



BASIC WELDING SYMBOLS

Developed by: PC Viljoen
Senior Educational Specialist for
Engineering Graphics and Design
Free State Province

WELDING & WELDING SYMBOLS

- Welding is a process that joins materials, usually metals (or thermoplastics), by means of high heat that will melt two or more parts together and allowing them to cool causing fusion.

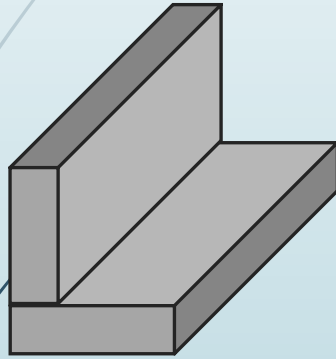


WELDING & WELDING SYMBOLS

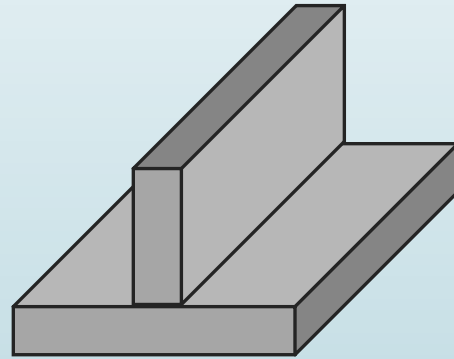
- ▶ Energy sources that can be used for welding is:
 - ▶ a gas flame (chemical),
 - ▶ an electric arc (electrical),
 - ▶ a laser,
 - ▶ an electron beam,
 - ▶ friction, and
 - ▶ ultrasound.

WELDING JOINTS

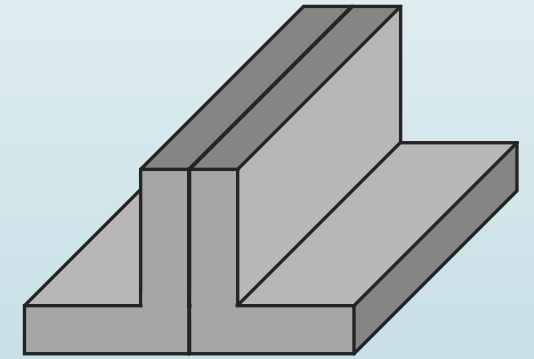
- There are basic types of welding joints according to position of parts



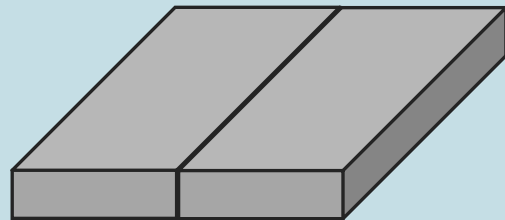
Corner joint



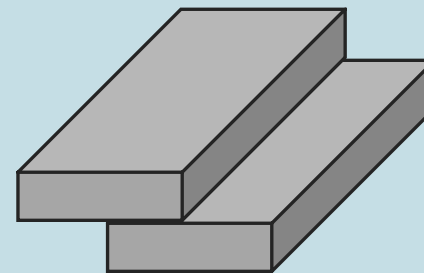
T-joint



Edge joint



Butt joint



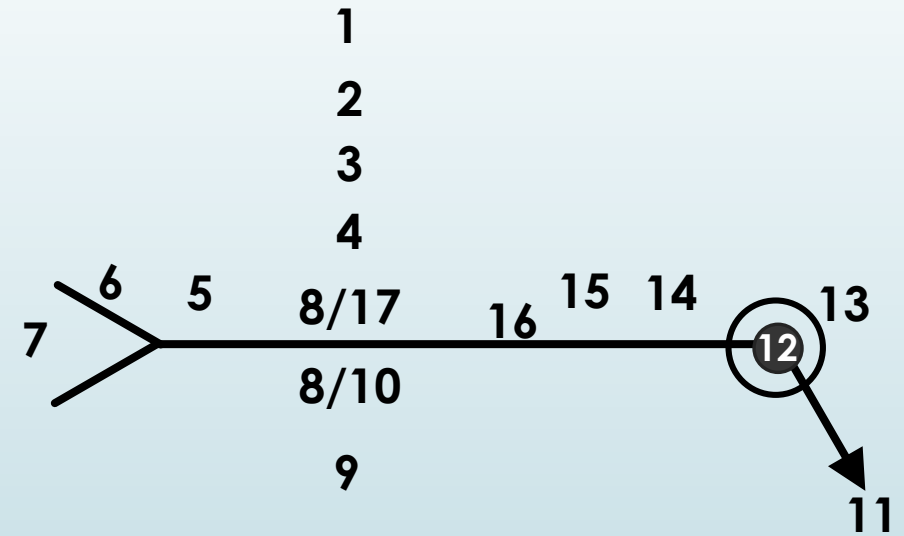
Lap joint

WELDING SYMBOLS

- On drawing papers a welding symbol will be use to indicate detailed information about what type of weld should be used.

ELEMENTS OF WELD SYMBOLS

➤ A weld symbol shows different information at specific allocated areas.



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

14. Centre-to-centre spacing

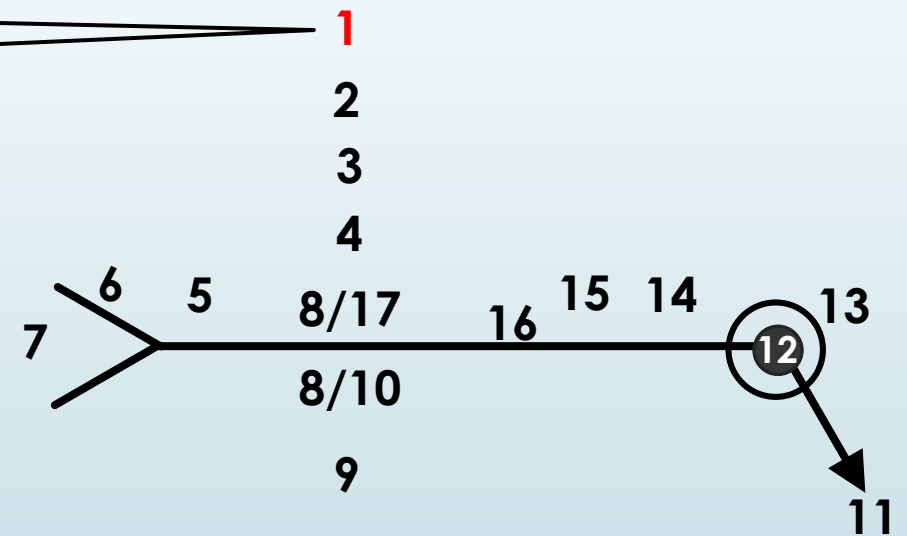
15. Length of weld

16. Reference line

17. Weld on other side of
arrow

ELEMENTS OF WELD SYMBOLS

FINISHING SYMBOL	
Method	Symbol
Machine	M
Flame	F
Chisel	C
Grinder	G
Rolling	R
Hammer	H



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

14. Centre-to-centre spacing

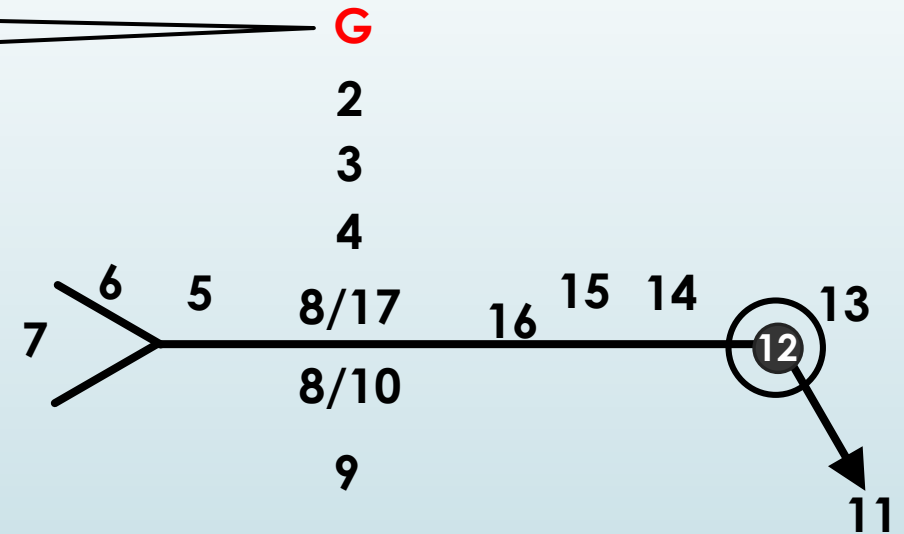
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

FINISHING SYMBOL	
Method	Symbol
Machine	M
Flame	F
Chisel	C
Grinder	G
Rolling	R
Hammer	H



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

14. Centre-to-centre spacing

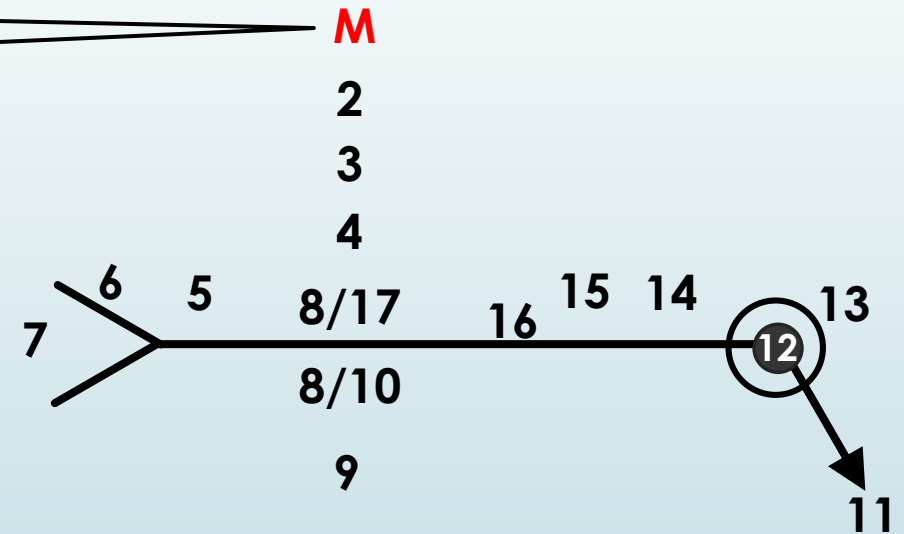
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

FINISHING SYMBOL	
Method	Symbol
Machine	M
Flame	F
Chisel	C
Grinder	G
Rolling	R
Hammer	H



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

14. Centre-to-centre spacing

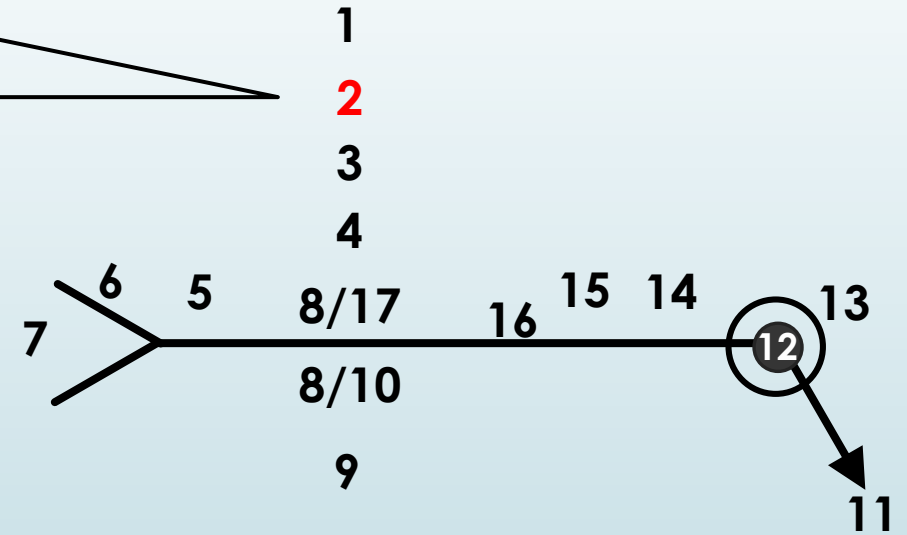
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

CONTOUR OR WELD SURFACE					
FLUSH		CONCAVE		CONVEX	
Method	Symbol	Method	Symbol	Method	Symbol



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

14. Centre-to-centre spacing

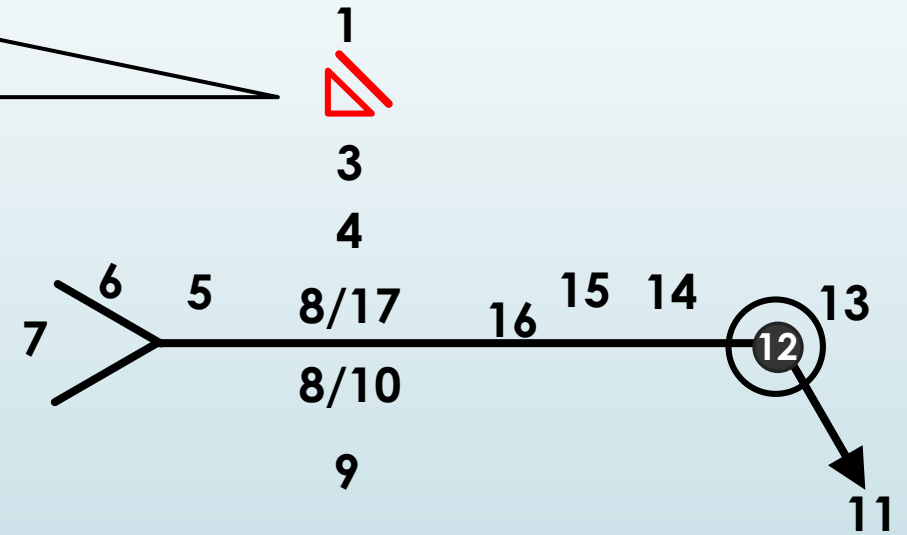
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

CONTOUR OR WELD SURFACE					
FLUSH		CONCAVE		CONVEX	
Method	Symbol	Method	Symbol	Method	Symbol



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

14. Centre-to-centre spacing

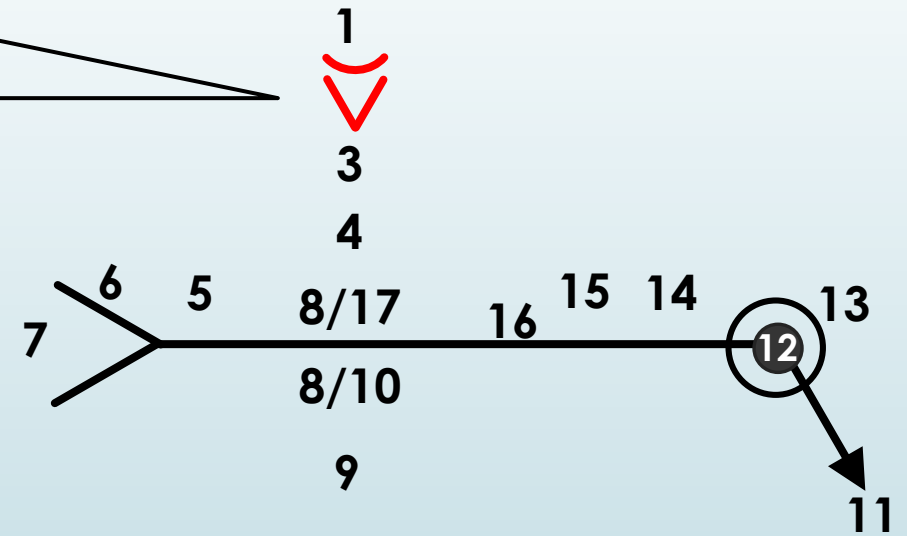
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

CONTOUR OR WELD SURFACE					
FLUSH		CONCAVE		CONVEX	
Method	Symbol	Method	Symbol	Method	Symbol



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

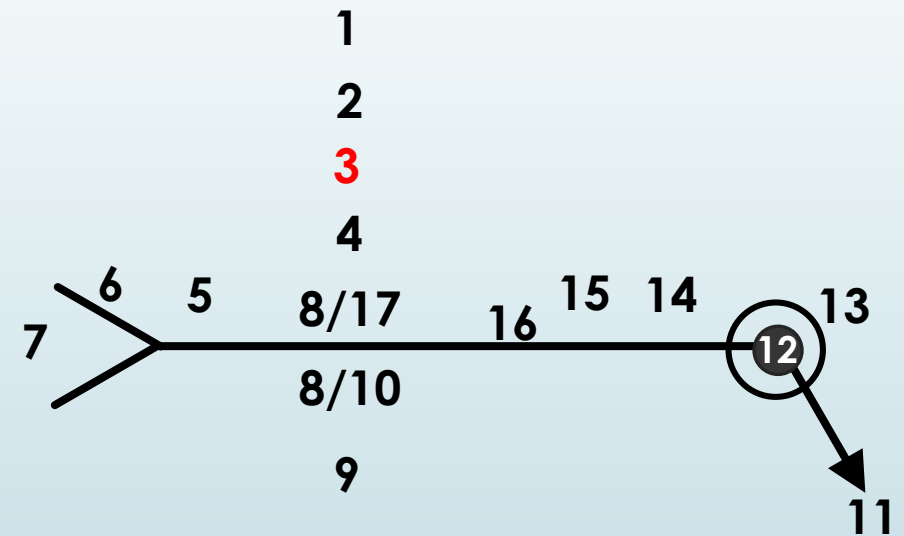
14. Centre-to-centre spacing

15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

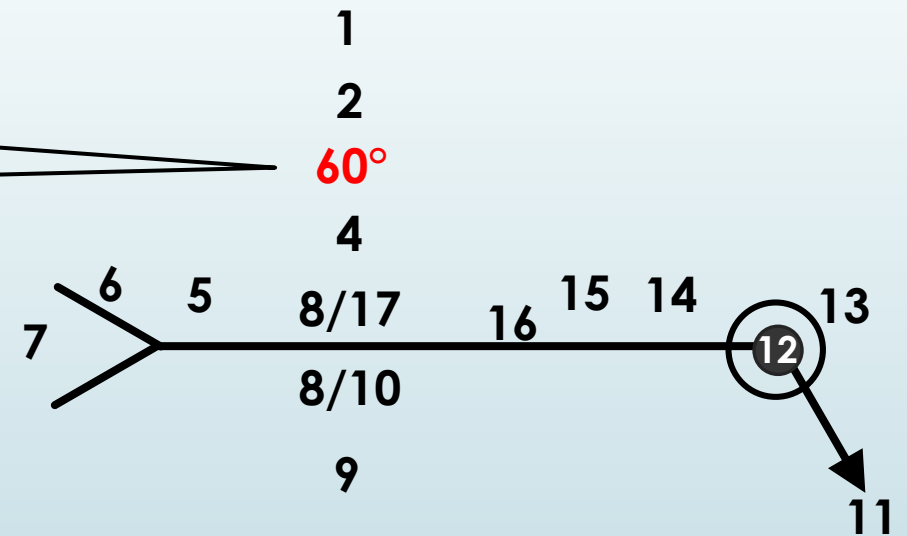
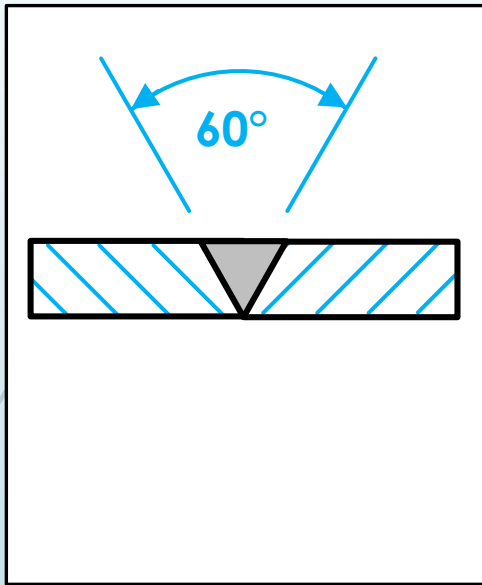
14. Centre-to-centre spacing

15. Length of weld

16. Reference line

17. Weld on other side of
arrow

ELEMENTS OF WELD SYMBOLS



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

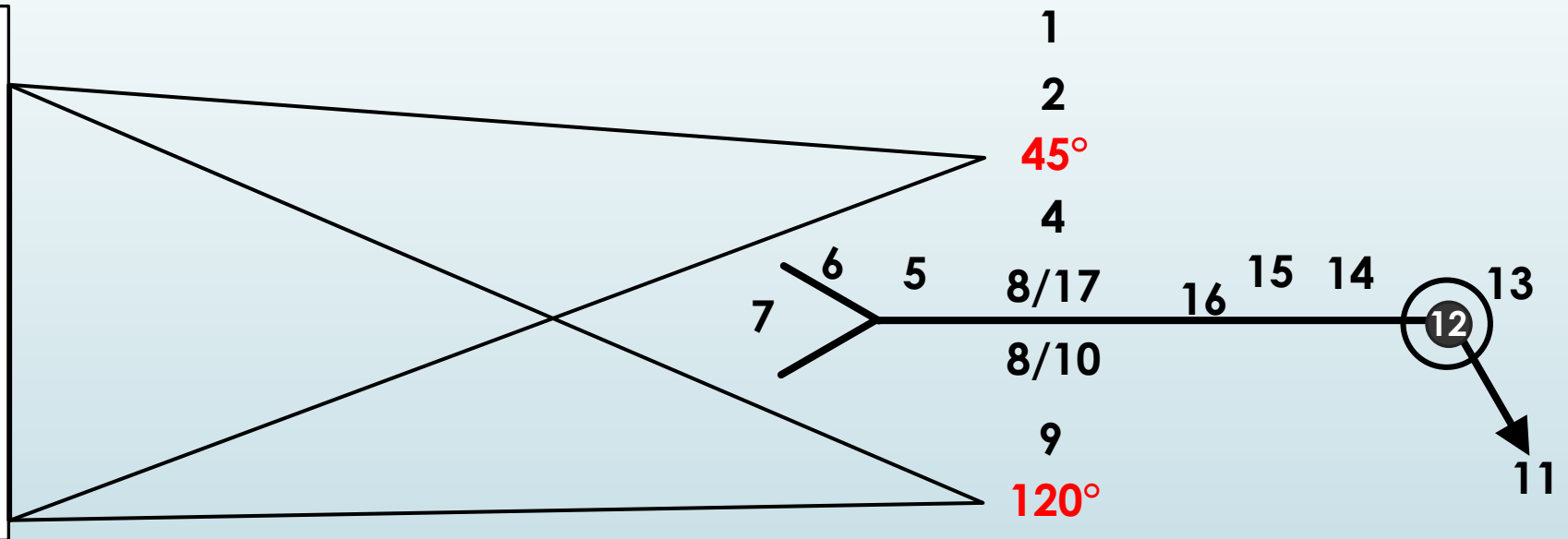
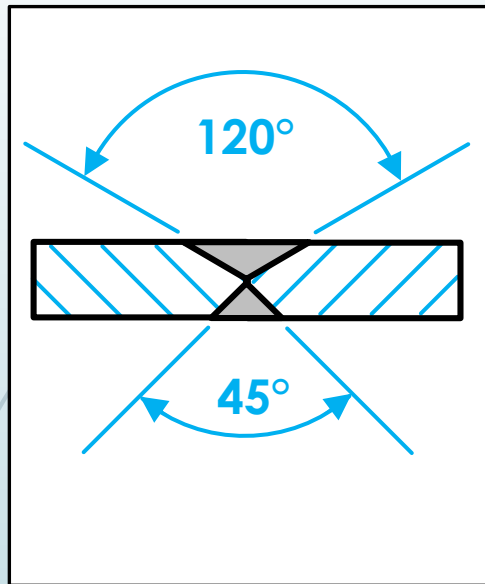
14. Centre-to-centre spacing

15. Length of weld

16. Reference line

17. Weld on other side of
arrow

ELEMENTS OF WELD SYMBOLS



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

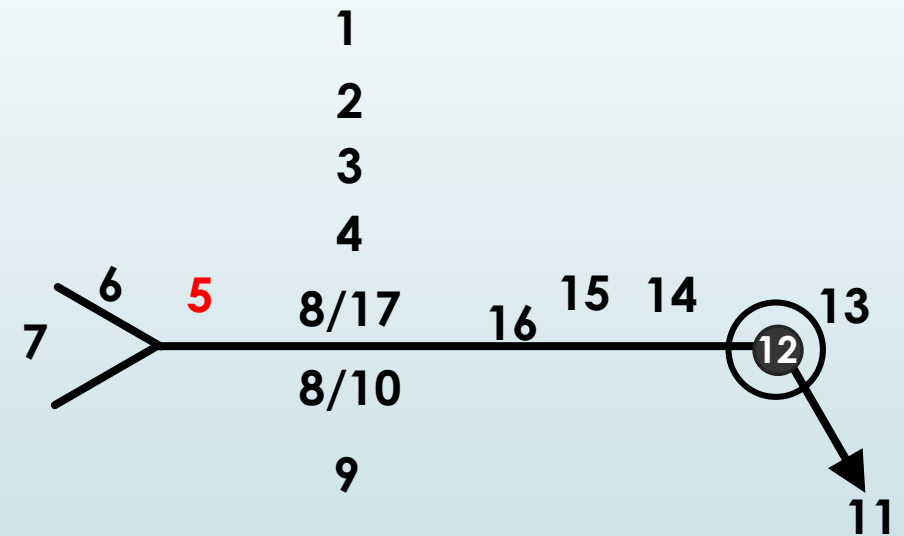
14. Centre-to-centre spacing

15. Length of weld

16. Reference line

17. Weld on other side of
arrow

ELEMENTS OF WELD SYMBOLS



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

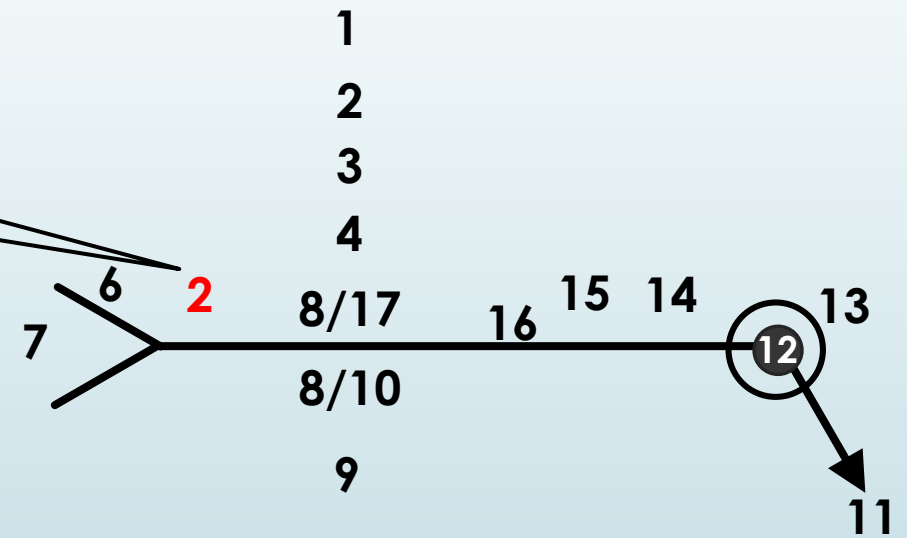
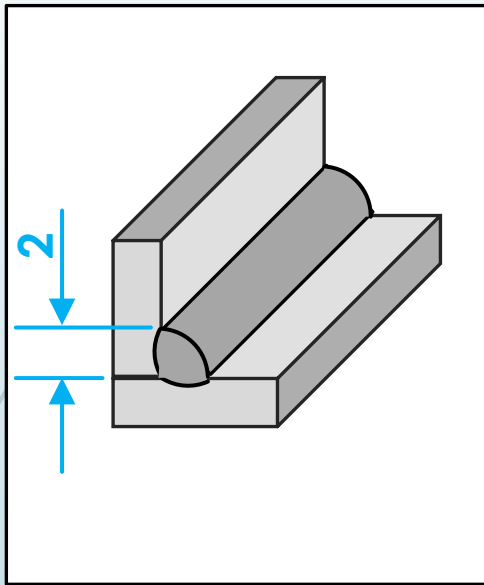
14. Centre-to-centre spacing

15. Length of weld

16. Reference line

17. Weld on other side of
arrow

ELEMENTS OF WELD SYMBOLS



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

14. Centre-to-centre spacing

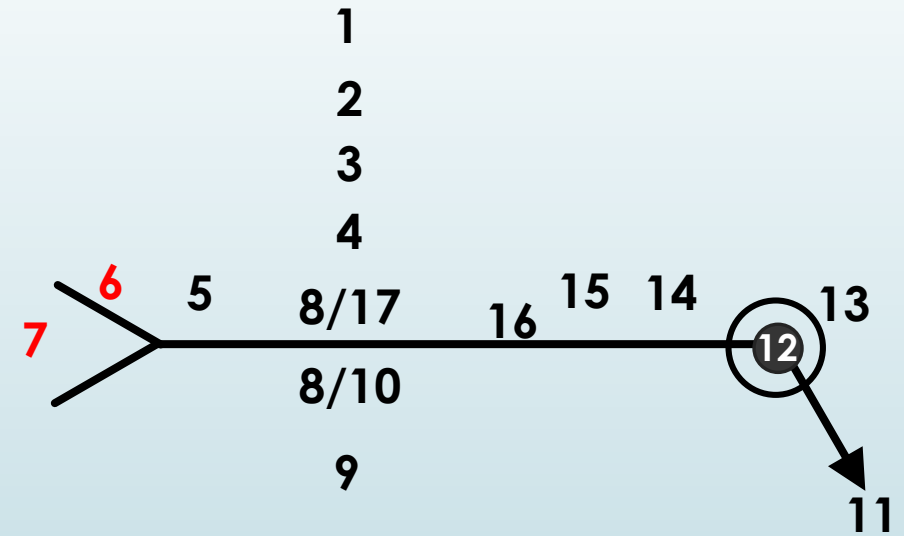
15. Length of weld

16. Reference line

17. Weld on other side of
arrow

ELEMENTS OF WELD SYMBOLS

➡ The annotation at 6 & 7 will occur only if a specified welding process need to be carried out.



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

14. Centre-to-centre spacing

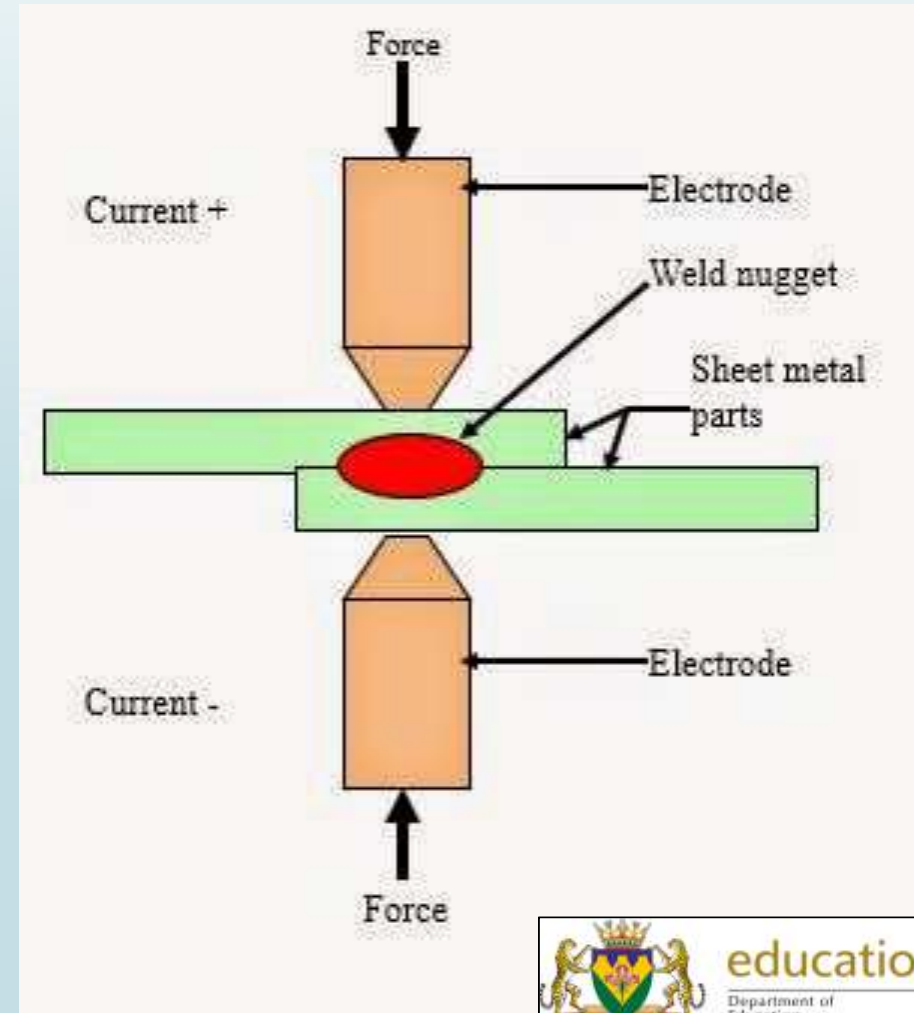
15. Length of weld

16. Reference line

17. Weld on other side of arrow

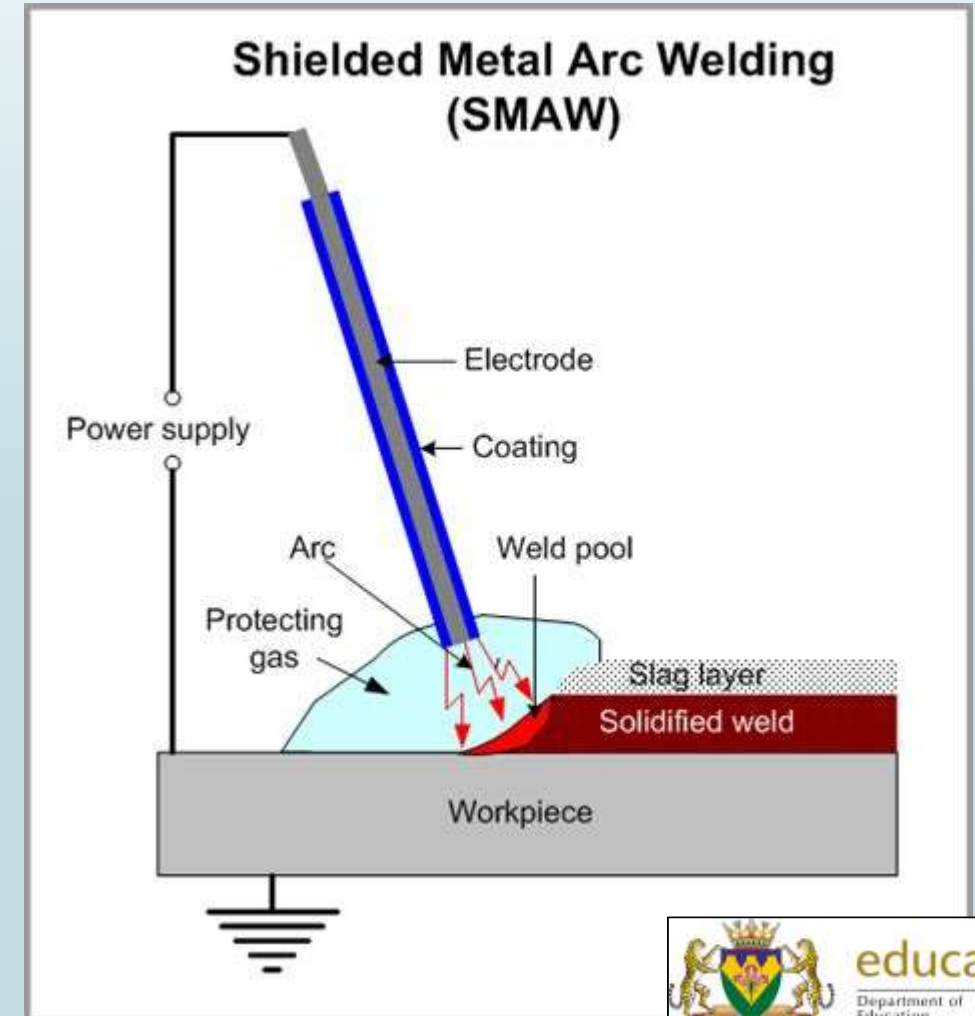
ELEMENTS OF WELD SYMBOLS

- Specified welding process
RSW (Resistance Spot Welding).



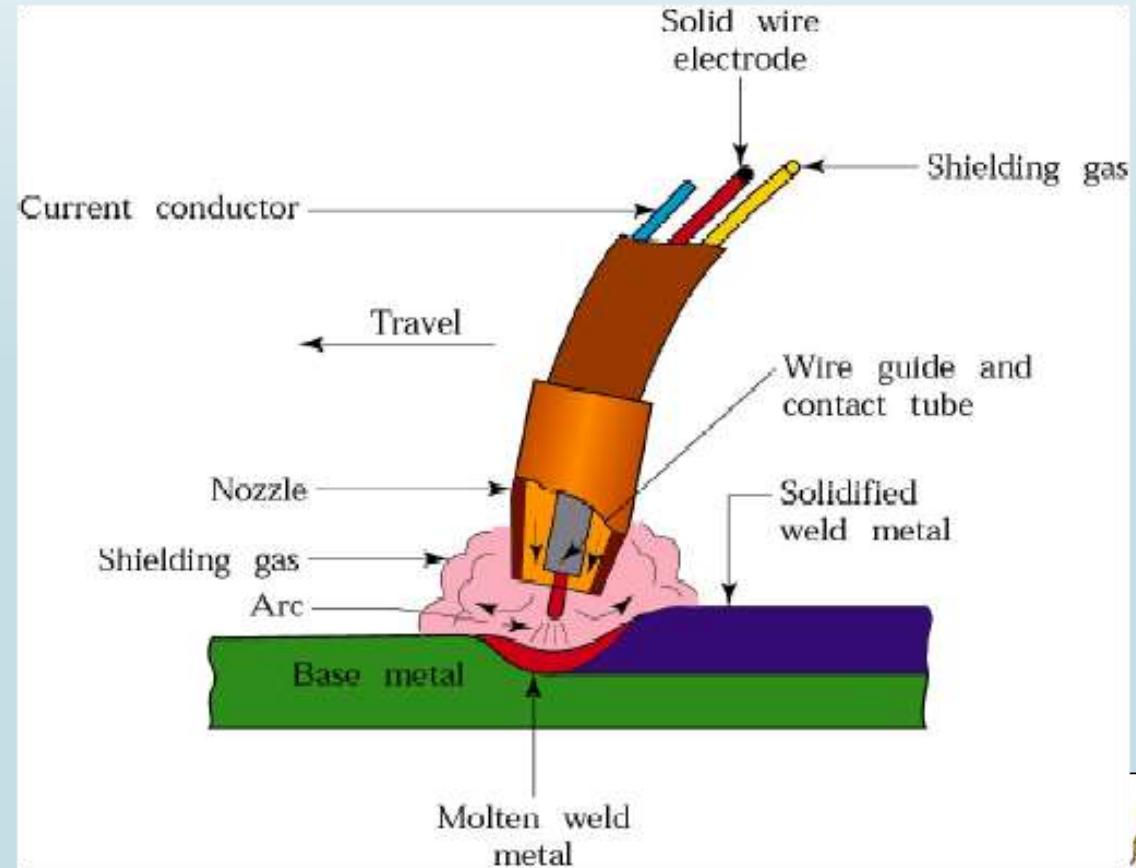
ELEMENTS OF WELD SYMBOLS

- Specified welding process **SMAW** (Shielded Metal Arc Welding).



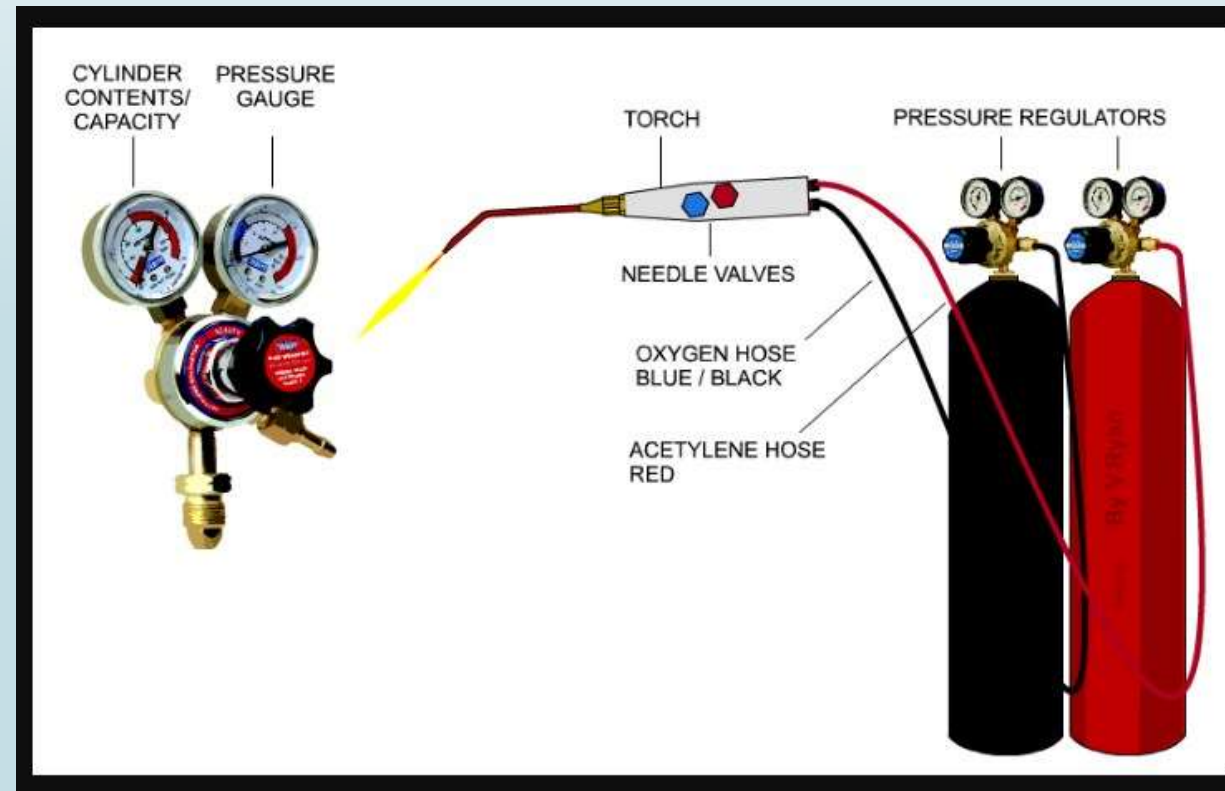
ELEMENTS OF WELD SYMBOLS

- Specified welding process
GMAW (Gas Metal Arc Welding).



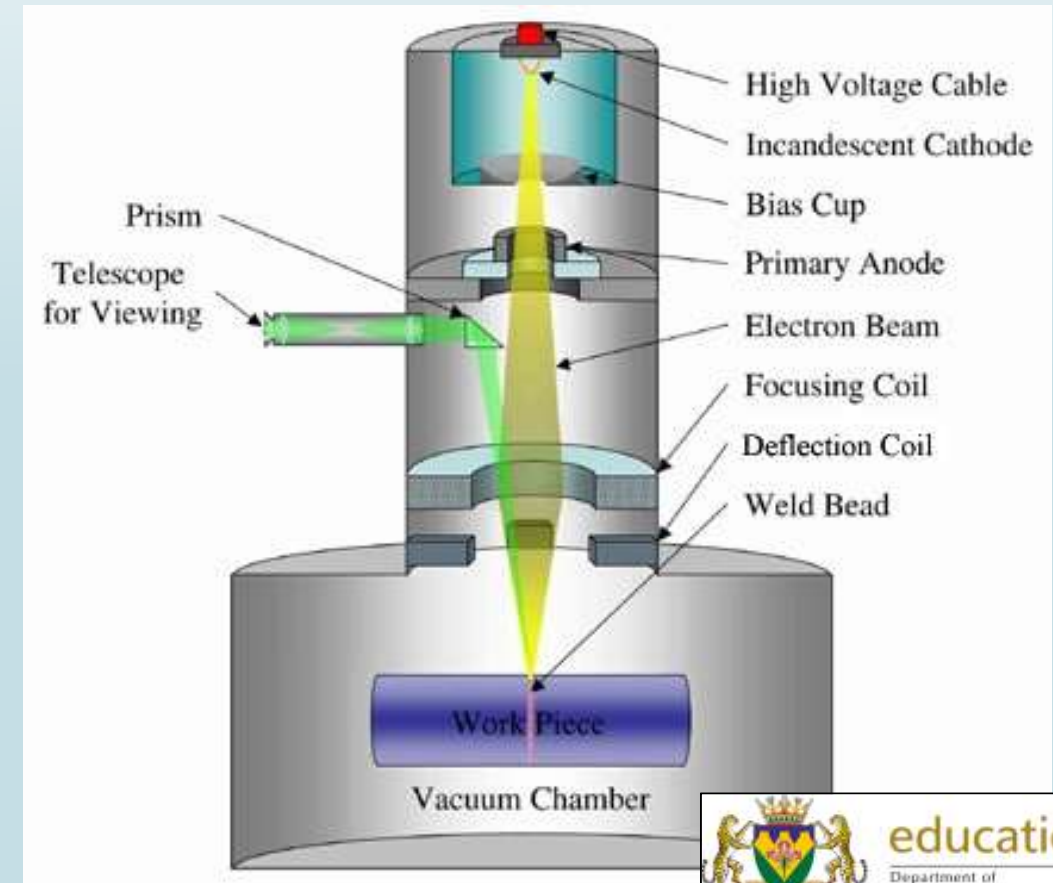
ELEMENTS OF WELD SYMBOLS

- Specified welding process
OFW (Oxy Fuel Welding).



ELEMENTS OF WELD SYMBOLS

- Specified welding process
EBW (Electron Beam Welding).



ELEMENTS OF WELD SYMBOLS

- Specified welding process
UW (Ultrasonic Welding).

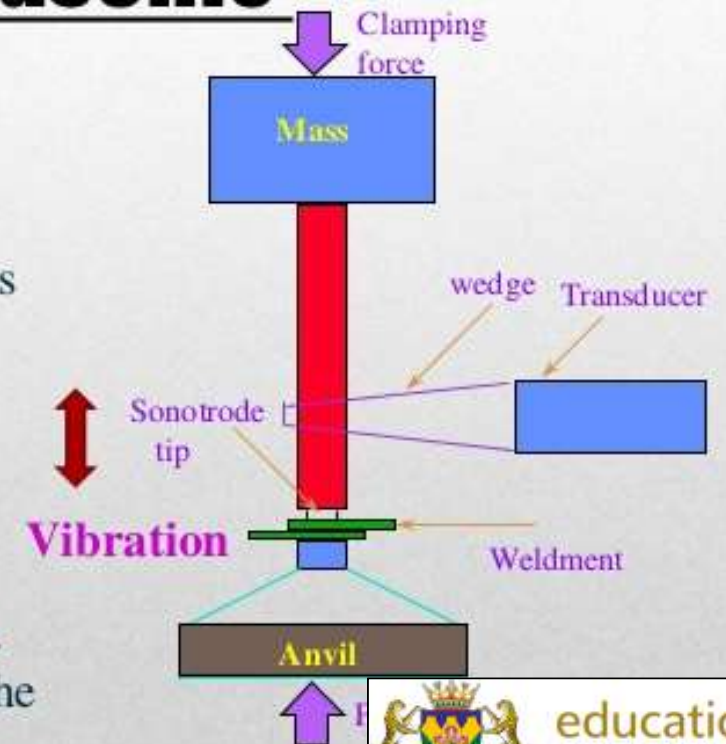
Principle of Ultrasonic Welding

*In US welding, frictional heat produced by the ultrasonic waves and force is used for joining process.

*US waves (15 to 60 kHz) are transferred to the material under pressure with a sonometer.

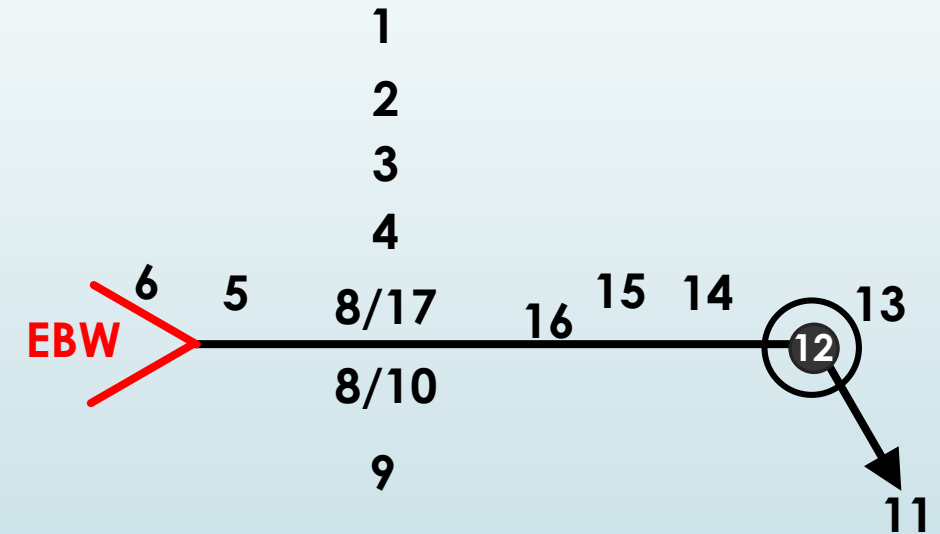
Welding times are lower than 3 s.

*It can proceed with or without the application of external heat.



ELEMENTS OF WELD SYMBOLS

➡ EBW (Electron Beam Welding)..



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

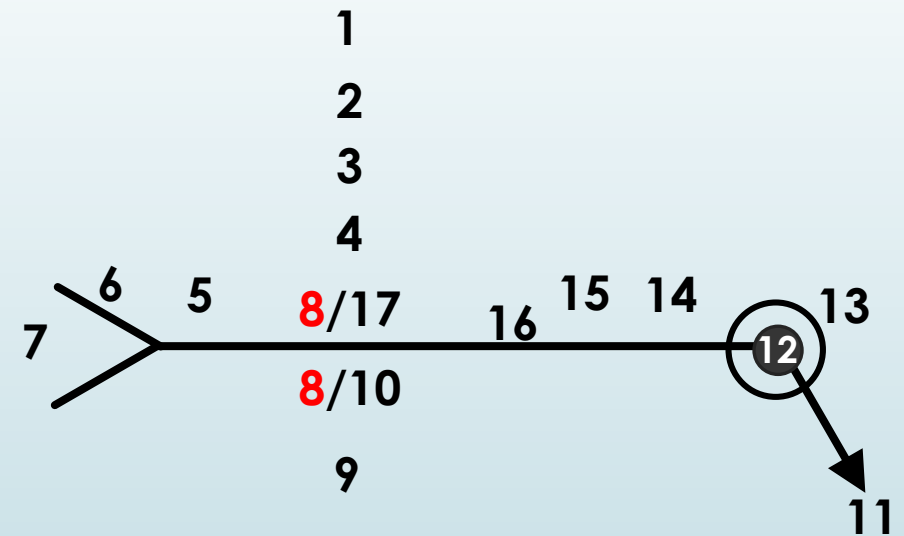
14. Centre-to-centre spacing

15. Length of weld

16. Reference line

17. Weld on other side of
arrow

ELEMENTS OF WELD SYMBOLS



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round



14. Centre-to-centre spacing

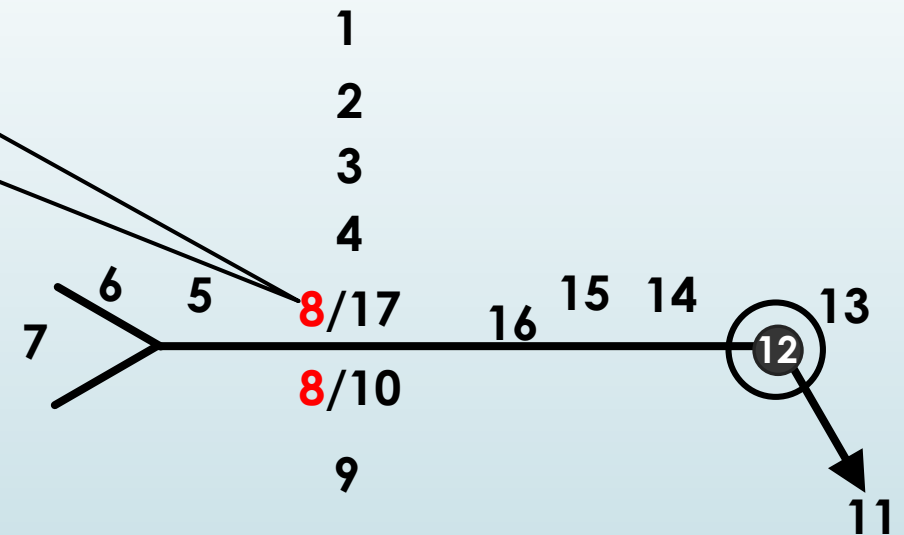
15. Length of weld

16. Reference line

17. Weld on other side of
arrow

ELEMENTS OF WELD SYMBOLS

TYPES OF WELD		
WELD	SECTIONAL VIEW	SYMBOL
SQUARE		



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

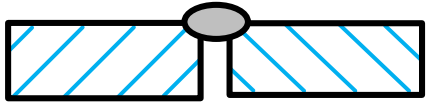

14. Centre-to-centre spacing

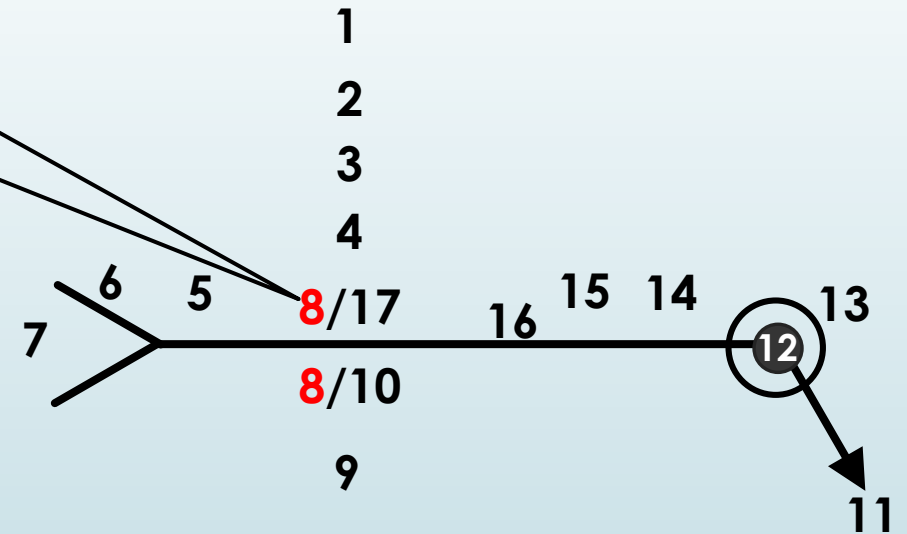
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

TYPES OF WELD		
WELD	SECTIONAL VIEW	SYMBOL
BEAD		



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round



14. Centre-to-centre spacing

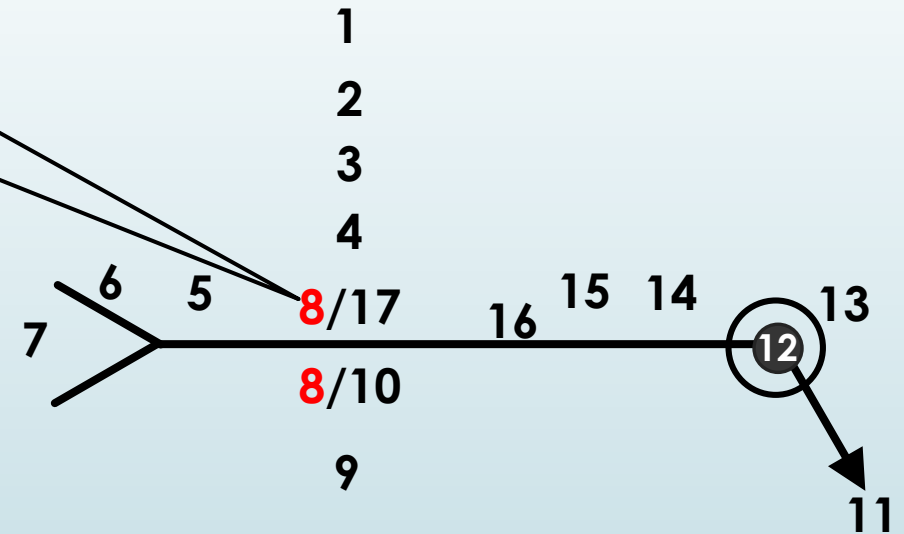
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

TYPES OF WELD		
WELD	SECTIONAL VIEW	SYMBOL
BEVEL		



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round



14. Centre-to-centre spacing

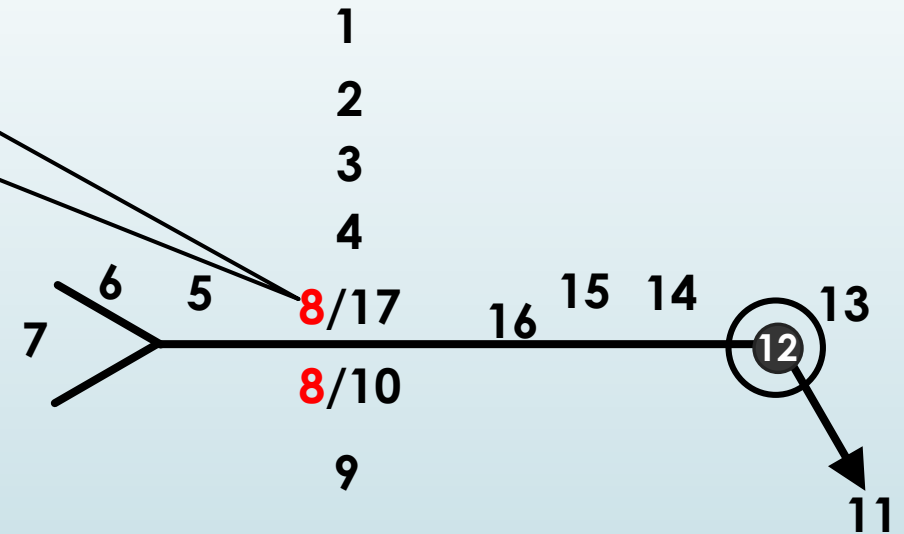
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

TYPES OF WELD		
WELD	SECTIONAL VIEW	SYMBOL
SINGLE-V		



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round



14. Centre-to-centre spacing

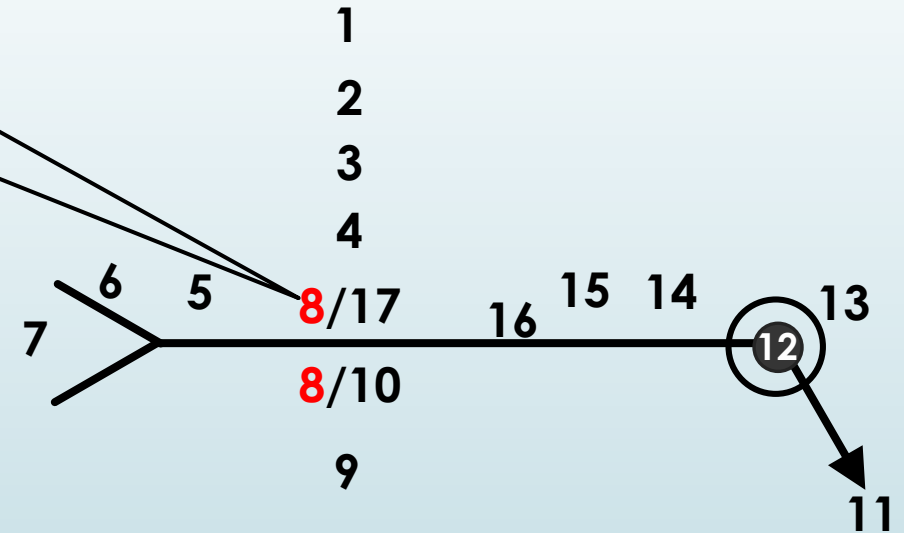
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

TYPES OF WELD		
WELD	SECTIONAL VIEW	SYMBOL
SINGLE-J		



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round



14. Centre-to-centre spacing

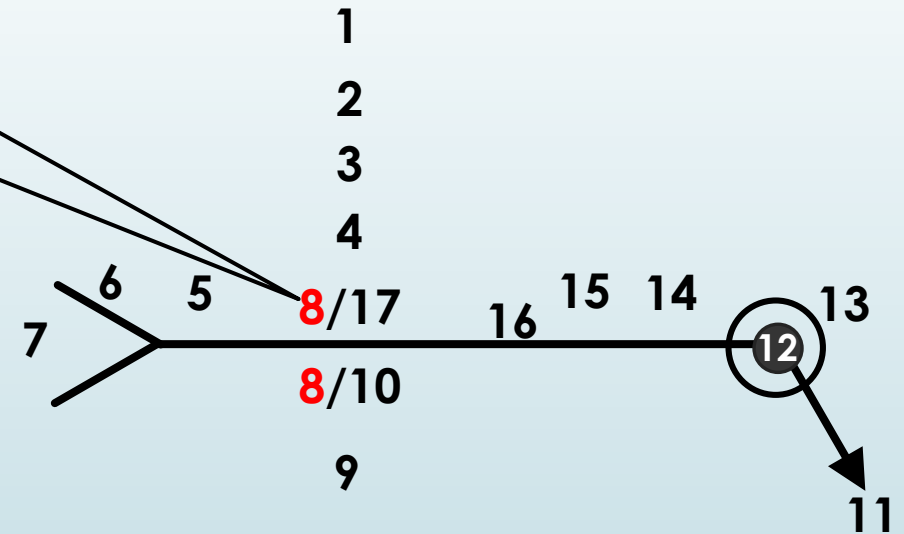
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

TYPES OF WELD		
WELD	SECTIONAL VIEW	SYMBOL
SINGLE-U		



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

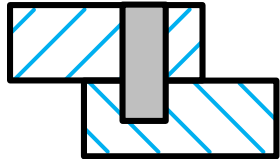

14. Centre-to-centre spacing

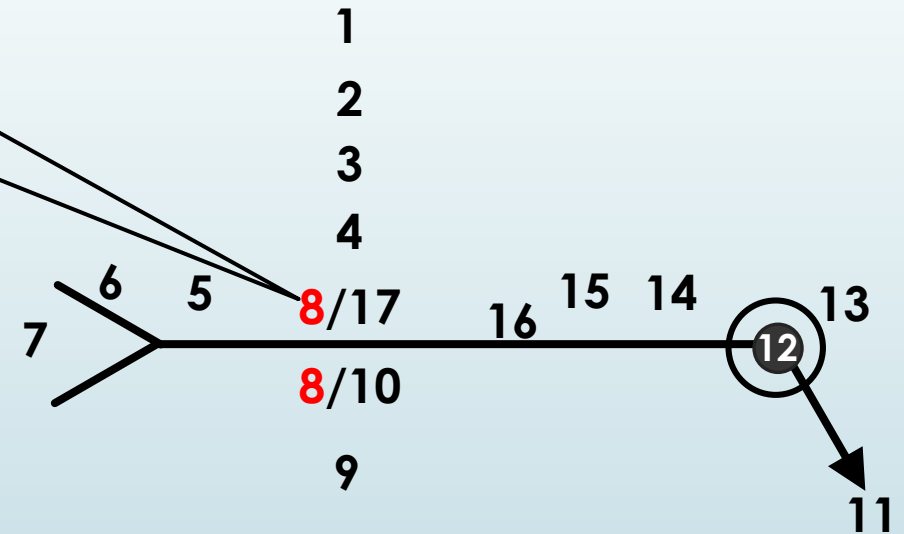
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

TYPES OF WELD		
WELD	SECTIONAL VIEW	SYMBOL
PLUG or SLOT		



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

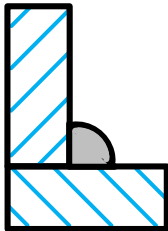

14. Centre-to-centre spacing

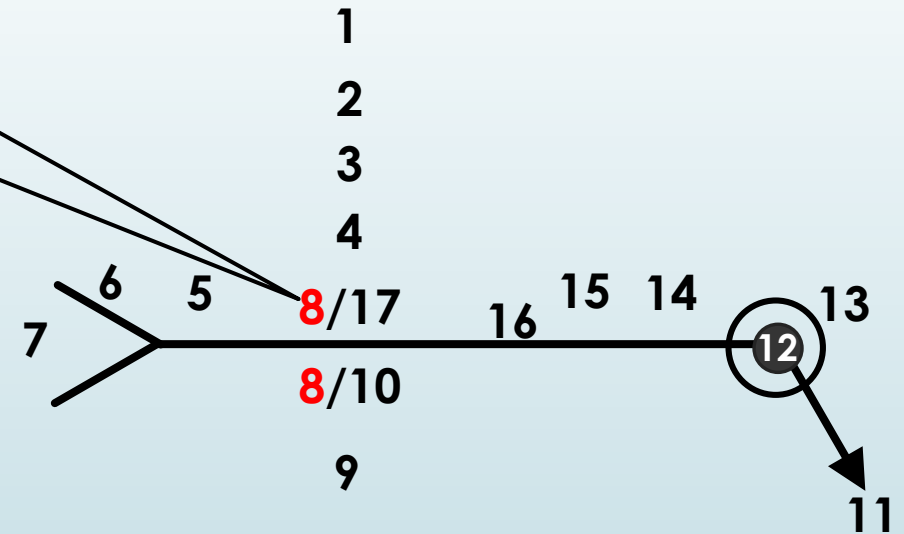
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

TYPES OF WELD		
WELD	SECTIONAL VIEW	SYMBOL
FILLET		



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

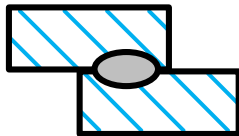

14. Centre-to-centre spacing

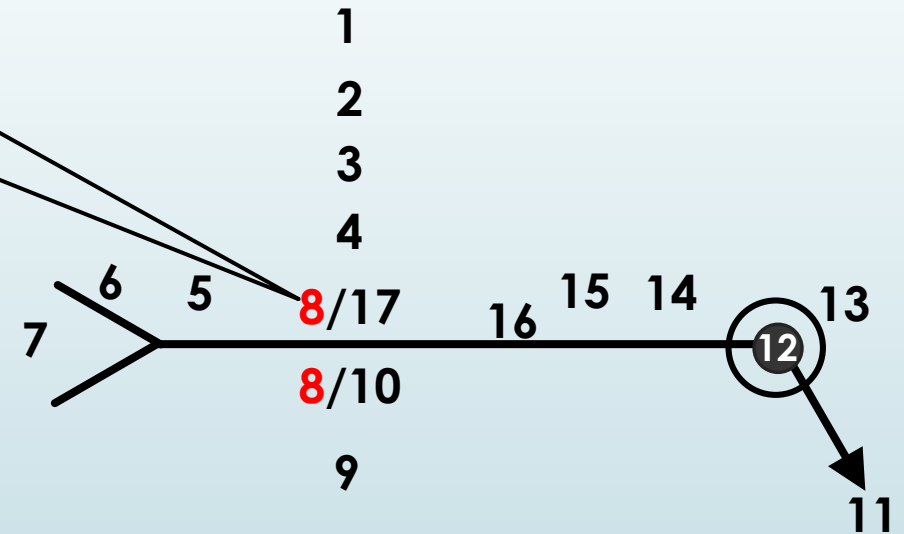
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

TYPES OF WELD		
WELD	SECTIONAL VIEW	SYMBOL
SPOT		



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round


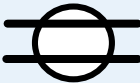
14. Centre-to-centre spacing

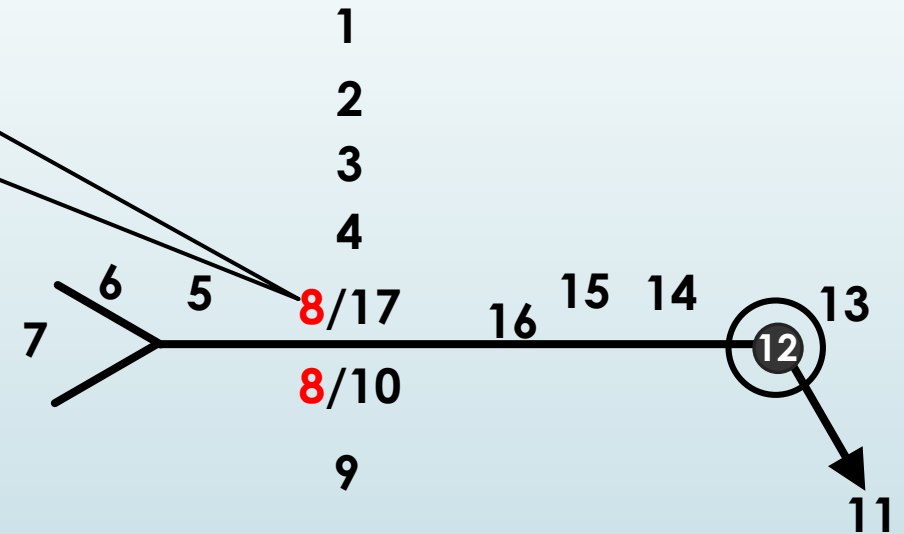
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

TYPES OF WELD		
WELD	SECTIONAL VIEW	SYMBOL
SEAM		



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round



14. Centre-to-centre spacing

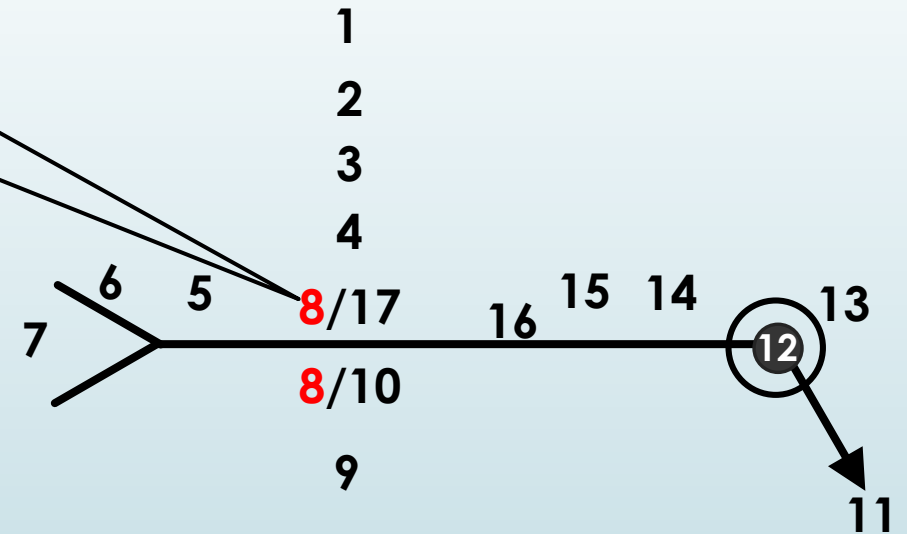
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

TYPES OF WELD		
WELD	SECTIONAL VIEW	SYMBOL
FLASH or UPSET		



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

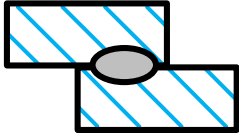

14. Centre-to-centre spacing

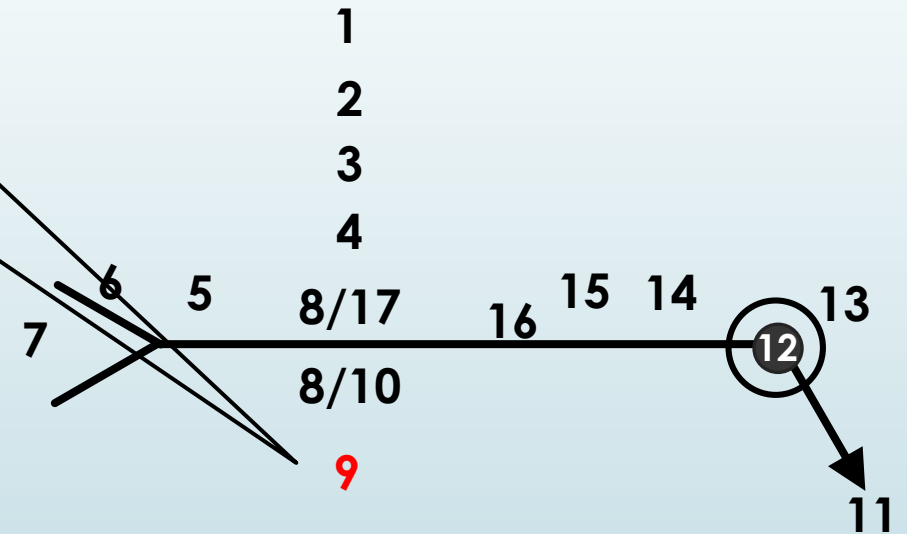
15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS

Number of Spots		
WELD	SECTIONAL VIEW	SYMBOL
SPOT		



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

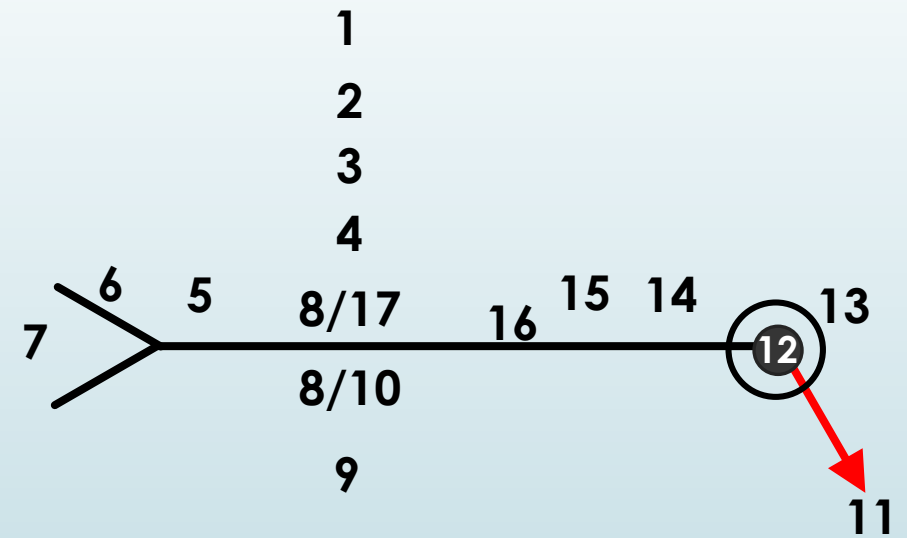
14. Centre-to-centre spacing

15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

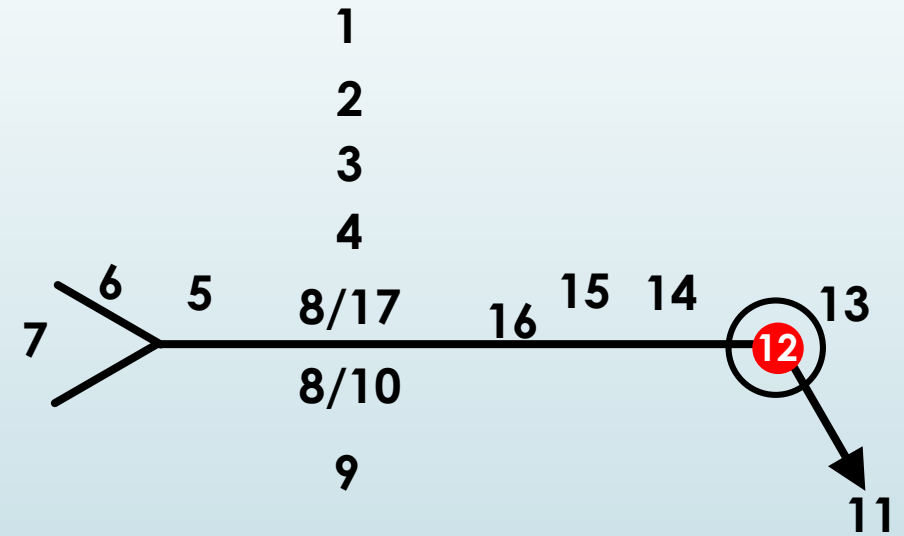
14. Centre-to-centre spacing

15. Length of weld

16. Reference line

17. Weld on other side of
arrow

ELEMENTS OF WELD SYMBOLS



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld (on site)

13. Weld-all-round

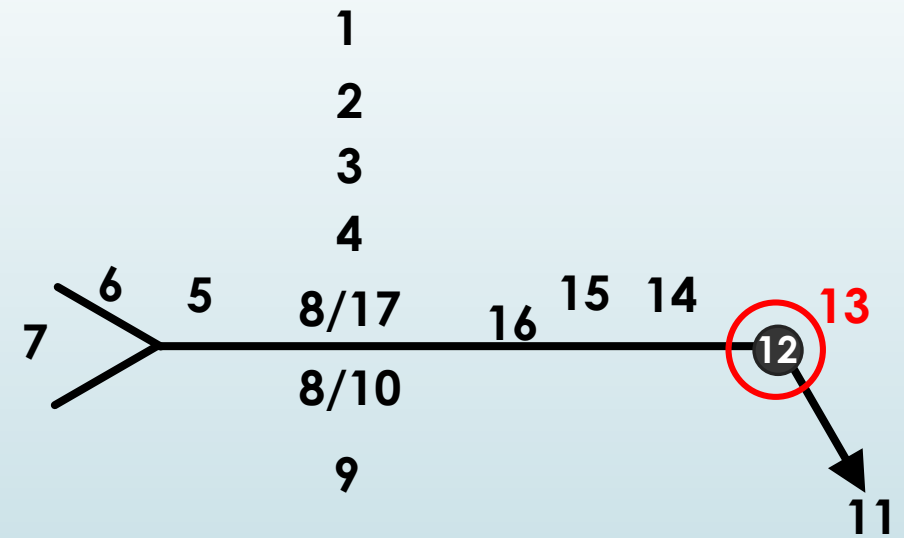
14. Centre-to-centre spacing

15. Length of weld

16. Reference line

17. Weld on other side of
arrow

ELEMENTS OF WELD SYMBOLS



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

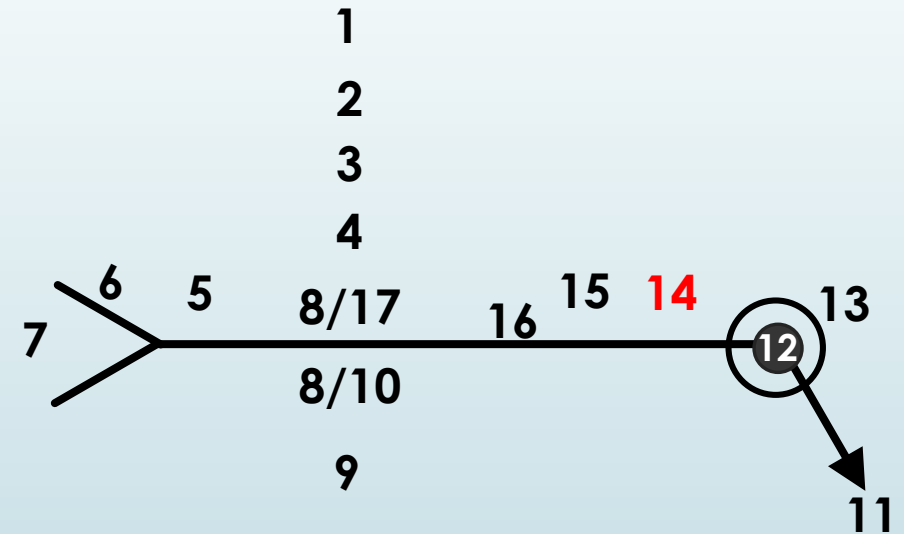
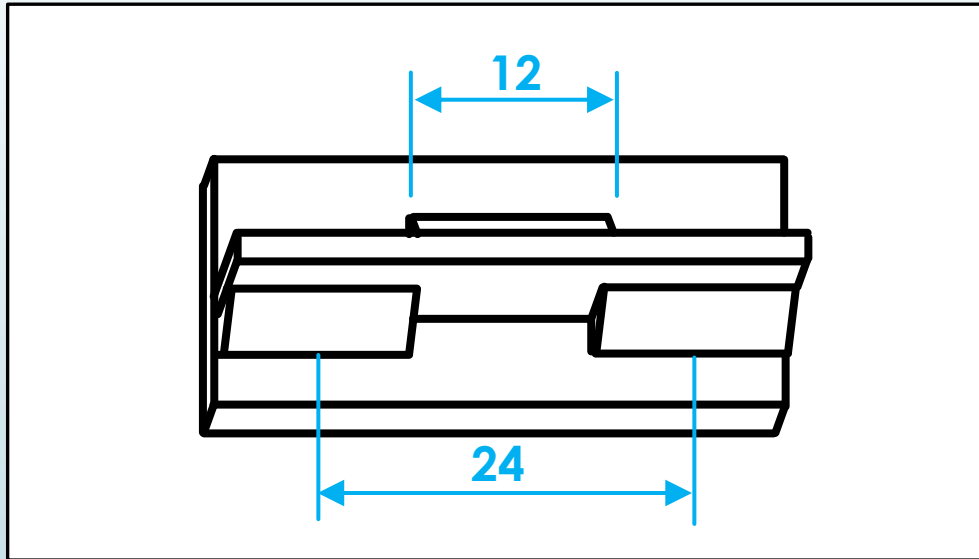
14. Centre-to-centre spacing

15. Length of weld

16. Reference line

17. Weld on other side of
arrow

ELEMENTS OF WELD SYMBOLS



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

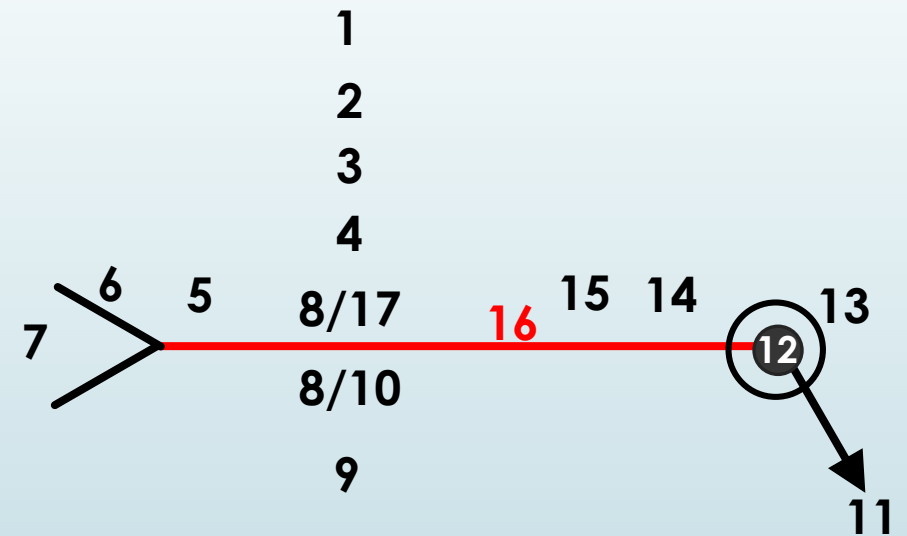
14. Centre-to-centre spacing

15. Length of weld

16. Reference line

17. Weld on other side of arrow

ELEMENTS OF WELD SYMBOLS



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

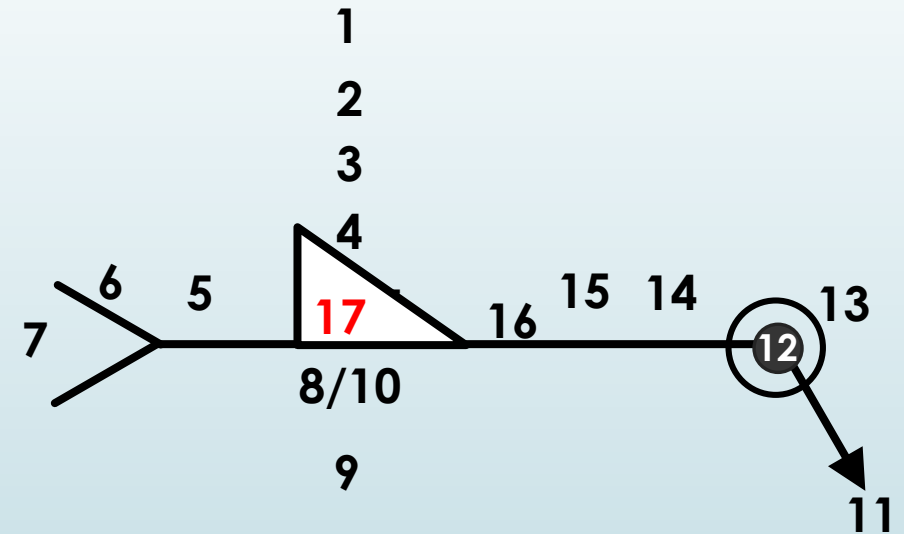
14. Centre-to-centre spacing

15. Length of weld

16. Reference line

17. Weld on other side of
arrow

ELEMENTS OF WELD SYMBOLS



1. Finish symbol

2. Contour symbol

3. Groove angle

4. Root opening

5. Size or strength

6. Tail

7. Welding process

8. Basic weld symbol

9. Number of spots

10. Weld on arrow side

11. Arrow line

12. Field weld

13. Weld-all-round

14. Centre-to-centre spacing

15. Length of weld

16. Reference line

**17. Weld on other side of
arrow**