

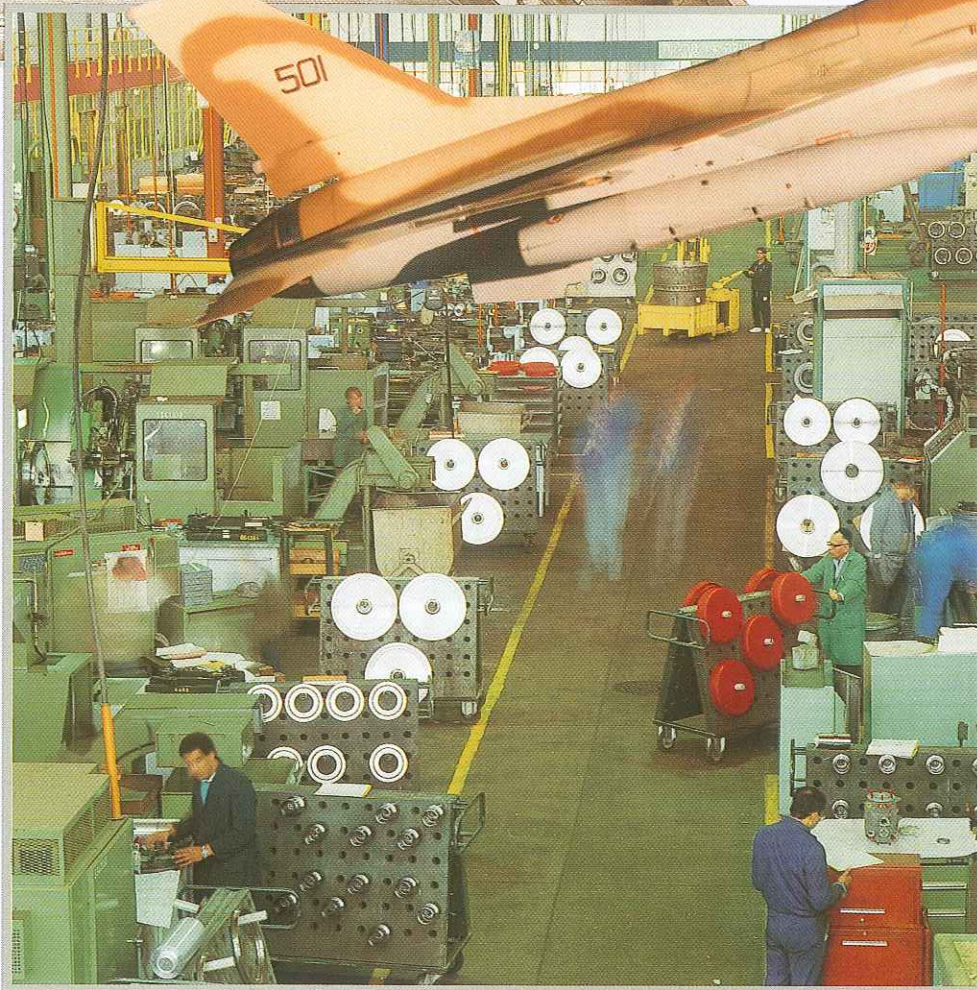
# *Bet Shemesh Engines Ltd.*



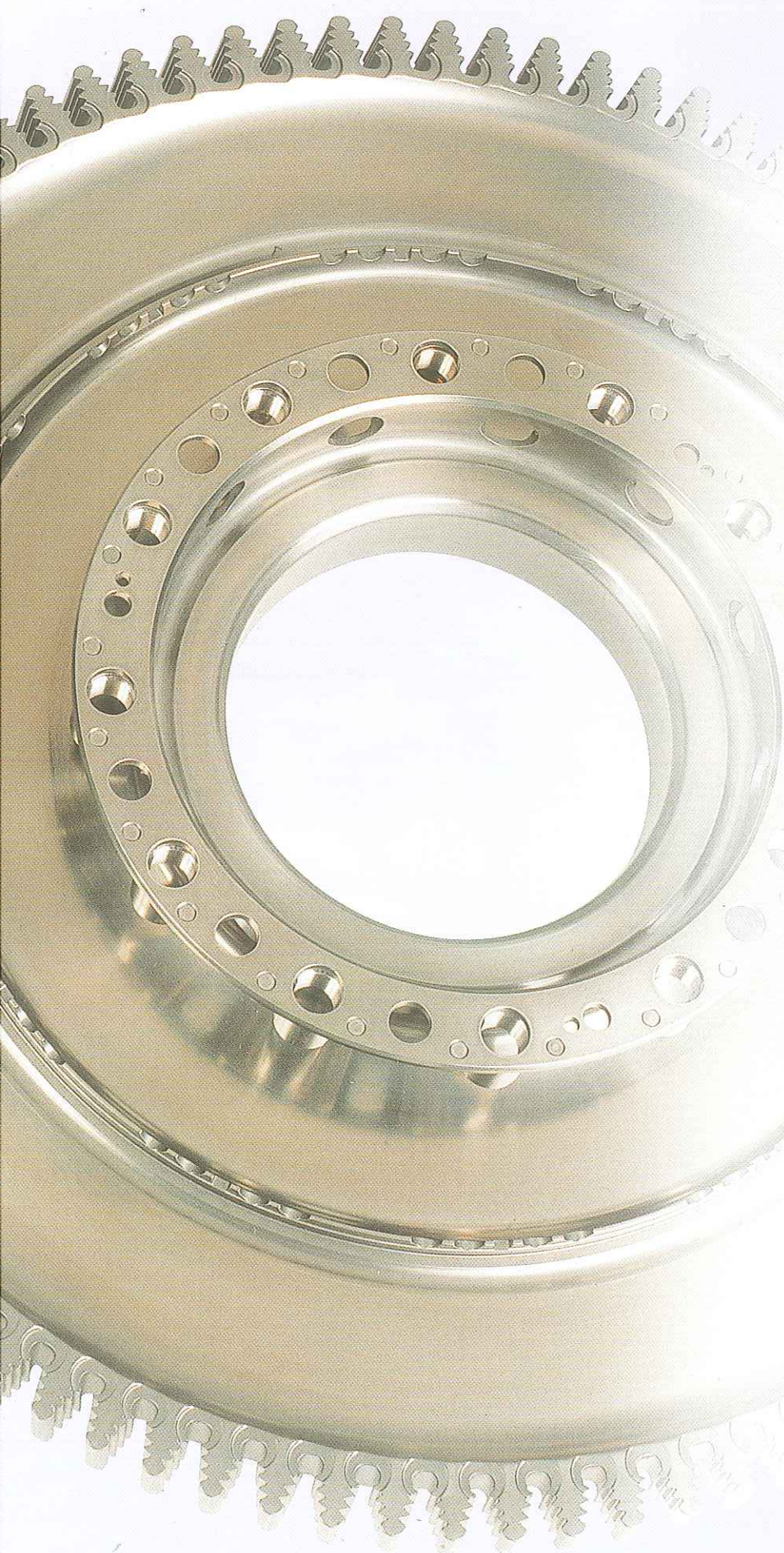
*Visit us at  
[www.bsel.co.il](http://www.bsel.co.il)*



# MANUFACTURING DIVISION







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*The Manufacturing Division of BET SHEMESH ENGINES enjoys over 40 years experience in producing jet engine parts that are of superior quality at competitive prices and meet "just on time" delivery.*

*Producing parts for industry leaders, such as Pratt & Whitney, MTU Aero Engines, Hamilton Sundstrand and GE Aviation requires meeting and exceeding the most demanding standards.*

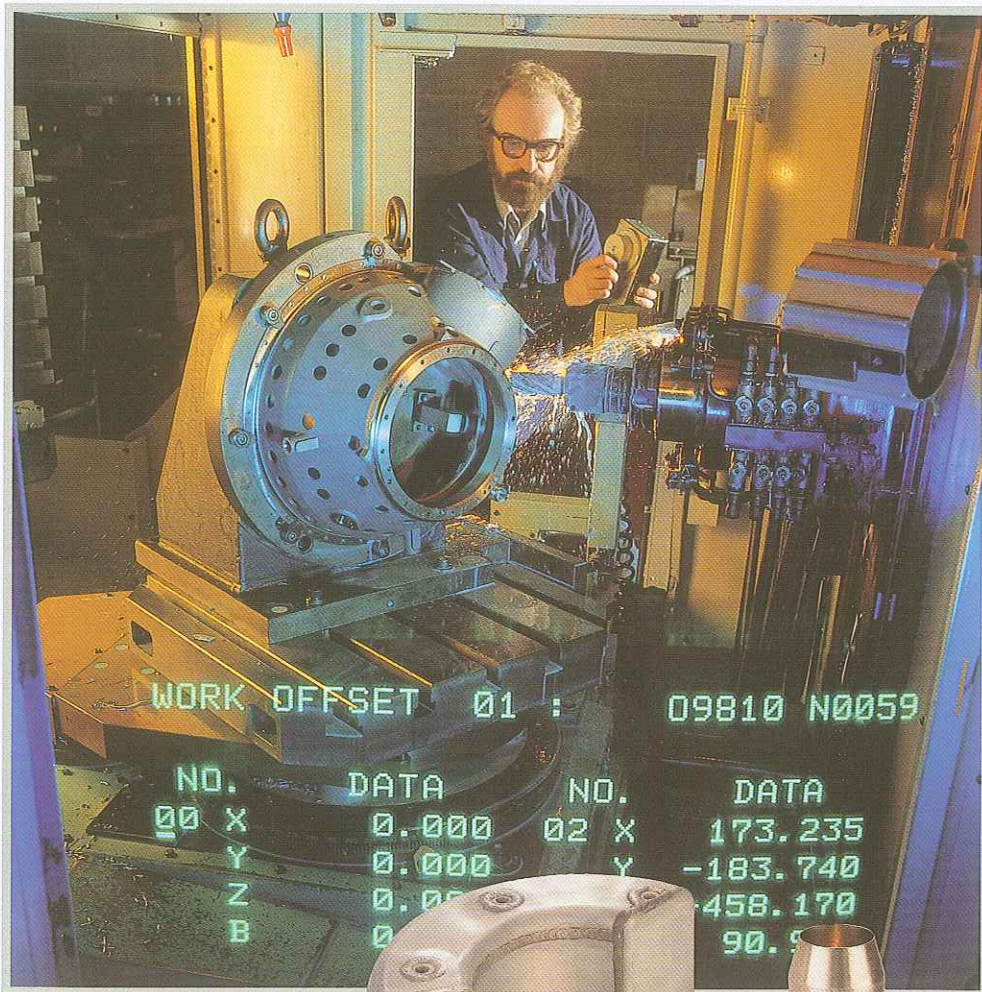
*BET SHEMESH ENGINES has an established record of providing customers with the best support possible for their critical engine parts requirements.*

*Their confidence and trust in BET SHEMESH ENGINES is exemplified by our continued standing as a prime source for most of the parts produced.*

*This Division produces gas turbine engine parts using various technologies.*



# Manufacturing Division



Sheet Metal Parts

## **Typical parts:**

Compressor and turbine disks  
Compressor and turbine frames  
and cases  
Compressor and turbine air seals  
and spacers  
Turbine nozzles  
Augmentor seals and flaps  
Augmentor flame holders

## **Typical applications:**

JT8D, JT9D, PW4000, V2500, CF6,  
CFM56, F100, J79, Marbore

## **Manufacturing technologies:**

Turning, milling, CNC grinding  
Five axis laser drilling  
Vertical and horizontal broaching  
Sheet metal pressing, spinning and  
punching  
Welding and brazing, including  
Electron Beam Welding, Laser Weld  
Metal plating, Sermetal coating,  
including a computerized robotic  
METCO plasma spray system,  
thermospray, HVOF and wire metallizing  
CNC shot peening, glass bead peening  
Heat treatment  
Hot Isostatic Pressure (HIP)

## **Quality Assurance:**

ISO 9001:2008  
AS 9100  
Pratt & Whitney  
GE Aviation

## **Inspection:**

Dimensional (CMM)  
Chemical testing  
Metallurgical testing (MCL)  
Fluorescent Penetrant Inspection (FPI)  
Magnetic Particles Inspection (MPI)  
X-Ray, Eddy Current (ECI) and  
Ultrasonic (US)





*APS 3200, Assembled  
Turbine Disk*



*Marbore 6, Sorek 4  
Combustion Chambers*



*Compressor  
Airseal and Spacer*



*Turbine  
Disks*



# Maintenance, Repair & Overhaul DIVISION







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*The Maintenance, Repair and Overhaul Division of BET SHEMESH ENGINES benefits from the expertise and experience of the Israel Air Force.*

*Both the management and technical staff began their aviation careers in the IAF, and most of them are still active in its reserves.*

*Continuous updating by the industry leaders, Pratt & Whitney and GE Aviation, maintains the team's performance at the highest standards possible and enables them to meet the requirements of the FAA, EASA and ICAA.*

*BET SHEMESH ENGINES' MRO Division provides assembly, repair, upgrade and overhaul services for the following engines/modules:*

*Pratt & Whitney:*

*F100-100, -220, -220E, -229*

*GE Aviation:*

*T700-700, -701, -701C, -701D, CT7*

*Rolls-Royce Model 250 (Allison):*

*-C20 series, -C30 series*

*Pratt & Whitney Canada: PT6A series*

*Turbomeca: Marbore II and VI*

*Bet Shemesh Engines:*

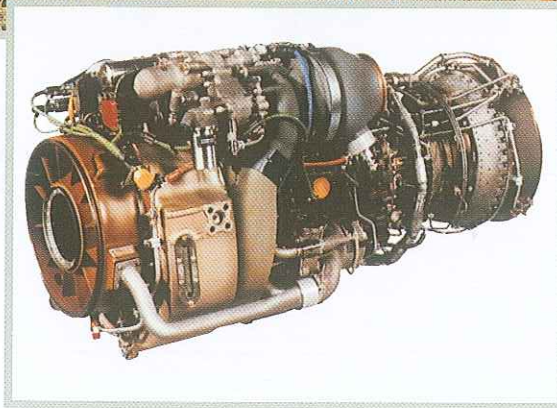
*Sorek and various expendable jet engines.*



# Maintenance, Repair & Overhaul Division



PWA - F100 final assembly line



GE-T700 engine

## **Repair & overhaul of engine parts:**

The Maintenance, Repair and Overhaul Division applies the following processes:

Extrudehone

Machining

Shot peening

Heat treatment

Welding

Brazing

Plating

Coating, including computerized robotic METCO plasma spray system, thermospray, HVOF and Sermetel coating

Balancing - both static and dynamic

## **Major programs:**

Parts manufacturing and assembly line for Marbore engines

Upgrading of F100 engines to the DPI/220E configuration with close to 250 engines supplied to date

## **Certified by:**

ISO 9001:2008

FAA (Repair Station # B7EY748J)

EASA (EASA.145.0031)

Pratt & Whitney

GE Aviation

Hamilton Sundstrand

Israel Air Force

European and Asian Air Forces

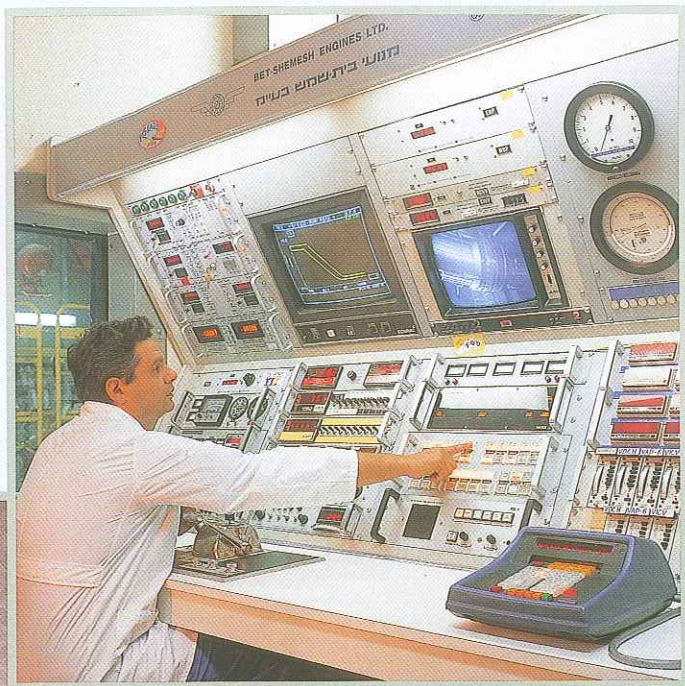
## **Testing**

Large and small test cells enable the testing of thrust engines up to 35,000 lb. and turboshaft engines up to 2,000 shp.

Computerized data acquisition system for highest accuracy

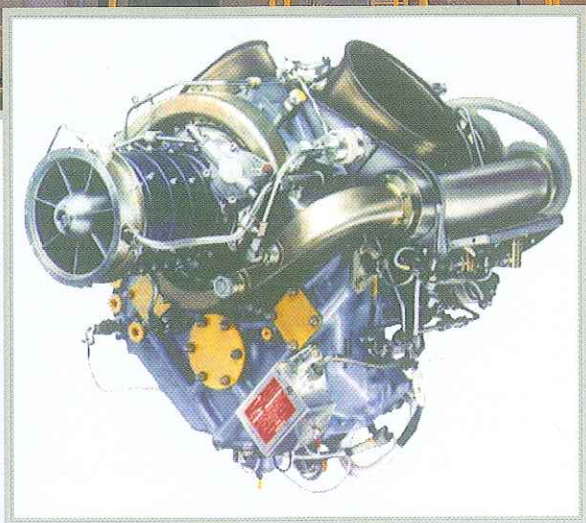
Routine calibration and correlation per engine manufacturers' requirements



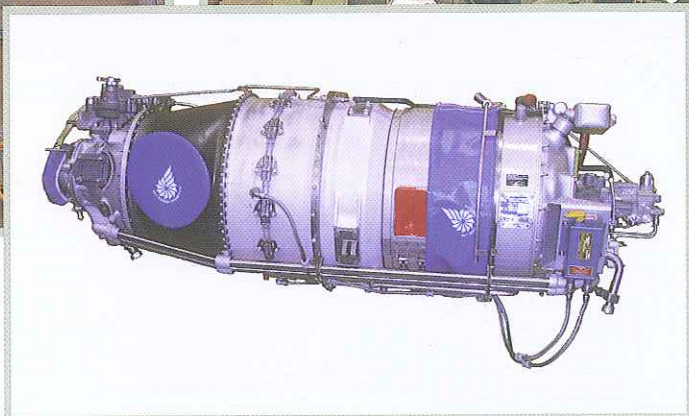


*Testing an F100 engine with automatic data acquisition and processing systems*

*Dynamic balancing up to 2,000 lb.*



*RR Model 250 Engine*



*PW PT6A Engine*



# CASTING DIVISION







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*The Casting Division of  
BET SHEMESH  
ENGINES produces parts  
for the most advanced  
engines, such as  
PRATT & WHITNEY'S PW4000.*

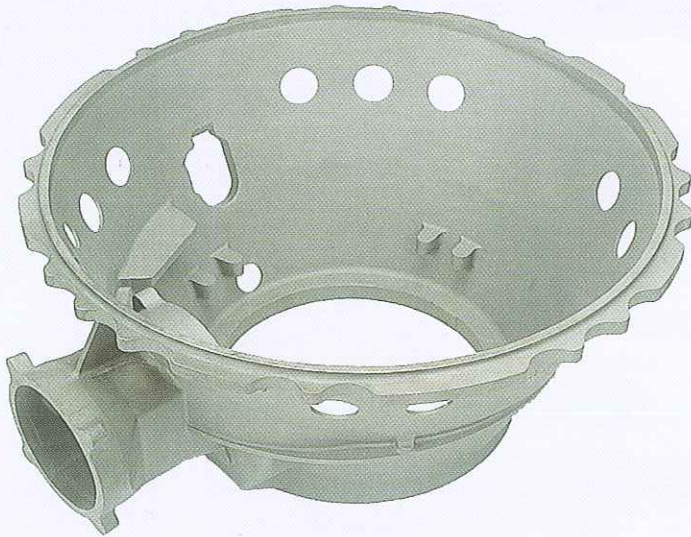
*This is achieved by meeting  
the most demanding  
standards of engine  
manufacturers in quality,  
competitive pricing and  
"just-on-time" delivery.*

*The Casting Division of  
BET SHEMESH  
ENGINES produces parts  
by the investment casting  
(lost wax) method.  
Parts are produced by  
air casting and vacuum  
casting.*

*This Division also includes  
a Rapid Prototype Center.*



# Casting Division



*PW 4000 Bearing Support  
(22.5 cm. radius)*



*Turbine Nozzles APS 2300, 3200 & 5000*

## **Typical Parts**

*Cored and solid airfoils  
(blades, vanes and clusters)  
Integral compressor and turbine wheels  
Gas turbine engine "hot parts"  
(turbine baffles, augmentor parts)  
Air valves for aircraft Environmental  
Control Systems (ECS)*

## **Typical Applications**

*Blades, vanes, clusters and nozzles for  
JT8D, J79, PW4000, V2500, APS 2300,  
APS 3200, APS 5000, PWC 307,  
PWC 306, PWC 545*

## **Typical Materials**

*Nickel based alloys:  
IN-100, IN-713, IN-718, IN-792, IN-939,  
René 41, René 77, René 80, René 108,  
René 125, B-1900, B-1914, MAR-M-246,  
MAR-M-247, U-500, C263  
Cobalt based alloys:  
MAR-M-509, L-605, CO#6, CO#31  
Carbon, low alloy steels and stainless  
steels such as:  
4140, 8640, 304, 316, 347, 416,  
17-4PH, 15-5PH*

## **Product Size**

*Air melt: up to 68 Kg / 150 lb  
Vacuum melt: up to 32 Kg / 70 lb*

## **Quality Assurance**

*Nadcap  
ISO 9001:2008  
AS 9100  
Pratt & Whitney  
GE Aviation  
MTU Aero Engines  
Hamilton Sundstrand  
Siemens*

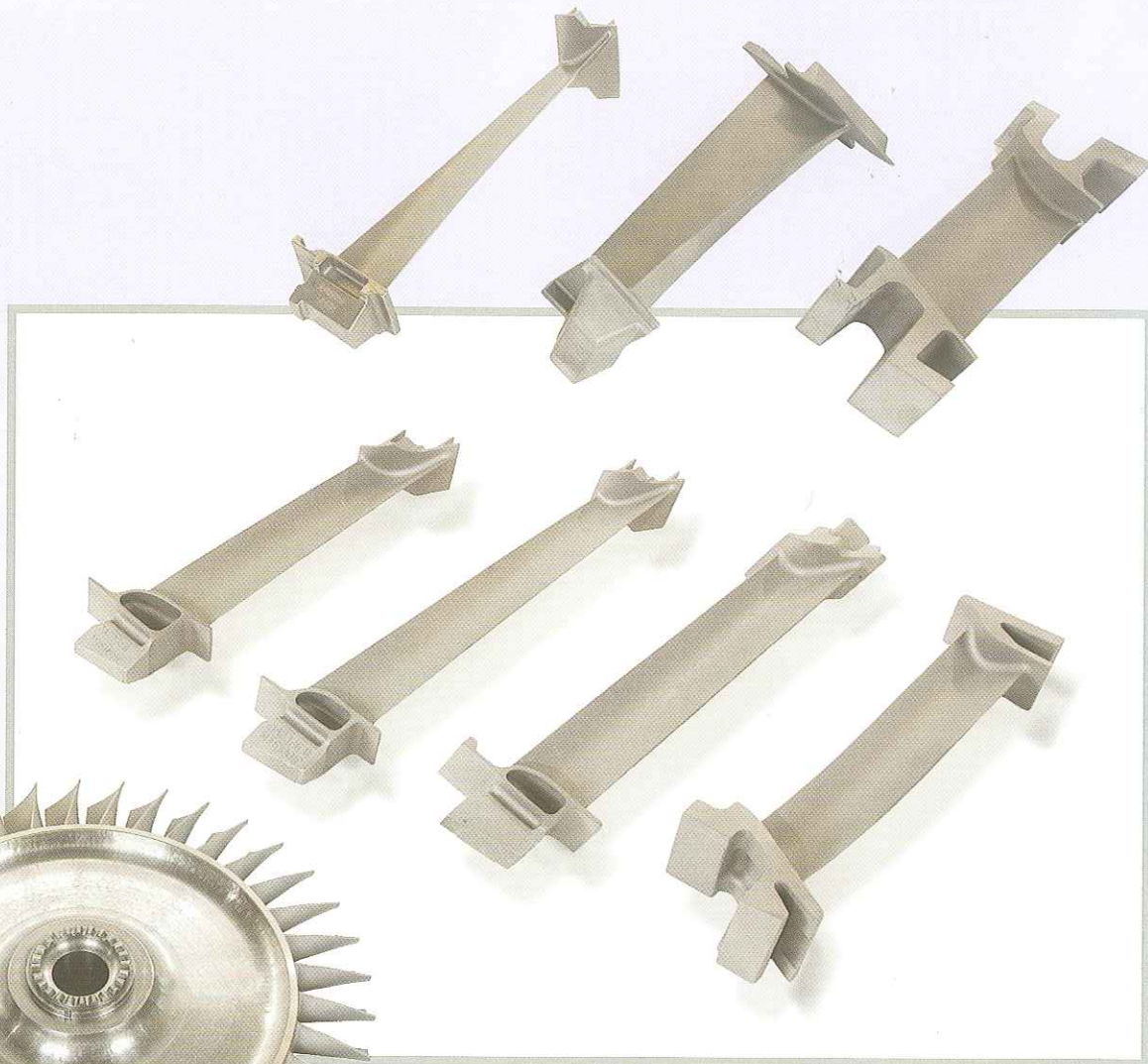
## **Inspection**

*Chemical testing  
Metallurgical testing  
X-ray  
Fluorescent Penetrant Inspection (FPI)  
Magnetic Particles Inspection (MPI)  
Dimensional  
Ultrasound*

## **Special Processes in House**

*Heat Treat  
HIP  
Welding  
Brazing  
Surface Treatment*

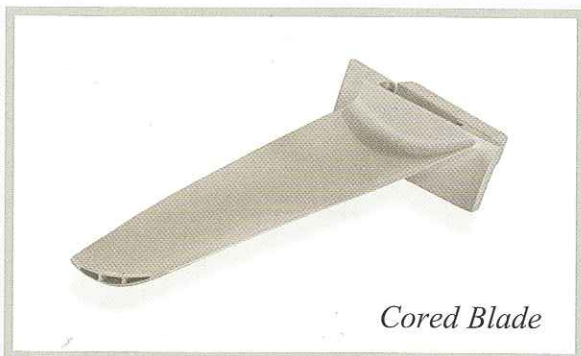
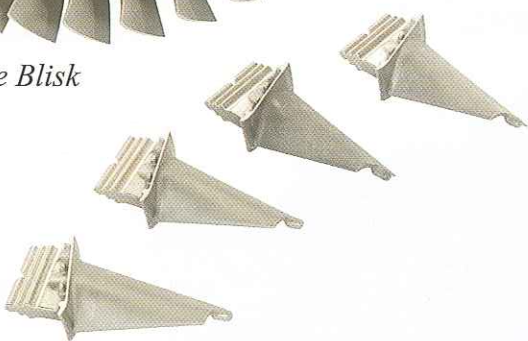




*Blades and Vanes*



*Sorek 4 Turbine Blisk*



*Cored Blade*

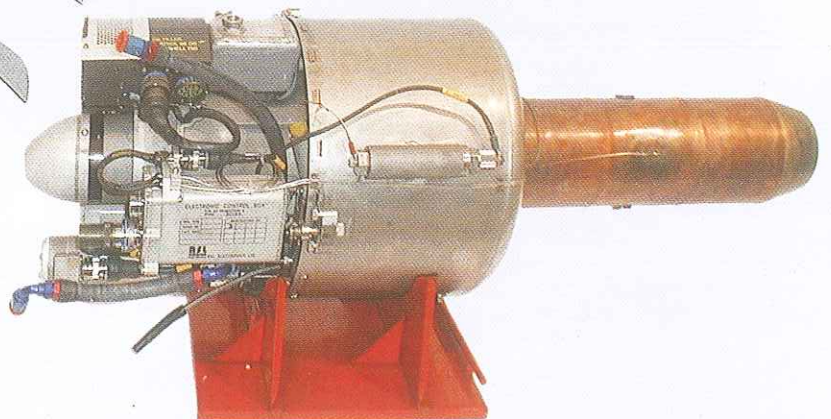
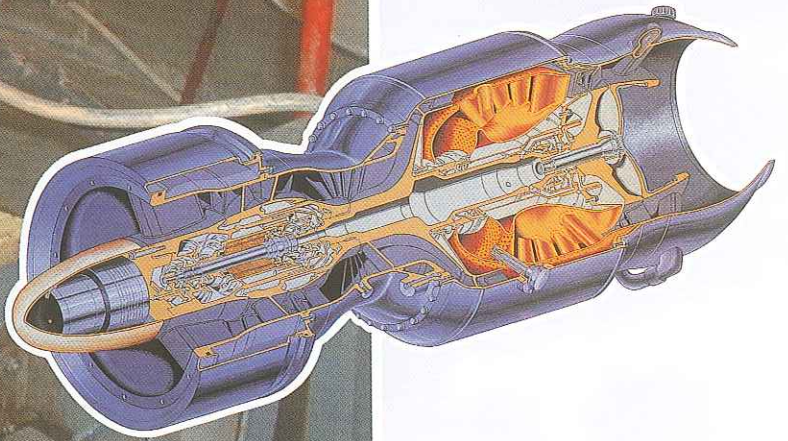
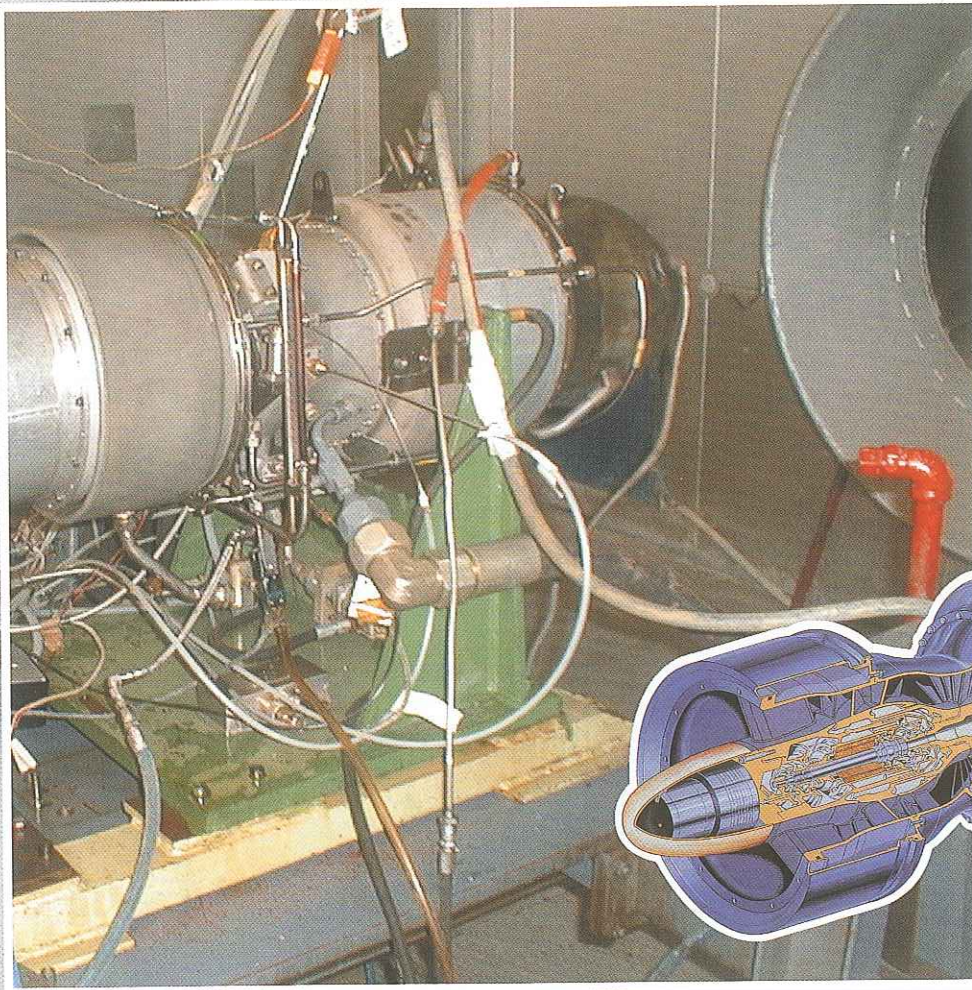


*Blade Root Machining*



# *R & D DIVISION*

## *Small turbojet engines*



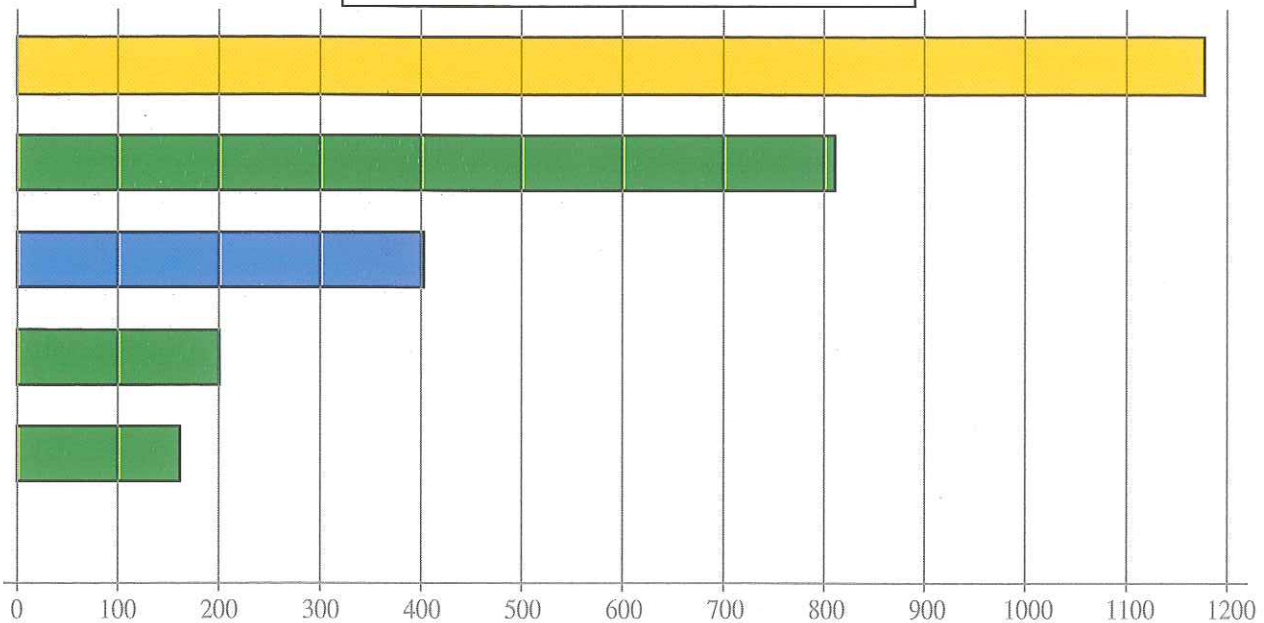


***BET SHEMESH ENGINES** offers a wide range of engines from 150 to 1200 lb thrust for unmanned aerial vehicles and target drones.*

***BET SHEMESH ENGINES'** operations include:*

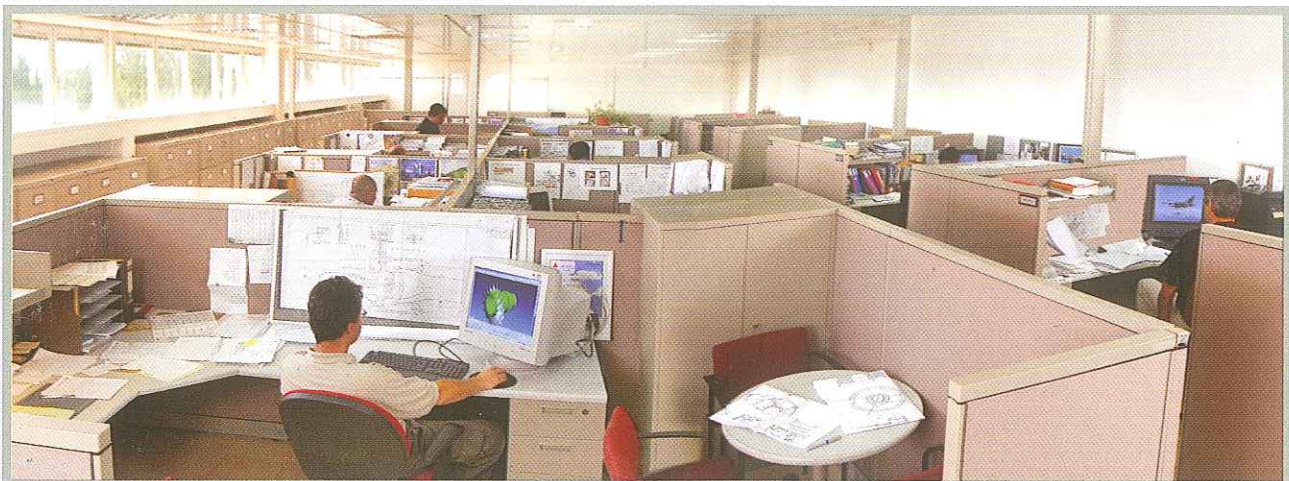
- *Design*
- *Development*
- *Integration support*
- *Customization for specific applications*
- *Prototype and Serial Production including in-house investment casting and Rapid Prototype Center*

### ***Engines' Thrust Range:***



THRUST (Lbf)

■ PRELIMINARY DESIGN   ■ DEVELOPMENT   ■ PRODUCTION







**BET SHEMESH ENGINES LTD.** was established in 1969 as a jet engine parts manufacturer, providing engine overhaul and customer support. The company is public and since 1997 trades on the Tel Aviv Stock Exchange.

The company combines four Divisions:

**Manufacturing Division** – Machining of large round parts (Disks, Spacers, Casings) and fabrication of sheet metal parts (Flame-holders, Turbine Nozzles).

**Casting Division** – Vacuum and air melt of superalloys and standard steel by investment casting (Turbine Blades and Vanes, various aerospace parts and other applications).

**Maintenance, Repair & Overhaul Division** – Overhaul and repair of the military F100, J79, T700, Marbore engines / modules.

An FAA and EASA approved repair station for commercial CT7 and Rolls-Royce (Allison) 250-C20, -C20B, -C30 engines / modules.

Pratt & Whitney Canada PT6A engine series.

**R&D Division** - Development and manufacture of small turbojet engines for UAVs.

Advanced equipment, combined with a highly trained and dedicated staff, enable Bet Shemesh Engines to meet any challenge in the gas turbine world: manufacturing of a single part, a sub-assembly or a complete engine.

Repair, upgrade and overhaul services are certified by major Original Equipment Manufacturers.



## *Bet Shemesh Engines Ltd.*

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