basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

MECHANICAL TECHNOLOGY (WELDING AND METALWORK)

GUIDELINES FOR PRACTICAL ASSESSMENT TASKS

GRADE 12

2024

These guidelines consist of 25 pages.

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1. INTRODUCTION

The 18 Curriculum and Assessment Policy Statements subjects which contain a practical component all include a practical assessment task (PAT). These subjects are:

- AGRICULTURE: Agricultural Management Practices, Agricultural Technology
- ARTS: Dance Studies, Design, Dramatic Arts, Music, Visual Arts
- SCIENCES: Computer Applications Technology, Information Technology, Technical Sciences, Technical Mathematics
- SERVICES: Consumer Studies, Hospitality Studies, Tourism
- TECHNOLOGY: Mechanical Technology, Civil Technology, Electrical Technology, and Engineering Graphics and Design

A practical assessment task (PAT) mark is a compulsory component of the final promotion mark for all candidates offering subjects that have a practical component and counts 25% (100 marks) of the final promotion mark at the end-of-year. The PAT is implemented across the first three terms of the school year. This is broken up into different phases or a series of smaller activities that make up the PAT. The PAT allows for candidate to be assessed on a regular basis during the school year and it also allows for the assessment of skills that cannot be assessed in a written format, e.g., test or examination. It is therefore important that schools ensure that all candidates complete the practical assessment tasks within the stipulated period to ensure that candidate are resulted at the end of the school year. The planning and execution of the PAT differs from subject to subject.

The PAT allows the teacher to directly and systematically observe applied competence. The PAT comprises the application/performance of the knowledge, skills and values particular to that subject and counts 25% of the total promotion/certification mark out of 400 for the subject.

Any profession requires of its members a thorough grounding in both theory and practice and MECHANICAL TECHNOLOGY is no exception. It is emphasised that the goal of the practical assessment task is to produce a skilled candidate in each specialisation field. A nation's true wealth is in its manpower and education that should aim to develop the talents of a candidate so that he/she can contribute to the well-being of the society by using and developing scientific and technological resources.

To prepare a candidate in the MECHANICAL TECHNOLOGY specialisation fields, one must focus on the following:

- An attitude where the candidate can selectively use ideas, gather evidence and facts, to drawing logical conclusions to put them to good use creatively and with imagination;
- A capability to express ideas and information clearly by speech, writing, drawing and manufacturing; and
- A willingness and capability to accept and exercise responsibility, to make decisions, and to learn by experience.

Attributes such as these cannot all be achieved in a classroom. A sound knowledge of engineering sciences is essential to equip the MECHANICAL TECHNOLOGY candidate with the necessary practical capabilities for the required processes. Practical training is the application of acquiring essential skills to bridge the gap between trade theory and practice.

Practical application in the workshop must therefore be made an interesting and challenging experience to develop the candidates both physically and mentally. The candidates must show their initiative, curiosity and persistence to learning. In order to stimulate and develop self-confidence the granting of some degree of responsibility during the practical application is very important.

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2. TEACHER GUIDELINES

2.1 Administration of the PAT

Teachers are requested to make copies of the different specialisation PAT documents. These documents need to be handed out to the candidates at the beginning of the year. The practical assessment task for Grade 12 is externally set, internally assessed and externally moderated.

Teachers must attach due dates for the different facets of the PAT. (Refer to the CAPS document.) In this manner, candidates can easily assess their progress. It is the responsibility of the teacher to administer formal assessment.

The PAT should be completed within the first three terms. The PAT should be completed under controlled conditions. (Refer to Mechanical Technology SPECIALISATION: CAPS Grade 10–12.)

Should the candidate make mistakes on a specific task, or the specific PAT phase is not done according to instruction, the candidate can be given an extended opportunity within the allocated timeframe of the phase to redo the task so that it is of satisfactory quality.

Teachers MUST build a prototype of the task to be able to demonstrate to the candidates what the final product will look like. It will guide the candidates with visual presentation. It provides the teacher with insight into possible challenges regarding machines, equipment or material and what possible manufacturing procedures he/she need to follow in the workshop in order to complete the PAT.

All tasks are to be completed onsite under teacher supervision. No PAT tasks are supposed to leave the site until the external moderation has been conducted.

2.2 Assessment of the PAT

Frequent and developmental feedback is needed to ensure necessary guidance and support to the candidates.

Both formal and informal assessment should be conducted to ensure that the embedded skills are developed. Informal assessments must be conducted to monitor the progress of the candidates. On completion of a phase, the candidate must use the rubric and complete the provided mark sheet under the heading of self-assessment to conduct his/her own informal assessment before the teacher conducts formal assessment. The candidate must sign and date the mark sheet on completion of each self-assessment.

After completion by the candidate of his/her own informal assessment, the teacher must then use the same mark sheet in the candidate's portfolio of evidence to complete the formal assessment and provide feedback comments (if needed) to the candidate.

All mark sheets in the candidate's portfolio of evidence must be signed by the teacher, departmental head and moderator (if the candidate was moderated). The formal mark must be recorded on the composite mark sheet. The composite mark sheets MUST be signed by the teacher, departmental head and the principal before external moderation commences.

On completion of each phase in each term, the marks for the completed phase need to be recorded onto the South African School Administration and Management System (SASAMS).

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2.3 Moderation of the PAT

Internal moderation by the departmental head of the school MUST be conducted for each completed phase of the task. Evidence of moderation reports must be available in the teacher file and be available as proof for provincial and external moderation. The internal moderator must use the same mark sheets as which are available in the candidate's portfolio of evidence whereby the candidate has conducted self-assessment and formal assessment by the teacher.

Marks must be recorded in the provided space for internal moderation. The marks on the school administration system, captured by the school, must be verified by the moderator against the composite mark sheet. The tasks, projects, assessment criteria and the mark sheets must be presented to the moderator during moderation of the PAT.

The moderator should be able to call on a candidate to explain and demonstrate the functions, principles and skills during the moderation process.

On completion, the moderator will, if necessary, adjust the marks of the group upwards or downwards should he/she deem it necessary.

Each project must be clearly marked with the correct initials and surname of the candidate.

2.4 Consequences of absence/non-submission of tasks

If a candidate's practical assessment task is incomplete or unavailable with valid reason, the candidate may be given three weeks before the commencement of the final end-of-year examination to submit the outstanding task. Should the candidate fail to fulfil the outstanding PAT requirement, such a candidate will be awarded a zero mark for that PAT component.

A candidate's results are regarded as incomplete if he/she does not present any component of the PAT task. He/she will be given another opportunity based on the decision of the head of the assessment body. Should the candidate fail to fulfil the outstanding PAT requirement, the marks for these components will be omitted and the final mark for Mechanical Technology will be adjusted for promotion purposes in terms of the completed tasks. If any tasks are still outstanding, the candidate runs the risk of not being resulted at the end of the year.

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2.5 Declaration of Authenticity

NAME OF THE SCHOOL:

_____

NAME OF CANDIDATE:

_____
(FULL NAME(S) AND SURNAME)

NAME OF TEACHER:

_____

I hereby declare that the project submitted for assessment is my own, original work and has not been previously submitted for moderation.

_____ _____
SIGNATURE OF CANDIDATE DATE

As far as I know, the above declaration by the candidate is true and I accept that the work offered is his or her own.

_____ _____
SIGNATURE OF TEACHER DATE

SCHOOL STAMP

3. CANDIDATE GUIDELINES

Instructions to the candidates

- The PAT consists of a specialisation task in **Welding and Metalwork**. The practical work is spread over three terms, as set out in this document. (See CAPS document.)
- All tasks must be completed according to the time frames set out in this document.
- Candidates are requested to actively engage in all practical assessment tasks.
- Candidates who are uncooperative will receive demerits or a zero mark for that particular section of the work.
- Candidates who act unsafely in the workshop and place other candidates in danger, will be given additional corrective tasks to improve their safety awareness.
- Your task must be fully completed by the end of August 2024 to be ready for provincial and/or national moderation.
- Your task needs to be **clearly marked** with your name and surname.
- On completion of a phase, you need to conduct self-assessment by using the provided marking rubric in this document.
- After your self-assessment is completed, you must present your completed project and portfolio of evidence to the teacher for formal assessment and feedback.
- Candidates MUST complete the **Declaration of Authenticity** to declare that the project they presented for formal assessment is their own work.
- Each term must have a completed phase in order to enter the mark on the working mark sheet and the South African School Administration and Management System (SASAMS).

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4. SPECIALISATION: WELDING AND METALWORK (SPECIFIC)

TASK: FOLDING BRAAI

Term: 1 to 3
Starting date: January 2024
Completion date: August 2024

Criteria and standards:

- The design of the folding braai is shown in given Examples 1, 2 and 3.
- Keep affordability in mind (standard dimensions of sheet metal).
- The folding braai is according to design. Make drawings and templates.
- Grid corners must be done according to the drawing. No 45° mitres are to be used.
- Overall sizes must be within ± 2 mm of the required measurement.
- Tools and equipment must not be damaged.
- All appropriate safety procedures must be adhered to.
- Welded joints must be cleaned of all slag. (Assess welds before grind finish.)
- Record marks after all dimensions have been marked out.
- Clean burrs from all edges.
- The project must be well presented.

RESOURCES REQUIRED FOR THE PAT:

PARTS LIST				
NO.	**PART**	**QUANTITY**	**DIMENSIONS**	**MATERIAL**
1.	Back plate	1	570 x 470 x 2	Sheet metal
2.	Grid supports	2	180 x 25 x 2	Angle iron
3.	Tray stoppers	2	34 x 30 x 5	Flat bar
4.	Grid frame (short side)	2	295 x 25 x 2	Angle iron
5.	Grid frame (long side)	2	495 x 25 x 2	Angle iron
6.	Grid	1	485 x 285 x 2	Expanded metal
7.	Ash tray	1	Calculated by candidate	Sheet metal
8.	Bolt	1	M8 x 12	Mild steel
9.	Wing nut	1	M8	Mild steel
10.	Hinges	2	100 x 38	Mild steel
11.	Grid hinges	2	40 x 8	Round bar
12.	Stopper	2	30 x 8	Round bar
13.	Handle	1	170 x 8	Round bar
14.	Tray catch	1	30 x 30 x 3	Flat bar

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FOLDING BRAAI CONCEPT DESIGNS

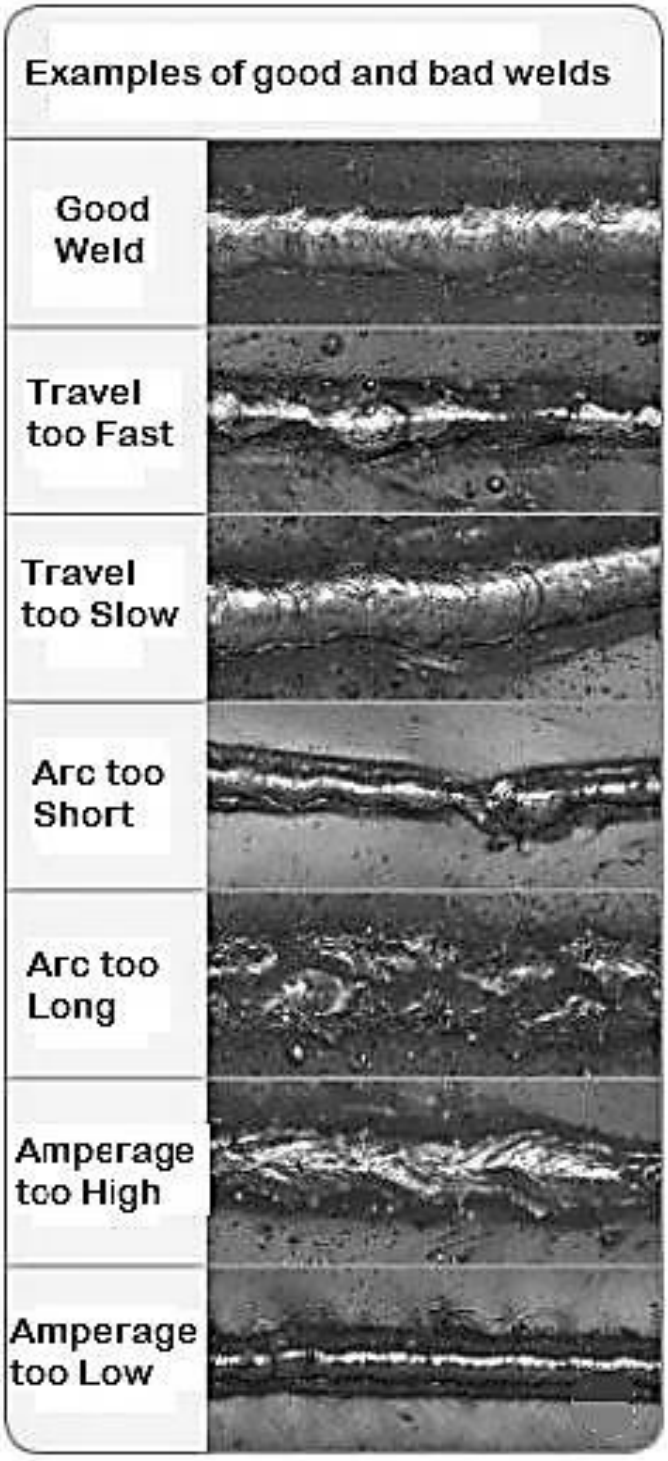
NOTE: These examples are illustrations for perception only to illustrate the concept of the design of the braai. The candidate must adhere to the design specifications in the figures provided.

EXAMPLE 1

EXAMPLE 2

EXAMPLE 3

EXAMPLES OF QUALITY OF WELDS



EXAMPLE 4

RUBRIC FOR MARKING, CUTTING, DRILLING, WELDING, FINISHING AND PRESENTATION

CATEGORY	Excellent (5)	Good (4)	Average (3)	Poor (2)	Incomplete (1)
MARKING OF PARTS	All parts marked and accurate. ± 1 mm deviation	Nearly all parts marked accurately. ± 2–3 mm deviation	Most parts marked accuracy. ± 4 mm deviation	Some parts partially marked/some accuracy obtained. ± 5 mm deviation	Poor and wrongly marked/inaccurate. ± 6 mm deviation
CUTTING AND DRILLING	All parts cut/drilled accurately. ± 1 mm deviation	Nearly all parts cut/drilled accurately. ± 2–3 mm deviation	Most parts marked and cut/drilled accurately. ± 4 mm deviation	Some accuracy obtained. ± 5 mm deviation	Section poorly cut/ drilled inaccurately. ± 6 mm deviation
WELDING QUALITY	No welding defects. Beading neat and complete fusion of metals achieved. All slag is removed.	Neat welding done. Good beading with some minor defects. Good fusion achieved. All slag is removed.	Some beading visible. Presence of some welding defects. Not complete fusion achieved. Slag is partially removed.	Poor welding done. Lot of welding defects visible. Poor fusion achieved. Some burning through metal occurred.	Bad welding. Lot of welding defects with no fusion and holes burned through.
FINISHING AND PRESENTATION	Weld areas are cleanly finished, ground and painted. Project excellently presented. Excellent functionality obtained.	Nearly all welded areas are cleanly finished, ground and painted. Project well presented. Will function well.	Most welded areas are cleanly finished, ground and painted. Average presentation. Project will function.	Some welded areas are cleanly finished, ground and painted. Poor presentation with limited functionality.	No welded areas cleanly finished, ground and painted. No complete assembly. Bad presentation with no functionality.

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FIGURE 1: THE COMPLETE EXPLODED VIEW OF THE FOLDING BRAAI

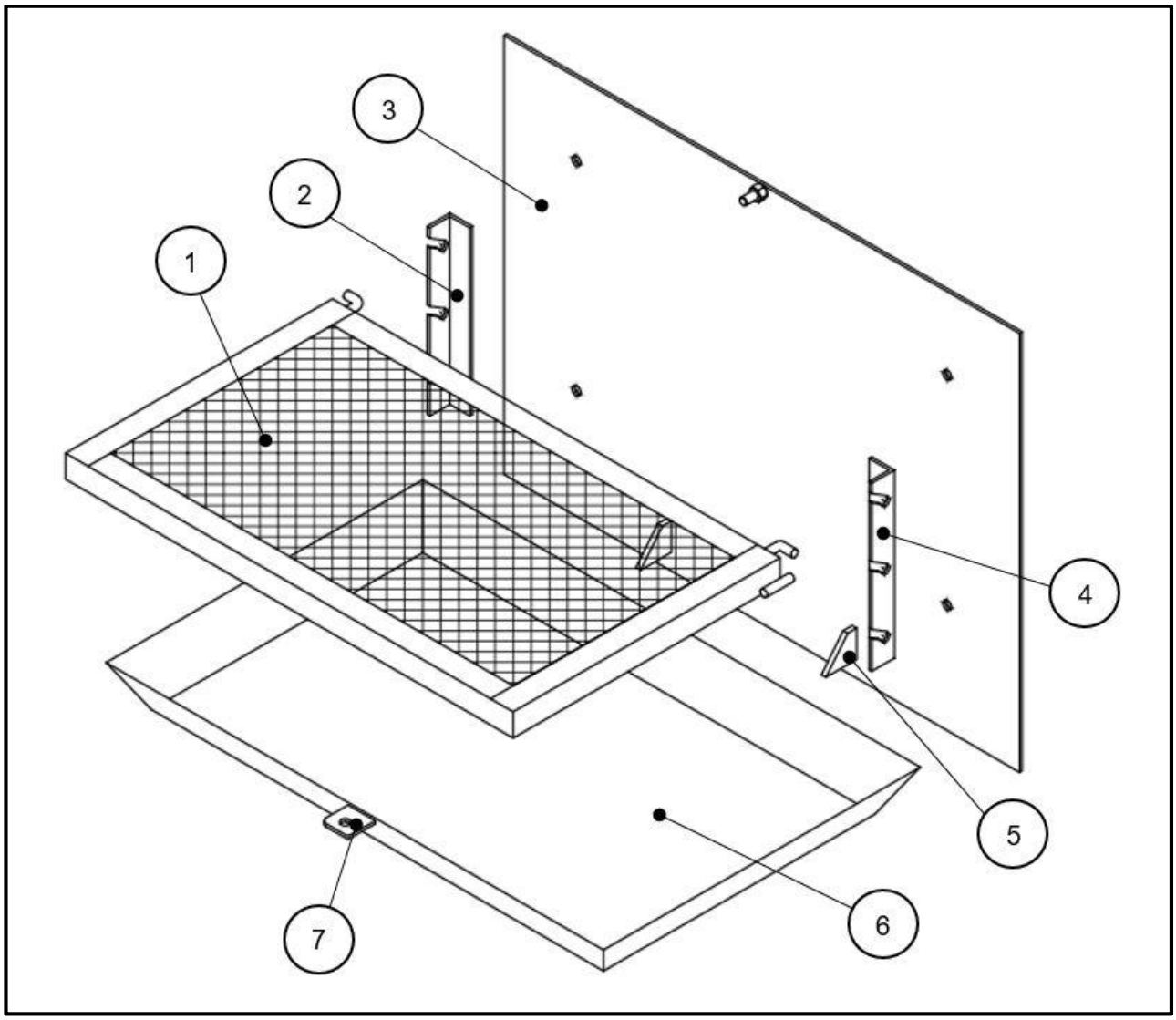

FIGURE 1

PARTS	
1	Braai grid
2	Grid support
3	Back plate
4	Grid support
5	Tray stopper
6	Ash tray
7	Tray stop washer

PHASE 1: BACK PLATE
January–March 2024

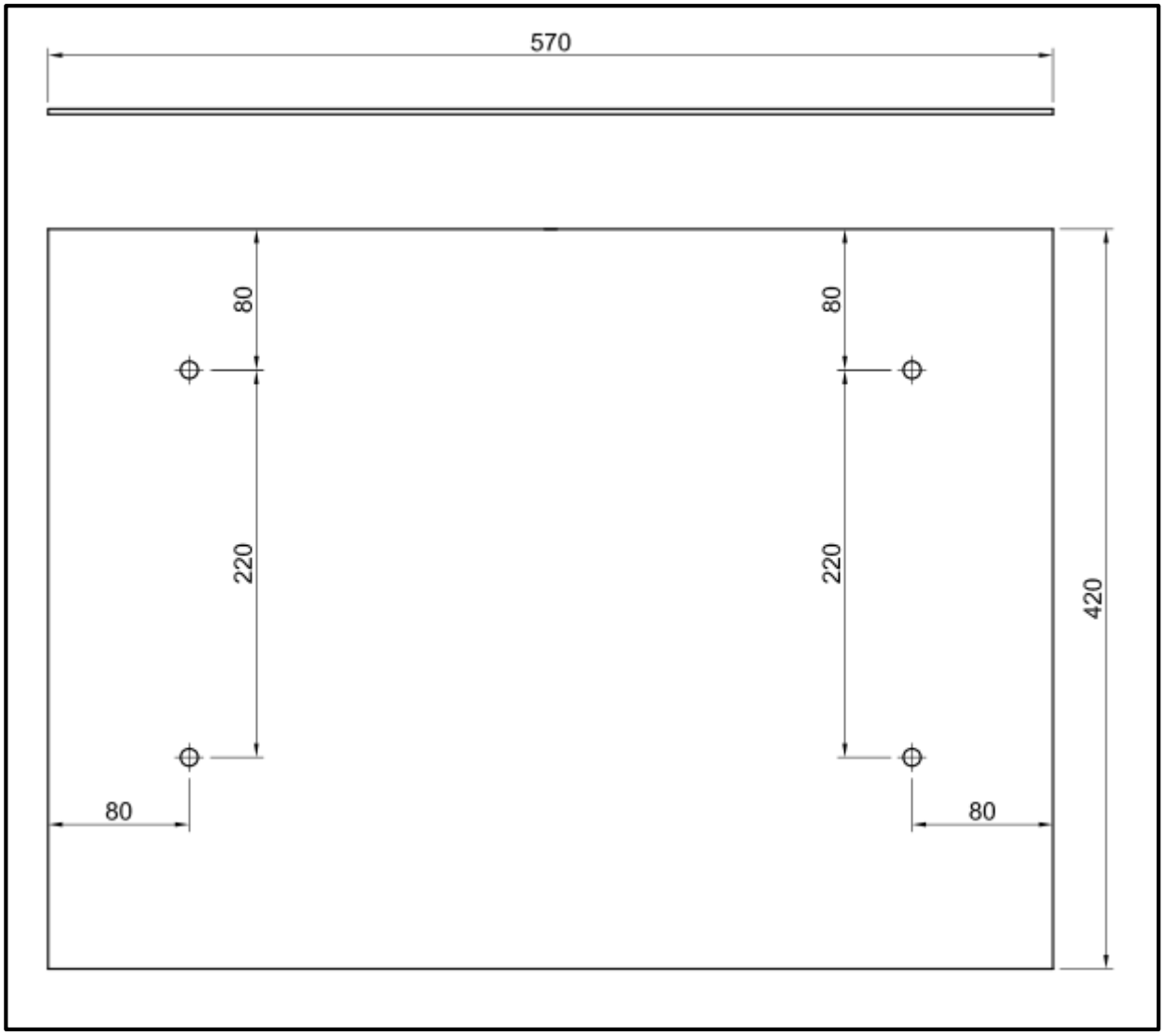

FIGURE 2: BACK PLATE

MECHANICAL TECHNOLOGY			
WELDING AND METALWORK			
MARK SHEET – BACK PLATE – PHASE 1			
GRADE	**12**	**DATE**	
PROJECT	**FOLDING BRAAI**		
CANDIDATE NAME:			

FACETS		**MARKS**	Candidate – Self-assessment	Teacher Assessment	Internal Moderation	Provincial Moderation	External Moderation	**TEACHER COMMENTS**
			1	**2**	**3**	**4**	**5**	
BACK PLATE	Measure, mark and cut sheet metal to size.	**10**						
	Mark position of holes and drill. (4 x 5)	**20**						
	Clean all burrs (holes and edges).	**10**						
	Squareness of plate	**10**						
PHASE 1 TOTAL:		**50**						

MODERATOR COMMENTS:		
NAME AND SIGNATURE OF CANDIDATE		
NAME AND SIGNATURE OF TEACHER		
NAME AND SIGNATURE OF TECHNICAL DEPARTMENTAL HEAD		
NAME AND SIGNATURE OF INTERNAL MODERATOR		
NAME AND SIGNATURE OF EXTERNAL MODERATOR		

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PHASE 2: GRID SUPPORT AND BACK PLATE ASSEMBLY
April–June 2024

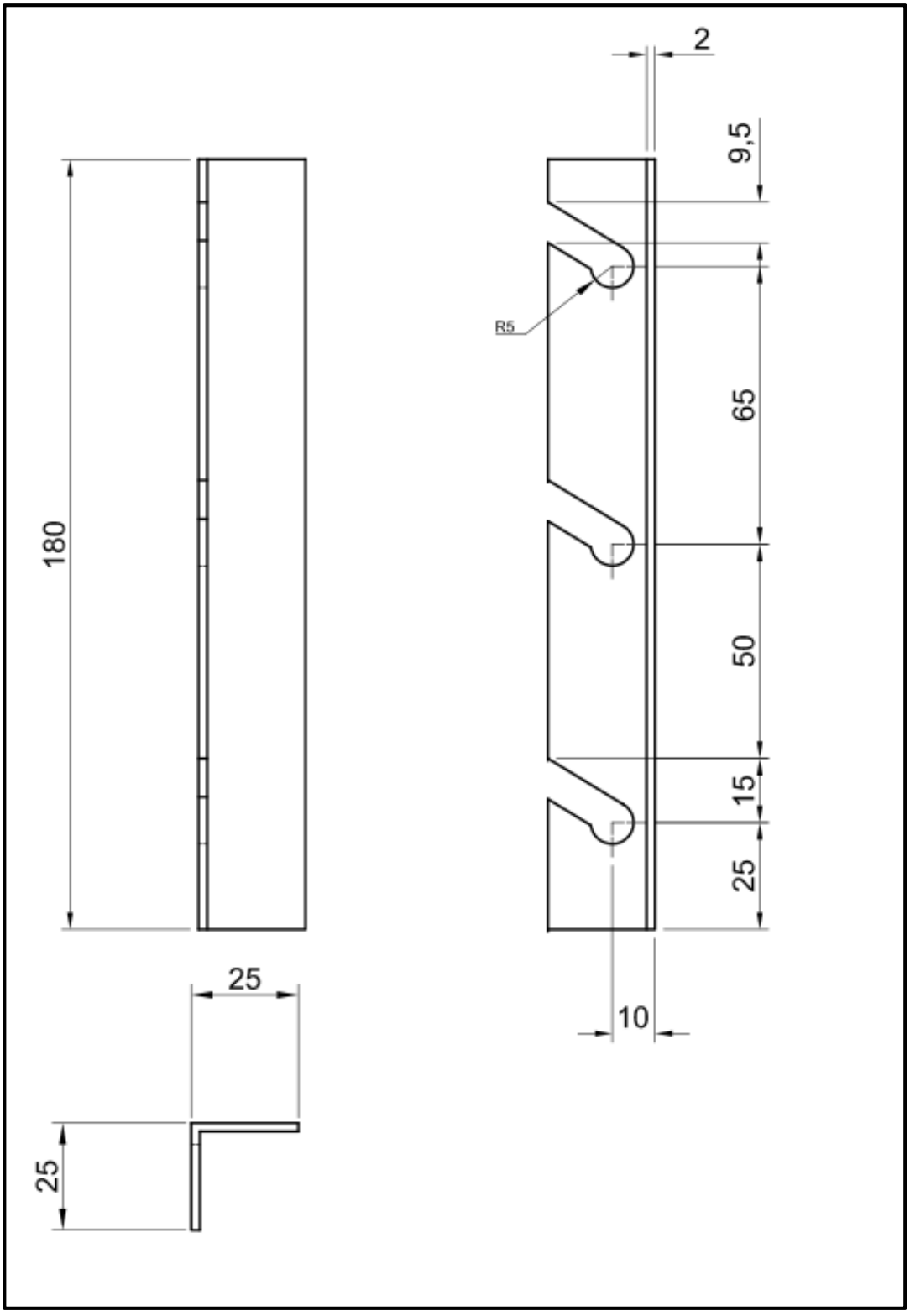

FIGURE 3: GRID SUPPORT

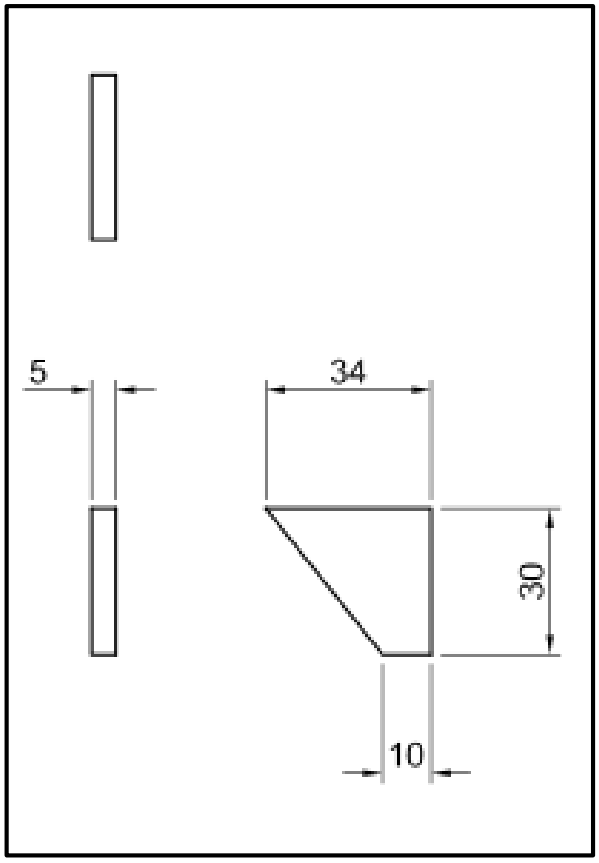

FIGURE 4: TRAY STOPPER

PART PLACEMENT

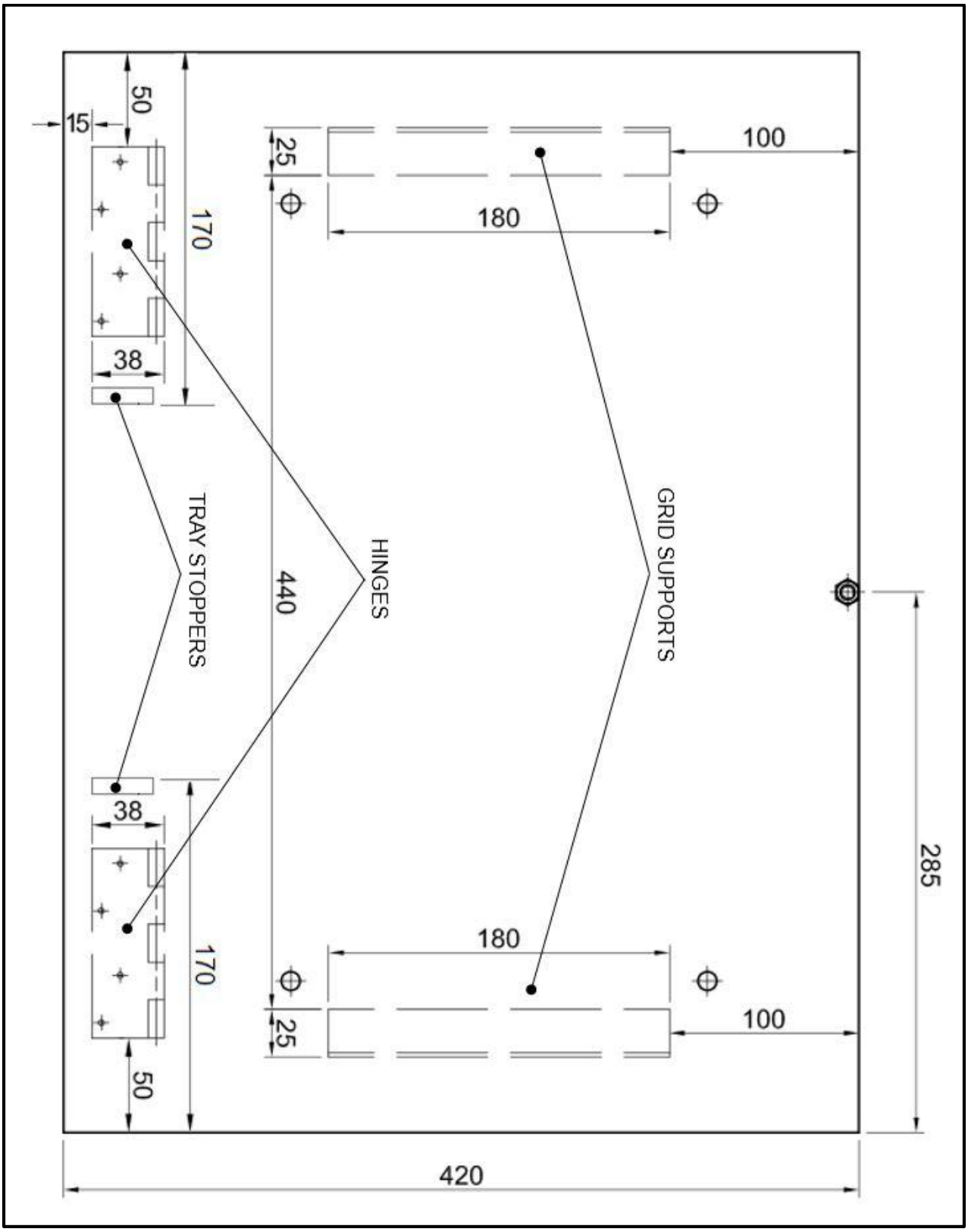

FIGURE 5: PART PLACEMENT

MECHANICAL TECHNOLOGY			
WELDING AND Metalwork			
MARK SHEET – GRID SUPPORT AND BACK PLATE ASSEMBLY – PHASE 2			
GRADE	**12**	**DATE**	
PROJECT	**FOLDING BRAAI**		
CANDIDATE NAME:			

	FACETS	**MARKS**	Candidate – Self-assessment	Teacher Assessment	Internal Moderation	Provincial Moderation	External Moderation	**TEACHER COMMENTS**
			1	**2**	**3**	**4**	**5**	
GRID SUPPORT	Measure, mark and cut to size 25 x 25 x 2 mm angle iron. Cut two pieces of 180 mm.	**10**						
	Drill 6 x Ø10 mm holes.	**30**						
	Mark out and cut SIX slots.	**30**						
	Clean all burrs.	**5**						
ASSEMBLY	Weld grid support onto back plate. Use alternate welding as per instruction.	**10**						
	Weld TWO tray stoppers in place.	**10**						
	Position TWO hinges in place and weld.	**10**						
	Weld finishing.	**5**						
	Subtotal:	**110**						
	PHASE 2 TOTAL:	**50**						

MODERATOR COMMENTS:		
NAME AND SIGNATURE OF CANDIDATE		
NAME AND SIGNATURE OF TEACHER		
NAME AND SIGNATURE OF TECHNICAL DEPARTMENTAL HEAD		
NAME AND SIGNATURE OF INTERNAL MODERATOR		
NAME AND SIGNATURE OF EXTERNAL MODERATOR		

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PHASE 3: GRID
July–August 2024

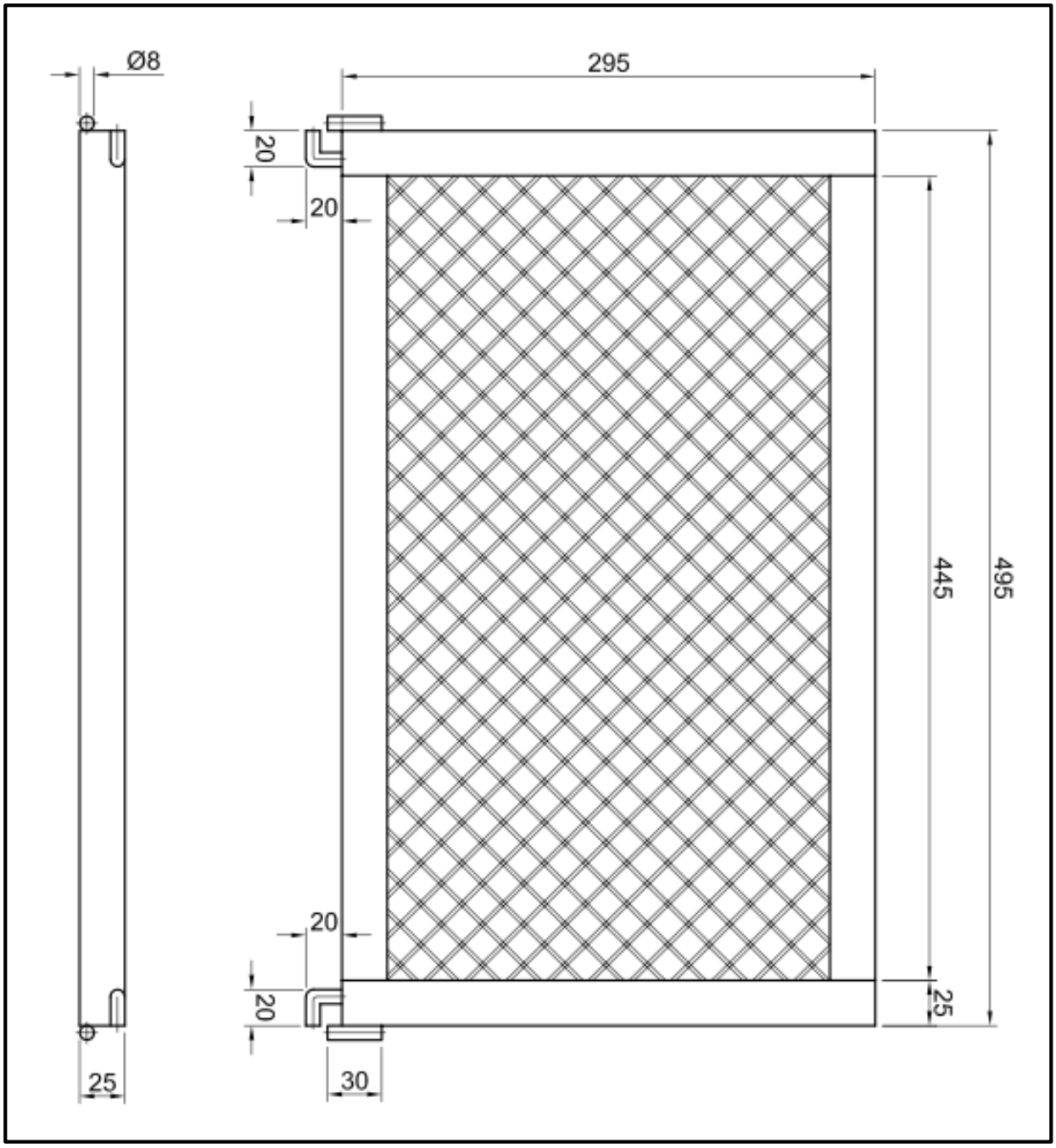

FIGURE 6: GRID
(Grid frame angles are not cut at 45°.)

MECHANICAL TECHNOLOGY			
WELDING AND METALWORK			
MARK SHEET – GRID FRAME– PHASE 3			
GRADE	**12**	**DATE**	
PROJECT	**FOLDING BRAAI**		
CANDIDATE NAME:			

	FACETS	**MARKS**	Candidate – Self-assessment	Teacher Assessment	Internal Moderation	Provincial Moderation	External Moderation	**TEACHER COMMENTS**
			1	**2**	**3**	**4**	**5**	
GRID FRAME	Cut grid frame pieces to size (495 x 2) (295 x 2).	**20**						
	Clean burrs.	**5**						
	Weld pieces to shape according to the drawing.	**10**						
	Cut expanded metal and weld onto grid frame.	**10**						
	Cut grid hinge and bend to shape.	**10**						
	Weld grid hinges in position.	**10**						
	Subtotal:	**65**						
	PHASE 3 TOTAL:	**50**						

MODERATOR COMMENTS:	

NAME AND SIGNATURE OF CANDIDATE		
NAME AND SIGNATURE OF TEACHER		
NAME AND SIGNATURE OF TECHNICAL DEPARTMENTAL HEAD		
NAME AND SIGNATURE OF INTERNAL MODERATOR		
NAME AND SIGNATURE OF EXTERNAL MODERATOR		

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PHASE 4: ASH TRAY AND FINAL ASSEMBLY
January–August 2024

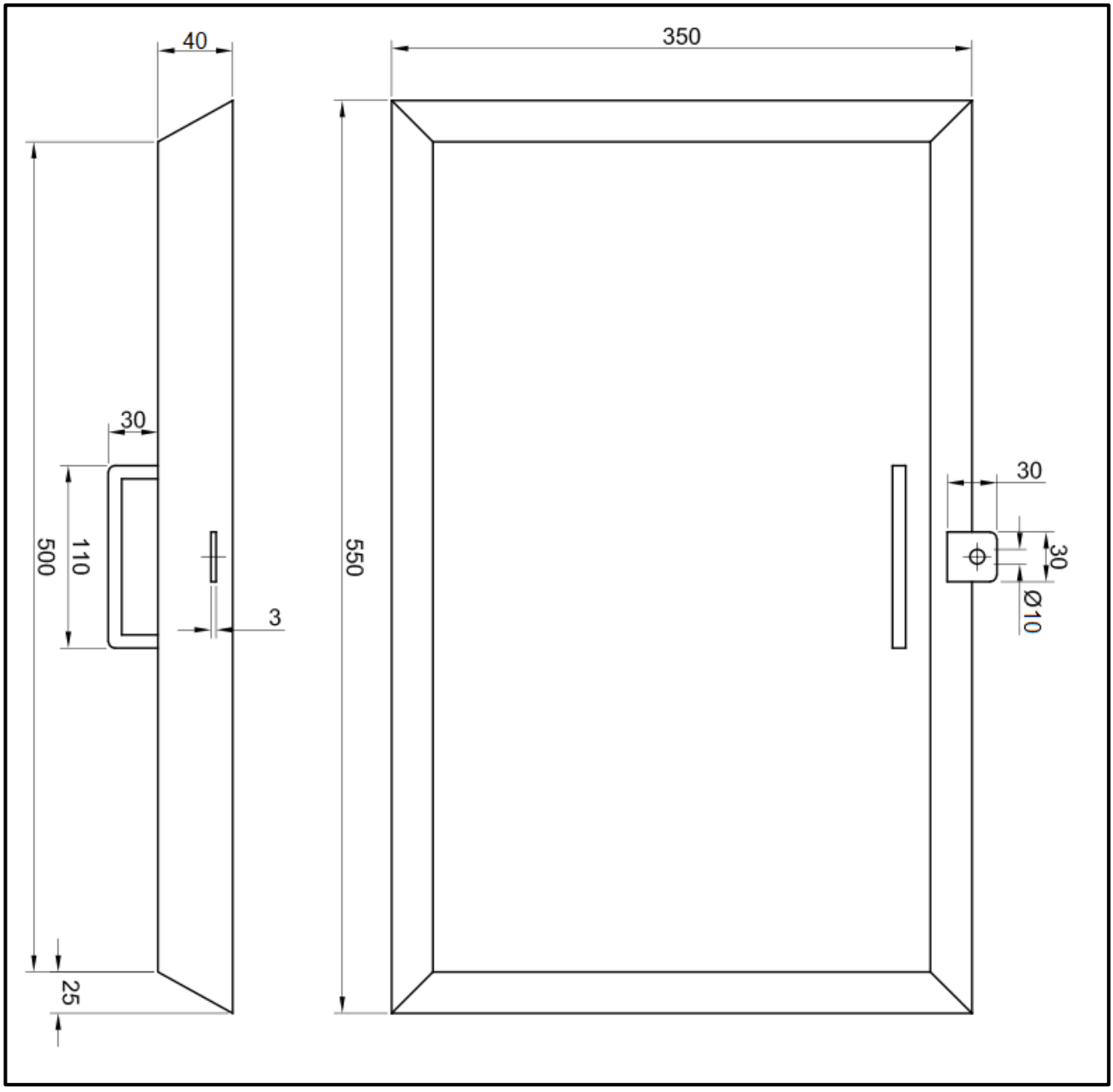
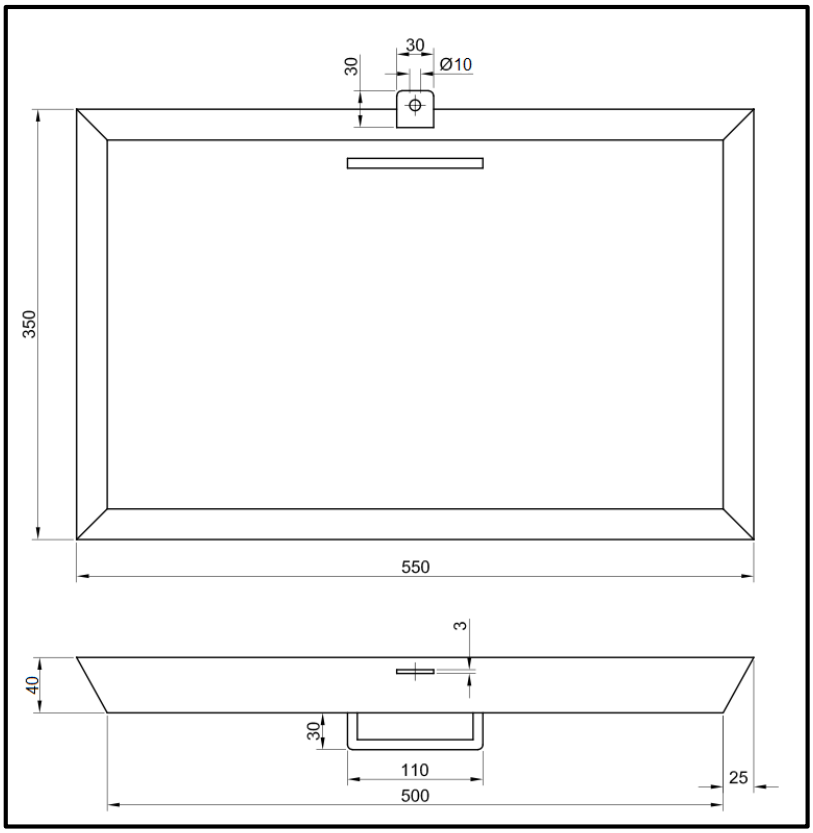


FIGURE 7: ASH TRAY

PHASE 4 WORKSHEET: ASH TRAY CALCULATION	
CANDIDATE NAME:	



	(10)

NOTE: This worksheet MUST be available in the candidate's portfolio of evidence.

MECHANICAL TECHNOLOGY			
WELDING AND METALWORK			
MARK SHEET – ASH TRAY AND FINAL ASSEMBLY – PHASE 4			
GRADE	**12**	**DATE**	
PROJECT	**FOLDING BRAAI**		
CANDIDATE NAME:			

	FACETS	**MARKS**	Candidate – Self-assessment	Teacher Assessment	Internal Moderation	Provincial Moderation	External Moderation	**TEACHER COMMENTS**
			1	**2**	**3**	**4**	**5**	
ASH TRAY	Calculate true length of slope and size of sheet metal required.	**10**						
	Mark out shape and cut.	**5**						
	Bend to shape.	**5**						
	Weld corners.	**5**						
	Cut tray catch to size. Drill Ø10 hole.	**10**						
	Measure, mark and cut handle to size.	**5**						
	Bend handle to shape and weld onto ash tray.	**10**						
ASSEMBLY	Weld ash tray onto hinges.	**10**						
	Attach grid frame onto back plate.	**5**						
	Test assembled folding braai for alignment.	**10**						
	Measure, mark and cut tray washer to shape.	**10**						
	Clean and paint.	**10**						
	Fit for purpose.	**5**						
	PHASE 4 TOTAL:	**100**						

MODERATOR COMMENTS:	

NAME AND SIGNATURE OF CANDIDATE		
NAME AND SIGNATURE OF TEACHER		
NAME AND SIGNATURE OF TECHNICAL DEPARTMENTAL HEAD		
NAME AND SIGNATURE OF INTERNAL MODERATOR		
NAME AND SIGNATURE OF EXTERNAL MODERATOR		

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MECHANICAL TECHNOLOGY											
WELDING AND METALWORK											
COMPOSITE MARK SHEET – TOTALS											
GRADE		**12**		**DATE**							
PROJECT		**FOLDING BRAAI**									
		CANDIDATES									
PHASES	**MARKS**										
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
PHASE 1	50										
PHASE 2	50										
PHASE 3	50										
PHASE 4	100										
TOTAL:	**250**										
TOTAL PAT MARK:	**100**										

NAME AND SIGNATURE OF TEACHER		
NAME AND SIGNATURE OF TECHNICAL DEPARTMENTAL HEAD		
NAME AND SIGNATURE OF PRINCIPAL		
NAME AND SIGNATURE OF INTERNAL MODERATOR		
NAME AND SIGNATURE OF EXTERNAL MODERATOR		

SCHOOL STAMP

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5. CONCLUSION

On completion of the practical assessment task candidates should be able to demonstrate their understanding of the industry, enhance their knowledge, skills, values and reasoning abilities as well as establish connections to life outside the classroom and address real-world challenges. The PAT furthermore develops the candidate's life skills and provides opportunities for candidates to engage in their own learning.

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