

Department of Education
SPTVE
Shielded Metal Arc Welding
(SMAW) 9
Acceptable Weld Profile
Quarter 2: Week 5 Module



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1. enumerate the criteria for acceptable weld profiles;
2. illustrate the acceptable fillet weld and butt weld profiles; and
3. appreciate the importance of acceptable weld profiles.



- For an unacceptable weld profiles, the weld was done with _____.
 - undercut
 - no overlaps
 - filled grooves
 - even coarse ripples
- Undercuts shall not exceed to _____.
 - 1/8 in.
 - 1/16 in.
 - 1/32 in.
 - 1/38 in.
- Excess penetration shall be limited to _____.
 - 1/8 in.
 - 1/16 in.
 - 1/32 in.
 - 1/38 in.
- The excess root penetration shall be limited to the lesser of _____.
 - 1/8 in.
 - 1/16 in.
 - 1/32 in.
 - 1/38 in.
- Your weld should be _____.
 - weld cracked
 - slag inclusions
 - with fine ripples
 - with abrupt ripples

- _____ 6. No cracks are permitted.
- _____ 7. Have an undercut that exceeds 1/32 inch.
- _____ 8. Even thickness plate.
- _____ 9. Root surface shall reduce the total thickness of the joint.
- _____ 10. The finished welds are suitable for the proper interpretation of destructive examination.



LOOKING BACK

Directions: Sort the following welding standards to where it belongs, choose your answer in the box below. Write your answer using a separate sheet of paper.

AWS	ASME	API

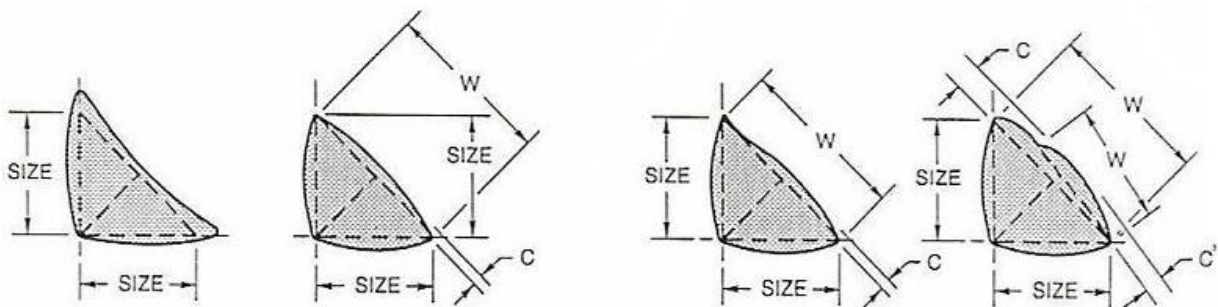
Piping Inspection	Nuclear	Bridge Welding Code
Welded Steel Tanks for Storage	Structural Steel Welding Code	
	Requirements for Power Boilers	



BRIEF INTRODUCTION

The external geometry plays an important role in the acceptability of a weld, since weld geometry is directly related to its load resistance, or nominal load capacity. Two factors that influence the external geometry are weld size and profile. Weld profiles represents the overall geometric configuration of the weld bead.

Two acceptable weld profile according to AWS Structural Welding Code, are shown below.

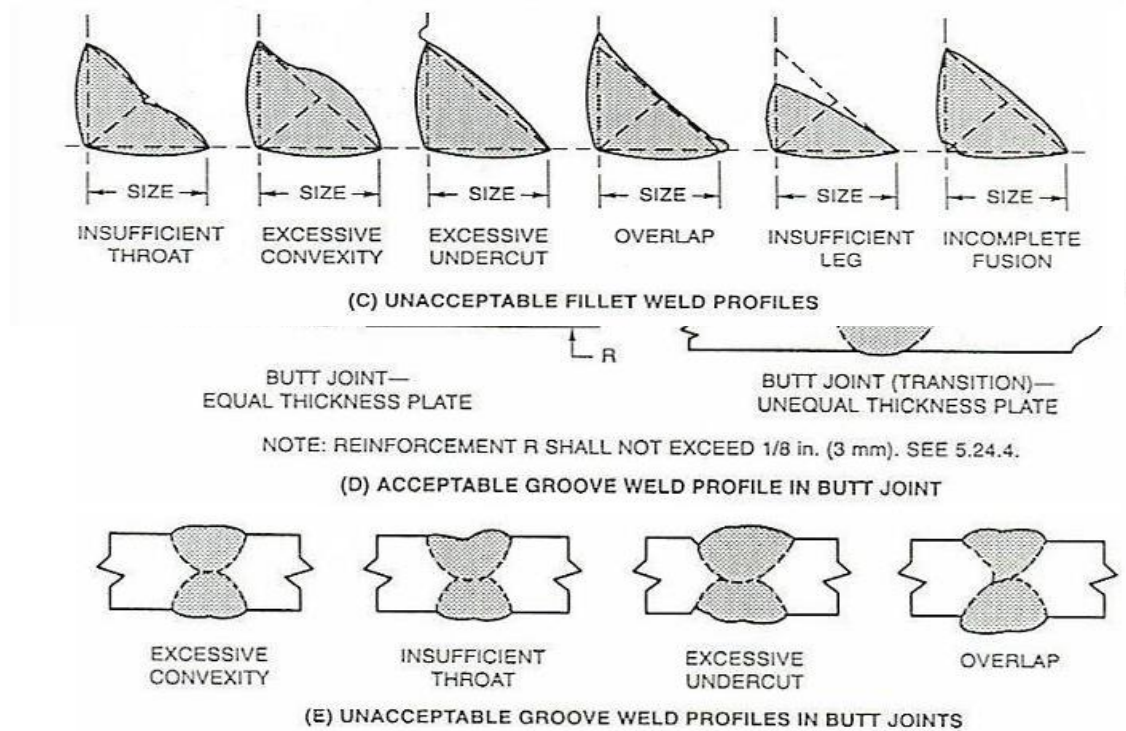


(A) DESIRABLE FILLET WELD PROFILES

(B) ACCEPTABLE FILLET WELD PROFILES

NOTE: CONVEXITY, C, OF A WELD OR INDIVIDUAL SURFACE BEAD WITH DIMENSION W SHALL NOT EXCEED THE VALUE OF THE FOLLOWING TABLE:

WIDTH OF WELD FACE OR INDIVIDUAL SURFACE BEAD, W	MAX CONVEXITY, C
$W \leq 5/16$ in. (8 mm)	1/16 in. (1.6 mm)
$W > 5/16$ in. TO $W < 1$ in. (25 mm)	1/8 in. (3 mm)
$W \geq 1$ in.	3/16 in. (5 mm)



ACCEPTANCE CRITERIA FOR COMPLETED WELDS

1. Butt Welds

- a. No cracks are permitted.
- b. As-welded surfaces are permitted; however, the surface of welds shall be sufficiently free from coarse ripples, grooves, overlaps, abrupt ridges, undercut, and valleys.
- c. The surface condition of the finished welds shall be suitable for the proper interpretation of radiographic and other nondestructive examinations when nondestructive examinations are required. In those cases where there is a question regarding the surface condition on the interpretation of a radiographic film, the film shall be compared to the actual weld surface for interpretation and determination of acceptability.
- d. Undercuts shall not exceed 1/32 in. and shall not encroach on the minimum required section thickness.
- e. For single-welded joints (i.e., butt joints welded from one side), concavity of the root surface shall not reduce the total thickness of the joint, including reinforcement, to less than the nominal thickness of the thinner component being joined. (This applies only when inside surface of the weld is readily accessible or the weld has been radiographed.)
- f. For single welded joints, the excess root penetration shall be limited to the lesser of 1/8 in. or 25 % of the nominal wall thickness of the thinner component being joined, down to 1/4 in. wall thickness. For any nominal wall thickness less than 1/4 in., the excess penetration shall be limited to 1/16 in. (applies only when inside surface of the weld is readily accessible or the weld has been radiographed).

- g. Weld reinforcement greater than the amounts specified in the weld reinforcement table shall be considered unacceptable.

2. Socket and Fillet Welds

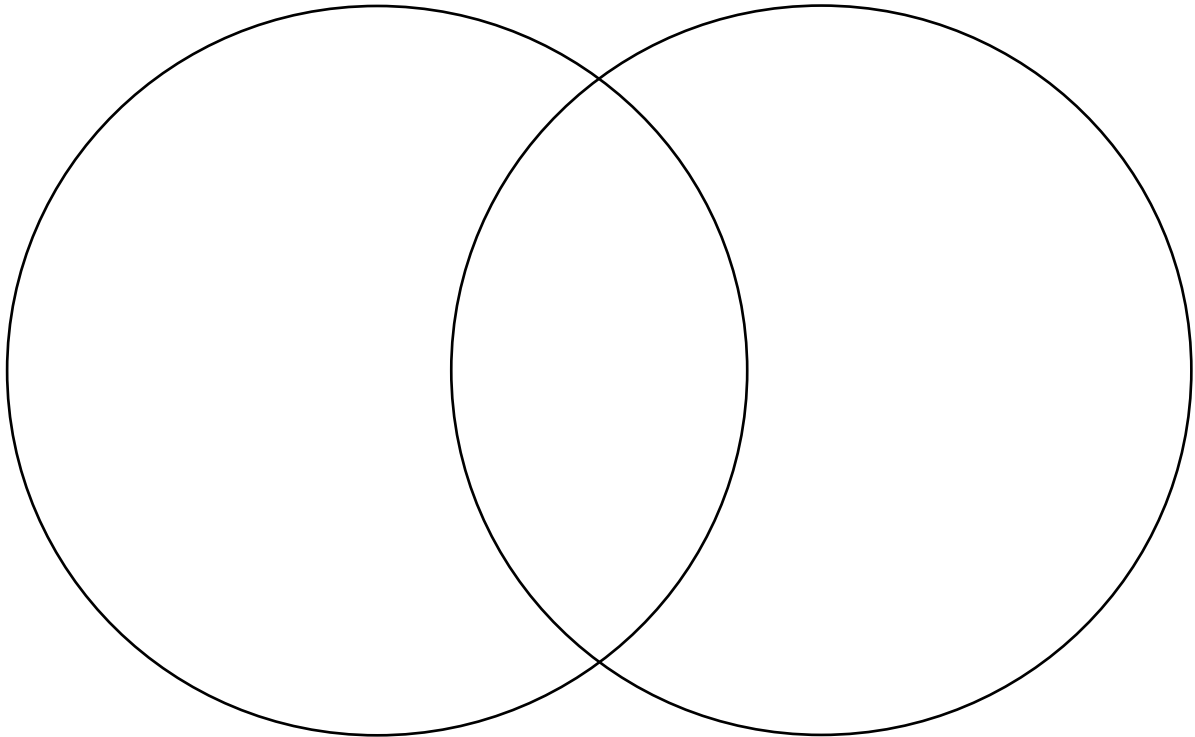
- a. As-welded surfaces are permitted; however, the surface of welds shall be sufficiently free from coarse ripples, grooves, overlaps, abrupt ridges, undercut, and valleys.
- b. The surface condition of the finished welds shall be suitable for the proper interpretation of nondestructive examinations.
- c. Socket and fillet welds may vary from convex to concave.



ACTIVITIES

- A. Directions:** Illustrate the acceptable fillet weld and butt weld profiles.
Use long bond paper for your drawing.

C. Directions: Using the Venn Diagram, enumerate the criteria for acceptable butt weld and fillet weld. Use a separate sheet of paper for your answer.



REMEMBER

- Weld profiles represents the overall geometric configuration of the weld bead.
- It is the responsibility of both the welder and welding inspector to assess the acceptability of a weld. Visual inspection and weld gages are two simple inspection tools that should be used during the fabrication of a welded structure to provide a rapid assessment of the weld size and general profile.

[illegible]

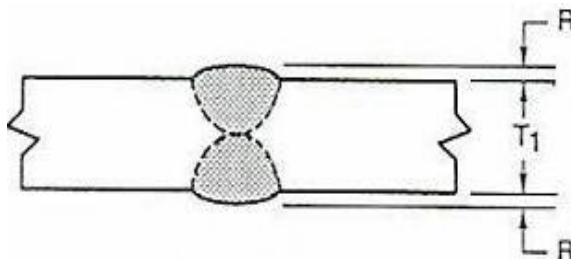
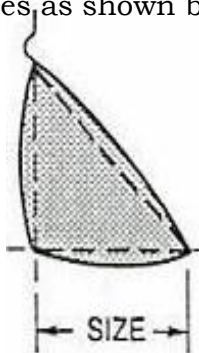


POST TEST

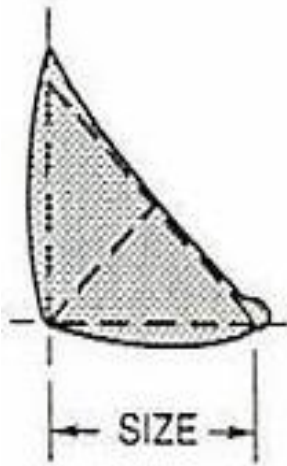
Directions: Write TRUE if the statement is correct and change the underlined word if the statement is false. Use separate paper for your answer sheet.

1. Weld should be free from coarse ripples, grooves, overlaps, abrupt ridges, undercut, and valleys.
2. Undercuts shall not exceed 1/8 in. and shall not encroach on the minimum required section thickness.
3. Concavity of the root surface shall be equal the total thickness of the joint.
4. The excess root penetration shall be limited to the lesser of 1/32 in. or 25% of the nominal wall thickness of the thinner component being joined, down to 1/4 in. wall thickness.
5. The excess penetration shall be limited to 1/16 in.
6. The surface condition of the finished welds shall be suitable for the proper interpretation of nondestructive examinations.
7. Socket and fillet welds may vary from convex to concave.
8. Weld reinforcement greater than the amounts specified in the weld reinforcement table shall be considered unacceptable.
9. In cases where there is a question regarding the surface condition on the interpretation of a radiographic film, the film shall be compared to the actual weld surface for interpretation and determination of acceptability.
10. When inside surface of the weld is readily accessible, or the weld has been radiographed.

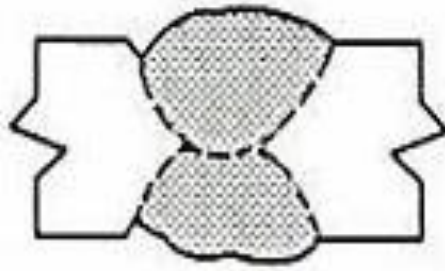
B. Directions: Write acceptable weld or unacceptable weld by examining the weld profiles as shown below. Write your answer in a separate sheet of paper.



1. _____



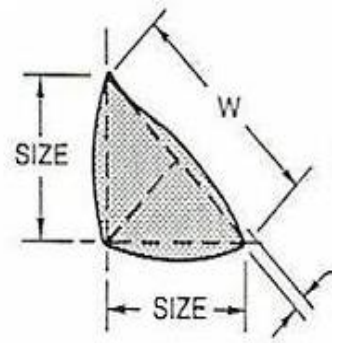
2. _____



3. _____

4. _____

5. _____



REFERENCES:

Public Technical Vocational Schools, COMPETENCY-BASED LEARNING MATERIAL, Third Year, Shielded Metal Arc Welding [Department of Education 2008]

Welding Technology, 2nd Edition, Gower A. Kennedy

Welding Guide Fabrication Shop, Ismael V. Palabrica

Metal Works 1, SEDP Series, Industrial Technology

Basic Manual Metal Arc Welding, National Training Center for Technical Education and Staff Development

Welding Principles and Applications, Larry Jeffus and Harold V. Johnson

Key to Correction

10. X
9. X
8. /
7. X
6. /
5. A
4. B
3. A
2. C
1. A
Pretest

15. ACCEPTABLE WELD
14. UNACCEPTABLE WELD
13. UNACCEPTABLE WELD
12. ACCEPTABLE WELD
11. UNACCEPTABLE WELD
10. TRUE
9. TRUE
8. TRUE
7. TRUE
6. TRUE
5. TRUE
4. 1/8 IN.
3. SHALL NOT REDUCE
2. 1/32 IN.
1. TRUE
Posttest