

Republic of South Sudan

Laws of South Sudan

CIVIL AVIATION AUTHORITY

**UNITS OF MEASUREMENT FOR AIR AND
GROUND OPERATIONS REGULATIONS, 2026**

**CIVIL AVIATION AUTHORITY UNITS OF MEASUREMENT FOR AIR AND
GROUND OPERATIONS REGULATIONS, 2026**

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CIVIL AVIATION AUTHORITY UNITS OF MEASUREMENT FOR AIR AND GROUND OPERATIONS REGULATIONS, 2026

In exercise of powers conferred upon me under Section 99(2) (e) of the Civil Aviation Authority Act, 2012 as amended, I hereby issue the following Regulations:

CHAPTER I PRELIMINARY PROVISIONS

1. Title and Commencement

This Regulation may be cited as the “Units of Measurement for Air and Ground Operations Regulations, 2026” and shall come into force on the date of its signature by the Minister.

2. purpose

The purpose of this regulation is to provide for a legal framework to govern units of measurement for air and ground operations in South Sudan.

3. Authority and Application

- (a) This regulation is drafted in accordance with the provisions of section 99 subsection (2) paragraph (e) of the South Sudan Civil Aviation Authority Act, 2012 as amended.
- (b) These regulations shall apply to person or organizations responsible for the units of measurement for air ground operation in South Sudan.

4. Interpretation

In these Regulations unless the context otherwise requires:

- | | |
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| “Ampere (A)” | means that constant electric current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed 1 metre apart in a vacuum, would produce between these conductors a force equal to 2×10^{-7} newton per metre of length; |
| “Becquerel (Bq)” | means the activity of a radionuclide having one spontaneous nuclear transition per second; |
| “Candela (cd)” | means the luminous intensity, in the perpendicular direction, of a surface of 1/600 000 square metre of black body at the temperature of freezing platinum under a pressure of 101 325 newtons per square metre; |

- “Celsius Temperature (t°C)”** means the Celsius temperature is equal to the difference $t^{\circ}\text{C} = T - T_0$ between two thermodynamic temperatures T and T_0 where T_0 equals 273.15 Kelvin;
- “Coulomb (C)”** means the quantity of electricity transported in 1 second by a current of 1 ampere;
- “Degree Celsius (°C)”** means the special name for the unit Kelvin for use in stating values of Celsius temperature;
- “Farad (F)”** means the capacitance of a capacitor between the plates of which there appears a difference of potential of 1 volt when it is charged by a quantity of electricity equal to 1 coulomb;
- “Foot (ft)”** means the length equal to 0.3048 metre exactly;
- “Gray (Gy)”** means the energy imparted by ionizing radiation to a mass of matter corresponding to 1 joule per kilogram;
- “Henry (H)”** means the inductance of a closed circuit in which an electromotive force of 1 volt is produced when the electric current in the circuit varies uniformly at a rate of 1 ampere per second;
- “Hertz (Hz)”** means the frequency of a periodic phenomenon of which the period is 1 second;
- “Human Performance”** means human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations;
- “Joule (J)”** means the work done when the point of application of a force of 1 Newton is displaced a distance of 1 metre in the direction of the force;
- “Kelvin (K)”** means a unit of thermodynamic temperature which is the fraction $1/273.16$ of the thermodynamic temperature of the triple point of water;
- “Kilogram (kg)”** means the unit of mass equal to the mass of the international prototype of the kilogram;
- “Knot (kt)”** means the speed equal to 1 nautical mile per hour;
- “International System of Units (SI)”** means a complete, coherent system which includes three classes of unit’s base units, supplementary units; and derived units;
- “Litre (L)”** means a unit of volume restricted to the measurement of liquids and gases which is equal to 1 cubic decimetre;

| | |
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| “Lumen (lm)” | means the luminous flux emitted in a solid angle of 1 steradian by a point source having a uniform intensity of 1 candela; |
| “Lux (lx)” | means the illuminance produced by a luminous flux of 1 lumen uniformly distributed over a surface of 1 square metre; |
| “Metre (m)” | means the distance travelled by light in a vacuum during $1/299\,792\,458$ of a second; |
| “Mole (mol)” | means the amount of substance of a system which contains as many elementary entities as there are atoms in 0.012 kilogram of carbon-12; |
| “Nautical Mile (NM)” | means the length equal to 1,852 metres exactly; |
| “Newton (N)” | means the force which when applied to a body having a mass of 1 kilogram gives it an acceleration of 1 metre per second squared; |
| “Ohm (Ω)” | means the electric resistance between two points of a conductor when a constant difference of potential of 1 volt, applied between these two points, produces in this conductor a current of 1 ampere, this conductor not being the source of any electromotive force; |
| “Pascal (Pa)” | means the pressure or stress of 1 newton per square metre; |
| “Radian (rad)” | means the plane angle between two radii of a circle which cut off on the circumference an arc equal in length to the radius; |
| “Second (s)” | means the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium-133 atom; |
| “Siemens (S)” | means the electric conductance of a conductor in which a current of 1 ampere is produced by an electric potential difference of 1 volt; |
| “Sievert (Sv)” | means the unit of radiation dose equivalent corresponding to 1 joule per kilogram; |
| “Steradian (sr)” | means the solid angle which, having its vertex in the centre of a sphere, cuts off an area of the surface of the sphere equal to that of a square with sides of length equal to the radius of the sphere; |

| | |
|--------------|---|
| “Tesla (T)” | means the magnetic flux density given by a magnetic flux of 1 weber per square metre; |
| “Tonne (t)” | means the mass equal to 1 000 kilograms; |
| “Volt (V)” | means the unit of electric potential difference and electromotive force which is the difference of electric potential between two points of a conductor carrying a constant current of 1 ampere, when the power dissipated between these points is equal to 1 watt; |
| “Watt (W)” | means the power which gives rise to the production of energy at the rate of 1 joule per second; |
| “Weber (Wb)” | means the magnetic flux which, linking a circuit of one turn, produces in it an electromotive force of 1 volt as it is reduced to zero at a uniform rate in 1 second. |

CHAPTER II STANDARD APPLICATION OF UNITS OF MEASUREMENT

5. SI Units

- (1) The International System of Units developed and maintained by the General Conference of Weights and Measures (CGPM) shall, subject to regulations 5 and 6 be used as the standard system of units of measurement for all aspects of civil aviation air and ground operations.
- (2) The prefixes and symbols listed in Table 3-1 shall be used to form names and symbols of the decimal multiples and submultiples of SI units.

| <i>Multiplication factor</i> | <i>Prefix</i> | <i>Symbol</i> |
|---|---------------|---------------|
| 1 000 000 000 000 000 000 = 10 ¹⁸ | exa | E |
| 1 000 000 000 000 000 = 10 ¹⁵ | peta | P |
| 1 000 000 000 000 = 10 ¹² | tera | T |
| 1 000 000 000 = 10 ⁹ | giga | G |
| 1 000 000 = 10 ⁶ | mega | M |
| 1 000 = 10 ³ | kilo | k |
| 100 = 10 ² | hecto | h |
| 10 = 10 ¹ | deca | da |
| 0.1 = 10 ⁻¹ | deci | d |
| 0.01 = 10 ⁻² | centi | c |
| 0.001 = 10 ⁻³ | milli | m |
| 0.000 001 = 10 ⁻⁶ | micro | μ |
| 0.000 000 001 = 10 ⁻⁹ | nano | n |
| 0.000 000 000 001 = 10 ⁻¹² | pico | p |
| 0.000 000 000 000 001 = 10 ⁻¹⁵ | femto | f |
| 0.000 000 000 000 000 001 = 10 ⁻¹⁸ | atto | a |

6. Non-SI Units

The non-SI units listed in Table 3-2 shall be used either in lieu of, or in addition to, SI units as primary units of measurement but only as specified in Table 3-4.

Table 3-2. Non-SI units for use with the SI

| <i>Specific quantities in Table 3-4 related to</i> | <i>Unit</i> | <i>Symbol</i> | <i>Definition (in terms of SI units)</i> |
|--|-------------------|---------------|---|
| mass | tonne | t | 1 t = 10 ³ kg |
| plane angle | degree | ° | 1° = (π/180) rad |
| | minute | ' | 1' = (1/60)° = (π/10 800) rad |
| | second | " | 1" = (1/60)' = (π/648 000) rad |
| temperature | degree Celsius | °C | 1 unit °C = 1 unit K ^{a)} |
| time | minute | min | 1 min = 60 s |
| | hour | h | 1 h = 60 min = 3 600 s |
| | day | d | 1 d = 24 h = 86 400 s |
| | week, month, year | — | |
| volume | litre | L | 1 L = 1 dm ³ = 10 ⁻³ m ³ |

Non-SI alternative units permitted for temporary use with the SI

The non-SI units listed in Table 3-3 shall be permitted for temporary use as alternative units of measurement but only for those specific quantities listed in Table 3-4.

Table 3-3. Non-SI units for use with the SI

| <i>Specific quantities in Table 3-4 related to</i> | <i>Unit</i> | <i>Symbol</i> | <i>Definition (in terms of SI units)</i> |
|--|---------------|---------------|--|
| distance (long) | nautical mile | NM | 1 NM = 1 852 m |
| distance (vertical) ^{a)} | foot | ft | 1 ft = 0.304 8 m |
| speed | knot | kt | 1 kt = 0.514 444 m/s |

a) altitude, elevation, height, vertical speed.

7. Application of Specific Units

The application of units of measurement for certain quantities used in civil aviation air and ground operations shall be in accordance with Table 3-4.

Table 3-4. Standard Application of Specific Units of Measurement

| <i>Ref. No.</i> | <i>Quantity</i> | <i>Primary unit (symbol)</i> | <i>Non-SI alternative unit (symbol)</i> |
|--------------------------------|--|----------------------------------|---|
| 1. Direction/Space/Time | | | |
| 1.1 | altitude | m | ft |
| 1.2 | area | m ² | |
| 1.3 | distance (long) ^{a)} | km | NM |
| 1.4 | distance (short) | m | |
| 1.5 | elevation | m | ft |
| 1.6 | endurance | h and min | |
| 1.7 | height | m | ft |
| 1.8 | latitude | ° " | |
| 1.9 | length | m | |
| 1.10 | longitude | ° " | |
| 1.11 | plane angle (when required, decimal subdivisions of the degree shall be used) | ° | |
| 1.12 | runway length | m | |
| 1.13 | runway visual range | m | |
| 1.14 | tank capacities (aircraft) ^{b)} | L | |
| 1.15 | time | | s min h d week month year |
| 1.16 | visibility ^{c)} | | km |
| 1.17 | volume | | m ³ |
| 1.18 | wind direction (wind directions other than for a landing and take-off shall be expressed in degrees true; for landing and take-off wind directions shall be expressed in degrees magnetic) | | ° |

2. Mass-related

| | | |
|------|-----------------------------|------------------------|
| 2.1 | air density | kg/m ³ |
| 2.2 | area density | kg/m ² |
| 2.3 | cargo capacity | kg |
| 2.4 | cargo density | kg/m ³ |
| 2.5 | density (mass density) | kg/m ³ |
| 2.6 | fuel capacity (gravimetric) | kg |
| 2.7 | gas density | kg/m ³ |
| 2.8 | gross mass or payload | kg |
| | | t |
| 2.9 | hoisting provisions | kg |
| 2.10 | linear density | kg/m |
| 2.11 | liquid density | kg/m ³ |
| 2.12 | mass | kg |
| 2.13 | moment of inertia | kg · m ² |
| 2.14 | moment of momentum | kg · m ² /s |
| 2.15 | momentum | kg · m/s |

3. Force-related

| | | |
|------|------------------------|--------|
| 3.1 | air pressure (general) | kPa |
| 3.2 | altimeter setting | hPa |
| 3.3 | atmospheric pressure | hPa |
| 3.4 | bending moment | kN · m |
| 3.5 | force | N |
| 3.6 | fuel supply pressure | kPa |
| 3.7 | hydraulic pressure | kPa |
| 3.8 | modulus of elasticity | MPa |
| 3.9 | pressure | kPa |
| 3.10 | stress | MPa |
| 3.11 | surface tension | mN/m |
| 3.12 | thrust | kN |
| 3.13 | torque | N · m |
| 3.14 | vacuum | Pa |

4. Mechanics

| | | | |
|------|-----------------------------------|--------------------|--------|
| 4.1 | airspeed ^{d)} | km/h | kt |
| 4.2 | angular acceleration | rad/s ² | |
| 4.3 | angular velocity | rad/s | |
| 4.4 | energy or work | J | |
| 4.5 | equivalent shaft power | kW | |
| 4.6 | frequency | Hz | |
| 4.7 | ground speed | km/h | kt |
| 4.8 | impact | J/m ² | |
| 4.9 | kinetic energy absorbed by brakes | MJ | |
| 4.10 | linear acceleration | m/s ² | |
| 4.11 | power | kW | |
| 4.12 | rate of trim | °/s | |
| 4.13 | shaft power | kW | |
| 4.14 | velocity | m/s | |
| 4.15 | vertical speed | m/s | ft/min |
| 4.16 | wind speed ^{e)} | m/s | kt |

5. Flow

| | | |
|------|--------------------------------------|---------------------|
| 5.1 | engine airflow | kg/s |
| 5.2 | engine waterflow | kg/h |
| 5.3 | fuel consumption (specific) | |
| | piston engines | kg/(kW · h) |
| | turbo-shaft engines | kg/(kW · h) |
| | jet engines | kg/(kN · h) |
| 5.4 | fuel flow | kg/h |
| 5.5 | fuel tank filling rate (gravimetric) | kg/min |
| 5.6 | gas flow | kg/s |
| 5.7 | liquid flow (gravimetric) | g/s |
| 5.8 | liquid flow (volumetric) | L/s |
| 5.9 | mass flow | kg/s |
| 5.10 | oil consumption | |
| | gas turbine | kg/h |
| | piston engines (specific) | g/(kW · h) |
| 5.11 | oil flow | g/s |
| 5.12 | pump capacity | L/min |
| 5.13 | ventilation airflow | m ³ /min |
| 5.14 | viscosity (dynamic) | Pa · s |
| 5.15 | viscosity (kinematic) | m ² /s |

6. Thermodynamics

| | | |
|-----|---------------------------------|------------------------|
| 6.1 | coefficient of heat transfer | W/(m ² · K) |
| 6.2 | heat flow per unit area | J/m ² |
| 6.3 | heat flow rate | W |
| 6.4 | humidity (absolute) | g/kg |
| 6.5 | coefficient of linear expansion | °C ⁻¹ |
| 6.6 | quantity of heat | J |
| 6.7 | temperature | °C |

7. *Electricity and magnetism*

| | | |
|------|-------------------------|------------------|
| 7.1 | capacitance | F |
| 7.2 | conductance | S |
| 7.3 | conductivity | S/m |
| 7.4 | current density | A/m ² |
| 7.5 | electric current | A |
| 7.6 | electric field strength | C/m ² |
| 7.7 | electric potential | V |
| 7.8 | electromotive force | V |
| 7.9 | magnetic field strength | A/m |
| 7.10 | magnetic flux | Wb |
| 7.11 | magnetic flux density | T |
| 7.12 | power | W |
| 7.13 | quantity of electricity | C |
| 7.14 | resistance | Ω |

8. *Light and related electromagnetic radiations*

| | | |
|-----|--------------------|-------------------|
| 8.1 | illuminance | lx |
| 8.2 | luminance | cd/m ² |
| 8.3 | luminous exitance | lm/m ² |
| 8.4 | luminous flux | lm |
| 8.5 | luminous intensity | cd |
| 8.6 | quantity of light | lm · s |
| 8.7 | radiant energy | J |
| 8.8 | wavelength | m |

9. *Acoustics*

| | | |
|------|---------------------------------|-------------------|
| 9.1 | frequency | Hz |
| 9.2 | mass density | kg/m ³ |
| 9.3 | noise level | dB ^{e)} |
| 9.4 | period, periodic time | s |
| 9.5 | sound intensity | W/m ² |
| 9.6 | sound power | W |
| 9.7 | sound pressure | Pa |
| 9.8 | sound level | dB ^{f)} |
| 9.9 | static pressure (instantaneous) | Pa |
| 9.10 | velocity of sound | m/s |
| 9.11 | volume velocity (instantaneous) | m ³ /s |
| 9.12 | wavelength | m |

10. Nuclear physics and ionizing radiation

| | | |
|------|---------------------------|----------|
| 10.1 | absorbed dose | Gy |
| 10.2 | absorbed dose rate | Gy/s |
| 10.3 | activity of radionuclides | Bq |
| 10.4 | dose equivalent | Sv |
| 10.5 | radiation exposure | C/kg |
| 10.6 | exposure rate | C/kg · s |

- a) As used in navigation, generally in excess of 4 000 m.
- b) Such as aircraft fuel, hydraulic fluids, water, oil and high pressure oxygen vessels.
- c) Visibility of less than 5 km may be given in m.
- d) Airspeed is sometimes reported in flight operations in terms of the ratio MACH number.
- e) A conversion of 1 kt = 0.5 m/s is used in ICAO Annexes for the representation of wind speed.
- f) The decibel (dB) is a ratio which may be used as a unit for expressing sound pressure level and sound power level. When used, the reference level must be specified.

8. Design, Procedures and Training

The means and provisions for design, procedures and training shall be established for operations in environments involving the use of standard and non-SI alternatives of specific units of measurement, or the transition between environments using different units, with due consideration to human performance.

9. Use of Alternative Non-SI Units

The use in civil aviation operations of the alternative non-SI units (Knot, Nautical Mile and foot) shall be terminated on the dates to be established by ICAO.

Issued under my hand in Juba on this ^{1^h}12..... day of the month of Feb..... in Year 2026.

12 02
2026



Hon Rizik Zakaria Hassan
Minister of Transport
Republic of South Sudan - Juba