

ANNEXURE - II

SCOPE OF WORK AND SPECIFICATION FOR RADIOGRAPHY TESTING FOR UPPER HALF OF IP INNER CASING MIDDLE PART

Specification No. SFQC/NDT/2018-19/RT/03 dtd 15/03/2019

NOTE:-

- 1. Vendor must submit complete information against each clause. The offer meeting these clauses would only be processed.**
- 2. The "Vendors Remarks" Column of this format shall be filled in by the Vendor and vendor shall submit details and documents where required along with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance. Vendor to submit his offer with numbering on pages.**
- 3. The offer and all documents enclosed with offer should be in English language only.**
- 4. All dimensions are in mm unless otherwise stated.**

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	Vendor to provide	Vendors remarks	BHEL Remarks
1.0	OBJECTIVE AND SCOPE OF WORK			
1.1	Radiography testing is to be carried out for Upper half of IP inner casing Middle part (Drawing No- 0-10602-60904) for 100% volumetric coverage as per Standard Guide for Radiographic Examination ASTM E-94. Workpiece / casting shall be delivered at vendors works as per mutually agreed date by BHEL . After completion of radiography works, BHEL shall bring back casting from vendors works	vendor to confirm		
2.0	WORK PIECE DETAILS:			
2.1	Work piece is Upper half of IP inner casing casted as per Drawing no- 0-10602-60904. (Drawing enclosed with this specification)	vendor to note		
2.2	Material - Alloy 625 (INCONEL Grade)	vendor to note		
2.3	Thickness- Upto 410 mm	vendor to note		
2.4	Radiographic equivalence factor for Inconel grade relative to steel is 1.3 as per Standard Guide for Radiographic Examination (ASTM E-94)	vendor to note		
2.5	Weight of casting - 8520 kg	vendor to note		
2.6	Work piece will be in cast /machined condition.	vendor to note		

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2.7	Vendor may visit CFFP, BHEL, Haridwar to physically view the casting for assessment of work involved before quoting in the tender.	vendor to note		
3.0	TECHNICAL DETAILS OF RADIOGRAPHY TECHNIQUE :			
3.1	Film based radiography is to be done and permanent records (Films) are to be handed over to CFFP, BHEL, Haridwar for evaluation of films and storage purpose.	vendor to confirm		
3.2	Applicable standard- ASTM E-94	vendor to confirm		
3.3	Technique- Single wall single image	vendor to confirm		
3.5	Optical density requirement -2 to 4.0	vendor to confirm		
3.6	IQIs to be used - Hole Type IQI (As per ASTM E1025) for Steel and Alloy steel group	vendor to confirm		
3.7	Sensitivity requirement - Image quality level- 2-2T is to be achieved in every radiograph.	vendor to confirm		
3.8	Pentrameters are to be placed at source side.	vendor to confirm		
3.9	Source	vendor to provide details		
3.10	Energy/Voltage	vendor to provide details		
3.11	Focal size of source	vendor to provide details		
3.12	Film Type / Manufacturer	vendor to provide details		
3.13	Film size	vendor to provide details		
3.14	Screen Front / Back	vendor to provide details		
4.0	OTHER REQUIREMENTS			
4.1	Radiographs shall be free of any artifacts (mechanical, chemical, handling-related, or other blemishes) which could mask or be confused with the image of any discontinuity in the area of interest on the radiograph. Acceptance of the radiographs will be done by BHEL personnel. If any doubt exists as to the true nature of an indication exhibited by the film, the radiograph shall be retaken.	vendor to confirm		
4.2	Suitable Lead numbers and letters are to be used on each radiograph to designate the part number and location. The same is to be punched on casting for correlation.	vendor to confirm		

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4.3	Radiography may be witnessed by BHEL personnel. Vendor has to inform before start of work.	vendor to confirm		
4.4	Vendor should have crane facility suitable for the job and other suitable facility for movement of job at his works.	vendor to confirm		
4.5	Radiography of the repaired area, if any, is to be carried out.	vendor to note		
5.0	DETAILS / DOCUMENTS TO BE PROVIDED:			
5.1	Documents for qualifying conditions to be submitted as per Annexure- V of tender enquiry.	vendor to note and provide		
5.2	Time required to complete the radiography of the above mentioned work piece however it should not be more than 15 days.	vendor to confirm and provide details		
5.3	Radiography plan and shooting sketch are to be provided by vendor along with technical offer.	vendor to provide		
5.4	Exposure calculations to be furnished by vendor	vendor to provide		
5.5	Documents and Details of suitable source being used for radiography for the above mentioned work piece.	vendor to provide		
5.6	Vendor should have Radiography testing facility approved by AERB.	vendor to confirm and provide documents		
5.7	Radiography testing shall be performed with the safe practices as required by AERB, Government of India.	vendor to confirm and provide details		
5.8	Radiography shall be performed by certified radiographer and other certified staff as per the requirement of AERB.	vendor to confirm and provide documents		

Prepared By


Vimal Kumar
Dy Mgr (SFQC)

Checked By


Arun Kumar Agarwal
SDGM (Fdy Qc , RMI)

Approved By


G M Verma
AGM (QM)

ANNEXURE - I

SCOPE OF WORK AND SPECIFICATION FOR RADIOGRAPHY TESTING FOR LOWER HALF OF IP INNER CASING MIDDLE PART

Specification No. SFQC/NDT/2018-19/RT/02 dtd 15/03/2019

NOTE:-

- 1. Vendor must submit complete information against each clause. The offer meeting these clauses would only be processed.**
- 2. The "Vendors Remarks" Column of this format shall be filled in by the Vendor and vendor shall submit details and documents where required along with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance. Vendor to submit his offer with numbering on pages.**
- 3. The offer and all documents enclosed with offer should be in English language only.**
- 4. All dimensions are in mm unless otherwise stated.**

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	Vendor to provide	Vendors remarks	BHEL Remarks
1.0	OBJECTIVE AND SCOPE OF WORK			
1.1	Radiography testing is to be carried out for Lower half of IP inner casing Middle part (Drawing No- 0-10602-60904) for 100% volumetric coverage as per Standard Guide for Radiographic Examination ASTM E-94. Workpiece / casting shall be delivered at vendors works as per mutually agreed date by CFFP,BHEL, hasridwar. After completion of radiography works, BHEL shall bring back casting from vendors works .	vendor to confirm		
2.0	WORK PIECE DETAILS:			
2.1	Work piece is Lower half of IP inner casing middle part casted as per Drawing no- 0-10602-60904. (Drawing enclosed with this specification)	vendor to note		
2.2	Material - Alloy 625 (INCONEL Grade)	vendor to note		
2.3	Thickness- Upto 410 mm	vendor to note		
2.4	Radiographic equivalence factor for Inconel grade relative to steel is 1.3 as per Standard Guide for Radiographic Examination (ASTM E-94)	vendor to note		
2.5	Weight of casting - 20748 kg	vendor to note		
2.6	Work piece will be in cast /machined condition.	vendor to note		

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2.7	Vendor may visit CFFP, BHEL, Haridwar to physically view the casting for assessment of work involved before quoting in the tender.	vendor to note		
3.0	TECHNICAL DETAILS OF RADIOGRAPHY TECHNIQUE :			
3.1	Film based radiography is to be done and permanent records (Films) are to be handed over to CFFP, BHEL, Haridwar for evaluation of films and storage purpose.	vendor to confirm		
3.2	Applicable standard- ASTM E-94 and ASME SECTION V	vendor to confirm		
3.3	Technique- Single wall single image	vendor to confirm		
3.5	Optical density requirement - 2 to 4.0	vendor to confirm		
3.6	IQIs to be used - Hole Type IQI (As per ASTM E1025) for Steel and Alloy steel group	vendor to confirm		
3.7	Sensitivity requirement - Image quality level- 2-2T is to be achieved in every radiograph.	vendor to confirm		
3.8	Pentrameters are to be placed at source side.	vendor to confirm		
3.9	Source	vendor to provide details		
3.10	Energy/Voltage	vendor to provide details		
3.11	Focal size of source	vendor to provide details		
3.12	Film Type / Manufacturer	vendor to provide details		
3.13	Film size	vendor to provide details		
3.14	Screen Front / Back	vendor to provide details		
4.0	OTHER REQUIREMENTS			
4.1	Radiographs shall be free of any artifacts (mechanical, chemical, handling-related, or other blemishes) which could mask or be confused with the image of any discontinuity in the area of interest on the radiograph. Acceptance of the radiographs will be done by BHEL personnel. If any doubt exists as to the true nature of an indication exhibited by the film, the radiograph shall be retaken.	vendor to confirm		
4.2	Suitable Lead numbers and letters are to be used on each radiograph to designate the part number and location. The same is to be punched on casting for corelation.	vendor to confirm		

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4.3	Radiography may be witnessed by BHEL personnel. Vendor has to inform before start of work.	vendor to confirm		
4.4	Vendor should have crane facility suitable for the job and other suitable facility for movement of job at his works.	vendor to confirm		
4.5	Radiography of the repaired area, if any, is to be carried out.	vendor to note		
5.0	DETAILS / DOCUMENTS TO BE PROVIDED:			
5.1	Documents for qualifying conditions to be submitted as per Annexure- V of tender enquiry.	vendor to note and provide		
5.2	Time required to complete the radiography of the above mentioned work piece however it should not be more than 15 days.	vendor to confirm and provide details		
5.3	Radiography plan and shooting sketch are to be provided by vendor along with technical offer.	vendor to provide		
5.4	Exposure calculations to be furnished by vendor	vendor to provide		
5.5	Documents and Details of suitable source being used for radiography for the above mentioned work piece.	vendor to provide		
5.6	Vendor should have Radiography testing facility approved by AERB.	vendor to confirm and provide documents		
5.7	Radiography testing shall be performed with the safe practices as required by AERB, Government of India.	vendor to confirm and provide details		
5.8	Radiography shall be performed by certified radiographer and other certified staff as per the requirement of AERB.	vendor to confirm and provide documents		

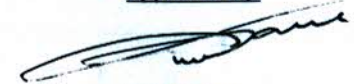
Prepared By


Vimal Kumar
Dy Mgr (SFQC)

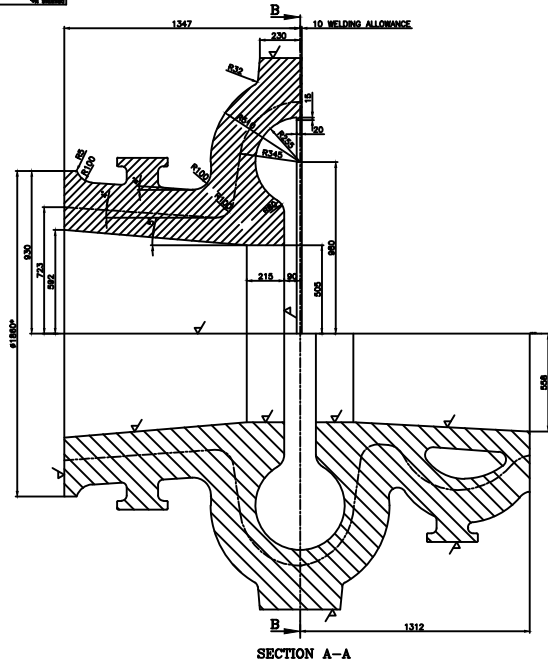
Checked By


Arun Kumar Agarwal
SDGM (Fdy Qc , RMI)

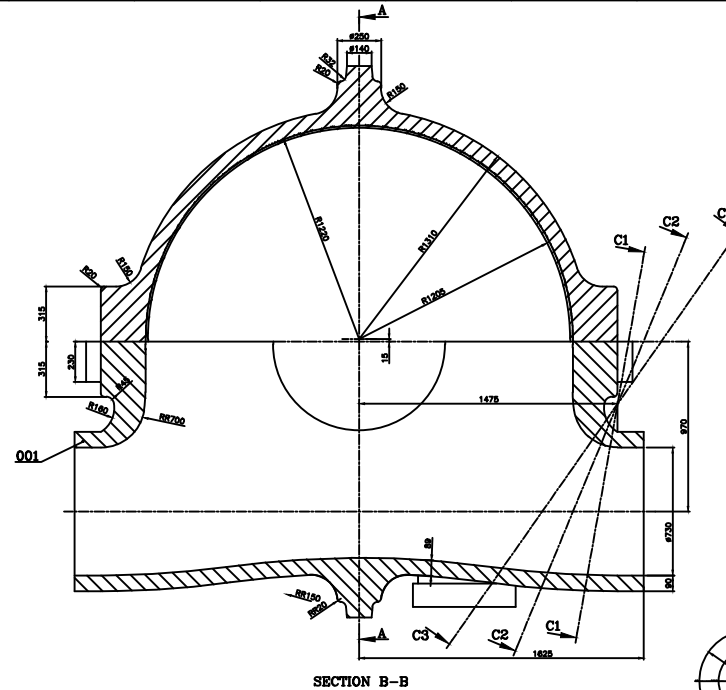
Approved By


G M Verma
AGM (QM)

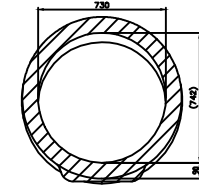
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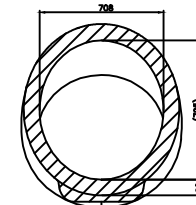
SECTION A-A



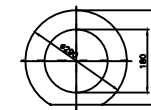
SECTION B-B



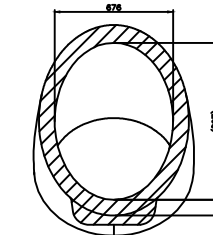
SECTION C1-C1



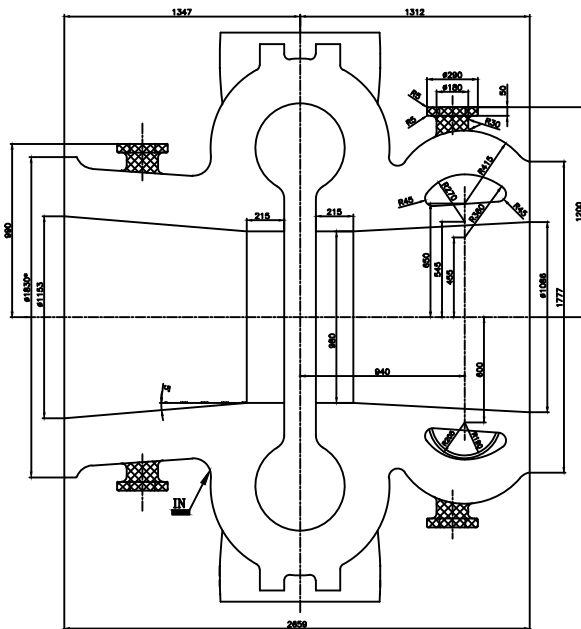
SECTION C2-C2



VIEW U
SCALE 1:5



SECTION C3-C3



VIEW OF CASING JOINT OF LOWER HALF

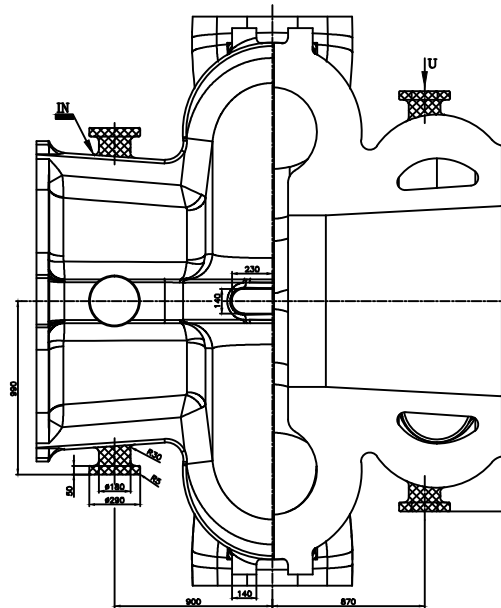


TABLE 1

ITEM NO.	DESCRIPTION	NO. OF QUANTITY	WTO
1	UPPER HALF	1	8.1867
2	LOWER HALF	1	20.295
3	ASST.		28.5754

TECHNICAL REQUIREMENTS:-

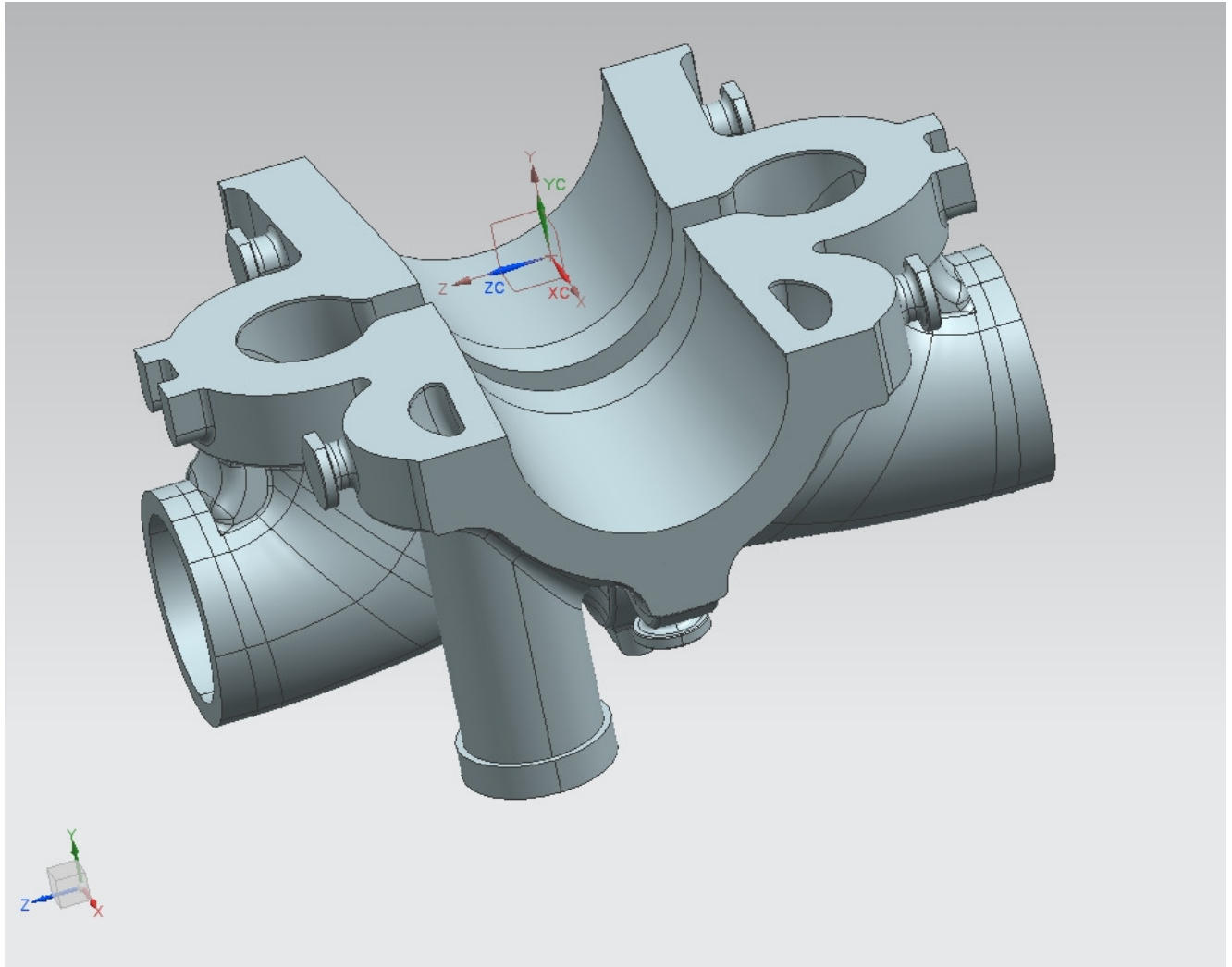
- CASTING TO BE SUPPLIED IN ROUGH MACHINED CONDITION. SURFACES MARKED WITH ∇ TO BE SUPPLIED WITH MACHINING ALLOWANCE OF 0.2mm. [$\nabla = \sqrt{1}$]
- CASTING TO BE SUPPLIED AS PER ORDERING SPECIFICATION TDC-AUSC-ALLOY IN625M-001.
- CASTING QUALITY CLASS : D.P. AND R.T. AS PER ORDERING SPEC. TDC-AUSC-ALLOY IN625M-001.
- WALL THICKNESS NOT LESS THAN 90mm.
- ALL UNSPECIFIED RADI SHALL BE R8.
- REBS AREA TO BE SUPPLIED WITH QUALITY CLASS 1 OF R.T. AND D.P. LEVEL 1 (AS PER ORDERING SPECIFICATION).
- FLANGE SURFACE : THREADED HOLES SHALL BE MADE IN THIS SURFACE. (INFORMATION FOR THE CASTING SUPPLIER).
- IDENTIFICATION AT THE LOCATION MARKED WITH IN.

CROSS REFERENCES -

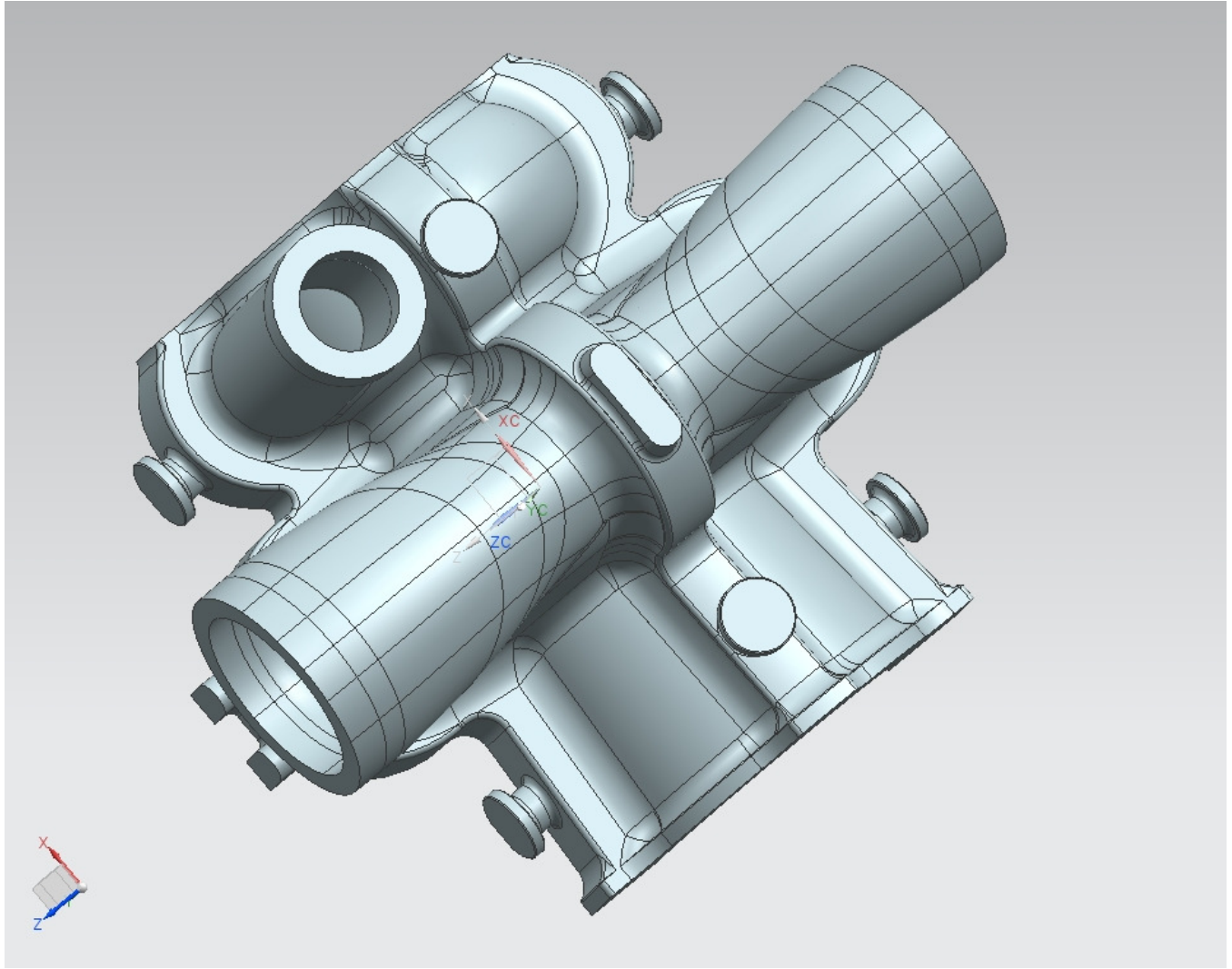
* REFER DRAWING NUMBER 01002080901 & 01002090903

QTY.	REMARKS	ITEM	DESCRIPTION	DRAWING NO.	MATERIAL SPEC.	UNIT	WEIGHT
001		002	Upper half of turbine casing	0-10602-80904	W3310402034	8520	DD
001		001	Lower half of turbine casing	0-10602-80904	W3310402044	20746	DD

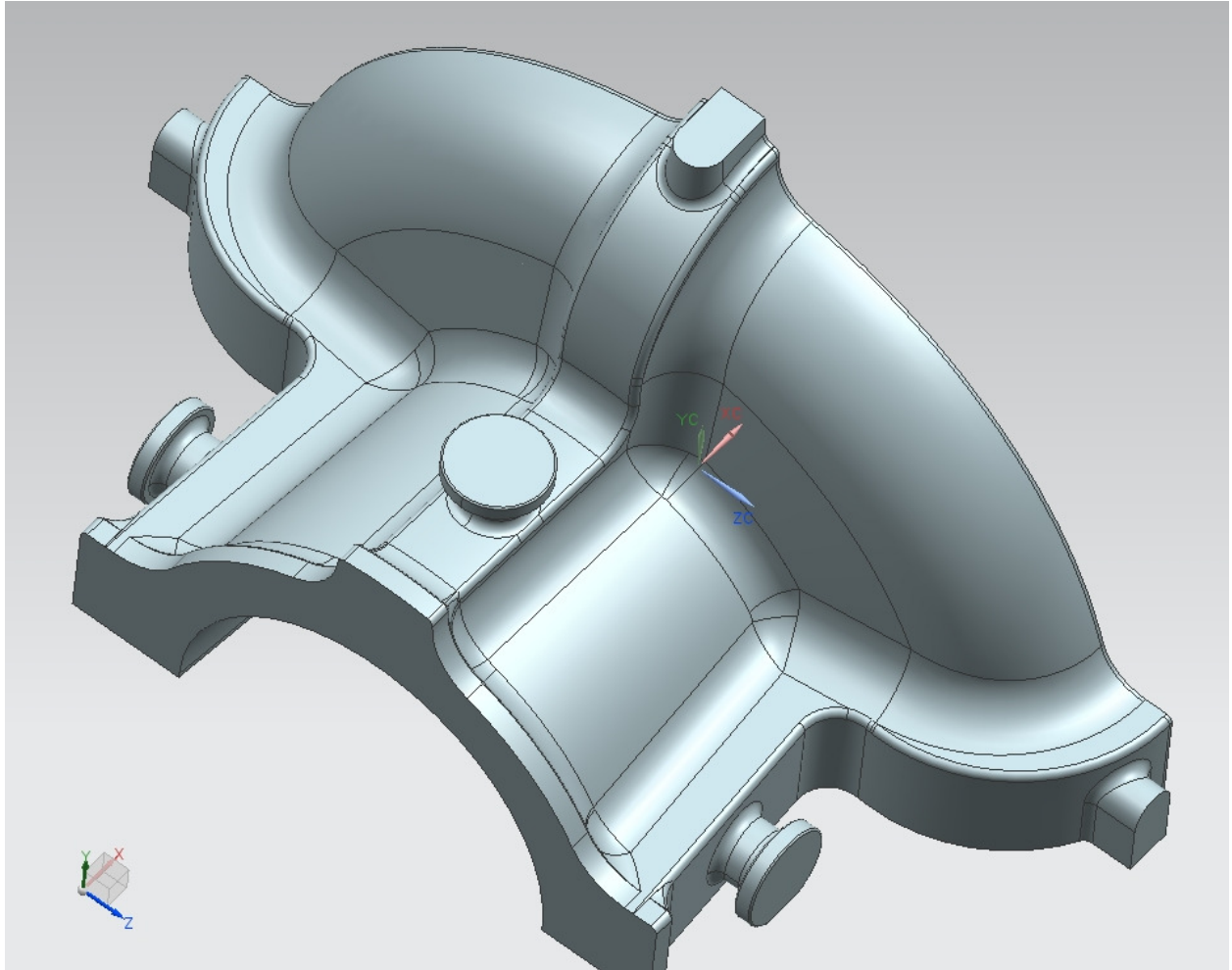
GRADE OF UNTOOLING		DATE		TYPE OF PRODUCT		NAME OF CUSTOMER/PROJECT	
M/C/D - 2/M/A	A02202004	17/11/20	17/11/20	STEAM TURBINE	STEAM TURBINE	STEAM TURBINE	STEAM TURBINE
WELDING - X/B/T/W	A022021104	17/11/20	17/11/20	STEAM TURBINE	STEAM TURBINE	STEAM TURBINE	STEAM TURBINE
D/S CUTTING - 13/A022021101		DATE		DEPT		SCALE	
17/11/20		17/11/20		MTE		1:10	
SUPERSEDES THE OLD DRG UNDER THE SAME NO. C/A. NO. MTE-18-70004		SUPERSEDES THE OLD DRG UNDER THE SAME NO. C/A. NO. MTE-18-70020		SUPERSEDES THE OLD DRG UNDER THE SAME NO. C/A. NO. MTE-18-70011		SUPERSEDES THE OLD DRG UNDER THE SAME NO. C/A. NO. MTE-18-70012	
TITLE				DRAWING NO.			
CASTING FOR IP INNER CASING MIDDLE PART				0-10602-80904			
DRAWING NO.				FORM NO. 01			



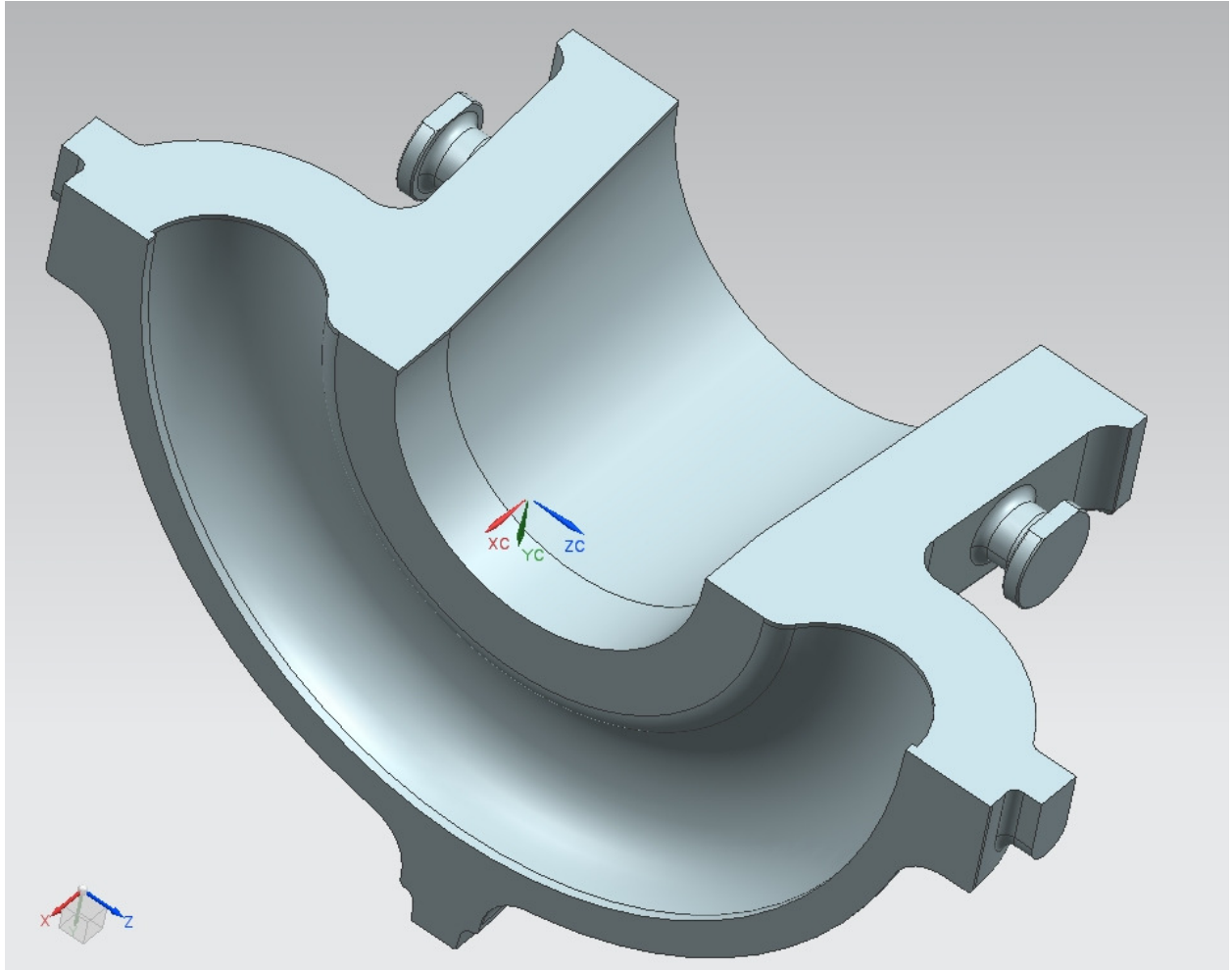
3-D VIEW OF LOWER HALF OF IP INNER CASING MIDDLE PART



3-D VIEW OF LOWER HALF OF IP INNER CASING MIDDLE PART



3-D VIEW OF UPPER HALF OF IP INNER CASING MIDDLE PART



3-D VIEW OF UPPER HALF OF IP INNER CASING MIDDLE PART