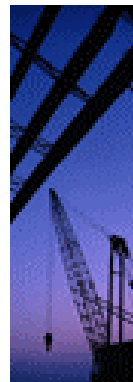
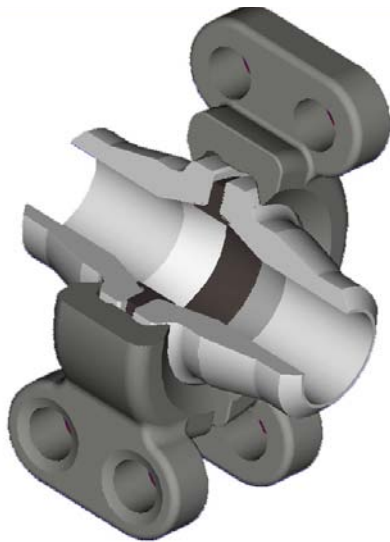


# Clamp Pipe Connector



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## BlueSky Clamp Connector

BlueSky Clamp Connectors have been designed and manufactured to provide the most advanced sealing performance in connecting piping systems. BlueSky Clamp Connectors are superior to traditional flanges and provide the best alternative for the most severe piping applications.

## Industrial Applications

The advantages of the BlueSky clamp connector makes it an optimal solution in a wide variety of applications and industries.

### Aerospace

### Chemical and Petro-Chemical

chemical batch processing  
polymer production

### Coal Gasification & Liquefaction

### Environmental

### Food Processing

### Hydraulics

### Marine

subsea and general piping  
loading and offloading facilities

### Mining

erosive slurry  
thermocyclic applications

### Nuclear, Power, Fuels

heavy water piping  
fuel bundle loading caps

### Oil & Gas Production (land, offshore, subsea)

wellheads (onshore and offshore)  
chokes and loading risers

### Refining & Upgrading

hydrotreating/hydrocracking  
desulphurization  
hydrogen  
heavy oil upgrading

### Research & Development

### Steam

Steam generation  
Steam assisted gravity drainage (SAGD)



The BlueSky clamp joint is ideally suited for severe services involving one or a combination of high pressure/temperature, cyclic, corrosive, & erosive conditions.

## Clamp Connector Description

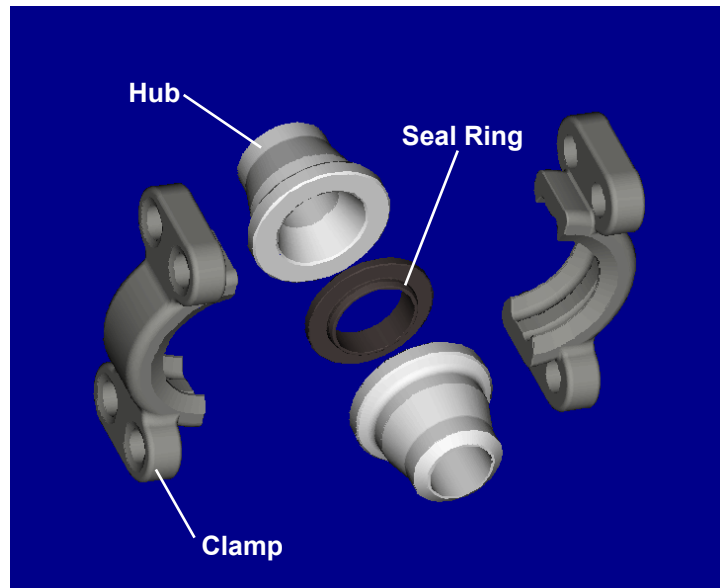
The BlueSky clamp connector is a highly reliable, easy to assemble, metal to metal sealed joint. It is designed for use in piping systems which require high integrity seals in applications that may involve corrosive, erosive, high temperature/pressure and cyclic conditions.

The clamp joint has the following configuration:

- 2 clamps
- 2 hubs
- 1 seal ring
- 4 studs
- 8 nuts

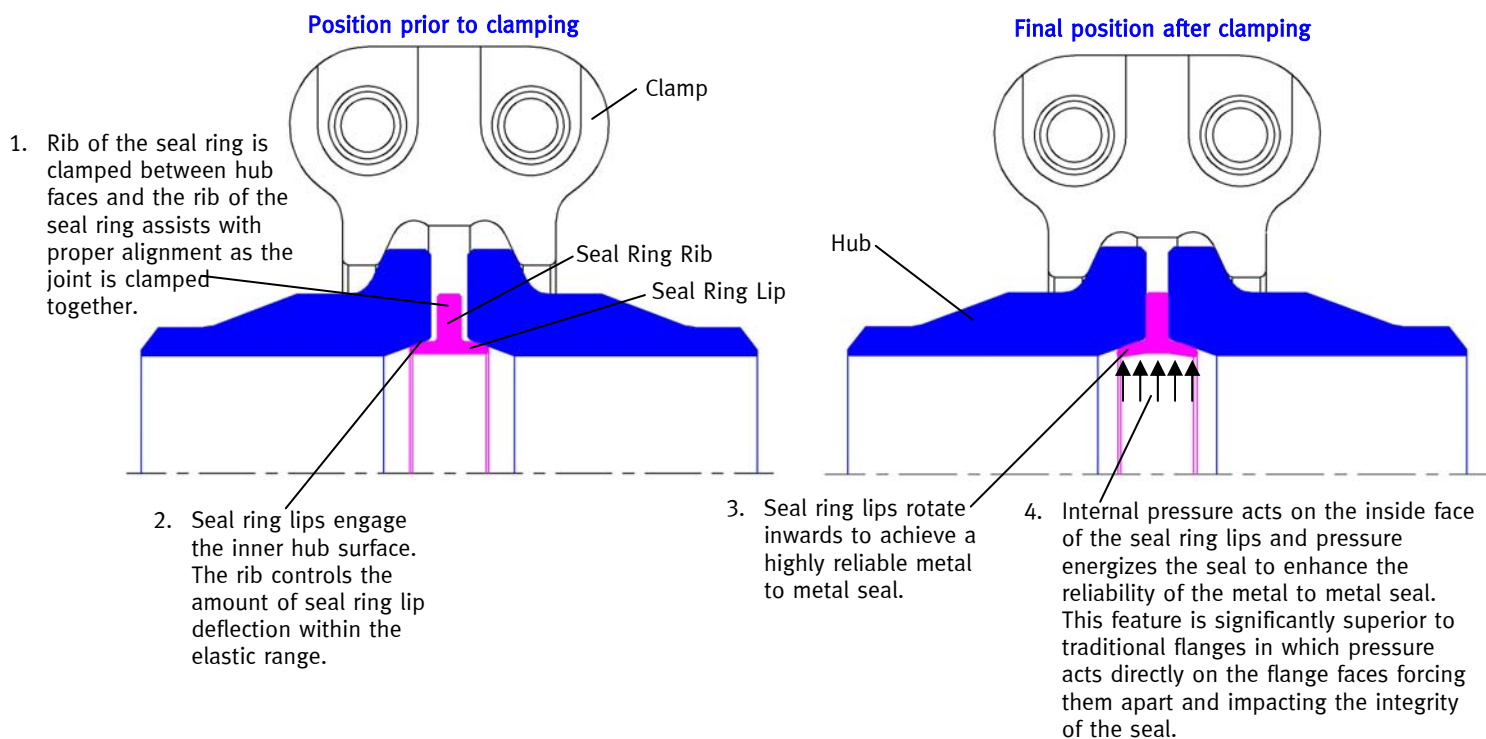
The seal ring is a zero leakage, re-useable, metal to metal gasket interfaced with the hub sealing surface to ensure a high integrity and reliable seal.

This joint configuration ensures the seal ring is elastically loaded during assembly and offers a self-energized seal during operation.



For additional details, refer to the *BlueSky Clamp Joint Installation and Maintenance Manual*.

## How the Metal to Metal Seal Works



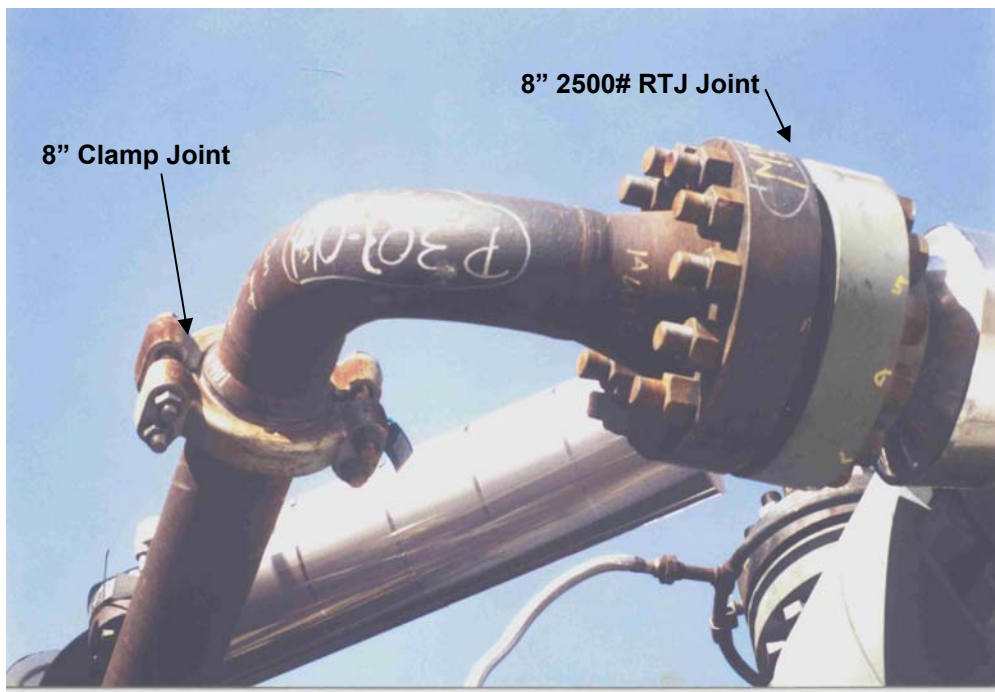


**design  
features**

- Standard sizes from 1/2" to 16"
- Sizes of 18" and larger are also available
- Highly reliable all metal seal
- Easy and fast to assemble / disassemble
- High integrity in corrosive, erosive, cyclic and high pressure/temperature applications
- Self energized and pressure energized seal
- Zero Fugitive Emissions
- Reusable seal ring (elastic design)
- Virtually unaffected by external loads and external pressures

**advantages  
over  
conventional  
flanges  
(RF, FF, RTJ)**

- Lower "total installed cost" in 900# class and higher services
- Lower torquing requirements with no requirement for special hydraulic tensioning
- Seal ring is reusable, where RTJ ring is crushed and is not considered reuseable
- 4 bolt connection (compared with 8-24 for conventional flange) for quick assembly and disassembly
- No bolt holes to align
- Pressure assisted seal vs. conventional flange seal
- Unaffected by uneven tightening of bolts
- Zero fugitive emissions
- Lighter weight, fewer parts



Site photo illustrating clamp joint versus RTJ flange  
Same pipe, same service

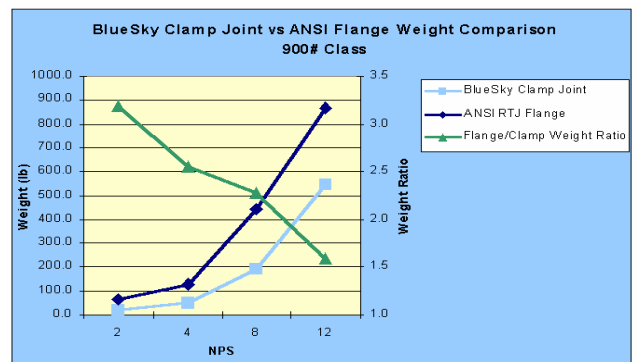
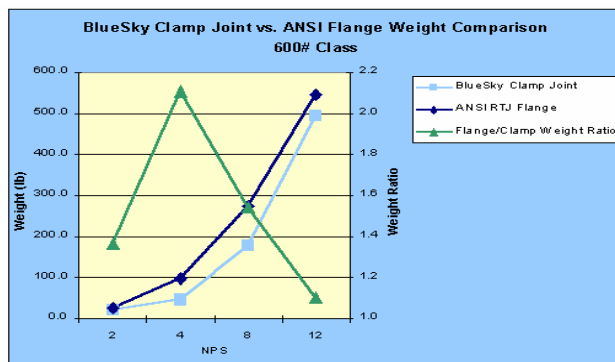
## The BlueSky Clamp Pipe Connector The Light Choice

For high pressure applications, the BlueSky Clamp Joint is lighter by over 6 times compared to a conventional ANSI Flange. In the analysis below, the BlueSky Clamp Joint represents a substantial weight savings for 600# line classes and up. In fact, the higher the pressure, the greater the savings.

### BlueSky Clamp Joint vs. ANSI Flange Weight Comparison

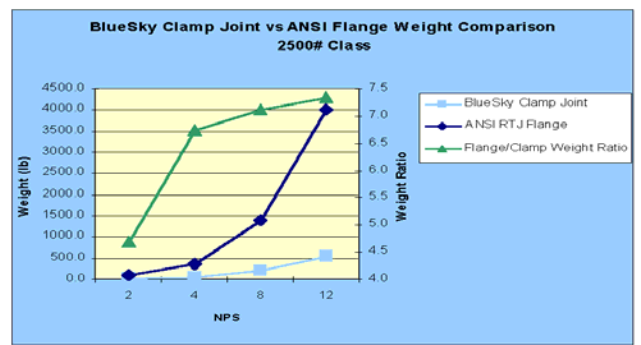
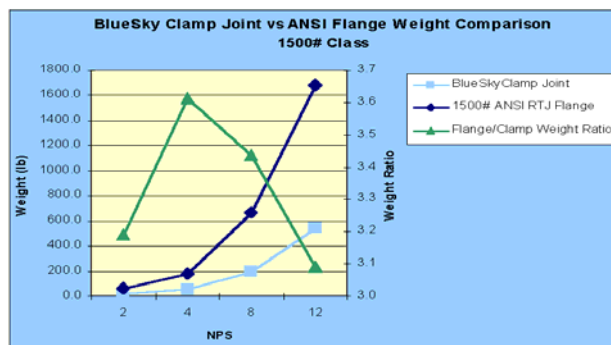
Weight (lb) 600# (pipe sch. 80)			
NPS	BlueSky Clamp Joint	RTJ ANSI Flange	Flange/Clamp Weight Ratio
2	19.4	26.5	1.4
4	46.0	97.0	2.1
8	177.6	274.4	1.5
12	493.5	544.5	1.1

Weight (lb) 900# (pipe sch. 160)			
NPS	BlueSky Clamp Joint	RTJ ANSI Flange	Flange/Clamp Weight Ratio
2	20.0	63.9	3.2
4	50.0	127.9	2.6
8	194.4	443.1	2.3
12	545.6	868.6	1.6



Weight (lb) 1500# (pipe sch. 160)			
NPS	BlueSky Clamp Joint	RTJ ANSI Flange	Flange/Clamp Weight Ratio
2	20.0	63.9	3.2
4	50.0	180.8	3.6
8	194.4	668.0	3.4
12	545.6	1686.5	3.1

Weight (lb) 2500# (pipe sch. xxs)(1)			
NPS	BlueSky Clamp Joint	RTJ ANSI Flange	Flange/Clamp Weight Ratio
2	20.7	97.0	4.7
4	52.7	354.9	6.7
8	194.4	1384.5	7.1
12	545.6	3999.2	7.3

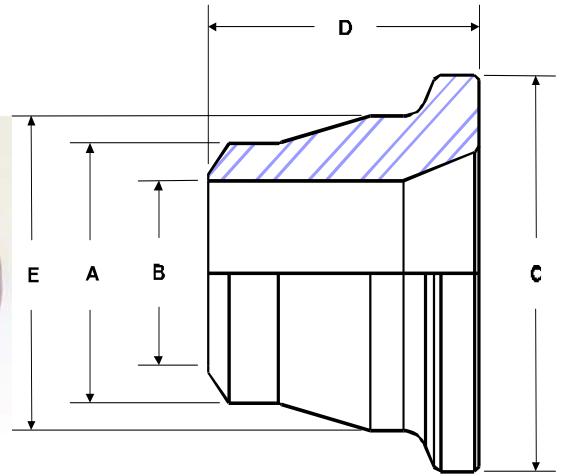


- (1) Pipe sch. 160 was used for 12"-2500# hub.
- (2) The BlueSky Clamp Joint eight includes 2 hubs, 2 clamp-halves, 1 seal ring, 4 studs, and 8 nuts.
- (3) The ANSI RTJ Flange weights include 2 weld-on flanges, 1 ring, and the fasteners

## Butt Weld Hub Data

BlueSky hubs are typically made from the same grade of material as the mating pipe and, as such, can be made from any machinable metal including Nickel, Titanium, and Zirconium alloys in addition to the standard carbon, low alloy, and stainless steels.

Although the table below lists standard pipe schedules, BlueSky hubs are also available in special wall thicknesses. BlueSky hubs are supplied with weld preparations in accordance with ANSI B16.5. Other weld preparations are available.



The sealing surfaces on carbon and low alloy steel hubs are provided with suitable corrosion protection.

Nominal Pipe Size	Pipe Sch	Product Number	Part Number	Seal Ring Size	Clamp Size	Est Weight (lbs) (1)	Pipe OD		Dimensions (Inches)		
							A	B	C	D	E
½	40	1CJ5	HC0010	5	1	0.61	0.840	0.622	2.000	1.750	1.500
	80	1CJ5	HC0020	5	1	0.61	0.840	0.546	2.000	1.750	1.500
	160	1CJ4	HC0030	4	1	0.60	0.840	0.466	2.000	1.750	1.500
	XX	1CJ4	HC0040	4	1	0.66	0.840	0.252	2.000	1.750	1.500
¾	40	1CJ7	HC0050	7	1	0.56	1.050	0.824	2.000	1.750	1.500
	80	1CJ7	HC0060	7	1	0.54	1.050	0.742	2.000	1.750	1.500
	160	1CJ5	HC0070	5	1	0.64	1.050	0.614	2.000	1.750	1.500
	XX	1CJ4	HC0080	4	1	0.68	1.050	0.434	2.000	1.750	1.500
1	40	1CJ11	HC0090	11	1	0.46	1.315	1.049	2.000	1.750	1.500
	80	1CJ11	HC0100	11	1	0.49	1.315	0.957	2.000	1.750	1.500
	160	1CJ7	HC0110	7	1	0.59	1.315	0.815	2.000	1.750	1.500
	XX	1CJ5	HC0120	5	1	0.70	1.315	0.599	2.000	1.750	1.500
1 ½	40	1.5CJ14	HC0130	14	1 ½	1.60	1.900	1.610	3.125	2.375	2.375
	80	1.5CJ14	HC0140	14	1 ½	1.74	1.900	1.500	3.125	2.375	2.375
	160	1.5CJ14	HC0150	14	1 ½	1.91	1.900	1.338	3.125	2.375	2.375
	XX	1.5CJ14	HC0160	14	1 ½	2.04	1.900	1.100	3.125	2.375	2.375
	XX	1.5CJ11	HC0620	11	1 ½		1.900	1.100	3.125	2.375	2.375
2	40	2CJ20	HC0170	20	2	2.24	2.375	2.063	3.625	2.750	2.875
	80	2CJ20	HC0180	20	2	2.46	2.375	1.939	3.625	2.750	2.875
	160	2CJ20	HC0190	20	2	2.78	2.375	1.689	3.625	2.750	2.875
	160	2CJ16	HC0630	16	2		2.375	1.689	3.625	2.750	2.875
	XX	2CJ14	HC0200	14	2	3.23	2.375	1.503	3.625	2.750	2.875
2 ½	40	2.5CJ25	HC0210	25	2 ½	5.57	2.875	2.469	5.000	3.250	4.000
	80	2.5CJ25	HC0220	25	2 ½	6.04	2.875	2.323	5.000	3.250	4.000
	160	2.5CJ20	HC0230	20	2 ½	6.80	2.875	2.063	5.000	3.250	4.000
	XX	2.5CJ20	HC0240	20	2 ½	7.36	2.875	1.771	5.000	3.250	4.000
3	40	3CJ27	HC0250	27	3	4.70	3.500	3.063	5.000	3.250	4.000
	80	3CJ27	HC0260	27	3	5.23	3.500	2.900	5.000	3.250	4.000
	160	3CJ25	HC0270	25	3	6.20	3.500	2.626	5.000	3.250	4.000
	XX	3CJ25	HC0280	25	3	6.87	3.500	2.300	5.000	3.250	4.000
	XX	3CJ23	HC0640	23	3		3.500	2.300	5.000	3.250	4.000
4	40	4CJ40	HC0290	40	4	6.62	4.500	4.026	6.000	3.625	5.000
	80	4CJ40	HC0300	40	4	7.41	4.500	3.826	6.000	3.625	5.000
	120	4CJ34	HC0310	34	4	8.92	4.500	3.636	6.000	3.625	5.000
	160	4CJ34	HC0320	34	4	9.62	4.500	3.438	6.000	3.625	5.000
	XX	4CJ31	HC0330	31	4	11.0	4.500	3.152	6.000	3.625	5.000
5	40	5CJ52	HC0340	52	5	10.5	5.563	5.047	7.500	4.375	6.500
	80	5CJ52	HC0350	52	5	10.5	5.563	4.813	7.500	4.375	6.500
	160	5CJ46	HC0360	46	5	16.2	5.563	4.313	7.500	4.375	6.500
	XX	5CJ40	HC0370	40	5	20.5	5.563	4.063	7.500	4.375	6.500
6	40	6CJ62	HC0380	62	6	20.9	6.625	6.065	9.250	4.625	7.750
	80	6CJ62	HC0390	62	6	23.0	6.625	5.761	9.250	4.625	7.750
	160	6CJ52	HC0400	52	6	31.5	6.625	5.187	9.250	4.625	7.750
	XX	6CJ52	HC0410	52	6	32.1	6.625	4.897	9.250	4.625	7.750

Nominal Pipe Size	Pipe Sch	Product Number	Part Number	Seal Ring Size	Clamp Size	Est Weight (lbs) (1)	Pipe OD		Dimensions (inches)		
							A	B	C	D	E
8	40	8CJ82	HC0420	82	8	30.4	8.625	7.981	11.500	5.375	10.000
	80	8CJ76	HC0430	76	8	39.0	8.625	7.625	11.500	5.375	10.000
	160	8CJ72	HC0440	72	8	47.5	8.625	6.813	11.500	5.375	10.000
	XX	8CJ72	HC0450	72	8	47.5	8.625	6.875	11.500	5.375	10.000
10	40	10CJ102	HC0460	102	10		10.750	10.020	13.625	6.000	11.625
	60	10CJ97	HC0470	97	10		10.750	9.750	13.625	6.000	11.625
	80	10CJ97	HC0480	97	10		10.750	9.562	13.625	6.000	11.625
	160	10CJ84	HC0490	84	10	84.6	10.750	8.500	13.625	6.000	11.625
12	40	12CJ120	HC0500	120	12		12.750	11.938	16.000	6.625	14.000
	60	12CJ120	HC0510	120	12		12.750	11.626	16.000	6.625	14.000
	80	12CJ120	HC0520	120	12		12.750	11.374	16.000	6.625	14.000
	160	12CJ102	HC0530	102	12	123	12.750	10.126	16.000	6.625	14.000
14	40	14CJ134	HC0540	134	14	125	14.000	13.124	18.500	7.250	16.500
	60	14CJ134	HC0550	134	14	133	14.000	12.812	18.500	7.250	16.500
	60	14CJ130	HC0650	130	14		14.000	12.812	18.500	7.250	16.500
	80	14CJ130	HC0560	130	14	177	14.000	12.500	18.500	7.250	16.500
	160	14CJ112	HC0570	112	14	197	14.000	11.188	18.500	7.250	16.500
16	40	16CJ152	HC0580	152	16	190	16.000	15.000	21.000	7.875	19.000
	60	16CJ152	HC0590	152	16	205	16.000	14.688	21.000	7.875	19.000
	80	16CJ152	HC0600	152	16	230	16.000	14.312	21.000	7.875	19.000
	160	16CJ134	HC0610	134	16	294	16.000	12.812	21.000	7.875	19.000

(1) The weight listed is for steel. Please contact BlueSky for the weight of other materials

## Hub Material Specifications

Hubs can be supplied in a variety of material types depending on the application and the piping system involved.

Most common grades include SA105 (carbon steel) and SA182-F316 (stainless steel).

Hubs can be manufactured out of most machinable metals, including carbon, alloy steels, stainless steels and titanium.

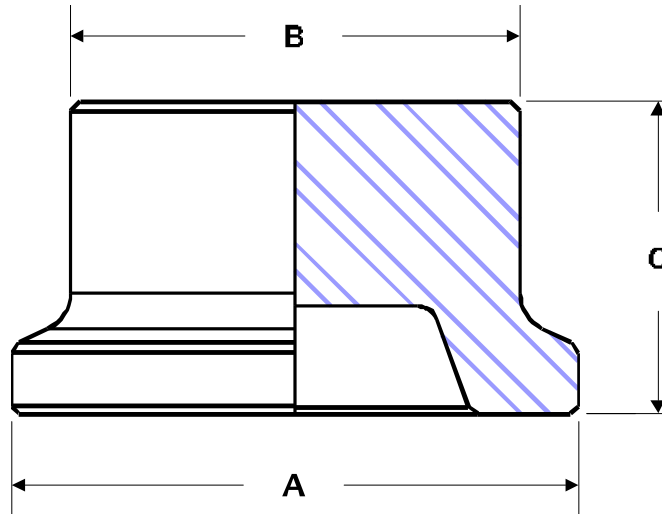
Please contact Blue Sky for further information and evaluation of these and any other materials not listed.

Hub Material Selection Table	
Common Name	Forging Specification
Carbon	SA105
	SA350-LF2
	SA350-LF1
3½ Ni	SA350-LF3
C - ½Mo	SA182-F1
½Cr - ½Mo	SA182-F2
1Cr - ½Mo	SA182-F12
1¼Cr - ½Mo	SA182-F11
2¼Cr - 1Mo	SA182-F22
5Cr - ½Mo	SA182-F5
	SA182-F5a
9Cr - 1Mo	SA182-F9
18Cr - 8Ni	SA182-F304
	SA182-F304H
16Cr - 12Ni - 2Mo	SA182-F316
	SA182-F316H
18Cr - 10Ni - Ti	SA182-F321
	SA182-F321H
18Cr - 10Ni - Cb	SA182-F347
	SA182-F347H
	SA182-F348
	SA182-F348H
25Cr - 20Ni	SA182-F310
Alloy 600	SB564-N06600
Alloy 800	SB564-N08800
Alloy C276	SB574-N10276
	SB564-N06625
	SB425-N08825
Duplex	SA182-F51
	SA182-F53
	SA182-F55



## Blind Hub Data

Clamp joint blind hubs are designed to fit all standard clamp joints. Designed to withstand the full pressure-temperature rating of the clamp joint, they can be used as pressure vessel and heat exchanger closures. Blind hubs can be tapped or modified to meet most instrumentation requirements.

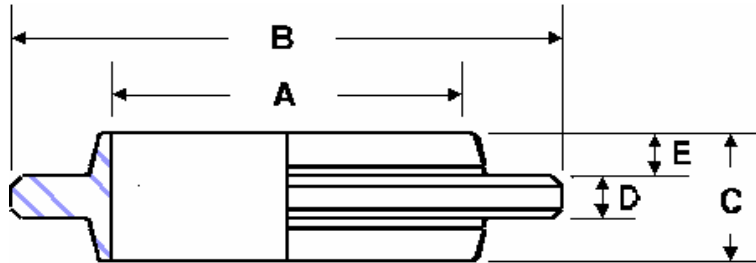


Product Number	Part Numbers	Seal Ring Size	Clamp Size	Approx. Weight (lbs)	Dimensions (inches)		
					A	B	C
1CJ4	BC0010	4	1	3	2.000	1.500	1.750
1CJ5	BC0020	5	1	3	2.000	1.500	1.750
1CJ7	BC0030	7	1	3	2.000	1.500	1.750
1CJ11	BC0040	11	1	3	2.000	1.500	1.750
1.5CJ14	BC0050	14	1 ½	3.5	3.125	2.375	2.125
2CJ14	BC0060	14	2	4.5	3.625	2.875	2.000
2CJ20	BC0070	20	2	4.3	3.625	2.875	2.000
2.5CJ20	BC0080	20	2 ½	9.5	5.000	4.000	2.500
2.5CJ25	BC0090	25	2 ½	9.2	5.000	4.000	2.500
3CJ25	BC0100	25	3	9.2	5.000	4.000	2.500
3CJ27	BC0110	27	3	8.3	5.000	4.000	2.500
4CJ31	BC0120	31	4	15	6.000	5.000	2.875
4CJ34	BC0130	34	4	14	6.000	5.000	2.875
4CJ40	BC0140	40	4	14	6.000	5.000	2.875
5CJ40	BC0150	40	5	40	7.500	6.500	3.500
5CJ46	BC0160	46	5	43	7.500	6.500	2.875
5CJ52	BC0170	52	5	40	7.500	6.500	2.875
6CJ52	BC0180	52	6	45	9.250	7.750	3.500
6CJ62	BC0190	62	6	42	9.250	7.750	2.875
8CJ72	BC0200	72	8	75	11.500	10.000	3.500
8CJ76	BC0210	76	8	70	11.500	10.000	3.000
8CJ82	BC0220	82	8	68	11.500	10.000	3.000
10CJ84	BC0230	84	10	150	13.625	11.625	4.250
10CJ97	BC0240	97	10	105	13.625	11.625	3.500
12CJ102	BC0250	102	12	240	16.000	14.000	5.250
12CJ112	BC0260	112	12	175	16.000	14.000	4.250
12CJ120	BC0270	120	12	170	16.000	14.000	3.875
14CJ112	BC0280	112	14	400	18.500	16.500	6.000
14CJ130	BC0290	130	14	283	18.500	16.500	6.000
14CJ134	BC0300	134	14	250	18.500	16.500	6.000
16CJ134	BC0310	134	16	540	21.000	19.000	7.500
16CJ152	BC0320	152	16	430	21.000	19.000	7.500

## Seal Ring Data

BlueSky seal rings are be manufactured to meet specific material requirements for the application. Standard seal ring material is AISI 4140 and A564 Gr. 630 (17-4PH) stainless steel with MoS<sub>2</sub> coating. Other materials are available on request such as SA638 Gr. 660 and SB637 UNS N07718 (Alloy 718).

Seal rings are also available with other coating to provide additional lubrication.



Seal Ring Size	Part Numbers	Approx Weight (lbs)	Dimensions (inches)				
			A	B	C	D	E
4	SC004	0.03	0.500	1.000	0.375	0.125	0.125
5	SC005	0.03	0.625	1.094	0.375	0.125	0.125
7	SC007	0.04	0.906	1.375	0.375	0.125	0.125
11	SC011	0.06	1.125	1.734	0.375	0.125	0.125
14	SC014	0.28	1.610	2.625	0.563	0.250	0.156
16	SC016	0.28	1.868	2.688	0.625	0.250	0.188
20	SC020	0.45	2.063	3.250	0.750	0.250	0.250
23	SC023	0.48	2.375	3.500	0.750	0.250	0.250
25	SC025	0.62	2.672	4.000	0.750	0.250	0.250
27	SC027	0.62	3.063	4.250	0.750	0.250	0.250
31	SC031	0.69	3.250	4.500	0.750	0.250	0.250
34	SC034	0.80	3.688	5.000	0.750	0.250	0.250
40	SC040	1.13	4.063	5.500	1.000	0.250	0.375
46	SC046	1.34	4.750	6.188	1.000	0.250	0.375
52	SC052	1.33	5.313	6.625	1.000	0.250	0.375
62	SC062	3.13	6.065	7.875	1.375	0.375	0.500
67	SC067	3.84	6.875	8.750	1.375	0.375	0.500
72	SC072	4.40	7.250	9.500	1.375	0.375	0.500
76	SC076	4.67	7.750	10.000	1.375	0.375	0.500
82	SC082	4.26	8.250	10.125	1.375	0.375	0.500
84	SC084	5.79	8.500	11.125	1.375	0.375	0.500
87	SC087	6.07	8.875	11.500	1.375	0.375	0.500
94	SC094	5.61	9.500	12.000	1.375	0.375	0.500
97	SC097	5.55	9.875	12.000	1.375	0.375	0.500
102	SC102	5.48	10.250	12.000	1.375	0.375	0.500
112	SC112	12.3	11.250	14.125	1.625	0.625	0.500
120	SC120	6.04	12.000	13.875	1.375	0.375	0.500
122	SC122	6.16	12.250	14.125	1.375	0.375	0.500
130	SC130	8.47	13.000	15.000	1.500	0.500	0.500
134	SC134	8.78	13.500	15.500	1.500	0.500	0.500
137	SC137	13.7	13.875	16.500	1.625	0.625	0.500
140	SC140	11.0	14.000	16.500	1.500	0.500	0.500
152	SC152	11.9	15.250	17.750	1.500	0.500	0.500

**Notes:** 1. All seal rings are coated with MoS<sub>2</sub> dry lubricant. Other coatings or uncoated rings are available on request

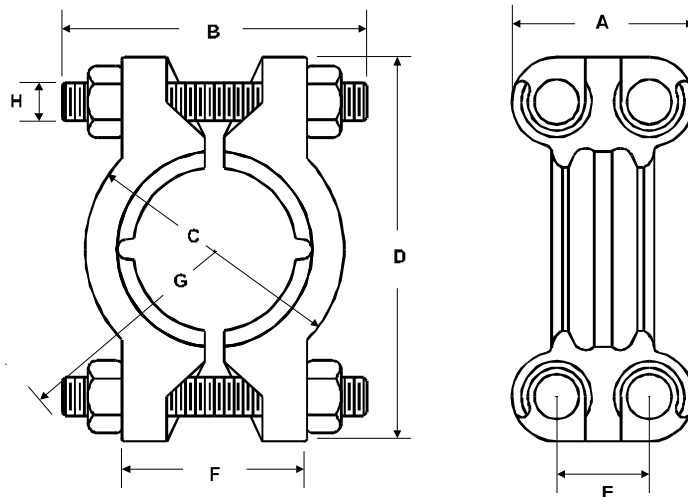
## Clamp Assembly Data & Recommended Bolting Torque

BlueSky clamp set assemblies are comprised of two clamps and a set of studs and nuts. Common stock materials and dimensional data is shown below. Other materials are available on request.

Clamp Material Selection Table		
Carbon Steel	Alloy Steel	Stainless Steel
SA266-Cl 3	SA193 B7/B7M	SA182-F304
SA487-Cl 1B, 2B, 4B or 4A	SA182-F22	SA182-F316
SA217-WCB	SA217-WC9	SA351-CF8M

Nuts are specially machined with a spherical facing to facilitate easy installation and improve stress distribution.

Please consult the *BlueSky Clamp Joint Installation and Maintenance Manual* for installation details.



Clamp Size	Part Number	Approx Set Weight (lbs)	Stud Bolt	Average Torque (ft-lbs)	Dimensions (inches)							
					A	B	C	D	E	F	G	H
1	CC0100	4	½-13UNC	17	2.313	3.500	2.813	4.250	1.250	2.250	2.625	½
1 ½	CC0150	10	5/8-11UNC	35	3.125	5.000	4.500	6.500	1.625	3.250	4.000	5/8
2	CC0200	14	¾-10UNC	55	3.500	5.250	5.062	7.500	1.813	3.625	4.500	¾
2 ½ / 3	CC0300	22	¾-10UNC	55	3.500	6.000	6.875	9.250	1.813	4.500	5.250	¾
4	CC0400	30	7/8-9UNC	90	4.063	7.000	8.125	10.500	2.063	5.250	6.000	7/8
5	CC0500	43	1-8UNC	140	4.438	8.000	9.750	12.375	2.313	6.125	7.375	1
6	CC0600	67	1 1/8-8UN	205	4.813	9.375	12.000	15.000	2.437	6.625	8.750	1 1/8
8	CC0800	95	1 ¼-8UN	290	5.875	10.500	14.500	18.250	2.875	7.500	9.875	1 ¼
10	CC1000	230	1 5/8-8UN	630	7.375	14.125	17.625	22.000	3.625	10.000	12.750	1 5/8
12	CC1200	295	1 ¾-8UN	870	7.500	16.000	20.250	25.750	3.750	10.000	14.500	1 ¾
14	CC1400	405	2-8UN	1300	8.250	16.250	23.000	29.000	4.250	10.000	16.000	2
16	CC1600	900	2 ½-8UN	2570	10.500	22.000	27.500	34.625	5.500	12.500	19.750	2 ½

**Notes:** 1. Clamp sets are complete with bolting as standard

## Pressure / Temperature Ratings (ASME B31.3 – Carbon Steel)

Hub Material: SA105 Stud Material: SA193-B7  
 Clamp Material: SA266-CI3 (1" – 12") Nut Material: SA194-2H  
 SA487-CI 1B, 2B, 4B or 4A (14" & larger, up to 650F)  
 SA217-WC9 (14" & larger, over 650F)

Pipe Size	Pipe Schedule	BlueSky Product Number	Pressure Rating (psi)										
			-20 to 100°F	200°F	300°F	400°F	500°F	600°F	700°F	800°F	900°F	950°F	1000°F
½	40	1CJ5	14036	13193	12831	12410	11687	10723	10422	7229	3916	2711	1506
	80	1CJ5	15533	14600	14200	13733	12933	11867	11533	8000	4333	3000	1667
	160	1CJ4	17070	16044	15604	15092	14212	13040	12674	8791	4762	3297	1832
	XX	1CJ4	20529	19295	18767	18150	17093	15683	15242	10573	5727	3965	2203
¾	40	1CJ7	9979	9379	9122	8822	8308	7623	7409	5139	2784	1927	1071
	80	1CJ7	11633	10934	10634	10285	9685	8887	8637	5991	3245	2247	1248
	160	1CJ5	14242	13386	13020	12592	11858	10880	10575	7335	3973	2751	1528
	XX	1CJ4	17611	16553	16100	15571	14664	13454	13076	9070	4913	3401	1890
1	40	1CJ11	5295	4977	4841	4682	4409	4045	3932	2727	1477	1023	568
	80	1CJ11	6710	6306	6134	5932	5586	5126	4982	3456	1872	1296	720
	160	1CJ7	10161	9551	9289	8984	8461	7763	7545	5233	2835	1962	1090
	XX	1CJ5	14499	13628	13255	12819	12072	11077	10765	7467	4045	2800	1556
1 ½	40	1.5CJ14	6567	6172	6003	5806	5468	5017	4876	3382	1832	1268	705
	80	1.5CJ14	7819	7349	7148	6913	6510	5973	5805	4027	2181	1510	839
	160	1.5CJ14	9798	9209	8957	8663	8158	7485	7275	5046	2733	1892	1051
	XX	1.5CJ14	11522	11522	11522	11411	10746	9860	9583	6647	3600	2154	1346
2	40	2CJ20	4809	4520	4396	4252	4004	3674	3570	2477	1341	929	516
	80	2CJ20	5852	5501	5350	5174	4873	4471	4345	3014	1633	1130	628
	160	2CJ20	8053	7569	7362	7120	6705	6152	5979	4147	2247	1555	864
	XX	2CJ14	11986	11265	10957	10597	9979	9156	8899	6173	3344	2315	1286
2 ½	40	2.5CJ25	7366	6923	6733	6512	6133	5627	5469	3793	2055	1423	790
	80	2.5CJ25	8381	7878	7662	7410	6978	6403	6223	4317	2338	1619	899
	160	2.5CJ20	12567	11812	11489	11111	10464	9601	9331	6472	3506	2427	1348
	XX	2.5CJ20	14747	13861	13481	13038	12278	11266	10949	7595	4114	2848	1582
3	40	3CJ27	3574	3359	3267	3160	2976	2730	2654	1841	997	690	383
	80	3CJ27	4443	4176	4061	3928	3699	3394	3299	2288	1239	858	477
	160	3CJ25	7358	6916	6726	6505	6126	5621	5463	3789	2053	1421	789
	XX	3CJ25	9450	8949	8703	8417	7927	7273	7069	4903	2656	1766	1022
4	40	4CJ40	2564	2410	2344	2267	2135	1958	1903	1320	715	495	275
	80	4CJ40	3310	3111	3026	2926	2756	2528	2457	1705	923	639	355
	160	4CJ34	5746	5400	5252	5080	4784	4389	4266	2959	1603	1110	616
	XX	4CJ31	8832	8302	8074	7809	7354	6748	6558	4549	2464	1706	948
5	40	5CJ52	3188	2997	2915	2819	2655	2436	2367	1642	889	616	342
	80	5CJ52	3915	3679	3579	3461	3259	2991	2907	2016	1092	756	420
	160	5CJ46	6186	6114	5946	5751	5416	4969	4830	3350	1815	1156	698
	XX	5CJ40	8346	8346	8346	8346	7956	7355	6981	4914	2613	1560	975
6	40	6CJ62	3010	2829	2751	2661	2506	2299	2235	1550	840	581	323
	80	6CJ62	3773	3546	3449	3336	3142	2882	2801	1943	1053	729	405
	160	6CJ52	6225	6225	6225	6225	5872	5387	5207	3632	1949	1163	727
	XX	6CJ52	6225	6225	6225	6225	5934	5585	5207	3665	1949	1163	727
8	40	8CJ82	2568	2414	2348	2271	2138	1962	1907	1323	716	496	276
	80	8CJ76	3541	3329	3237	3131	2949	2705	2629	1824	988	684	380
	160	8CJ72	5569	5444	5295	5121	4823	4425	4301	2983	1616	1041	621
	XX	8CJ72	5569	5311	5166	4996	4705	4317	4196	2910	1576	1041	606
10	40	10CJ97	2032	1910	1857	1796	1692	1552	1509	1046	567	392	218
	60	10CJ97	2448	2301	2238	2164	2038	1870	1817	1261	683	473	263
	80	10CJ97	2749	2583	2513	2430	2288	2100	2041	1416	767	531	295
	160	10CJ84	5777	5430	5281	5107	4810	4413	4289	2975	1612	1116	620
12	40	12CJ120	2149	2020	1964	1900	1789	1642	1596	1107	599	415	231
	60	12CJ120	2564	2410	2344	2267	2135	1958	1903	1320	715	495	275
	80	12CJ112	3093	2907	2827	2734	2575	2363	2296	1593	863	597	332
	160	12CJ102	5446	5446	5446	5313	5003	4591	4462	3095	1676	1018	636
14	40	14CJ134	2938	2762	2686	2598	2446	2245	2182	1513	820	567	315
	60	14CJ134	3313	3114	3028	2929	2758	2531	2460	1706	924	640	355
	80	14CJ130	3835	3671	3575	3458	3256	2988	2904	2014	1091	755	420
	160	14CJ112	5075	4858	4779	4759	4759	4719	4325	3637	1970	1364	758
16	40	16CJ152	3451	3244	3155	3051	2874	2637	2562	1777	963	667	370
	60	16CJ152	3805	3576	3478	3364	3168	2907	2825	1960	1061	735	408
	80	16CJ152	4238	3983	3874	3747	3529	3238	3147	2183	1182	818	455
	160	16CJ134	7242	6807	6620	6403	6030	5533	5377	3730	2020	1399	777

- Notes:**
1. Ratings are based on calculations from ASME BPVC Section VIII, Division 1, Appendix 24 – 1998 (A99) Edition and material stress allowables from ASME B31.3 – 1999 Edition (if available) for steady state / static pressure / temperature design conditions
  2. Ratings for cast clamps are based on a quality factor of 0.8 (sizes 14" & larger)
  3. Ratings are based on maximum bore with corrosion allowance of 1/16"
  4. Ratings do not include any allowance for external loads or effects from adjoining pipe system



## Pressure / Temperature Ratings (ASME B31.3 – Stainless Steel)

Hub Material: SA182 F316      Stud Material: SA193-B8  
 Clamp Material: SA182-F304 (1" – 12")      SA351-CF8M (14" & up)      Nut Material: SA194-Gr.8

Pipe Size	Pipe Schedule	BlueSky Product Number	Pressure Rating (psi)										
			-325 to 300°F	400°F	500°F	600°F	700°F	800°F	900°F	1000° F	1200° F	1400° F	1500° F
½	40	1CJ5	14134	13640	12650	12014	11519	11237	10954	10813	5230	1625	919
	80	1CJ5	15326	14789	13716	13027	12490	12184	11877	11724	5670	1762	996
	160	1CJ4	16502	15924	14769	14026	13449	13119	12789	12624	6106	1898	1073
	XX	1CJ4	18904	18242	16919	16068	15406	15028	14650	14461	6994	2174	1229
¾	40	1CJ7	10730	10354	9603	9120	8745	8530	8315	7868	3421	1234	697
	80	1CJ7	11403	10661	9977	9350	9122	8666	8324	7868	3421	1311	789
	160	1CJ5	14296	13796	12795	12152	11651	11365	11079	10936	5289	1644	929
	XX	1CJ4	16906	16314	15131	14370	13779	13440	13102	12933	6255	1944	1099
1	40	1CJ11	6220	6002	5567	5287	5069	4945	4821	4758	2292	715	404
	80	1CJ11	7564	7143	6684	6264	6112	5806	5577	5271	2292	870	492
	160	1CJ7	10881	10501	9739	9249	8868	8651	8324	7868	3421	1251	707
	XX	1CJ5	14503	13996	12980	12328	11820	11530	11240	11095	5366	1668	943
1 ½	40	1.5CJ14	6863	6623	6143	5834	5594	5456	5319	5251	2539	789	446
	80	1.5CJ14	8004	7724	7164	6804	6523	6363	6203	6123	2962	920	520
	160	1.5CJ14	9791	9448	8763	8322	7980	7784	7588	7430	3230	1126	636
	XX	1.5CJ14	10768	10068	9422	8830	8615	8184	7861	7430	3230	1238	754
2	40	2CJ20	5002	4827	4476	4251	4076	3976	3876	3826	1851	575	325
	80	2CJ20	5942	5734	5318	5051	4843	4724	4605	4545	2198	683	386
	160	2CJ20	7897	7500	7019	6578	6417	6096	5856	5535	2406	908	513
	XX	2CJ14	9756	9415	8732	8293	7951	7756	7561	7463	3610	1122	634
2 ½	40	2.5CJ25	7067	6820	6325	6007	5760	5618	5477	5406	2615	813	459
	80	2.5CJ25	7960	7681	7124	6766	6487	6328	6169	6089	2649	915	517
	160	2.5CJ20	11594	11188	10377	9855	9449	9217	8986	8870	4290	1333	754
	XX	2.5CJ20	13441	12970	12030	11425	10954	10685	10417	10034	4363	1546	874
3	40	3CJ27	3618	3492	3238	3076	2949	2877	2804	2768	1339	416	235
	80	3CJ27	4392	4239	3931	3734	3580	3492	3404	3360	1625	505	286
	160	3CJ25	7022	6777	6285	5969	5723	5583	5442	5372	2598	808	456
	XX	3CJ25	8831	8257	7727	7242	7065	6712	6447	6094	2649	1016	579
4	40	4CJ40	2597	2506	2324	2207	2116	2064	2012	1986	961	299	169
	80	4CJ40	3258	3144	2916	2769	2655	2590	2525	2492	1205	375	212
	160	4CJ34	5426	5236	4856	4612	4422	4314	4205	4151	2008	624	353
	XX	4CJ31	8152	7867	7296	6929	6644	6481	6318	6226	2707	938	530
5	40	5CJ52	3067	2960	2745	2607	2499	2438	2377	2346	1135	353	199
	80	5CJ52	3702	3573	3314	3147	3017	2943	2869	2832	1370	426	241
	160	5CJ46	5781	5406	5059	4741	4625	4394	4220	3989	1734	665	389
	XX	5CJ40	7800	7293	6825	6396	6240	5928	5694	5382	2340	897	546
6	40	6CJ62	2849	2749	2550	2421	2322	2265	2208	2179	1054	328	185
	80	6CJ62	3517	3394	3148	2989	2866	2796	2726	2691	1275	404	229
	160	6CJ52	5817	5439	5090	4770	4654	4421	4247	4014	1745	669	407
	XX	6CJ52	5817	5439	5090	4770	4654	4421	4247	4014	1745	669	407
8	40	8CJ82	2400	2316	2148	2040	1956	1908	1860	1836	888	276	156
	80	8CJ76	3257	3143	2915	2769	2655	2590	2524	2492	1205	375	212
	160	8CJ72	5205	4867	4554	4268	4164	3956	3800	3591	1561	599	339
	XX	8CJ72	5095	4867	4554	4268	4153	3956	3800	3591	1561	586	331
10	40	10CJ97	1907	1840	1707	1621	1554	1516	1478	1459	706	219	124
	60	10CJ97	2272	2192	2033	1931	1852	1806	1761	1738	841	261	148
	80	10CJ97	2534	2446	2268	2154	2066	2015	1964	1939	938	291	165
	160	10CJ84	5177	4996	4633	4400	4219	4116	4012	3906	1698	595	336
12	40	12CJ120	1986	1916	1777	1688	1618	1579	1539	1519	735	228	129
	60	12CJ120	2347	2265	2100	1995	1913	1866	1819	1795	868	270	153
	80	12CJ112	2811	2713	2516	2389	2291	2235	2179	2150	1040	323	183
	160	12CJ102	5090	4759	4454	4174	4072	3868	3716	3512	1527	585	347
14	40	14CJ134	2650	2557	2372	2252	2160	2107	2010	1816	929	305	172
	60	14CJ134	2773	2690	2510	2371	2246	2163	2010	1816	929	333	193
	80	14CJ130	2985	2895	2701	2552	2418	2328	2164	1955	1000	358	224
	160	14CJ112	3949	3831	3574	3377	3199	3080	2863	2587	1323	474	296
16	40	16CJ152	3083	2975	2760	2621	2513	2451	2390	2359	1141	355	200
	60	16CJ152	3389	3270	3033	2880	2762	2694	2626	2592	1254	390	220
	80	16CJ152	3762	3631	3367	3198	3066	2991	2916	2878	1392	433	245
	160	16CJ134	5695	5524	5154	4869	4613	4442	4129	3730	1908	683	413

- Notes:**
- Ratings are based on calculations from ASME BPVC Section VIII, Division 1, Appendix 24 – 1998 (A99) Edition and material stress allowables from ASME B31.3 - 1999 Edition (if available) for steady state / static pressure / temperature design conditions
  - Ratings for cast clamps are based on a quality factor of 0.8 (sizes 14" & larger)
  - Ratings are based on maximum bore with corrosion allowance of 0" assumed for stainless steel
  - Ratings do not include any allowance for external loads or effects from adjoining pipe system



## Pressure / Temperature Ratings (ASME Section VIII, Division 1 – Stainless Steel)

Hub Material: SA182 F316      Stud Material: SA193-B8  
 Clamp Material: SA182-F304 (1" – 12")      Nut Material: SA194-Gr.8  
 SA351-CF8M (14" & up)

Pipe Size	Pipe Schedule	BlueSky Product Number	Pressure Rating (psi)										
			-20 to 200°F	300°F	400°F	500°F	600°F	700°F	800°F	1000°F	1200°F	1400°F	1500°F
½	40	1CJ5	14134	13710	13569	12721	12014	11519	11237	10813	5230	1625	919
	80	1CJ5	15326	14866	14713	13793	13027	12490	12184	11724	5670	1762	996
	160	1CJ4	16502	16007	15842	14851	14026	13449	13119	12624	6106	1898	1073
	XX	1CJ4	18904	18336	18147	17013	16068	15406	15028	14461	6994	2174	1229
¾	40	1CJ7	10730	10408	10300	9657	9120	8745	8530	7982	3478	1234	697
	80	1CJ7	11403	10775	10433	9977	9464	9008	8666	7982	3478	1311	789
	160	1CJ5	14296	13867	13724	12866	12152	11651	11365	10936	5289	1644	929
	XX	1CJ4	16906	16399	16230	15216	14370	13779	13440	12933	6255	1944	1099
1	40	1CJ11	6220	6034	5971	5598	5287	5069	4945	4758	2301	715	404
	80	1CJ11	7564	7219	6990	6684	6341	6035	5806	5348	2330	870	492
	160	1CJ7	10881	10555	10433	9763	9249	8868	8651	7982	3478	1251	707
	XX	1CJ5	14503	14068	13923	13053	12328	11820	11530	11095	5366	1668	943
1 ½	40	1.5CJ14	6863	6658	6589	6177	5834	5594	5456	5251	2539	789	446
	80	1.5CJ14	8004	7764	7684	7204	6804	6523	6363	6123	2962	920	520
	160	1.5CJ14	9791	9497	9399	8812	8322	7980	7784	7490	3284	1126	636
	XX	1.5CJ14	10768	10176	9853	9422	8938	8507	8184	7538	3284	1238	754
2	40	2CJ20	5002	4852	4802	4502	4251	4076	3976	3826	1851	575	325
	80	2CJ20	5942	5764	5704	5348	5051	4843	4724	4545	2198	683	386
	160	2CJ20	7897	7580	7340	7019	6658	6337	6096	5615	2447	908	513
	XX	2CJ14	9756	9463	9366	8780	8293	7951	7756	7463	3610	1122	634
2 ½	40	2.5CJ25	7067	6855	6784	6360	6007	5760	5618	5406	2615	813	459
	80	2.5CJ25	7960	7721	7641	7164	6766	6487	6328	6089	2694	915	517
	160	2.5CJ20	11594	11246	11130	10435	9855	9449	9217	8870	4290	1333	754
	XX	2.5CJ20	13441	13038	12903	12097	11425	10954	10685	10179	4435	1546	874
3	40	3CJ27	3618	3510	3474	3257	3076	2949	2877	2768	1339	416	235
	80	3CJ27	4392	4261	4217	3953	3734	3580	3492	3360	1625	505	286
	160	3CJ25	7022	6812	6742	6320	5969	5723	5583	5372	2598	808	456
	XX	3CJ25	8831	8346	8081	7727	7330	6977	6712	6182	2694	1016	579
4	40	4CJ40	2597	2519	2493	2337	2207	2116	2064	1986	961	299	169
	80	4CJ40	3258	3160	3128	2932	2769	2655	2590	2492	1205	375	212
	160	4CJ34	5426	5263	5209	4883	4612	4422	4314	4151	2008	624	353
	XX	4CJ31	8152	7908	7826	7337	6929	6644	6481	6236	2752	938	530
5	40	5CJ52	3067	2975	2944	2760	2607	2499	2438	2346	1135	353	199
	80	5CJ52	3702	3591	3554	3332	3147	3017	2943	2832	1370	426	241
	160	5CJ46	5781	5463	5290	5059	4799	4567	4394	4047	1763	665	389
	XX	5CJ40	7800	7371	7137	6825	6474	6162	5928	5460	2379	897	546
6	40	6CJ62	2849	2763	2735	2564	2421	2322	2265	2179	1054	328	185
	80	6CJ62	3517	3411	3376	3165	2989	2866	2796	2691	1296	404	229
	160	6CJ52	5817	5497	5323	5090	4828	4596	4421	4072	1774	669	407
	XX	6CJ52	5817	5497	5323	5090	4828	4596	4421	4072	1774	669	407
8	40	8CJ82	2400	2328	2304	2160	2040	1956	1908	1836	888	276	156
	80	8CJ76	3257	3160	3127	2932	2769	2655	2590	2492	1205	375	212
	160	8CJ72	5205	4919	4763	4554	4320	4112	3956	3643	1588	599	339
	XX	8CJ72	5095	4919	4763	4554	4320	4112	3956	3643	1588	586	331
10	40	10CJ97	1907	1850	1831	1716	1621	1554	1516	1459	706	219	124
	60	10CJ97	2272	2204	2181	2045	1931	1852	1806	1738	841	261	148
	80	10CJ97	2534	2458	2433	2281	2154	2066	2015	1939	938	291	165
	160	10CJ84	5177	5022	4970	4659	4400	4219	4116	3960	1726	595	336
12	40	12CJ120	1986	1926	1906	1787	1688	1618	1579	1519	735	228	129
	60	12CJ120	2347	2276	2253	2112	1995	1913	1866	1795	868	270	153
	80	12CJ112	2811	2727	2699	2530	2389	2291	2235	2150	1040	323	183
	160	12CJ102	5090	4810	4657	4454	4225	4021	3868	3563	1552	585	347
14	40	14CJ134	2650	2570	2544	2385	2252	2160	2107	2027	749	305	172
	60	14CJ134	2773	2690	2662	2482	2357	2260	2191	2066	749	319	193
	80	14CJ130	2985	2895	2865	2671	2537	2433	2358	2224	806	343	227
	160	14CJ112	3949	3831	3791	3535	3357	3219	3120	2942	1066	454	316
16	40	16CJ152	3083	2991	2960	2775	2621	2513	2451	2359	1141	355	200
	60	16CJ152	3389	3287	3253	3050	2880	2762	2694	2592	1213	390	220
	80	16CJ152	3762	3649	3612	3386	3198	3066	2991	2878	1213	433	245
	160	16CJ134	5695	5524	5467	5097	4841	4642	4499	4243	1538	655	413

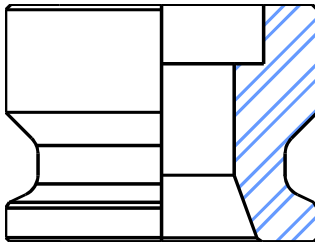
- Notes:**
- Ratings are based on calculations from ASME BPVC Section VIII, Division 1, Appendix 24 – 1998 (A99) Edition and material stress allowables from ASME BPVC Section II, Part D – 1998 (A99) Edition for steady state / static pressure / temperature design conditions
  - Ratings for cast clamps are based on a quality factor of 0.8 (sizes 14" & larger)
  - Ratings are based on maximum bore corrosion allowance of 0" assumed for stainless steel
  - Ratings do not include any allowance for external loads or effects from adjoining pipe system

## Other Clamp Connector Products

BlueSky clamp joint products can be specially designed to suit specific applications and process requirements. Contact BlueSky for additional product information on these and other designs.

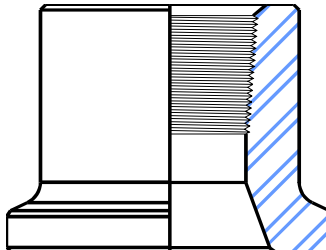


**SOCKET-WELD HUBS**



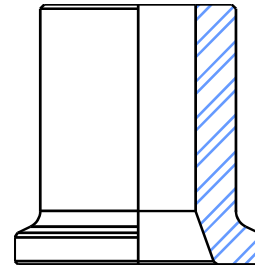
Socket weld hubs as fabrication alternative to standard butt weld ends.

**THREADED HUBS**



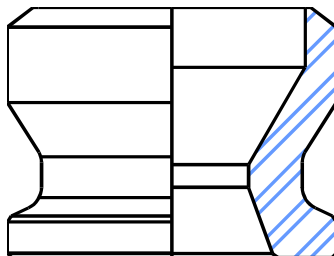
Threaded hubs with standard NPT connections to fit threaded piping systems.

**NOZZLES**



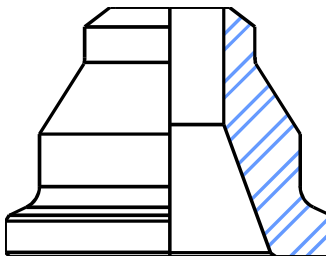
BlueSky nozzles for use in pressure vessel designs with special projection requirements

**REDUCING HUBS**



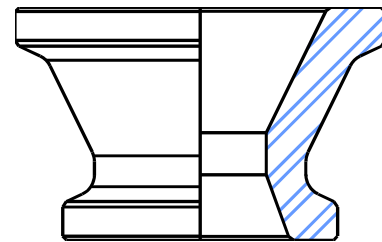
Reducing hubs for adaptation from larger bore pipe sizes to smaller clamp sizes.

**ENLARGING HUBS**



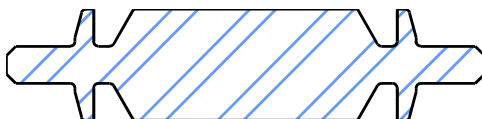
Enlarging hubs facilitate adaptation from smaller bore pipe sizes to larger clamp sizes.

**ADAPTER HUBS**



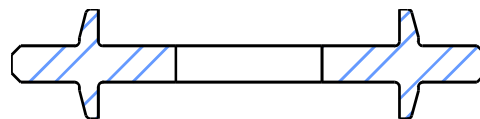
Adapter hubs enable the mating of two varying clamp sizes.

**BLIND SEAL RING**



Blind seal rings for in-line blanking. BlueSky should be consulted prior to use in any pressure containing service.

**ORIFICE SEAL RING**



Orifice seal rings are available for flow restriction or flow measurement applications.



**BLUE SKY**  
**CLAMP JOINT SPECIFICATION / ORDER SHEET**

COMPANY NAME:  
CONTACT:  
PHONE:  
FAX:

DATE:  
COMPLETED BY:

HUB DATA	Example	2	3	4	5
HUB STYLE	BUTT WELD				
PRODUCT CODE	2CJ20				
NOMINAL PIPE SIZE	2				
PIPE SCHEDULE	160				
MATERIAL	SA105N				
QUANTITY	100				
PART NUMBER	HC0190				
SPECIAL REQ'TS	N/A				

SEAL RING DATA	Example	2	3	4	5
SEAL RING SIZE	20				
COATING	MOS2				
MATERIAL	17-4PH				
QUANTITY	75				
PART NUMBER	SC020				
SPECIAL REQ'TS	N/A				

CLAMP DATA	Example	2	3	4	5
CLAMP SIZE	2"				
CLAMP MATERIAL	SA266 CL3				
BOLTING MAT'L	B7/2H				
QUANTITY (SETS)	50				
PART NUMBER	CC0200				
SPECIAL REQ'TS	N/A				

FLOW DATA	Example	2	3	4	5
MEDIA	HYDROGEN				
DESIGN PRESSURE	1500 PSIG				
DESIGN TEMPERATURE	200°F				
DESIGN CODE	ASME B31.3				

NOTES