

# **Yak-18T**

# **Normal Checklists**

v2.5  
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## NORMAL CHECKLISTS

*NB: Engine start below 5 °C requires pre-heating or oil dilution.*

### **PRE-FLIGHT (Cockpit)**

Brakes	On
Landing Gear Handle	Down & latched
Magneto Switch	Off (zero)
Battery (master) Switch	On (up)
Engine Instrument Switch	On
Fuel Quantity	Sufficient
Engine Instrument Switch	Off
Battery Switch	Off (mid position)
Emergency Air Valve	Closed (clockwise)
	<i>Do not open the Emergency Air Valve</i>
Main Air Valve	Open (anticlock) 9/10 <sup>th</sup>
Main Air Supply	30 – 45 kg/cm <sup>2</sup>
Cowl Shutters & Oil Cooler door	Both open (forward)
Boost (throttle)	Closed (back)
Flap Handle	Up

### **PRE-FLIGHT (External)**

*Carry out normal external checks including:*

Engine Oil Level	Sufficient (9 lit min)
Fuel	Sufficient
Fuel Drain	Check for Water
Main Air Purge Valve	Drain, clockwise to close

### **HYDRAULIC LOCK PREVENTION**

*By now throttle is closed, brakes on, mags off & master switch off!*

Chocks	Securely set
Inlet manifold drains	Check open (up & twist)
Propeller	Pull through 7 blades
	<i>Repeat if significant oil emerges</i>
Inlet manifold drains	Close (twist & drop)

## ENGINE PRIME

*Prime engine one stroke for every 10 °C below 100 °C, preferably simultaneously pulling propeller through.*

*Do not pull engine through if cylinder temp above 80 °C*

Magneto switch	Off (zero)
Battery switch (master)	Off (mid position)
Operate primer	Right to Prime
Propeller	Pull through 4 blades
Inlet manifold drains	Depress to drain excess fuel
Chocks	Remove

## BEFORE START

Battery switch (master)	On (up)
Generator	On
Ignition Switch	On
Landing Gear Lights Switch	On
Engine Instruments Switch	On
Beacon	On
Boost (throttle)	Open, close (back), 1" open
Prop	Fully fine (forward)
Carburettor Heat	Off (up)
Oil Cooler Door	Closed (back)
Cowl Shutters	Open (forward)
Main Air Valve	Open (9/10 <sup>th</sup> anticlockwise)
Main Air Pressure	20 prefer 30 – 45 kg/cm <sup>2</sup>
Emergency Fuel Shut-off	Open (fully forward)
Emergency Air	Closed (clockwise)
Primer	Left – 2 or 3 strokes
Fuel pressure	Check rise
Primer	Turn right to assist start
Engine / Flight Instruments	Check

## ENGINE START

*Do not turn mags on until engine fires or engine might run backwards; hold starter in for a few secs until engine is stable; if engine rotates backwards at all cease pressing starter immediately and retry. And check main air pressure rises after start.*

*If engine fails to start after significant extra priming do not continue. Ensure mags & switches are off. Return to hydraulic lock prevention.*

Brakes	On
Starter Button	Press & hold
Primer	Pump if required
Magneto Switch	1+2 after engine fires

## AFTER START

Boost (throttle)	40% RPM
Oil pressure	Green
Primer	Locked (vertical)
Starter ring	Turn right to lock (red dot)
Cowl shutters & oil cooler	Close both (back)
Carb heat	On (down) to warm up
Remaining switches	On as required
Flaps	Deploy; Check; Retract (up)
Radio	On; frequency set
Intercom	On
Transponder	Standby
U/c retract warning light	Check
Warning Lights	Check
Stall Horn	Check
Volts & Amps	Check / Gen Light Out
Main Air Valve	Check 9/10 <sup>th</sup> open (anti-)
Main Air Pressure	Rising to 30 – 45 kg/cm <sup>2</sup>
Taxi Light	As required

## WARM UP & TAXI

*Before using greater than 50% RPM for taxi:*

Boost (throttle)	50% RPM
Oil temperature (min)	40 °C
Cylinder Head Temp (min)	120 °C

*Once CHT reaches 120 °C, set 60% RPM with boost (throttle) and select coarse prop pitch to quicken oil warm up.*

## ENGINE RUN-UP

Engine Ts & Ps	Check
Cowl Shutters	Open (forward)
Oil Cooler	Open (forward)
Propeller	Fully fine (forward)
Carb heat	Off (up)
Brakes	On
Boost (throttle)	70% RPM
Engine Instruments	Check
Carb heat	On (down), wait, off <i>check RPM drop; air inlet temp rise.</i>
Prop	Fully coarse & fully fine x2 <i>check RPM decreases 54%, returns 70%</i>
Magnetos	Both, 1, both, 2, both <i>max allowable drop 3%</i>
Prop	Set 64% RPM
Boost (throttle)	Open & close 10 units <i>ensure CSU holds RPM; repeat</i>
Prop	Fully fine (forward)
Boost (throttle)	58% RPM
Amp/Volt meter button	Press: Check 28 V
Boost (throttle)	Idle
Amp/Volt meter button	Press: Check 23 V
Generator Warning light	Check turns on
Boost (throttle)	Open smoothly to 80%
Boost (throttle)	50% RPM

## BEFORE TAKEOFF

Pilot Door	Closed & latched
Elevator Trim	Neutral (green light)
Landing Gear Handle	Down & latched
Magneto Switch	1+2
Warning Lights	Check
Starter ring	Turn right to lock (red dot)
Primer	Locked (vertical)
DI/Compass	Synchronise
Flight Instruments	Check
Altimeter	Set
Transponder	Set 7000
Taxi light	As required
Propeller	Fully fine (forward)
Cowl Shutters	Open (forward)
Oil Cooler Door	As required
Flaps	Up
Main Air Valve	Check 9/10 <sup>th</sup> open (anti-)
Main Air Pressure	30 kg/cm <sup>2</sup> min
Fuel Quantity	Sufficient
Emergency Fuel Shut-off	Open (i.e. not pulled)
Passenger Door	Closed & latched
Harnesses	Waist & shoulders
Flight Controls	Full & Free
Engine Ts & Ps	Check

## TAKE OFF

*Rotate at 90 kph; Unstick at 135 kph; Climb at 170 kph*

Carb Heat	Off (up)
Brakes	Off
Boost (throttle) & propeller	Both fully forward
Engine Ts & Ps	Check
RPM & boost	100% & as expected
No more runway, climbing?	U/c retract
Propeller	82% RPM (at safe height)

## CRUISE

Fuel Pressure	0.2 – 0.5 kg/cm <sup>2</sup>
Oil Temperature	40 – 75 °C
Oil Pressure	4 – 6 kg/cm <sup>2</sup>
Main Air Pressure	30 – 55 kg/cm <sup>2</sup>
Engine CHT	220 °C max
Electrics - Volts	26.5 – 28.5
Electrics - Amps	54 max

## BEFORE LANDING

Cowl shutters	Reduce CHT to 150 °C
Carb heat	On (down)
Main Air Supply	30 – 55 kg/cm <sup>2</sup>
Speed	< 200 kph
Landing Gear	Down, 3 greens, 3 poles
Gear Retract Safety Latch	Latched
Landing/taxi Lights	As required
	<i>Maximum duration of taxi/landing lights 5 mins.</i>
Fuel	Sufficient
Speed	< 170 kph
Flaps	Down
Cowl Shutters	As required for 150 °C
Oil Cooler	As required
Doors	Closed & latched
Harnesses	Secure

## SHORT FINALS

Speed (with flaps)	150 kph
Speed (flapless)	155 kph
Landing Gear	Down, 3 greens, 3 poles
Propeller	Fully fine (forward)
Carb Heat	Off (up)
Cowl Shutters	Open (forward)

## AFTER LANDING

Gear Retract Safety Latch	Latched
Flaps	Up
Oil Cooler Door	Open (forward)
Cowl Shutters	Open (forward)
Elevator Trim	Neutral (green light)
Landing Light	Off (centre position)

## ENGINE SHUTDOWN

Brakes	On
Cowl shutters	Open (forward)
Oil Cooler Door	Open (forward)
Non essential electrics	Off (down)
	<i>(all but first five from left + beacon)</i>
Prop	Fine (forward)
Boost (throttle)	28-34% RPM
CHT	150 °C max (OAT $\geq 25$ °C) 165 °C max
Boost	60% RPM for 15 secs
Boost	Closed (back)
Magneto Switch	Off (zero)
	<i>Flying within 1 hr? Open throttle as engine stops &amp; reclose.</i>
Main Air Valve	Closed (clockwise)
Electrical Switches	All Off (down except...)
Battery switch (master)	Off (...central position &...)
Map / cabin light switch	Off (central position)
Oil Cooler Door	Closed (back)
Cowl Shutters	Closed (back)
Chocks	Set
Main Air Purge Valve	Drain, close (clockwise)
Manifold drains	Open (push up & twist)
Brakes	Off

# OPERATING LIMITATIONS SUMMARY

## **SPEEDS**

Climb out	170 kph (92 kt)	$V_Y$
Cruise I	225 kph (121 kt)	
Max Cruise (Nom I)	262 kph (141 kt)	
Turbulence max	300 kph (161 kt)	$V_{NO}$
Never exceed	<i>cannot find!</i>	$V_{NE}$
Gear extend	200 kph (108 kt)	$V_{LE}$
Flap extend	170 kph (92 kt)	$V_{FE}$
Approach with Flap	150 kph (81 kt)	
Approach without Flap	155 kph (83 kt)	
Touchdown	130 kph (70 kt)	
Stall Clean	123 kph (66 kt)	$V_S$
Stall - Flap & Gear down	114 kph (61 kt)	$V_{SO}$
Best Glide speed	<i>cannot find!</i>	

## **MAX G LIMITS**

At 1500 kg	+6.4 and -3.2
At 1650 kg	+5 and -2.5

## **POWER SETTINGS**

*99.4% RPM = 2900 crankshaft RPM = 1908 propeller RPM  
Take off, Nom I & Nom II : Throttle (boost) is unlimited*

	<u>RPM</u>	<u>Boost</u>	<u>Power</u>	<u>lit / hr</u>
Take off	100%	$P_o+1.3$	360 hp	143 – 148
Nom I	82%	$P_o+1.0$	290 hp	113 – 135
Nom II	70%	$P_o+0.8$	240 hp	88 – 100
Cruise I	64%	7.4 max	180 hp	53 – 58
Cruise II	59%	6.7 max	145 hp	43 – 47
Idle	26%	–	–	–

$P_o$  (at ISA sea level) = 1013 hPa = 76 cmHg = 7.6 boost

## OIL QUANTITY

Minimum	8 lit
Aerobatics	Less than 14 lit
Normal	13 – 14 lit
Long Cruise	15 – 16 lit
Maximum	20 lit
Total tank capacity	30 lit

## OIL PRESSURE

Normal	4 – 6 kg/cm <sup>2</sup>
Minimum at Idle	1 kg/cm <sup>2</sup>

## OIL TEMPERATURE

Minimum	40 °C
Normal (recommended)	50 – 65 °C
Maximum (continuous)	75 °C
Maximum (15 Minutes)	85 °C

## FUEL PRESSURE

Normal	0.2 – 0.5 kg/cm <sup>2</sup>
Minimum at Idle	0.15 kg/cm <sup>2</sup>

## CYLINDER HEAD TEMPERATURE

Normal (recommended)	140 – 190 °C
Minimum	120 °C
Maximum (continuous)	220 °C
Maximum (max 15 mins)	240 °C
Max at Shutdown	(OAT < 25 °C) 150 °C (OAT ≥ 25 °C) 165 °C

## GENERATOR

Normal Volts	26.5 – 28.5 V
Minimum Volts	24 V
Max Current	54 A

## MAIN AIR SYSTEM

Minimum for start	20 kg/cm <sup>2</sup>
Minimum for take-off	30 kg/cm <sup>2</sup>
Normal	30 – 45 kg/cm <sup>2</sup>
Maximum	55 kg/cm <sup>2</sup>

## WEIGHT & BALANCE

	<u>Normal</u>	<u>Aerobatic</u>
Empty (LG down)	18.5 %MAC	18.5 %MAC
Permissible CoG	13.0 – 26.0	13.0 – 20.5
Empty	1217 kg	1217 kg
Useful load	443 kg	303 kg
Take off	1660 kg	1520 kg
<u>Sample full loads</u>		
Fuel (139 lit)	100 kg	100 kg
Oil	18 kg	18 kg
Pilot	80 kg	80 kg
Trainees	240 kg (3 pp)	80 kg (1 pp)
Equipment	5 kg	25 kg
Take off (LG up)	24.5 %MAC	19.5 %MAC
Landing (LG down)	23.4 %MAC	17.8 %MAC
	<i>(10kg fuel 9kg oil)</i>	

## TAKEOFF CHARACTERISTICS

### Firm Grass

<u>Mass</u>	<u>Speed</u>	<u>Take off Run</u>	<u>10 m height</u>
1650 kg	135 kph	370 m	670 m
1510 kg	125 kph	265 m	540 m

### Soft Grass

<u>Mass</u>	<u>Speed</u>	<u>Take off Run</u>	<u>10 m height</u>
1650 kg	125 kph	500 m	920 m
1510 kg	120 kph	455 m	830 m

## LANDING CHARACTERISTICS

### Firm Grass

<u>Mass</u>	<u>Speed</u>	<u>Landing Run</u>	<u>From 15 m</u>
1650 kg	130 kph	470 m	790 m
1510 kg	120 kph	390 m	690 m

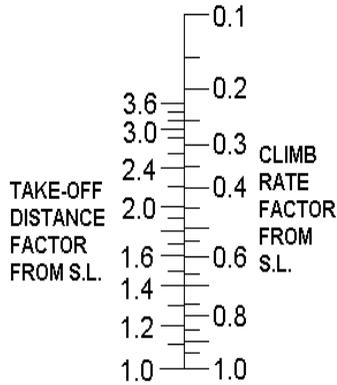
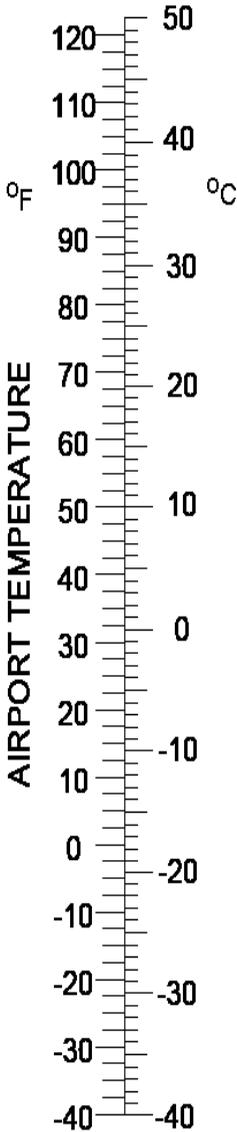
### Soft Grass

<u>Mass</u>	<u>Speed</u>	<u>Landing Run</u>	<u>From 15 m</u>
1650 kg	125 kph	350 m	650 m
1510 kg	124 kph	350 m	610 m

## CROSSWIND LIMITS

Take off	23 kt
Landing	19 kt

# KOCH CHART



DRAW A LINE FROM AIRPORT PRESSURE ALTITUDE TO AIRPORT TEMPERATURE TO FIND T.O. DISTANCE AND CLIMB FACTORS FROM SEA LEVEL.