217.10
1/4	3058.87	1/4	3379.82	1/4	3717.05	1/4	4070.16	1/4	4439.53	1/4	4824.44	1/4	5225.62
3/8	3065.40	3/8	3386.71	3/8	3724.24	3/8	4077.69	3/8	4447.40	3/8	4832.64	3/8	5234.14
1/2	3071.93	1/2	3393.53	1/2	3731.44	1/2	4085.23	1/2	4455.27	1/2	4840.84	1/2	5242.68
5/8	3078.47	5/8	3400.40	5/8	3738.65	5/8	4092.77	5/8	4463.16	5/8	4849.05	5/8	5251.22
3/4	3085.00	3/4	3407.28	3/4	3745.87	3/4	4100.32	3/4	4471.05	3/4	4857.26	3/4	5259.77
7/8	3091.57	7/8	3414.16	7/8	3753.09	7/8	4107.88	7/8	4478.94	7/8	4865.48	7/8	5268.33

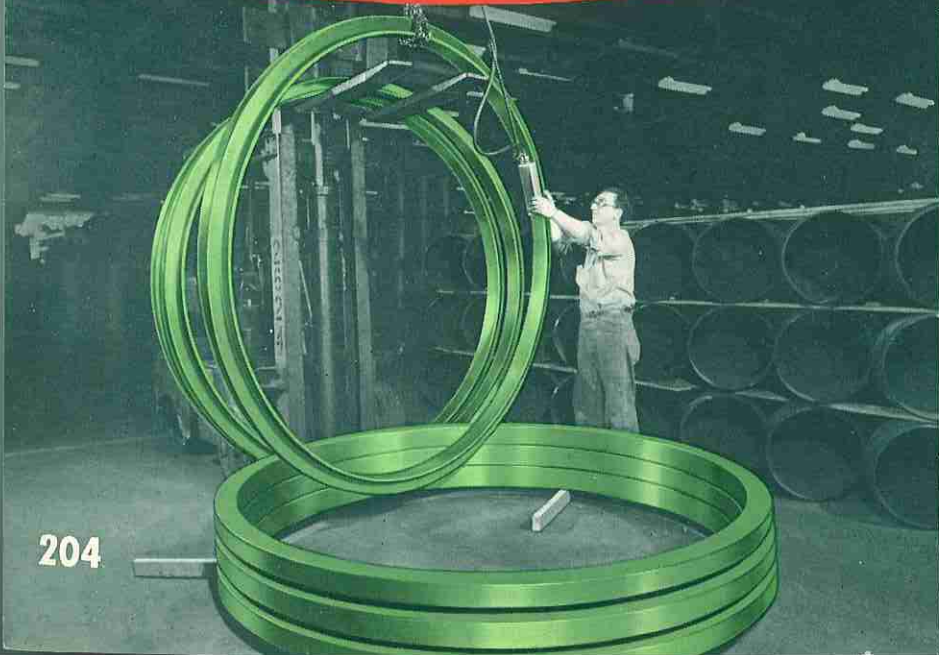
## SEAMLESS FORGED AND ROLLED STEEL RINGS

## WEIGHTS OF STEEL DISCS PER INCH OF THICKNESS

DIAM- ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM- ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM- ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM- ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM- ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM- ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS	DIAM- ETER, INCHES	WEIGHT PER INCH OF THICKNESS, POUNDS
<b>154</b>	5276.89	<b>160</b>	5696.10	<b>166</b>	6131.31	<b>172</b>	6582.55	<b>178</b>	7049.81	<b>184</b>	7533.09	<b>190</b>	8032.39
1/8	5285.46	1/8	5705.01	1/8	6140.55	1/8	6592.12	1/8	7059.72	1/8	7543.33	1/8	8042.96
1/4	5294.04	1/4	5713.92	1/4	6149.79	1/4	6601.70	1/4	7069.63	1/4	7553.58	1/4	8053.54
3/8	5302.62	3/8	5722.84	3/8	6159.05	3/8	6611.29	3/8	7079.55	3/8	7563.83	3/8	8064.13
1/2	5311.21	1/2	5731.76	1/2	6168.30	1/2	6620.88	1/2	7089.47	1/2	7574.09	1/2	8074.72
5/8	5319.81	5/8	5740.69	5/8	6177.57	5/8	6630.48	5/8	7099.41	5/8	7584.35	5/8	8085.32
3/4	5328.42	3/4	5749.63	3/4	6186.84	3/4	6640.09	3/4	7109.34	3/4	7594.63	3/4	8095.93
7/8	5337.03	7/8	5758.58	7/8	6196.12	7/8	6649.70	7/8	7119.29	7/8	7604.91	7/8	8106.54
<b>155</b>	5345.65	<b>161</b>	5767.52	<b>167</b>	6205.41	<b>173</b>	6659.32	<b>179</b>	7129.24	<b>185</b>	7615.19	<b>191</b>	8117.16
1/8	5354.27	1/8	5776.48	1/8	6214.70	1/8	6668.94	1/8	7139.21	1/8	7625.49	1/8	8127.79
1/4	5362.90	1/4	5785.45	1/4	6224.00	1/4	6678.58	1/4	7149.17	1/4	7635.79	1/4	8138.43
3/8	5371.54	3/8	5794.42	3/8	6233.31	3/8	6688.22	3/8	7159.15	3/8	7646.10	3/8	8149.07
1/2	5380.19	1/2	5803.40	1/2	6242.62	1/2	6697.87	1/2	7169.13	1/2	7656.42	1/2	8159.72
5/8	5388.84	5/8	5812.39	5/8	6251.94	5/8	6707.52	5/8	7179.12	5/8	7666.74	5/8	8170.37
3/4	5397.50	3/4	5821.38	3/4	6261.27	3/4	6717.18	3/4	7189.11	3/4	7677.07	3/4	8181.04
7/8	5406.17	7/8	5830.38	7/8	6270.60	7/8	6726.85	7/8	7199.11	7/8	7687.40	7/8	8191.71
<b>156</b>	5414.85	<b>162</b>	5839.39	<b>168</b>	6279.95	<b>174</b>	6736.53	<b>180</b>	7209.12	<b>186</b>	7697.74	<b>192</b>	8202.38
1/8	5423.53	1/8	5848.40	1/8	6289.29	1/8	6746.21	1/8	7219.14	1/8	7708.10	1/8	8213.07
1/4	5432.22	1/4	5857.43	1/4	6298.65	1/4	6755.90	1/4	7229.16	1/4	7718.45	1/4	8223.76
3/8	5440.91	3/8	5866.46	3/8	6308.01	3/8	6765.60	3/8	7239.19	3/8	7728.82	3/8	8234.45
1/2	5449.61	1/2	5875.49	1/2	6317.38	1/2	6775.30	1/2	7249.23	1/2	7739.19	1/2	8245.16
5/8	5458.32	5/8	5884.53	5/8	6326.76	5/8	6785.01	5/8	7259.27	5/8	7749.56	5/8	8255.87
3/4	5467.04	3/4	5893.58	3/4	6336.14	3/4	6794.73	3/4	7269.32	3/4	7759.95	3/4	8266.59
7/8	5475.76	7/8	5902.64	7/8	6345.53	7/8	6804.45	7/8	7279.38	7/8	7770.34	7/8	8277.31
<b>157</b>	5484.49	<b>163</b>	5911.70	<b>169</b>	6354.93	<b>175</b>	6814.18	<b>181</b>	7289.44	<b>187</b>	7780.74	<b>193</b>	8288.03
1/8	5493.23	1/8	5920.77	1/8	6364.33	1/8	6823.92	1/8	7299.52	1/8	7791.15	1/8	8298.77
1/4	5501.97	1/4	5929.85	1/4	6373.74	1/4	6833.66	1/4	7309.60	1/4	7801.56	1/4	8309.51
3/8	5510.72	3/8	5938.94	3/8	6383.16	3/8	6843.42	3/8	7319.68	3/8	7811.98	3/8	8320.27
1/2	5519.48	1/2	5948.03	1/2	6392.58	1/2	6853.17	1/2	7329.77	1/2	7822.40	1/2	8331.03
5/8	5528.25	5/8	5957.13	5/8	6402.02	5/8	6862.94	5/8	7339.87	5/8	7832.84	5/8	8341.79
3/4	5537.02	3/4	5966.23	3/4	6411.45	3/4	6872.71	3/4	7349.98	3/4	7843.28	3/4	8352.57
7/8	5545.80	7/8	5975.34	7/8	6420.90	7/8	6882.49	7/8	7360.09	7/8	7853.72	7/8	8363.35
<b>158</b>	5554.58	<b>164</b>	5984.46	<b>170</b>	6430.35	<b>176</b>	6892.28	<b>182</b>	7370.22	<b>188</b>	7864.18	<b>194</b>	8374.14
1/8	5563.38	1/8	5993.59	1/8	6439.81	1/8	6902.07	1/8	7380.34	1/8	7874.64	1/8	8384.93
1/4	5572.18	1/4	6002.72	1/4	6449.28	1/4	6911.87	1/4	7390.48	1/4	7885.11	1/4	8395.73
3/8	5580.98	3/8	6011.86	3/8	6458.75	3/8	6921.68	3/8	7400.62	3/8	7895.58	3/8	8406.54
1/2	5589.80	1/2	6021.01	1/2	6468.23	1/2	6931.50	1/2	7410.77	1/2	7906.06	1/2	8417.36
5/8	5598.62	5/8	6030.16	5/8	6477.72	5/8	6941.32	5/8	7420.92	5/8	7916.55	5/8	8428.18
3/4	5607.44	3/4	6039.32	3/4	6487.22	3/4	6951.15	3/4	7431.09	3/4	7927.05	3/4	8439.01
7/8	5616.28	7/8	6048.49	7/8	6496.72	7/8	6960.98	7/8	7441.26	7/8	7937.55	7/8	8449.85
<b>159</b>	5625.12	<b>165</b>	6057.67	<b>171</b>	6506.23	<b>177</b>	6970.82	<b>183</b>	7451.43	<b>189</b>	7948.06	<b>195</b>	8460.69
1/8	5633.97	1/8	6066.85	1/8	6515.75	1/8	6980.67	1/8	7461.61	1/8	7958.58	1/8	8471.54
1/4	5642.82	1/4	6076.04	1/4	6525.27	1/4	6990.53	1/4	7471.80	1/4	7969.10	1/4	8482.40
3/8	5651.69	3/8	6085.23	3/8	6534.80	3/8	7000.39	3/8	7482.00	3/8	7979.63	3/8	8493.26
1/2	5660.56	1/2	6094.43	1/2	6544.34	1/2	7010.26	1/2	7492.21	1/2	7990.17	1/2	8504.13
5/8	5669.43	5/8	6103.31	5/8	6553.88	5/8	7020.14	5/8	7502.42	5/8	8000.72	5/8	8515.01
3/4	5678.32	3/4	6112.86	3/4	6563.43	3/4	7030.02	3/4	7512.63	3/4	8011.27	3/4	8525.90
7/8	5687.21	7/8	6122.08	7/8	6572.99	7/8	7039.91	7/8	7522.86	7/8	8021.83	7/8	8536.79



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**LADISH**  
LARGE DIAMETER AND  
T. E. M. A. FLANGES  
•  
LONG WELDING NECK  
FLANGES  
•  
ROLLED RINGS





**TO MARK PROGRESS**

## **LADISH CATALOG NO. 55**

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