

Engines of the third Millennium



ДЕРЖАВНЕ ПІДПРИЄМСТВО
ЗАПОРІЗЬКЕ МАШИНОБУДІВНИ
КОНСТРУКТОРСЬКЕ БЮРО
ПРОГРЕС
ІМ. АКАДЕМІКА О.Г. ІВЧЕНКА

HISTORY



**ZAPOROZHYE MACHINE-BUILDING DESIGN
BUREAU PROGRESS STATE ENTERPRISE
NAMED AFTER ACADEMICIAN A.G. IVCHENKO
(SE IVCHENKO-PROGRESS)**

Foundation date:

May 5, 1945

1945-1968



**A.G. Ivchenko
Designer General**

1968-1988



**V.A. Lotarev
Designer General**



**F.M. Muravchenko
Designer General**

AWARDS



GOVERNMENT AWARDS

1966



Order of Lenin

1975



**Order of Labor,
CzSSR**

1981



**Order of the Red
Banner of Labour**

INTERNATIONAL PUBLIC AWARDS



**Diploma of Laureate and Prize
"Golden Dolphin" for the best year's
scientific development,
Regional Rating of Popularity.
"Starry Way", 1998**



**Diploma and public award for
outstanding achievements in effective
use of power resources.
State Committee on energy saving,
2000**



**Diploma and Award "Crystal Elephant"
for development of engines
of the third millennium.
International open Rating of popularity
and quality "Golden Fortune", 2001**



**Diploma of merit and Award "Golden Trade Mark"
for a complex implementation
of aeroengines in industry.
International Economy Forum
"Business-Olympus", 2001**



**Diploma and Award of International prize
"European Quality" for achieved high quality
of products which meet European standards.
European Academy of Business,
Oxford, 2002**



**Diploma and silver award
"the Goddess Fortune
with a Golden Sword".
International open Rating
of Popularity and Quality
"Golden Fortune ", 2002**



**Diploma and Award "Golden
Maltese Cross" for high quality
of products and services.
International Business Forum,
Malta, 2002**



**Diploma and Cross of Honour award
"For Revival of Ukraine" of First Class, for
implementing modern technologies in
development of advanced aviation products.
Ukrainian Fund of Scientific and Economic &
Juridical Cooperation, 2002**



**Diploma and Award
"Symbol of New Millenium -
European Quality".
The 16th International
Congress, Paris, 2002**



AWARDS



INTERNATIONAL PUBLIC AWARDS



Certificate of Quality No. 0021 for highest quality, truly competitive aeroengines and gas-turbine drives made by SE IVCHENKO-PROGRESS and recommended for exporting to International markets.
European Marketing Research Center, Brussels, 2003



Diploma and Award "EuroMarket Laureate" for high achievements in development of new products and dynamism in development of company.
European Market Research Center, Brussels, 2003



Certificate and Golden Award for Technology and Quality-2004.
Editorial Office, Geneva, 2004



Diploma of laureate of rating "The Best Enterprises of Ukraine" in nomination of machine-building industry.
The 7th Congress of Business and Cultural Circles of Ukraine, Kiev, 2005



Ukraine-Russia Cooperation diploma and award for development and strengthening of economical relations between Ukraine and Russian Federation.
Chamber of Commerce & Industry of Ukraine, Kiev, 2005



Diploma and Award of laureate of special International Prize "Golden star" in nomination: Research and design of aviation products,
"The Kremlin" Fund, Moscow, 2006



Diploma of Laureate of Honorary Award Leader in Economics of Ukraine for effectiveness and high results achieved in economic activities,
Business Assembly of Ukraine, Kiev, 2007

INTERNATIONAL RECOGNITION OF CERTIFICATION AUTHORITIES



Aviation Register of Interstate Aviation Committee (ARMAK)
Certificates No. SPR-15, No. R-3, No. R-69 and others



ГОСАВИАСЛУЖБА
State Department of Aviation Transport of Ukraine
Certificates No. VR 0036, No. TD 0005 and others



Quality Systems Certification Authority of "QUALITY" Certification Centre (Russian Federation)
Certificate of Compliance
POCC UA.MX04.B00034
POCC UA.MX04.B00043
POCC UA.MX04.B00044



Bureau Veritas (France)
Certificate No. 213617,
No. 010-UKR and
No. 010-UKF

* Totally 59 certificates of various types.

FORM OF PROPERTY:

State enterprise as a part of Ministry of Machine-Building, Military and Industrial Complex and Conversion of Ukraine

SPHERE OF ACTIVITIES:

Design, manufacture, certification, putting into series production, overhaul, test of aircraft and industrial gas turbine engines

CO-OPERATION:

More than 800 associated enterprises and suppliers including almost 600 from Russian Federation

QUANTITY PRODUCTION:

Motor Sich JSC, Zaporozhye, Ukraine
Federal State Unitary Enterprise Salut MMPP, Moscow, Russia
UMPO JSC, Ufa, Russia
Kazan Motor Building Association (KMPO) JSC, Russia
IACI, Iran
Povazske Strojarnie JSC, Povazska Bystrica, Slovak Republic

OPERATION:

57 types of aircraft powered by engines and APUs of SE IVCHENKO-PROGRESS design are operated in Ukraine and 109 countries of Europe, Asia, Africa and America. More than 80 thousand piston and gas-turbine engines have been manufactured by series production plants. Total operating time of the gas-turbine engines in service is over 300 million hours.

- AI-20** - The 1- st in the USSR turboprop engine with long service life
- AI-25** - The 1- st in the USSR bypass engine for short-haul aircraft
- D-36** - The 1- st in the USSR three-shaft turbofan engine with high bypass ratio
- D-18T** - The 1- st in the USSR turbofan with a thrust over 20 tons
- D-136** - The most powerful in the world helicopter engine
- D-27** - The 1- st in the world propfan engine

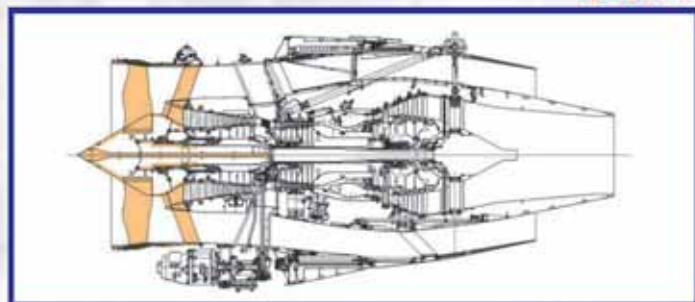


**Advanced
engines**

D-436T2, D-436T3



D-436T2



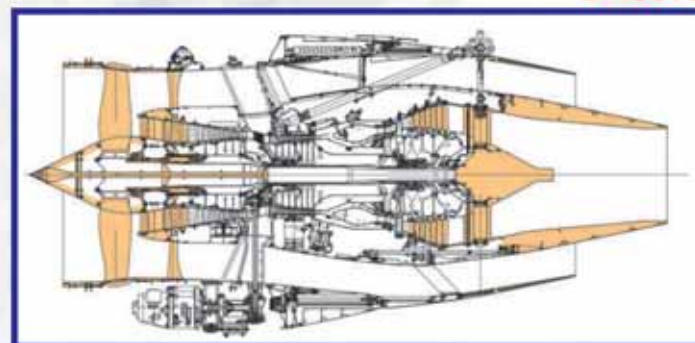
Takeoff (S/L static; ISA)

	D-436T2
R, kgf	8 400
C _R , kg/h/kgf	0.371

Tu-334-200



D-436T3



Takeoff (S/L static; ISA)

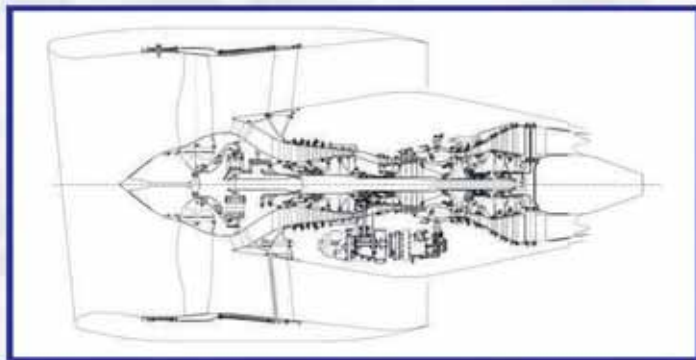
	D-436T3
R, kgf	9 400
C _R , kg/h/kgf	0.366

Tu-334-300



SPM-21

SPM-21



MS-21



MTA



Takeoff (S/L static; ISA)

$\sigma_{inlet} = 0.98$; $\Delta G_{bleed} = 2291 \text{ kg/h}$; $\Delta N = 77 \text{ kW}$

SPM-21

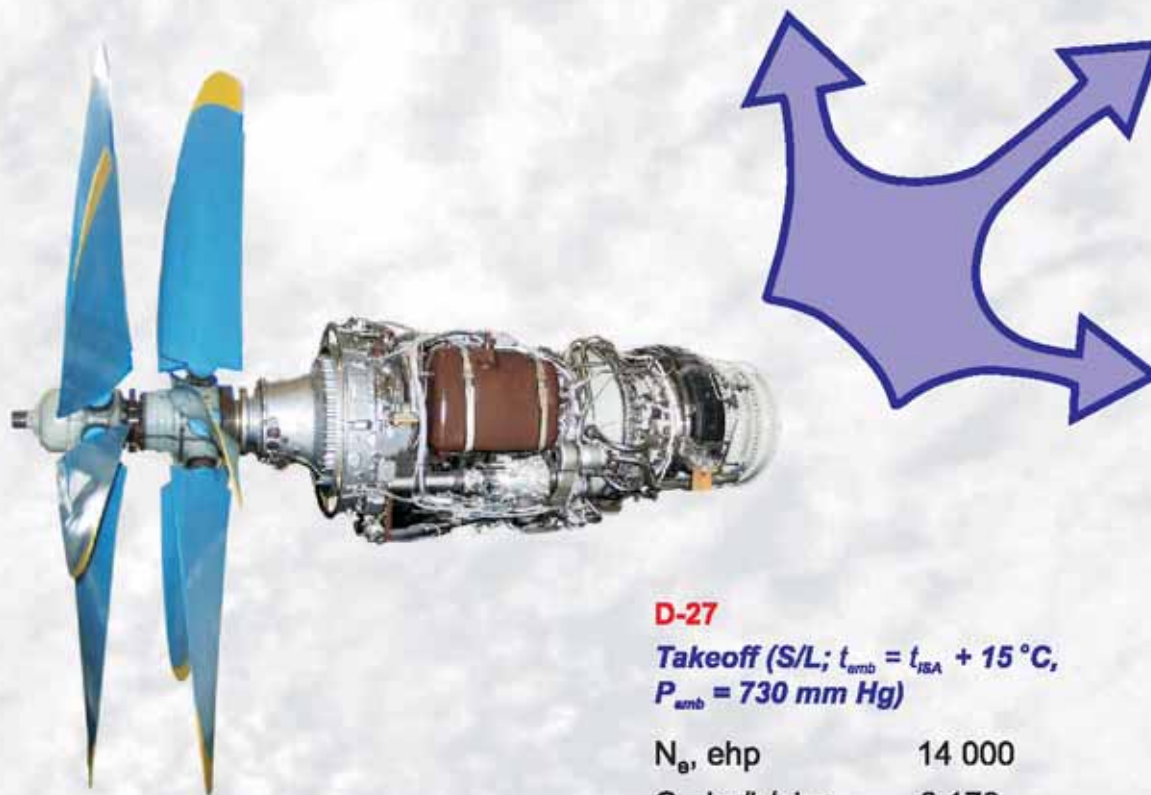
R, kgf	12 500
C_R , kg/h/kgf	0.262

D-27

Tu-95MS



An-70,-70T



A-42PE



D-27

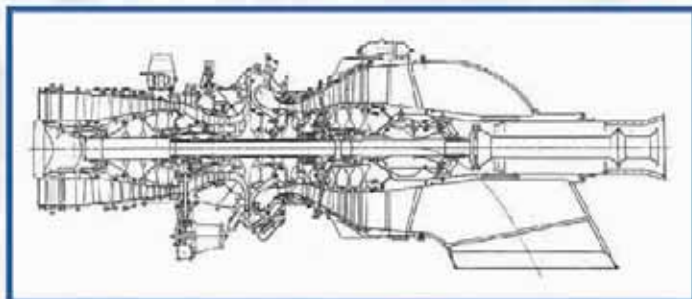
Takeoff (S/L; $t_{amb} = t_{ISA} + 15\text{ }^{\circ}\text{C}$,
 $P_{amb} = 730\text{ mm Hg}$)

N_g , ehp	14 000
C_N , kg/h/ehp	0.170

AI-127, AI-727, AI-727M



AI-127



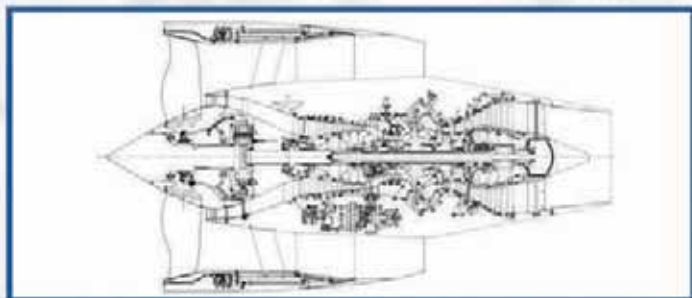
Max takeoff (S/L static; ISA)

	AI-127
N_e , hp	14 500
C_{N1} , kg/h/hp	0.170

Heavy lift helicopters



AI-727



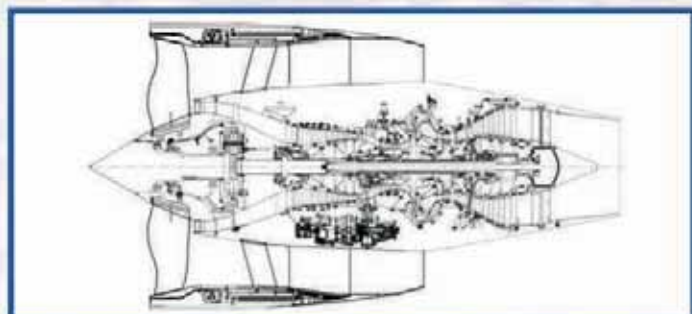
Takeoff (S/L static; ISA)

	AI-727
R, kgf	10 000
C_{R1} , kg/h/kgf	0.257

An-148T



AI-727M



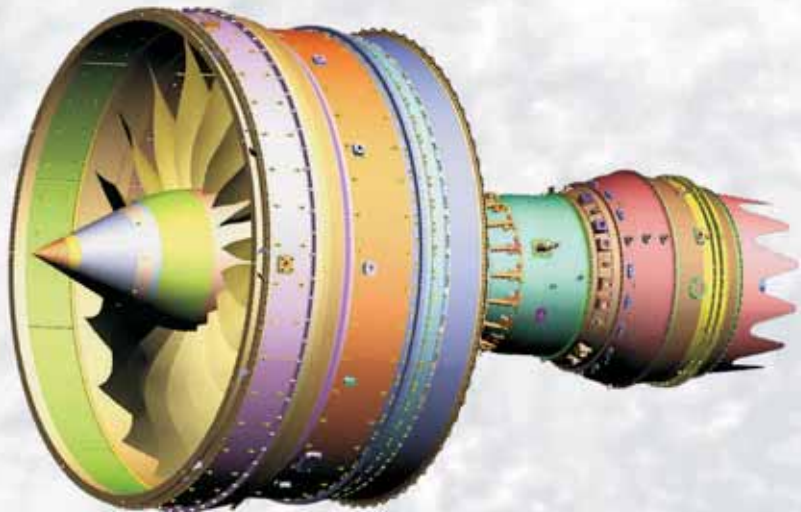
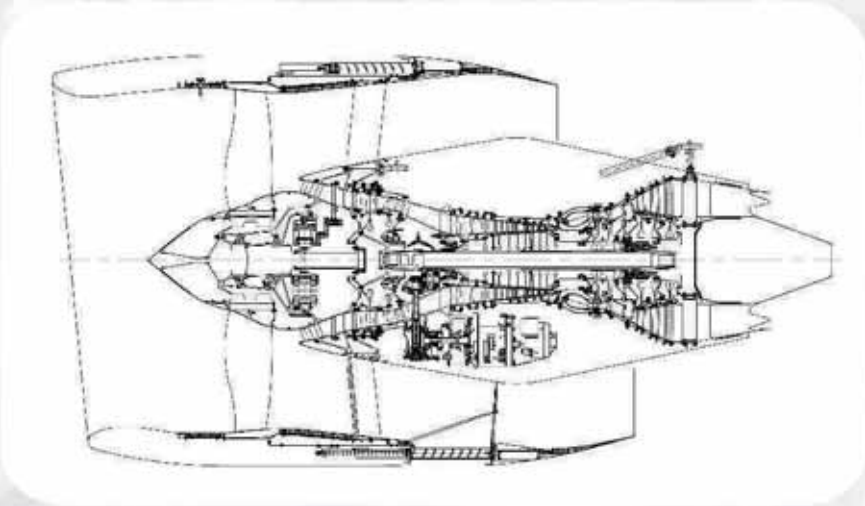
Takeoff (S/L static; ISA)

	AI-727M
R, kgf	11 000
C_{R1} , kg/h/kgf	0.243

Short- and medium-haul aircraft



AI-28



Takeoff
(S/L static; ISA)

R, кгс	7800
C_{R_1} , кг/кгс·ч	0,245

AI-222-25, AI-222-25F



AI-222-25



Yak-130



AI-222-25F



Light supersonic airplane



**Takeoff
(S/L static; ISA)**

**AI-222-25,
AI-222-25F**

**Full augmented power
(S/L static; ISA)**

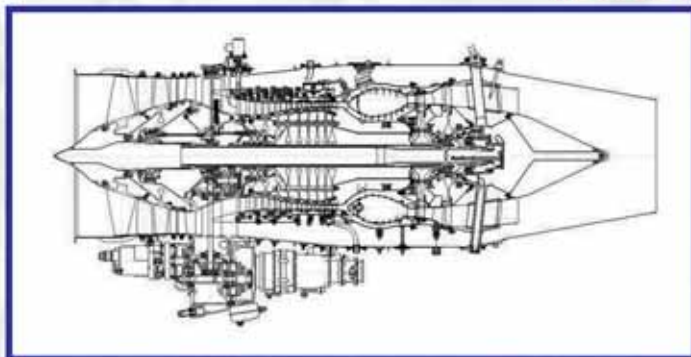
AI-222-25F

R, kgf	2 500	4 200
C _R , kg/h/kgf	0.64	1.9

AI-222-28, AI-6500, AI-8000, AI-8000V



AI-222-28



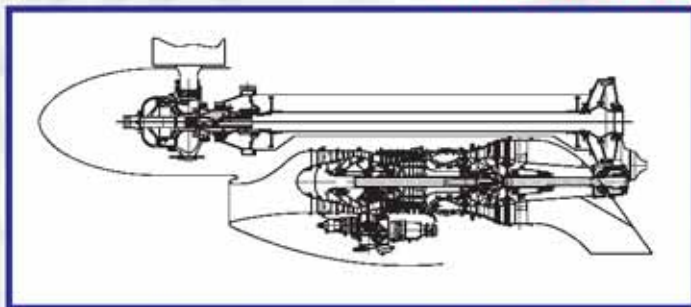
Takeoff (S/L static; ISA)

	AI-222-28
R, kgf	2 800
C _R , kg/h/kgf	0.67

Light combat aircraft



AI-6500, AI-8000



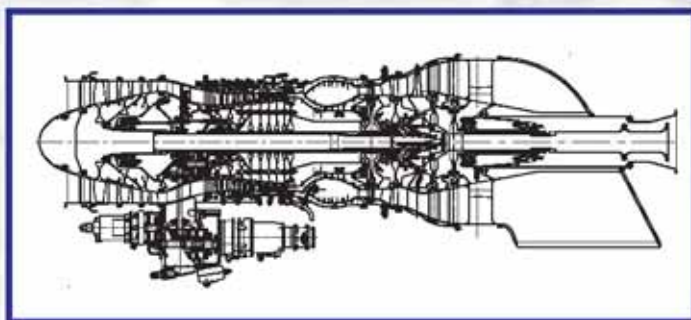
Takeoff (S/L static; ISA)

	AI-6500	AI-8000
N _e , ehp	6 500	8 000
C _e , kg/h/ehp	0.20	0.189

Transport and passenger aircraft



AI-8000V



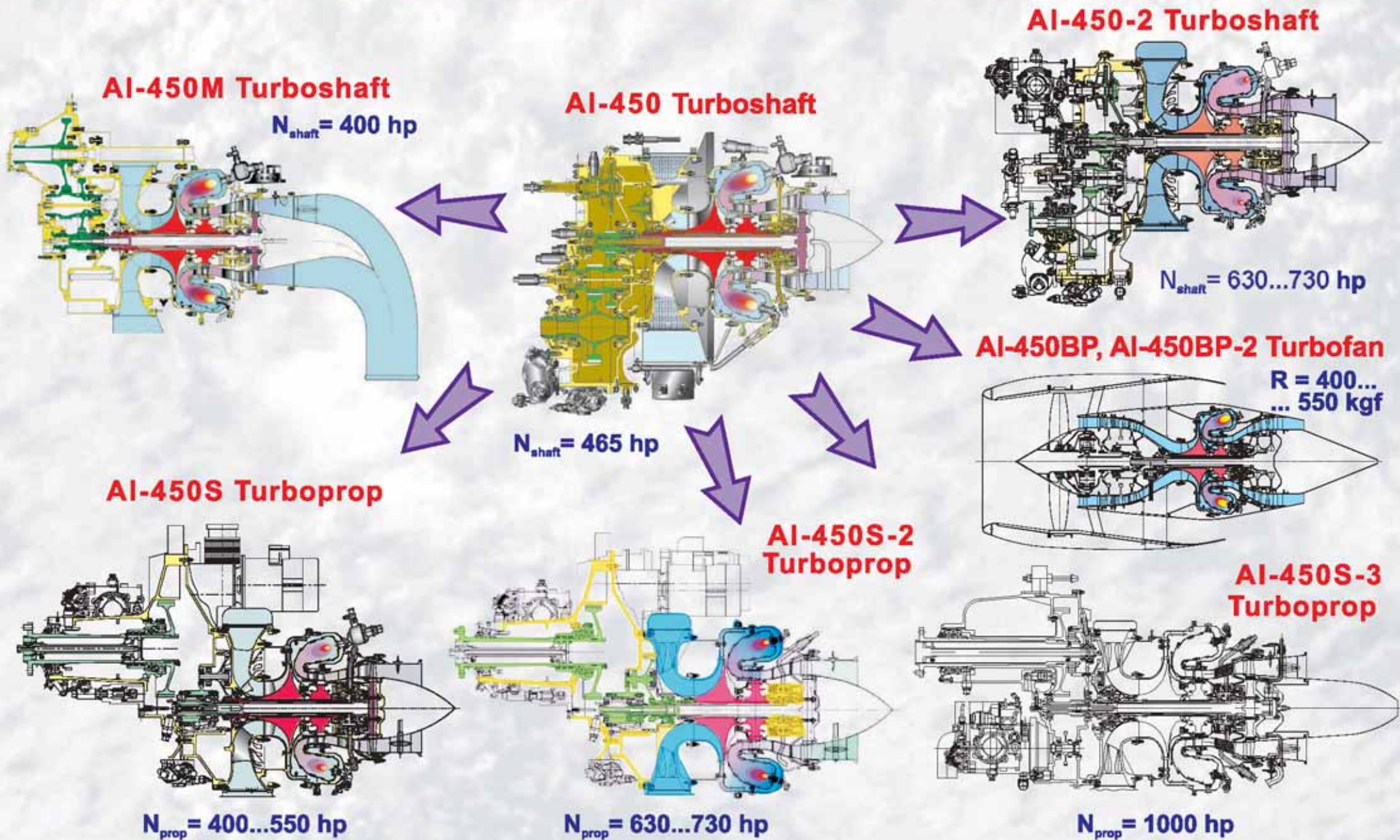
Takeoff (S/L static; ISA)

	AI-8000V
N _B , hp	7 600
C _N , kg/h/hp	0.192

Transport helicopter



AI-450 ENGINE FAMILY



AI-450, AI-450M, AI-450-2



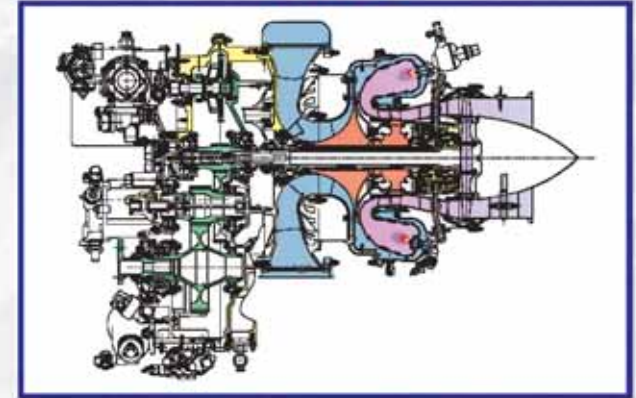
AI-450



AI-450M



AI-450-2



Ka-226



Mi-2M



Helicopters with takeoff weight of 3000...3300 kg



Takeoff (S/L static; ISA)

AI-450

N, hp 465

Takeoff (S/L static; ISA)

AI-450M

N, hp 400
C_N, kg/h/hp 0.260

Takeoff (S/L static; ISA)

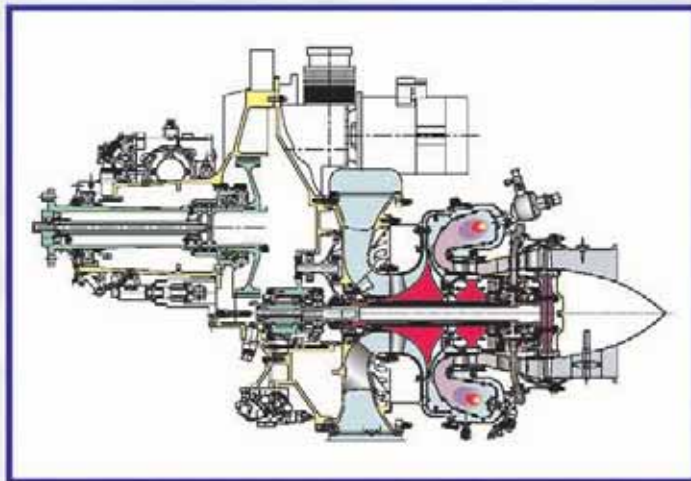
AI-450-2

N, hp 630...730
C_N, kg/h/hp 0.255

AI-450S



AI-450S



Takeoff
(S/L static; ISA) N, hp

AI-450S
400...550

Yak-18T



UAV



Light multi-purpose aircraft



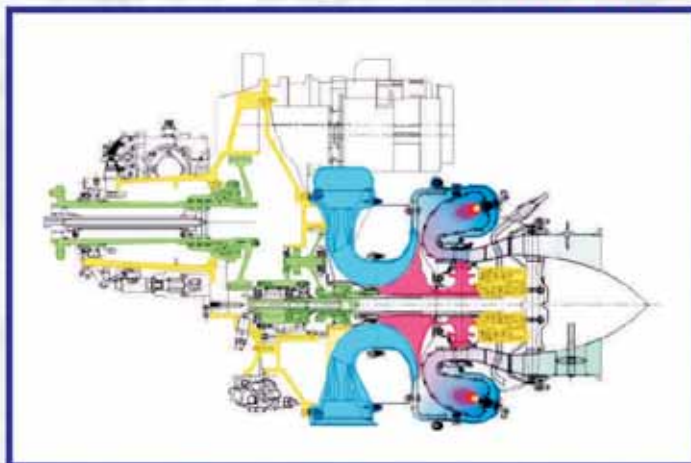
Light trainers



AI-450S-2, AI-450BP, -450BP-2



AI-450S-2



EV-55



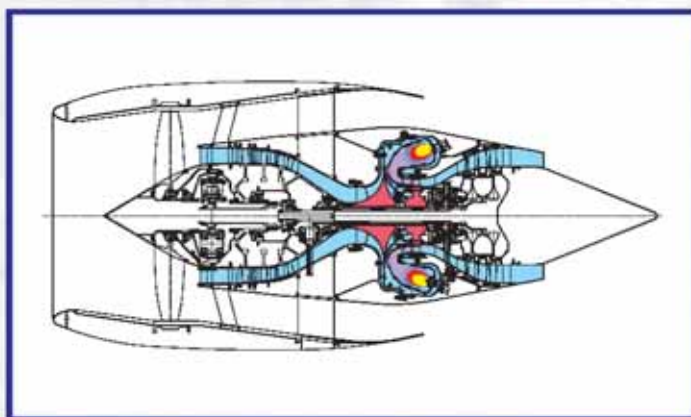
Light multi-purpose aircraft



Takeoff
(S/L static; ISA) N, hp

AI-450S-2
630...730

AI-450BP, -450BP-2



UAV

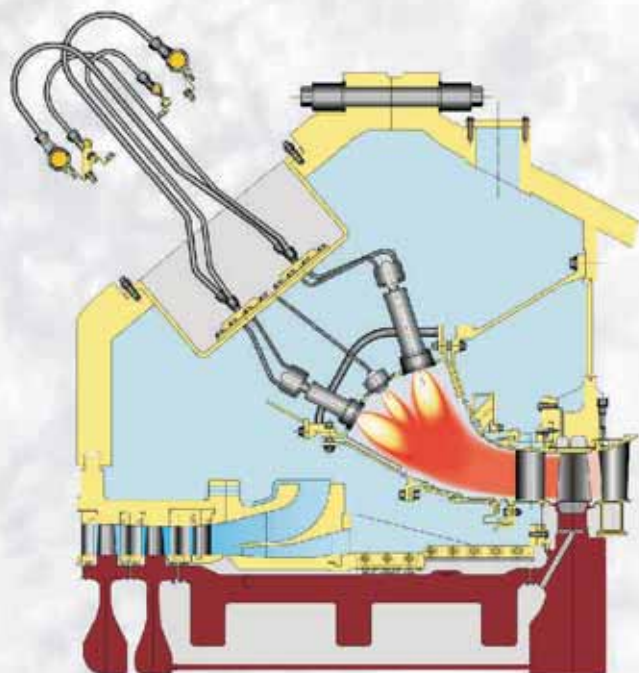


Takeoff
(S/L static; ISA)

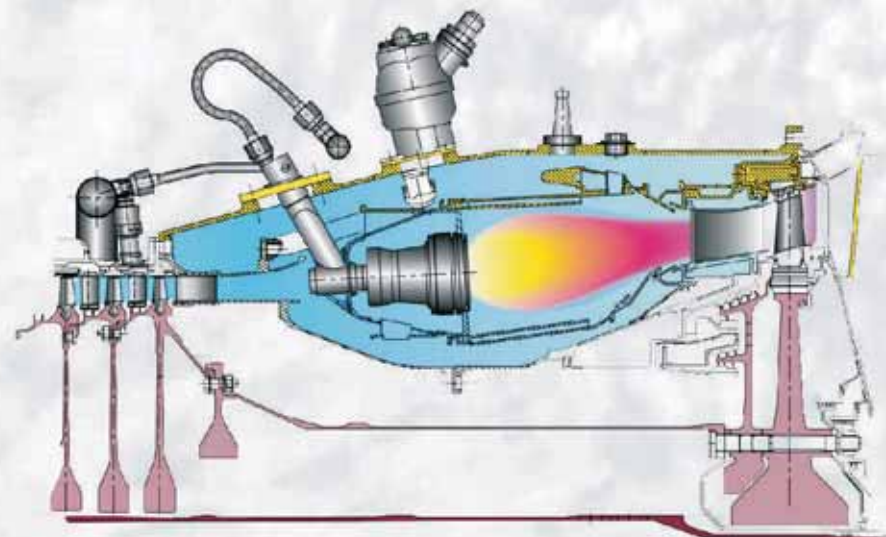
AI-450BP, -450BP-2

R, kgf 410...560
C_R, kg/h/kgf 0.370

LOW-EMISSION COMBUSTION CHAMBERS



LOW-EMISSION COMBUSTION CHAMBERS FOR INDUSTRIAL GAS TURBINE UNITS OF VARIOUS POWER LEVELS BOTH NEW AND TO BE UPDATED



Д-336, AI-336 GAS TURBINE DRIVES OF ALL MODIFIED VERSION S WITH LOW-EMISSION COMBUSTION CHAMBERS

Nitrogen oxide concentration

$$\text{NO}_x \leq 50 \text{ mg/Nm}^3$$

Carbon monoxide concentration

$$\text{CO} \leq 100 \text{ mg/Nm}^3$$

under all power ratings without water supply