

TECHNICAL REQUIREMENT AND SPECIFICATIONS

**DESCRIPTION:** Manufacture and assembly of 2 nos. of prototype waterjet units

**PURPOSE:** This document is to invite competitive bids from manufacturers capable of high precision fabrication for 2 nos. of prototype waterjet units on the basis of detailed engineering design developed at IIT Madras (IITM). The units are to be fitted and integrated with the amphibious Futuristic Infantry Combat Vehicle (FICV) developed and manufactured at the Ordnance Factory Medak (OFMK) through a collaborative project.

**DESCRIPTION OF THE SYSTEM:**

The waterjet unit receives the input torque power from a prime mover through the shaft and converts it to propulsive thrust power. The prime mover is part of the FICV system and is not within the scope of the present supply. The major components of the waterjet unit are the Inlet casing, rotor/impeller, stator and outlet casing. The overall assembly is about 510 mm long and 415 mm in diameter and with mass of about 77kg. Each waterjet unit is designed to run at 1700rpm with a rated input power of 5.5kW and produce 5kN of thrust.

**SCOPE OF WORK:**

THE SCOPE OF THE WORK IS FABRICATION AND SUPPLY OF TWO WATERJET UNITS AS PER THE DRAWINGS AND SPECIFICATIONS GIVEN IN ANNEXURE

Refer to drawing PS-ASM-01 (4 sheets). This set shows the general arrangement.

Sheet 1 shows the external view of the waterjet unit.

Sheet 2 shows cut section view with all the major components labelled.

Sheet 3 shows the details of the inner hub of the waterjet unit.

Sheet 4 gives the total parts list.

Refer to the following component drawings in the Annexure which give details, tolerances and materials:

Sl.no.	TITLE	MATERIAL SPECIFICATION
1.	Casing front	AISI 316 Annealed stainless steel bar
2.	Casing rear	AISI 316 Annealed stainless steel bar
3.	Cover plate rear	Plain carbon steel
4.	Stator vane	SS2205
5.	Gasket (end cap)	Rubber
6.	Gasket (Locknut)	Rubber
7.	Hub sheet 1 of 2 (rotor)	SS2205
8.	Hub sheet 2 of 2 (rotor)	SS2205
9.	Locknut	SS2205
10.	Nose	SS2205
11.	Cover plate rear	AISI 316 Annealed stainless steel bar
12.	Spacer 1	PTFE
13.	Spacer 2	PTFE
14.	Seal housing	AISI 316 Annealed stainless steel bar
15.	Shaft	SS2205
16.	Sleeve for propulsion system	AISI 316 Annealed stainless steel bar
17.	Hub sheet 1 of 2 (stator)	SS2205
18.	Hub sheet 2 of 2 (stator)	SS2205
19.	Supporting rod	SS2205
20.	Washer	Rubber

## **SUBMISSION OF BIDS**

The bidder will present a two part bid consisting of (i) Technical and (ii) Financial parts in two separate sealed covers superscribed clearly as Technical and Financial.

The bidders will make a technical presentation before the EPC to evaluate their technical capability. Only those bidders who are deemed to have technically qualified will be included in the price bid opening. The technical bid must highlight the capability of the bidder in terms of having facility for carrying out high quality precision work, experience in carrying out similar work for the last two years with evidence of having executed such works.

The financial bid will contain only the commercial offer consisting of base price and applicable taxes as extra. The validity of the offer should be for at least one month from the date of opening the bid.

**Inputs provided by the IITM team:**

1. Geometric solid models in Computer Aided Design (CAD) format
2. Preliminary drawings. Final drawings and CAD models will be provided during the issuance of Purchase Order.
3. Bill of materials (BoM)
4. Part numbers for standard hardware
5. Assembly process and instructions

**Supplier scope will be as follows:**

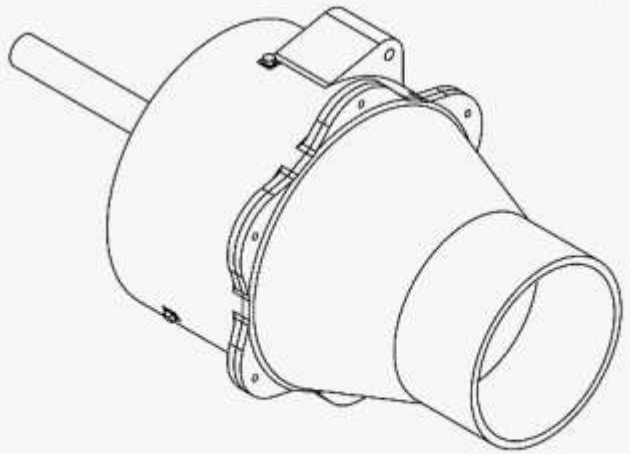
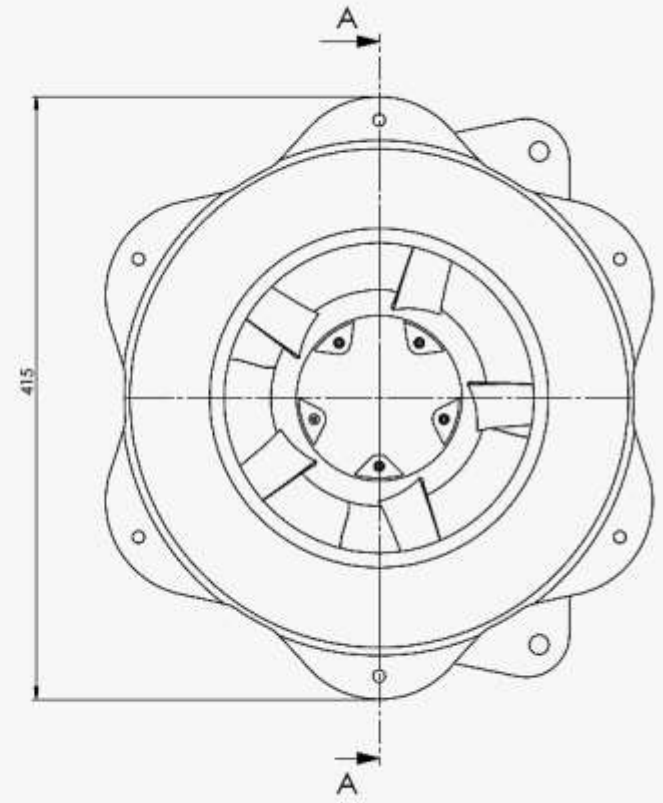
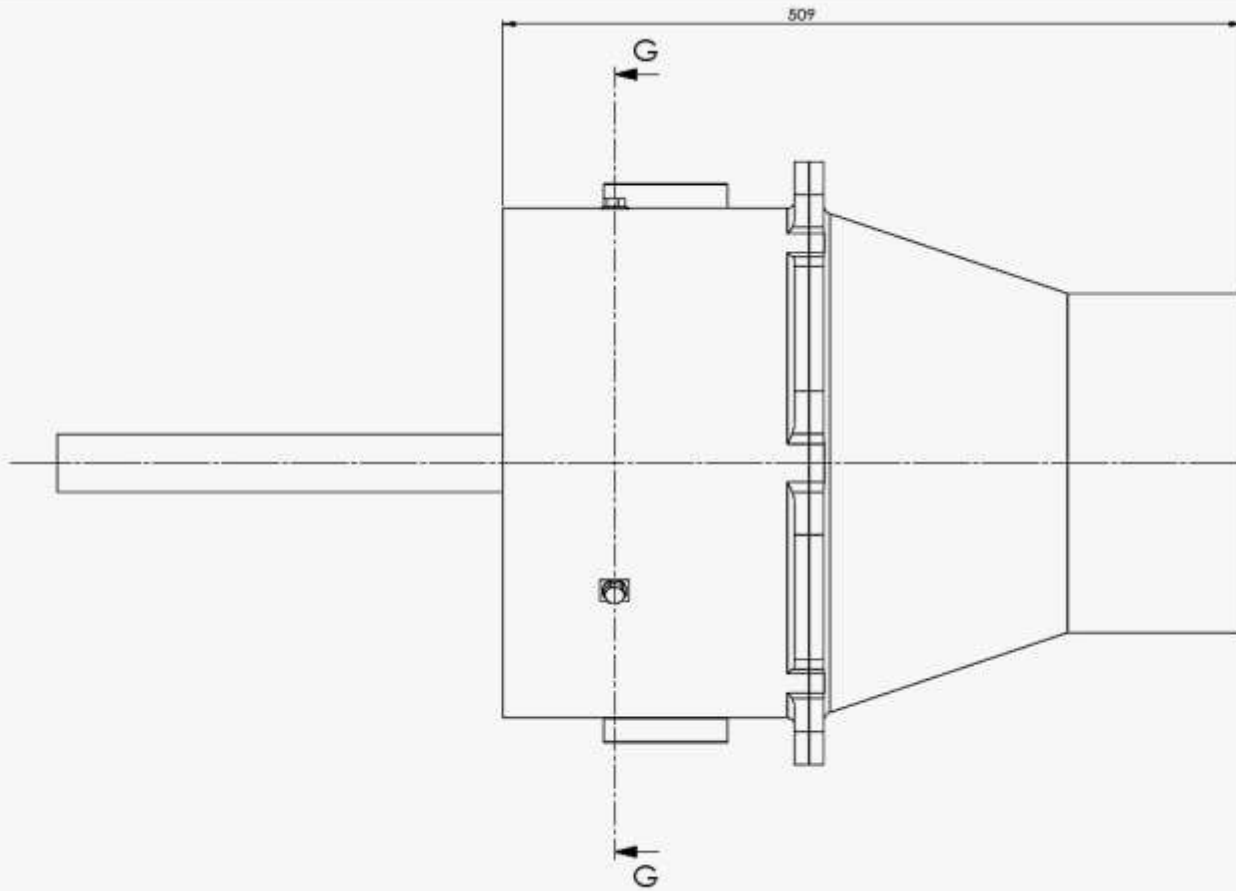
1. Manufacture components as per BoM using drawings and CAD models provided by IITM
2. Supplier can propose alternate manufacturing process and design modifications to improve manufacturability
3. Material specimens, test certificates for strength and chemical composition are required to be submitted. Typical materials for components are SS2205, SS316 & SS316L
4. Execution of heat treatment and other special processes as mentioned in the drawings and documentation of quality check reports
5. Part inspection reports to be submitted
6. Procure standard off the shelf hardware
  - a. O-rings
  - b. Seals
  - c. Bearings
  - d. Gaskets
  - e. Bolts, nuts and washers
7. Manufacture impeller and stator blades using rapid-prototype process to achieve tight tolerance as per the drawings
8. Sub-assembly of components, welding and balancing of impeller should be as per the specifications on the drawings
9. Assembly operations should ensure the fits, clearances and bolts preloads as per the instructions from IITM

**Bill of Materials:**

ITEM NO.	DRAWING NUMBER	TITLE	MATERIAL	QTY.
1	PS-PRT-01	NOSE	SS2205	1
2	PS-PRT-02	SUPPORTING ROD	SS2205	3
3	PS-PRT-03	SPACER - 1	PTFE (general)	1
4	PS-PRT-04	SPACER -2	PTFE (general)	1
5	PS-PRT-05	SHAFT	SS2205	1
6	PS-PRT-06	SLEEVE-PROPULSION SYSTEM	AISI 316 Annealed Stainless Steel Bar (SS)	1
7	PS-PRT-07	SEAL HOUSING	AISI 316 Annealed Stainless Steel Bar (SS)	1
8	PS-PRT-08	HUB	SS2205	1
9	PS-PRT-09	O-RING PLATE	AISI 316 Annealed Stainless Steel Bar (SS)	1
10	PS-PRT-10	GASKET (LOCKNUT)	NEOPRENE	1
11	PS-PRT-11	LOCKNUT	AISI 316 Stainless Steel Sheet (SS)	1
12	PS-PRT-12	STATOR- REAR	AISI 316 Annealed Stainless Steel Bar (SS)	1
13	PS-PRT-13	COVER PLATE-REAR	AISI 316 Stainless Steel Sheet (SS)	1
14	PS-PRT-14	Washer	AISI 316 Stainless Steel Sheet (SS)	1
15	PS-PRT-15	GASKET (END CAP)	NEOPRENE	1
16	PS-PRT-16	END CAP	AISI 316 Stainless Steel Sheet (SS)	1
17	PS-PRT-17	CASING-FRONT	AISI 316 Annealed Stainless Steel Bar (SS)	1
18	PS-PRT-18	CASING-REAR	AISI 316 Annealed Stainless Steel Bar (SS)	1

ITEM NO.	DRAWING NUMBER	TITLE	MATERIAL	QTY.
19	STD PART	IS1364-M8x40x22-N12	STD PART	3
20	STD PART	IS 2269 - M3X20	STD PART	3
21	STD PART	IS 2016 A-9	STD PART	3
22	STD PART	IS 2016 - A- 3.4	STD PART	19
23	STD PART	IS 2269 - M3X16-S	STD PART	16
24	STD PART	O-RING-115X3	STD PART	1
25	STD PART	O-RING-60X2	STD PART	1
35	STD PART	O-RING-120X3	STD PART	1
27	STD PART	O-RING-65X2	STD PART	1
28	STD PART	M30-W-N : IS 1364 (PART 3)	STD PART	1
29	STD PART	IS 2016 A-33	STD PART	1
30	SKF	40x52x8 HMSA10 RG	STD PART	1
31	SKF	70x85x8 HMSA10 V	STD PART	1
32	SKF	NKI 40/30-TN	STD PART	1
33	SKF	81209-TN	STD PART	1
34	SKF	NKXR-30-Z	STD PART	1
35	SKF	65x95x10 HMSA10 RG	STD PART	1
36	SKF	SKF-51406-8,SI,NC,8_68	STD PART	1
37		BLADE - IMPELLER	SS2205	4
38		STATOR - VANE	SS2205	1

SECTION SIZE :



ISOMETRIC VIEW

QUOTATION PURPOSE ONLY  
NOT FOR MANUFACTURING  
DIMENSIONS MAYBE SUBJECTED TO CHANGE

 Department of Ocean Engineering, IIT Madras		TITLE: <b>PROPULSION SYSTEM</b>	
DWG NO. <b>PS-AIM-01</b>		MASS: <b>77.12 Kg</b>	
MATERIAL: <b>REFER DOM</b>		QTY:	
Scale: NTS		REV:	
SHEET 1 OF 4		<b>A2</b>	

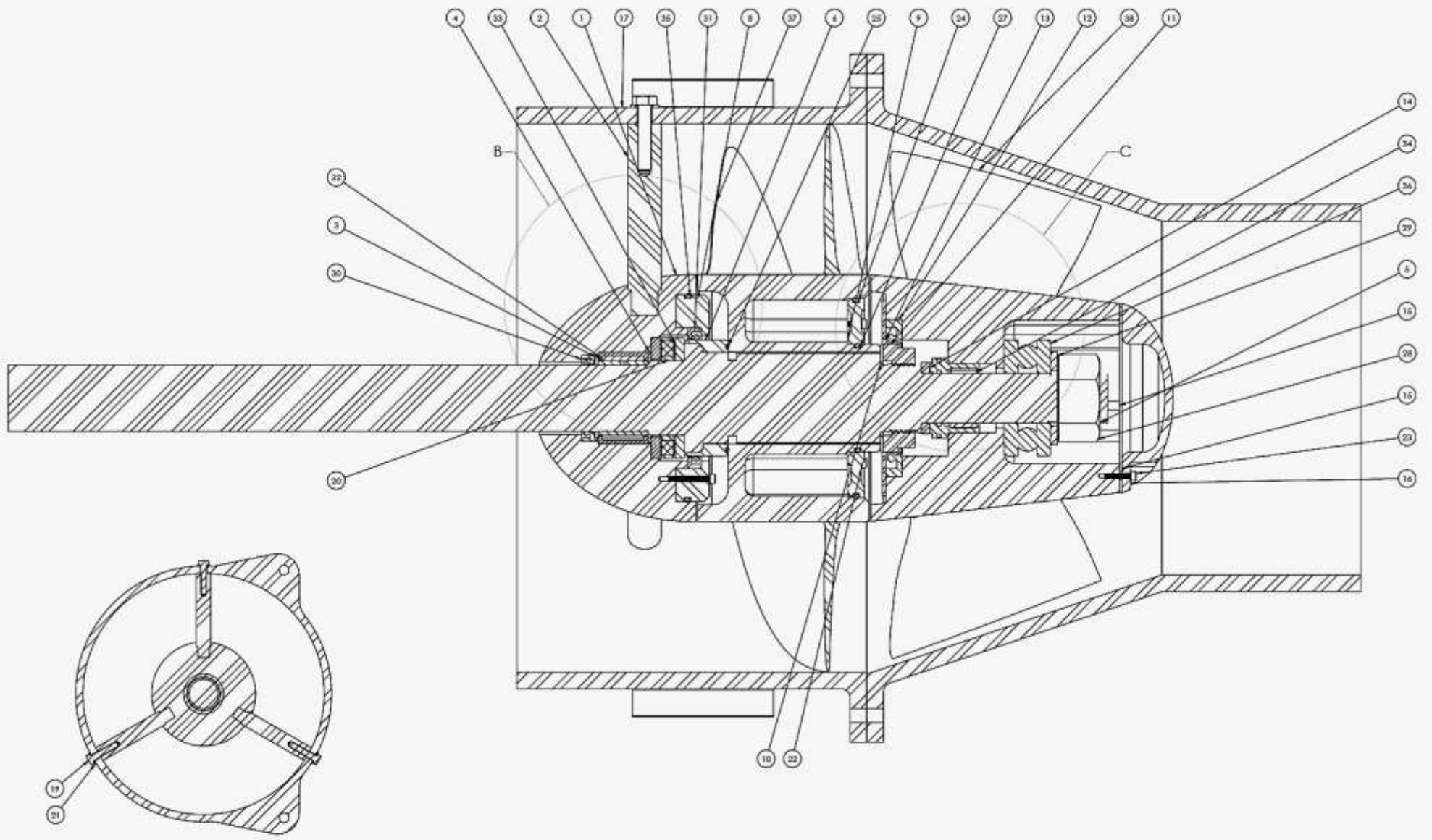
Rev	DESCRIPTION	DATE	BY
01	ISSUED FOR QUOTATION		

ITEM NO.	QTY	DESCRIPTION	UNIT	REMARKS
1	1	PROPULSION SYSTEM	NO	

ITEM NO.	QTY	DESCRIPTION	UNIT	REMARKS
1	1	PROPULSION SYSTEM	NO	



SECTION G-G  
SCALE 1:2.5

REFER SHEET 4 OF 4 FOR BOM LIST

QUOTATION PURPOSE ONLY  
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 Department of Ocean Engineering, IIT Madras	
TITLE: PROPULSION SYSTEM	
DESIGNED BY: PS-625416	
SCALE: 1:2.5	
REFER BOM:	
DATE:	SHEET 2 OF 4 (A)