

# TURBINE ENGINES

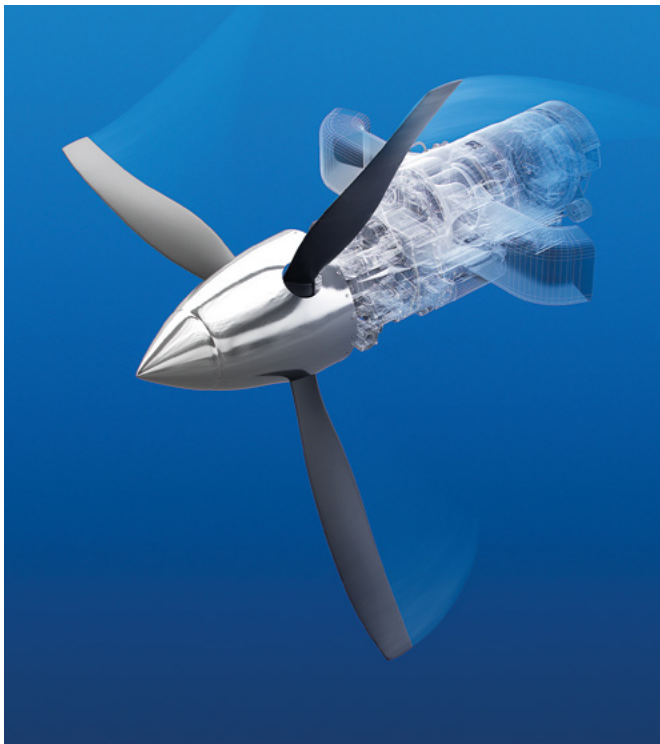
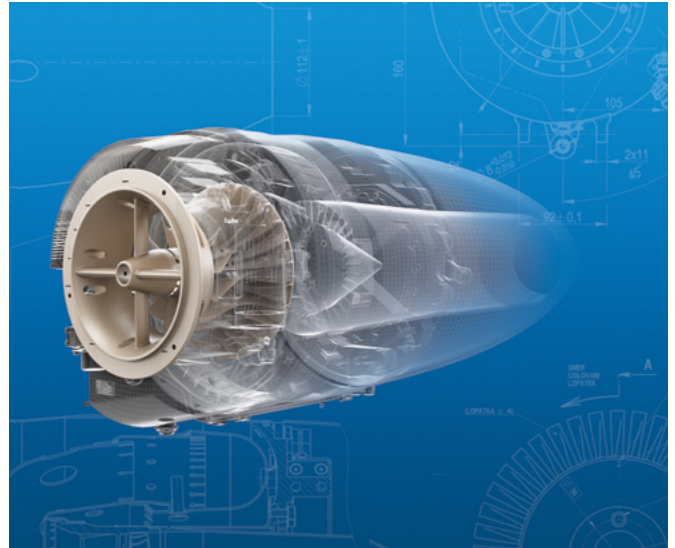


AEROSPACE • INVESTMENT CASTING • CRYOGENICS • SURFACE TREATMENT

# WE DEVELOP AND MANUFACTURE TURBINE ENGINES

We have designed and successfully launched several different engine programs in the past 20 years. Our high-quality, reliable small turbine engines are designed specifically for use in unmanned aircraft systems (UAVs), target drones, expendable systems, experimental aircraft and ultralight helicopters.

Our R&D department is currently finishing a new development project – a brand new, clean sheet design turbojet engine PBS TJ200. It will be the most powerful engine in the range of PBS jet engines.



## EVOLUTION OF THE PBS ENGINE PROGRAMS

PBS offers a wide portfolio of customer modifications. We continuously increase the performance of individual types of engines while maintaining installation dimensions. We modify the engines for in-flight starting, re-use after landing in salt water and other specific customer modifications.

For selected types, it is possible to choose between a version lubricated by a separate oil system or lubrication with an oil admixture in the fuel.

We apply experience from thousands of installations in various manned and unmanned aircraft types.

## PBS JET ENGINE MODIFICATIONS



**OIL**  
Separate oil system



**SALT WATER**  
Salt water recovery



**PYRO**  
Pyro in-flight ignition



Under development



Under development

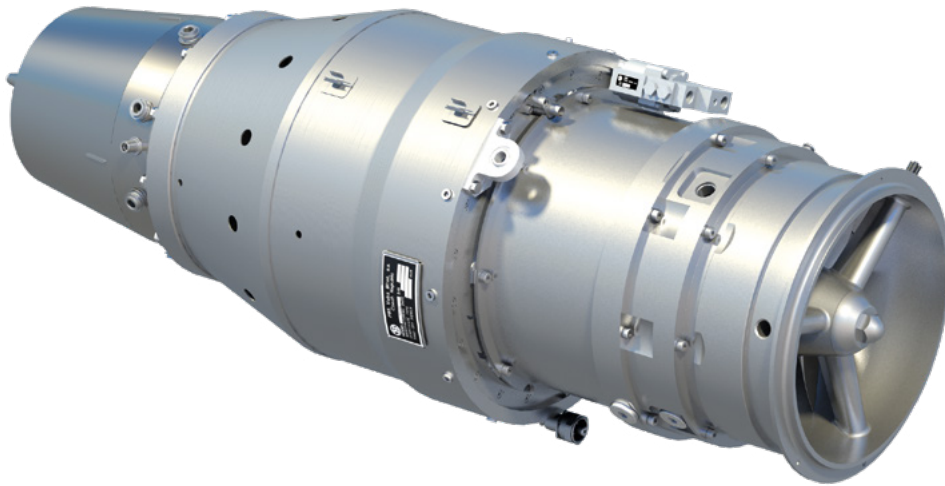


Under development

# PBS TJ200 UNDER DEVELOPMENT

The turbojet engine PBS TJ200 currently under development is designed primarily as a propulsion unit for modern UAV and UCAV systems. It is a compact engine of a simple design, fuel lubricated, equipped with BLDC starter-generator,

electric metering fuel pump and electronic control system of FADEC type. TJ200 will represent the most powerful propulsion unit from the PBS turbojet engine family.



## MAIN FEATURES

- › Compact design
- › Excellent thrust-to-weight ratio
- › The built-in starter-generator
- › Full authority digital engine control (FADEC)

## TECHNICAL PARAMETERS

TECHNICAL PARAMETERS	METRIC	IMPERIAL
Thrust	2,280 N	512.54 lbf
Power supply	28 V DC	28 V DC
Electrical power output	4.0 kW	4.0 kW

DIMENSIONS AND WEIGHT	METRIC	IMPERIAL
Outer diameter*	246 mm	9.68 in
Length (including exhaust nozzle)	730 mm	28.74 in
Weight	28.0 kg	61.73 lb

\*Excluding insulation and equipment

OPERATING ENVELOPE	METRIC	IMPERIAL
Max. altitude	10,000 m	32,808 ft
Max. speed	0.95 M	0.95 M

STARTING ENVELOPE	METRIC	IMPERIAL
Max. altitude	6,000 m	19,685 ft
Max. speed	0.4 to 0.8 M	0.4 to 0.8 M

# PBS TJ150

The PBS TJ150 small jet engine has been developed for unmanned aerial vehicles (UAVs), target drones as well as manned aircraft.



## MAIN FEATURES

- › Compact design
- › Excellent thrust-to-weight ratio
- › Low fuel consumption
- › The built-in starter-generator allows a reliable start and power supply to the deck network



OIL



SALT WATER



PYRO



## TECHNICAL PARAMETERS

PARAMETERS	METRIC	IMPERIAL
Thrust	1,500 N	337 lbf
Power supply	28 V DC	28 V DC
El. power output	600 - 2,250 W	600 - 2,250 W
SFC	0.12 kg/N/h	1.138 lb/lbf/hr
TBO	20-50 hrs	20-50 hrs

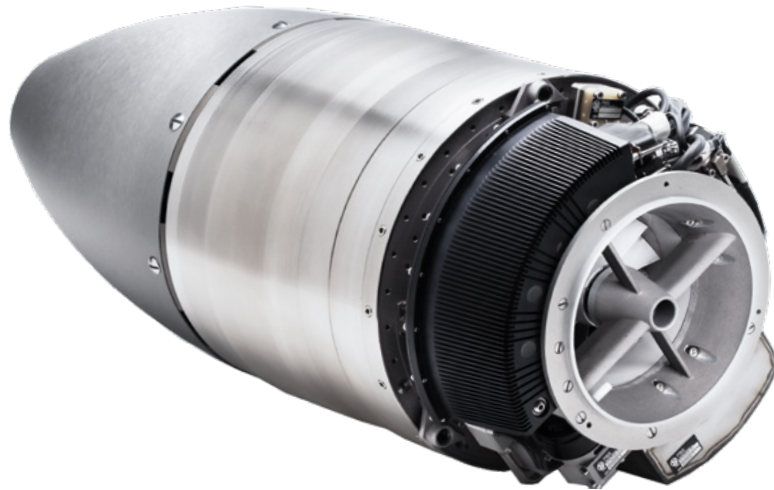
DIMENSIONS	METRIC	IMPERIAL
Outer diameter	272 mm	10.71 in
Length	636 mm	25.04 in
Weight	17.10 kg	37.70 lb

OPERATING ENVELOPE	METRIC	IMPERIAL
Max. altitude	10,000 m	32,808 ft
Max. speed	0.9 M	0.9 M
Ambient temperature	-50/+45 °C	-58/+113 °F

STARTING ENVELOPE	METRIC	IMPERIAL
Max. altitude	6,000 m	19.685 lbf
Max. speed	0.5 M	0.5 M
Ambient temperature	-35/+45 °C	-31/+113 °F

# PBS TJ100

The PBS TJ100 jet engine has been developed for unmanned aerial vehicles (UAVs), including target drones, remote carriers, unmanned combat systems, disposable applications and light experimental jet aircraft.



## MAIN FEATURES

- › Excellent thrust-to-weight ratio
- › Low fuel consumption
- › Compact design
- › Built-in starter-generator
- › Electric starting
- › Ground or in-flight restart
- › Windmill starting option under 7 sec.



OIL



SALT WATER



PYRO



## TECHNICAL PARAMETERS

PARAMETERS	METRIC	IMPERIAL
Thrust	1,100 - 1,250 N	247 - 281 lbf
Power supply	28 V DC	28 V DC
El. power output	700 - 2,300 W	700 - 2,300 W
SFC	0.126 kg/N/h	1.236 lb/lbf/hr
TBO	20 - 300 hrs	20 - 300 hrs

DIMENSIONS	METRIC	IMPERIAL
Outer diameter	272 mm	10.71 in
Length	636 mm	25.04 in
Weight	17.60 kg	38.80 lb

OPERATING ENVELOPE	METRIC	IMPERIAL
Max. altitude	10,000 m	32,808 ft
Max. speed	0.8 M	0.8 M
Ambient temperature	-50/+45 °C	-58/+113 °F

STARTING ENVELOPE	METRIC	IMPERIAL
Max. altitude	6,000 m	19,685 ft
Max. speed	0.5 M	0.5 M
Ambient temperature	-35/+45 °C	-31/+113 °F

# PBS TJ80-120

PBS TJ80-120 is a small jet engine designed for unmanned aerial vehicles (UAVs), including target drones, remote carriers, unmanned combat systems, and disposable applications.



## MAIN FEATURES

- › Best thrust-to-weight ratio in its category
- › Compact design
- › Built-in starter generator
- › Ground or in-flight restart
- › Quick air start under 7 sec.



OIL



SALT  
WATER



PYRO



## TECHNICAL PARAMETERS

PARAMETERS	METRIC	IMPERIAL
Thrust	900 - 1,250 N	202 - 269 lbf
Power supply	28 V DC	28 V DC
El. power output	650 - 2,250 W	650 - 2,250 W
SFC	0.125 kg/N/h	1.226 lb/lbf/hr
TBO	25 - 50 hrs	25 - 50 hrs

DIMENSIONS	METRIC	IMPERIAL
Outer diameter	235 mm	9.25 in
Length	636 mm	25.04 in
Weight	12.80 kg	28.22 lb

OPERATING ENVELOPE	METRIC	IMPERIAL
Max. altitude	10,000 m	32,808 ft
Max. speed	0.9 M	0.9 M
Ambient temperature	-50/+45 °C	-58/+113 °F

STARTING ENVELOPE	METRIC	IMPERIAL
Max. altitude	6,000 m	19,685 ft
Max. speed	0.6 M	0.6 M
Ambient temperature	-35/+45 °C	-31/+113 °F

# PBS TJ40-G1

Small turbojet engine developed for UAVs, target drones and other unmanned systems.



## MAIN FEATURES

- › Excellent thrust-to-weight ratio
- › Low fuel consumption
- › Compact design
- › Built-in starter-generator
- › Electric starting/pyro starting
- › Ground or in-flight restart
- › Windmill starting option under 7 sec.



OIL



SALT  
WATER



PYRO



## TECHNICAL PARAMETERS

PARAMETERS	METRIC	IMPERIAL
Thrust	395 - 425 N	89 - 96 lbf
Power supply	14 V DC	14 V DC
El. power output	150 W	150 W
SFC	0.147 kg/N/h	1.442 lb/lbf/hr
TBO	50 hrs	50 hrs

DIMENSIONS	METRIC	IMPERIAL
Outer diameter	147 mm	5.79 in
Length	304 mm	11.97 in
Weight	3.40 kg	7.50 lb

OPERATING ENVELOPE	METRIC	IMPERIAL
Max. altitude	9,000 m	29,528 ft
Max. speed	0.8 M	0.8 M
Ambient temperature	-50/+50 °C	-58/+122 °F

STARTING ENVELOPE	METRIC	IMPERIAL
Max. altitude	4,500 m	14,764 ft
Max. speed	0.35 M	0.35 M
Ambient temperature	-40/+50 °C	-40/+122 °F

# PBS TJ40-G2

Small turbojet engine developed for UAVs, target drones and other unmanned systems.



## MAIN FEATURES

- › Excellent thrust-to-weight ratio
- › Low fuel consumption
- › Compact design
- › Built-in starter-generator
- › High electric power output
- › Ground or in-flight restart
- › Windmill starting option under 7 sec.



OIL



SALT  
WATER



PYRO



## TECHNICAL PARAMETERS

PARAMETERS	METRIC	IMPERIAL
Thrust	395 N	89 lbf
Power supply	28 V DC	28 V DC
El. power output	1,100 W	1,100 W
SFC	0.147 kg/N/h	1.442 lb/lbf/hr
TBO	50 hrs	50 hrs

DIMENSIONS	METRIC	IMPERIAL
Outer diameter	147 mm	5.79 in
Length	373 mm	14.69 in
Weight	3.80 kg	8.38 lb

OPERATING ENVELOPE	METRIC	IMPERIAL
Max. altitude	9,000 m	29,528 ft
Max. speed	0.8 M	0.8 M
Ambient temperature	-50/+50 °C	-58/+122 °F

STARTING ENVELOPE	METRIC	IMPERIAL
Max. altitude	4,500 m	14,764 ft
Max. speed	0.35 M	0.35 M
Ambient temperature	-40/+50 °C	-40/+122 °F



# TURBOPROP ENGINE PBS TP100

The PBS TP100 turboprop engine is suitable for UAVs and light aircraft. The engine is designed for use in both pusher and tractor configuration.



## MAIN FEATURES

- › Low weight
- › Small installation dimensions
- › Excellent power-to-weight ratio
- › Digital interface for control and monitoring
- › Stable operation at high altitudes and high temperatures
- › Ability to run at cold temperatures below -30 °C without preheating
- › Pusher and tractor configuration option



## TECHNICAL PARAMETERS

PARAMETERS	METRIC	IMPERIAL
Output shaft speed	2,158 RPM	2,158 lbf
Power supply	28 V DC	28 V DC
El. power output	720 - 1,500 W	720 - 1,500 W
Max continuous power	180 kW	241 HP
Specific fuel consumption	0.548 kg/kW/h	0.901 lb/HP/hr

DIMENSIONS	METRIC	IMPERIAL
Height x width (no exhaust)	398 x 330 mm	15.67 x 13.00 in
Length	891 mm	35.08 in
Weight	61.60 kg	135.80 lb

OPERATING ENVELOPE	METRIC	IMPERIAL
Max. altitude	9,000 m	29,528 ft
Ambient temperature	-50/+30 °C	-58/+86 °F

STARTING ENVELOPE	METRIC	IMPERIAL
Max. altitude	6,000 m	19,685 ft
Ambient temperature	-30/+30 °C	-22/+86 °F

# TURBOSHAFT ENGINE PBS TS100

The turboshaft engine PBS TS100 is suitable for light and ultralight helicopters weighing up to 1,000 kg. The engine offers a power take-off of up to 180 kW.



## MAIN FEATURES

- › Low weight
- › Small installation dimensions
- › Excellent power-to-weight ratio
- › Digital interface for control and monitoring
- › Stable operation at high altitudes and high temperatures
- › Ability to run at cold temperatures below -30 °C without preheating
- › Pusher and tractor configuration option



## TECHNICAL PARAMETERS

PARAMETERS	METRIC	IMPERIAL
Output shaft speed (ZA/DA)	5,978/2,158 RPM	5,978/2,158 RPM
Power supply	28 V DC	28 V DC
El. power output	720 - 1,500 W	720 - 1,500 W
Max continuous power	180 kW	241 HP
Specific fuel consumption	0.548 kg/kW/h	0.901 lb/HP/hr

DIMENSIONS	METRIC	IMPERIAL
Height x width (no exhaust)	398 x 330 mm	15.67 x 13.00 in
Length (ZA/DA)	829/881 mm	32.64/34.69 in
Weight (ZA/DA)	56.70/61.30 kg	125.00/135.10 lb

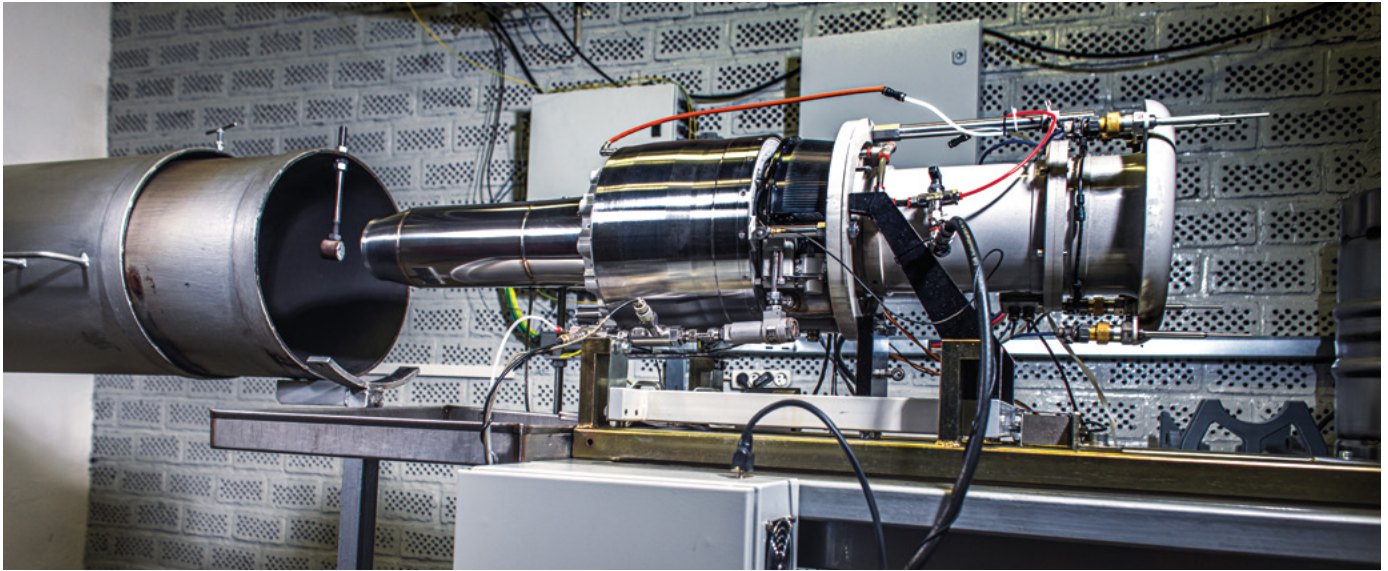
OPERATING ENVELOPE	METRIC	IMPERIAL
Max. altitude	9,000 m	29,528 ft
Ambient temperature	-50/+50 °C	-58/+122 °F

STARTING ENVELOPE	METRIC	IMPERIAL
Max. altitude	6,000 m	19,685 ft
Ambient temperature	-30/+30 °C	-22/+86 °F

# PBS TESTING FACILITY

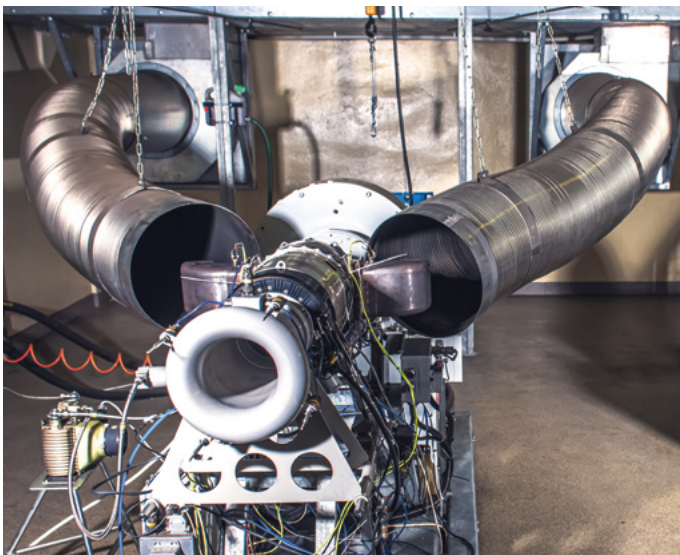
The development and production of UAV turbine engines at PBS Velka Bites is also supported by our own extensive in-house test facility. More than 50 experienced flight test engineers and

technicians have 16 specialized testing cells for comprehensive testing of turbine engines as well as auxiliary power units and environmental control systems at their disposal.



## TESTING CAPABILITIES

- › Turbojet engines with a thrust up to 2,500 N
- › Flight speed simulation up to 0.8 M
- › Testing with air pressure up to 1,200 kPa
- › Temperatures from -60 to 80 °C
- › G-force limit tests
- › Vibration and impact tests
- › Complete ATP and production testing



# WE ARE PBS

The PBS brand history in precision engineering goes 200 years deep. Today's PBS Velka Bites is an innovative engineering company focusing its activities foremost in aerospace industry. **PBS develops and manufactures turbojet, turboprop and turboshaft engines, auxiliary power units (APU) and environmental control systems (ECS).**

The PBS production program also includes precision casting, precision machining, metal finishing and last but not least production of components for cryogenics.

PBS Velka Bites is a member of PBS GROUP a.s.



DOA, POA a MOA



AS 9100,  
ISO 9001 a ISO 14001



MAA 056 a MAA 076  
Ministry of Defence, Czech Republic



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