

PRECISION | INNOVATION | GLOBAL STANDARDS

AS9100D CERTIFIED

**EXPERTS IN
MISSION-CRITICAL
AEROSPACE & DEFENSE
COMPONENTS**

SPECIALIZED IN

**High-Precision
Machining**

**Design
Engineering**

**Quality
Inspection**



Plot No. G58, General Park,
IP Sulthanpur, Sangareddy, Telangana – 502319

☎ : +91 40 662 22555

🌐 : aerospace.varsun.com

✉ : mfg.sales@varsun.com

Table of Contents

1.	Welcome to Varsun Aerospace Technologies.....	3
2.	Our SERVICES	3
a)	Manufacturing.....	3
b)	Engineering.....	4
3.	Salient FEATURES	4
4.	List of MACHINERY	5
5.	Special PROCESS / Case STUDIES	10
6.	QUALITY COMMITMENT	14
a)	Quality Certificates.....	14

1. Welcome to Varsun Aerospace Technologies

Who we are

Varsun Aerospace Technologies Pvt. Ltd. is an AS9100D-certified global engineering and manufacturing company, specializing in high-precision machining, design engineering, and quality inspection services.

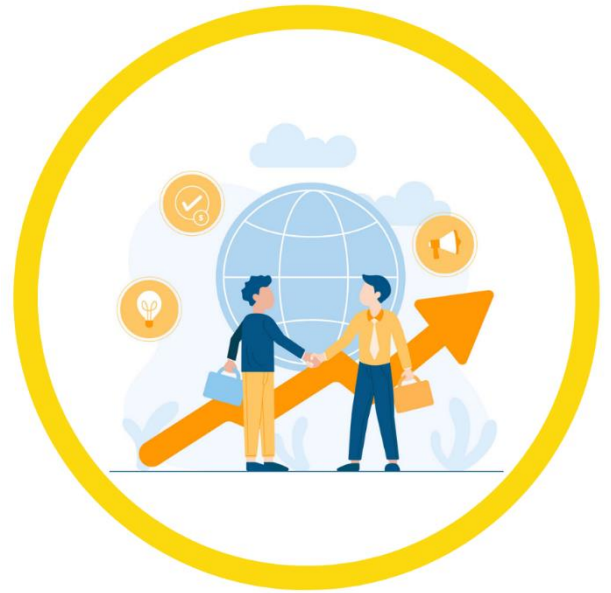
Founded in 2004, and based in Sultanpur, Telangana, Varsun combines innovation, advanced technology, and strict quality control to deliver components and systems trusted by the aerospace, defense, and high-tech industries.

Mission

"Manufacturing of High Precision and Advanced Technology Products with Quality to match Global Standards"

Vision

"Varsun envision achieving global leadership in providing sustained value to its clients by combining technology skills, domain expertise, process focus and a commitment to long-term relationship"



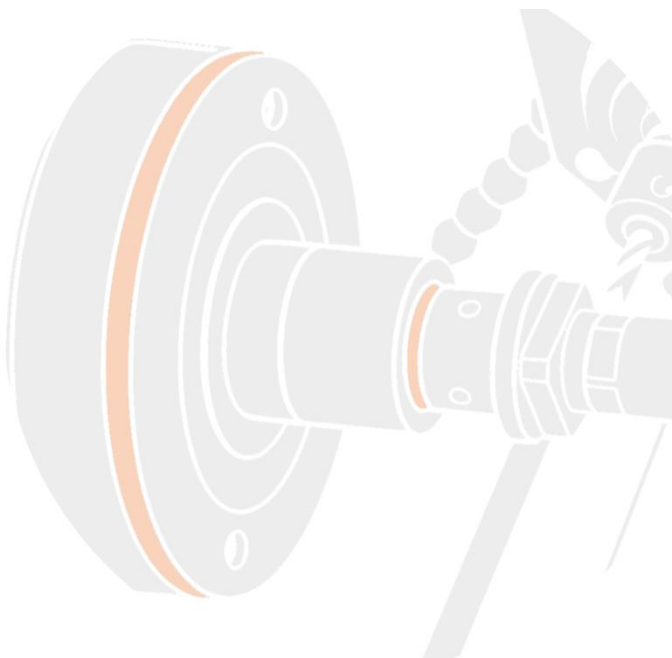
2. Our SERVICES

a) Manufacturing

- Aerospace-grade CNC Machining (3, 4, 5 Axis) and Creep Feed Grinding Machines
- Expertise in Titanium & Nickel Alloy Machining
- Aerospace Components: Blades, Casings, Rings
- High-Precision CMM Inspection
- Rapid Prototyping & Custom Tooling

Supporting Defense R&D with Agile, Scalable manufacturing:

- High-Precision Machining - Complex parts with tight tolerance
- Prototyping & Low-Volume Production - Rapid development of functional prototypes
- A Material Expertise - Aerospace-grade metals such as Titanium and Nickel alloys, composites, and special alloys
- End-to-End Support - From material procurement to component delivery



b) Engineering

- DFM (Design for Manufacturability) - Optimize designs for manufacturability and cost
- CAD/CAM Engineering - 3D modelling, simulation, and toolpath generation
- Reverse Engineering - Reconstructing legacy or undocumented parts
- Co-Development - Collaborative design iteration with defense engineers
- Expertise in 3D CAD design using multiple platforms
- Product and Manufacturing BoM creation, 2D product drawing generation
- Structural design, FEM calculations, and CAE analysis
- Experience working in PLM/PDM platforms for seamless data management
- Technical publications for service maintenance manuals and work instructions



3. Salient FEATURES

- AS9100D Certified - Compliant with international aerospace & defense quality standards.
- Advanced CNC Infrastructure - Equipped with 5-axis, 4-axis, 3-axis CNC Milling and Turning machining centers for complex geometries
- Precision Assurance - Coordinate Measuring Machine (CMM) for high-accuracy dimensional inspection.
- Serving aerospace, defense, and high-tech industries with consistent quality and reliability.
- Equipped with a high-precision Creep Feed Grinding Machine for fir-tree root serrations on turbine blades and other critical aerospace components like nozzle guide vanes and spines



4. List of MACHINERY

CNC MILLING



Machine Model: BFW-BMV 60

- **Size:** X - 1050mm; Y - 610 mm; Z - 610mm
- **Axis:** 3 & 4 with angular head attachment
- **ATC:**
- **Material Machined:** Titanium & Nickel
- **Qty.:** 2 no.



Machine Model: BFW-BMV 45

- **Size:** X - 600mm; Y - 450 mm; Z - 500mm
- **Axis:** 3 & 4
- **ATC:** 24
- **Material Machined:** Titanium & Nickel
- **Qty.:** 14 nos.



Machine Model: DMU - 65

- **Size:** X - 735mm; Y - 650 mm; Z - 560mm; C - 180°; B - 360°
- **Axis:** 5
- **ATC:**
- **Material Machined:** Titanium & Nickel
- **Qty.:** 1 no.



Machine Model: COSMOS CVM 700

- **Size:** X - 700mm; Y - 450 mm; Z - 500mm
- **Axis:** 3 & 4
- **ATC:** 20
- **Material Machined:** Titanium & Nickel
- **Qty.:** 2 nos.



Machine Model: COSMOS CVM 1160

- **Size:** X - 1100mm; Y - 650 mm; Z - 600mm
- **Axis:** 3 & 4
- **ATC:** 24
- **Material Machined:** Titanium & Nickel
- **Qty.:** 1 no.

CNC TURNING



Machine Model: JYOTHI DX-200 5a and ACE Jobber XL

- **Size:** Dia - 365; Length - 400mm;
Swing Over Dia - 500mm
- **Axis:** 2
- **ATC:** 8
- **Material Machined:** Titanium & Nickel
- **Qty.:** 5nos.

VTL MACHINES

(Manual with DRO. 4 nos., & CNC - Fanuc & Siemens Control 4 nos. Chuck Dia – 800mm to 2200mm [maximum turning diameter 2800mm])



CONVENTIONAL MILLING



Machine Name: **BFW**

- Size: X-1400, Y-400, Z-400mm
- Qty.: 2 Nos.

CONVENTIONAL DRILLING (Qty. 3 nos.)



CNC CREEP FEED GRINDING – HEAVY DUTY

(2 Nos. Length 800mm x 350mm x 300mm with pallet changer)



CONVENTIONAL GRINDING & EDM (Qty. 3 nos. 700mm x 400mm x 300)



CONVENTIONAL TURNING (Qty.: 8 nos. Large and Medium)



5. Special PROCESS / Case STUDIES

Case Study – 1 : 7th Compressor Rotor Blade of Helicopter Engine



Material: Titanium Alloy

PROCESS :

1. The subject blade is machined from Titanium base raw material from an envelope forging comprising of two parts from one billet.
2. Initially dovetail root is milled on both ends of billet using in-house developed fixtures using 4- Axis VMC.
3. Centring is done on the other end of the billet after parting off the billet into two blades.
4. Aerofoil profile is generated in various steps using in-house developed NX software program (Rough/semi finish, Final, transition radii & Notch milling)
5. Blade total height is maintained after parting off of centring end portion.
6. All aerofoil profile parameters like maximum profile thickness, leading & trailing edge thickness, chord width, transition radii etc. using profile templates and gauges by grinding, polishing and buffing operations.
7. Final inspection is carried out as per customer's supplied technology using CMM & other precise gauges/ instruments.

CHALLENGES:

Very small / critical dimensions like blade dovetail Root matching dim $4.74 - 0.048$, total Height $27.9 - 0.3$, Chord width $12 \pm 0.01\text{mm}$ & L/T edge thickness 0.1 to 0.2mm are more challenging to achieve practically using small I/H developed form tools, fixtures and gauges.

Case Study – 2 : 1st LPC Guide Vane of Aircraft Engine



Material: **Titanium Alloy**

PROCESS :

1. The subject Guide Vane is machined from Titanium base raw material by heavy duty forging of height 240mm and width 60mm.
2. The upper and lower platform of the Vane are machined successively after centring both ends and then a set of 54 Vanes are assembled in a turning fixture for pouring of Cerobond alloy into CC & CV profile zones for a rigid clamping and finish turning of upper and lower platforms using CNC VTL m/c.
3. De-Cero bonding is carried out using hot water both and all 54 Vanes are dismantled for further aerofoil profile milling.
4. Aerofoil profile is generated in different settings using in-house developed fixtures and NX software program (Rough/semi finish, Final and transition radii).
5. All aerofoil profile parameters like maximum profile thickness, leading & trailing edge thickness, chord width, transition radii etc. using profile optical measuring device and gauges by grinding, polishing and buffing operations.
6. Final inspection is carried out as per customer's supplied technology using CMM & other precise gauges/ instruments.

CHALLENGES:

Upper platform diameters $866.35 - 0.1$ & $857.51 - 0.1$ as well as Lower platforms diameters $448.33 + 0.15$, $441.79 + 0.15$ & $448.36 + 0.12$ are very critical to achieve on all the 54 blades at a time in a set using heavy snap gauges with dial indicator readings wrt customer's standard, Final Aerofoil profile dimensions are very stringent to maintain using standard gauges and optical measuring device.

Case Study – 3 : LPTR BLADE of Aircraft Engine



Material : **Nickle base Alloy**

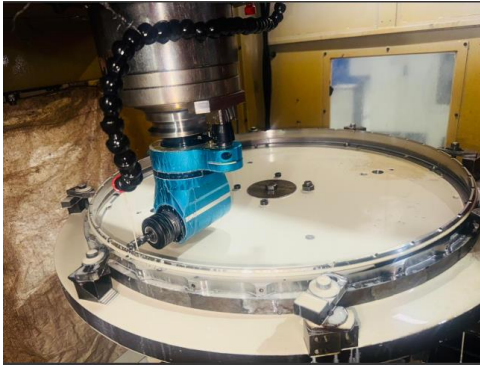
PROCESS :

1. The billet of the subject LPTR Blade is received from the customer in the form of investment casting stage with inside hollow profile.
2. Initially, Aerofoil profile dimensions like maximum profile thickness, Leading edge thickness are maintained by investment casting stage itself except Trailing edge thickness and Chord width which are maintained as per technology by the polisher using customers' standard and gauges.
3. The datum faces of both ends i.e. Root & Shroud are ground on surface grinding machine initially to facilitate further final creep feed grinding operations of both Fir-tree Root serrations & Shroud abutment faces using high value imported CFG M/c.
4. Shroud end Labyrinth crest is formed on 90 Nos of blades as a set-in assembly state on a facing lathe using cylindrical grinding attachment.
5. Locking groove of all blades are milled individually on VMC & Root Labyrinthis formed individually on surface grinding / Creep feed grinding machine.
6. Final inspection is carried out as per customer's supplied technology using CMM & other precise gauges/ instruments.

CHALLENGES:

Critical T.C like- over roller dimensions of Root Fir -Tree serrations (3 Nos) with digital micrometer, symmetry of Root, taper and non-parallelism of all serrations, misalignment of longitudinal serrations are very much challenging to maintain during creep feed grinding operations using sophisticated gauges & instruments. Angular dimensions of abutment faces are very critical in nature to maintain the required T.C like positions of faces wrt to standard / dial indicator readings.

Case Study – 4 : MIXER RING



Material : **NICKEL BASE ALLOY**

PROCESS :

1. The subject Mixer Ring is machined from Nickel Base Alloyraw material by heavy duty ring forging of ODXIDW= 899X851X65 mm.
2. Initial as well as final turning operations are done in different stages using conventional VTL & CNC VTL of rotary table size of dia 900/1200mm to maintain all critical dimensions with close tolerances.
3. Ribs, slots, contours, holes etc. are milled in horizontal / vertical settings on 4-Axis VMC- BMV 60, using I-H developed fixtures and NX software program.
4. Final dressing / polishing are carried out by polisher on both outer & inner contours of Ring to get the required surface finish, hole chamfers, rib width, slot width dimensions etc.
5. Final inspection is carried out as per customer's supplied technology using CMM & other precise gauges/ instruments.

CHALLENGES:

Ovality of Ring in free condition is a big challenge after maintaining the dimensions on the machine along with fixture. Variations in wall thickness at different zones is also a challenge to maintain on the subject Ring from 1.6 ± 0.1 to $2.1 - 0.3$ mm

6. QUALITY COMMITMENT

- Our **AS9100D-certified Quality Management System** ensures excellence in every component we deliver.
- CMM Inspection for Dimensional Accuracy
- First Article Inspection (FAI - AS9102)
- Full Material Traceability & Documentation
- In-Process QC & Continuous Improvement



The entire production process is rigorously managed through a three-stage quality control system—IQC (Incoming Quality Control), IPQC (In-Process Quality Control), and FQC (Final Quality Control)—to ensure the highest product quality. Precision instruments, including Croma CMM, are employed to guarantee accurate measurements and precise alignment across all products

a) Quality Certificates

The certificate is from DNV, featuring their logo at the top left. The title "MANAGEMENT SYSTEM CERTIFICATE" is prominently displayed in the center. Below the title, a table provides key details: Certificate no. C706882, Initial certification date 01 July 2020, Issue Date 01 July 2020, and Expiry Date 30 July 2028. The main body of the certificate states that the management system of Varsun Aerospace Technologies Private Limited, located at 70, 174/G58, General Park Sultanpur, Sultanpur, Patancheru, Sangareddy - 502319, Telangana, India, has been found to conform to the Quality Management System standards: AS9100D and ISO 9001:2015 (technically equivalent to EN9100:2018 and JISQ9100:2016). It also mentions that the system has been audited in accordance with the requirements of AS 9104/1:2012 and that DNV Business Assurance USA Inc. is accredited under the Industry Controlled Other Party (ICOP) Scheme. The type of certification structure is noted as "Single Site". The scope of the certificate is "Manufacture of Precision Machined Components for Aerospace and Industrial Applications". At the bottom, it includes the place and date of issuance (Katy, TX, 21 July 2020), a QR code, the ANAB logo, and the signature of Steve Mackay, Managing Representative. A footer contains the address of the accrediting body, DNV Business Assurance USA Inc., and their contact information.

DNV

**MANAGEMENT SYSTEM
CERTIFICATE**

Certificate no. C706882	Initial certification date 01 July 2020	Issue Date 01 July 2020	Expiry Date 30 July 2028
----------------------------	--	----------------------------	-----------------------------

This is to certify that the management system of

Varsun Aerospace Technologies Private Limited
70, 174/G58, General Park Sultanpur, Sultanpur, Patancheru, Sangareddy - 502319, Telangana, India

has been found to conform to the Quality Management System standards:
AS9100D and ISO 9001:2015
(technically equivalent to EN9100:2018 and JISQ9100:2016)

and has been audited in accordance with the requirements of AS 9104/1:2012. DNV Business Assurance USA Inc. is accredited under the Industry Controlled Other Party (ICOP) Scheme.

Type of certification structure: Single Site

This certificate is valid for the following scope:
Manufacture of Precision Machined Components for Aerospace and Industrial Applications

Place and date:
Katy, TX, 21 July 2020

For the accredited unit:
DNV - Business Assurance
1400 Ravello Drive, Katy, TX, 77450-5166, USA

ANAB
2020 National Accreditation Board
ACCREDITED
MANAGEMENT SYSTEMS
CERTIFICATION BODY

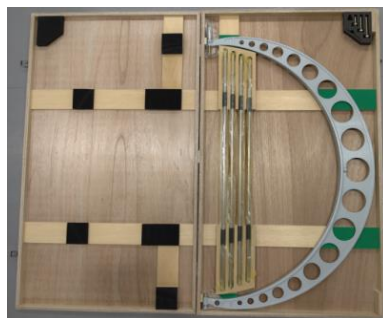
Steve Mackay
Managing Representative

Link of full text of conditions as set out in the Certification Agreement may be found on Certificate itself.
ACCREDITED UNIT: DNV Business Assurance USA Inc., 1400 Ravello Drive, Katy, TX, 77450, USA | TEL: +1 281 286 1800 | www.dnv.com

QUALITY EQUIPMENT



Hexagon CMM Machine (Qty. 1 no.)



Micrometres
Range - 0 to 1500mm



Pomkol - (Qty. 5 nos.)



ALTERA 20.10.8