



2. 가

2.1 가

Evolution 가  
 GE 가  
 1 A, B, C, E,  
 EA, F, FA, FA+e, FB H  
 가 Life-Cycle

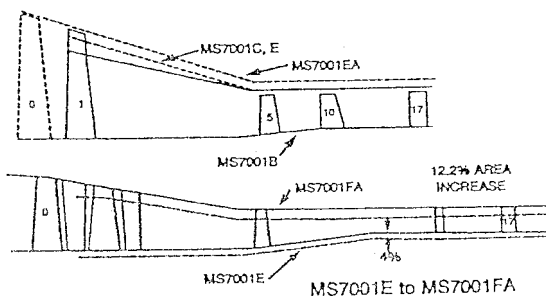
가 1430 가  
 60%, 282MW

1 7F Performance evolution

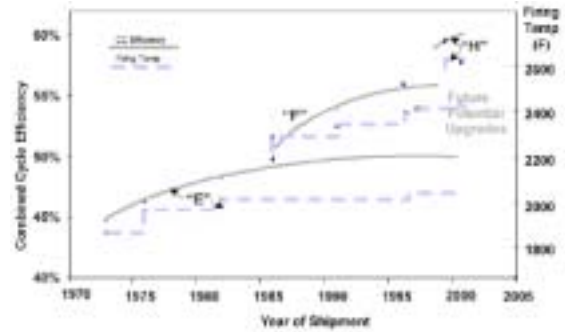
|      |         | (kW)    | ( )   |      |
|------|---------|---------|-------|------|
| A    | 1970-71 | 47,260  | 899   | 9.3  |
| B    | 1970-72 | 51,800  | 982   | 9.4  |
| C    | 1974-77 | 68,500  | 1,065 | 10.5 |
| E    | 1974-75 | 71,700  | 1,085 | 11.2 |
| EA   | 1984-87 | 80,080  | 1,104 | 12.4 |
| F    | 1988-91 | 147,210 | 1,260 | 13.5 |
| FA   | 1992    | 159,000 | 1,288 | 13.5 |
| FA+  | 1995    | 167,000 | 1,315 | 15   |
| FA+e | 1999    | 171,000 | 1,327 | 15.5 |
| FB   | 2001    | 184,000 | 1,402 | 18.5 |
| H    | 2003    | 282,000 | 1,430 | 23   |

가  
 가 Evolution  
 2 E, F Evolution

1 Evolution



2 E, F Evolution



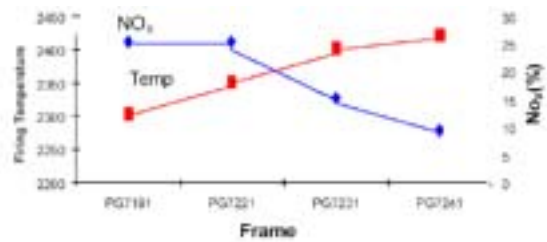
DLN 가  
 9ppm 2 가

3

2 NOx (15% O<sub>2</sub>)

| GT    |        |       |
|-------|--------|-------|
| 7EA   | WLN    | 50ppm |
| 7F    | DLN1.0 | 50ppm |
| 7FA   | DLN2.0 | 25ppm |
| 7FA+e | DLN2.6 | 9ppm  |

3 NOx



2.2 가

(TMF), Creep, Oxidation, Corrosion

( 3)

3

DSS

**PG7191(F) / PG9301(F) Parts**

|                   | Basic Interval | Baseline Interval (Hours)      | Baseline Interval (Starts)     |
|-------------------|----------------|--------------------------------|--------------------------------|
| Combustion Liners | CI             | 5 (CI) <sup>(1)</sup>          | 5 (CI)                         |
| Caps              | CI             | 5 (CI) <sup>(1)</sup>          | 5 (CI)                         |
| Transition Pieces | CI             | 5 (CI) <sup>(1)</sup>          | 5 (CI)                         |
| Fuel Nozzles      | CI             | 3 (CI)                         | 3 (CI)                         |
| Crossfire Tubes   | CI             | 1 (CI) / 2 (CI) <sup>(2)</sup> | 1 (CI) / 2 (CI) <sup>(2)</sup> |
| End Covers        |                | 5 (CI) <sup>(1)</sup>          | 3 (CI)                         |
| Stage 1 Nozzles   | HQPI           | 3 (HQPI)                       | 3 (HQPI)                       |
| Stage 2 Nozzles   | HQPI           | 3 (HQPI)                       | 3 (HQPI)                       |
| Stage 3 Nozzles   | HQPI           | 3 (HQPI)                       | 3 (HQPI)                       |
| Stage 1 Struts    | HQPI           | 2 (HQPI)                       | 2 (HQPI)                       |
| Stage 2 Struts    | HQPI           | 2 (HQPI)                       | 2 (HQPI)                       |
| Stage 3 Struts    | HQPI           | 3 (HQPI)                       | 3 (HQPI)                       |
| Exhaust Diffuser  | HQPI           |                                |                                |
| Stage 1 Bucket    | HQPI           | 2 (HQPI)                       | 2 (HQPI)                       |
| Stage 2 Bucket    | HQPI           | 3 (HQPI) <sup>(3)</sup>        | 3 (HQPI) <sup>(3)</sup>        |
| Stage 3 Bucket    | HQPI           | 3 (HQPI) <sup>(3)</sup>        | 3 (HQPI) <sup>(3)</sup>        |

CI = Combustion Inspection Interval  
 HQPI = Hot Gas Path Inspection Interval  
 (1) Decision will be made based on fleet leader's experience.  
 (2) 2 (CI) for 7191 / 1 (CI) for 9301. The goal is to increase this interval.  
 (3) With welded hardware on struts, recouling of 1st HQPI may be required to achieve replacement life.

가

3.1.1 가  
가

35,000

2%

4

가

1992. 6

2004. 2

50,895

54,738

51,943

가

35,000

6

가

1

30.81% 가

31.85%

1.04%

가

(EOH<sup>1)</sup>)

EOH

6 1

OH

(2002.10 )

21,000 EOH

| (kW)    |         | (% )  |       |
|---------|---------|-------|-------|
| CC      | GT      | CC    | GT    |
| 217,170 | 143,325 | 46.81 | 30.81 |

5

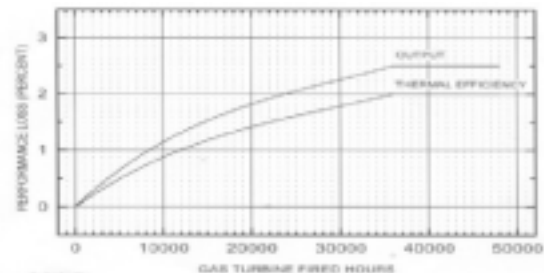
5 7FA

|  |            |     |
|--|------------|-----|
|  |            |     |
|  | 24,000     | 900 |
|  | 21,000 EOH |     |

\* EOH = + 20x

3. 가

4 가



3.1.2

7F

1

3.1

1992

가

4

1990

1992. 6

1,800MW

150MW 가

75MW

1:1

8

가

1

2004. 2

가

GE

1987

7F

2,487

(DSS)

가

1.77

가 1,260

DLN1.0

A

Mark 가

42.94%(가

: 32.51%)

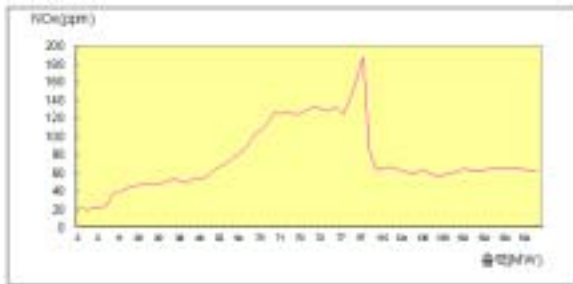
5,000 가

1) EOH(Equivalent Operating Hours)

3.1.3

가 DLN1.0  
2 가 5  
NOx 가  
가 NOx  
가 GE  
115MW

5 DLN1.0 NOx



3.2 가  
가

가

3.2.1 가

가

가

7

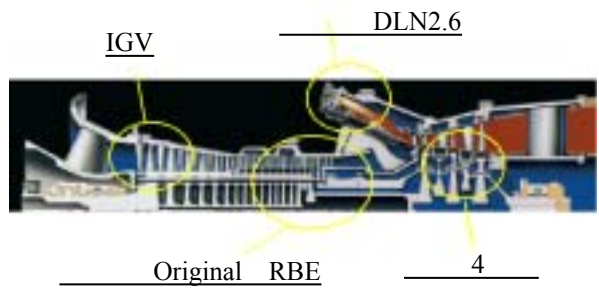
|       |           |        |
|-------|-----------|--------|
| 1.    |           |        |
| -     | ×         |        |
| -     |           |        |
| - IGV |           |        |
| -     | ×         |        |
| -     | ×         |        |
| -     | ×         |        |
| 2.    | (CC )     |        |
| -     | 1.15%     | 3%     |
| -     | 110MW( )  | 80MW   |
| - NOx | 60 ppm( ) | 15 ppm |

3.2.2

가 7F  
7FA+e  
8 6  
8 7F/7FA+e

|     |              |                |
|-----|--------------|----------------|
|     | 7F           | 7FA+e          |
|     | 7FA          | 7FA+e          |
|     | DLN1.0       | DLN2.6         |
|     | 1,260        | 1,327          |
|     | 4            | RBE, 4         |
| IGV | Cambered IGV | Uncambered IGV |
|     | Mark         | Mark           |

6 GT

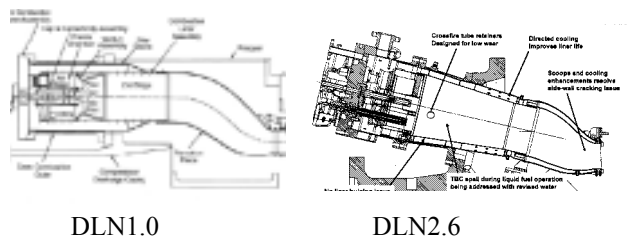


7FA+e (Bucket/Nozzle) 7FA  
, Seal  
1 Bucket Film  
cooling Leading Edge Tip  
DVC TBC  
DLN2.6 NOx

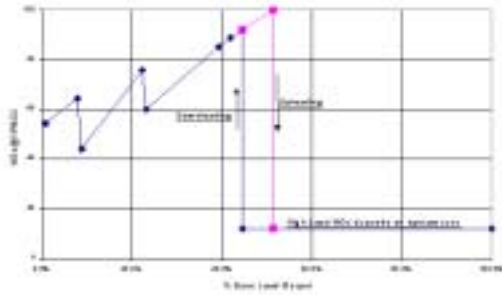
DLN1.0

가 1,327 NOx  
15ppm 가 7 DLN1.0  
DLN 2.6 8  
DLN2.6 NOx

7 DLN1.0 DLN2.6

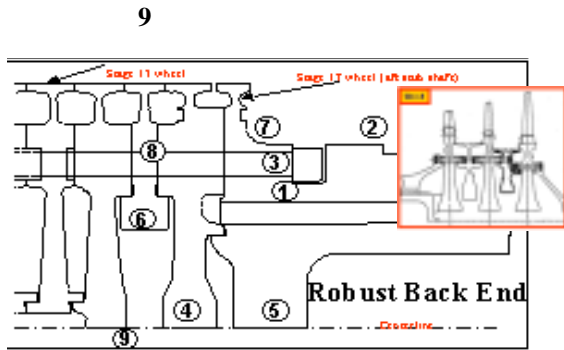


8 DLN2.6 NOx



9 RBE가

4 가 , Honeycomb seal ,  
Robust 2-3 Spacer



가  
Un-cambered IGV

Mark Upgrade  
9 Mark

Mark

9 Mark Mark

|                  | Mark         | Mark            |
|------------------|--------------|-----------------|
| Memory           | 286/16Mbyte  | Pentium/32Mbyte |
| On-line          | 가            | 가               |
| System           | Function Key | Windows NT      |
| Data             | 250ms        | 40ms            |
| CPU Redundant    |              | 3               |
| Enclosure        | Compact      | Large( )        |
| Operator Console | 1            | 2               |
| Printer          | 1            | 3 (Color 1 )    |

3.3

가 7F 가 7FA+e 가  
1 A 가 (42 )  
2003. 7.11 GE  
10  
10

|     |                            |
|-----|----------------------------|
|     | 50.25% (HHV)               |
|     | 254,520kW                  |
| NOx | 15ppm (O <sub>2</sub> 15%) |

3.3.1

가 42

가

가

12 2 . 10

10

| Seq | 장비       | 위치 | 종 | 용 | 10 | 11 | 12 | 10/1 |
|-----|----------|----|---|---|----|----|----|------|
| 1   | 사양서작성(가) |    |   |   |    |    |    |      |
| 2   | 사양서작성(가) |    |   |   |    |    |    |      |
| 3   | 사양서작성    |    |   |   |    |    |    |      |
| 4   | 사양서작성    |    |   |   |    |    |    |      |
| 5   | 사양서작성    |    |   |   |    |    |    |      |
| 6   | 사양서작성    |    |   |   |    |    |    |      |
| 7   | 사양서작성    |    |   |   |    |    |    |      |
| 8   | 사양서      |    |   |   |    |    |    |      |
| 9   | 사양서      |    |   |   |    |    |    |      |

3.3.2

Multi Tasking

11

가

Assembly

Lifting

가

가

Foundation

가

7FA+e 가 가 DLN2.6 Gas  
Fuel Skid Atomizing Air Skid가 DO

, Water Injection

Lifting Oil 가

가

NG 가

Heater

가 가

12

4.

Key

1,300

가

가

12

180MW

가



40

가

75%

15ppm

3.4

가

Simple Cycle

가

DSS

11

NOx

가

11

|           |         |         |         |
|-----------|---------|---------|---------|
| (kW)      | 143,325 | 165,400 | 170,030 |
| (%)       | 30.81   | 32.93   | 33.42   |
| NOx (ppm) | 60      | 15      | 12      |

가

- (1) GE Gas Turbine Design Philosophy(GER-3434D)
- (2) Heavy-Duty Gas Turbine Operation and Maintenance Consideration(GER-3620j)
- (3) The F Technology Experience Story(GER-3950C)

HRSG/

Bottom Cycle

( 254,520kW, 50.25%)

가

11 가

