

Dizajn procesných zariadení

Zvary a Závity

Prednáška

Vypracoval: doc. Ing. Martin Juriga, PhD.

Bratislava, február 2024

Označovanie zvarov na výkresoch

Slovensko:

Pôvodná norma STN 01 3155

zrušená.

Nahradená európskou normou

STN EN 22553

Európa:

EN 22553

čo je vlastne prebratá ISO 2553

USA:

American Welding Society
(AWS)

ANSI/AWS A2.4-98



Označovanie zvarov na výkresoch

Zváranie.

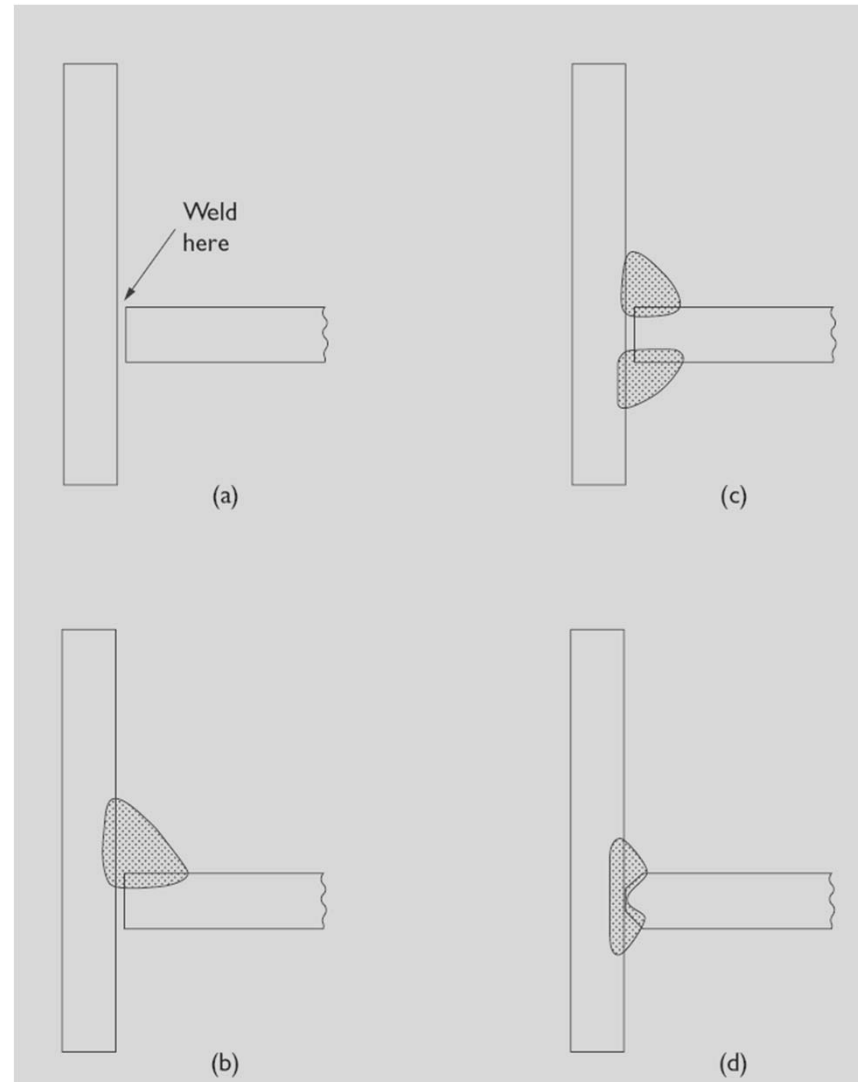
- Aký použijeme zvar /návrh, výpočet/
- Technológia zvaru /MIG, TIG, Elektródové zváranie /

Ako označujeme zvary na výkresoch?

Porovnanie medzi európsky a americkým štandardom

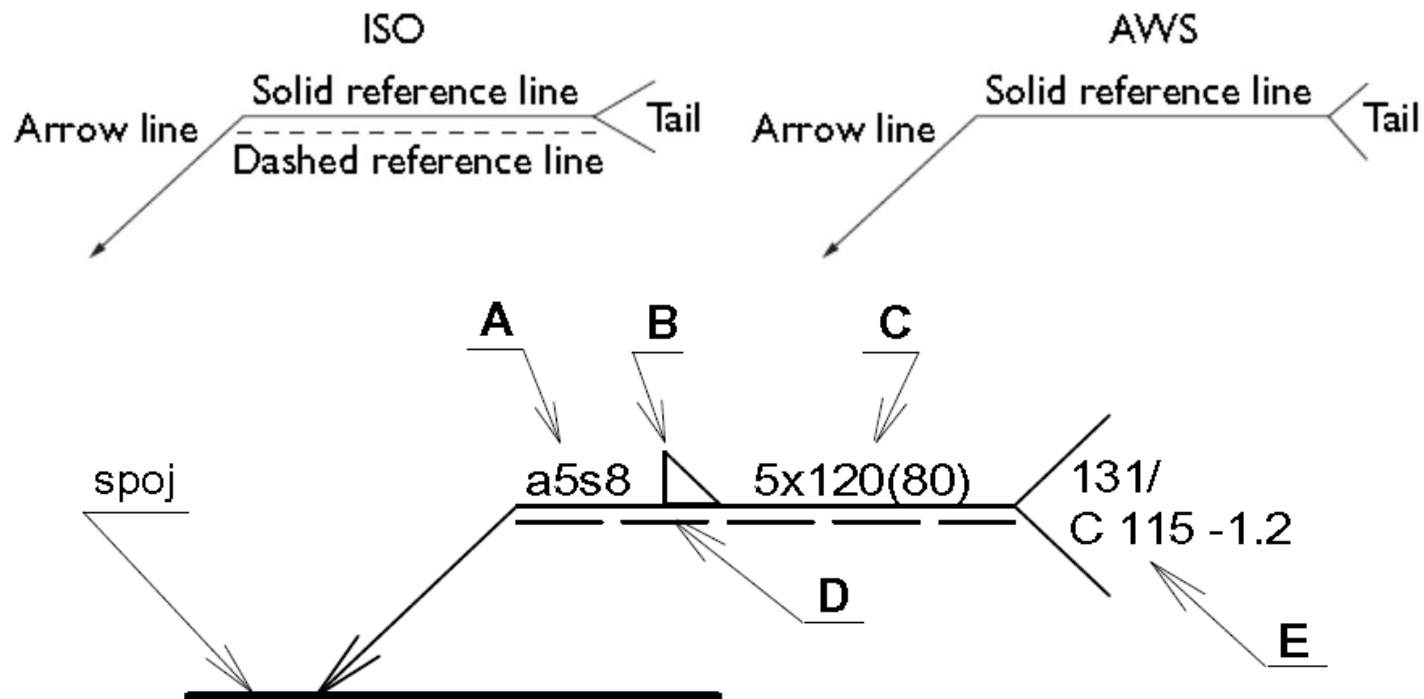
(AWS)
ANSI/AWS A2.4-98

ISO 2553
vs.
ANSI/AWS A2.4-98



Označovanie zvarov na výkresoch

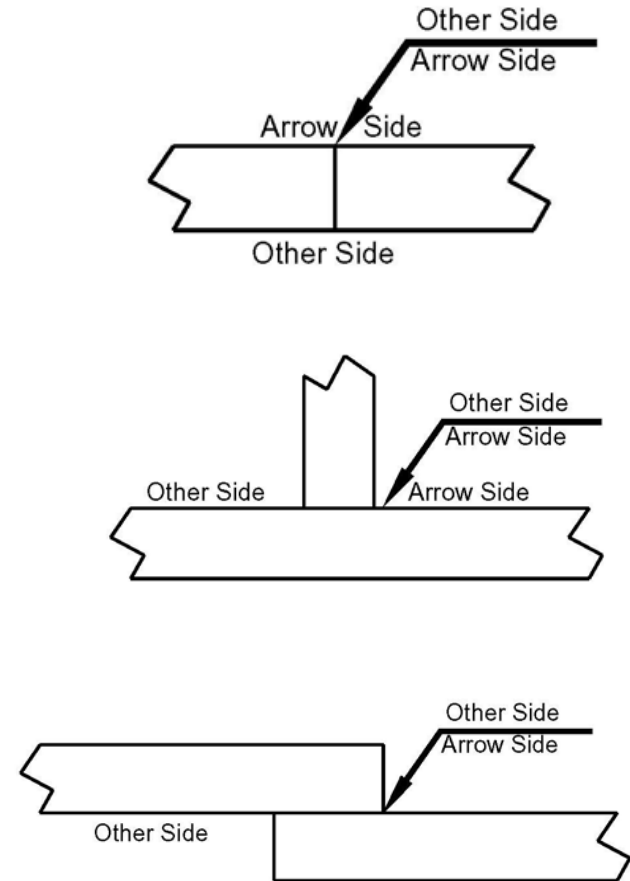
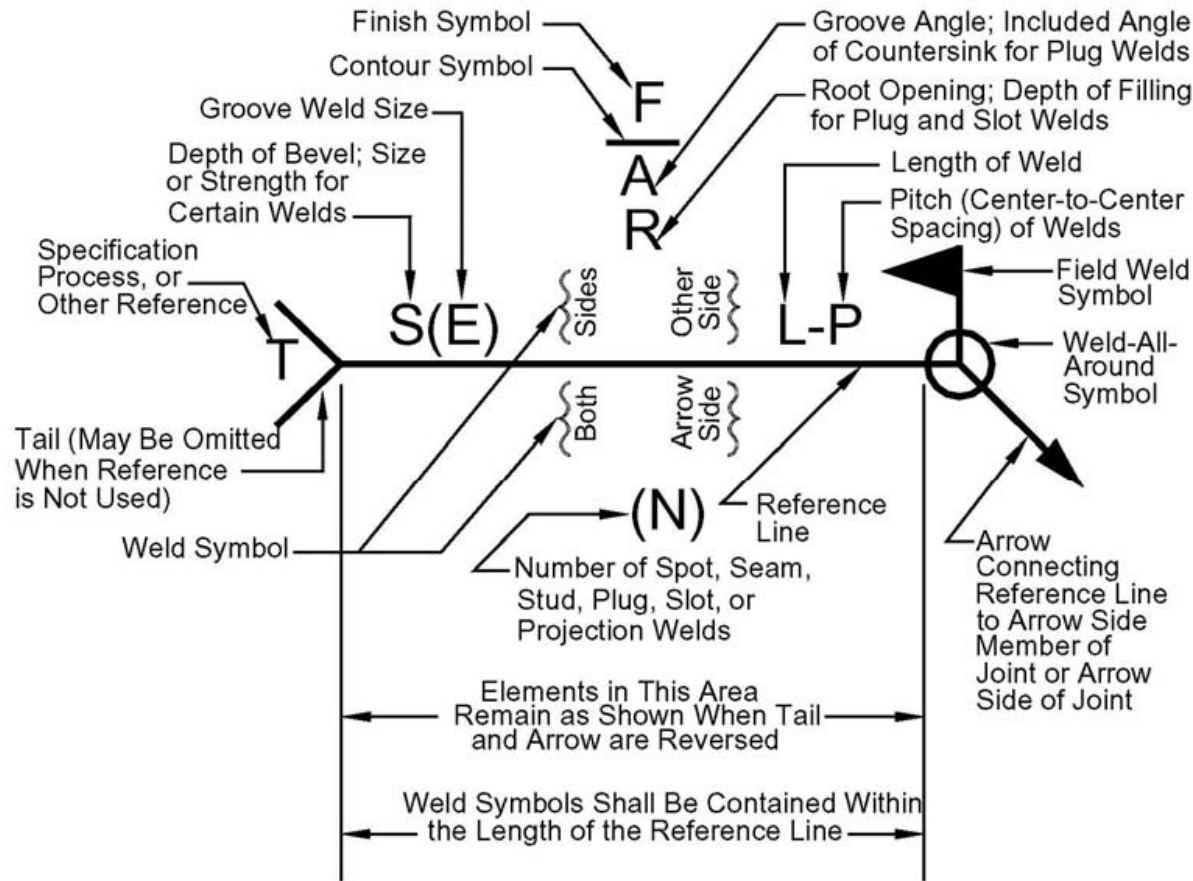
Základné označenie



- A - miesto určené na uvedenie **charakteristického rozmeru** zvaru;
- B - miesto na umiestnenie **značiek zvaru**;
- C - miesto na zápis **dĺžkových rozmerov** zvaru;
- D - čiarkovaná čiara zástavky určujúca **polohu zvaru**;
- E - vidlica odkazovej čiary na zápis **ostatných údajov** o zváraní

Označovanie zvarov na výkresoch

Základné označenie

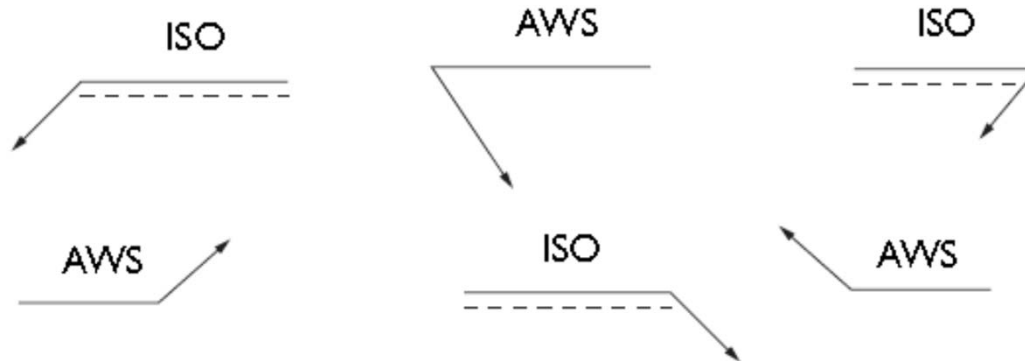
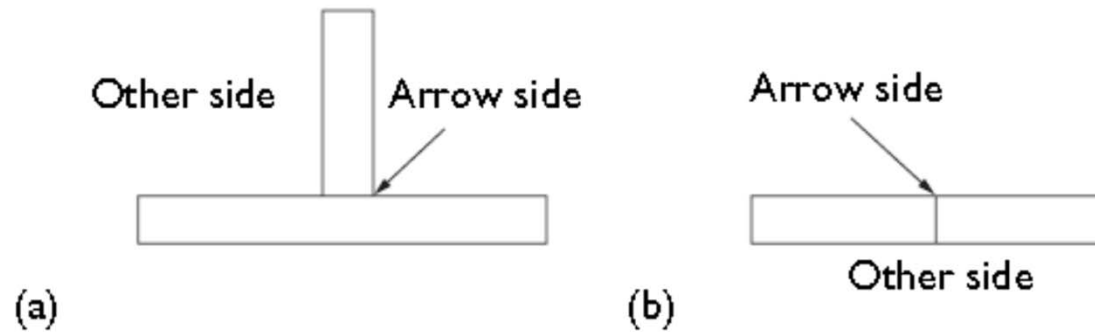


Označovanie zvarov na výkresoch

Základné
 označenie

Arrow side
 (označená strana)

Other side
 (druhá strana)



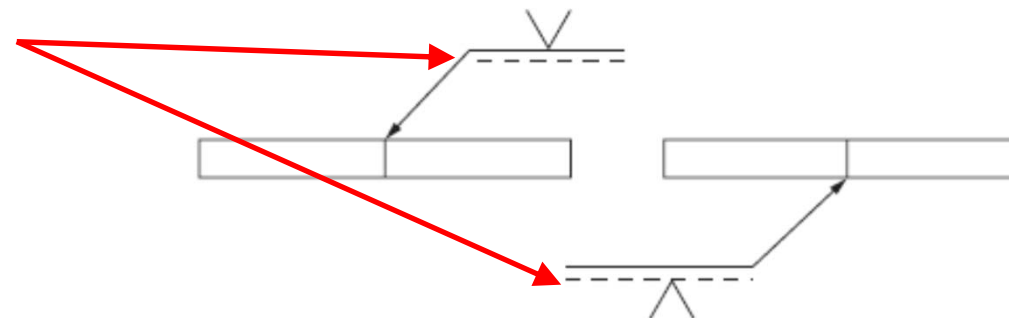
Označovanie zvarov na výkresoch

Základné označenie

ISO 2553

Zvar ktorý je na ARROW SIDE
(označená strana, strana so
šípkou) sa znázorňuje tak, že
značka zvaru sa umiestni NAD
odkazovú (referenčnú) čiaru.

Čiarkovaná čiara určuje polohu:
Musí byť umiestnená POD
odkazovou (referenčnou čiarou)



Označovanie zvarov na výkresoch

Základné označenie

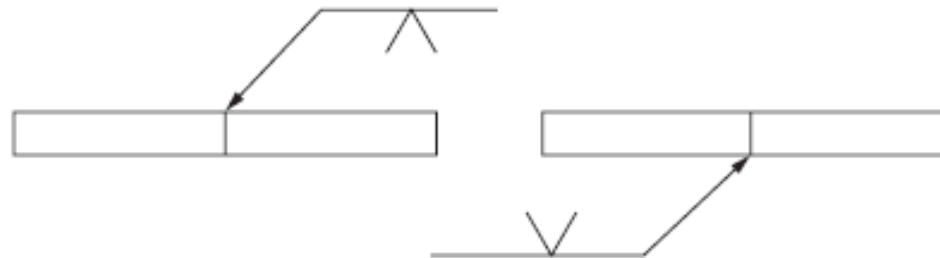
ANSI/AWS A2.4-98

Zvar ktorý je na ARROW SIDE
(označená strana, strana so
šípkou) sa znázorňuje tak, že
značka zvaru sa umiestni POD
odkazovú (referenčnú) čiaru.

AWS



Americké označenie nepozná
čiarokovanú čiaru



Rovnaké označenie platí pre ISO
2553:

Čiarkovaná čiaru musí byť
umiestnená NAD odkazovou
(referenčnou čiarou)

Označovanie zvarov na výkresoch

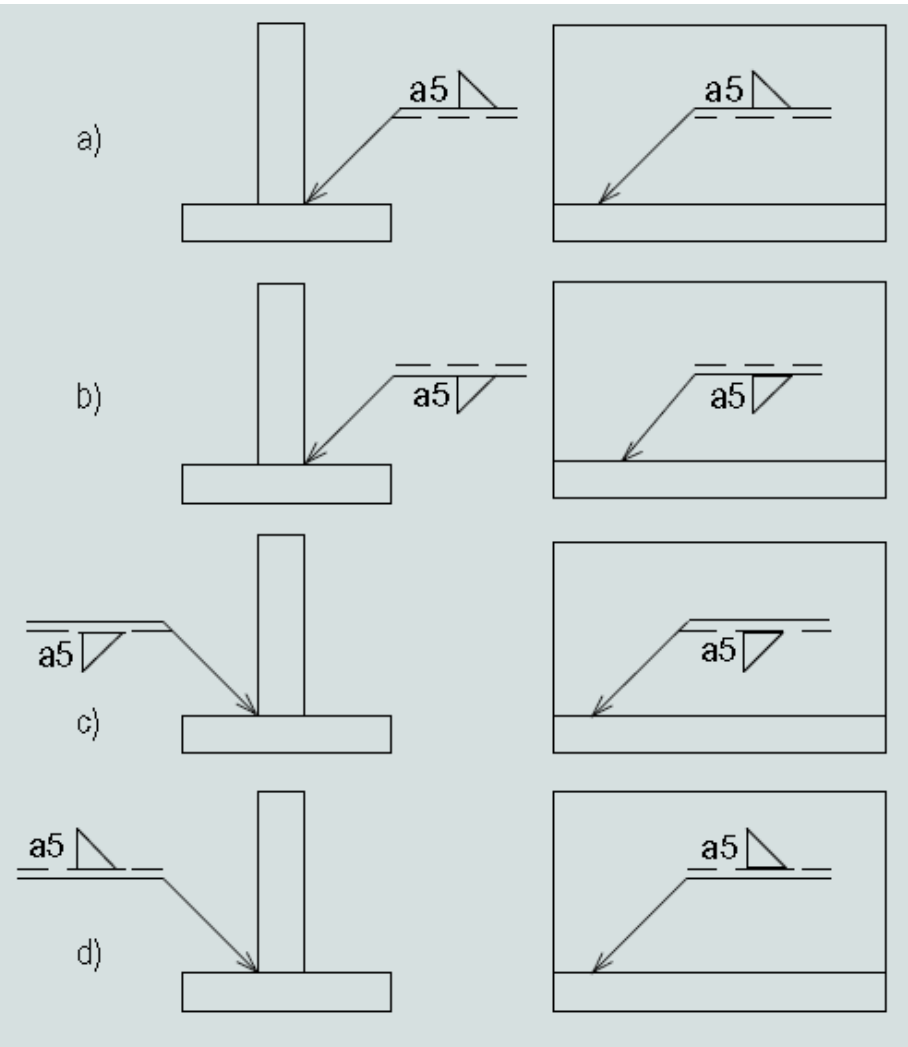
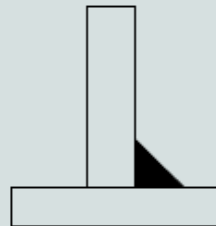
Základné označenie

Poloha čiarkovanej
čiary určuje polohu
symbolu zvaru

Ak je čiarkovaná čiara
dole – zvar je nad
referenčnou čiarou

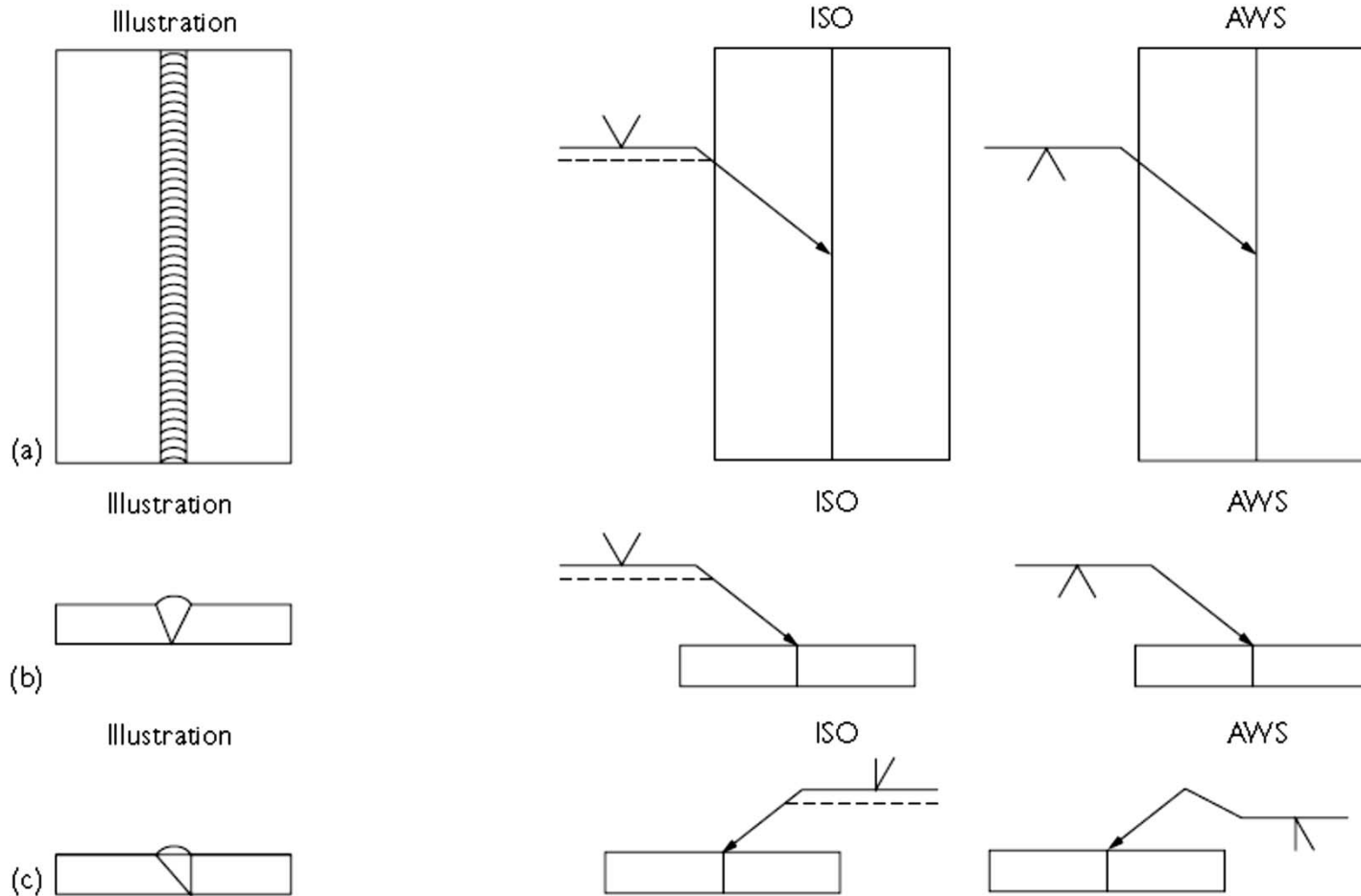
Ak je čiarkovaná čiara
hore – zvar je pod
referenčnou čiarou

zobrazenie zvaru



Označovanie zvarov na výkresoch

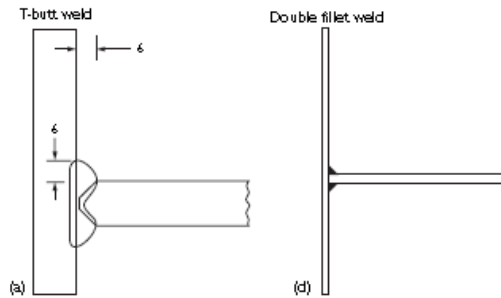
Základné označenie



Označovanie zvarov na výkresoch

Základné označenie

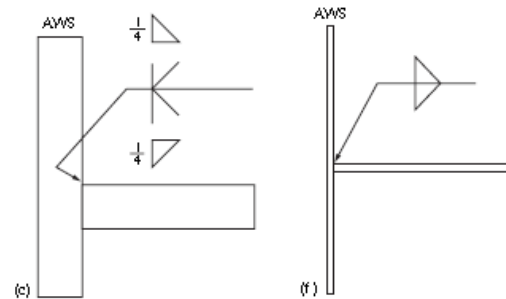
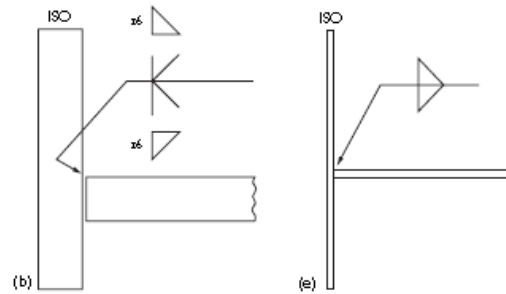
Pre obojstranne zvary
 platí rovnaké
 označenie.



ISO 2553

~

AWS 2.4-98



Označovanie zvarov na výkresoch

Základné označenie

Designation	Illustration	Symbol
(a) Single-V butt/groove weld		
(b) Square butt/groove weld		
(c) Single bevel butt/groove weld		
(d) Single-U butt/groove weld		
(e) Single-J butt/groove weld		
(f) Butt weld between plates with raised edges (ISO) Edge weld on a flanged groove joint (AWS)		
(g) Single-V butt weld with broad root face		

Označovanie zvarov na výkresoch

Základné označenie

Designation	Illustration	Symbol
(a) Fillet weld		
(b) Edge weld		 ISO AVYS
(c) Backing run (ISO) Back or backing weld (AVYS)		
(d) Flare-Y-groove weld (AVYS)		
(e) Flare-bevel-groove weld (AVYS)		








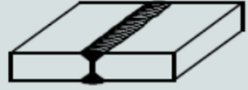


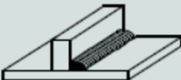
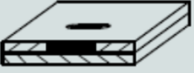
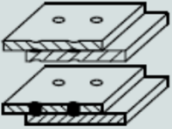
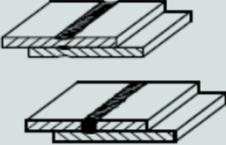
Označovanie zvarov na výkresoch

Základné označenie

Designation	Illustration	Symbol
Resistance spot weld (Reference lines (ISO) shown for clarity)		
Arc spot weld (a)		
Resistance seam weld (Reference lines (ISO) shown for clarity)		
Arc seam weld (b)		
Surfacing (c)		
Steep flanked single-V butt weld (d)		
Steep flanked single-bevel butt weld (d)		

Označovanie zvarov na výkresoch

Základné označenie

Názov zvaru	Zobrazenie	Značka	Názov zvaru	Zobrazenie	Značka
V zvar		∇	1/2 V zvar		∇
Dvojstranný V zvar		×	Dvojstranný 1/2 V zvar		⊞
I zvar			Y zvar		Y
U zvar		∩	Dvojstranný Y zvar		∩
Dvojstranný U zvar		∩	V zvar so strmými zvarovými plochami		∩
Kútový zvar		△	Dierový zvar		∇
Bodový zvar		○	Švový zvar		⊕

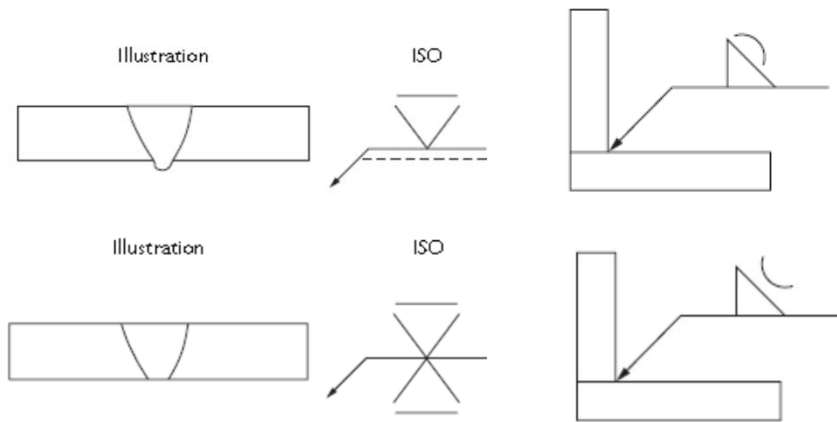
Označovanie zvarov na výkresoch

Základné označenie

Doplňujúce symboly

Nad základným symbolom.

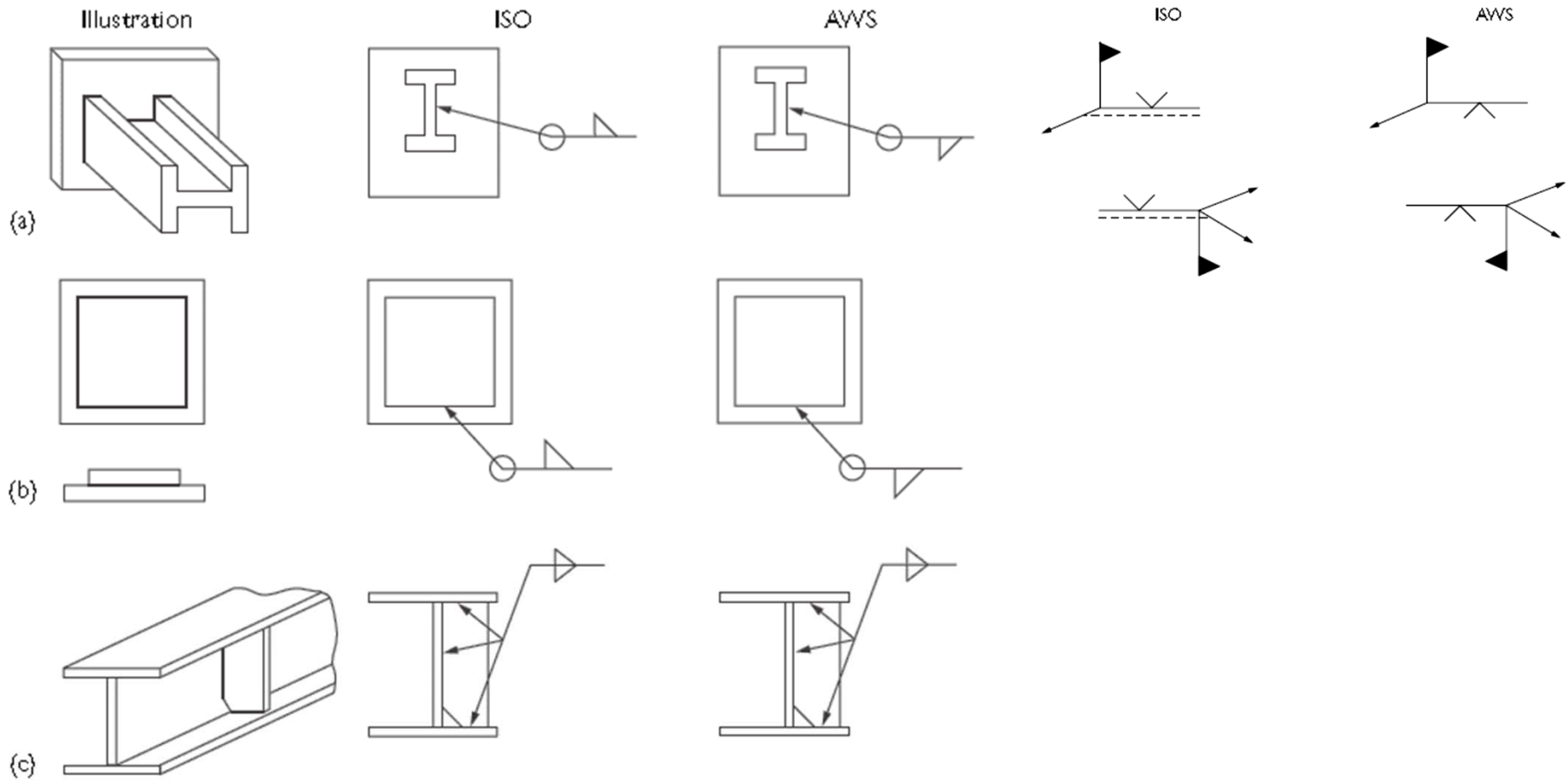
Na odkazovej čiare



ISO	AWS	ISO	AWS
 Flat (usually finished flush)	 Flush or flat	No symbol	 Melt through
 Convex	 Convex	No symbol	 Consumable insert
 Concave	 Concave	 Peripheral weld	 Weld all round
 Toes shall be blended smoothly	No symbol	 Field or site weld	 Field weld
No symbol	 Spacer	 Permanent backing strip used	 Backing
No symbol	 Back or backing weld	 Removable backing strip used	 Removable backing

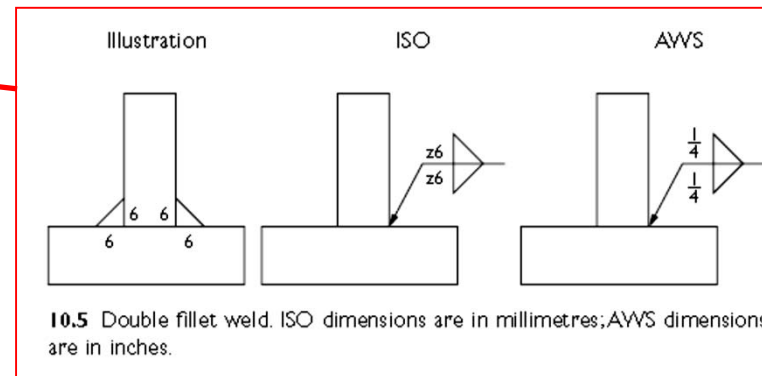
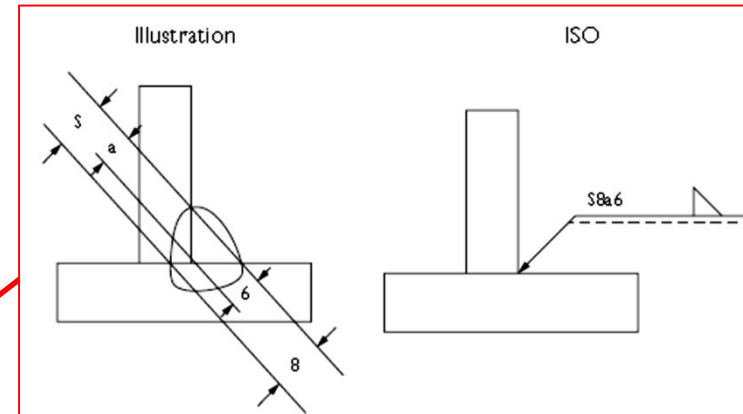
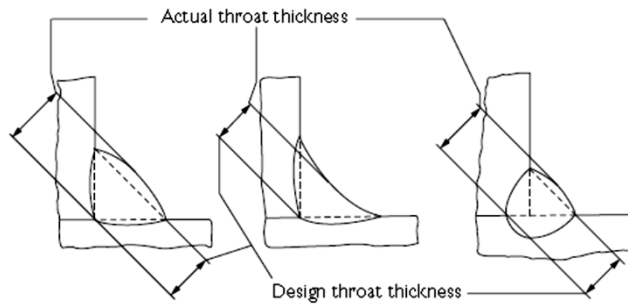
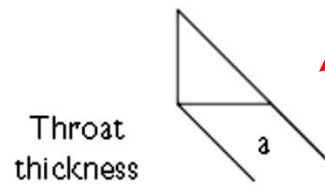
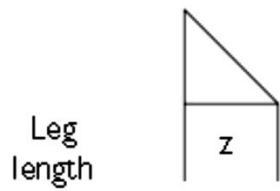
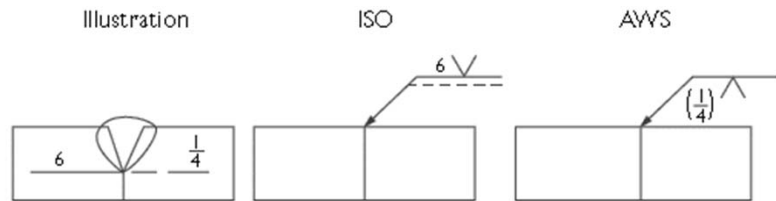
Označovanie zvarov na výkresoch

Základné označenie



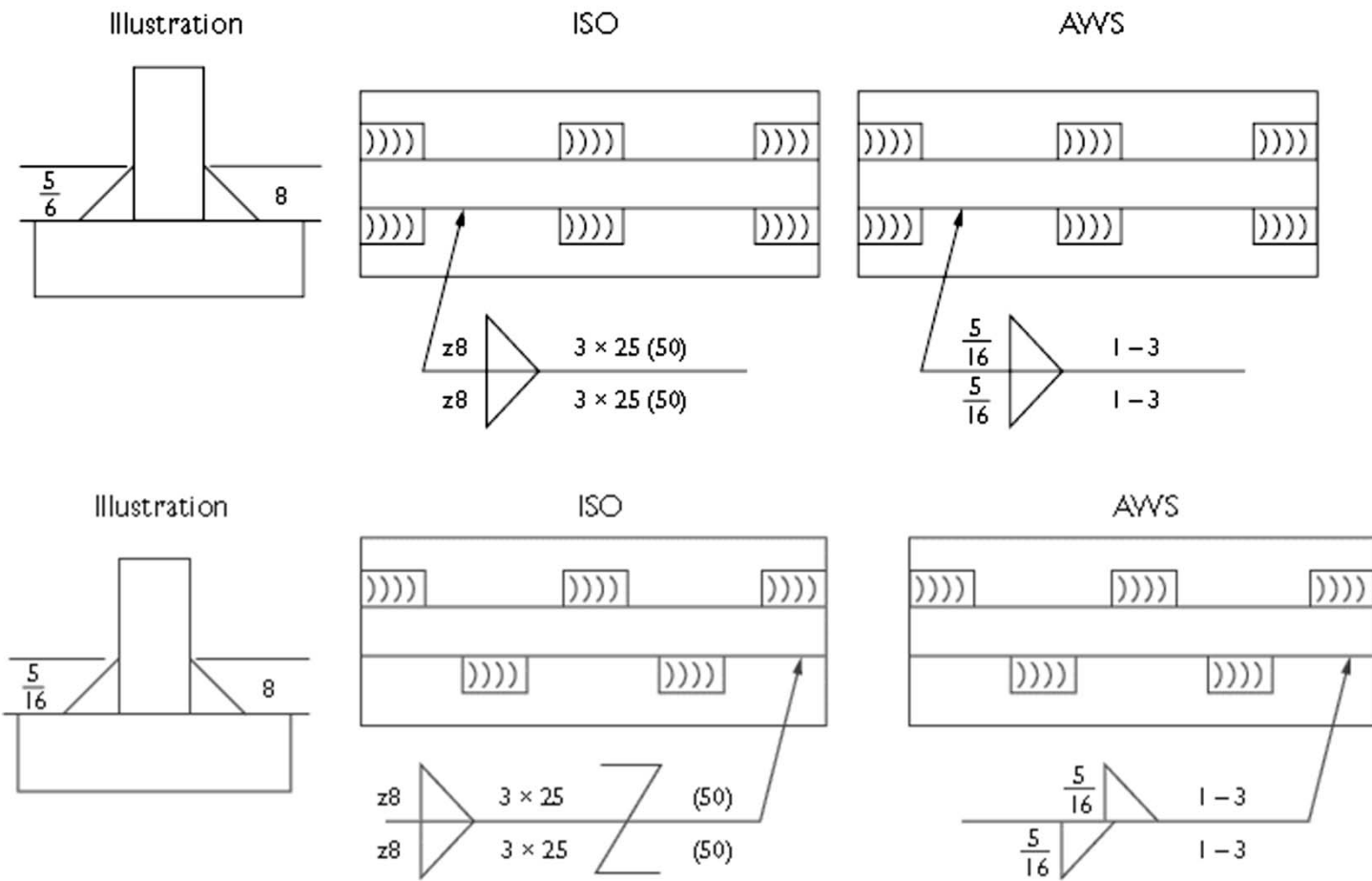
Označovanie zvarov na výkresoch

Základné označenie



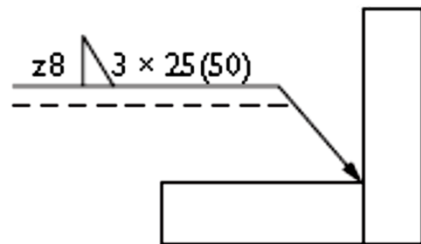
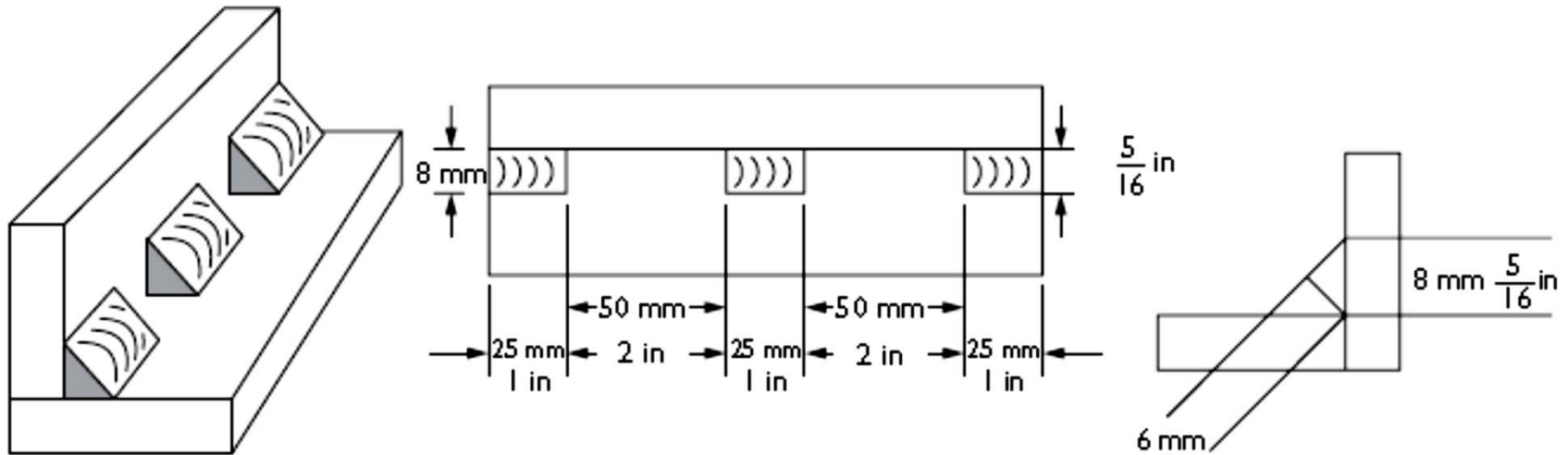
Označovanie zvarov na výkresoch

Základné označenie

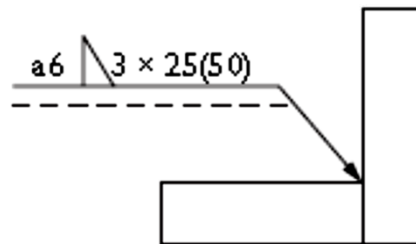


Označovanie zvarov na výkresoch

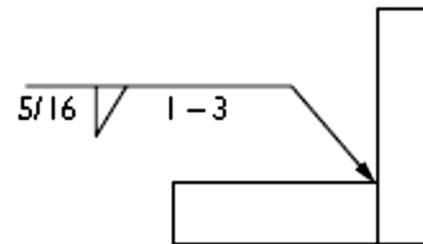
Základné označenie



ISO (Leg length)



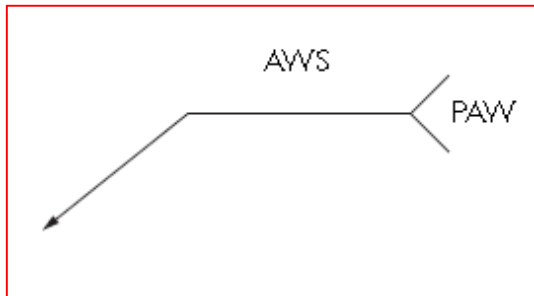
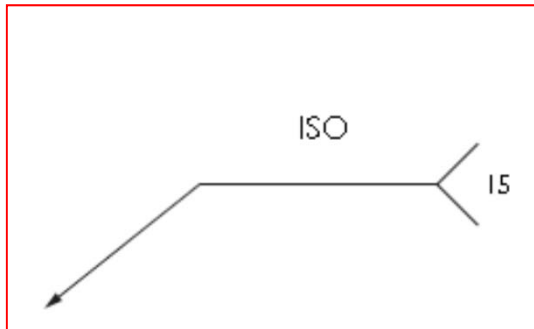
ISO (Throat thickness)



AWS (Leg length)

Označovanie zvarov na výkresoch

Základné označenie



ISO 4063 : 1992		ANSI/AWS A2.4-98	
1	Arc welding	AW	Arc welding
111	Metal arc welding with covered electrode (manual metal arc welding)	SMAW	Shielded metal arc welding
114/136	Flux cored metal arc welding	FCAW	Flux cored arc welding
12	Submerged arc welding	SAW	Submerged arc welding
13	Gas shielded metal arc welding		
131	MIG welding	GMAW	Gas metal arc welding
135	MAG welding (non-inert gas)		
141	TIG welding	GTAW	Gas tungsten arc welding
15	Plasma arc welding	PAW	Plasma arc welding
2	Resistance welding	RW	Resistance welding
21	Spot welding	RSW	Resistance spot welding
22	Seam welding	RSEW	Resistance seam welding
23	Projection welding	RPW	Projection welding
24	Flash welding	FW	Flash welding
3	Gas welding	OPW	Oxyfuel gas welding
311	Oxy-acetylene welding	OAW	Oxyacetylene welding
42	Friction welding	FRW	Friction welding
43	Forge welding	FOW	Forge welding
71	Thermit welding	TW	Thermit welding
72	Electroslag welding	ESW	Electroslag welding
781	Arc stud welding	SW	Stud arc welding
91	Brazing	B	Brazing
94	Soldering	S	Soldering
97	Braze welding		

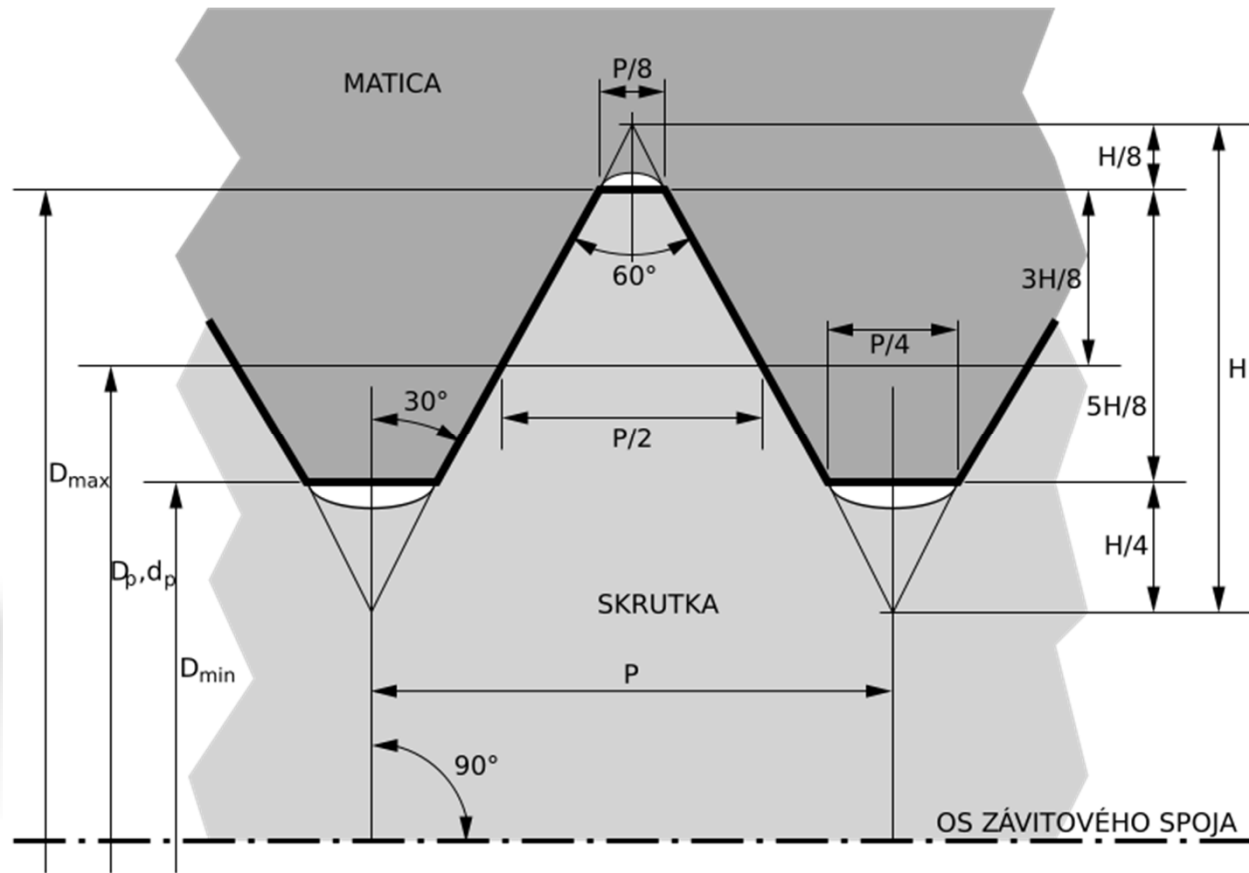
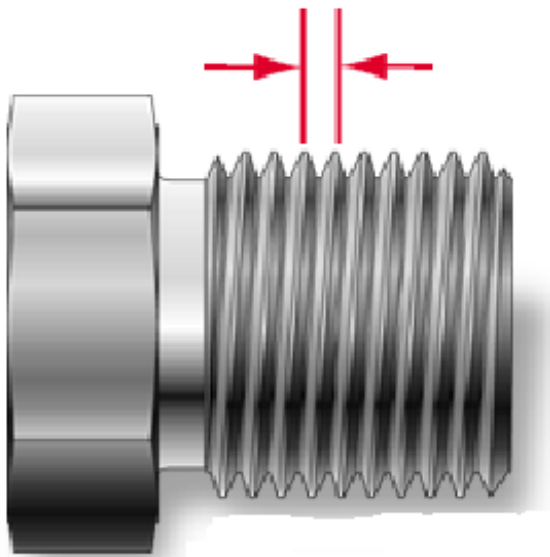
Suffixes	
MA	manual
SA	semi-automatic
AU	robotic
ME	machine

Označovanie závitov na výkresoch

Vo svete viac než 90 druhov závitov.

Základné parametre závitů

Stúpanie – pitch / Thread pitch is the distance between a single thread/

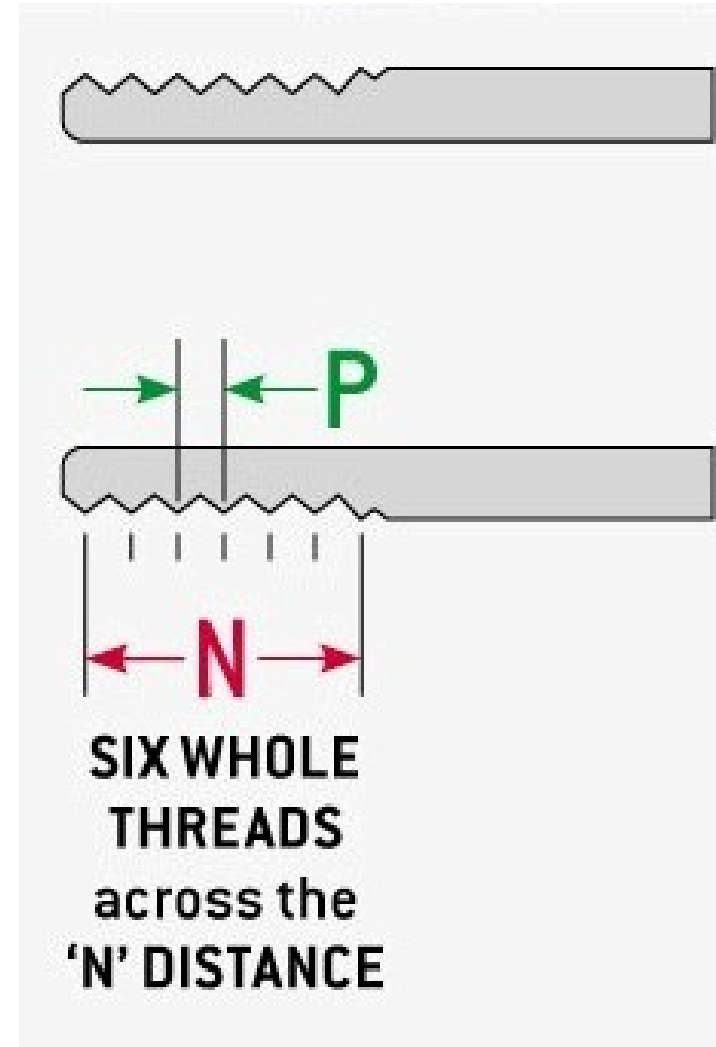
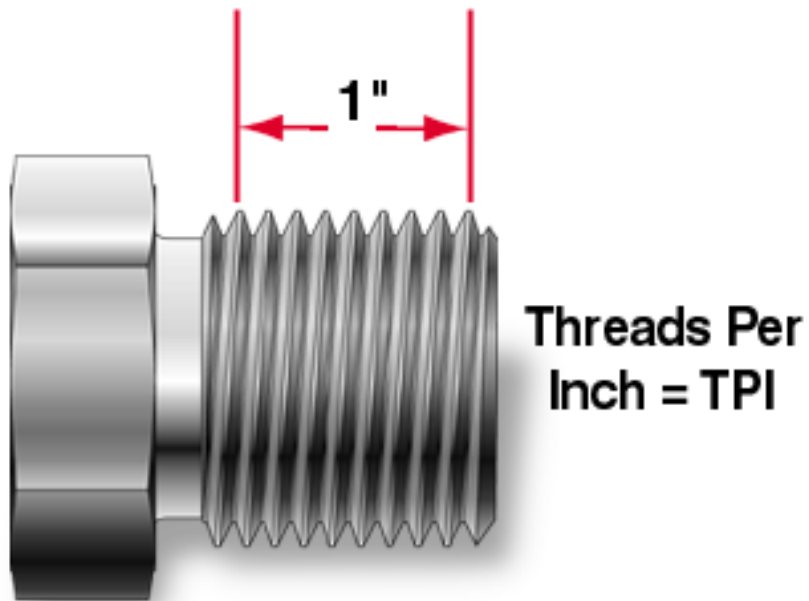


Označovanie závitov na výkresoch

Stúpanie – pitch

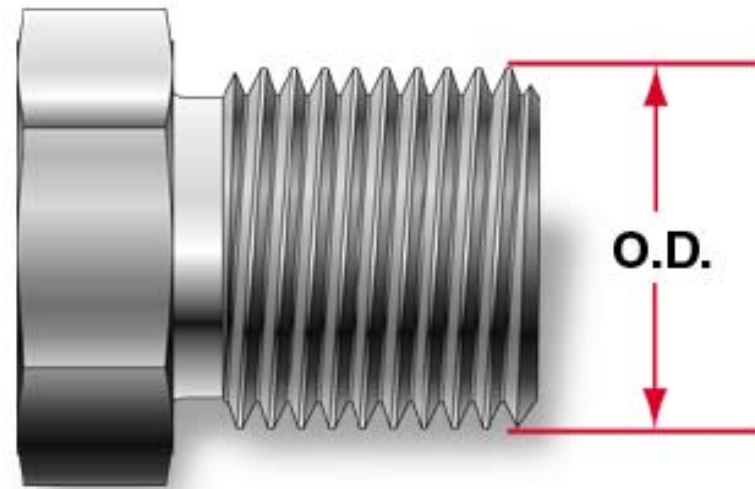
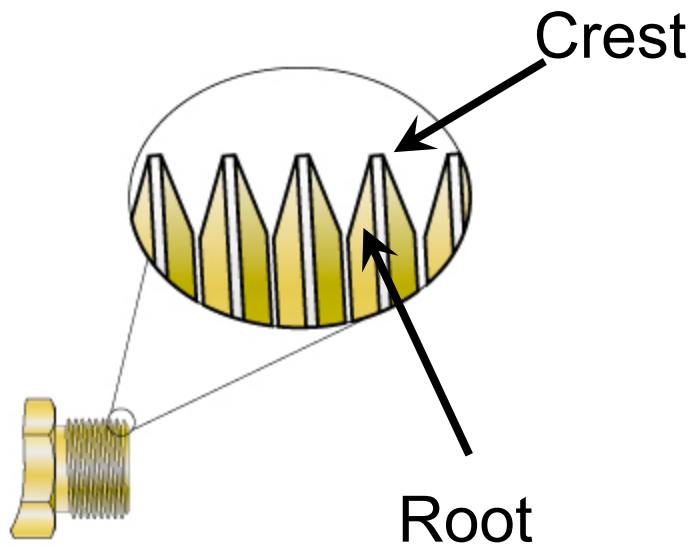
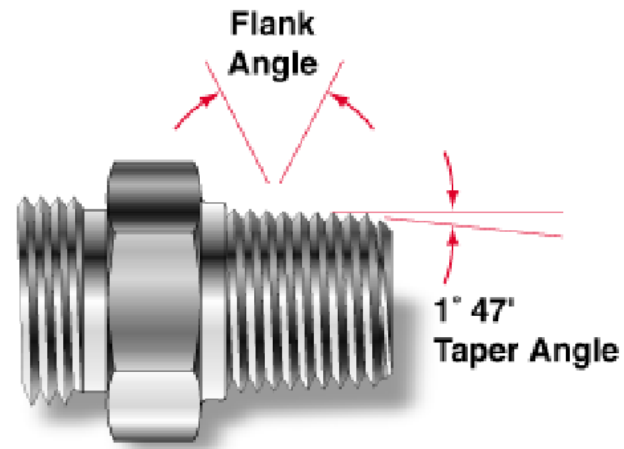
je niekedy vyjadrené ako počet závitov na palec.

/ Pitch is sometimes written as the number of threads within one inch distance /



Označovanie závitov na výkresoch

- Flank /Thread/ Angle
- Taper Angle
- Crest
- Root
- O.D.



Označovanie závitov na výkresoch

Thread Standards and Definitions

- *Pitch* – distance between adjacent threads.
Reciprocal of threads per inch
- *Major diameter* – largest diameter of thread
- *Minor diameter* – smallest diameter of thread
- *Pitch diameter* – theoretical diameter between major and minor diameters, where tooth and gap are same width

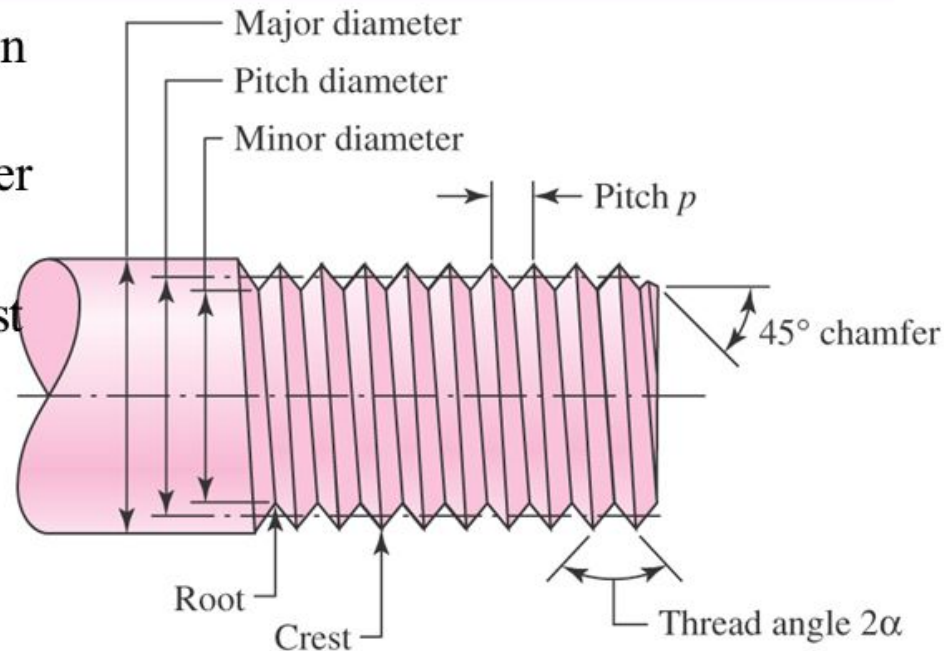
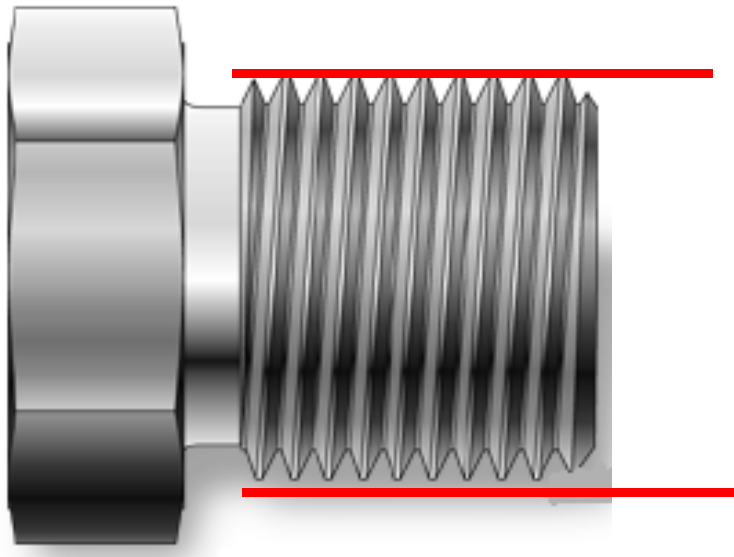


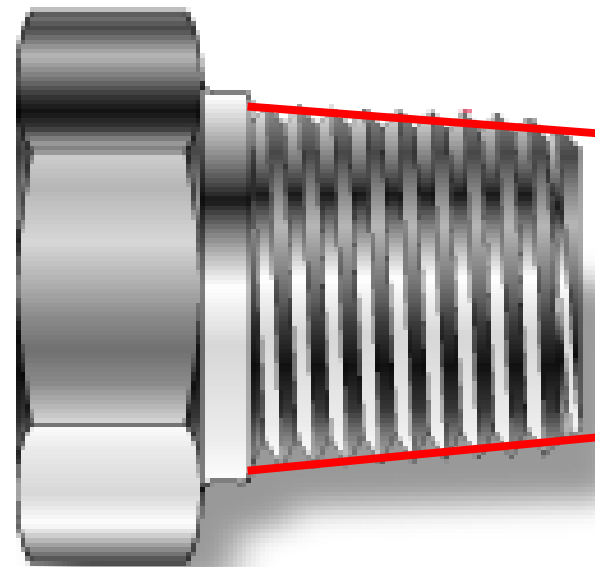
Fig. 8-1

Označovanie závitov na výkresoch

Valcové / Parallel
Kuželové / Taper



Parallel

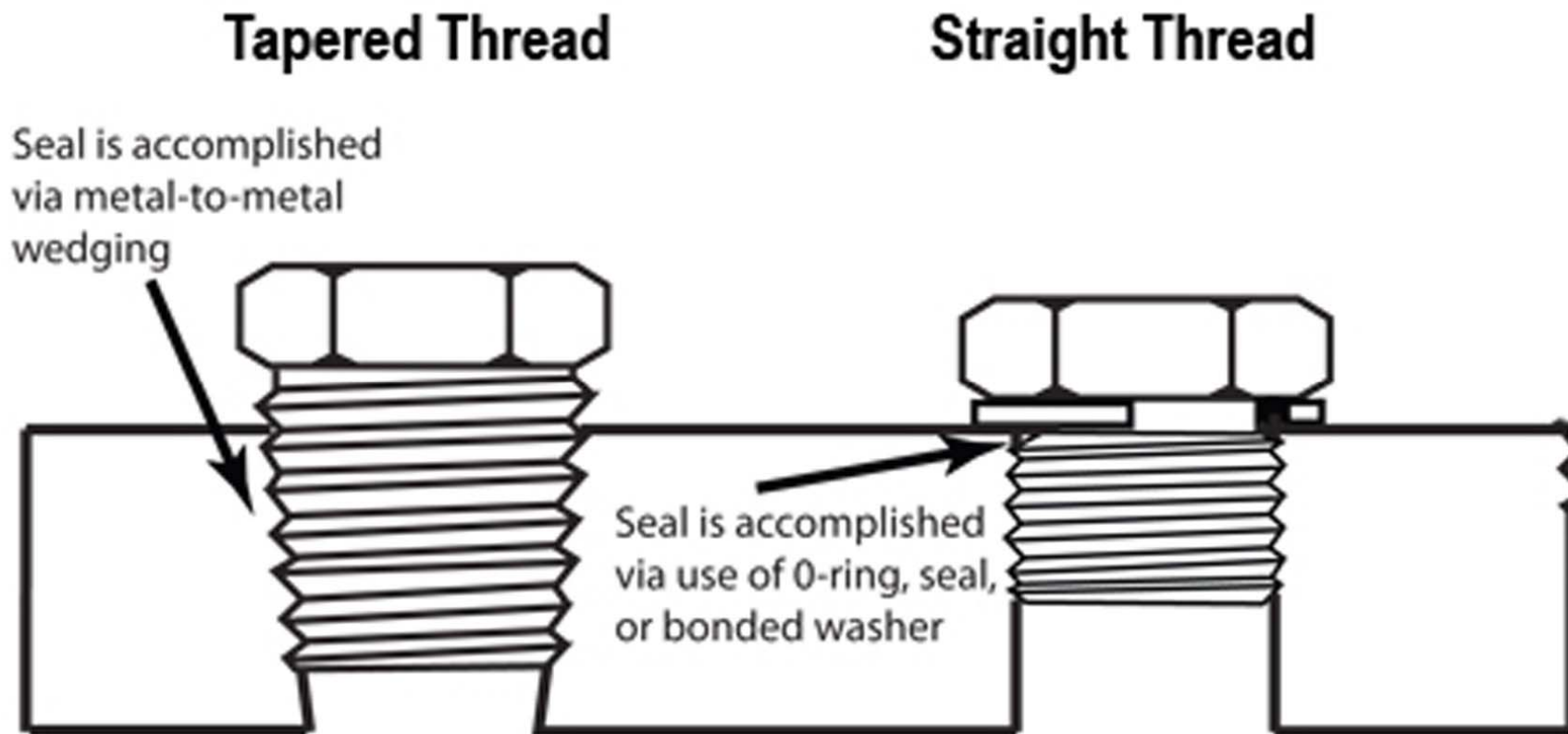


Tapered

Označovanie závitov na výkresoch

Valcové / Parallel

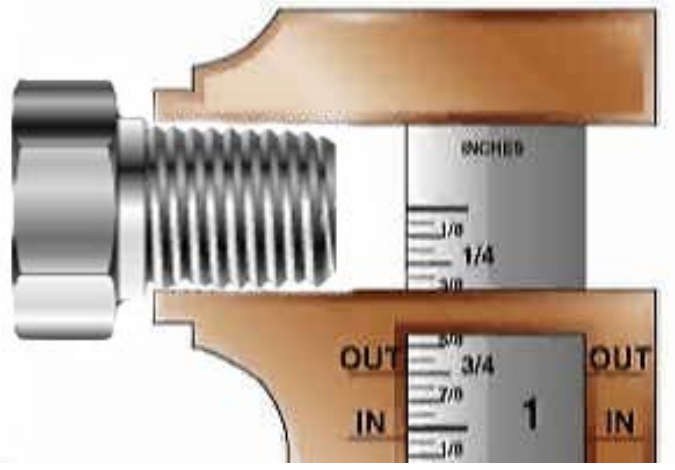
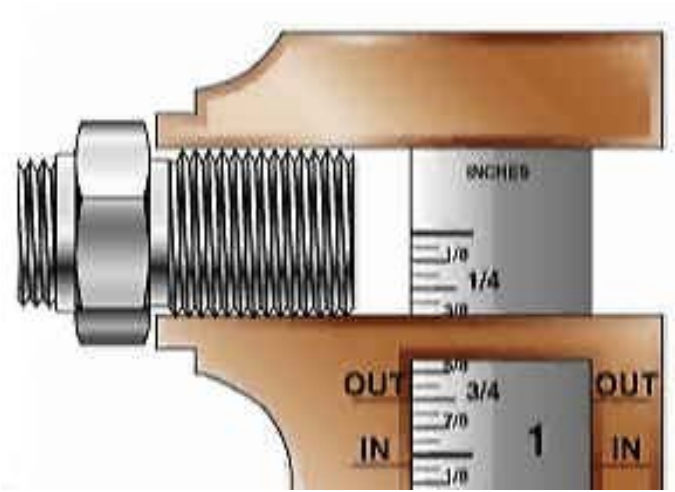
Kuželové / Taper



Označovanie závitov na výkresoch

Identifikácia:

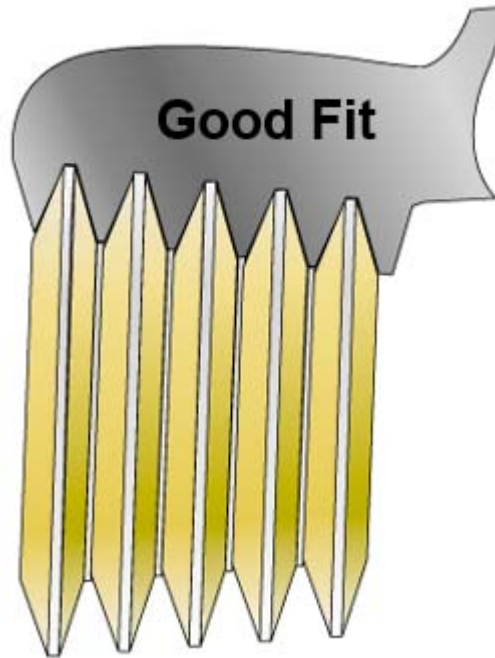
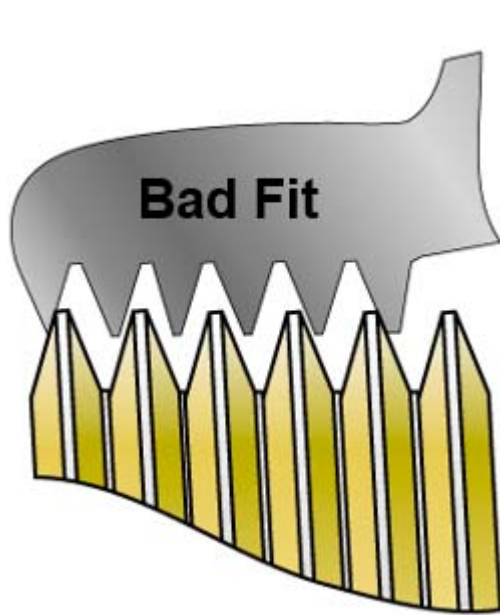
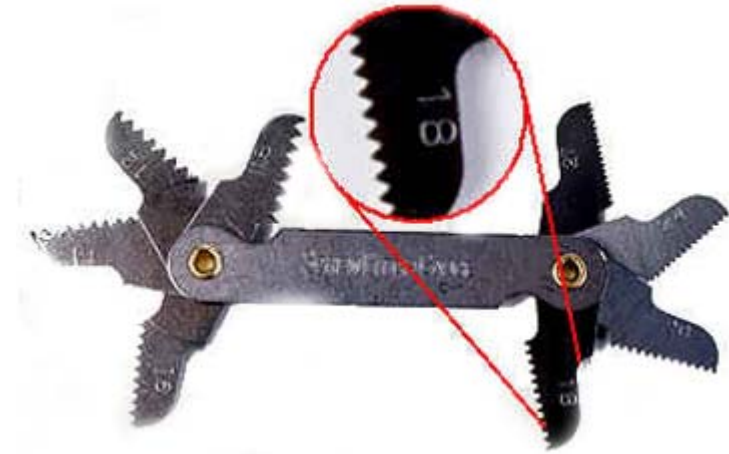
Caliper / Posuvné meradlo, „šublera“/



Označovanie závitov na výkresoch

Identifikácia:

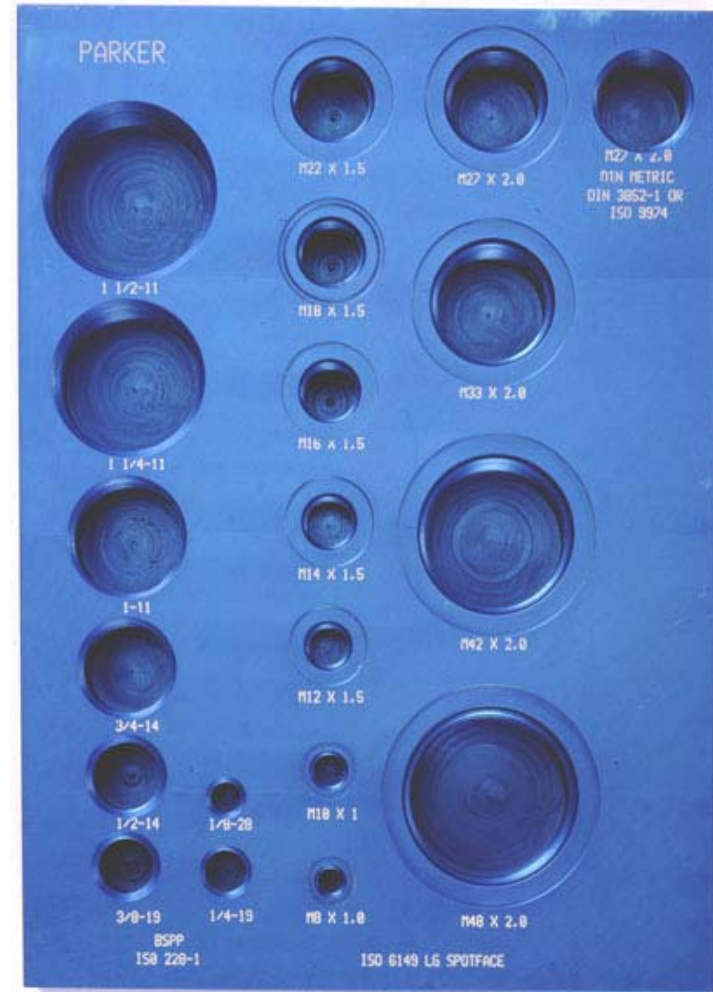
Thread gauge
/Závitové mierky/



Označovanie závitov na výkresoch

Identifikácia:

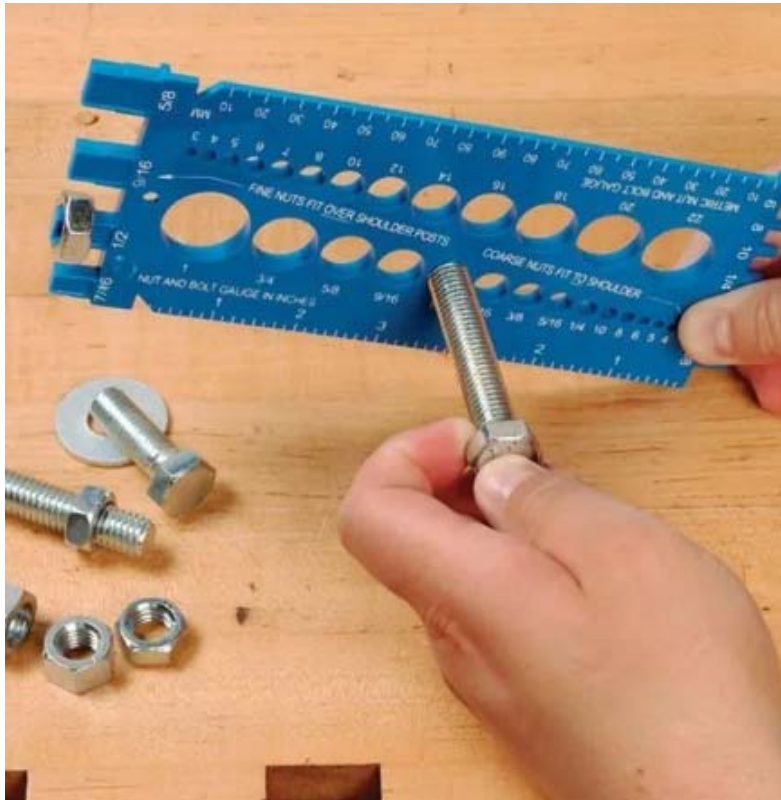
Thread gauge
/Závitové mierky/



Označovanie závitov na výkresoch

Identifikácia:

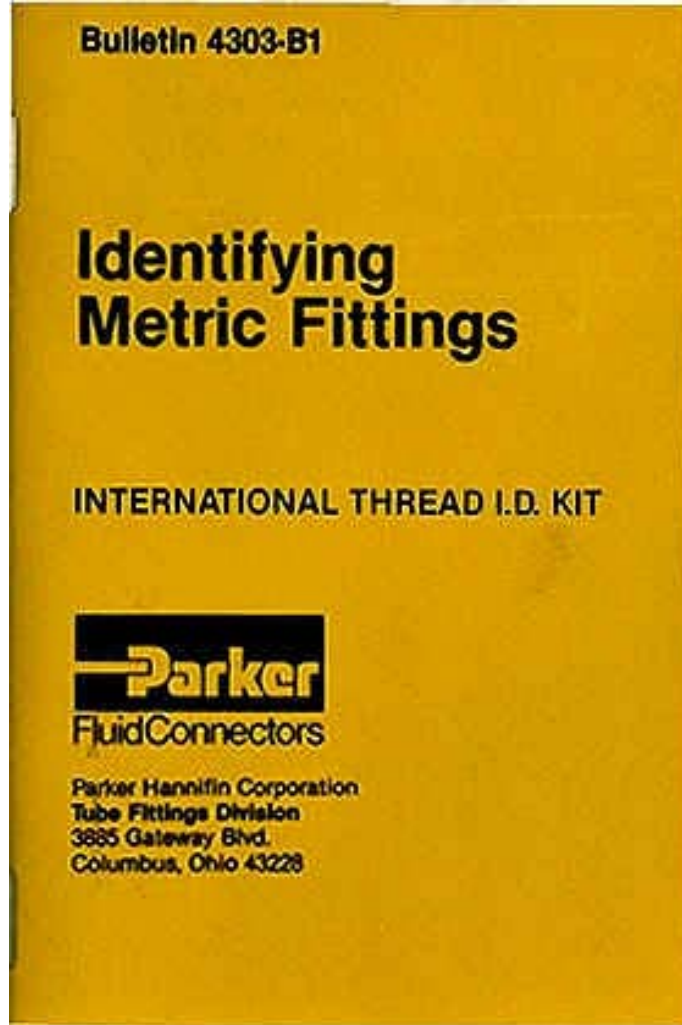
Thread gauge
/Závitové mierky/



Označovanie závitov na výkresoch

Identifikácia:

Instruction booklet /Contains specifications for various thread forms/



Fitting Identification

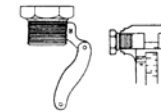
Fitting Thread Size Comparison Chart

The male connections have (Male unified thread class 2 fit) UN-2A specification threads and the female connections have (Female unified thread class 2 fit) UN-2B specification threads. The exceptions are male and female pipe threads.

Tube Fittings

There are four basic types of tube fittings: Flare, Flareless, Straight Thread O-Ring, and Flat Face O-Ring Seal (FOR-SEAL™). Tube fittings seal in two ways. Flare and Flareless fittings use metal to metal contact joints. Straight Thread O-Ring and Flat Face O-Ring fittings use a rubber o-ring. Where extreme vibration is present, use Flareless.

Straight Thread or Flat Face O-Ring Seal fittings. SIZING: For accuracy, it is recommended the male thread be measured. Measure the outside diameter. For our example use 7/16". Next measure the threads per inch - use 20. Our fitting size measures 7/16-20. Refer to the thread chart on this page for appropriate tube size and illustration.



See page 425 for Thread Measuring Kits.



SIZE	PIPE	FOR-SEAL®	37° FLARE FLARE-TWIN®	ERRETTO® 7000 SERIES	STRAIGHT THREAD O-RING SEAL	45° FLARE	INVERTED FLARE
1/8	1/8-27	—	5/16-24	5/16-24	5/16-24	5/16-24	5/16-24
3/16	—	—	3/8-24	3/8-24	3/8-24	3/8-24	3/8-24
1/4	1/4-18	9/16-18	7/16-20	7/16-20	7/16-20	7/16-20	7/16-24
5/16	—	—	1/2-20	1/2-20	1/2-20	1/2-20	1/2-20
3/8	3/8-18	11/16-16	9/16-18	9/16-18	9/16-18	5/8-18	5/8-18
7/16	—	—	—	—	—	11/16-16	11/16-18
1/2	1/2-14	13/16-16	3/4-16	3/4-16	3/4-16	3/4-16	3/4-18
5/8	—	1-14	7/8-14	7/8-14	7/8-14	7/8-14	7/8-18
3/4	3/4-14	1-3/16-12	1-1/16-12	1-1/16-12	1-1/16-12	1-1/16-14	1-1/16-16
7/8	—	—	1-3/16-12	1-3/16-12	1-3/16-12	—	1-3/16-16
1	1-11-1/2	1-7/16-12	1-5/16-12	1-5/16-12	1-5/16-12	—	1-5/16-16
1 1/4	1-1/4-11-1/2	1-11/16-12	1-5/8-12	1-5/8-12	1-5/8-12	—	—
1 1/2	1-1/2-11-1/2	2-12	1-7/8-12	1-7/8-12	1-7/8-12	—	—
2	2-11-1/2	—	2-1/2-12	2-1/2-12	2-1/2-12	—	—
2 1/2	2-1/2-8	—	3-12	—	—	—	—
3	3-8	—	3-1/2-12	—	—	—	—

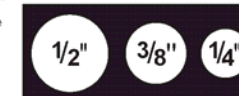
Pipe Fittings

The American Society of Automotive Engineers in co-operation with industry set up a standard for improvement in pipe threads. This improvement is known as the Dryseal Pipe Thread. All Weatherhead pipe threads are American Standard Taper Dryseal Pipe Threads (NPTF). The metal to metal seal is formed by contact at the thread crest and root. Nominal pipe sizes do not

agree with either the I.D., O.D., or thread sizes. To determine pipe size (up to 1-1/4") measure the diameter of the threads and subtract 1/4". For example, subtract 1/4" from a 1" pipe to obtain the nominal pipe size of 3/4".

Pipe sizes can also be given in "dash numbers". A dash number is always the numerator of an inch over 16th. For instance, if the pipe O.D. measures 1/2"

that would be converted to 16ths (8/16), but be written as -8.

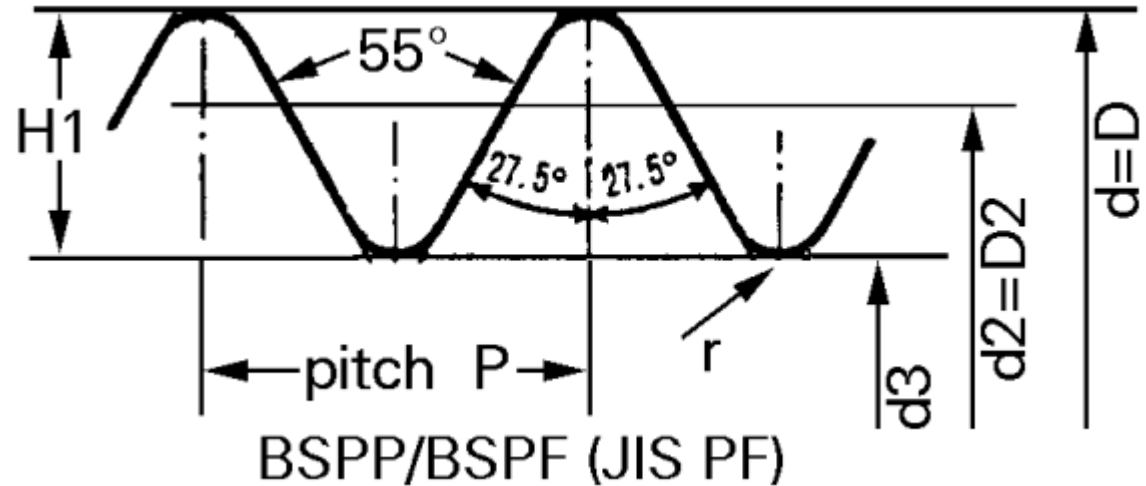


Označovanie závitov na výkresoch

PIPE THREADS

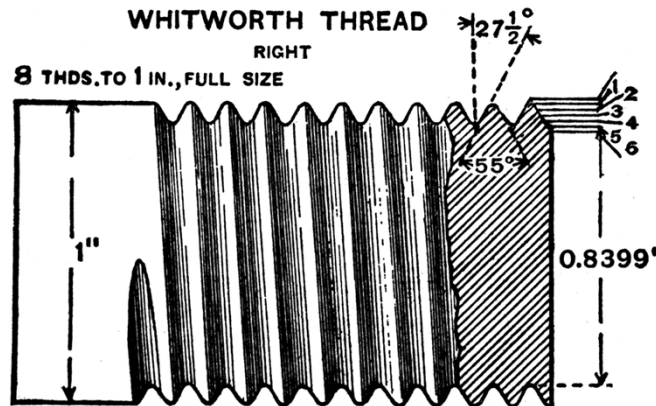
Potrubárske závit (závit na spájanie potrubí), alebo pripojenia na potrubia

Vychádzajú z WHITWORTH-ovho závit. (jedným s prvých patentovaných priemyselných štandardov)



WHITWORTH-ov závit

Vrcholový uhol: 55°
 Stúpanie: počet závitov na 1"
 Označenie W ½"



JOSEPH
 WHITWORTH
 UK 1841

Označovanie závitov na výkresoch

PIPE THREADS

Z Whitworth-ovho závitu je odvodený najpoužívanejší závit pri spájaní potrubí:

G 1" (33,249mm)
 odpovedá rúrke
 svetlosti DN25 (33,7 mm)

RÚRKOVÝ (Trubkový) závit .
 Používame viacero závitov.

Vrcholový uhol: 55°
 Stúpanie: počet závitov na 1"
 Označenie: G 1 ½", Rp 1 ½", R 1 ½", R 1 ½",

- Tesnenie v závite
- Tesnenie mimo závit

1	ISO 7/1		DIN 2999		BS 21		DIN ISO 228 part 1 ²⁾
2	<i>Pipe threads where pressure tight joints are made on the threads</i>		<i>Whitworth pipe threads for threaded pipes and fittings</i>		<i>Pipe threads for tubes and fittings where pressure tight joints are made on the threads</i>		<i>Pipe threads where pressure-tight joints are not made on the threads</i>
3	<i>sealing on the thread</i>		<i>sealing on the thread</i>		<i>sealing on the thread</i>		<i>not sealing on the thread</i>
4	<i>internal thread cylind.</i>	<i>external thread taper</i>	<i>internal thread cylindrical</i>	<i>external thread taper</i>	<i>internal thread cylind.</i>	<i>external thread taper</i>	<i>internal and external thread cylindrical</i>
5	Rp	Rc	R	Rp	R	R	G
6	<i>taper limit plug gauge - ISO 7/2¹⁾</i>	<i>taper limit ring gauge - ISO 7/2¹⁾</i>	<i>taper limit plug gauge - DIN 2999-4</i>	<i>cylindrical limit ring gauge - DIN 2999-5</i>	<i>taper limit plug gauge - BS 21</i>	<i>taper limit ring gauge - BS 21</i>	<i>cylindrical Go / No Go plug gauge cyl. Go ring gauge tolerance A or B DIN ISO 228 part 2</i>

Označovanie závitov na výkresoch

PIPE THREADS - DIN EN 10226.

Kuželový vonkajší závit a valcový vnútorný závit DIN EN 10226 nahradila skorší DIN 2999. Rozmery závitov zodpovedajú medzinárodnej norme ISO 7/1.

Tento rúrkový závit je dimenzovaný pre spoje tesniace v závite.

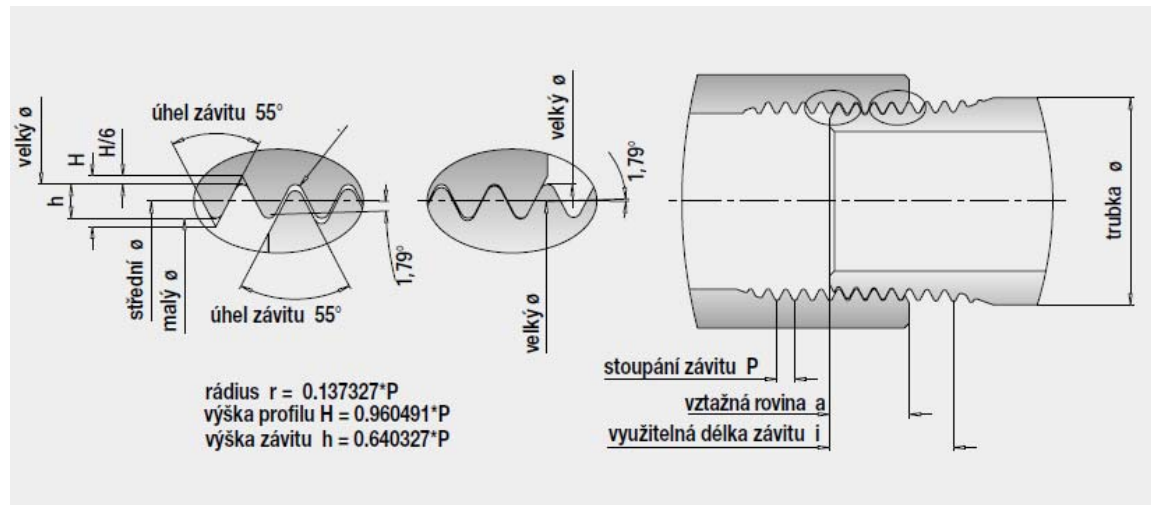
Do závitu je možné použiť vhodný tesniaci prostriedok (napr. konope alebo teflónovú pásku).

Rp

DIN 2999-Rp-1/2
vnitřní závit válcový
Parallel inside

R

DIN 2999-R-1/2-1 ISO 7/1
vnější závit kuželový (kužel 1:16)
Tapered outside (taper 1:16)



Description:

The tapered R outside thread has the same core, haunch and outside dia as the Rp inside thread, so that it can be threaded in by hand. The torque from the spanner lengthens the tapped hole and seals with the aid of a proprietary sealing material (eg. PTFE tape). **Comparison with ISO 228:** The parallel Rp inside thread of this Standard has the same nominal size for the thread dia and profile as for the inside thread to ISO 228. However, the G inside thread in core and haunch dia has only a positive deviation (from DIN 2999 +/- tolerance). Therefore a DIN 2999 tapered outside thread may be screwed into an ISO 228 parallel inside thread. The outside thread can be screwed 1 turn further. The likelihood of leaks occurring is increased due to larger core dia tolerance of the G thread which gives a larger clearance between the points of the threads. **In no circumstances** combine ISO 228 parallel G outside thread with DIN 2999 Rp parallel inside thread as the inside thread is too small.

Označovanie závitov na výkresoch

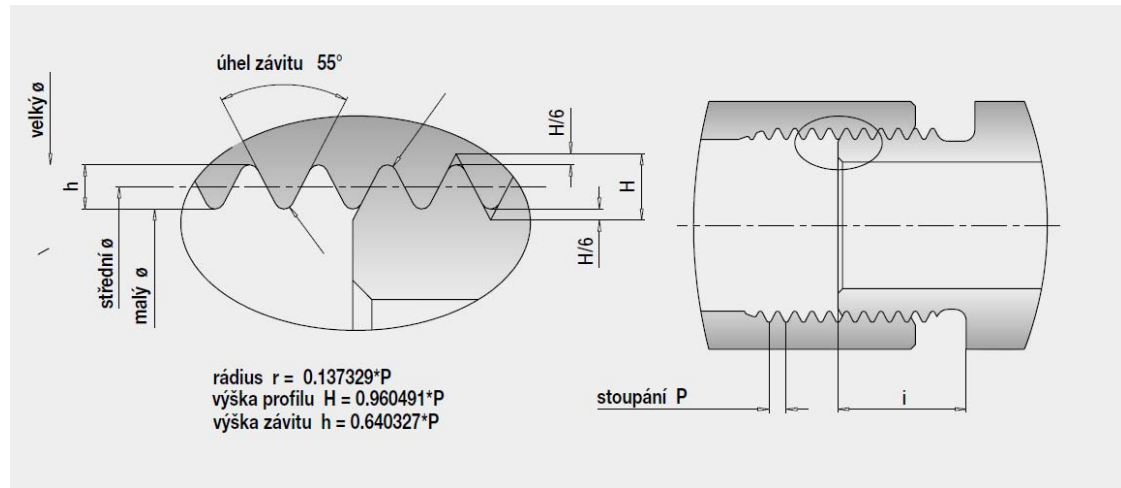
PIPE THREADS - EN ISO 228

Pre spoje netesniace v závite
Norma DIN EN ISO 228 nahrádza
predchádzajúcu normu pre rúrkový
závit Whitworth DIN 259 (známa aj
pod označením BSPP - British
Standard Pipe Parallel)
Valcový vnútorný / vonkajší závit.
Tento rúrkový závit pre spoje
netesniace v závite slúži najmä na
mechanické spojenie fittingov a
armatúr. Utesnenie spoja sa
vykonáva tak, že sa na seba pritlačia
dve tesniace plochy mimo závitu
opatrené vhodným tesnením.

G

ISO 228-G 1/2"
vnitřní závit válcový
parallel inside

ISO 228-G 1/2" A
vnější závit válcový (tol. třída A)
parallel outside (Tol. class A)



Description:

This thread is mainly used for mechanical connection of fittings. The seal results from the pressing together of two sealing faces outside the thread and from the use of a proprietary sealing material. [Male studs](#) (with sealing ring), [Form B](#) (with sealing edge) and [Form E](#) (on agreement) as well as the respective [Form X](#) tapped holes (with run out) and [Form Y](#) (with grooves), to [DIN 3852 Part 2](#) have G threads to this standard.

Označovanie závitov na výkresoch

NPT - ASME/ANSI B1.20.1

Rúrkový závit NPT - samotesniace rúrkové skrutkové spoje.

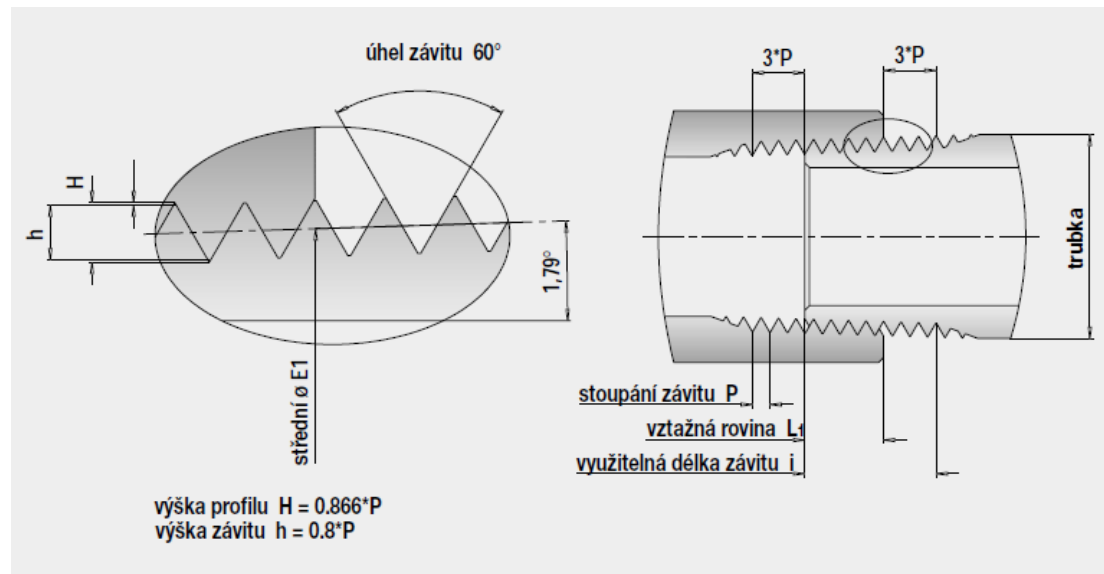
Ako vnútorný, tak vonkajší závit sú kužeľovité.

Pretože ako vnútorný, tak vonkajší závit sú kužeľovité, prispieva k utesneniu a rozneseniu sily viacerých otáčok závitú. Vďaka malému splošteniu závitú vzniká len minimálna netesnosť.

NPT

3/8 - 18 NPT
 vnitřní závit kužeľový
 Tapered inside

vnější závit kužeľový (kužel 1:16)
 Tapered outside (taper 1:16)



Description:

The tapered NPT outside thread has the same core, haunch and outside dia as the NPT inside thread at the start of the thread so that it can be screwed in by hand. The torque from the spanner lengthens the tapped hole and seals with the aid of a proprietary sealing material (eg PTFE tape). As both the inside and outside threads are tapered, the likelihood of leaks occurring is small.

Označovanie závitov na výkresoch

NPT - ASME/ANSI B1.20.1

Rúrkový závit NPT - samotesniace rúrkové skrutkové spoje.

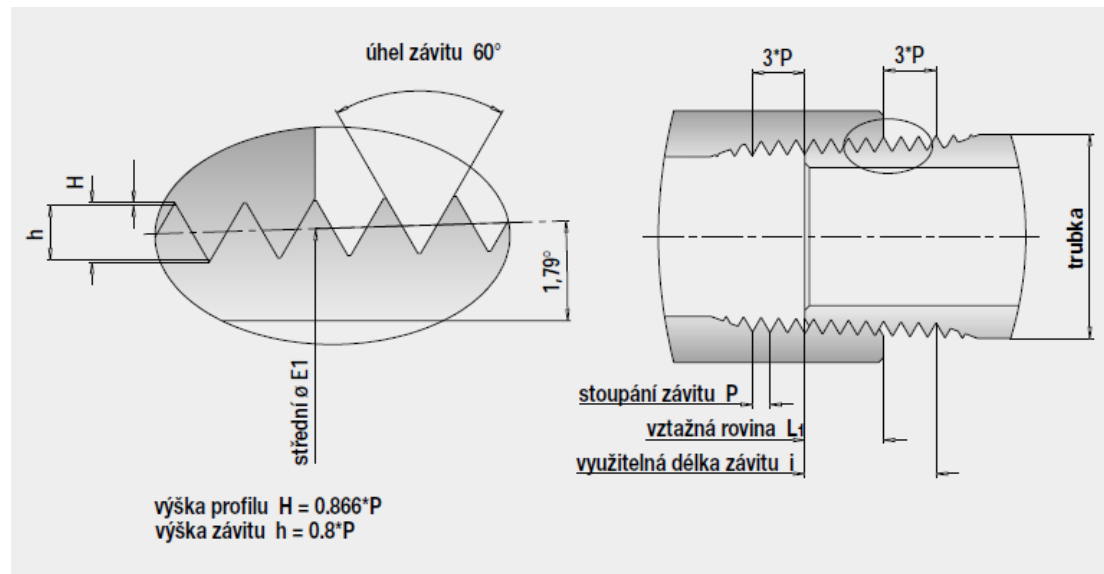
Ako vnútorný, tak vonkajší závit sú kužeľovité.

Pretože ako vnútorný, tak vonkajší závit sú kužeľovité, prispieva k utesneniu a rozneseniu sily viacerých otáčok závitú. Vďaka malému splošteniu závitú vzniká len minimálna netesnosť.

NPT

3/8 - 18 NPT
 vnitřní závit kužeľový
 Tapered inside

vnější závit kužeľový (kužel 1:16)
 Tapered outside (taper 1:16)



Description:

The tapered NPT outside thread has the same core, haunch and outside dia as the NPT inside thread at the start of the thread so that it can be screwed in by hand. The torque from the spanner lengthens the tapped hole and seals with the aid of a proprietary sealing material (eg PTFE tape). As both the inside and outside threads are tapered, the likelihood of leaks occurring is small.

Označovanie závitov na výkresoch

NPT - ASME/ANSI B1.1
UNF 7/16-20

Slúži predovšetkým na
 mechanické spájanie
 súčiastok.

Aj vnútorný aj vonkajší závit
 je valcový.

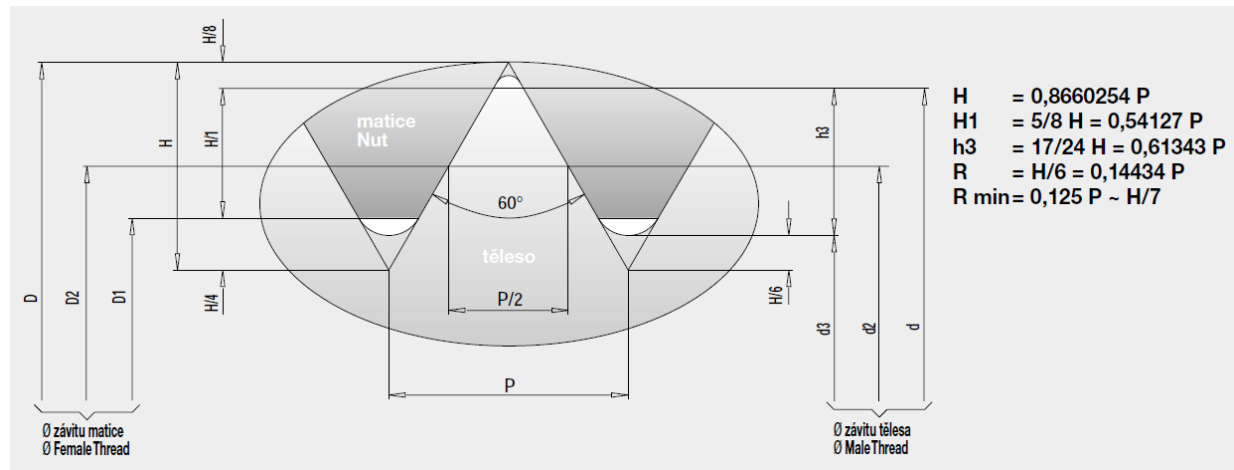
Na dosadanej ploche je
 potrebné použiť vhodný
 tesniaci materiál.

UNF / UN

ANSI B 1.1 UNF 7/16-20

vnitřní válcový závit (tol. 2 B)
parallel inside (Tol. 2 B)

vnější válcový závit (tol.2 A)
parallel outside (Tol. 2 A)



Description:

This thread is mainly used for mechanical connection of fittings. The seal results from the pressing together of two sealing faces outside the thread and from the use of a proprietary sealing material.

Označovanie závitov na výkresoch

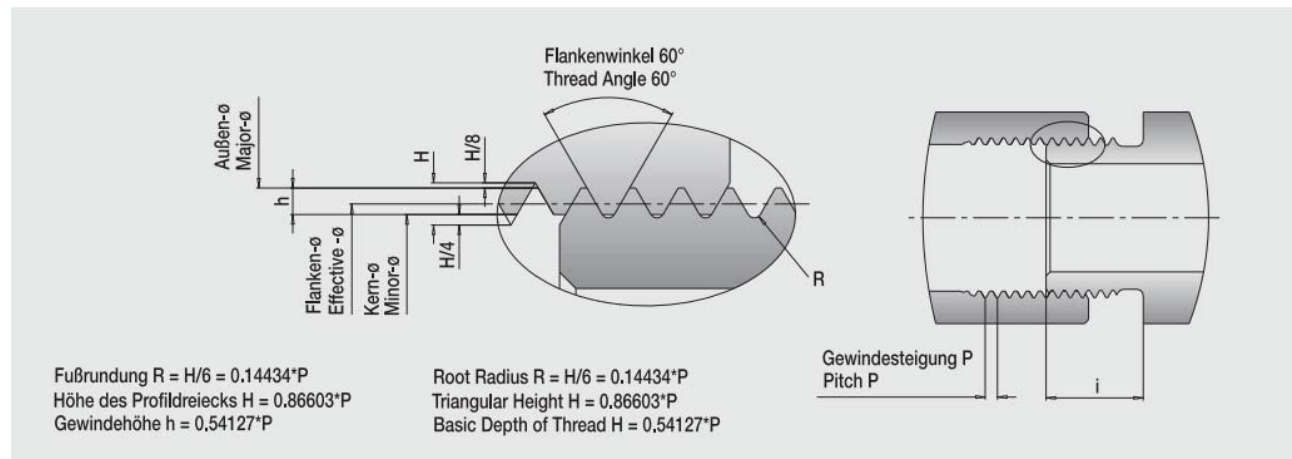
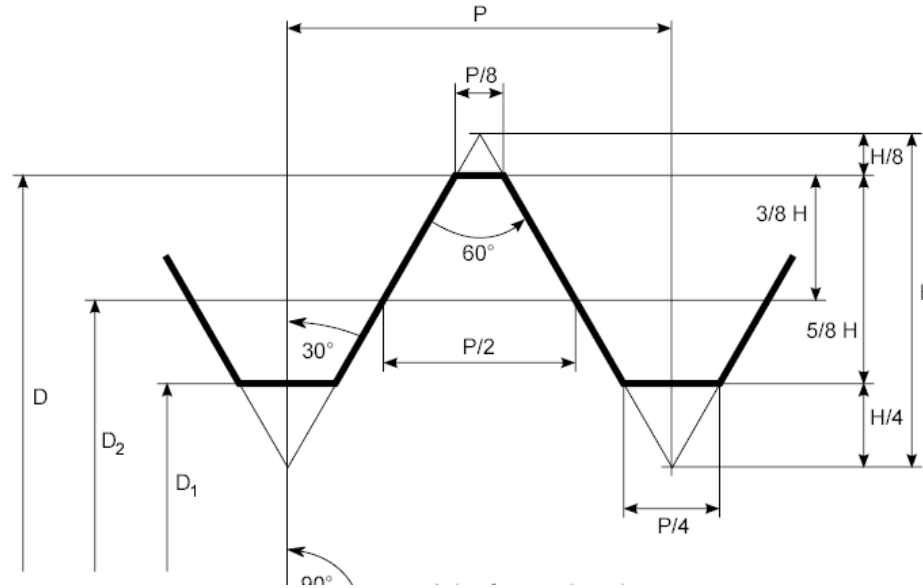
Metrický závit - DIN 13

Slúži predovšetkým na mechanické spájanie súčiastok.

Metrický závit
 Vrcholový uhol: 60°
 Označenie: M 12 x 1

Stúpanie - Pitch (P)
 LH – ľavý

Aj vnútorný aj vonkajší závit je valcový.



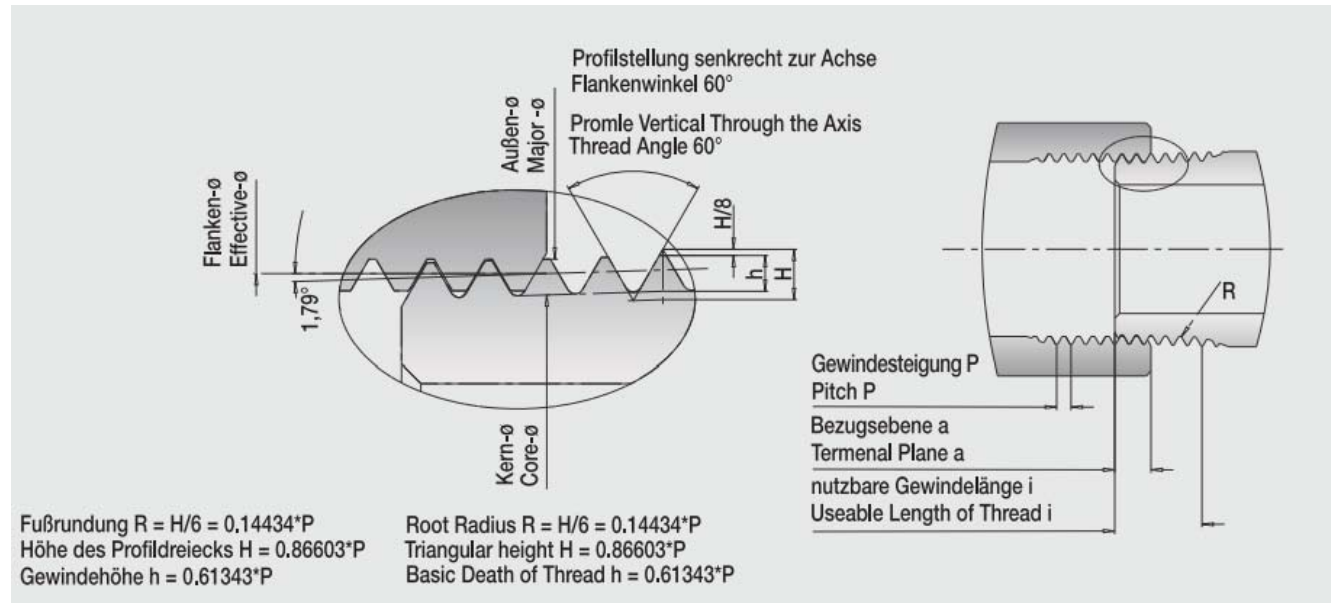
Označovanie závitov na výkresoch

Metrický závit - DIN 158

Slúži predovšetkým na mechanické spájanie súčiastok.

Metrický závit
 Vrcholový uhol: 60°
 Označenie: M 12 x 1

Aj vnútorný závit je valcový, vonkajší je kužeľový.



Description:

Threads to this Standard are used for **Pipe fittings with tapered male studs Form C, which are screwed into tapped holes Form Z, to DIN 3852 Part 1**. The distance **a** conforms to **DIN 3852 Part 1**. The tapered outside thread of this Standard has the same outside diameter as that of the inside parallel thread in DIN 13, enabling it to be screwed in by hand. The fitting does not need to be tightened too firmly and the seal is made with the aid of a proprietary sealing material (such as PTFE tape). All the diameters have the same tolerances and the middle values are shown in the table. The parallel inside thread should be to DIN 13, so that the clearance between the points of the thread and thereby the likelihood of leaks occurring, is minimised.

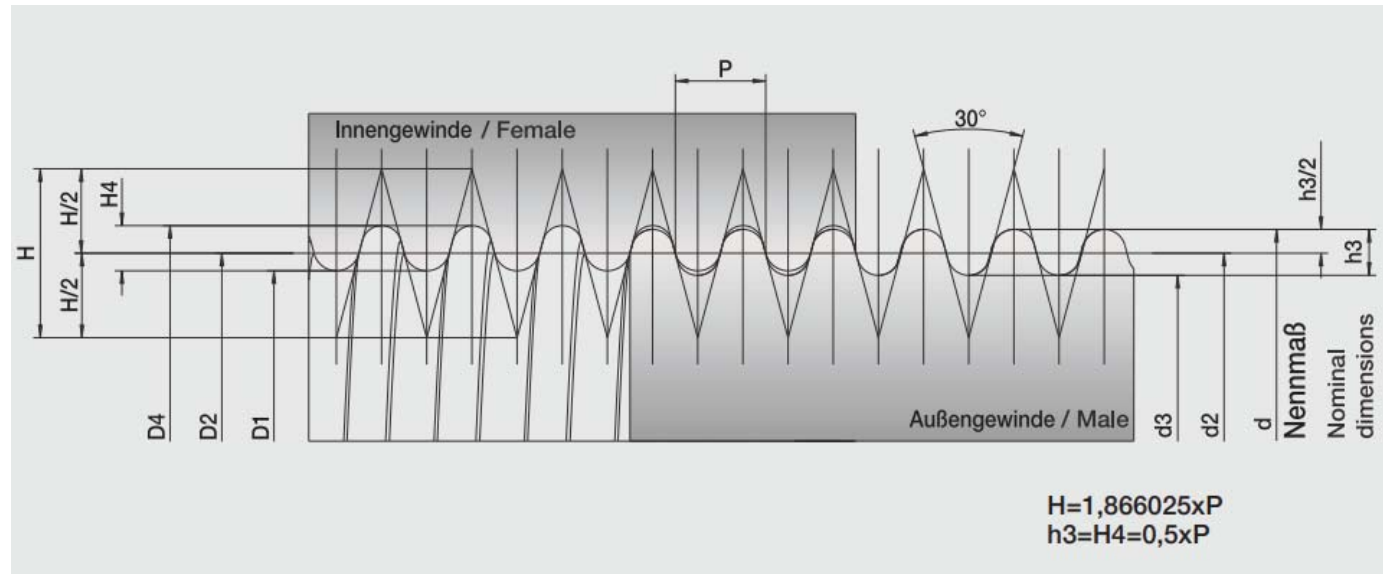
Označovanie závitov na výkresoch

Oblý závit - DIN 405

Označenie Rd

Slúži predovšetkým na mechanické spájanie súčiastok.

Vnútorný aj vonkajší závit je valcový, vonkajší je kužeľový.



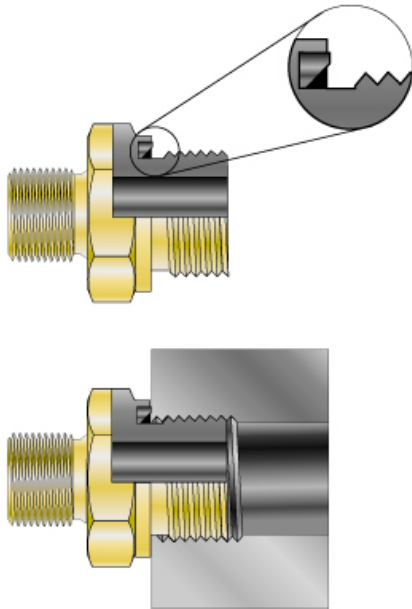
Description:

Knuckle threads are mainly used as fastening screw threads. The round form of the Knuckle thread makes it highly resistant against damages and fouling. Although the flanks overlap only a little bit, the thread can absorb major forces. Due to the round form a stress concentration is nearly impossible. Knuckle threads according that norm do have different profiles for the outside- and inside-thread. On the outside-thread the radiuses on the thread highs and lows are similar, on the inside-thread the radiuses are different. The major-, effective- and minor-aperture derives from the profil.

Označovanie závitov na výkresoch

Not Sealing on the
 thread – O-ring in
 groove

/Tesnenie mimo
 závit/



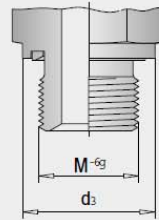
závitový čep
 s měkkým těsněním

Male screwed plug
 with captive seal

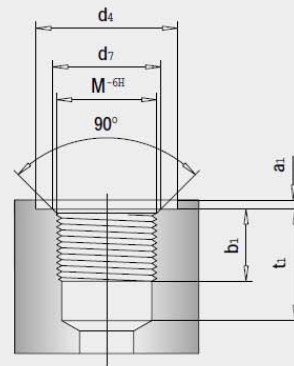
závitová díra
forma X
 pro závitové čepy s
 měkkým těsněním

Tapped holes
Form X
 for studs
 with captive seal

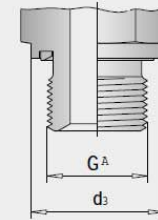
podle DIN 3852 - část 1:
 s válcovým metrickým
 závitem podle DIN 13



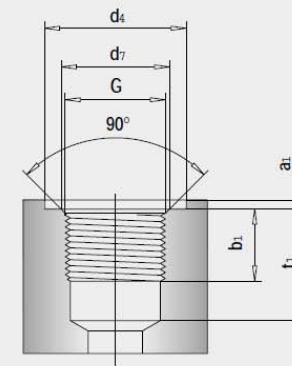
to DIN 3852 - Part 1:
 with parallel metric thread
 to DIN 13



podle DIN 3852 - část 2:
 s válcovým trubkovým závitem
 podle DIN/ISO 228



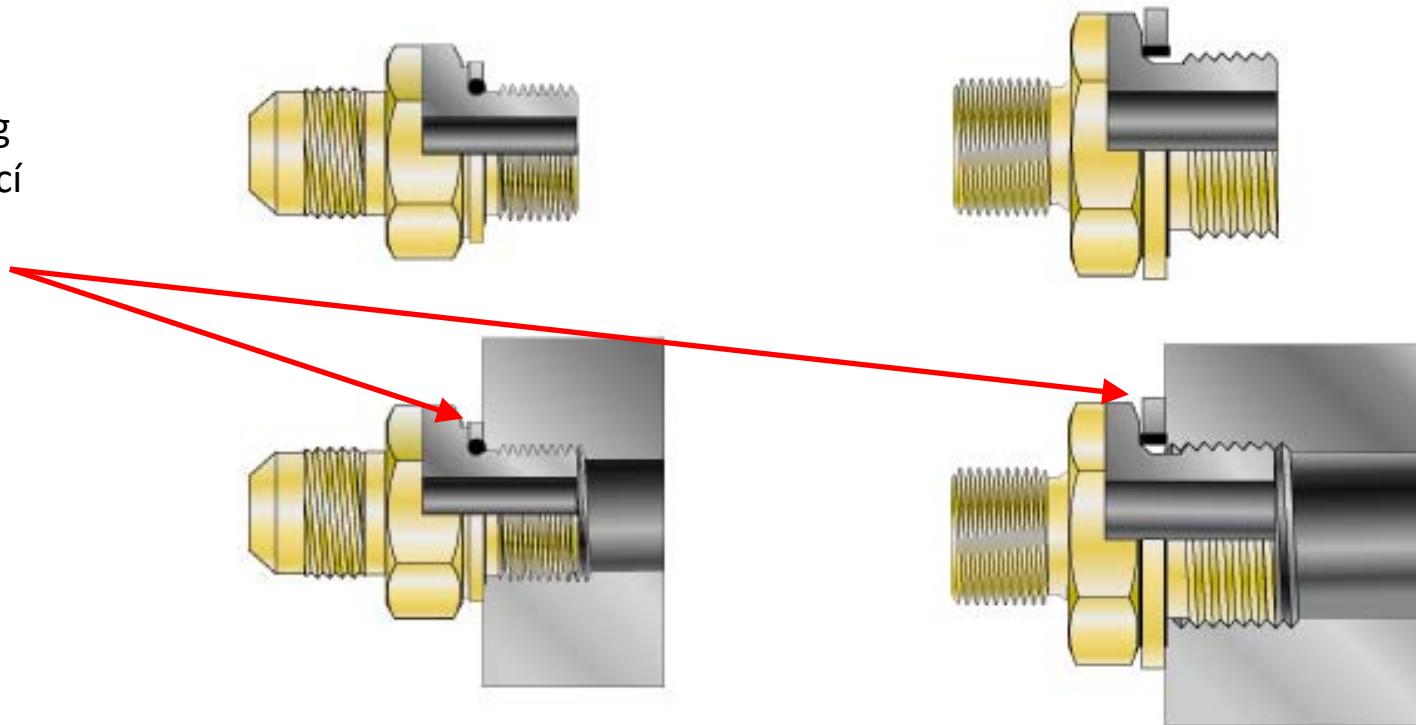
to DIN 3852 - Part 2:
 with parallel BSP thread
 to ISO 228



Označovanie závitov na výkresoch

Not Sealing on the
thread – O-ring in
groove

Retaining ring
/Obmedzovací
krúžok /

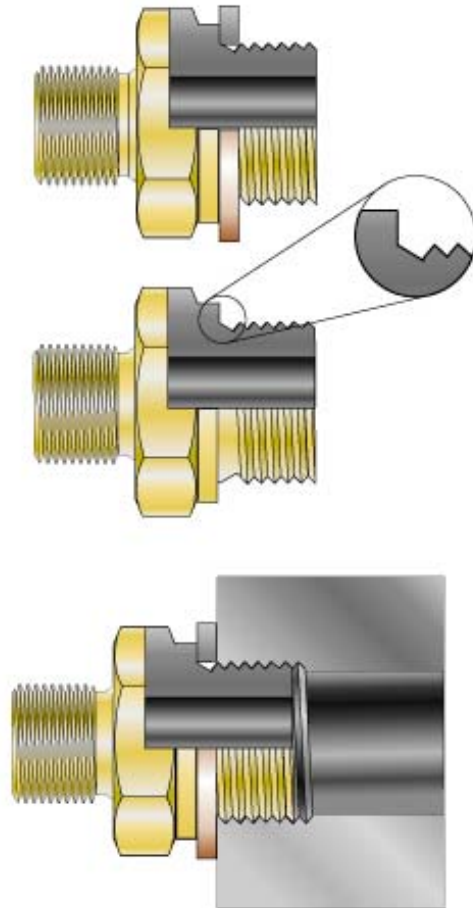


Označovanie závitov na výkresoch

Not Sealing
on the thread

—

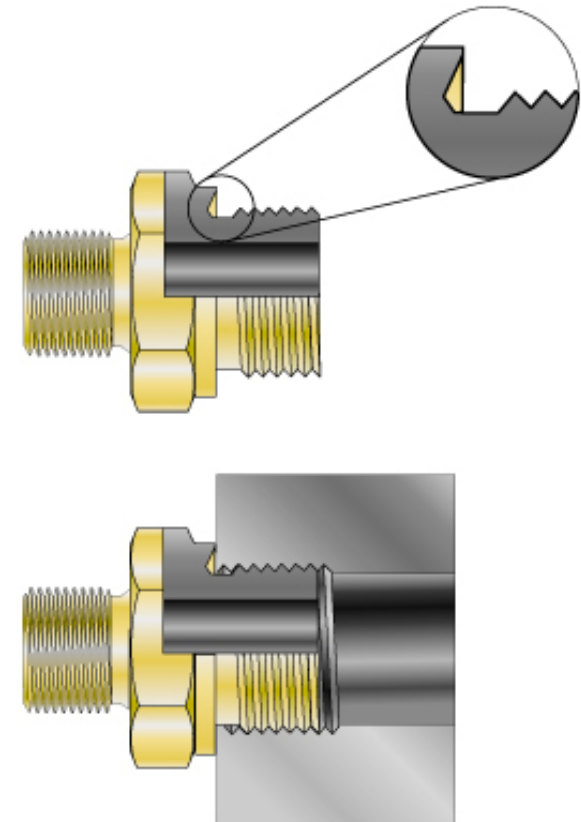
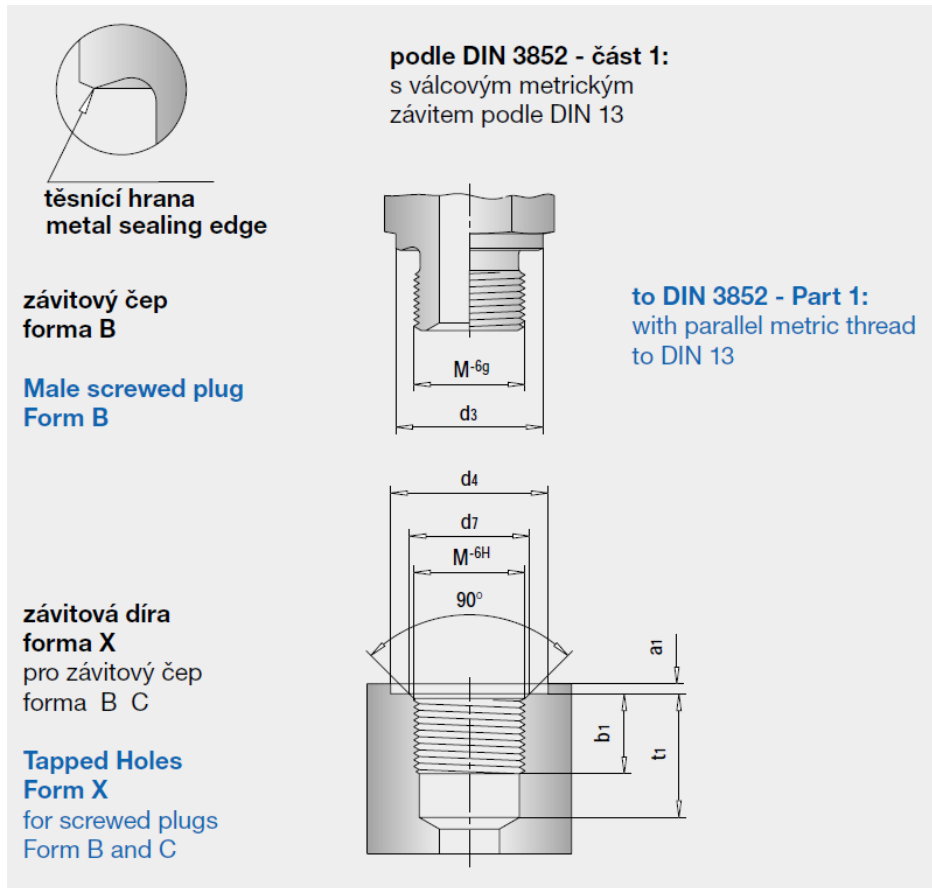
Soft Metal
Seal , Copper



Označovanie závitov na výkresoch

Not Sealing
on the thread

Cutting Face
Seal



Označovanie závitov na výkresoch

Not Sealing on the thread –

Prone to galling

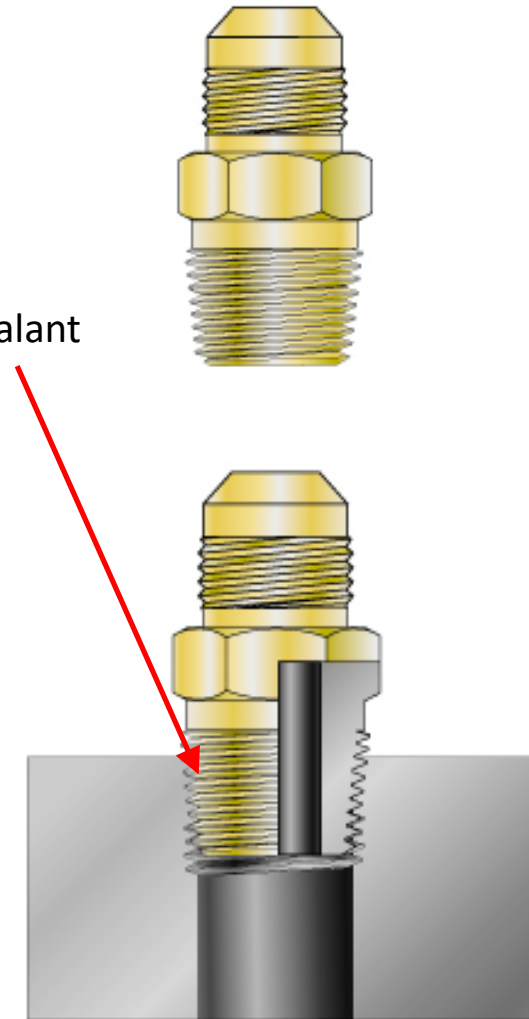
Sealing initiated by thread interference

Additional sealant usually required

Prone to fatigue failure



Sealant



Označovanie závitov na výkresoch

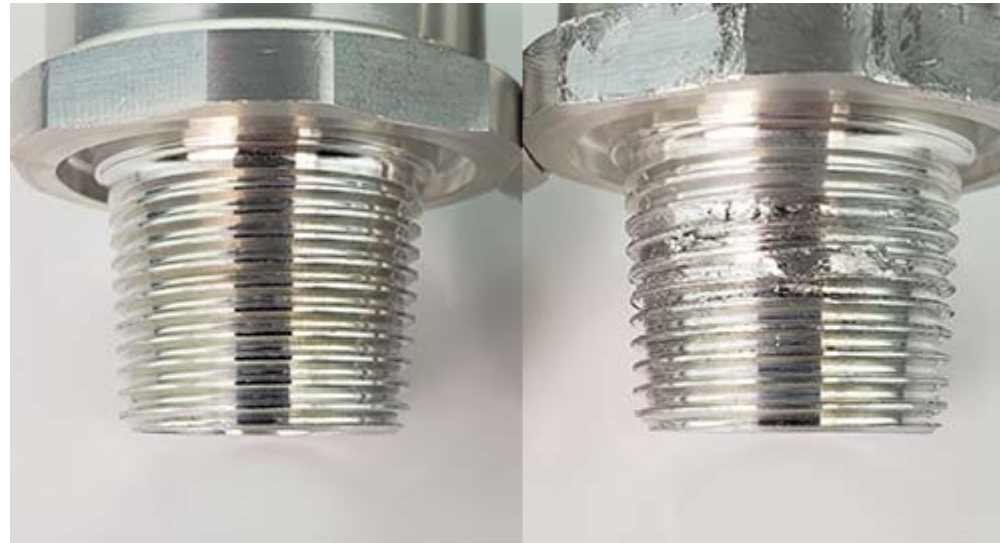
Not Sealing on the
thread –

Prone to galling

Sealing initiated by
thread interference

Additional sealant
usually required

Prone to fatigue failure



No Galling

Galled Threads

“Kúsnutie závitů” Odieranie prípadne zadieranie závitů je spôsobené adhéziou medzi klznými plochami lícujúcich závitů. Stretnem sa s ním hlavne pri nerezových závitoch