



OKLAHOMA CITY AIR LOGISTICS CENTER



TEAM TINKER



U.S. AIR FORCE

PEWG and Tinker Air Force Base

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Overview

- PEWG
- HVOF
- New Starts at TAFB



PEWG

A Propulsion Community Collaboration
for Advanced Turbine Engine
Technology Insertion

PEWG Mission

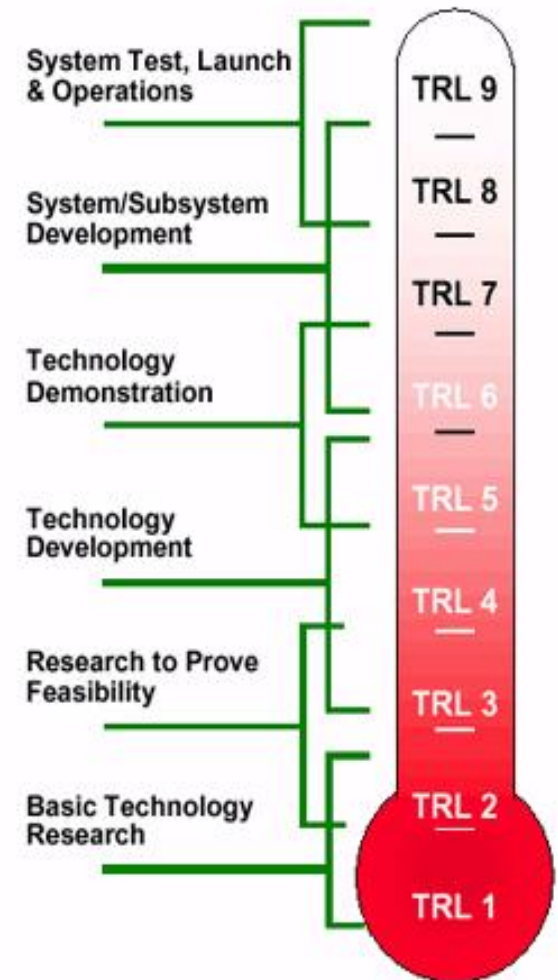
- Work within the military propulsion community to discover and insert safe, clean, and effective manufacturing and repair technologies to improve product
 - Performance
 - Sustainability, affordability, availability
 - Competitiveness with foreign technology

Improvement Targets

- New engine and part manufacture
 - Component design
 - Industrial processes
- Fielded engine repair
 - Repair methods
 - MRO processes

Technology Readiness Levels

- Identify project opportunity
 - S&T TRL 7 development
 - Component improvement
 - Process improvement
- Test and demonstrate
 - Real part, real engine
 - Shop floor
- Qualify specification changes



Guidance for PEWG Project Proponents

1. Show evidence your technology is TRL Level 7+
2. Identify specific GTE components that will benefit
3. Identify specific benefits that will accrue
4. When requested by PEWG Management, provide information required by source of project funds
5. Nominate projects by contacting the PEWG Management Office Bob.Bondaruk.ctr@tinker.af.mil
6. Proponents may be invited to present at PEWG meeting – For details visit www.pewg.com

HVOF

TINKER FACILITY

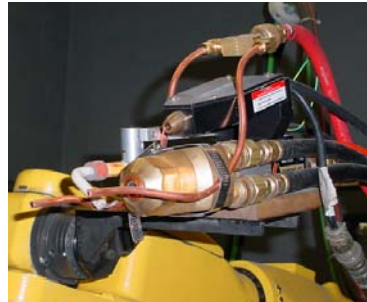
- TWO BOOTHS SHARING ONE CONTROL ROOM



**Sulzer Metco Diamond
Jet Controller**



**9MP DJ Powder
Feeder**



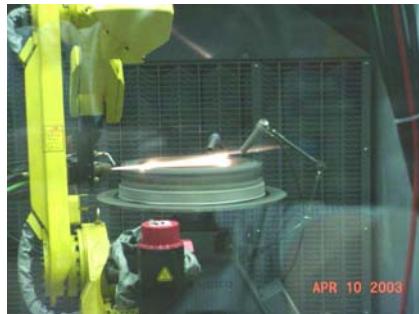
**Sulzer Metco Diamond
Jet Gun**



Cryogenic Oxygen Supply



Fanuc M16i Robot



**M16i Robot/
Sulzer Metco 9HL Turntable**



Temperature Measurement



•Temperature Display

HVOF Qualification

TF33 No 4 Hub

AMS 2447-__



F101 2nd Fan Disk Inconel 718



F100 Balance Nozzle Segment AMS 2447-__



F118 1st stage Aior Seal Inconel 718

Summary HVOF

- Successful technology insertion
- Qualified on TF 33 & F100 component families
- Planning 2 new booths for FY08

HVOF

THIS IS AN UNCONTROLLED DOCUMENT. DESTROY AFTER USE.

Process Operation Sheet - POS HVOF

POS PMXG-85-11- 0008 Rev: A
Date Created: 6/6/2006
Date Reaffirmed: 7/21/2006
PQR#: 06143-02

Non-Rotating Simple

WCD: 65933R Building: 3001 Booth: 17 Family: 27 Coating Type: Coating

Part Noun: Nozzle Segment - Balance, Augmentor Engine: F100-PW-229
Part Number: 4070067 T.O. Reference: 2J-F100-53-10, WP 415 00

Data listed within this box will be verified with the Tech Order before starting work. If conflicts occur, notify MXPPE for verification and/or re-qualification.

Coating Data

Powder Spec: AMS 7879
Powder Name: Metco 71 VF-NS-5 / Linage Alloy 3379

Preparation

Cleaning: Alcohol Wipe
Fixturing: X200333682
Masking: X20034928
Spray Area: Area W (Gas Path Side)

Blast Info

Manual/Mechanical: Manual Distance("): 7
Pressure(Dyn psi): 30 Nozzle Size("): 0.375
Angle("): 70 Dwell Time(Min): As Req.

Mechanical Only

Number of Strokes: N/A
Turntable RPM: N/A P1 (top): N/A
Gun Speed: N/A P2 (bottom): N/A

Spray Equipment Supplements

Controller Type: Diamond Jet - DJC
Nozzle: DJ7-8 Aircap: DJ-2603

Gas Settings

	Flow(FMR)	Pressure(PSI)
Hydrogen:	62 - 66	140 - 160
Oxygen:	30 - 34	160 - 180
Air:	42 - 46	90 - 110

Testing Info

Test Piece Material: TI 6-4
Testing Requirements:
Three "Tensile Bond Bars" at the beginning of the week - see T.O for thickness req. One sample "Micro Only" per lot sprayed to part thickness.

Gun Info

Manufacturer/Model: Sulzer Metco / DJ8W
Program: HVOF_0500 Passes: 10 - (As Required)
Spray Distance: 10 (+/- 1/4")
Angle("): 3 (+/- 5°)
Robot Hole: 7

Powder Feeder

Manufacturer/Model: Sulzer Metco / 9MP-DJ
Feed Rate: 76 (+/- 7 g/min) Vibrator(PSI): 20
Feed Hose: Orange

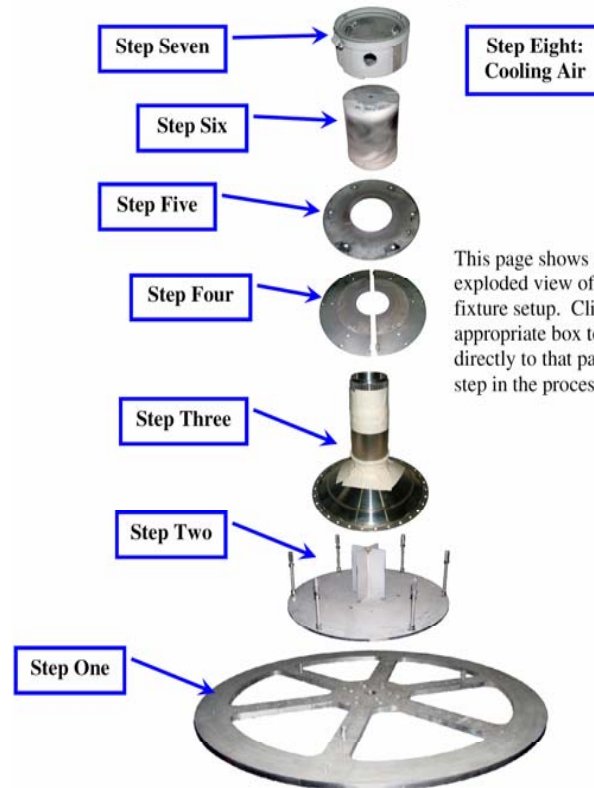
Carrier Gas Settings Injection Port

Gas: Nitrogen Injector: DJ8-8
Flow(SCFH): 28 (+/- 0.5) Powder Shaft: E

Misc Data

Turntable Speed(RPM): 30
PPSI #: HVOF_0500
Preheat Temp(°F): 150 Max Temp(°F): 350
Notes:
Pyrometer at 17" opposite side of part. * Control by robot program

Fixture Setup



This page shows an exploded view of the fixture setup. Click on the appropriate box to go directly to that particular step in the process.

[Return to Menu](#)

WCD Name: #4 HUB H/C COMP
Program #: 0504

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New Starts

- SermeTel W Cr+6 replacement coatings
 - SermeTel, Alseal, and CERAL
- TBC coating removal inefficiencies
 - High Frequency Forced Pulse Waterjet
- Plasma Coating Removal
 - Qualifying citric acid benign solutions
- Gatorgard equipment replacement
 - Eliminating proprietary process

New Starts (cont'd)

- Supersonic Particle Deposition (SPD)
 - ESTCP ARL collaboration
 - TF33 and F100
- NLOS Cr+6
 - ESTCP collaboration Nano Phosphorous Cobalt
- Field level repair capability
 - Hand held laser

Summary

- PEWVG management office now at TAFB
- HVOF project successful and expanding
- New starts are In progress
- Summer PEWVG, Phoenix, June 25-28
 - Registration www.pewg.com