

**JOB SPECIFICATION  
AND  
SKILL TEST**

9/98

**JOB TITLE** : Arc Welder (1G and 1F), L - 1  
**SECTOR** : Mechanical Engineering  
**SUB-SECTOR** : Fabrication/Welding

**COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING  
NATIONAL SKILL TESTING BOARD  
KATHMANDU, NEPAL  
2001(2057/058)**

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## The National Skill Standards and Test was revised by :

1. Mr. Rabindra Nath Bhattarai	Co-ordinator	Society of Mechanical Engineers Nepal.
2. Mr. Harihar Thapaliya	Member	Director, Skill Testing Division, CTEVT
3. Dr. Bhakta Bahadur Ale	Member	Associate Professor IOE, Pulchock
4. Mr. Chudamani Upadhyaya	Member	Senior Instructor IOE, Thapathali Campus
5. Mr. Rajan Basnet	Member	Trade Incharge Sanothimi Technical School
6. Mr. Suresh Bhaila	Member - Secretary	Skill Testing Officer CTEVT, Skill Testing Division.

Approved by the Tripartite National Skills Testing Board.  
2001 (2057/058)

## TASK SPECIFICATION

1.	<b>JOB TITLE</b>	:Arc Welder (1G and 1F)
	<b>LEVEL</b>	: 1
2.	<b><u>JOB DESCRIPTION :</u></b>	
	Arc Welder (1G and 1F) selects metal (3mm and above), marks out, cuts metal to be arc welded, trims and shapes joints, pre-sets, and secures parts using clamps. Selects and operates appropriate arc-welding equipment (down hand weld), cleans, smooth welds, and examines visually.	
3.	<b><u>LIST OF TASK :</u></b>	
	<ol style="list-style-type: none"> <li>1. Selecting and preparing metal by cutting, trimming, and shaping</li> <li>2. Setting the arc-welding machine</li> <li>3. Operating welding machine</li> </ol>	
4.	<b>QUALIFYING NOTES (ENTRY REQUIREMENTS, etc.):-</b>	
	<b>PHICYSICAL REQUIREMENTS :</b> Normal Health.	
	<b>EDUCATIONAL REQUIREMENTS :</b> Able to read and write. Understand specification and interpret manufacturer's or workshop manual.	

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## TASK SPECIFICATION

5	<p><b>TASK NO : 1</b></p> <p><b>Selecting and preparing metal by cutting, trimming, and shaping</b>      <b>JOB TITLE : Arc Welder (1G and 1F), L - 1</b></p>
6	<p><b><u>TASK ELEMENTS</u></b></p> <p>1.1      Receives and follows verbal/written instructions.</p> <p>1.2      Uses protective clothing.</p> <p>1.3      Selects metal to be welded (rejects damaged metal) as specified.</p> <p>1.4      Marks out and cuts square or angle as specified.</p> <p>1.5      Shapes and trims joints as specified for welding.</p> <p>1.6      Pre-sets and clamps metal as required for welding</p>

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## TASK SPECIFICATION

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### TASK PERFORMANCE REQUIREMENTS

Mild steel plates, various structural steel sections including angle iron, channels, bars, and I-sections of thickness 3mm and above, mild steel pipes of thickness up to 5mm, square, scribe, protractor, hacksaw, measuring tape, steel ruler, flat files (coarse), G-clamps, vice, bench hammer, welding table, safety goggles, leather apron, sleeves, gloves, portable grinder, stool.

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### TASK PERFORMANCE STANDARDS

- Metal selected according to instruction, damaged metal reported.
- Metal marked out, cut square or angle within tolerance of  $\pm 0.5$  mm of the scribed line using hacksaw as instructed.
- Butt and V-joints prepared as instructed. Gap between joints 1 - 2 mm maintained at in case of metal 6 - 15 mm thick, joints bevelled to 30 degree  $\pm 5$  degree (single V), gap 2 - 3, nose 2 - 3 mm.
- Lap and T - joint: no preparation.
- Work pre-set to minimize distortion, work clamped with appropriate clamping devices.
- Cleanliness and related safety precautions observed.

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<b>TASK TRAINING DATA</b>					
TASK NO.	T.E. NO.	TECHNICAL KNOWLEDGE	APPLIED CALCULATION	GRAPHIC INFORMATION	SAFETY & HYGINE
1.	3.	Use of protective clothing, i.e. gloves, leather aprons, sleeves.			First aid: practicing and reporting.
	4.	Identification of mild steel. Ability to identify and reject damaged materials.			Use of safety goggles.
	5.	Care and use of steel ruler/tape, square, scribe, various types of chisels and slides, G-clamp and welding tongs, bench hammer, center punch.	Use of metric and imperial system.		Hazards involved in using cutting tools and mushroomed chisels.
	6.	Identification of butt, lap and T-welded joints and their preparation and care. Use of hand tools i.e. hacksaw, files, angular grinder.			Safety clamping.
	7.	Ability to anticipate distortion. Pre-sets work by tack welding.			

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## TASK PERFORMANCE TEST (Skill assessment)

11	<p><b>TASK TITLE :</b> Selecting and preparing metal by cutting, trimming, and shaping</p> <p><b>TASK NO :</b> 1</p>	<p><b>LOCATION OF TEST:</b></p> <p><b>CANDIDATE'S NAME :</b></p> <p><b>EVALUATORS' NAME :</b></p>	
12	<p><b>TEST FACTORS AND ITEMS</b></p>	<p><b>STANDARD MET</b></p>	<p><b>STANDARD NOT MET (Comments)</b></p>
	<p><u>Did the Candidate ?</u></p> <p>1.1. Dress in appropriate safety clothing.</p> <p>1.2. Select appropriate materials.</p> <p>1.3. Report damaged materials.</p> <p>1.4. Mark out, cut square or at an angle within <math>\pm 5</math> mm of the scribed line.</p> <p>1.5. Prepare joints according to instructions. Butt joint, gap between joint 1 - 2 mm file/hacksaw used for preparation metal from 6 - 15 mm. Joints bevelled to 30 degree <math>\pm 5</math> degrees, (single V), gap 2 - 3 mm, nose 2 - 3 mm.</p> <p>1.6. Pre-set and clamp metal on welding table/vice.</p> <p>1.7. Observe related safety precautions.</p> <p>1.8. Complete the test within specified time.</p>		

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**TASK SPECIFICATION**

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**TASK NO : 2**  
**Setting the arc welding machine**

**JOB TITLE : Arc Welder (1G and 1F), L - 1**

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**TASK ELEMENTS**

- 2.1 Determines the capacity of the arc welding machine required.
- 2.2 Sets the proper ampere required.
- 2.3 Connects and clamps earth cable.
- 2.4 Selects and clamps appropriate electrodes.
- 2.5 Switches on the arc welding machine and fume extractor.

- Appropriate arc welding machine selected
- Ampere set appropriately
- Earth cable clamped tight to welding table or vice
- Specified electrode selected and clamped
- Arc welding machine and fume extractor power cables connected and power switched on
- Cleanliness and related safety precautions observed

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**TASK SPECIFICATION**

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**TASK PERFORMANCE REQUIREMENTS**

Arc welding machine (minimum 150 amperes capacity), complete power and welding cable, rutile and basic electrodes, leather apron, sleeves, gloves, fume extractor, de-slagging hammer, wire brush, helmet/hand shield, 2 G-clamps, welding table.

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**TASK PERFORMANCE STANDARDS**

- Appropriate arc welding machine selected.
- Ampere set appropriately.
- Earth cable clamped tight to welding table or vice.
- Specified electrode selected and clamped.
- Arc welding machine and fume extractor power cables connected and power switched on.
- Cleanliness and related safety precautions observed.

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## TASK TRAINING DATA

TASK NO.	T.E. NO.	TECHNICAL KNOWLEDGE	APPLIED CALCULATION	GRAPHIC INFORMATION	SAFETY & HYGINE
2.		<ol style="list-style-type: none"> <li>1. Identification of arc welding transformers, their basic maintenance, capacity and use.</li> <li>2. Selection of required ampere and setting according to types and size of materials and electrode.</li> <li>3. Knowledge of making good contact for earth clamp.</li> <li>4. Knowledge of using different types and sizes of electrodes, appropriate storage, and handling welding errors and their prevention.</li> <li>5. Knowledge of connecting power and outlet cables correctly.</li> </ol>			<p>First aid: practicing and reporting.</p> <p>Electrical hazards involved in using electrical welding machine.</p> <p>Welding hazards near inflammable materials.</p> <p>Toxic welding fumes and their hazards.</p> <p>Action incase of fire.</p>

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TASK PERFORMANCE TEST (Skill assessment)			
11	<b>TASK TITLE :</b> Setting the arc welding machine <b>TASK NO :</b> 1		<b>LOCATION OF TEST:</b>  <b>CANDIDATE'S NAME :</b>  <b>EVALUATORS' NAME :</b>
12	<b>TEST FACTORS AND ITEMS</b>	<b>STANDARD MET</b>	<b>STANDARD NOT MET (Comments)</b>
	<u>Did the Candidate ?</u>  2.1 Dress in appropriate safety clothing. 2.2 Select arc welding transformer with suitable capacity. 2.3 Select the appropriate ampere setting. 2.4 Connect and clamp earth cable to welding table or vice. 2.5 Select and clamp appropriate electrode. 2.6 Connect arc welding machine and fume extractor power cable firmly and switch on power supply. 2.7 Observe related safety precautions. 2.8 Complete the test within specified time.		

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## TASK SPECIFICATION

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**TASK NO : 3**

**Operating welding machine**

**JOB TITLE : Arc Welder (1G and 1F), L - 1**

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**TASK ELEMENTS**

- 3.1 Tack welds pre-set work.
- 3.2 Performs down hand (flat position) welding to produce required butt joint.
- 3.3 Performs down hand (flat position) welding to produce required edge joint.
- 3.4 Performs down hand (flat position) welding to produce required T joint.
- 3.5 Performs down hand (flat position) welding to produce required lap joint.
- 3.6 Cleans the welds.

**TASK PERFORMANCE STANDARDS**

Pre-set work tack welded, down hand (flat position) weld butt joint (angle-V), edge joint, T-joint and lap joint using mild steel 3 mm thickness and above and mild steel plates of thickness up to 5 mm.

Visual inspections of welds should conform to the following standards:

- All slag, spatter and droplet removed.
- Profile of weld uniform.
- Butt joint weld fully penetrated, amount of beak as specified.
- Reinforcement of butt weld blended smoothly with parent metal.
- Undercut maximum 30% of total length.
- Surface of weld free from cracks, cavities, porosity and trapped slag.
- Joint where weld has been stopped and restarted shows no gross root cracks or beak on welded surface.
- Cleanliness and repair safety procedures observed.

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## TASK SPECIFICATION

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### TASK PERFORMANCE REQUIREMENTS

Mild steel plates, various structural steel sections including angle iron, channels, bar, and I-sections of thickness 3 mm and above, mild steel pipes of thickness up to 5 mm, square, scribe, hacksaw, measuring tape (2000 mm), steel ruler, flat file (coarse), G-clamp, vice, bench hammer, center punch, welding table, safety goggles, apron, sleeves and gloves, arc welding machine (minimum 150 ampere capacity), power and welding cables, rutile and basic electrodes, fume extractor, de-slagging hammer, wire brush, helmet/hand shield, and blacksmith tongs.

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### TASK PERFORMANCE STANDARDS

Pre set work tack welded, down hand (flat position) weld butt joint (single -V), edge joint, T-joint, and lap joint using mild steel 3 mm thickness and above and mild steel pipes of thickness up to 5 mm.

Visual inspections of welds should conform to the following standards:-

- All slag, fume spray and droplet removed.
- Profile of weld uniform.
- Butt joint weld fully penetrated, amount of beads as specified.
- Reinforcement of butt weld blended smoothly with parent metal.
- Undercut maximum 30% of total length.
- Surface of weld free from cracks, cavities, porosity and trapped slag.
- Joint where weld has been stopped and restarted show no pronounced crater or hump on welded surface.
- Cleanliness and related safety precaution observed.

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9		10		TASK TRAINING DATA	
TASK NO.	T.E. NO.	TECHNICAL KNOWLEDGE	APPLIED CALCULATION	GRAPHIC INFORMATION	SAFETY & HYGINE
3.	1.	Knowledge of starting welding procedure and appropriate tack welding for various pre set works.			First aid: practicing and reporting.
	2.	Knowledge of various techniques of down hand welding (flat position), i.e. angle of electrode, weaving speed of travel and arc length.			Use of helmet and hand shield.
	3.	Knowledge of the change of metal brittleness caused by rapid cooling.			Hazards involved if naked eye or skin is exposed to light of arc welding.
	4.	Knowledge and use of de-slugging (chipping) hammer, wire brush, and flat file.			Hazards involved in handling welded hot metals.

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## TASK PERFORMANCE TEST (Skill assessment)

11	<b>TASK TITLE : Operating welding machine</b> <b>TASK NO : 3</b>	<b>LOCATION OF TEST:</b>  <b>CANDIDATE'S NAME :</b>  <b>EVALUATORS' NAME :</b>	
12	<b>TEST FACTORS AND ITEMS</b>	<b>STANDARD MET</b>	<b>STANDARD NOT MET (Comments)</b>
	<p><b><u>Did the Candidate ?</u></b></p> <p>3.1 Dress in appropriate safety clothing.</p> <p>3.2 Tack weld pre set works.</p> <p>3.3 Produce down hand welding on butt, edge, T, and lap joint .</p> <ul style="list-style-type: none"> <li>▪ Profile of weld uniform.</li> <li>• Joint fully penetrated.</li> <li>• Amount of beads as specified.</li> <li>• Undercut maximum 30% of total length.</li> </ul> <p>Surface of weld free from cracks, cavities, porosity and trapped slag.</p> <p>Joint where weld has been stopped and restarted shows no pronounced crater or hump on welded surface.</p> <p>3.4 Observe related safety precautions.</p>		
	<p>3.4 Complete the test within specified time.</p>		

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## TASK PERFORMANCE TEST (Skill assessment)

11	<b>TASK TITLE :</b> Arc welder (1G and 1F), L - 1 <b>TASK NO :</b> Comprehensive test	<b>LOCATION OF TEST:</b>  <b>CANDIDATE'S NAME :</b>  <b>EVALUATORS' NAME :</b>	
12	<b>TEST FACTORS AND ITEMS</b>	<b>STANDARD MET</b>	<b>STANDARD NOT MET (Comments)</b>
	<p><b><u>Did the Candidate ?</u></b></p> <p>1.1 Dress in appropriate safety clothing.</p> <p>1.2 Select correct materials as instructed.</p> <p>1.3 Mark out, cut square within <math>\pm 0.5</math> mm of scribed line</p> <p>1.4 Pre set and clamp metal on welding table or vice.</p> <p>1.5 Set the appropriate ampere for welding.</p> <p>1.6 Connect and clamp earth cable light to welding table or vice.</p> <p>1.7 Select and clamp appropriate electrode.</p> <p>1.8 Connect arc welding machine and fume extractor power cable firmly and switch on power supply.</p> <p>1.9 Produce down hand welding on butt, edge, lap and T-joint with:-</p> <ul style="list-style-type: none"> <li>• Profile of weld uniform.</li> <li>• Joint fully penetrated.</li> <li>• Amount of beads as specified.</li> <li>• Undercut maximum 30% of total length.</li> </ul>		

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## TASK PERFORMANCE TEST (Skill assessment)

11	<b>TASK TITLE : Operating welding machine</b> <b>TASK NO : 3</b>	<b>LOCATION OF TEST:</b>  <b>CANDIDATE'S NAME :</b>  <b>EVALUATORS' NAME :</b>	
12	<b>TEST FACTORS AND ITEMS</b>	<b>STANDARD MET</b>	<b>STANDARD NOT MET (Comments)</b>
	<p><u>Did the Candidate ?</u></p> <ul style="list-style-type: none"> <li>• Surface of weld free from cracks, cavities, porosity and trapped slag.</li> <li>• Joint where weld has been stopped and restarted shows no pronounced crater or hump on welded surface.</li> </ul> <p>1.10 Observe related safety precautions.</p> <p>1.11 Complete the test within specified time.</p>		

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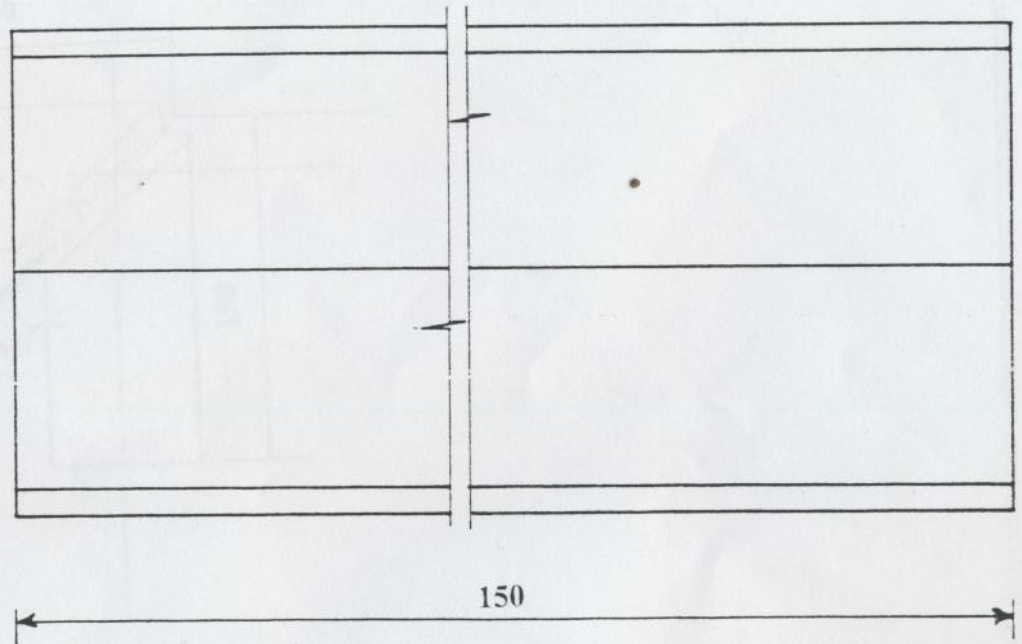
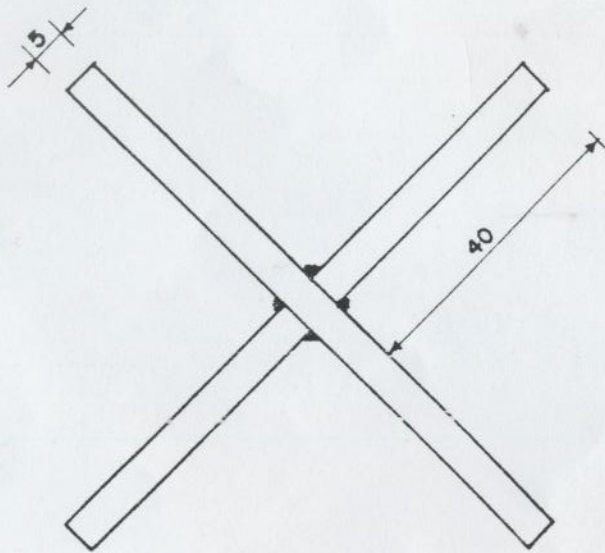
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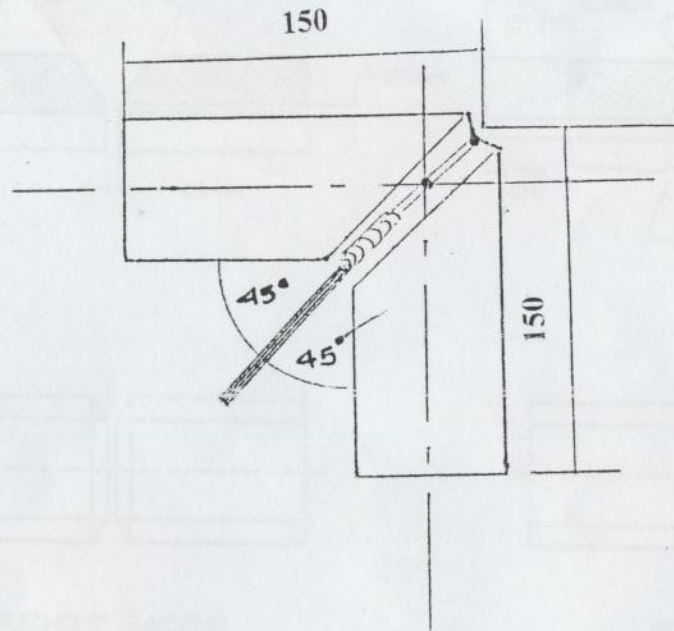


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SUBJECT - WELDER (ARC) L-1	SKILL TESTING DIVISION	SCALE - 1:1
DATE -	NATIONAL SKILL TEST	TIME - 2 hrs.

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व्यवसायका नाम :

मिाते :

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राष्ट्रीय सीप परीक्षण समिति  
सीप परीक्षण महाशाखा

त्केल :

समय:-

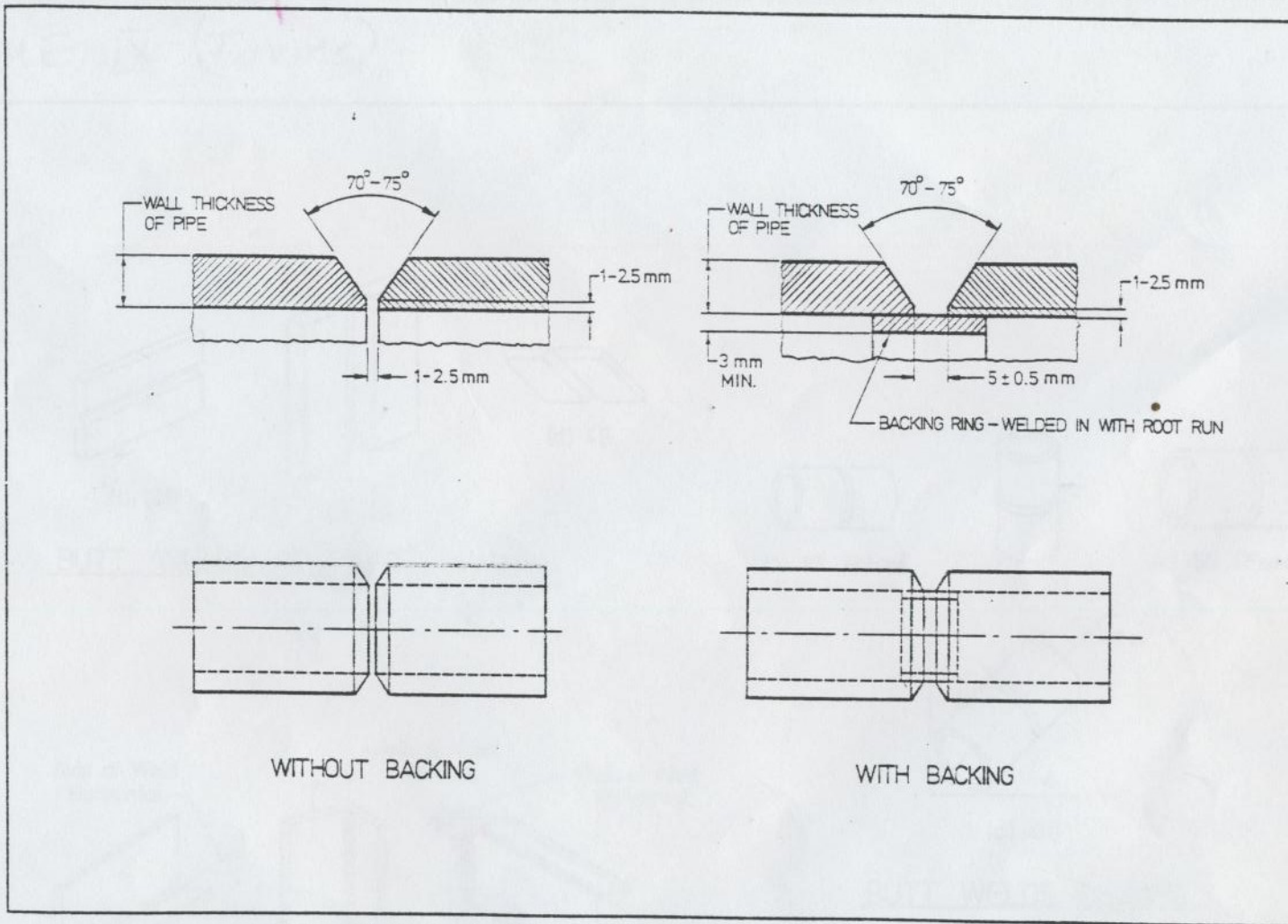
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C.M. Jadhav

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व्यवसायको नाम :

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 राष्ट्रिय नीप परीक्षण समिति  
 सीप परीक्षण महाशाखा

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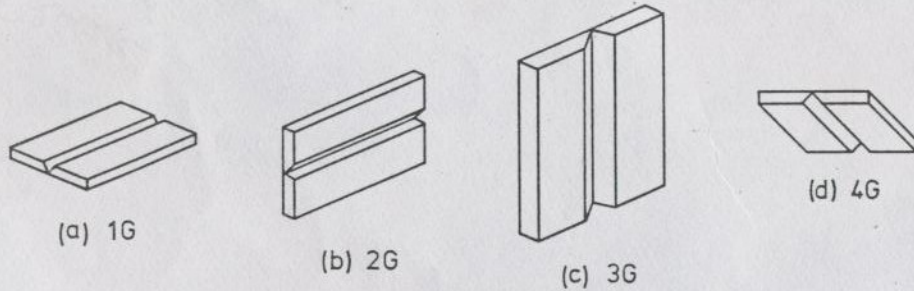
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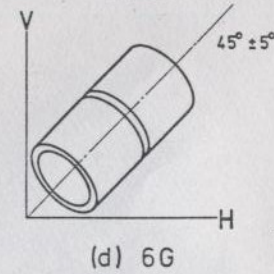
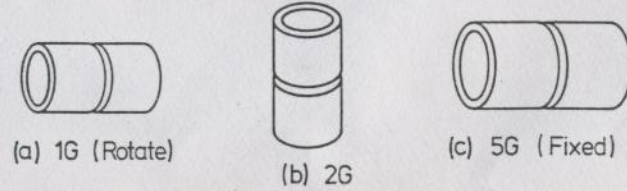
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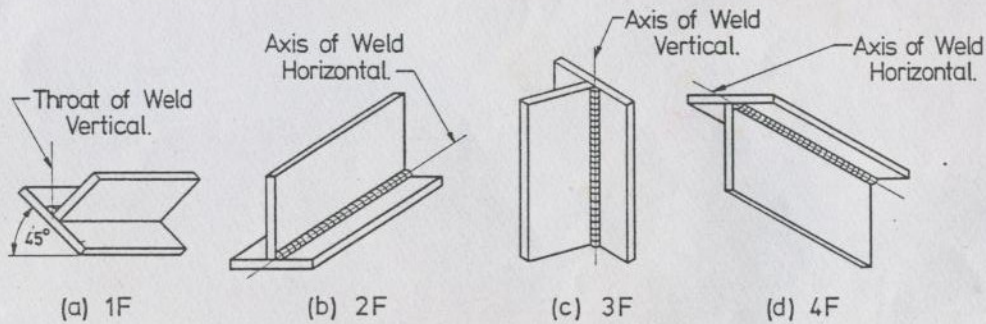
# A.S. M.E. IX (Terms)



BUTT WELDS IN PLATE.



BUTT WELDS IN PIPE.



FILLET WELDS.

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## WELD POSITIONS.

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G - Groove  
F - Filled

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