

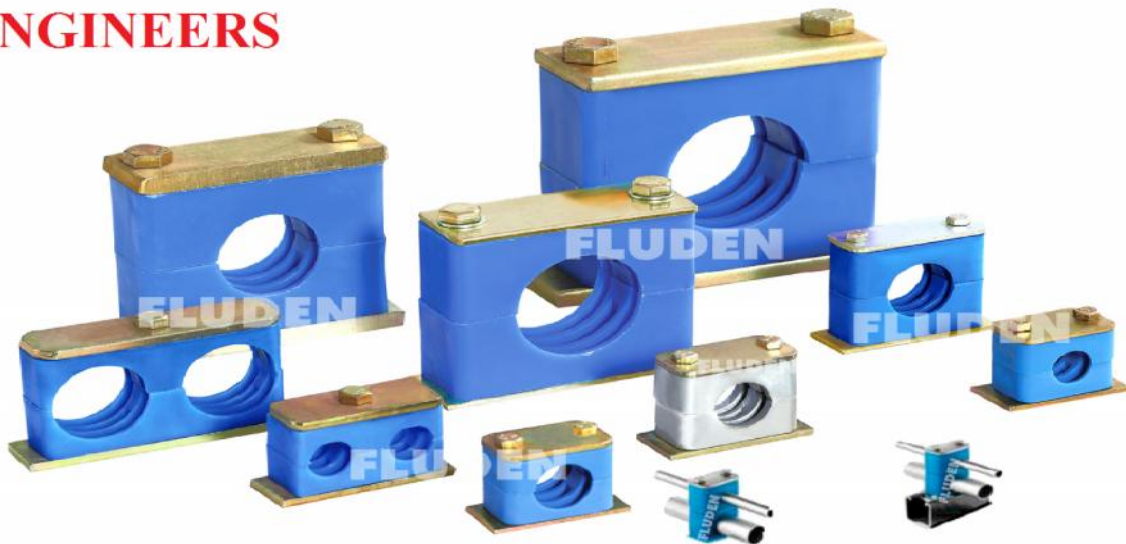


FLUDEN[®]
HYDRAULIC ACCESSORIES

FLUDEN

STANDARD - DUTY AND HEAVY - DUTY TUBE / PIPE CLAMPS

**FLUID POWER
ENGINEERS**



CLAMPS



FLUDEN[®]

Table Of Contents

Evolution of Clamps	2
Tubing vs. Piping – Difference/Comparison...	3
Features/Benefits of Clamps	4-5
Standard-Duty (Light-Duty) Clamps.....	6-7
Heavy-Duty Clamps.....	8
Twin Clamps (Standard-Duty).....	9
Mounting Options/Instructions.....	10
Installation/Assembly Instructions.....	11-12
Accessories/How To Order.....	13
Support Clamps.....	14

Evolution of Clamps

Today, clamps are widely used for providing simple, reliable dampening support for tubes, pipes, hoses and conduits in industrial and mobile hydraulic systems, process industries and electrical construction.

In many installations, pipe, hose or tube clamping is required to lessen vibration, provide rigid support and prevent loosening of the joints and welds.

FLUDEN Clamps, with their unique 4-rib design, prevent vibration transmission. They also provide Support in both vertical and horizontal directions. This support relieves the stress caused by unequal movements in the pipe, hose or tubing.

Clamp materials can differ depending on working conditions. Different materials are available for temperatures ranging from cold to extreme heat over 400 °C.



Standard-Duty Clamps

Standard-Duty Clamps are used in installations that have average loading with relatively light vibration within the system. These clamps are ideal for machine and tool applications, as well as in instrumentation plumbing.

On equipment with little or no vibration, Standard-Duty Clamps can be used without the top plate to save on expenses. In applications with relatively light to moderate vibration, these clamps can be used with a top plate for additional support.

FLUDEN Standard-Duty Clamps are also available for mounting on rails using rail nuts. The rails are available in a variety of lengths and are useful for multiple clamping on a single base. They also allow clamping flexibility where the pitch between the pipe or tubing is uneven. Rail-mounted pipe clamps can be used with or without the top plate, depending on the application.

Standard-Duty Clamps are available for pipe sizes up to 76 mm.

Heavy-Duty Clamps

FLUDEN Heavy-Duty Clamps are used in installations where heavier pipe and higher vibrations exist. They are typically used for trench layouts that are exposed to weather conditions.

Heavy-Duty Clamps are available with weld-plate mounting for all sizes, as well as for rail-mounting with special rail nuts for sizes up to 70 mm. FLUDEN's standard mounting rail length is 1 meter and are economical for multiple mountings on a single rail.

Both weld-plate and rail-mounting designs are available for applications where the top plate is in view of heavy vibration and loading. Heavy-Duty Clamps with polypropylene bodies are available for pipe sizes up to 406 mm.

FLUDEN Heavy-Duty Clamps are also available in vertical mounting and horizontal multi-clamp arrangement, either back-to-back or as a twin assembly on a single weld plate.

Both Standard-Duty and Heavy-Duty Clamps are offered in other mounting forms for compact, efficient plumbing where the installation has multiple lines stacked vertically or horizontally. They can both be used in horizontal back to back mounting where excessive vibration is encountered.

FLUDEN Clamp Nomenclature

P	C	S -	16 -	S S
Pipe Tube	clamp	Standard Heavy Twin	tube OD	Hardware material

* No suffix required for Blue colour Polypropylene bodies.
Add suffix (-BL) for black Polyamide bodies or for Aluminium body Material



PIPE: SIZE AND IDENTIFICATION

For PIPE, the determining reference is:

- A .The NB (nominal bore) or NP (nominal pipe size) which loosely refers to inner diameter
- B . The Schedule of the pipe, which determines the thickness of the pipe

Example:

For an ASME/ANSI B 36.10 Welded and Seamless Wrought Steel Pipe the Inside diameter – ID – of a NPS 2 inches pipe with:

- 2" Schedule 40 is 2.067"
- 2" Schedule 80 is 1.939"

The outside diameters of both schedules are constant at 2.375".Therefore, the "Schedule" of the pipe determines the thickness, the ID

Pipe generally has looser tolerances, is always cylindrical and are cheaper to produce than tubing.

TUBE: SIZE AND IDENTIFICATION

For TUBING, the determining reference is:

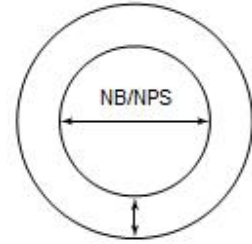
- a. The outside diameter which is specified
- b. The wall thickness of the tube

Tube dimensions are "actual" and not "nominal."

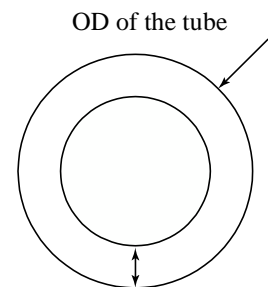
Unlike pipe, which is always cylindrical, tubing can be round, square, Rectangular or any shape of hollow material of uniform thickness.

Tolerances for tubing are tighter than those for pipe and tubing is generally More expensive to produce.

PIPE VS TUBE: A pipe and a tube are both, by definition, hollow cylinders used to pass liquids through them.
A SUMMARY Both are created to be rigid and permanent contributions from engineering standpoint.



Wall Thickness
as given by the "Schedule"



Wall Thickness
As specified by the user

	PIPE	TUBE
1	A hollow cylindrical piece identified by NB (nominal bore).	A hollow cylindrical piece identified by outside diameter.
2	Thickness of Pipe is defined by mentioning ID in terms of schedule i.e. sch. 10, sch. 80, sch. 160, etc.	Thickness of a tube is defined by the gauge, i.e. 16 gauge, 18 gauge, 20 gauge.
3	Lower sch. no. – wall thickness is lower. Higher sch. no. – wall thickness is higher.	Lesser the gauge no. – wall thickness is more. More the gauge no. – wall thickness is less.
4	Pipe is fabricated for most of sizes and drawn for lower sizes.	Tubing is always drawn and never fabricated.
5	Pipe is always circular.	A tube can be circular, square, oval, rectangular, etc.
6	Pipe starts from 1/8" (6mm) to 24" NB or 36". Fabricated pipe can be of any diameter.	Tubing starts from 1/8" to max. 4" or 6" for eg: 1/4"OD, 1/1.5/2 mm wall thickness.

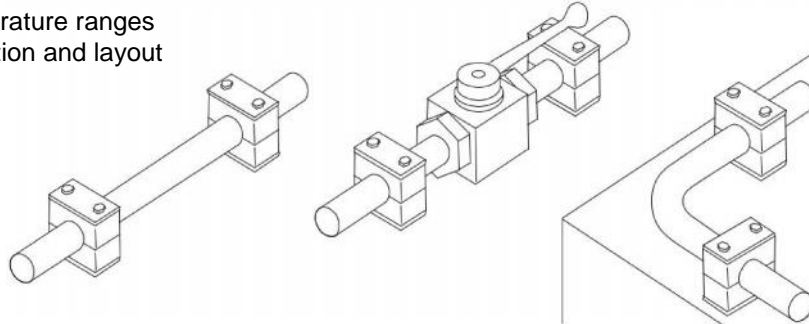
**Pipe vs. Tube:
Implications**

The decision to use tube or pipe depends on the project engineer. Choice to use pipe or tube impacts the purchase of associated items such as clamps ,fitting, etc.

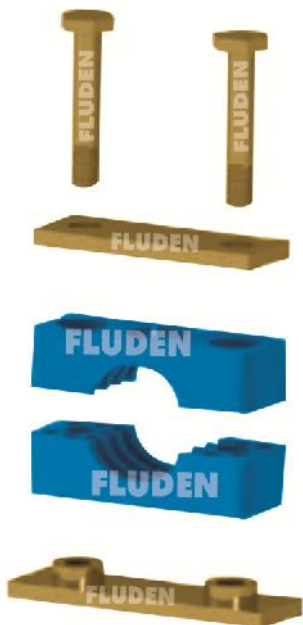
For the selection of CLAMPS, the user will designate PIPE CLAMPS or TUBE CLAMPS depending on if they are using tubing or pipe. Apart from nomenclature, there is no difference between the form and function of a TUBE CLAMP or a PIPE CLAMP.

Features of Clamps

- Simple to operate
- Easy to install
- Can accommodate various temperature ranges
- Make for quick, easy pipe installation and layout
- A very high impact resistance
- Noise reducing property
- Adjustable in small range
- Good appearance
- Shock-absorption
- Vibration dampening
- Stackable and adjustable
- Prevent loosening of joints



KEY COMPONENTS OF A CLAMP



- ← **High tensile bolts** – which hold the assembly together. The material of the bolt can be carbon steel or SS304 and it matches the MOC of the plates. Threading is as per client requirement – for India M-type Metric Standard.
- ← **Top plate**
- ← **Body** – material polypropylene. Aluminium bodies are used for high temperature applications.
- ← **Weld plate with Hex /Round weld nut** – this plate is welded to the application surface. If the assembly is rail Mounted, then there is no weld plate.

CLAMP FINISH

- All carbon steel material is vibro polished and then trivalent plated with blue passivation . The metallic parts include the plates, bolts and bushes.
- All SS304 material is vibro polished and then electro-polished
- The BLUE body is moulded from polypropylene and has a ribbed construction design.

HOW TO SELECT CLAMPS

Material of the clamp

- Can be of polypropylene (most common), polyamide, aluminium for high temperature applications

Material of the Metallic Parts

- Mild steel, stainless steel

Usage Criteria

- Type of application- e.g. aluminium clamps used in high temp environments
- Sector of usage – applications in steel mills require heavy clamps
- Pressure rating during flow – higher pressure causes more vibration
- Economy in terms of space – this determines heavy or standard or construction clamps



TYPES OF CLAMPS

Clamps with mounting rails – a series of clamps can be mounted with rail nuts.



Clamps are stackable and can also be mounted back-to-back.



Rigid pipe clamp with polypropylene / polyamide Or aluminium body – this can Standard-Duty or Heavy-Duty.



Twin Clamp – Standard – Duty.



FLUDEN Clamps: Range

Standard-Duty Pipe / Tube Clamps

Clamps in polypropylene with SS304 or CS plates.
Clamps manufactured to DIN 3015 – Part 1 standards.



Heavy-Duty Pipe / Tube Clamps

Clamps in polypropylene with CS plates. Clamps manufactured to DIN 3015 – Part 2 standards.



Twin Clamps

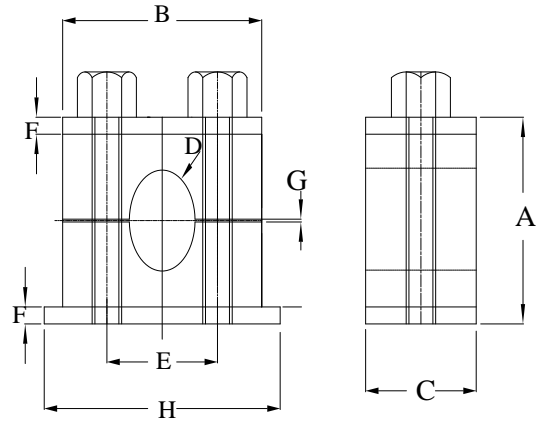
Clamps in polypropylene with metallic parts in CS.
Clamps manufactured to DIN 3015 – Part 3 standards.



Standard-Duty Clamps are available with mounting rails and rail nuts.



- Used in installations having average loading with relatively light vibration in the system.
- Ideal for machine tool applications and in Instrumentation piping.
- The clamps may be used without the top plate for reasons of economy where there is low/no vibration.
- Construction of clamp is light and suitable for moderate load.
- Weld Plate / top Plate – CS / SS 304 0.118" or 3 mm thick. Choice of material depends upon environmental conditions.
- The body is of polypropylene and the clamp Design as per DIN 3015.



Standard Mechanical Stress (PCS)

Order Code	A	B	C	D	E	F	G	H	Hex Nut	Round Nut
PCS - 06	31.5	35	30	6	20	3	0.6	46	N	Y
PCS - 08 TO 12	32.5	37	30	8	20	3	0.6	46	Y	N
PCS - 12.7	38.5	42	30	12.7	26	3	0.6	54	Y	N
PCS - 14 & 15	38.5	41	30	14 TO 15	25	3	0.6	51	Y	N
PCS - 16 & 18	38	42	30	16 TO 18	26	3	0.8	54	Y	N
PCS - 20 TO 25	40	48	30	20 TO 25	33	3	0.8	59.5	Y	N
PCS - 26.7 TO 30	46.5	57	30	26.7 TO 30	40	3	0.8	69	Y	N
PCS - 32 TO 42	61.5	70	30	32 TO 42	52	3	1	81	Y	N
PCS - 48.3 TO 57.2	71	86	30	48.3 TO 57.2	66	3	1	98	Y	N
PCS - 60.3 TO 76.1	100	120	30	60.3 TO 76.1	95	5	1	135	Y	N

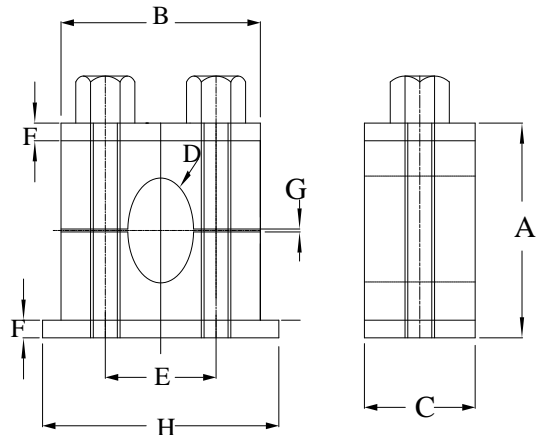
Order Code	Tube Clamp	Series	OD (mm)	Material
	PC	X	XX	PP, PA, HDPE, ALL
		S = Standard		PP = Poly Propylene / ALL = Aluminium
		H = Heavy		PA = Poly Amide
		D = Double / Twin		HDPE = High Density Poly Ethylene

Note: Unspecified tolerance ± 1 mm

DIMENSIONS IN MM FOR REFERENCE



- Used in installations having average loading with relatively light vibration in the system.
- Ideal for machine tool applications and in Instrumentation piping.
- The clamps may be used without the top plate for reasons of economy where there is low/no vibration.
- Construction of clamp is light and suitable for moderate load.
- Weld Plate / top Plate – CS / SS 304 0.118" or 3 mm thick. Choice of material depends Upon environmental conditions.
- The body is of polypropylene and the clamp Design as per DIN 3015.



Heavy Mechanical Stress (PCH)

ORDER CODE	A	B	C	D	E	F	G	H	HEX NUT	ROUND NUT
PCH – 10 TO 18	41	56	30	10 TO 18	33	5	0.6	73.5	Y	N
PCH – 20 TO 28	57	71	30	20 TO 28	45	5	0.6	86	Y	N
PCH – 30 TO 42	68	85	30	30 TO 42	60	5	0.6	100	Y	N
PCH – 48 TO 60	110	117	45	48 TO 60	90	10	2.0	130	N	Y
PCH – 65 TO 88.9	140	152	63	65 TO 88.9	122	10	2.0	184.5	N	Y
PCH – 90 TO 133	203	206	80	90 TO 114	168	15	2.0	229	N	Y
PCH -140 TO 168	218	251	90	140 TO 168	205	15	3.0	272	N	Y
PCH-168 TO 219	320	336	120	168 TO 219	265	25	3.0	340	N	Y
PCH- 219 TO 324	470	470	160	219 TO 324	395	30	3.0	520	N	Y
PCH –356 TO 406	590	630	180	356 TO 406	534	30	3.0	680	N	Y

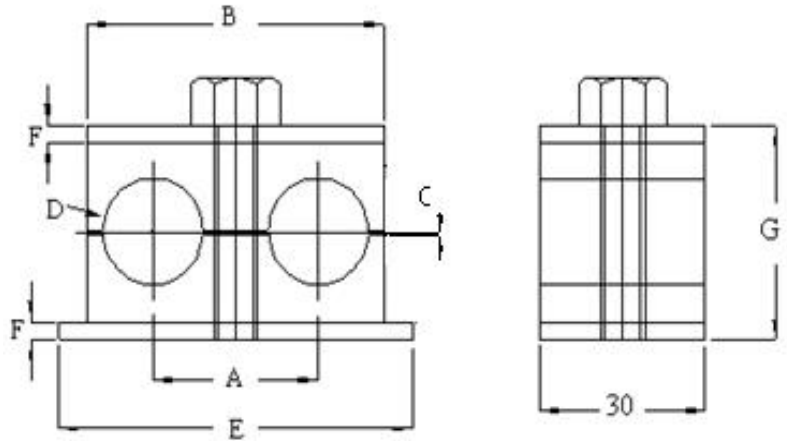
Order Code	Tube Clamp	Series	OD (mm)	Material
	PC	X	XX	PP, PA, HDPE, ALL
		S = Standard	PP = Poly Propylene /	ALL = Aluminium
		H = Heavy		PA = Poly Amide
		D = Double / Twin	HDPE = High Density Poly Ethylene	

Note:

- Unspecified tolerance ± 1 mm
- DIMENSIONS IN MM FOR REFERENC



- Twin-Type Pipe Clamps are used in installations where two smaller pipes have to be installed and low vibrations are encountered.
- The use of twin clamps reduces installation time and expenses on maintenance
- Twin clamps can be used when two equal diameters and parallel pipe lines are to be installed.



TWIN Mechanical Stress (PCD)

Order Code	A	B	C	D	E	F	G	Hex Nut	Round Nut
PCD – 06 TO 12	20	38	0.4	6 TO 12	49	3	32.5	N	Y
PCD - 12.7 TO 19	30	55	0.4	12.7 TO 19	64	5	35.5	Y	N
PCD – 20 TO 25	36	66	0.5	20 TO 25	77	5	45.5	Y	N
PCD - 26.7 TO 30	45	81.5	0.5	26.7 TO 30	94	5	53	Y	N
PCD – 32 TO 42	56	107	0.8	32 TO 42	120	5	65.5	Y	N

Order Code	Tube Clamp	Series	OD (mm)	Material
	PC	X	XX	PP, PA, HDPE, ALL
		S = Standard	PP = Poly Propylene /	ALL = Aluminium
		H = Heavy	PA = Poly Amide	
		D = Double / Twin	HDPE = High Density Poly Ethylene	

Note:

- Unspecified tolerance ± 1 mm
- DIMENSIONS IN MM FOR REFERENCE

FLUDEN CLAMPS WITH STANDARD, HEAVY & TWIN SERIES –DIN-3015 MOUNTING OPTIONS

Horizontal Mounting

- Run-on clamps in the Standard-Duty series for which Twin Clamps have not been developed
- The clamps have a common weld plate



Back-to-Back Mounting

- This assembly is for Heavy-Duty Clamps for very heavy vibration and load
- The clamps have a common weld plate



Vertical Mounting: Twin Clamps

- Multi-level clamps permit easy mounting of several tubes or pipes of the same group
- This is also possible in the event of varying size diameters. The clamps are connected by stacking bolts and plates



Vertical Mounting Arrangements

- This arrangement can be used when pipes run parallel in a vertical format
- Both Standard- and Heavy-Duty Pipe Clamps are available in Vertical mounting arrangements
- In this arrangement, there is plate between the bodies
- The assembly is pinned together by the use of stacking bolts



Rail Mounting for Clamps

- Standard- and Heavy-Duty Pipe Clamps are available for mounting On channels with Rail Nut
- Rails are available in lengths of 1 meter and are useful for multiple Clamping on a single base
- They also allow flexibility of clamping where the pitch between the Pipes is uneven
- Rail-mounted Pipe Clamps may be used with or without the top plate,
Depending upon the application.
- Rails available in carbon steel only





WELD PLATES INSTALLATION

We recommend for best alignment of clamp is to mark its location. Then weld plates into position, Place and push bottom half of clamp on, install pipe, mount top half of clamp, cover plate and bolt together.

Note: To avoid damage to

clamp bodies, we recommend mounting plastic clamp bodies after having welded the weld plates in position.

INSTALLING ON MOUNTING RAILS

FLUDEN mounting rails are available in 1 meter lengths.

Bolt or weld rails to the supporting structure. For standard and twin series, place hexagon rail nut and turn to lock.

For heavy-duty series, slide in rail nut.

Push on bottom half of clamp, insert pipe place top half of clamp, cover plate

and bolt together.

Clamp units can be adjusted before final bolting.

MULTI-LEVEL ASSEMBLY

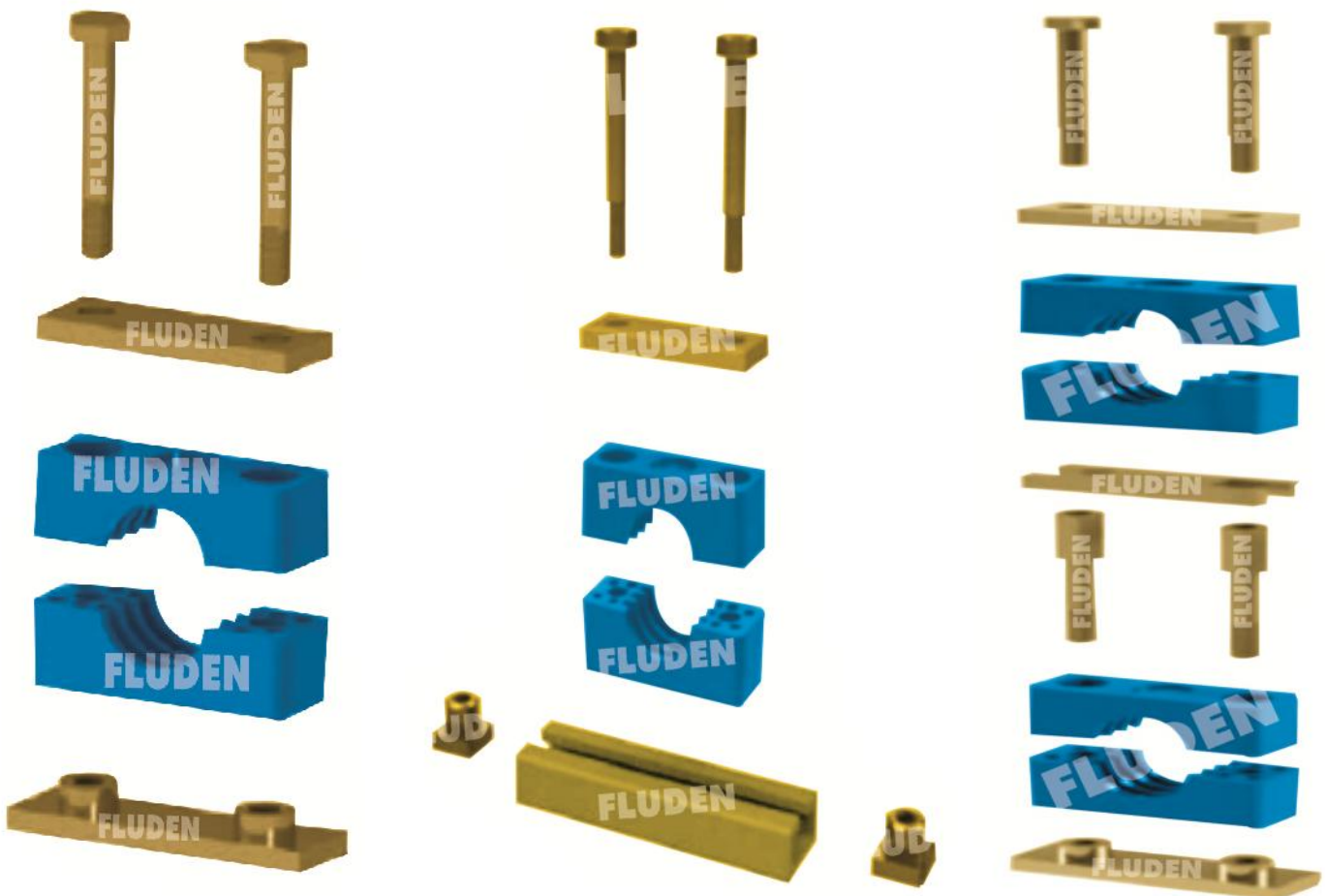
FLUDEN multi-level pipe clamps allow for easy stacking of several pipes or tubes of the same group.

(Twin-clamps groups 2-5 allow stacking of different-sized groups.)

The clamps are connected by stacking bolts.

Stacking plates (ASP) inserted between the clamps prevents stacking bolts from turning.

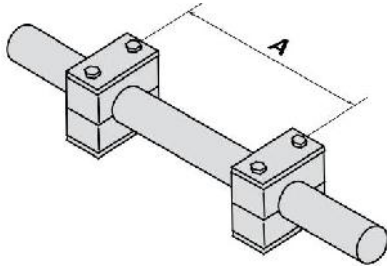
FLUDEN stacking assembly can be fitted to rails or weld plates.





RECOMMENDED DISTANCE

BETWEEN CLAMPS



The recommended distances between clamps stated in the adjacent chart are standard values and are valid for static loads

Pipe-O.D.	[mm]	[inch]	Distance A	[m]	[ft]
6.0	– 12.7	.23" – .50"	1.0	3.3	
12.7	– 22.0	.50" – .86"	1.2	4.0	
22.0	– 32.0	.86" – 1.25"	1.5	5.0	
32.0	– 38.0	1.25" – 1.50"	2.0	6.5	
38.0	– 57.0	1.50" – 2.25"	2.7	8.8	
57.0	– 75.0	2.25" – 2.95"	3.0	9.8	
75.0	– 76.1	2.95" – 3.00"	3.5	11.5	
76.1	– 88.9	3.00" – 3.50"	3.7	12.0	
88.9	– 102.0	3.50" – 4.00"	4.0	13.0	
102.0	– 114.0	4.00" – 4.50"	4.5	14.7	
114.0	– 168.0	4.50" – 6.60"	5.0	16.5	
168.0	– 219.0	6.60" – 8.60"	6.0	19.6	
219.0	– 324.0	8.60" – 12.70"	6.7	22.0	
324.0	– 356.0	12.70" – 14.00"	7.0	23.0	
356.0	– 406.0	14.00" – 16.00"	7.5	24.6	
406.0	– 419.0	16.00" – 16.50"	8.2	26.9	
419.0	– 508.0	16.50" – 20.00"	9.0	29.5	
			10.		
508.0	– 521.0	20.00" – 20.50"	0	32.8	
			12.		
521.0	– 558.0	20.50" – 22.00"	5	41.0	
558.0	– 800.0	22.00" – 31.50"			

TEMPERATURE AND MATERIALS

Tube and Pipe Clamps in blue bodies of polypropylene are suitable for temperatures up to 80°C. For higher temperatures and heavy ratings, Pipe and Tube Clamp bodies are made of polyamide (blue in colour). Where temperatures are in excess of 200°C, these bodies are made from aluminium. Properties of the clamp body materials are given in the chart below:

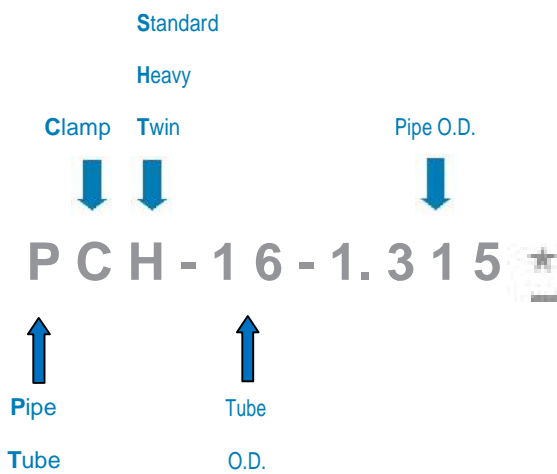
Clamp Body		Polypropylene PP Density: 0.906 gm/cm ²	Polyamide – Nylon 66 Density: 1.12 – 1.15gm/cm ²	Aluminium – LM 6 IS: 733-1983 Density: 2.65gm/cm ²
Mechanical Properties				
Flexural Deflection	ASTM D638	5221 psi	18854... 29007N/mm ²	10152 psi
Impact Resistance	ASTM D256	No failure	60 kJ/m ²	
Compressive Strength	ASTM D695	13053 psi	17404 psi	HB 72518... 87022 psi
Modulus of Elasticity	ASTM D790	166793 psi	435113 psi	10152641 psi
Tensile Stress	ASTM D695	4061 psi	20305 psi	26106 psi
Hardness		R70	R120	
Thermal Properties				
Max. Temperature Resistance		-86... +194°F	-104... + 248°F	to 752°F
Chemical Properties				
Weak acids, solvents		cond. consistent	cond. consistent	
Benzene, mineral oils		cond. consistent	consistent	
Alcohol, other oils, seawater		consistent	consistent	



HOW TO ORDER

To order FLUDEN Clamp Accessories, simply add the 3 letter Accessories designator (that begins with "A") as a suffix to the full clamp part number



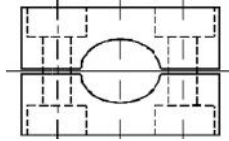


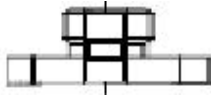
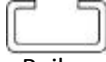
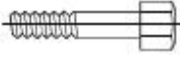
Example



*In this example, the clamp part number is CPH-16-1.315

To order the Top Plate for this clamp, simply order Part Number: CPH-16-1.315-ATP

FLUDEN CLAMP ACCESSORY NOMENCLATURE

A W P	
	Weld Plate
A T P	
	Top Plate
A C P	
	Clamp Pair
A S P	
	Stacking Bolt
A S B	
	Stacking Bolt
A R N	
	Rail Nut
A R L	
	Rail
A H B	
	Hex Bolt

* No suffix required for Green/Polypropylene-material clamp bodies which are sold in pairs.

Add suffix (-BL) for Polyamide or (-D) for Aluminium Body material.

304 S.S. hardware, plates and accessories can be ordered by adding (-SS) suffix to the clamp part number in Brennan twin, single, pipe and tube styles for both Standard and Heavy-Duty series.

** FLUDEN mounting rail length is 1 meter (39-3/8").