



OKLAHOMA CITY AIR LOGISTICS CENTER



TEAM TINKER

PEWG and Tinker Air Force Base



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Integrity - Service - Excellence

Overview

- PEWG
- HVOF
- New Starts at TAFB



PEWG

A Propulsion Community Collaboration
for Advanced Turbine Engine
Technology Insertion

PEWEG Mission

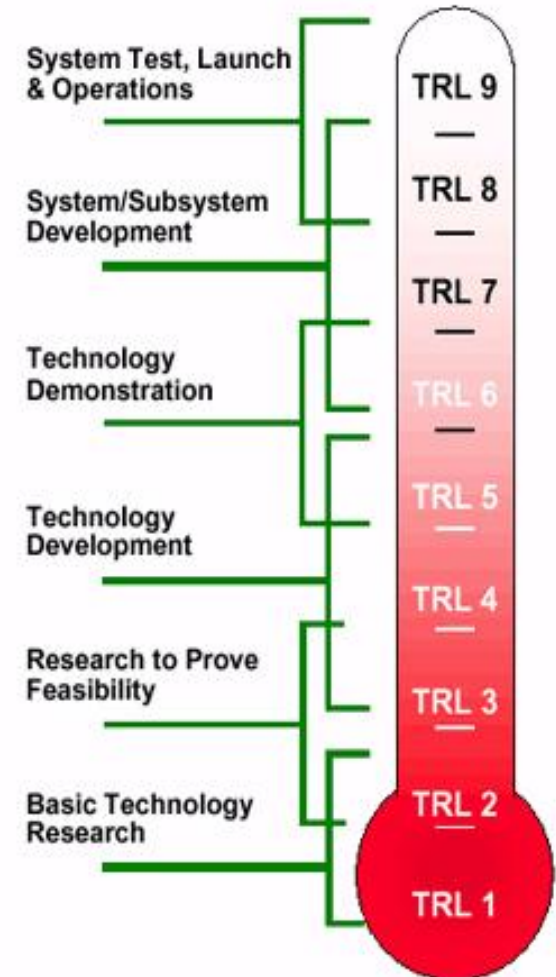
- Work within the military propulsion community to discover and insert safe, clean, and effective manufacturing and repair technologies to improve product
 - Performance
 - Sustainability, affordability, availability
 - Competitiveness with foreign technology

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

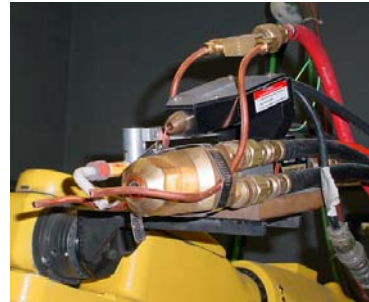
- TWO BOOTHS SHARING ONE CONTROL ROOM



Sulzer Metco Diamond Jet Controller



9MP DJ Powder Feeder



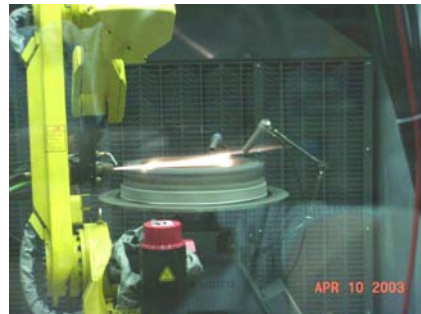
Sulzer Metco Diamond Jet Gun



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

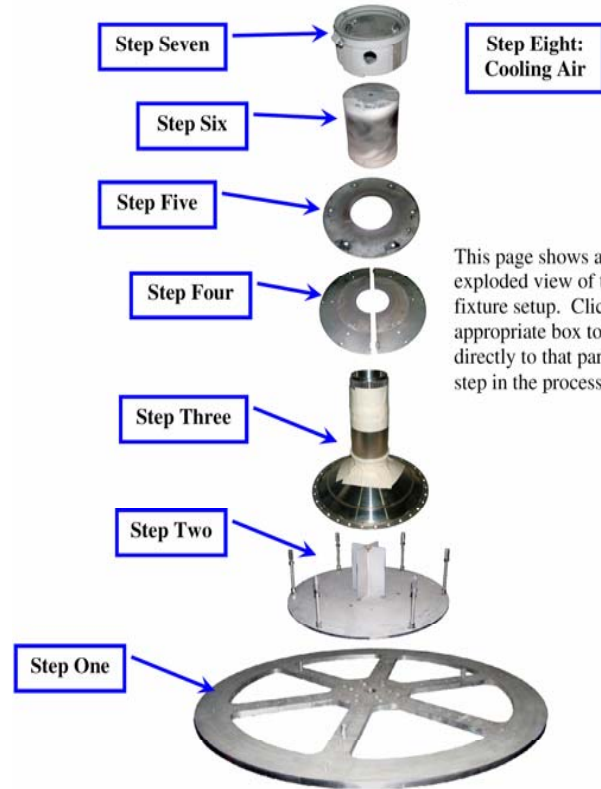
- Successful technology insertion
- Qualified on TF 33 & F100 component families
- Planning 2 new booths for FY08

HVOF

THIS IS AN UNCONTROLLED DOCUMENT. DESTROY AFTER USE.

Process Operation Sheet - POS		POS PMXG-85-11- 0008 Rev: A												
HVOF		Date Created: 6/6/2006												
Non-Rotating <input type="checkbox"/> Simple <input type="checkbox"/>		Date Reaffirmed: 7/21/2006												
		PQR#: 06143-02												
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												
<p>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.</p> <p>Coating Data</p> <p>Powder Spec: AMS 7879</p> <p>Powder Name: Metco 71 VF-NS-5 / Linage Alloy 3379</p>														
<p>Preparation</p> <p>Cleaning: Alcohol Wipe</p> <p>Fixturing: X200333682</p> <p>Masking: X20034928</p> <p>Spray Area: Area W (Gas Path Side)</p>														
<p>Blast Info</p> <p>Manual/Mechanical: Manual Distance("): 7</p> <p>Pressure(Dyn psi): 30 Nozzle Size("): 0.375</p> <p>Angle("): 70 Dwell Time(Min): As Req.</p>														
<p>Mechanical Only</p> <p>Number of Strokes: N/A</p> <p>Turntable RPM: N/A P1 (top): N/A</p> <p>Gun Speed: N/A P2 (bottom): N/A</p>														
<p>Spray Equipment Supplements</p> <p>Controller Type: Diamond Jet - DJC</p> <p>Nozzle: DJ7-8 Aircap: DJ-2603</p>														
<p>Gas Settings</p> <table border="1"> <thead> <tr> <th></th> <th>Flow(FMR)</th> <th>Pressure(PSI)</th> </tr> </thead> <tbody> <tr> <td>Hydrogen:</td> <td>62 - 66</td> <td>140 - 160</td> </tr> <tr> <td>Oxygen:</td> <td>30 - 34</td> <td>160 - 180</td> </tr> <tr> <td>Air:</td> <td>42 - 46</td> <td>90 - 110</td> </tr> </tbody> </table>				Flow(FMR)	Pressure(PSI)	Hydrogen:	62 - 66	140 - 160	Oxygen:	30 - 34	160 - 180	Air:	42 - 46	90 - 110
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Hydrogen:	62 - 66	140 - 160												
Oxygen:	30 - 34	160 - 180												
Air:	42 - 46	90 - 110												
<p>Testing Info</p> <p>Test Piece Material: TI 6-4</p> <p>Testing Requirements:</p> <p>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.</p>														
<p>Gun Info</p> <p>Manufacturer/Model: Sulzer Metco / DJ8W</p> <p>Program: HVOF_0500 Passes: 10 - (As Required)</p> <p>Spray Distance: 10 (+/-1/4")</p> <p>Angle("): 3 (+/-5")</p> <p>Robot Hole: 7</p>														
<p>Powder Feeder</p> <p>Manufacturer/Model: Sulzer Metco / 9MP-DJ</p> <p>Feed Rate: 76 (+/-7 g/min) Vibrator(PSI): 20</p> <p>Feed Hose: Orange</p>														
<p>Carrier Gas Settings Injection Port</p> <p>Gas: Nitrogen Injector: DJ8-8</p> <p>Flow(SCFH): 28 (+/-0.5) Powder Shaft: E</p>														
<p>Misc Data</p> <p>Turntable Speed(RPM): 30</p> <p>PPSI #: HVOF_0500</p> <p>Preheat Temp(°F): 150 Max Temp(°F): 350</p> <p>Notes:</p> <p>Pyrometer at 17" opposite side of part. * Control by robot program</p>														

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

New Starts

- SermeTel W Cr+6 replacement coatings
 - SermeTel, Aloseal, 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