



ABOUT COMPANY

Foreign Trade Company ALLWE was founded on June 9, 1992 as a multi-industry export company operating in the sphere of deliveries of hi-tech products manufactured by Russian, CIS and foreign enterprises.



The implementation of innovative financial management system allows Foreign Trade Company ALLWE to participate in a number of large investment projects, provide its customers with optimal payment terms and guarantee short deadlines during order fulfillment.

The equipment delivered by the company meets all technical requirements of customers.

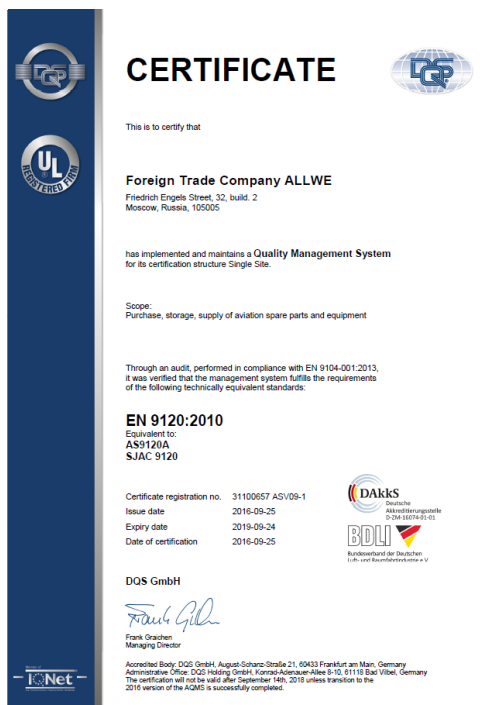
The internal quality control system provides an appropriate level of product safety and its compliance with state and industry standards.

One of the most important activities of ALLWE is the export of aviation equipment, assurance of aircraft operability and maintenance outside Russia.

CERTIFICATES

The company's activities are certified in accordance with the international quality management standard and match the high level of specific certification requirements.

In 2013, the Ministry of Industry and Trade of the Russian Federation provided ALLWE with license No.12532-AT for the aviation equipment development, manufacture, testing and maintenance.



OUR PARTNER COUNTRIES



The company carries out marketing research on a regular basis which allows successfully monitoring foreign goods and services markets. The list of import countries already having long-term cooperation programmes with ALLWE includes all continents of the globe.



MEMBERSHIP IN INTERNATIONAL ORGANIZATIONS



ASA
Aviation Suppliers Association



EASO
European Aviation Suppliers Organization



HAI
Helicopters Association International



ICC
International Chamber of Commerce



ICIE
International Congress of Industrialists and Entrepreneurs



Chamber of Commerce and Industry of Russian Federation



International Association of Trading Companies



EBA (Europe Business Assembly)

The company's membership in the International Chamber of Commerce, International Association of Trading Companies, Aviation Suppliers Association (ASA), Helicopters Association International (HAI), International Congress of Industrialists and Entrepreneurs, Chamber of Commerce and Industry of Russia, Russian Union of Industrialists and Entrepreneurs facilitates the establishment and maintenance of close business relations with foreign partners.



Russian Union of Industrialists and Entrepreneurs



Russian Aviation Suppliers Organization



Noncommercial partnership Souzsert - Russian Union of Certification



Moscow Chamber of Commerce and Industry



International Aerospace Quality Group



Quality Service QS Schaffhausen AG (Swiss Certification Service)



SAI Global Certification Services Pty Ltd



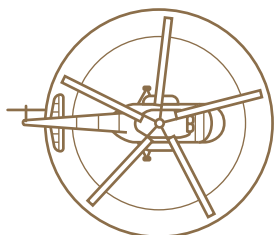
Bureau Veritas Certification

EXPORT EQUIPMENT LIST



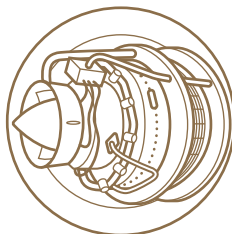
PLANES

- An-2
- An-12
- An-24
- An-26
- An-28
- An-32
- An-70
- An-72
- An-74
- An-140
- An-148
- An-158
- Tu-134
- Tu-154
- Tu-324,
- Tu-334
- Il-114
- Il-76Td
- Yak-40
- Yak-42



HELICOPTERS

- Mi-2
- Mi-8
- Mi-17
- Mi-34
- Mi-38
- Ka-32
- Ka-226 and its modifications



AVIATION EQUIPMENT

Engines

- ASH-62 ser16
- AI-20M
- AI-24
- D-27
- D-30KP2
- D-30KU-154
- D-36
- D-131ser1
- D-436T
- 1\TP\148
- AI-450
- TV2-117A
- TV3-117BM
- TV3-117
- VMA-SBM1
- TV-117 VMA-SBM1B ser1
- TV-117 VMA-SBM1B ser4E
- VK-2500
- AI-9
- AI-9V
- AI-9V ser1
- AI-9V-3B
- TA-6
- TA-8
- TA-12
- RU-19A-300
- AI-450-MS

Test and control equipment

- Test and control equipment KPA-PVD
- Thermometers verification unit UPT-1M ser.2
- Tachometric control unit KTU-1M
- Fire annunciator system test and control equipment KPA-SSP
- Remote control unit PP-SSP
- Steering system test and control equipment LA

Main gearbox

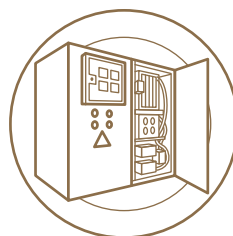
- VR-2
- VR-8
- VR-14
- VR-26
- VR-226N
- VR-252

Foreign Trade Company ALLWE concludes long-term contracts for creation of service centres for aircraft and aircraft units maintenance. Our experts are able to carry out modification of aircraft according to manufacturers' bulletins and to provide maintenance of aircraft engines with a full TBO cycle.



SPECIAL PURPOSE VEHICLE

- Aircraft mobile unit APA
- Fuel tanker TZ
- Ground air-conditioning unit AMK
- Oxygen replenishing mobile station AKZS
- Air servicer VZ



EXTERNAL EQUIPMENT

- Frequency inverters FCA
- Aerodrome rectifiers
- AR-1x400/600/800x28,0/28,5
- Aerodrome rectifiers AR-2x40 0x28,5/48
- Cable winding automatic device ACW-01



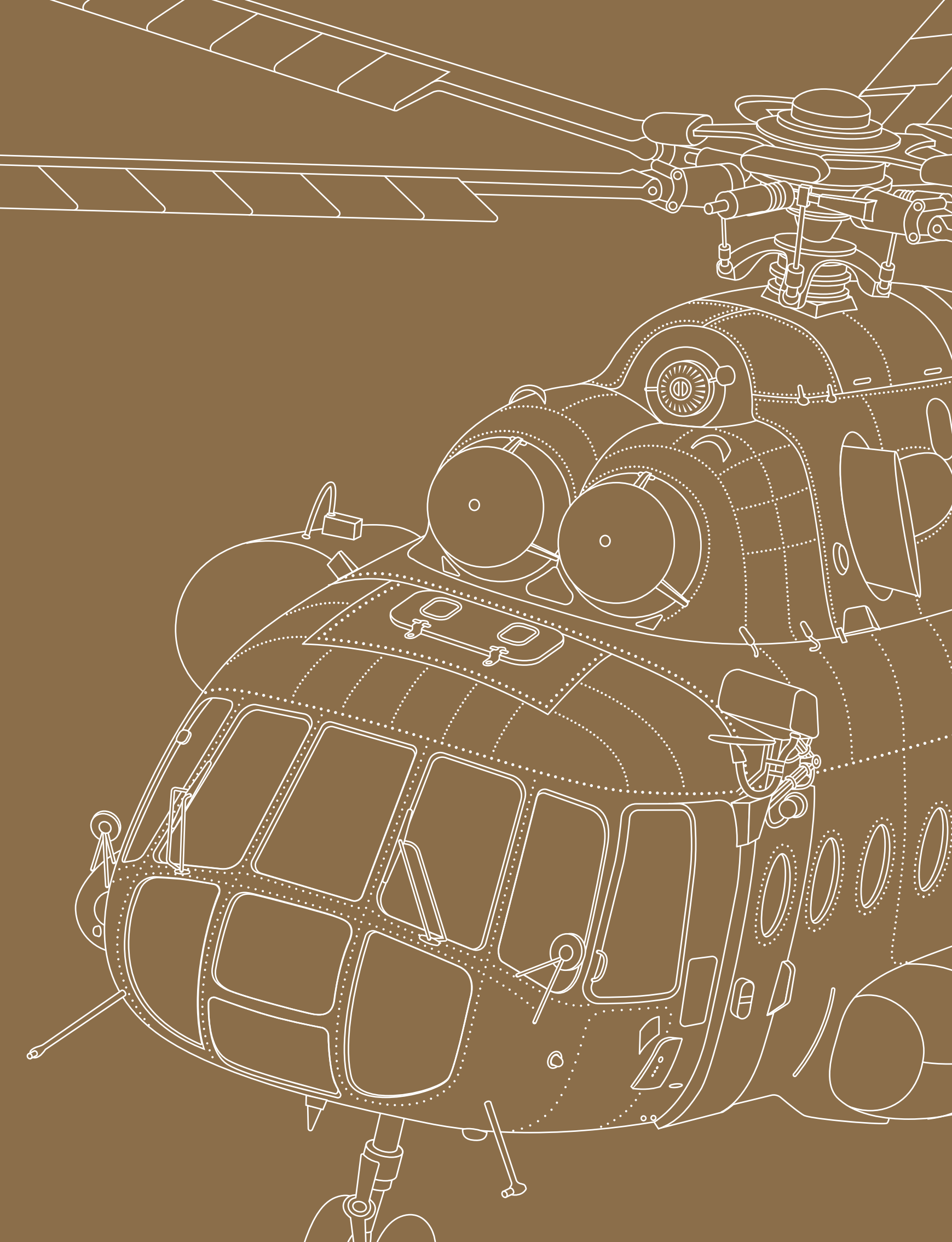
AIRCRAFT REPAIR SERVICE

- Engines
- Airplane and helicopter units
- Instruments
- Avionics equipment
- Electric equipment

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MI-8/17 HELICOPTER. BASIC FLIGHT PERFORMANCE

Mi-8 is a medium transport multipurpose helicopter that has been manufactured since 1964. More than 120 modifications and variations have been created on the basis of the Mi-8 helicopter. More than 12,000 Mi-8/17 helicopters have been manufactured, including more than 8000 in Kazan (JSC «Kazan Helicopter Plant») and more than 4000 in Ulan-Ude (JSC «U-UAP»). Mi-8/17 helicopters are in operation in more than 84 countries. The helicopter has a single-rotor configuration with a five-blade main rotor and a three-blade tail rotor. The helicopter crew consists of two pilots and one flight engineer.



MI-8/17 SERIES FLIGHT PERFORMANCE

YEAR OF CONSTRUCTION	B-8 1961	B-8A 1961	B-8AT 1963	Mi -8T 1965
Crew	3	3	3	3
Number of passengers	18	on	9P	9L
Engine type	AI-24V	TV2-117	TV2-117	TV2-117A
Engine power, h.p.	1x1990	2x1500	2x1500	2x1500
Main rotor diameter, m	21	21,3	21,3	21,3
Empty weight helicopter, kg	5726	5860	7230	6934
Take-off mass, kg				
normal	-	9000	8780	11100
maximum	-	9500	10000	12000
Cargo weight, kg				
normal	1500	2000	2000	2000
maximum	2000	3000	4000	4000
on external sling	-	3000	3000	3000
Speed, km/h				
maximum	-	240	260	260
cruising	-	220	220	225
Static altitude, m				
taking into account ground effect	-	-	900	850
without ground effect	-	2200	1900	1800
Zoom altitude, m	-	4700	4500	4500
Maximal total range, km	-	455	450	480

Mi -8P 1965	Mi 8AT 1990	Mi-8MT 1975	Mi -8MTV-1 1987	Mi -8AMT 1991	Mi -171 1997	Mi -172 1991
3	2	2	1	3	3	3
9Ya	24	24	24	27	26	26
TV2-117A	TV2-117AG	TV3-117MT	TV3-117VM	TV3-117VM	TV3-117VM	TV3-117VM
2x1500	1 2x1500	2x1900	2x2000	2x2000	2x1900	2x2000
21,3	1 21,3	21,3	21,3	21,3	21,3	21,3
7000	1 7143	7200	7381	6913	6985	7514
11570	11100	11100	11100	11100	11100	11878
12000	12000	13000	13000	13000	13000	-
2000	2000	2000	3000	3000	3000	3000
4000	4000	4000	4000	4000	4000	4000
3000	3000	3000	4000	4000	4000	5000
250	250	250	250	250	250	250
225	230	220	240	230	230	230
60	850	1760	3980	3980	3980	-
1300	1800	3500	-	-	-	-
4200	4500	5000	6000	6000	6000	-
425	520	520	590	570	637	-

SERVICE LIFE OF MI-8MTV, MI-17, MI-171 HELICOPTERS

NO.	NAME	PART NUMBER
1	Helicopter	Mi-8MTV, Mi-17, Mi-171
2	Fuselage, tail boom and tail boom pylon	
3	Stabilizer	
	with linen skin	8AT-3100-00 8AT-3100-00
	with metal skin	8AT.3100.000-05
4	Reduction gearbox frame	140-0800-00
5	Engine	TV3-117VM
6	Auxiliary power plant	AI-9V
7	Main gearbox	VR-14
8	Main rotor blade:	
	manufactured at Kazan Helicopter Factory	8AT-2710-00
	manufactured at Ulan-Ude Aviation Factory	8AT-2710-00
9	Swash plate	8-1950-000
10	Rotor hub	8-1930-000 c. 02
11	Tail rotor	246-3904-000 c.01
12	Tail rotor hub	246-3914-000
13	Tail rotor blade	246-3925-00
14	Intermediate gearbox	8A-1515-000
15	Tail rotor drive shaft	8A-1516-000
16	Tail gearbox	246-1517-000
17	Fan	8A-6311-00 c. 4

SERVICE LIFE			REASON
before first repair hours/years	overhaul hours/years	specified hours/years	Bulletin (decision, conclusion)
2000/9	2000/8	7000/35	T3215-БЕ-AB, T3071-БЕ-AB
2000/9	2000/8	7000/35	Concl. № F-Mi-8MTV(AMT)-12-1
2000/9	2000/8	12000/30	Concl. № S-MTV, AMT-05-1
2000/9	2000/8	12000/30	Concl. № Sm-80MTV-01
2000/9	2000/8	7000/30	Concl. № R-MTV, AMT-05-1
2000/10	1500/10	4500/-	K78-008-БЕ-, K78-010-БЕ-
3000зап 6000/17	3000зап6000/17	6000зап./9000отб/	N9V-46БЕ-
2000/10	2000/10	6000/-	Concl. № 612VR-66-06
-	-	2000/7	Concl. № L-172-95
-	-	2000/7	Concl. № L80-02
1500/8	1500/8	3000/-	-
1500/7	1500/8	3000/-	-
1000/7	1000/7	3000/-	-
1000/7	1000/7	3000/-	-
-	-	1000/7	Concl. № LR-172-96
1500/9	1500/6	3000/-	T2976-БЕ-AB
1500/9	1500/6	3000/-	T2976-БЕ-AB
1500/9	1500/6	3000/-	T2976-БЕ-AB
2000/8	1500/8	6500/-	Decision № 451D-80/03

HELICOPTER LAYOUT

1 | FUSELAGE

All-metal semi-monocoque variable section consisting of frame stressed skin and hard points.

- Nose part – 2.15 m long compartment with a cockpit, batteries, instruments, electric and radio units.
- Central part - 8.74 m long compartment with a cargo compartment, rear compartment with halfdoors.
- Tail boom - 5.44 m long, of riveted construction, it consists of primary structure and smooth outside skin.
- Tail boom pylon consists of tail rotor beam and fairing.

2 | HOOD

Hood closes engines, fan, main gearbox, main systems units located in the upper part of the fuselage.

- Two tunnels for air supply to the engine.
- Hood leg.
- Engine compartment hood.
- Direct firewall.
- Tunnel for air supply to the fan.
- Fan compartment hood.
- Cross-sectional firewall.
- Gearbox compartment hood.
- Tip compartment hood.

3 | ALIGHTING GEAR

Alighting gear for softening the impact force during landing, take-off and for ground movement.

- Nose landing gear (lever damper strut, strut fork, two wheels).
- Main landing gear (double chamber shock absorber, brace, axle, wheel, fairing).
- Tail bearing (shock-absorber, fork brace, formed duraluminium footstep).

4 | MAIN ROTOR

Main rotor to create lift and thrust force, to provide pitch and cross-sectional control of the helicopter.

- 5 main rotor blades.
- Tail rotor hub for transmitting rotation of the blades of the main gearbox.
- Swash plate for changing the magnitude and direction of thrust force of the tail rotor.

5 | TAIL ROTOR

Tail rotor to balance the reaction torque of the main rotor for yaw control by creating thrust force.

- Hub (nave, gimbal, feathering hinges, driving element).
- 3 blades.

6 | TRANSMISSION

Transmission to change the rotational speed and torque transfer from two engines to the main and tail rotors, fan and accessories, installed on the main gearbox.

- Tail rotor drive shaft for torque transfer from the main gearbox through the intermediate and tail gearboxes to the tail rotor.
- Main rotor brake to reduce the rotor stopping time and lock transmission while mooring.
- Cardan shaft of the fan drive for torque transfer from the main gearbox to the fan.
- Intermediate gearbox to change tail shaft axel to 45° angle according to the bending of tail boom pylon.
- Tail gearbox to transmit rotation to the tail rotor with required corrected speed.
- Main gearbox to combine two engines power, transfer it to the main and tail rotor drive shafts at respective rotational speeds and ensure auxiliary units activation.

HELICOPTER LAYOUT

MAIN TECHNICAL CHARACTERISTICS OF TRANSMISSION

NAME	TRANSMISSION RATIO	SHAFT SPEED REV/MIN	N TRANSFERRED	WEIGHT kg
INTERMEDIATE GEARBOX 8A-1515-000	1	2575	184 KW MAX 442 KW	24,4
TAIL GEARBOX 246-1517-000	0.4318	N 1=2575 N 2=1112	184 KW MAX 442 KW	58,7
SWASH PLATE 8-1950-000	–	192	–	122
TAIL ROTOR DRIVE SHAFT 8A-1516-000	–	2589	M KP =575 H.M. M KP.MAX =1380 H.M.	57

MAIN GEARBOX VR-14

PARAMETER	Value
Transmission ratio:	
to the main rotor drive shaft	0,0128
to the tail rotor drive shaft	0,1729
Input shafts rotational speed. Rated, rev/min	15000
Power, transmitted by gearbox:	
max, from each engine, h.p.	2100
take-off regime, h.p.	2x1900
rated regime, h.p.	2x1700
Gearbox weight, kg	842,5
Leading dimensions, mm:	
length	1200
width	880
height	1760

HELICOPTER LAYOUT

7 | HELICOPTER CONTROL

Helicopter Control is executed by varying the magnitude and direction of a complete main rotor aerodynamic force and change of the tail rotor thrust force.

- Double polar control.
- Double pedal control.
- Spring-feel box control.
- Double combined pitch control.
- Individual engine control.
- Fuel shutoff valve control.

8 | HYDRAULIC SYSTEM

Hydraulic system is basic for combined hydraulic actuators power supply included in helicopter system control.

- Pump NSh-39M.
- Side panel.
- Pilot cylinder lever.
- Panel with hydraulic units.
- Pipelines.
- Hydraulic accumulator, 2,3 l.
- Hydraulic filter 8D.966.017-2.
- Filter FG11BN.
- Pump unloading automatic control unit GA77V.
- Reverse valve OK10A.
- Two-position valve with electromagnetic control GA74M / 5.
- Emergency power valve GA59/1.
- Metering device GA172-00-2.
- Solenoid valves GA192/2.
- Pressure warning indicators MST MST-35M-25A.
- Electric pressure gauge DIM-100.
- Removable collectors.
- Control unit KAU-30B.
- Control unit RA-60B.

9 | AIR SYSTEM

Air System for the main landing gear wheels braking, recharging wheels cameras from on-board cylinder in the off-aerodrome conditions.

- Brakes control lever.
- Cable run.
- Pneumatics unit PU-7.
- Air pressure gauges MA-60K, the MVU-100.
- Air filter 723900.
- Pipelines.
- Air compressor AK-50T.
- Gravitation filter 5565-10.
- Reverse valves 636100M.
- Air filter 723900-4AT.
- Pressure automatic control unit AD-50.
- On-board charging point 3509s50.
- Air cylinders (internal cavity chassis braces of a total capacity of 10 litres).

10 | KEROSENE HEATER KO-50

Kerosene heater KO-50 for cockpit warming.

- Heater.
- Fan.
- Fuel box.
- Thermostiches.
- Temperature sensor.
- Electronic control block.
- Temperature setting device.
- Two thermal relay assemblies.

POWERPLANT

Helicopter MI-8/17 powerplant consists of two turboshaft TV3-117 engines and auxiliary powerplant AI-9V.

THE FOLLOWING MODIFICATIONS WERE CREATED ON THE BASIS OF THE TV3-117 ENGINE:

TV3-117M

(«M» — marine) — modification for Mi-14 with for sea operation.
Serial production since 1976.

TV3-117KM

(«KM» — Kamov, marine) — modification for Ka-27 helicopters.

TB3-117VK

(«VK» — high altitude, Kamov) — modification similar to TV3-117V but for Ka-27, Ka-29 and Ka-32 helicopters. These helicopters were manufactured for export equipped engines. TV3-117VKR («VKR» — high altitude, Kamov, Ka-28 helicopters modifications) with advanced power in rated and cruising modes
Serial production since 1985.

TV3-117MT

(«MT» — modernized, transport) — modification for Mi-8MT / Mi-17 helicopters and their modifications.
Serial production since 1977.

TV3-117V

(«V» — high altitude) — modification for use in Mi-24 helicopters in the mountains (designed to for operation in Afghanistan). Serial production since 1980.

TV3-117VMA

(«VMA» — high altitude, modernized, modification «A») — modification developed for Ka-50. At present it is installed on Ka-27, Ka-29, Ka-31, Mi-24, Mi-28A/H, Ka-32. It has certificates of AR MAC type and Transport Canada. Serial production since 1986. TV3-117VMAR modification is used on Ka-28 export variant («VMAR» – high altitude, modernized, modification «A») with rated and cruising modes, identical to TV3-117VKR.

TR3-117 (A)

turbo-jet engine for Tupolev «Reys» drones (Reys–D).

VK-2500

engine was created on the basis of TV3-117VMA in 2001.

TV3-117VM

(«VM» — high altitude, modernized) — modification developed for the Mi-28 helicopter. Later installed on Mi-8MT / Mi-17 helicopters. It is distinguished by the introduction of automatic emergency mode. It has certificates of AR MAC type, India and PRC. Serial production since 1986.

V3-117VM SER.02

TV3-117VM variant for Mi-8Mt/Mi-17 civil helicopters. It has certificates of AR MAC type, India and PRC. Serial production since 1993.

POWERPLANT

MAIN TECHNICAL CHARACTERISTICS OF TV3-117

MODIFICATIONS TV3-117 (OEI)	TV3-117VM ser. 02	TV3-117VMA ser. 02
EMERGENCY MODE (H=0, V=0, MSA+150S):		
Power, h.p.	2200	2400
TAKE-OFF MODE (H=0, V=0):		
Power (MSA+25/150S), h.p.	2000	2000
Specific fuel consumption (MSA), g/h.p. hour	220	215
CRUISING MODE (H=0, V=0, MSA+150S):		
Power, h.p.	1500	1500
LEADING DIMENSIONS, mm:		
Length	2055	2055
Width	660	660
Height	728	728
Weight, kg	295	295

MAIN TECHNICAL CHARACTERISTICS OF VK-2500

ENGINE MODIFICATIONS

I

II

III

EMERGENCY MODE (H=0, V=0):

Power (MSA+150S), h.p.

2700

2700

2700

TAKE-OFF MODE (H=0, V=0):

Power (MSA+25/150S), h.p.

2000

2000

2000

Specific fuel consumption (MSA), g/h.p. hour

220

214

210

CRUISING MODE (H=0, V=0, MSA+150S):

Power, h.p.

1500

1500

1750

LEADING DIMENSIONS, mm:

Length

2055

2055

2055

Width

660

660

660

Height

728

728

728

Weight, kg

300

300

300

MAIN ENGINE SYSTEMS

FUEL SYSTEM

The fuel system is used for supplying the engine with fuel, regulation of engine power, as well as ensuring operation of individual engine control units.

LUBRICATION AND BREATHER SYSTEMS

The lubrication system is self-sufficient, single-circuit, circulating. Oil tank and air-oil radiator are mounted on the helicopter and are connected to the engine lubrication system. Synthetic oil such as B-3V, LZ-240 is used.

COOLING SYSTEM

The cooling system cools hot parts, components of turbines and third engine bearer.

ICE PROTECTION SYSTEM

Hot-air anti-ice system heats front parts of the engine with hot air.

GAS TEMPERATURE LIMITATION SYSTEM

Gas temperature limitation system is used for automatic gas temperature limitation in front of the turbine by means of fuel supply reduction.

ELECTRICAL POWER AND STARTING SYSTEMS

Electrical system, ignition system, and fuel firing system with two igniters are participating in the launch on the ground and in the air. Starting system is receives power from starter-generator GS-18TO.

REGULATION AND CONTROL SYSTEM

Regulation and control system ensures engine start-up, engine control in all modes, limiting parameters restriction, maintaining main rotor rotational speed within prescribed limits, both engines power leveling. The system also includes hydraulic control system.

MAIN ENGINE UNITS

INPUT DEVICE

Smooth channel for air supply from the atmosphere, protected from ice formation.

COMPRESSOR TURBINE

Compressor two-stage axial-flow turbine.

FREE TURBINE

Two-stage axial-flow free turbine.

EXHAUST DEVICE

Unregulated, extensible exhaust device.

MAIN DRIVE

Main drive ensures torque transfer from free turbine rotor to overriding clutch main gearbox drive shaft.

CENTRAL DRIVE AND DRIVES GEARBOX

Gearbox contains main engine assembly with turbine rotor compressor drive.

COMPRESSOR

Ten-stage axial-flow compressor.

COMBUSTION CHAMBER

Ring combustion chamber with eight nozzle heads and two igniters.

AUXILIARY POWER UNIT

AI-9V AUXILIARY POWER UNIT MAIN TECHNICAL CHARACTERISTICS

(H=0, V=0, Tn=288 K, Ph=0,1 MPa)

RATED ROTATIONAL SPEED, MIN-1	36750 ± 475
Amount of extracted air, kg/s	0,4
Total pressure of extracted air, MPa, not less than	0,29
Temperature of extracted air, K	433
Fuel consumption, kg/h, less than	76
DRY WEIGHT, KG, NOT MORE THAN	70
Power at the generator terminals, KW	3
GASES TEMPERATURE BEHIND TURBINE, K, LESS THAN	1023

INSTRUMENTS

FUNCTION

- Helicopter operation in all weather conditions during the day and night.
- Control, engine, transmission operation monitoring.
- Helicopter flight data recorder system.

EQUIPMENT LIST

Flight and navigation equipment for providing information about speed, altitude, flight direction and helicopter position relative to the horizon.

- Altitude gauge VD-10K.
- Speed indicator US-450K.
- Vertical rate indicator VR-10 MK.
- Air pressure probe PVD-6M.
- Gyro horizon AGB-3K.
- Comparison and limiting bank unit BSPK-1.
- Turn indicator EUP-53K.
- Compass KI-13K.
- Compass system GMK-1A.
- Torque switch VK-53RV (ЭПВ).
- Automatic pilot system AP-34B.
- Clock AChS-1M.

Engines and transmissions operation control devices show rotation speed (maximum percentage) of engines and main rotor, pressure and oil temperature in the engine and main gearbox, oil temperature in the intermediate and tail gearboxes, as well as pressure and fuel reserve.

- Two-pointer tachometer indicator ITE-2.
- Tachometer device KTA-5.
- Three-pointer indicator EMI-ZRI.
- Temperature indicator ITG-180.
- Single-pointer tachometer indicator ITE-1.
- Pitch indicator UShV-1.
- Three-pointer indicator EMI-ZRVI.
- Temperature indicator TUE-48.
- Fuel gauging system SKES-2027V.
- Temperature control device amplifier URT-27.
- Vibration monitoring equipment IV-500A.

Hydraulic and air systems operation control devices show pressure in the main and backup hydraulic systems of the helicopter, as well as the air pressure in the air system and brakes.

- Air pressure indicator DIM-100 ser.3.
- Air pressure indicator MVU-100K.
- Air pressure indicator MA-60MK.

INSTRUMENTS

Recording devices provide collection and recording of flight data under normal and emergency conditions.

- SARPP-12DM system.
- Recording device BUR-1-2ZH.

Other (auxiliary) devices are used to measure the air temperature in the cargo compartment or passenger cabin.

- Thermometer TV-45.
- Thermometer TV-19.

Oxygen devices are used to deliver oxygen during high-altitude flights.

- Removable oxygen device KKO-LS.
- 7.6 l oxygen bottle with pressure of 30 kg / cm².
- 1.7 l oxygen bottle with pressure of 30 kg / cm².
- Oxygen device KP-21.
- Oxygen mask KM-15M.

All devices are electric except air pressure receptors, clock, KI-13K compass, gauges and TV-45 thermometers.

Fuel, oil and hydraulic system gauges receive the 36 V and 400 Hz AC power through 115/36 V transformer. The circuits are protected by SP fuses installed on the AC fuse panel.

The AGB-ZK artificial horizon is supplied with the 36 V and 400 Hz DC power by the system bus through AZSGK battery switch from PT-500Ts (TSB) circuit converter.

AC power supply networks devices are protected by SP-2 and SP-5 fuses installed in the junction box of the right generator.

RADIO EQUIPMENT

FUNCTION

- Two-way communication over long distances.
- Communication with the command post.
- Communication between crew members.
- Notification of the helicopter crew and command post about an emergency in flight.
- Recording information and orders received by radio and on-board internal phone network.
- Actual altitude determination.
- Determination of the longitudinal and transverse vector of the helicopter's forward speed.

EQUIPMENT LIST

Communications equipment.

- Radio Yadro-1A.
- Radio R-863.
- Radio Baklan-20.
- Radio R-852.
- Transmission device RI-65B.
- Communication device SPU-7.
- Speaker SGU-15.
- Recorder MS-61.
- Recorder P-503.
- Equipment SSO TREVOGA.

Navigation equipment.

- Radio compass ARK-9.
- Radio compass ARK-U2.
- Radio compass ARK-UD.
- Radio altimeter RV-3.
- Radio altimeter A-037.

Radars.

- Radar SRO-2.
- Weather radar A-813.

ELECTRICAL EQUIPMENT

FUNCTION

Electrical equipment and devices produce and consume DC and AC power and distribute electrical energy through helicopter. Electrical equipment and devices include power sources, electrified mechanisms, lights, heating and signal equipment and power supply network.

POWER SOURCES

DC generation system.

- Starter GS-18mo.
- Accumulators 12-SAM-28.
- Connectors SHRAP-500K.
- DC sources control devices .
- Calibration devices.
- DC power system.
- Switching-on, pre-flight checks, DC sources operation control.

AC generation system.

- Generator SGO-ZOU Series 4 (SGO-ZOURS-A)
- Converter PO-750A
- Converter PT-500D (TSB)
- Transformers
- Connector SHRA-200LK
- Calibration devices
- AC sources control devices
- Switching-on, pre-flight checks, AC sources operation control

ELECTRICAL EQUIPMENT

AIRCRAFT ELECTRICAL SYSTEM

Electrical circuit wires for power transfer from sources to consumers (BPVL, BPVLA, BPVLE, MGS HV, PTL-200, PTLE-200).

- Red – for weapons system.
- Blue – for radio equipment.
- Yellow - AC power circuit.
- White - DC power circuit.

Power connectors for easy installation, dismantling and possibility of harnesses and wires replacement.

- Plug and socket joint type SHR.
- Terminal blocks 73K, 75K, NU-7200-27.

Distribution switching devices for spacing switching equipment, switching instruments, caution lights, control installation and protection.

- Left generator distribution board.
- Right generator distribution board.
- Auxiliary accumulators junction box.
- Alternating current junction box.
- Fire system junction box.

Protection equipment for electrical circuit, electrical circuit sources and consumers protection from g-loads and short circuits.

- Circuit breakers AZSGK-2, AZSGK-5, AZSGK-10, AZSGK-15, AZSGK-20, AZSGK-25, AZSGK-30.
- Glass fuses SP-1, SP-2, SP-5, SP-10.
- Inertial fuses IP-15, IP-30, IP-35, IP-50.
- Refractory fuses TP-400, TP-600.

Switching equipment for controlling electrical circuit consumers.

- Switches VG-15K-2S, 2VG-15K-2S, VNG-15K, 2VNG-15K, V-200K, 2V-200K.
- Switches PPG -15K, 2PPG-15K, PNG -15K, PPNG -15K, 2PPNG-15K.
- Wafer switches PGK11Π1N-A, 21P1N-K13.
- Buttons 5K, 204K, 205K, K4M, KNZ, KNR, 4KNR, GRZ.604.006SP.
- Microswitches A-802K, A-802V.

Energy sources and consumers control equipment to monitor energy sources and consumers operational mode.

- Voltmeter V-1.
- Amperemeters A-3K.
- Amperemeters A-2K.
- Amperemeter VF0,4-150.
- Amperemeter AF1-200.

Antijamming blackout circuit during radio equipment operation for minimization of interference to radio equipment activity by energy sources and consumers.

- Filters FGS-2.
- Filters FG-5.
- Filter F-70.
- Filter F-100.
- Duct capacitor KBP-S-125-40-2±10%.
- Capacitors OMBGO-2-160-4-P.

Static protection devices for levelling helicopter hull potential with respect to ground potential

- Rope with pin for helicopter body connection with ground during moorage.
- Grounding pins on main landing gear legs to remove electric charge from helicopter surface.

OPTIONAL EQUIPMENT FOR MI-17 HELICOPTERS

EXTERNAL CARGO SLING

External cargo sling system consists of:

- external load slings (6) (4 pcs);
- electromechanical shackle DG-64M;
- weight-measuring device NTM-400;
- extension cable (7) (1 pc);
- cargo slings (9) (4 pcs);
- quick-release guard (10).

8AT.9600.700 –up to 3000 kg lifting capacity. Specification:

- suspension type - cable;
- lifting capacity up to 3000 kg;
- shackle type: electromechanical, DG-64M;
- length of cargo sling - 4 m;
- length of explosive cable - from 1,7 to 65 m;
- mass of external cargo sling (without external cargo slings attached to the load) – 21,794 kg.

8MTV.9613.000 –up to 4500 kg lifting capacity. Specification:

- suspension type - cable;
- up to 4500 kg lifting capacity;
- shackle type: VT-DG6, 2 pcs.;
- length of cargo sling - 4 m;
- length of explosive cable - from 1,7 to 65 m;
- mass of set, max 220 kg.

FUEL TANKS

To prevent explosion, external and additional fuel tanks can be filled with polyurethane foam filler which is an elastic open-porous cellular plastic. Fuel tanks are covered with self-sealing rubber which prevents fuel leaks from the tanks in case of damage.

Service tank is protected with seal lining located inside the tank.

External fuel tanks:

- 8MV.6102.500 (rt.), 8MV.6102.400 (lf.).
- 8MT.6102.500 (rt.), 8MT.6102.400 (lf.).
- 8MTR.6102.050.001 (rt.), 8MTR.6102.040.001 (lf.).

Internal additional fuel tanks:

- 8MT.6117.000, 8MT.6117.100

External additional fuel tanks:

- 777.6150.000 (rt.)/(lf.).

SEARCH LIGHT SX-16

Specification:

- power supply - 27,5 V, 65 A;
- power - 1.6 kW;
- xenon lamp;
- light beam intensity - 30 miles;
- search distance - up to 1600 m;
- turn angle - 350°;
- mass - 26 kg.

OPTIONAL EQUIPMENT FOR MI-17 HELICOPTERS

AIR CONDITIONER 2411

Specification:

- time of continuous operation - 3.5 h,
- maximum power - 200 kcal/h,
- mass - 35.0 ± 2 kg.

KEROSENE HEATER KO-50

Specification:

- operational modes: heating, fast heating, ventilation,
- efficiency - 50000 kcal/h,
- mass - 47.5 kg.

VIBRATION DAMPER 8MT-1280-100

To reduce helicopter vibration creating comfortable conditions for crew as well as for passengers, widens fatigue limits, reduces failure rate.

EMERGENCY EQUIPMENT

Variation:

- LPG-150M (lifting/lowering of cargoes of up to 150 kg).
- SLG-300 (lifting/lowering of one/two persons and cargoes of up to 300 kg).

WATER DRAIN DEVICE BAMBY

The purpose of water drain device is to perform the firefighting missions. Water drain device makes it possible to take water from open water basins or reservoirs, while helicopter is in hovering position, and transport it to a fire zone and drain it.

- capacity - 4500 kg,
- time of water gathering –3 to 5 sec,
- water throwing duration –10 to 15 sec,
- empty water drain device mass – 120 kg.

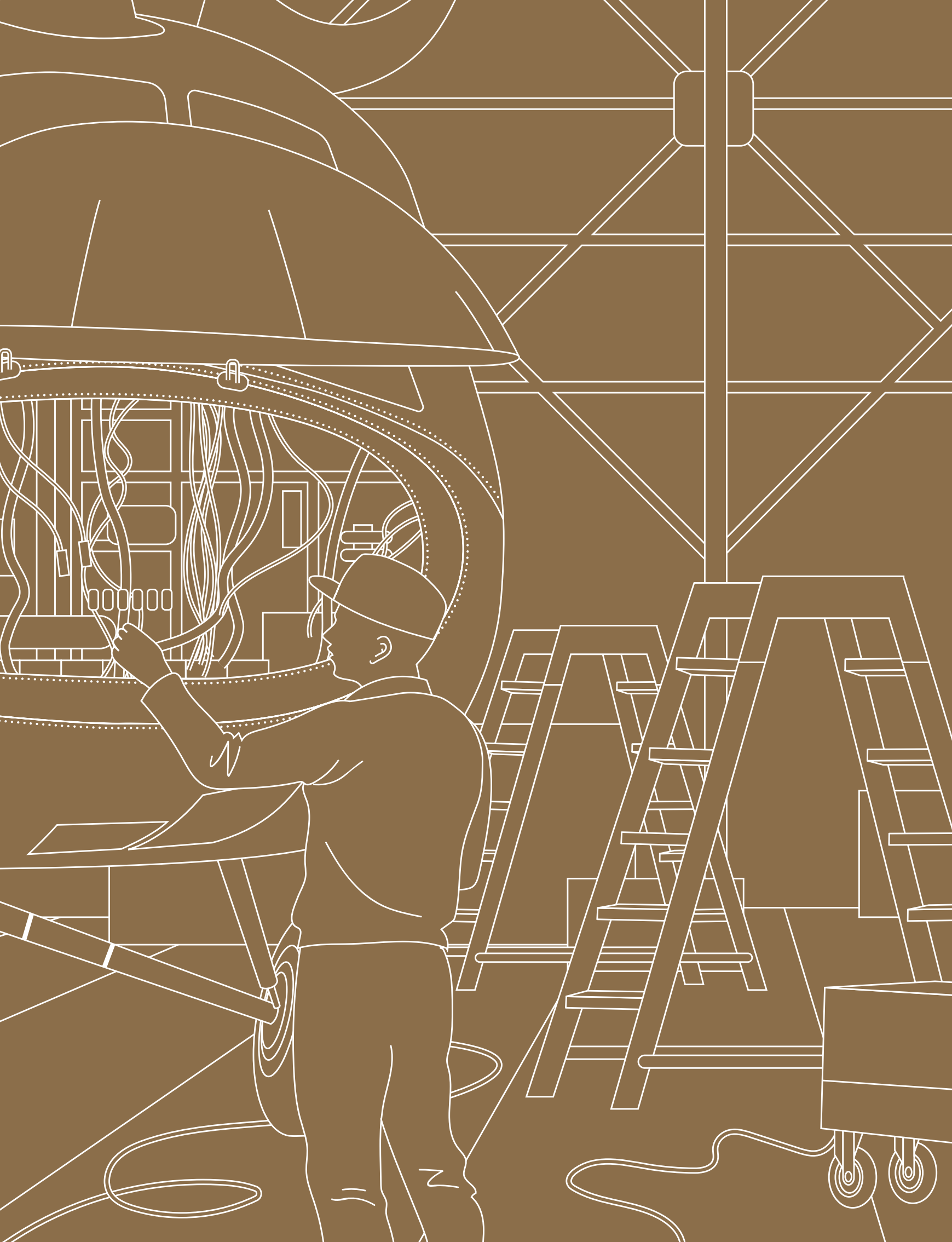
EMERGENCY FLOATATION SYSTEM

Main components:

- 2 front balloons,
- 2 rear balloons,
- cylinders filled with helium gas – 6 pcs. (4 - with 18 litres, 2 - with 9 litres), hoses, pipe lines,
- 3 rafts for 10 persons,
- up to 28 life jackets for passengers and 3 for crew members.

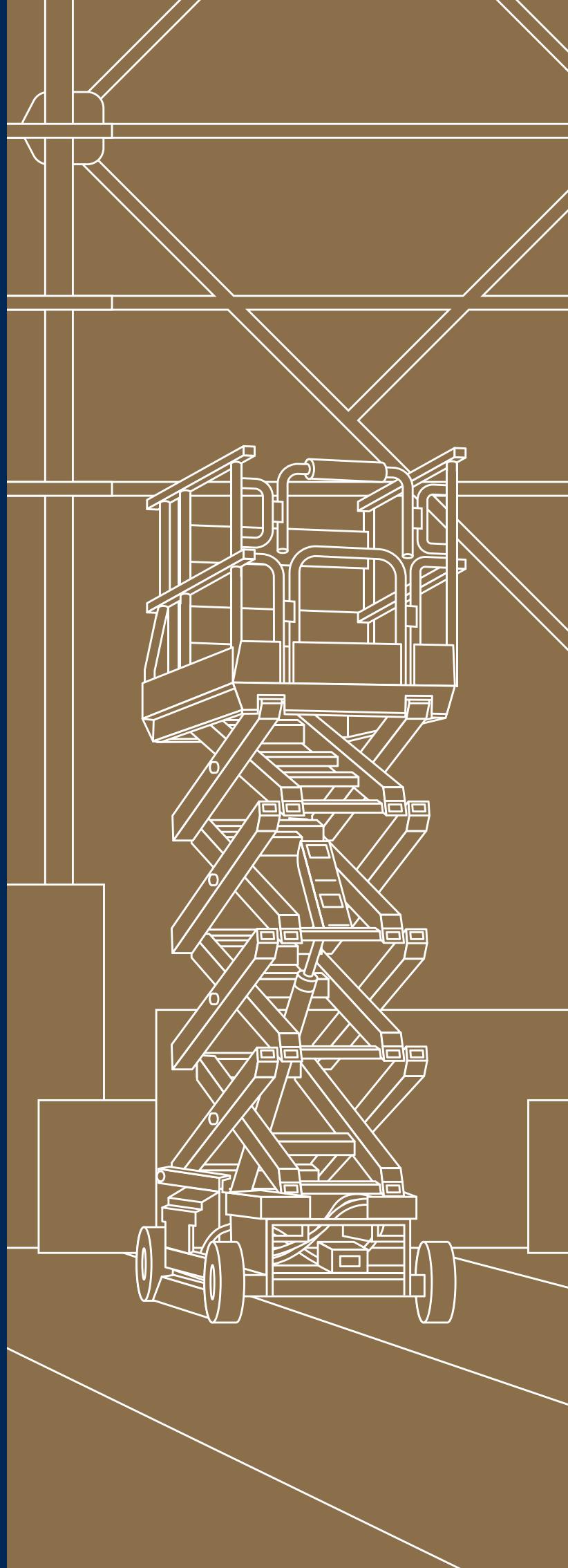
The system ensures balloon inflation and helicopter ditching under the following conditions:

- Inflation time: 3 - 5 sec.
- Minimum ditching time: up to 30 min.
- Maximum speed of helicopter during inflation: up to 180 km/h (112kn).
- Maximum altitude above sea level: 2500 m (8200 feet).
- Operating temperature range between- 40° C and +70°C (- 400°F to +1580°F).
- Swell on water surface: from 3 to 5 points.
- Head wind speed: up to 20 m/sec.
- Cross and tail wind speed: up to 5 m/sec.
- Service life of equipment: 10 years.
- Time of removable part installation: 6 man/hour.
- Warranty time: 1 year.
- Mass:
 - Total mass – 317 kg.
 - Mass of removable part – 297,5 kg.



GROUND SUPPORT EQUIPMENT FOR MI-8, MI-17 HELICOPTERS

Equipment and tools required for maintenance and units replacement for Mi-8 helicopters.



TOWING AND MOORING TOOLS, LIFTING TOOLS

Tow bar 8AT.9800.000

Designed for helicopter towing by motor vehicle on airfields, highways or dirt roads.

Chock 8AT.9126.000

Designed to prevent spontaneous helicopter movement on the ground.

Chock with persistent cogs. Persistent chock contour is made according to the wheel radius.

Drawing bar 8AT.9900.40

Designed for helicopter main rotor blades auxiliary fixation on the ground when wind speed exceeds 20 m/s and their protection from turning.

Hydraulic jack 8AT.9907.00

Designed to lift helicopter during landing gear shock-absorber strut installation and removal, their charging, wheels removal and installation, helicopter rigging as well as for other operations related to helicopter lifting. The unit consists of four hydraulic jacks.

TOOLS THAT PROVIDE ACCESS TO COMPONENTS AND UNITS

Universal onboard ladder 8A.9917.000

Designed to service the helicopter on the ground and consists of three units with handrails. It has three modifications.

Ladder for tail boom 8.9905.000

Designed for tail boom access from fuselage. Side posts and four spokes are made of duraluminium pipes. Rubberized tips are installed on the lower and upper ends of the ladder.

Ladder for KO-50 8MTV.9919.000 maintenance

Designed to provide access to the work area for overhead kerosene heater KO-50 maintenance.

Ladder for tail and main rotors maintenance 8AT.9919.000

Designed for tail and main rotor blades examination and helicopter tail rotor hub maintenance.

Dolly for work under fuselage 8AT.9803.00

Designed for work under fuselage. For the purpose of extra rigidity, dolly is edged with duralumin profile. Dolly has an elevation for worker's head.

Ladder for work at height $H = 2000$ mm

Designed for organization of an operating area at a height of 2000 mm while scheduled maintenance is being performed.

MOUNTING AND DISMANTLING TOOLS

Main rotor blades assembly storing support 8AT.9915.000

Assembly consists of two lodgements installed on steel trusses for 5 main rotor blades storage. For the sake of blades surfaces protection from damage, the lodgements are covered with rubber and ground sheet material.

Main gearbox support 8AT.9906.000

Designed for main gearbox VR-8, BP-14 storage, as well as for mounting and dismantling procedures.

Wheel landing gear chamber mounting rope V.0099.587

Designed for wheels chambers mounting of the main and front helicopter undercarriage legs.

Lifting sling 8AT.9920.000

Designed for helicopter swash plate lifting (lowering) with the help of loading devices.

Main rotor hub and hydraulic unit lifting sling 8AT.9921.000

Designed for helicopter main rotor hub and hydraulic unit lifting (lowering) with the help of loading devices.

Tail boom pylon lifting sling 8AT.9924.000

Designed for helicopter tail boom pylon lifting (lowering) with the help of loading devices.

Tail boom and tail boom pylon lifting sling assembly 8AT.9936.000

Designed for tail boom (together with tail boom pylon) connection and disconnection from helicopter fuselage with the help of loading devices.

Tail gearbox lifting sling 8MT.9925.000

Designed for helicopter tail gearbox lifting (lowering) with the help of loading devices.

Main rotor blades lifting sling 8A.9903.000

Designed for helicopter main rotor blades lifting (lowering) with the help of loading devices during mounting and dismantling procedures.

Tail rotor hub lifting grip 8AT.9925.100

Designed for helicopter tail rotor hub lifting (lowering) with the help of loading devices.

Trolley for engine TV3-117

Designed for transportation and preliminary mounting on the ground before TV3-117 and TV2-117 engines installation on the fuselage.

Wheel tire remover SSh-04

Designed for main and front helicopter undercarriage legs wheel tires dismantling.

Cross-piece for engine TV3-117 lifting 140.9908.000

Designed for engine TV3-117 lifting (lowering) with the help of loading devices during mounting and dismantling procedures.

Cross-piece for engine TV2-117 lifting 140.9908.000

Designed for engine TV2-117 lifting (lowering) with the help of loading devices during mounting and dismantling procedures.

Device for main wheels bearings mounting and dismantling 8AT.9938.00

Designed for main helicopter undercarriage legs wheels bearings mounting and dismantling.

Grip for engine disconnection from main gearbox

Designed for TV2-117 engine disconnection from helicopter main gearbox. Assembly includes two grips: right and left.

Eye nut for helicopter and main gearbox lifting 8AT.9942.000

Designed for helicopter and main gearbox lifting (lowering) during mounting and dismantling procedures with the help of loading devices.

SHORT-TERM SUPPLY EQUIPMENT

AIR PUMPS

- 623ANM
- 703V
- 748A
- 4062
- NR-112A
- NR-128

AIR GENERATORS

- GT40BCh8
- GT40PCh8V
- GT90NZhCh12NM

AIR GENERATORS TECHNICAL CHARACTERISTICS

INDEX	GENERATOR TYPE				
	GO-16PH8	GT16PH8	GT-40PH8	GT-60PH8ATB	GT120PH6
Winding connection method	Wye	Wye	Wye	Wye	Wye
Line voltage, V	208	208	208	208	208
Power, kW	16	16	40	60	208
Load current (phases), A	133	44,5	111	167	333
Power coefficient	0,85	0,85	0,8	0,8	0,8
Operational frequency, Gz	396-404	400	392-408	400	400
Rotational speed, rev/min	7920-8080	8000	7840-8160	8000	6000
Excitation voltage, V	26-30	42	26-30	-	43-49
Excitation current, A	25	2	self-excitation	2,5	2,9
Generator mass, kg	27,5	16	47	59	85

INDEX	GENERATOR TYPE				
	SGS-300T	GS-30-8	SGS-40U	SGS-90	SG-90/360 2s
Winding connection method	delta circuit (triangle)	Wye	Wye	Wye	delta circuit (triangle)
Line voltage, V	208	208	208	360	306
Power (protractedly), kW	30	30	40	75	75
Load current (phases), A	83,4	83,5	111	120	120
Power coefficient	0,85	0,85	0,9	0,9	0,9
Bandwidth, Gz	225-450	368-580	378,5-417,5	375-450	375-450
Shaft revolutions range, rev/min	4500-9000	5500-8700	7750-8350	7500-9000	7500-9000
Excitation voltage, V	26-30	26-30	26-30	-	50
Current	55	40	29	-	3,5

ACCUMULATOR BATTERIES

- 12SAM-28
- 12SAM-55
- 20NKBN-25U3
- 20NKBN-25U3 ser2
- 20NKBN-25U3 ser3
- 20NKBN-28

SHORT-TERM SUPPLY EQUIPMENT

AVIATION FIRE-EXTINGUISHERS

Type 1 and Type 2 fixed fire extinguishers for aircraft fire extinguishing system are designed for storage of extinguishant fluid, chladone 114 V2 or chladone 13V1, 12V1, and its supply to fire extinguishing system. 70 versions of fire extinguishers are being manufactured.

Fire extinguisher marking:

- 1st figure - fire extinguisher type (1-ball, 2-cylindrical);
- 2nd figure - cylinder capacity in litres;
- 3rd figure - number of explosive caps.

Example of designation: 1-2-2, 2-16-1.

TECHNICAL CHARACTERISTICS, TYPE 1:

PARAMETER / FIRE EXTINGUISHER DESIGNATION	1-2-1	1-2-4	1-3-2	1-3-3	1-4-4	1-6-1	1-6-2	
CHARGE MASS, KG	114V2	2,82	2,82	4,25	4,25	5,64	8,5	8,5
	13V1	2,4	2,4	3,7	3,7	4,9	7,4	7,4
Operating pressure, MPa (kgp/sm ²)	14,7 (150)							
Bursting disk rupture pressure, MPa (kgp/sm ²)	19,6±2,0 (200±20)							
Pyrocartridge type	7PP-683 (PP-3)							
Pyrocartridge operating voltage, V	27±2,7							

PARAMETER / FIRE EXTINGUISHER DESIGNATION	1-2-1	1-2-4	1-3-2	1-3-3	1-4-4	1-6-1	1-6-2
Minimum operating voltage, V					18		
Operating temperature	from – 60 to + 80 C°						

TECHNICAL CHARACTERISTICS, TYPE 2:

PARAMETER / FIRE EXTINGUISHER DESIGNATION	2-5-2	2-8-1	2-16-1	2-16-5	2-20-1
CHARGE MASS, KG	114V2 7,05	11,3	22,6	22,6	28,2
	13V1 6,1	9,9	19	19	24,7
Operating pressure, MPa (kgp/sm ²)	14,7 (150)				
Bursting disk rupture pressure, MPa (kgp/sm ²)	19,6±2,0 (200±20)				
Pyrocartridge type	7PP-683 (PP-3)				
Pyrocartridge operating voltage, V	27±2,7				
Minimum operating voltage, V	18				
Operating temperature	from – 60 to + 80 C°				

SHORT-TERM SUPPLY EQUIPMENT

FUEL FILTERS

- 12TF1512TF15-1
- 12TF15-1
- 12TF15SN
- 12TF29SN
- TF6P
- 32TF6
- 11TF30SMLIF3OSM-1
- 11TF30SM-0
- 11TF30M
- 8D2.966.005
- 8D2.966.118-2

AIR FILTERS

- 31VF3A
- 11VF5
- 11VF12-1
- 11VF20A

HYDRAULIC FILTERS

- FG31SN-1
- 11GF4SN-1
- 12GF5SN-1
- 13GF6SN-1
- 13GF6SN-1
- 14GF8SN-1
- 15GF7SN-1
- 15GF18SN-1
- 11GF4-1
- 12GF5-1
- 13GF6
- 15GF7
- N5812-0
- N5812-0-1
- 8D2.966.515-01
- 8D2.966.515-03
- 8D2.966.515-04
- 11GF9-1
- 12GF10-1
- 14GF1-1
- 15GF12-1
- 15GF17-1
- FG44/2-1
- FG11/4-1
- 11GF9SN-1
- 12GF10SN-1
- 14GF1SN-1
- 15GF12SN-1
- 15GF17SN-1
- FG44/2SN-1
- FG11BN
- 12GF10BN-1
- 15GF17BN-1
- 8D2.966.464

FILTER ELEMENTS

- 340.042A
- 340.043A
- 340.044A
- 340.045A
- 340.099A
- 340.100A
- 8D2.966.034

REVERSE VALVES

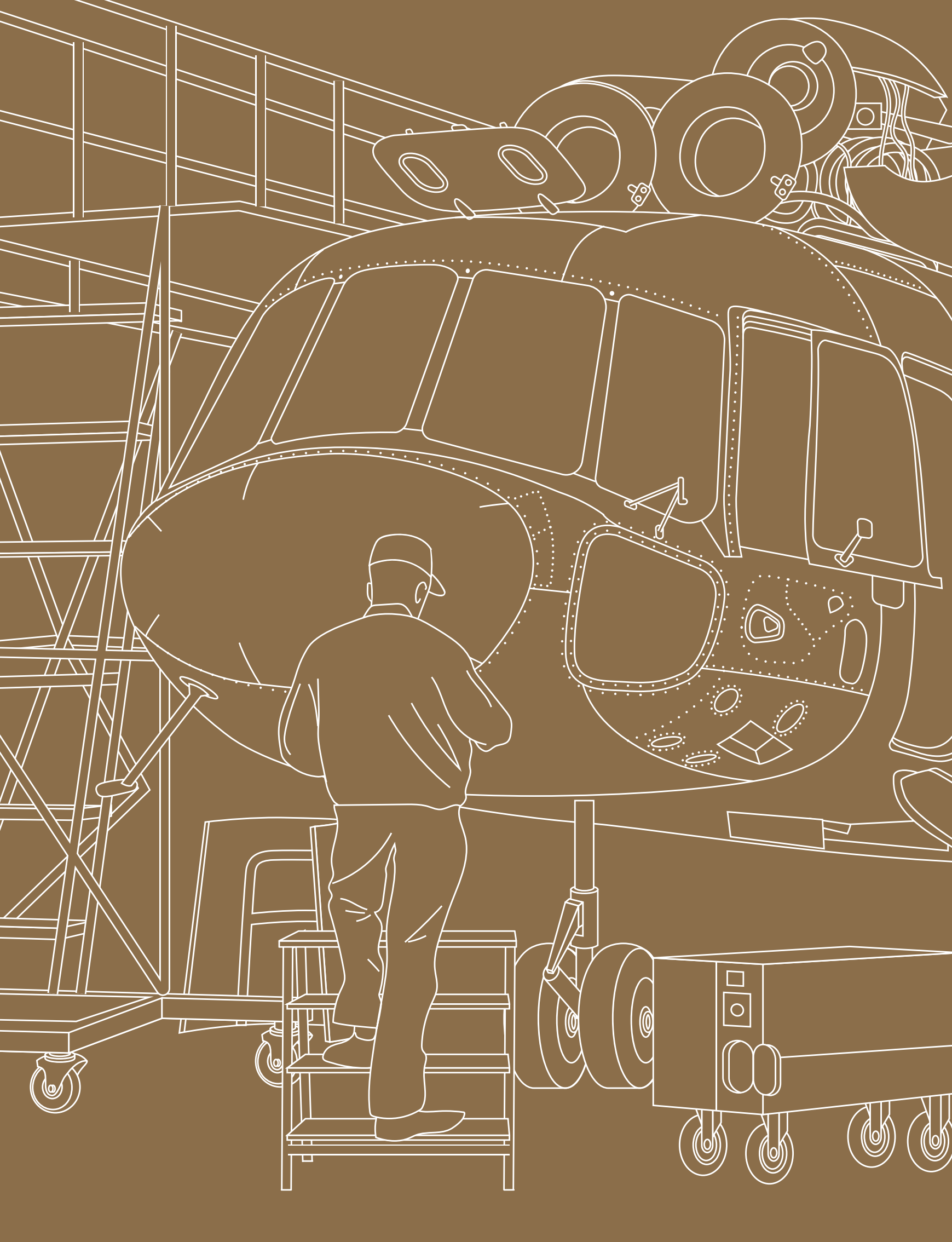
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- OK8-00-2
- GA 102
- GA 104

ELECTROMAGNETIC VALVES

- UE24/1

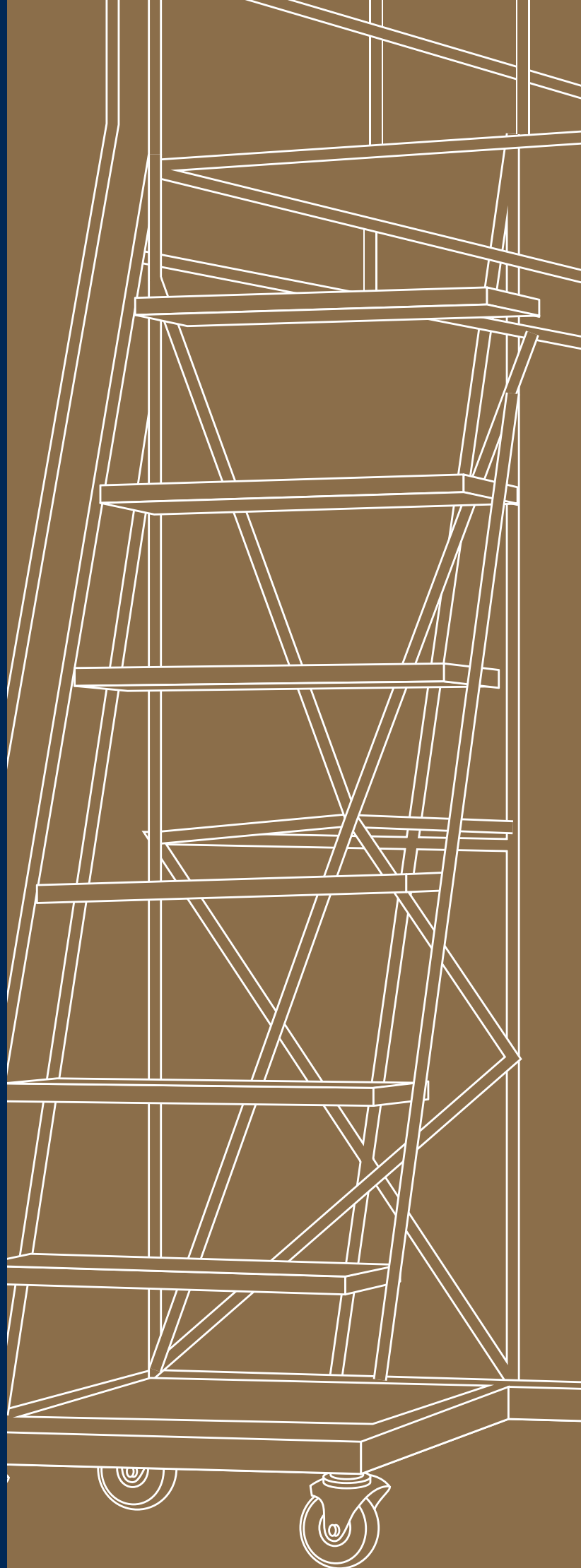
HYDRAULIC LOCKS

- GA 111, GA 111A, GA111H



SERVICES

A set of actions aimed at maintaining the operation and flight worthiness of helicopters Mi-8/17.



SERVICES

MI-8 HELICOPTER MODIFICATIONS

MODIFICATION TYPE	WORK PERFORMANCE ORDER ON ONE HELICOPTER
Ice warning sender unit RIO-3 replacement by SO-121, EW-164	2 specialists during 5 working days
Satellite navigation receivers GPS-GLONASS installation	2 specialists during 5 working days
Low-altitude radio altimeters installation	2 specialists during 2 working days
HF and VHF radio stations and satellite communication system installation	2 specialists during 3 working days
Early ground proximity warning system installation	2 specialists during 5 working days
Emergency radio beacons installation	2 specialists during 3 working days
ILS system installation	2 specialists during 5 working days

SUPPLY OF NIGHT VISION GOGGLES

Night vision goggles that can be used on helmet ZSh-7V or on Western helmets used in NATO member countries as well as other optical and thermal imaging devices and night vision devices.

TRANSPORT HELICOPTER MI-17 OPERATIONAL RETROFIT INTO AMBULANCE VERSION

MMV.9520.000 medical unit supply and installation.

HELICOPTERS, ENGINES AND OTHER UNITS MAINTENANCE

Maintenance works organization at certified industry enterprises.

CUSTOMER'S STAFF TRAINING

Customer's staff training organization of helicopters, engines operation and maintenance works performance.

SERVICE CENTRE FOR HELICOPTERS MAINTENANCE ORGANIZATION AND TOOLING

Assistance to helicopter and helicopter equipment developers and manufacturers for service centre organization and tooling.

POWER SOURCES FOR AIRCRAFT GROUND MAINTENANCE

FCA FREQUENCY CONVERTERS, 10 TO 180 KW

Designed to provide all aircraft types with power equaling 3 X 200/115 V and frequency of 400 Hz during a pre-flight check at airport and aircraft maintenance. This equipment can also be used for test desk power supply at aviation factories. The device can be supplied in basic configuration or manufactured as per customer's special needs and requests.

- FCA-90-12H
- FCA-90-12HC
- FCA-90-12S
- FCA-90-12M
- FCA-10

AERODROME RECTIFIERS

AR-1X400/600/800X28,0/ 8,5

Designed to provide onboard DC network with power equaling 28,0 V during planes and helicopters preflight check. They can also be used for test desk power supply at aviation factories. The rectifier has two versions: stationary and mobile.

AERODROME RECTIFIER

AR-2X40 0X28,5/48

Designed to provide onboard DC network with power equaling 28,5 V during planes and helicopters preflight check. Can also be used for engine start-up on the system 24/48.

AUTOMATIC CABLE WINDING UNIT ACW-01

Designed for cable unwinding and winding as well as for cable storage. Cable drum drive may be provided with an electromagnetic clutch that enables cable unwinding in manual mode in case of electric drive failure. The capacity of the cable drum is 22 m (optional - 30 m, 40 m). Automatic cable winding control is executed by remote control.



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