DESTEC
ENGINEERING LTD

EPERC

1st EPERC International Conference

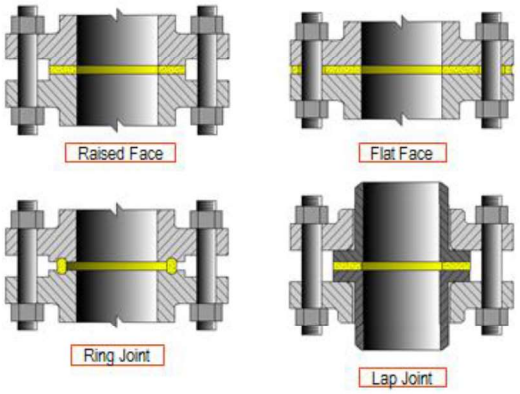
Roma, Italy
1 - 3 April 2019

Piping arrangement using
a number of clamps.

Bolted Standard flanges.

Bolted flanged joints can be disconnected as opposed to welded joints which are seen as permanent.

The most common type of flange used for Pressure Equipment is the standard piping flange, which is supplied in accordance with various International specifications such as :



ASME B16.5 & EN 1759

Cover sizes NPS ½ inch to 24 inch and are pressure and temperature designated.

ASME B16.47

Covers sizes NPS 26 to 60 and are also pressure and temperature designated.

EN ISO 10423 identical to ANSI / API Spec 6A

Covers flanges for high pressure applications as used in Oil & Gas industries.

NPS 24 inch is DN 600 mm.

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Advantages and disadvantages of Standard Flanges.

Advantages

Readily available from stockists

Pressure ratings recognised by main Pressure Vessel & piping Codes

Standard dimensions

Wide range of gaskets readily available.

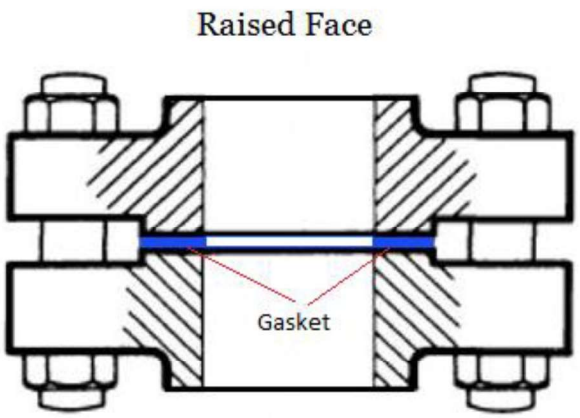
Disadvantages

Large and heavy as design calculations are based on a normal sealing Diameter.

Expensive with more exotic materials.

Require regular maintenance to ensure integrity of seal, bolting torques.

Bolts can be overtightened by maintenance personnel.



An example of a standard flange assembly.

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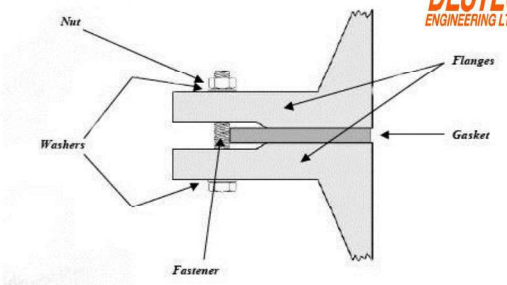
Deterioration of flanged gasket joints.

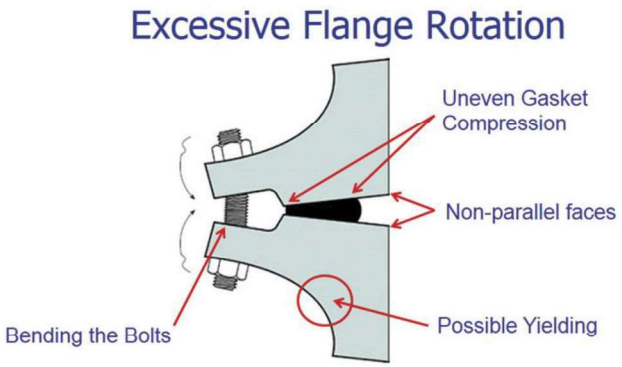
The initial design and preload can be attained on initial assembly of the system.

The problem is maintaining this preload through the life of the joint.

Main factors that cause bolted flange joints to leak :



- Relaxation of bolts and subsequent loss of load due to bolt creep, vibrations and thermal cycling etc.
- Degradation / relaxation of gasket.
- Over tightening of bolts during maintenance – bends flange.
- ANSI design does not consider effect of bending of bolts.



Fugitive leaks.

Whilst today a number of standards are being established for fugitive leak rates manufacturers can assist by providing designs that are suitable for the thermal, pressure, and mechanical cycles a joint may experience in service.

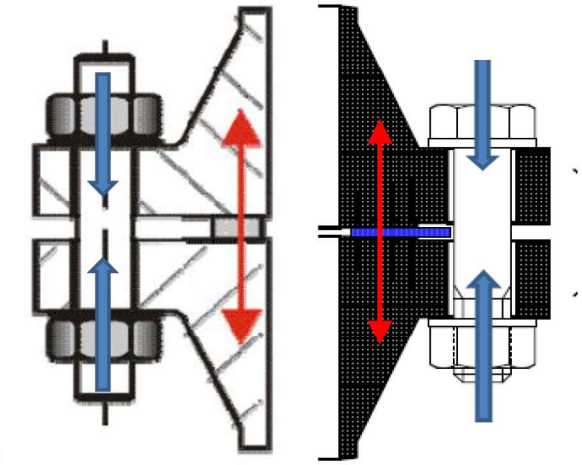
The Compact Flange and Clamp

The Compact Flange

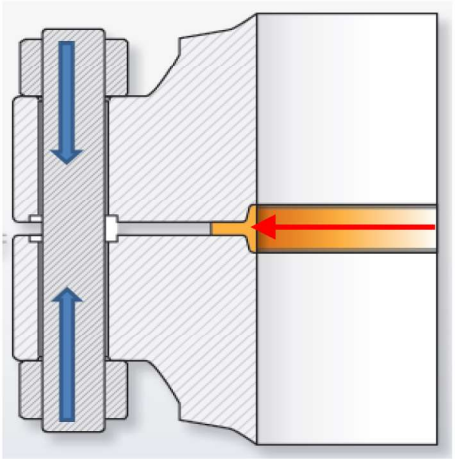
The Clamp

The compact flange and clamp are designed so as to overcome the weaknesses of standard flange.

Pressure Energised Seal.



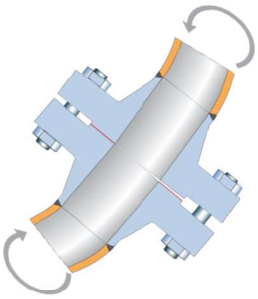
Conventional Gasket Forces are generated by Bolt Load only



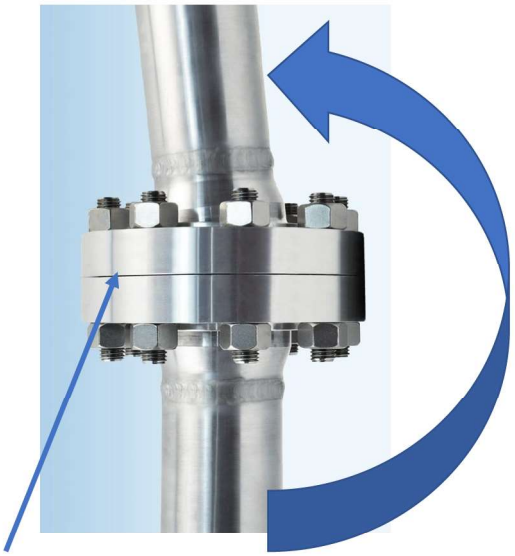
Pressure Energised Gasket Forces are generated by initial interference then by internal pressure

Key features of the Compact Design

- The compact flange is a Static Joint, that is any external forces are not transmitted to the seal. The flange faces are in direct contact with each other. No crushing of a gasket.
- The bolts are pre-loaded to 50% of yield. No relaxation of the bolts, no re-tightening or maintenance is required throughout the life even when subjected to a wide range of working temperatures.
- For equal pressure ratings the bolt circle is much reduced. Leading to a compact design with smaller bolts.
- Seals are re-usable.
- Swivel designs are available.
- API fire tested.



Bending Moment Applied.



Flange faces in direct contact. No gap.
Acts as a single block ie static.

Sizing for like performance.

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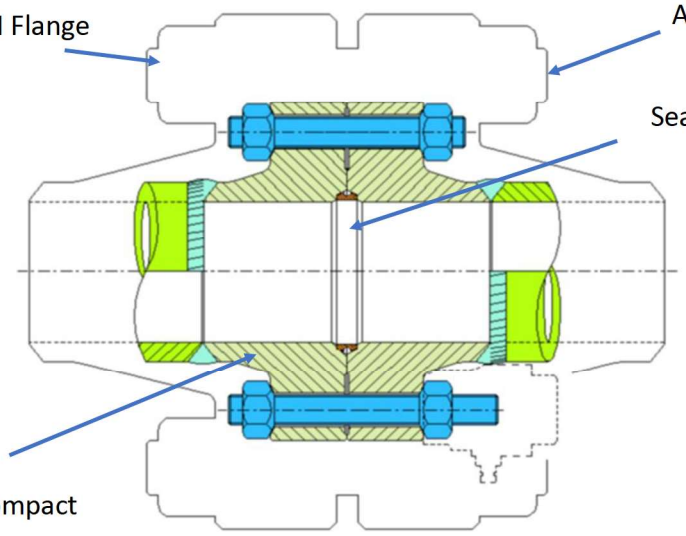
6” 6DF25 (85kg) vs ANSI 6” 2500lb (355kg)

Profile of ANSI Flange

ANSI bolt pcd

Seal ring close to the bore.



Section of compact flange.

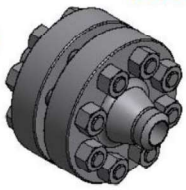
Pressure Energised Seal. The greater the internal pressure the greater seal contact.

Weight saving 270 kg

Comparing ANSI 2 inch Flange with Compact and Clamp

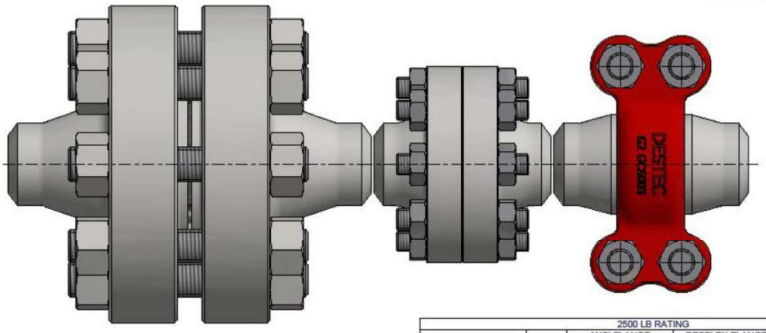
ANSI FLANGE vs DESTEC CONNECTIONS

2 in. N.B. Sch XXS
2500lb ANSI
FLANGE



2 in. N.B. Sch XXS
DESFLEX SIZE
2DF25 - D40
COMPACT FLANGE

2 in. N.B. Sch XXS
G-RANGE CLAMP
TYPE CONNECTION
SIZE G2-14



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2500 LB RATING				
		ANSI FLANGE	DESFLEX FLANGE	G RANGE CLAMP
PRESSURE RATING	BAR	431	1070	865
	lbs/in²	6250	15520	12546
WEIGHT	Kg	44	9.58	8.9
	Lbs	97	21.1	19.6

ISSUE	DATE	INITIALS	'A' No
10			
9			
8			
7			
6			
5			
4			
3			
2			
ALTERATION			

TOLERANCE SYMBOLS

- MACHINED SURFACE
- BOXED DIMENSION T.P.
- SYMMETRY
- CONCENTRICITY
- SQUARENESS
- PARALLELISM
- POSITION

SURFACE FINISH IN ROUGHNESS Nos TO BS 1134
ALL THREADS MEDIUM FIT TO BS 1580 / BS 3643

TOLERANCES FOR UNLIMITED MACHINED DIMENSIONS ARE:-
~~IMPERIAL ± 0.015"~~
METRIC ± 0.4mm

IF IN DOUBT, ASK

DIMENSIONS ARE IN:- ~~INCHES~~ MILLIMETRES

A3 Sheet

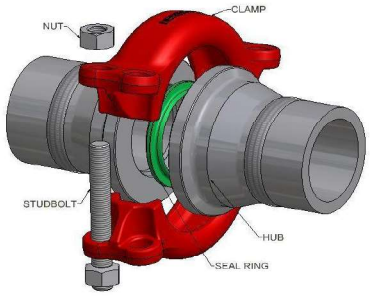
TITLE: 2500Lb ANSI FLANGE, DESFLEX FLANGE G-RANGE COMPARISON

MATERIAL:

DRAWN:	CHECKED:
J.C	C.T
DATE: 24/06/11	DATE: 27/06/11
SCALE: 1:2	SHEET: 1 OF 1

DRAWING NO: GS809

The Hub Clamp Connector



The Clamp was introduced in 1956 at the Tulsa Oil Show .

Destec obtained the licence in 1969.

Gives upto 75% weight saving gains Vs ANSI spec.

4 bolts only to seal the clamp.

No bolt holes to align.

Clamp allows 360 degree orientation.

Used in subsea & topside applications

Once set in position requires no maintenance.

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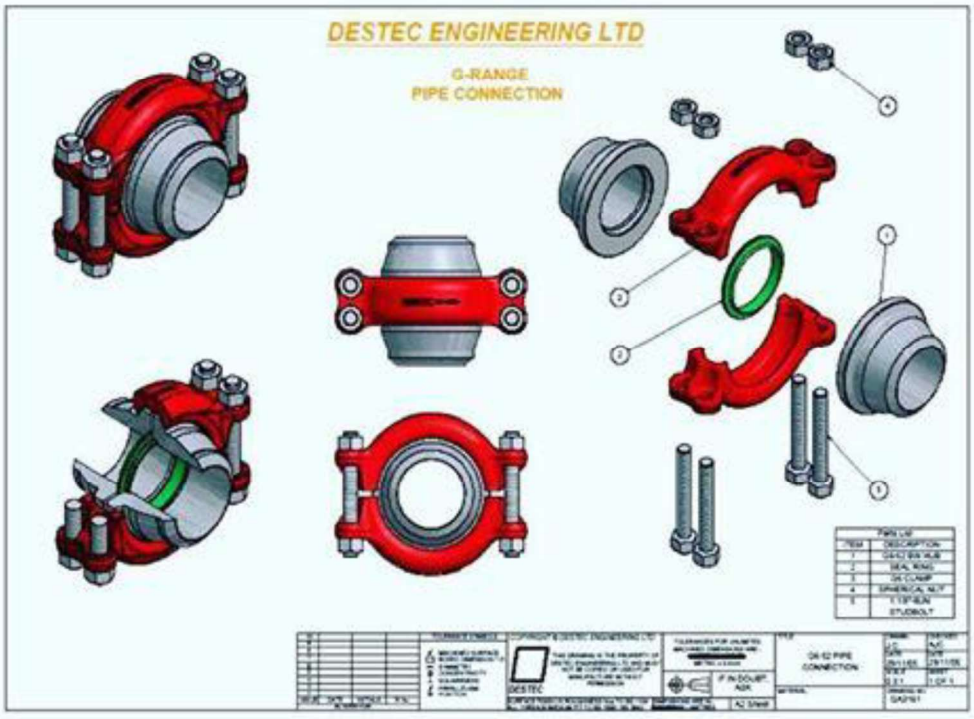
Clamp design



DESFLEX Compact Flanges

Smaller & Lighter alternative to ANSI Flanges
Suitable for High pressure & extreme Temps
Easy, Quick & Reliable make-up
Seal Ring matches bore of Pipe
Spherical faced nuts, no bolt bending stresses
Reusable Metal Seal Rings
No Leakage and no re-tightening of bolts
Cost saving with exotic materials

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DESFLEX Compact Flanges

LloydsType Approval, Fire tested
ABS type Approved
Face to face contact prevents corrosion
Large Weight Savings
Codes ASME VIII, PD5500
Weld Neck, Blind & Swivel Flanges
Proven Design with Track Record
Sizes from ½”to 60”
Licence Agreements for interfacing

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Making and maintaining the right connection

Thank You

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