MD&A has added important solutions to an already exemplary offering of services, parts and repairs. With our consistent tradition of over 35 years of unmatched customer service, MD&A has extended its scope of capabilities with the introduction of the Frame 7FA Parts Solution, another alternative in the power generation space that gives the customer more while costing less.

The MD&A San Antonio Service Center, our gas turbine parts service facility in Texas, is an industry leader in 7FA gas parts, repair, and manufacturing. The deep experience in aviation engineering and technology, repair techniques and equipment, and proven expertise on multiple frame gas components, creates a facility that epitomizes the best in service and value.

Our enhanced Frame 7FA parts solution expands energy output while reducing customer cost. Extensive testing on existing OEM components culminates in an improved version and new design; The Frame 7FA parts solution has greater flexibility, extended service life, and customized maintenance intervals. It comes complete with the same proficiency and service the world has come to expect from MD&A.

PRODUCT FACTS FOR COMBUSTION AND TURBINE HARDWARE

Operation in accordance with GER-3620

Maximum firing temperature: 2420 °F

Fuel: natural gas

Operation mode: base or cyclic load

24,000 hours/900 starts
Repairability guarantee

48,000 hours/1,800 starts
Repairability guarantee

72,000 hours/2,700 starts
Technical review

Subject to MD&A's standard terms and conditions.

PRODUCT FACTS FOR COMPRESSOR HARDWARE

Operation in accordance with GER-3620

144,000 hours/5,000 starts
Design Life

Installation hardware: included

Visit **www.mdaturbines.com** for more information

MD&A

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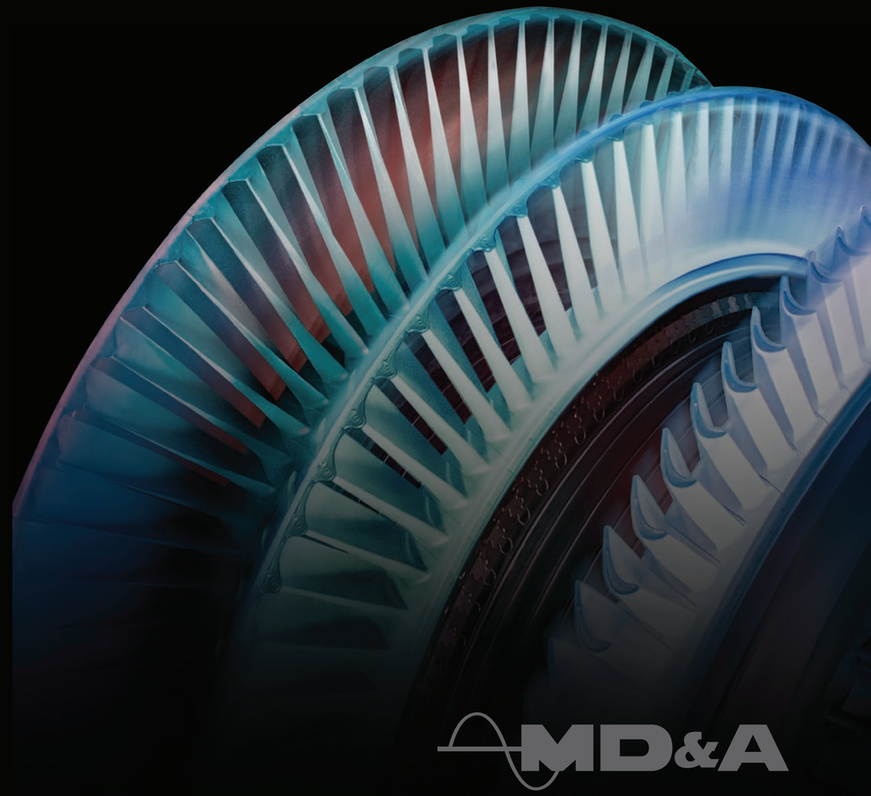
FRAME 7FA **SOLUTIONS**

PARTS, REPAIRS & SERVICE



MD&A

BUCKETS

7FA.03 1ST STAGE BUCKET DESIGN ADVANTAGES:

- Trailing edge undercut to alleviate trailing edge cooling hole cracking
- Cooled platform to resolve platform burn and cracking (leading cause of scrapping 1st stage buckets)
- Improved cooling distribution to reduce peak metal temperature
- Proprietary directionally solidified alloy and thermal barrier coating (TBC) system to provide improved creep and oxidation life

7FA.03 2ND STAGE BUCKET DESIGN ADVANTAGES:

- Significant creep life improvement for the tip shroud
- Cutter tooth is replaced with an abrasive rail coating
- Proprietary equiaxed alloy and TBC system to provide improved creep and oxidation life
- Improved fillet design to reduce stress

7FA.03 3RD STAGE BUCKET DESIGN ADVANTAGES:

- Significant creep life improvement for the tip shroud
- Cutter tooth is replaced with an abrasive rail coating
- Proprietary equiaxed alloy and a chromide coating system provide improved creep and corrosion life

COMBUSTION PARTS

7FA.03 TRANSITION PIECES DESIGN ADVANTAGES:

- Improved impingement cooling air and hardface coatings
- Proprietary gas path TBC for demonstrated improvement in oxidation life

7FA.03 COMBUSTION FLOW SLEEVE DESIGN ADVANTAGES:

- 304 stainless steel alloy that eliminates corrosion and pitting associated with carbon steel parts and improves oxidation life

7FA.03 LINER CAP ASSEMBLY PIECES DESIGN ADVANTAGES:

- TBC coated effusion plate to improve component life

7FA.03 COMBUSTION LINER PIECES DESIGN ADVANTAGES:

- Proprietary gas path TBC for demonstrated improvement in oxidation life
- Proprietary exterior coating system for improved oxidation life

NOZZLES AND SHROUDS

7FA.03 1ST STAGE NOZZLE DESIGN ADVANTAGES:

- Full gas path TBC to improve oxidation life, reduce airfoil metal temperature, and reduce thermal gradients
- Improved airfoil to sidewall fillets to improve cracking resistance

7FA.03 2ND STAGE NOZZLE DESIGN ADVANTAGES:

- Full gas path TBC provides reduced airfoil metal temperature and eliminates fatigue debit from external aluminum coating
- Improved airfoil to sidewall fillets to improve cracking resistance
- Proprietary alloy improves creep, oxidation life, and maintains ability to weld repair
- Inner diaphragm material changed to 310SS for improved oxidation over Ni-Resist; more operator friendly during repair weld schemes

7FA.03 3RD STAGE NOZZLE DESIGN ADVANTAGES:

- Inner diaphragm material changed to 310SS for improved oxidation over Ni-Resist; more operator friendly during repair weld schemes

7FA.03 1ST STAGE SHROUD BLOCK ADVANTAGES:

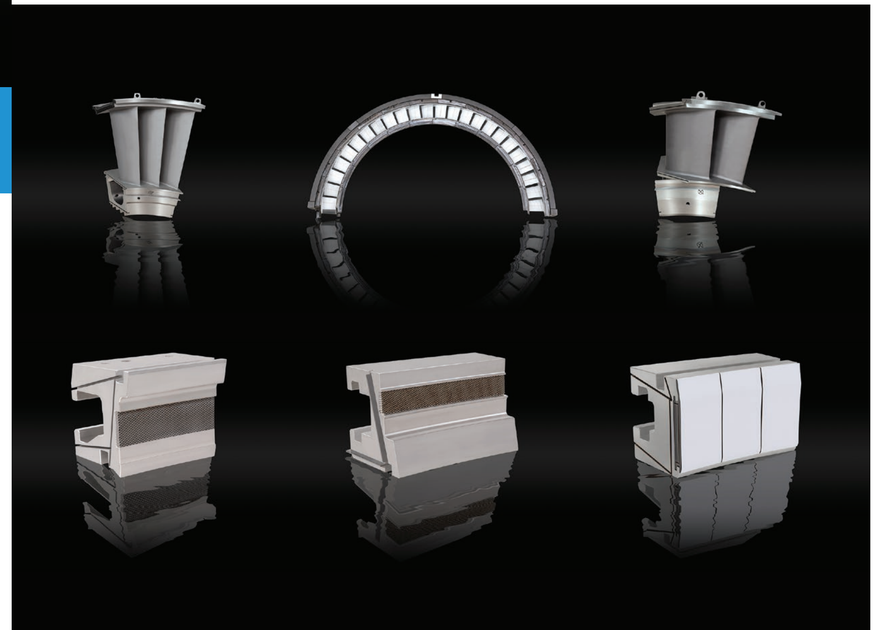
- Made of commercially-available 310 stainless steel alloy
- Shroud block shoes are manufactured from a proprietary nickel alloy
- Shroud tiles are coated with a proprietary coating specially formulated to provide durability with abradability for improved tip clearance control with the 1st stage bucket

7FA.03 2ND STAGE SHROUD BLOCK ADVANTAGES:

- Made of commercially-available Haynes 120 (AMS 5916)

7FA.03 3RD STAGE SHROUD BLOCK ADVANTAGES:

- Made of commercially-available 310 stainless steel alloy



COMPRESSOR HARDWARE

R0 COMPRESSOR BLADE

The R0 blade has been redesigned to address ongoing field issues with this component. The design is made from a higher strength alloy with superior corrosion and cavitation erosion resistance. Design enhancements include: dovetail relief cut, compound fillet radii transitions, and airfoil tuning to provide superior blade design life.

S0 – S4 COMPRESSOR VANE ASSEMBLIES

The S0 – S4 compressor stator vanes have been redesigned to address ongoing field issues. Design enhancements include: the fabrication of the shorter vane carrier in a non-corrosive alloy, relief slot in the vane carriers for ease of removal, elimination of shims, curved squealer tips to decrease leakage and non-uniform S0 and S1 vane spacing to mitigate R0 and R1 vibratory response.

S5 – S17, EXIT GUIDE VANES (EGV) STATOR VANES

The design for all compressor vanes have arched (radius) bases to conform to the compressor case. This radius base configuration provides less wear on the components. We increased the widths of the vane platforms at the horizontal joint. These vane platforms will be machined during the outage to the case, negating the need for shims.

MD&A ALSO OFFERS GAS TURBINE SERVICES OF:

- COMPRESSOR VANE PINNING
- OUTAGE PLANNING
- TURNKEY INSPECTIONS
- GAS TURBINE ALIGNMENT
- END OF LIFE EVALUATIONS
- FIELD MACHINING
- BALANCING AND VIBRATION ANALYSIS
- CONTROL AND EXCITATION FIELD ENGINEERING, CONSULTING AND TRAINING
- ROOT CAUSE ANALYSIS
- ENGINEERING SUPPORT
- PERFORMANCE TESTING AND ANALYSIS
- LONG-TERM SERVICE AGREEMENTS

Visit www.mdaturbines.com for more information