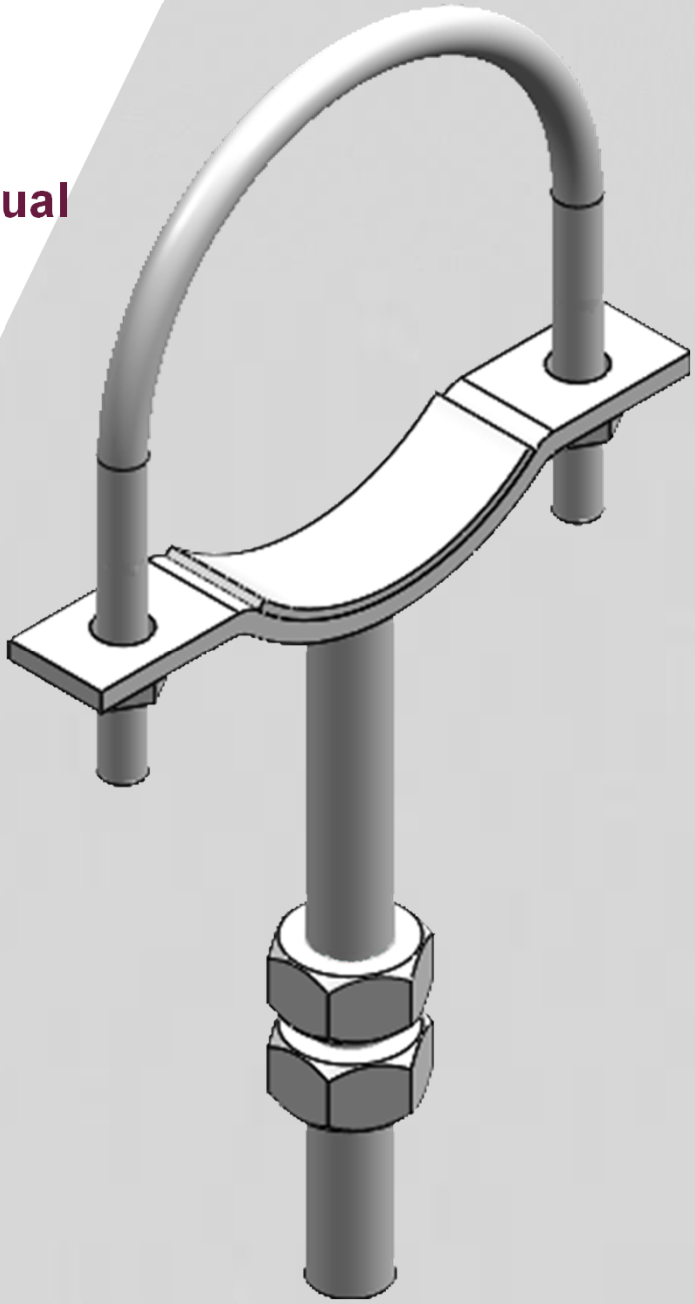
PIPE SADDLE WITH U-BOLT

2199861 / 2199851
2199862 / 2199852
2199863 / 2199853
2199864 / 2199854
2199865 / 2199855
2199866 / 2199856
2199867 / 2199857
2199868 / 2199858
2199869 / 2199859
2199870 / 2199860

Hilti North America
Installation Technical Manual
Technical Data
Hangers & Clamps

Version 2.0 **31.03.2022**



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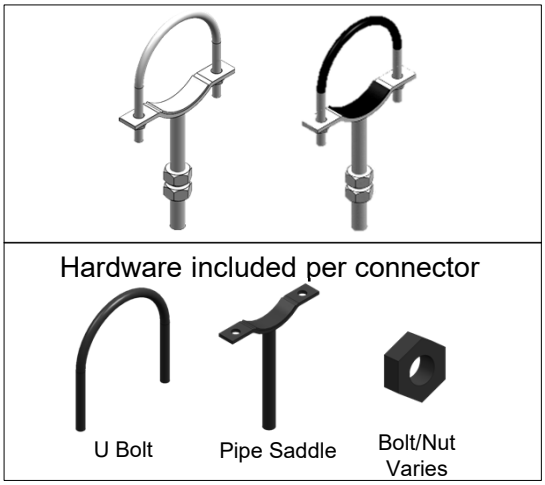
Suitability of structures combining different products for specific applications needs to be verified by conducting a system design and calculation, using for example Hilti PROFIS software. In addition, it is crucial to fully respect the Instructions for Use and to assure clean, unaltered and undamaged state of all products at any time in order to achieve optimum performance
(e.g. avoid misuse, modification, overload, corrosion).
As products but also technical data generation methodologies evolve over time, technical data might change at any time without prior notice. We recommend to use the latest technical data sheets published by Hilti.

In any case the suitability of structures combining different products for specific applications need to be checked and cleared by an expert, particularly with regard to compliance with applicable norms, codes, and project specific requirements, prior to using them for any specific facility. This book only serves as an aid to interpret the capacity of the components listed,
without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application. User must take all necessary and reasonable steps to prevent or limit damage. The suitability of structures combining different products for specific applications need to be confirmed with a professional designer and/or structural engineers to ensure compliance with User`s specific jurisdiction and project requirements.

Pipe Saddle with U bolt

Designation	Weight (lb)	Item number
Pipe Saddle w/ Uncoated U-Bolt, 2”	**0.5**	**2199861**
Pipe Saddle w/ Uncoated U-Bolt, 2-1/2”	**1.1**	**2199862**
Pipe Saddle w/ Uncoated U-Bolt, 3”	**1.7**	**2199863**
Pipe Saddle w/ Uncoated U-Bolt, 3-1/2”	**2.2**	**2199864**
Pipe Saddle w/ Uncoated U-Bolt, 4”	**2.8**	**2199865**
Pipe Saddle w/ Uncoated U-Bolt, 5”	**4.0**	**2199866**
Pipe Saddle w/ Uncoated U-Bolt, 6”	**5.1**	**2199867**
Pipe Saddle w/ Uncoated U-Bolt, 8”	**7.4**	**2199868**
Pipe Saddle w/ Uncoated U-Bolt, 10”	**9.7**	**2199869**
Pipe Saddle w/ Uncoated U-Bolt, 12”	**12**	**2199870**
Pipe Saddle w/ Coated U-Bolt, 2”	**0.5**	**2199851**
Pipe Saddle w/ Coated U-Bolt, 2-1/2”	**1.1**	**2199852**
Pipe Saddle w/ Coated U-Bolt, 3”	**1.7**	**2199853**
Pipe Saddle w/ Coated U-Bolt, 3-1/2”	**2.2**	**2199854**
Pipe Saddle w/ Coated U-Bolt, 4”	**2.8**	**2199855**
Pipe Saddle w/ Coated U-Bolt, 5”	**4.0**	**2199856**
Pipe Saddle w/ Coated U-Bolt, 6”	**5.1**	**2199857**
Pipe Saddle w/ Coated U-Bolt, 8”	**7.4**	**2199858**
Pipe Saddle w/ Coated U-Bolt, 10”	**9.7**	**2199859**
Pipe Saddle w/ Coated U-Bolt, 12”	**12**	**2199860**

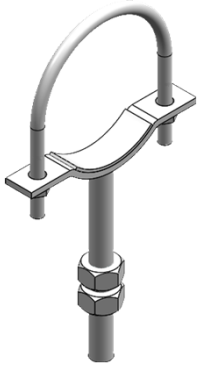
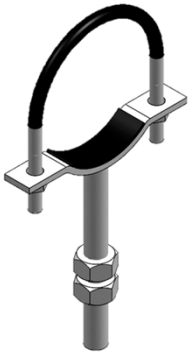


Corrosion protection:
Hot dipped galvanized per ASTM A153

Description:
Hot dipped galvanized saddle for pipe support.

Material properties	Yield strength	Ultimate strength	E-modulus	Shear modulus
Threaded Rod ASTM A307 Grade A	-	f_u = 60 ksi (414 $\frac{N}{mm^2}$)	29000 ksi (200000 $\frac{N}{mm^2}$)	11000 ksi (75845 $\frac{N}{mm^2}$)
Nuts: ASTM A563 Grade A	-	f_u =144 ksi (993 $\frac{N}{mm^2}$)	29000 ksi (200000 $\frac{N}{mm^2}$)	11000 ksi (75845 $\frac{N}{mm^2}$)
Pipe Saddle: ASTM 36	f_y = 36 ksi (248 $\frac{N}{mm^2}$)	f_u = 58 ksi (400 $\frac{N}{mm^2}$)	29000 ksi (200000 $\frac{N}{mm^2}$)	11000 ksi (75845 $\frac{N}{mm^2}$)
U-Bolt: ASTM A36	f_y = 36 ksi (248 $\frac{N}{mm^2}$)	f_u = 58 ksi (400 $\frac{N}{mm^2}$)	29000 ksi (200000 $\frac{N}{mm^2}$)	11000 ksi (75845 $\frac{N}{mm^2}$)

Pipe Saddle with U bolt

Possible loading cases	
Pipe Saddle with Uncoated U-Bolt	Pipe Saddle with Coated U-Bolt
	

Design Criteria used for loading capacity

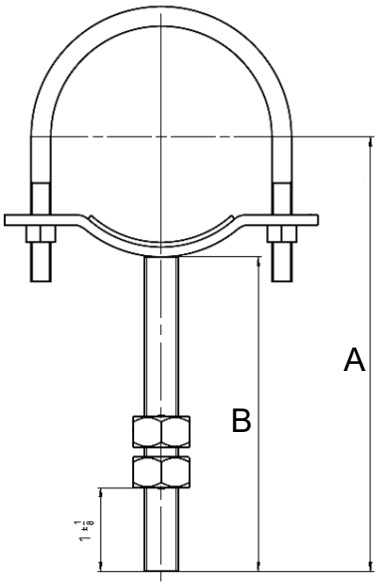
Methodology:
- Connection strength values are based on empirical calculations.

Standards and codes:
- ANSI/AISC 360-10 Specification for Structural Steel Buildings
- AISI S100-2016 North American Specification for the Design of cold-formed Steel Structural Members

Software:
- Microsoft Excel

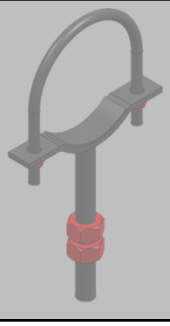
Environmental conditions:
- Static loads
- No fatigue Loads

Simplified drawing:



Uncoated U-Bolt Item Number	Coated U-Bolt Item Number	Pipe Size NPS	Threaded Rod Diameter (in)	A (in)	B (in)
2199861	2199851	2”	5/8	9.50	8
2199862	2199852	2.5”	5/8	9.75	8
2199863	2199853	3”	5/8	10.06	8
2199864	2199854	3.5”	5/8	10.31	8
2199865	2199855	4”	7/8	10.56	8
2199866	2199856	5”	7/8	11.06	8
2199867	2199857	6”	1-1/4	11.75	8
2199868	2199858	8”	1-1/4	12.75	8
2199869	2199859	10”	1-1/2	13.94	8
2199870	2199860	12”	1-1/2	14.94	8

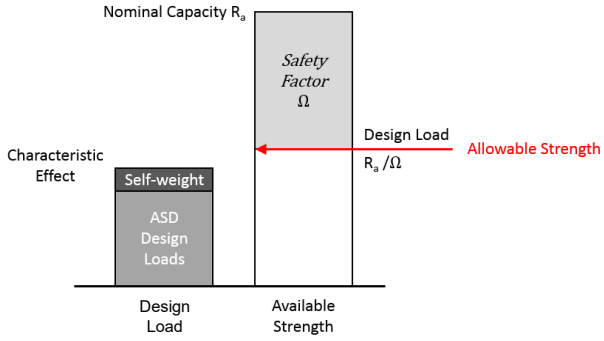
Pipe Saddle with U bolt

Pipe Saddle with Uncoated U-Bolt	Pipe Saddle with Coated U-Bolt
	

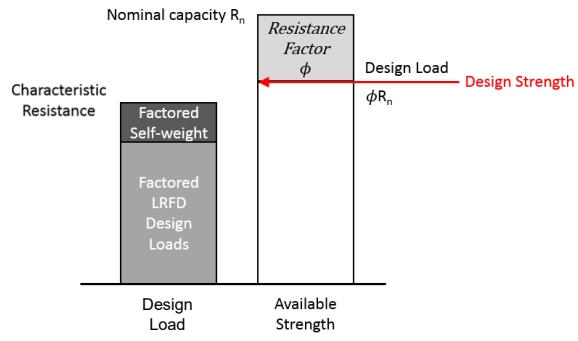
Loading case: In Uncoated Pipe Saddle	Combinations covered by loading case
BOM: Pipe Saddle Connector (item number varies) **Pipe Saddle with Uncoated U-Bolt (item number varies)** 	This particular loading case is limited by the threaded Rod. 

Design loading capacities – 3D 1/2

Allowable Strength Design (ASD)



Load Resistance Factored Design (LRFD)



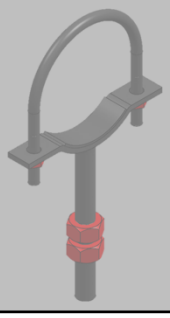
Limiting capacity representing the configurations are in following tables:

1. Loading of pipe in uncoated pipe saddle

Pipe Saddle with U bolt

Conditions for the loading capacity tables:

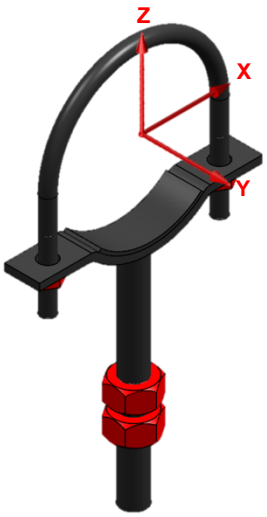
- Just for Static Loads
- No fatigue loads
- No low (< -10°C), no high (> +100°C) temperatures

Pipe Saddle with Uncoated U-Bolt	Pipe Saddle with Coated U-Bolt
	

Design loading capacity - 3D 2/2

NOTE: The provided values are based on empirical calculations capacity of the assembly. A safety factor of 3 as stated in the notes has been applied.

Connection system, including connector and hardware, per empirical calculations.



	Pipe Diameter	Threaded Rod [in]	Part	ϕF_{nx} [lb]	ϕF_{ny} [lb]	ϕF_{nz} [lb][1)]
LRFD	2"	5/8	2199861	100	100	6448
	2-1/2"	5/8	2199862	92	92	6448
	3"	5/8	2199863	92	92	6448
	3-1/2"	5/8	2199864	92	92	6448
	4"	7/8	2199865	242	242	13264
	5"	7/8	2199866	225	225	13264
	6"	1	2199867	334	334	17398
	8"	1	2199868	301	301	17398
	10"	1-1/4	2199869	534	534	27820
	12"	1-1/4	2199870	493	493	27820

Notes:
[1)] Value based on Tension capacity as per AISC 9th edition $0.33*Fu*A_{nom}*1.5$

Interaction Formula

$$\frac{\pm F_x}{\phi F_{nx}} + \frac{\pm F_y}{\phi F_{ny}} + \frac{\pm F_z}{\phi F_{nz}} \leq 1.0$$

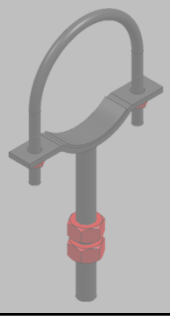
	Pipe Diameter	Threaded Rod [in]	Part	F_{ax}/Ω [lb]	F_{ay}/Ω [lb]	F_{az}/Ω [lb][2)]
ASD[1)]	2"	5/8	2199861	67	67	4326
	2-1/2"	5/8	2199862	61	61	4326
	3"	5/8	2199863	61	61	4326
	3-1/2"	5/8	2199864	61	61	4326
	4"	7/8	2199865	161	161	8843
	5"	7/8	2199866	150	150	8843
	6"	1	2199867	223	223	11599
	8"	1	2199868	201	201	11599
	10"	1-1/4	2199869	256	256	18547
	12"	1-1/4	2199870	356	356	18547

Notes:
[1)] Based on Safety Factor of 3
[2)] Value based on Tension capacity as per AISC 9th edition $0.33*Fu*A_{nom}$

Interaction Formula

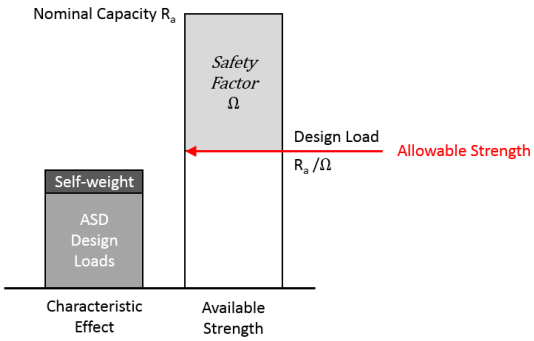
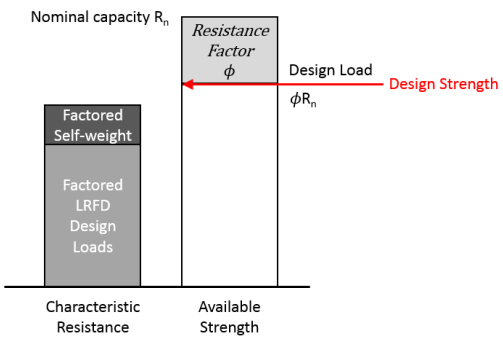
$$\frac{\pm F_x}{F_{ax}/\Omega} + \frac{\pm F_y}{F_{ay}/\Omega} + \frac{\pm F_z}{F_{az}/\Omega} \leq 1.0$$

Pipe Saddle with U bolt

Pipe Saddle with Uncoated U-Bolt	Pipe Saddle with Coated U-Bolt
	

Loading case: In Coated Pipe Saddle	Combinations covered by loading case
BOM: Pipe Saddle Connector (item number varies) **Pipe Saddle with Coated U-Bolt (item number varies)** 	This particular loading case is limited by the threaded Rod. 

Design loading capacities – 3D 1/2

Allowable Strength Design (ASD)	Load Resistance Factored Design (LRFD)
	

Limiting capacity representing the configurations are in following tables:

1. Loading of pipe in coated pipe saddle

Pipe Saddle with U bolt

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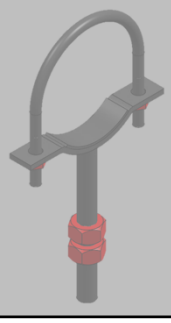
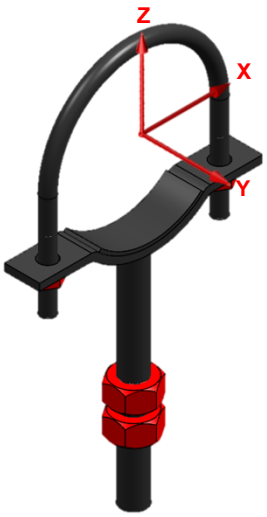
Pipe Saddle with Uncoated U-Bolt	Pipe Saddle with Coated U-Bolt
	

Design loading capacity - 3D 2/2

NOTE: The provided values are based on empirical calculations capacity of the assembly. A safety factor of 3 as stated in the notes has been applied.

Connection system, including connector and hardware, per empirical calculations.



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Notes:
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Interaction Formula

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Notes:
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[2)] Value based on Tension capacity as per AISC 9th edition $0.33*Fu*A_{nom}$

Interaction Formula

$$\frac{\pm F_x}{F_{ax}/\Omega} + \frac{\pm F_y}{F_{ay}/\Omega} + \frac{\pm F_z}{F_{az}/\Omega} \leq 1.0$$

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