

**GEN 2.7 TABLES OF BEGINNING OF CIVIL MORNING TWILIGHT / END OF CIVIL EVENING TW****1 General**

The tables on the following pages have been prepared by the Zambian Meteorological observatory and are reproduced here with their permission. The tables include (8) public airports/heliports.

1.1. The times in the tables are given in UTC for the beginning of civil morning twilight from sunrise (SR) to sunset (SS) and end of civil evening twilight for the years from 2012 to 2021.

1.2. The times given for the beginning of civil morning twilight and end of civil evening twilight are calculated for an altitude of the sun 6° above and 6° below the horizon, as commonly used.

The tables are calculated for the year 2017, which is used as an "Average Year" for the years from 2012 to 2021.

1.3. In this period, the times on the arbitrary date and place will deviate less than 2 minutes from the times on the same date and place in the "Average Year".

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### 3 Sunrise / Sunset Tables

#### 3.1 Sunrise / Sunset tables for CHIPATA/Chipata

CHIPATA/Chipata FLCP S133351.07 E0323509.89						CHIPATA/Chipata FLCP S133351.07 E0323509.89					
Month	Day	Twil From	SR	SS	Twil To	Month	Day	Twil From	SR	SS	Twil To
Jan	1		0326	1620		Jul	1		0413	1534	
	6		0329	1622			6		0414	1535	
	11		0331	1623			11		0414	1536	
	21		0337	1625			16		0414	1538	
	26		0340	1625			21		0413	1539	
							26		0412	1540	
Feb	1		0342	1624		Aug	1		0411	1542	
	6		0345	1623			6		0409	1543	
	11		0346	1621			11		0407	1543	
	16		0348	1619			16		0404	1544	
	21		0349	1617			21		0401	1545	
	26		0351	1614			26		0358	1545	
Mar	1		0351	1613		Sep	1		0355	1545	
	6		0352	1610			6		0351	1545	
	11		0353	1607			11		0348	1545	
	16		0353	1603			16		0344	1545	
	21		0354	1600			21		0340	1546	
	26		0354	1557			26		0337	0346	
Apr	1		0355	1553		Oct	1		0333	1546	
	6		0355	1549			6		0330	1546	
	11		0355	1546			11		0327	1547	
	16		0356	1543			16		0323	1547	
	21		0357	1540			21		0321	1548	
	26		0357	1538			26		0318	1549	
May	1		0358	1535		Nov	1		0316	1551	
	6		0359	1533			6		0314	1553	
	11		0400	1532			11		0313	1555	
	21		0403	1530			16		0312	1557	
	26		0405	1529			21		0312	1559	
							26		0312	1602	
Jun	1		0406	1529		Dec	1		0313	1605	
	6		0408	1529			6		0314	1607	
	11		0409	1529			11		0315	1610	
	16		0410	1530			16		0317	1613	
	21		0412	1531			21		0320	1615	
	26		0413	1532			26		0322	1618	

## 3.2 Sunrise / Sunset tables for KASAMA/Kasama

KASAMA/Kasama FLKS S101257.03 E0310820.52						KASAMA/Kasama FLKS S101257.03 E0310820.52					
Month	Day	Twil From	SR	SS	Twil To	Month	Day	Twil From	SR	SS	Twil To
Jan	1		0337	1620		Jul	1		0413	1545	
	6		0340	1622			6		0414	1547	
	11		0343	1624			11		0414	1548	
	16		0346	1625			16		0414	1549	
	21		0348	1625			21		0414	1550	
	26		0350	1626			26		0413	1551	
Feb	1		0353	1625		Aug	1		0412	1552	
	6		0354	1625			6		0410	1553	
	11		0356	1624			11		0409	1553	
	16		0357	1622			16		0407	1553	
	21		0358	1620			21		0404	1553	
	26		0359	1618			26		0402	1553	
Mar	1		0359	1617		Sep	1		0358	1553	
	6		0359	1614			6		0355	1553	
	11		0359	1612			11		0352	1552	
	16		0400	1609			16		0349	1552	
	21		0400	1606			21		0346	1551	
	26		0359	1603			26		0343	1551	
Apr	1		0359	1559		Oct	1		0340	1551	
	6		0359	1557			6		0337	1551	
	11		0359	1554			11		0334	1551	
	16		0359	1551			16		0331	1551	
	21		0359	1549			21		0329	1551	
	26		0400	1547			26		0327	1552	
May	1		0400	1545		Nov	1		0325	1553	
	6		0401	1543			6		0324	1555	
	11		0402	1542			11		0323	1556	
	16		0403	1541			16		0323	1558	
	21		0404	1540			21		0323	1600	
	26		0405	1540			26		0323	1602	
Jun	1		0406	1540		Dec	1		0324	1605	
	6		0408	1541			6		0325	1607	
	11		0409	1541			11		0327	1610	
	16		0410	1542			16		0329	1613	
	21		0411	1543			21		0332	1615	
	26		0412	1544			26		0334	1618	

### 3.3 Sunrise / Sunset tables for LIVINGSTONE/Harry Mwaanga Nkumbula International Airport

LIVINGSTONE/Harry Mwaanga Nkumbula International Airport FLHN S174844.30 E0254911.83						LIVINGSTONE/Harry Mwaanga Nkumbula International Airport FLHN S174844.30 E0254911.83					
Month	Day	Twil From	SR	SS	Twil To	Month	Day	Twil From	SR	SS	Twil To
Jan	1		0345	1655		Jul	1		0448	1553	
	6		0348	1657			6		0449	1554	
	11		0351	1658			11		0448	1556	
	16		0354	1658			16		0448	1558	
	21		0357	1658			21		0447	1559	
	26		0400	1658			26		0446	1601	
Feb	1		0404	1657		Aug	1		0444	1603	
	6		0406	1655			6		0441	1604	
	11		0409	1653			11		0439	1605	
	16		0411	1650			16		0436	1607	
	21		0413	1648			21		0432	1608	
	26		0415	1644			26		0429	1609	
Mar	1		0416	1642		Sep	1		0424	1610	
	6		0417	1639			6		0420	1610	
	11		0418	1635			11		0416	1411	
	16		0420	1631			16		0412	1612	
	21		0421	1627			21		0408	1612	
	26		0422	1623			26		0403	1613	
Apr	1		0423	1618		Oct	1		0359	1614	
	6		0424	1614			6		0355	1615	
	11		0425	1611			11		0351	1616	
	16		0426	1607			16		0348	1617	
	21		0427	1604			21		0344	1619	
	26		0429	1600			26		0341	1621	
May	1		0430	1558		Nov	1		0338	1623	
	6		0432	1555			6		0336	1625	
	11		0433	1553			11		0334	1628	
	16		0435	1551			16		0333	1630	
	21		0437	1550			21		0332	1633	
	26		0438	1549			26		0332	1636	
Jun	1		0441	1548		Dec	1		0332	1639	
	6		0442	1548			6		0333	1642	
	11		0444	1549			11		0334	1645	
	16		0445	1549			16		0336	1648	
	21		0447	1550			21		0339	1631	
	26		0448	1551			26		0341	1653	

## 3.4 Sunrise / Sunset tables for LUSAKA/Kenneth Kaunda International Airport

LUSAKA/Kenneth Kaunda International Airport FLKK S151950.80 E0282709.40						LUSAKA/Kenneth Kaunda International Airport FLKK S151950.80 E0282709.40					
Month	Day	Twil From	SR	SS	Twil To	Month	Day	Twil From	SR	SS	Twil To
Jan	1		0339	1641		Jul	1		0434	1547	
	6		0342	1643			6		0434	1549	
	11		0345	1644			11		0434	1550	
	16		0348	1644			16		0434	1552	
	21		0351	1645			21		0433	1553	
	26		0354	1644			26		0432	1555	
Feb	1		0357	1643		Aug	1		0430	1556	
	6		0359	1642			6		0429	1557	
	11		0401	1640			11		0426	1558	
	16		0403	1648			16		0423	1559	
	21		0405	1636			21		0420	1600	
	26		0406	1633			26		0417	1600	
Mar	1		0407	1631		Sep	1		0313	1601	
	6		0408	1628			6		0309	1602	
	11		0409	1624			11		0305	1602	
	16		0410	1621			16		0301	1602	
	21		0411	1617			21		0358	1603	
	26		0411	1613			26		0354	1603	
Apr	1		0412	1609		Oct	1		0350	1603	
	6		0413	1605			6		0346	1604	
	11		0414	1602			11		0343	1605	
	16		0414	1559			16		0339	1606	
	21		0415	1556			21		0336	1607	
	26		0416	1553			26		0323	1608	
May	1		0417	1550		Nov	1		0331	1610	
	6		0418	1548			6		0329	1612	
	11		0420	1546			11		0327	1614	
	16		0421	1545			16		0326	1617	
	21		0423	1544			21		0326	1619	
	26		0424	1543			26		0326	1622	
Jun	1		0426	1543		Dec	1		0326	1625	
	6		0428	1543			6		0328	1628	
	11		0429	1543			11		0329	1631	
	16		0431	1544			16		0331	1633	
	21		0432	1545			21		0333	1636	
	26		0433	1546			26		0336	1638	

### 3.5 Sunrise / Sunset tables for MANSA/Mansa

MANSA/Mansa FLMA S110817.24 E0285230.44						MANSA/Mansa FLMA S110817.24 E0285230.44					
Month	Day	Twil From	SR	SS	Twil To	Month	Day	Twil From	SR	SS	Twil To
Jan	1		0342	1635		Jul	1		0428	1550	
	6		0345	1637			6		0429	1552	
	11		0348	1638			11		0429	1553	
	16		0351	1639			16		0429	1554	
	21		0354	1639			21		0428	1556	
	26		0356	1639			26		0427	1557	
Feb	1		0359	1639		Aug	1		0426	1558	
	6		0401	1638			6		0424	1559	
	11		0403	1636			11		0422	1600	
	16		0404	1635			16		0419	1600	
	21		0406	1632			21		0417	1601	
	26		0407	1630			26		0414	1601	
Mar	1		0407	1628		Sep	1		0410	1601	
	6		0408	1625			6		0407	1601	
	11		0409	1622			11		0403	1601	
	16		0409	1619			16		0400	1601	
	21		0409	1616			21		0356	1601	
	26		0410	1612			26		0353	1601	
Apr	1		0410	1609		Oct	1		0349	1602	
	6		0410	1605			6		0346	1602	
	11		0411	1602			11		0343	1602	
	16		0411	1659			16		0340	1603	
	21		0412	1556			21		0337	1604	
	26		0412	1554			26		0334	1605	
May	1		0413	1552		Nov	1		0332	1606	
	6		0414	1550			6		0330	1608	
	11		0415	1548			11		0329	1610	
	16		0416	1547			16		0329	1612	
	21		0418	1546			21		0328	1614	
	26		0419	1546			26		0329	1617	
Jun	1		0421	1545		Dec	1		0329	1619	
	6		0422	1546			6		0331	1622	
	11		0424	1546			11		0332	1625	
	16		0425	1547			16		0434	1628	
	21		0426	1548			21		0336	1630	
	26		0427	1549			26		0339	1633	

## 3.6 Sunrise / Sunset tables for MFUWE/Mfuwe

MFUWE/Mfuwe FLMF S131525.53 E0315551.69						MFUWE/Mfuwe FLMF S131525.53 E0315551.69					
Month	Day	Twil From	SR	SS	Twil To	Month	Day	Twil From	SR	SS	Twil To
Jan	1		0335	1628		Jul	1		0420	1543	
	6		0338	1640			6		0421	1544	
	11		0340	1641			11		0421	1546	
	16		0344	1642			16		0421	1547	
	21		0346	1642			21		0421	1548	
	26		0348	1643			26		0420	1549	
Feb	1		0351	1632		Aug	1		0418	1550	
	6		0353	1632			6		0416	1551	
	11		0356	1643			11		0415	1552	
	16		0357	1628			16		0413	1553	
	21		0359	1626			21		0410	1553	
	26		0400	1623			26		0407	1554	
Mar	1		0400	1621		Sep	1		0404	1553	
	6		0401	1618			6		0358	1553	
	11		0402	1615			11		0357	1554	
	16		0402	1612			16		0353	1554	
	21		0402	1609			21		0349	1554	
	26		0402	1606			26		0346	1554	
Apr	1		0403	1601		Oct	1		0342	1555	
	6		0403	1658			6		0337	1555	
	11		0404	1656			11		0335	1555	
	16		0404	1552			16		0333	1555	
	21		0405	1549			21		0329	1557	
	26		0406	1547			26		0327	1558	
May	1		0406	1545		Nov	1		0324	1600	
	6		0407	1542			6		0322	1601	
	11		0408	1541			11		0322	1603	
	16		0409	1540			16		0321	1605	
	21		0411	1539			21		0321	1607	
	26		0412	1538			26		0322	1610	
Jun	1		0413	1538		Dec	1		0322	1612	
	6		0415	1538			6		0324	1615	
	11		0417	1539			11		0325	1618	
	16		0418	1539			16		0327	1621	
	21		0418	1540			21		0329	1623	
	26		0419	1541			26		0332	1625	

### 3.7 Sunrise / Sunset tables for MONGU/Mongu

MONGU/Mongu FLMG S151508.81 E0230900.96						MONGU/Mongu FLMG S151508.81 E0230900.96					
Month	Day	Twil From	SR	SS	Twil To	Month	Day	Twil From	SR	SS	Twil To
Jan	1		0400	1701		Jul	1		0454	1608	
	6		0403	1703			6		0455	1610	
	11		0406	1704			11		0455	1611	
	16		0409	1705			16		0454	1613	
	21		0412	1705			21		0454	1614	
	26		0412	1705			26		0452	1616	
Feb	1		0418	1704		Aug	1		0451	1617	
	6		0420	1702			6		0449	1618	
	11		0422	1701			11		0446	1619	
	16		0424	1659			16		0444	1620	
	21		0426	1656			21		0441	1621	
	26		0427	1653			26		0438	1621	
Mar	1		0428	1652		Sep	1		0433	1622	
	6		0429	1648			6		0430	1622	
	11		0430	1645			11		0426	1623	
	16		0431	1641			16		0422	1623	
	21		0431	1638			21		0418	1623	
	26		0432	1634			26		0414	1624	
Apr	1		0433	1630		Oct	1		0411	1624	
	6		0433	1626			6		0407	1625	
	11		0434	1623			11		0403	1625	
	16		0435	1620			16		0400	1626	
	21		0436	1616			21		0357	1627	
	26		0437	1614			26		0354	1629	
May	1		0438	1611		Nov	1		0352	1631	
	6		0439	1609			6		0350	1633	
	11		0440	1607			11		0348	1635	
	16		0442	1606			16		0447	1637	
	21		0443	1605			21		0347	1640	
	26		0445	1604			26		0347	1642	
Jun	1		0447	1604		Dec	1		0347	1645	
	6		0448	1604			6		0349	1648	
	11		0450	1604			11		0350	1651	
	16		0451	1605			16		0452	1654	
	21		0452	1606			21		0354	1656	
	26		0453	1607			26		0357	1659	



## 3.8 Sunrise / Sunset tables for NDOLA/Simon Mwansa Kapwepwe International Airport

NDOLA/Simon Mwansa Kapwepwe International Airport FLSK S125742.46 E0283058.45						NDOLA/Simon Mwansa Kapwepwe International Airport FLSK S125742.46 E0283058.45					
Month	Day	Twil From	SR	SS	Twil To	Month	Day	Twil From	SR	SS	Twil To
Jan	1		0342	1635		Jul	1		0428	1550	
	6		0345	1637			6		0429	1552	
	11		0348	1638			11		0429	1553	
	16		0351	1639			16		0429	1554	
	21		0354	1639			21		0428	1556	
	26		0356	1639			26		0427	1557	
Feb	1		0359	1639		Aug	1		0426	1558	
	6		0401	1638			6		0424	1559	
	11		0403	1636			11		0422	1600	
	16		0404	1635			16		0419	1600	
	21		0406	1632			21		0417	1601	
	26		0407	1630			26		0414	1601	
Mar	1		0407	1628		Sep	1		0410	1601	
	6		0408	1625			6		0407	1601	
	11		0409	1622			11		0403	1601	
	16		0409	1619			16		0400	1601	
	21		0409	1616			21		0356	1601	
	26		0410	1612			26		0353	1601	
Apr	1		0410	1609		Oct	1		0349	1602	
	6		0410	1605			6		0346	1602	
	11		0411	1602			11		0343	1602	
	16		0411	1659			16		0340	1603	
	21		0412	1556			21		0337	1604	
	26		0412	1554			26		0334	1605	
May	1		0413	1552		Nov	1		0332	1606	
	6		0414	1550			6		0330	1608	
	11		0415	1548			11		0329	1610	
	16		0416	1547			16		0329	1612	
	21		0418	1546			21		0328	1614	
	26		0419	1546			26		0329	1617	
Jun	1		0421	1545		Dec	1		0329	1619	
	6		0422	1546			6		0331	1622	
	11		0424	1546			11		0332	1625	
	16		0425	1547			16		0434	1628	
	21		0426	1548			21		0336	1630	
	26		0427	1549			26		0339	1633	

### 3.9 Sunrise / Sunset tables for SOLWEZI/Solwezi

SOLWEZI/Solwezi FLSW S121000 E0262200						SOLWEZI/Solwezi FLSW S121000 E0262200					
Month	Day	Twil From	SR	SS	Twil To	Month	Day	Twil From	SR	SS	Twil To
Jan	1		0353	1643		Jul	1		0436	1601	
	6		0356	1645			6		0436	1602	
	11		0359	1646			11		0436	1604	
	16		0401	1647			16		0436	1605	
	21		0404	1647			21		0436	1606	
	26		0406	1647			26		0435	1607	
Feb	1		0409	1647		Aug	1		0433	1608	
	6		0411	1646			6		0432	1609	
	11		0413	1645			11		0430	1610	
	16		0414	1643			16		0428	1610	
	21		0415	1641			21		0425	1611	
	26		0416	1638			26		0422	1611	
Mar	1		0417	1637		Sep	1		0419	1611	
	6		0417	1634			6		0415	1611	
	11		0418	1631			11		0412	1611	
	16		0418	1628			16		0409	1611	
	21		0419	1625			21		0406	1610	
	26		0419	1622			26		0402	1610	
Apr	1		0419	1618		Oct	1		0358	1610	
	6		0419	1615			6		0355	1611	
	11		0419	1612			11		0352	1611	
	16		0420	1609			16		0349	1611	
	21		0420	1606			21		0347	1612	
	26		0421	1604			26		0344	1613	
May	1		0421	1602		Nov	1		0342	1614	
	6		0422	1600			6		0340	1616	
	11		0423	1558			11		0339	1618	
	16		0424	1557			16		0339	1620	
	21		0426	1556			21		0339	1622	
	26		0427	1556			26		0339	1624	
Jun	1		0429	1556		Dec	1		0354	1646	
	6		0430	1556			6		0358	1649	
	11		0431	1557			11		0359	1650	
	16		0433	1547			16		0357	1651	
	21		0434	1558			21		0401	1655	
	26		0435	1600			26		0406	1657	