Sample Test Project

District / Zonal Skill Competitions

Skill- Plastic Die Engineering

Category: Manufacturing & Engineering Technology

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Section - A

A. Preface

Skill Explained:

Plastic Die Engineers involve the design and manufacture of injection molds for producing plastic components. They should read and understand mould drawings and be able to manufacture them.

Plastic Injection molded components are used in the field of Telecommunication, Automobile, Home appliances, Office automation and Entertainment electronics etc. There are many advanced technologies available for Die making but the basic skills required in planning, designing, machining, measuring, polishing, and fitting only tested in this competition.

The Competition is a demonstration and assessment of the competencies associated with these basic skills.

Eligibility Criteria (for IndiaSkills 2018 and WorldSkills 2019):

Competitors born on or after 01 Jan 1997 are only eligible to attend the Competition.

Total Duration: 6 to 10 Hrs

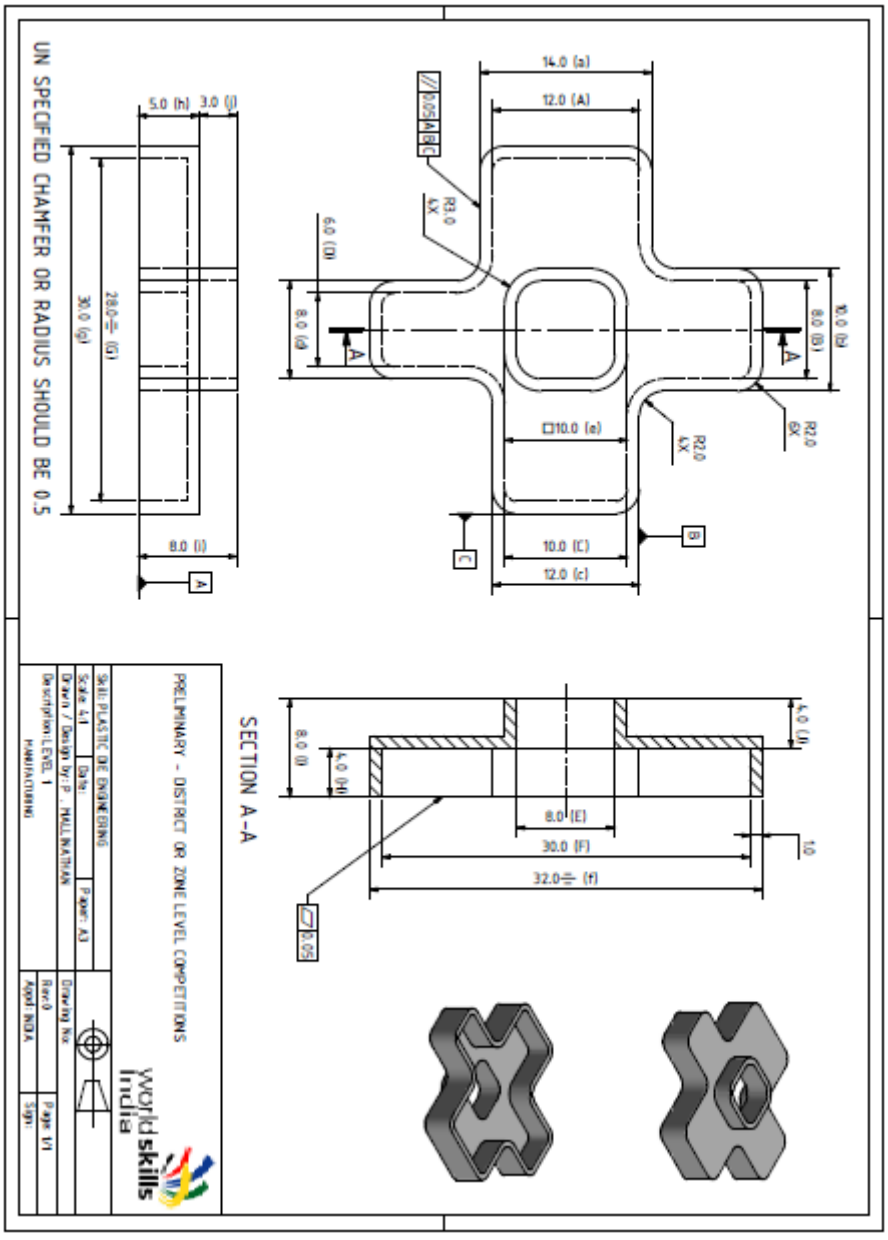
Section - B

B. Test Project

The test project consists manufacturing a simple mould with just core and cavity plates for the purpose of moulding plastic components as per part drawing. Competitors have to design core and cavity profiles as per requirements and manufacture the same. They will be supplied with steel blocks of size 100x100mm and standard items

The test project will cover;

- Machining: 4 to 6h- Work on different machine tools like conventional milling, drilling machine, pedestal grinder, Pin cut off machine etc.
- Bench working :1 to 2h



Section – C

C. Marking Scheme

Marking Scheme: The Assessment is done by awarding points by adopting two methods, Measurement and Judgments

- Measurement - One which is measurable
- Judgments - Based on Industry expectations

Aspects are criteria's which are judged for assessment.

Measurement is used to assess accuracy, precision, and other performance which can be measured in unambiguous way. Mark is awarded in full for a dimension with in tolerance and zero when it is out of tolerance.

Judgement is used to assess the quality of performance, about which there may be small differences of opinion

The scores from 0 to 3 are awarded for conformity with industry standards (score 1 stands for 1/3 and score 2 for 2/3 of the maximum mark allotted for the criterion).

• 0: performance below industry standard to any extent, including a non-attempt
• 1: performance meets industry standard
• 2: performance meets industry standard and surpasses that standard to some extent
• 3: excellent or outstanding performance relative to industry's expectations

- Aspects are criteria which are judged for assessment

Example-Judgment Marking

If maximum marks for Judgment criteria is 1 and if all 3 Experts (Juries) give 3 points to a candidate, the candidate will get 1 mark for that aspect. If 2 Experts give 3 and 1 Expert gives 2 points, then candidate will get (3+3+2)/9*1 = 0.89 marks for that aspect out of 1 mark.

M**arking:**

Main criteria	Judgment	Measurement	Total
Main dimensions		60	60
Secondary dimensions		32	32
Quality of work & mold	8		8
Grand Total	8	92	100

Judgment Marking Form

Skill Number: 43 Skill Name: Plastic Die Engineering

Competitor No: _____ Competitor Name: _____

Sub criterion: Quality of Work & Mould

Aspect ID	Max Mark	Aspect Criterion – Description	Experts Score (0 – 3)			Mark Awarded
			1	2	3	
1	0.8	Machine mark (outside the moulding area)				
2	1.6	Surface finish (Core side moulding area)				
3	1.6	Surface finish (Cavity side moulding area)				
4	2.0	Health & Safety				
5	2.0	Work place organization				

8.00 Maximum Mark for Sub criterion Mark Awarded 0.00

Signatures of experts selected to confirm the accuracy of this printed result

∑ Scores x (Max Mark)

Mark Awarded = ----------

Date and Time	

Measurement Marking Form

Skill Number: 43 Skill Name: Plastic Die Engineering

Competitor No: _____ Competitor Name: _____

Sub criterion: Main dimensions (B1) (Accuracy of the mould)

Aspect ID	Max Mark	Aspect Criterion – Description	Requirement or Nominal Size	Result or Actual Value	Mark Awarded
A	6.00	Dimension "A" on the mould	(12.060) ± 0.02		
B	6.00	Dimension "B" on the mould	(8.040) ± 0.02		
C	6.00	Dimension "C" on the mould	(10.050) ± 0.02		
D	6.00	Dimension "D" on the mould	(6.030) ± 0.02		
E	6.00	Dimension "E" on the mould	(8.040) ± 0.02		
F	6.00	Dimension "F" on the mould	(30.150) ± 0.02		
G	6.00	Dimension "G" on the mould	(28.140) ± 0.02		
H	6.00	Dimension "H" on the mould	(4.020) ± 0.02		
I	6.00	Dimension "I" on the mould	(8.040) ± 0.02		
J	6.00	Dimension "J" on the mould	(4.020) ± 0.02		

60.00 Maximum Mark for Sub criterion Mark Awarded 0.00

Signatures confirming the accuracy of this entry result

Expert 1	Chief Expert	Date and Time	

Measurement Marking Form

Skill Number: 43 Skill Name: Plastic Die Engineering

Competitor No: _____ Competitor Name: _____

Sub criterion: Secondary dimensions _B2 (Accuracy of the mould)

Aspect ID	Max Mark	Aspect Criterion – Description	Requirement or Nominal Size	Result or Actual Value	Mark Awarded
a	3	Dimension "a" on the mould	(14.070) ± 0.05		
b	3	Dimension "b" on the mould	(10.050) ± 0.05		
c	3	Dimension "c" on the mould	(12.060) ± 0.05		
d	3	Dimension "d" on the mould	(8.040) ± 0.05		
e	3	Dimension "e" on the mould	(10.050) ± 0.05		
f	3	Dimension "f" on the mould	(32.160) ± 0.05		
g	3	Dimension "g" on the mould	(30.150) ± 0.05		
h	3	Dimension "h" on the mould	(5.025) ± 0.05		
i	3	Dimension "i" on the mould	(8.040) ± 0.05		
j	3	Dimension "j" on the mould	(3.015) ± 0.05		
	2	No Additional material used for core & cavity	NO = 1.00 YES = 0.00		

32.00 Maximum Mark for Sub criterion Mark Awarded

Signatures confirming the accuracy of this entry result

Expert 1	Chief Expert	Date and Time	

Measurement Marking Form

Skill Number: 43 Skill Name: Plastic Die Engineering

Competitor No: _____ Competitor Name: _____

Criterion ID	Criterion Description	Max	Actual
B1	Main dimensions (accuracy)	60.00	
B2	Secondary dimensions (accuracy)	32.00	
B3	Quality of Work & Mould	8.00	
	Grand total	100	

Result confirmed by	Signed with date
Chief expert	

Section - D

D. Infrastructure List

- Workshop Installation-Tools & Equipment positioned by Organizers
- Tool Kit-Tool & Equipment allowed to be brought by competitors for competitions
- Cutting tools and measuring equipment's not provided by the organizer must be carried by the competitors

Tools and Equipment required for the competition

- Milling machine
- Work bench with vice 150 mm
- End mills Ø2 - Ø16 (mm)
- Ball end mills R2 – R3 mm
- Radius end mills R0.5 – R1 mm
- Face mills and inserts
- Machine reamers (Ø3-Ø8H7).
- Drill bits Ø2.8 - Ø7.8 (mm) (only reamer size drills)
- centre drills
- countersinks
- Tap wrenches
- Hand reamers (Ø3-Ø8H7)
- Set of metric Allen wrenches (2 - 12 mm)
- Parallel blocks
- Files of any kind
- Variety of honing (grinding) stones
- Various polishing equipment
- Air grinder or electric grinder
- Caliper 160 mm
- Outside micrometer 0-25
- Outside Micrometer 25-50mm
- Outside Micrometer 50-75mm
- Outside micrometer 75-100mm
- Disk micrometer 0-25mm
- Disk micrometer 25-50mm
- Depth micrometer set 0-25 mm
- Universal Dial indicator with stand
- Plunger dial indicator
- Edge finder

Section – E

E. Instructions for candidates

General Rules

- Polish the molding surface to mirror finish.
- Assemble the mould and keep it ready for testing.
- Follow safe machining practices.
- select right cutting parameters in order to finish machining with required dimensions, surface finish within the allotted time.

Section – F

F. Health, Safety, and Environment

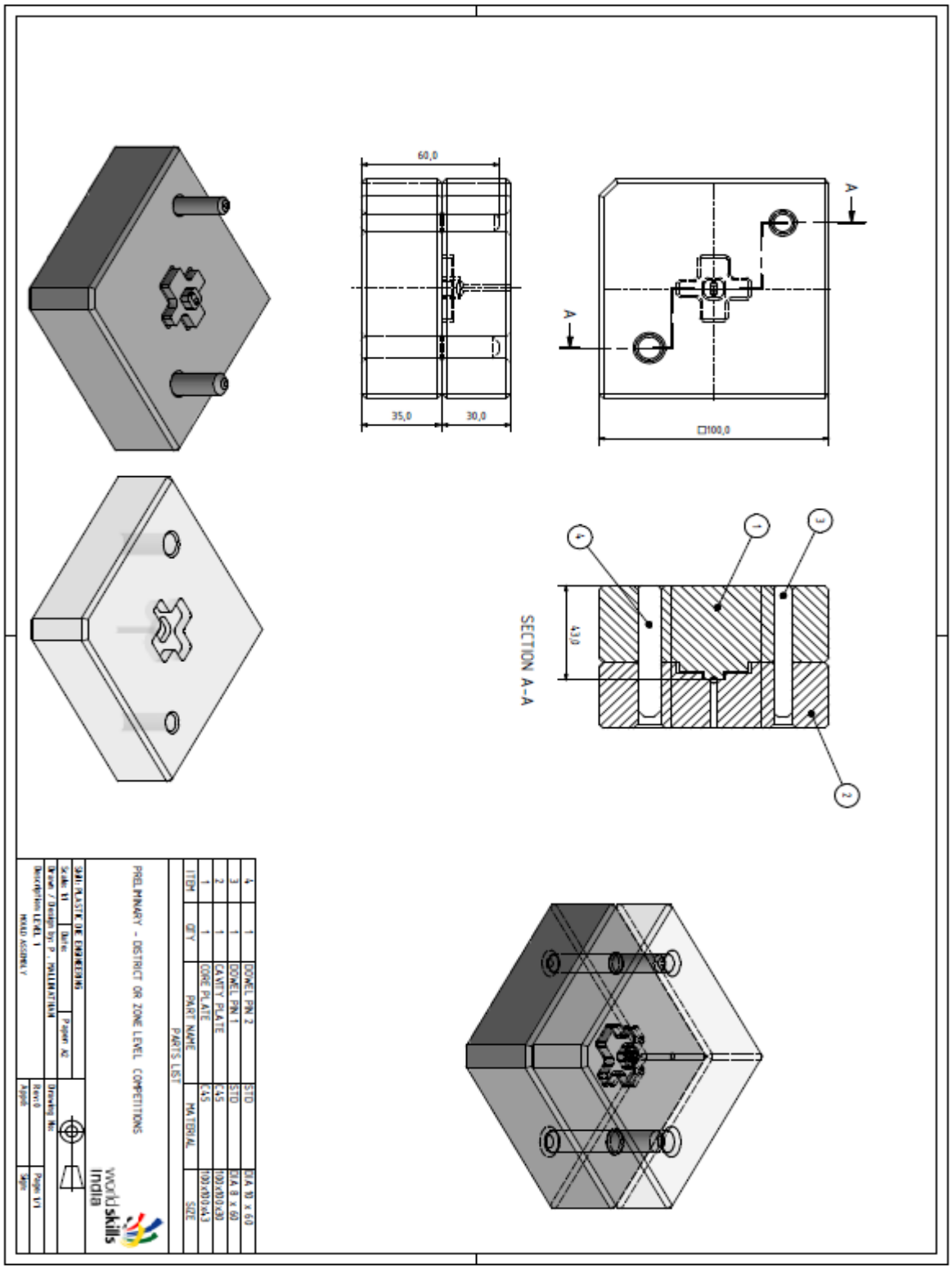
1. All accredited participants, and supporting volunteers will abide by rules and regulations with regards to Health, Safety, and Environment of the Competition venue.
2. All participants, technicians and supporting staff will wear the required protective Personnel clothing.
3. All participants will assume liability for all risks of injury and damage to property, loss of property, which might be associated with or result from participation in the event. The organizers will not be liable for any damage, however in case of Injury the competitor will immediately inform the immediate organizer for medical attention.

Competitors must consider the undermentioned specifics:

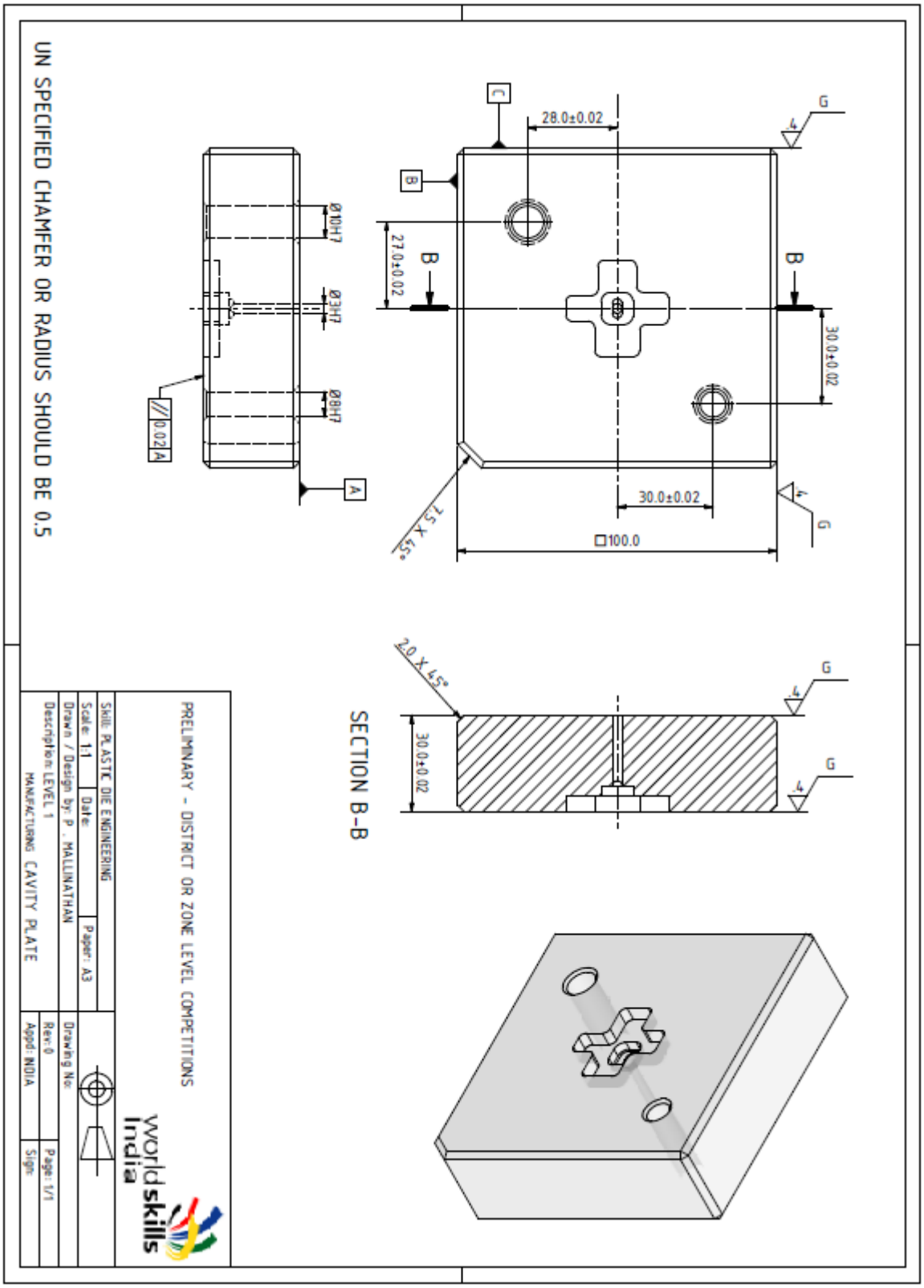
- Safety shoe should be worn all the time in the workshop area.
- Goggle should be worn whenever working on machines without cover.
- Keep the floor and machine area always clean
- Never spill oil or coolant on the floor
- Never wear loose cloths, chain, bangles, watch etc. while working on machine
- Tie the hair if it is long
- Clean the machine before leaving for bench work
- Work place should be always in a good state of organization
- No tools in use should be scattered around the work place and tools not in use should be kept inside the tool box

Appendix:

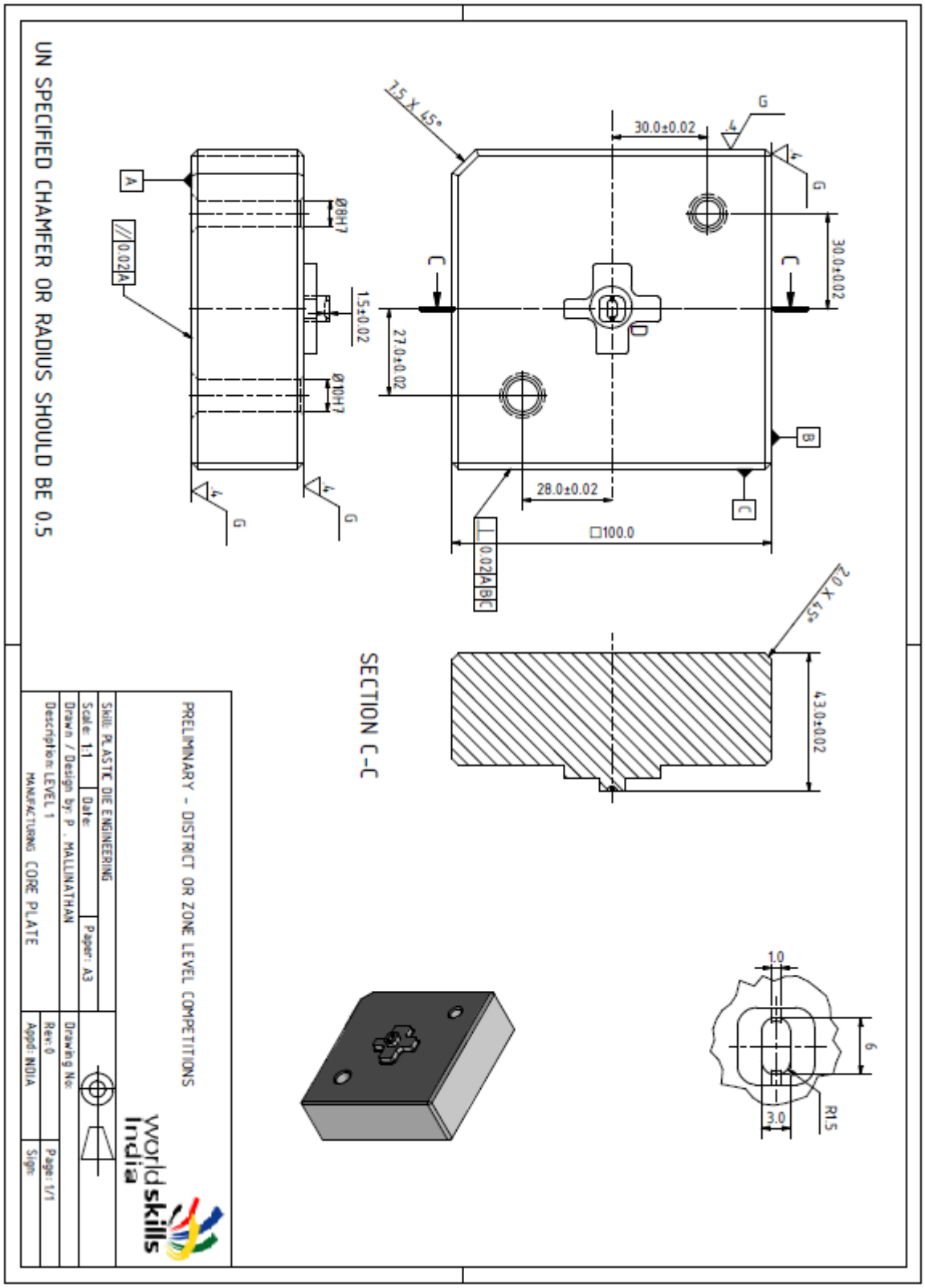
Assembly :



Cavity plate:



Core Plate:


UN SPECIFIED CHAMFER OR RADIUS SHOULD BE 0.5
15 X 45°
30.0±0.02
Ø8H7
Ø10H7
15±0.02
27.0±0.02
28.0±0.02
□100.0
SECTION C-C
20 X 45°
43.0±0.02
1.0
6
3.0
R1.5
PRELIMINARY - DISTRICT OR ZONE LEVEL COMPETITIONS
worldskills India
Skill: PLASTIC DIE ENGINEERING
Scale: 1:1
Date:
Paper: A3
Drawn / Design by: P . MALLINATHAN
Description: LEVEL 1
MANUFACTURING CORE PLATE
Drawing No:
Rev: 0
Appd: INDIA
Page: 1/1
Sign: