

Phone set

DESCRIPTION	IPA	SAMPA	HTK	ISIZULU	ISIXHOSA	SISWATI
Affricates						
Voiceless Alveo-labial affricate	tɸ	tp\	tp_b			intfutfu
Ejective Alveolar Lateral Affricate	tɬ'	tK_>	tK_>		intlahla	
Voiceless aspirated alveolar lateral affricate	tɬ ^h	tK_h	tK_h			
Voiced alveolar lateral affricate	dɬ	dK	dK			
Voiced aspirated alveolar lateral affricate	dɬ ^h	dK\	dK_b			
Post-Alveolar Affricate	tʃ	tS	tS			
Ejective Post-Alveolar Affricate	tʃ'	tS_>	tS_>	tshe	intsha	tshwala
Aspirated Post-Alveolar Affricate	tʃ ^h	tS_h	tS_h		tshisa	
Ejective Alveolar Affricate	ts'	ts_>	ts_>	tsatsaza	intsimi	intsaba
Aspirated Alveolar Affricate	ts ^h	ts_h	ts_h			tsatsa
Ejective Velar Affricate	kx'	kx_>	kx_>		ikrele	
Voiceless Velar affricate	kx ^h	kx_h	kx_h			
Voiceless Velo-alveolar lateral affricate	kɬ	kK_>	kK_>	kleza		kleza
Voiceless labio-alveolar ejective affricate	ps'	ps_>	ps_>			
Aspirated labio-alveolar affricate	ps ^h	ps_h	ps_h			
Aspirated labio-palatal affricate	pʃ ^h	pS_h	pS_h			
Voiceless labio-palatal ejective affricate	pʃ'	pS_>	pS_>			
Voiced Post-Alveolar Affricate	dʒ	d_0Z	d_0Z	inja	inja	inja
Voiced Alveolar Affricate	dz	dz	dz	zalo		indzaba
Voiced alveo-labial affricate	dβ	dB	dB			indvodza
Voiced retroflex affricate	dʒ	dz`	dz_a			
Voiced aspirated retroflex affricate	dʒ ^h	dz`h\	dz_ah_b			
Voiced aspirated palatal affricate	dʒ ^h	dZh\	dZh_b			
Fricatives						
Voiceless Labiodental Fricative	f	f	f	fa	fa	fa
Voiced Labiodental Fricative	v	v	v	vala	vala	vala

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Voiceless Dental Fricative	θ	T	T			
Voiced Dental Fricative	ð	D	D			
Voiceless Alveolar Fricative	s	s	s	sala	sala	sala
Voiced Alveolar Fricative	z	z	z	zama	zama	liza
Voiceless Post-Alveolar Fricative	ʃ	S	S	sha	shushu	sha
Voiced Post-Alveolar Fricative	ʒ	Z	Z			
Voiceless Velar Fricative	x	x	x			hola
Voiceless Glottal Fricative	h	h	h	hamba	huhuza	
Voiced Glottal Fricative	ɦ	h\	h_b	ihashi		lihashi
Voiceless Alveolar Lateral Fricative	ɬ	K	K	hlala	hlala	hlala
Voiced Alveolar Lateral Fricative	ɮ	K\	K_b	dlala	dlala	dlala
Voiced velar fricative	ɣ	G	G		igronya	
Voiced bilabial fricative	β	B	B			
Voiceless bilabial fricative	ɸ	p\	p_b			
Voiceless retroflex fricative	ɣ̣	s`	s_a			
Voiceless labialised alveolar fricative	sw	sw	sw			
Voiced retroflex fricative	zw	zw	zw			
Bilabial alveolar fricative	ɸs	p\ s	p_bs			
Voiceless bilabial postalveolar fricative	ɸS	p\ S	p_bS			
Voiced bilabial postalveolar fricative	βʒ	BZ	BZ			
Labiodantal-postalveolar fricative	fʃ	fS	fS			
Clicks						
Dental click		\	_b	cinga	caca	cinga
Voiced dental click	g_i	\g_0	_bg	gcina	cangci	
Aspirated dental Click	ʰ	\ʰ	_bh	chita	chachambo	
Alveolar lateral click		\ \	_b _b	xoxo	xoxa	
Voiced Alveolar Lateral Click	g_i	\ \g_0	_b _bg	gxumeka	gxabeka	
Aspirated Alveolar Lateral Click	ʰ	\ \ʰ	_b _bh	xhaka	isixhosa	

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Palatal Click	!	!\	!_b	qumba	qala	qumba
Voiced Palatal Click	!gǀ	!ǀg_0	!_bg	gqiba	iwaggqiba	
Aspirated Palatal Click	!ʰ	!ʰ	!_bh	qhuba	qhele	
Stops						
Voiceless Bilabial Plosive	p	p	p			impi
Aspirated Bilabial Plosive	pʰ	p_h	p_h	pha	pha	pha
Ejective Bilabial Plosive	p'	p_>	p_>	impi	pasa	
Voiceless palatalised bilabial ejective	pǀ'	pǀ_>	pǀ_>			
Voiceless aspirated palatalised bilabial plosive	pǀʰ	pǀ_h	pǀ_h			
Voiced Bilabial Plosive	b	b	b	i	bhala	imbuti/bhala
Voiced Bilabial Implosive	ɓ	b_<	b_<	bona,ubaba	bona	
Voiced palatalised bilabial plosive	bǀ	bǀ	bǀ			
Voiceless Alveolar Plosive	t	t	t			
Aspirated Alveolar Plosive	tʰ	t_h	t_h	thata	theta	thandaza
Ejective Alveolar Plosive	t'	t_>	t_>	taka	itakane	emanti
Voiceless palatalised alveolar plosive	tǀ	tǀ	tǀ			
Voiceless aspirated palatalised alveolar plosive	tǀʰ	tǀ_h	tǀ_h			
Voiced Alveolar Plosive	d	d	d	indoda	indoda	indishi
Voiced palatalised alveolar plosive	dǀ	dǀ	dǀ			
Voiced aspirated alveolar plosive	dʰ	dʰ\	dʰ_b			
Ejective Palatal Plosive	c'	c_>	c_>		ukutya	
Aspirated Palatal Plosive	cʰ	c_h	c_h		ityhefu	
Voiced Palatal Plosive	ɟ	ɟ\	ɟ_b		indyebo	
Voiceless Velar Plosive	k	k	k	ukuhamba		inkomo
Voiceless Aspirated Velar Plosive	kʰ	k_h	k_h	khokha	khoka	khokha
Ejective Velar Plosive	k'	k_>	k_>		inkomo	
Voiced Velar Plosive	g	g	g	ngena	ngena	ngena
Voiced aspirated velar plosive	gʰ	gʰ\	gʰ_b			
Voiceless alveolar lateral ejective	tǀ'	tǀ_>	tǀ_>			

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Voiceless aspirated alveolar lateral plosive	t ^h	tl_h	tl_h			
Nasals						
Bilabial Nasal	m	m	m	mema	mema	mema
Alveolar Nasal	n	n	n	nona	nona	nona
Palatal Nasal	ɲ	J	J	a	untshe	inyama
Velar Nasal	ŋ	N	N	ngakho, ingwe	inkomo	ingungu
Retroflex Nasal	ɳ	n'	n_a			
Voiced aspirated bilabial nasal	m ^h	m_h	m_h		mhumha	
Voiced aspirated alveolar nasal	n ^h	n_h	n_h		isininha	
Labiodental nasal	ɱ	m_j	m_j			
Voiced aspirated palatal nasal	ɲ ^h	J_h	J_h		inyholoba	
Vowels						
Unrounded high front vowel	i	i	i	vimba	vimba	vimba
Unrounded high front vowel with duration	i:	i:	i:			
Rounded high front vowel	y	y	y			
Rounded high back vowel	u	u	u	vula	vula	vula
Rounded high back vowel with duration	u:	u:	u:			
Unrounded mid-high front vowel	e	e	e			
Unrounded mid-high front vowel with duration	e:	e:	e:			
Rounded mid-high front vowel with duration	ø:	2:	eu_:			
Unrounded mid-low front vowel	ɛ	E	E	senga	senga	senga
Rounded central vowel with duration	ɜ:	3:	E_:			
Rounded mid-low back vowel	ɔ	O	O	bola	bola	bola
Rounded mid-low back vowel with duration	ɔ:	O:	O:			
Unrounded low central vowel	a	a	a	thanda	thanda	tsandza
Unrounded low central vowel with duration	a:	A:	A:			
Central vowel (schwa)	ə	@	@			

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Unrounded mid-low front vowel	æ	{	{			
Rounded Mid-high Back Vowel	o	o	o			
Rounded Mid-high Back Vowel with duration	o:	o:	o:			
Rounded Mid-low front Vowel	œ	9	u_			
Rounded open back vowel	ɒ	Q	Q			
Diphthongs						
	əi	@i	@i			
	œy	9y	u_y			
	ai	ai	ai			
	ɔi	Oi	Oi			
	əu	@u	@u			
	au	au	au			
	iə	i@	i@			
	eə	e@	e@			
	uə	u@	u@			
Trills and Flaps						
Alveolar trill	r	r	r	uMarija	uMariya	uMariya
Aspirated alveolar trill	rʰ	rʰ\	rh_b			
Approximants						
Alveolar Lateral Approximant	l	l	l	lala	lala	lala
Palatal Approximant	j	j	j	ukuya	ukuya	leniyenta
Voiced labio-velar Approximant	w	w	w	wa	wa	wa
Retroflex Lateral Approximant	ɭ	ɭ̣	l_a			

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ISINDEBELE	SEPEDI	SETSWANA	SESOTHO	XITSONGA	TSHIVENDA	AFRIKAANS	ENGLISH
Itlawana tlhaga				dlala ndlhazi		tjank*	chin
utjani itjhatjha itsikiri tshanya	tšaka tšhaba tsela tshadi	ntša setšhaba tsela tshaba	tjôtja tjhaba tsela tshêha	cina chukucha	mutshila kutsimu		
kggupula*	kgama	kgama	kgama				
	psila pshiò pšhatla		pshiò ptjhatla pjatla				
jabula idzila	ja	ja	ja	jaha	dzhena dzembe		gin
				dzwi, dzaha ndzhaku njhani			
funa vula	fofa	fofa	fofa	famba vhilwa	fana vili	fel,vel wat	fin vim

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							thin this sin zing shin measure
susa Zala	sesadi šala	sesadi šapa	sesadi shapa	silu muzumbi xava	sala zazamela shavha zhaka	sous zulu sjampoe genre	
rhonona ihogo	hêma lehodu hlaba	gana hêma	gafa hana hlaba	huma hlamula	xa hana	gat hand	loch hit
hlala dlala	gòga baba			vona sweka	vhavha fhala swara zwifha		
	lefsifsi Bofša bjala		bjaratsa lefhwa				
cima gcina chacha							

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qina umgqomu qhula			qaqa	xiqoko			
iphaphu iposo	phela pela	phela pela	phela pela	mpunga phanga	phala panda	pap	pin*
bhala bona		baba	baba	pyopya phya ba baba byala	bako	bas	bin*
thuta itafula	thapo tòpa	thopa tona	thopa tôpa	thula tatana tyatyasa thyaka	hula tafuna/takala	tot	tin
idada		dira	duma	dedeleka dya ndhambi	da/daha	dag	din
kela khamba inkomo igama	Khudu kudu	khudu kubu	sekhôna kula	kula khoma gamba nghena tlanga	dyelo khuhu kokodza goga	kyk gholf	kin give
	tla	tla	tla				

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	tlhabô	tlhabô	tlhako	tlhari			
mina nina inyama	êma nama nyaka	êma nama nyala	êma nama nyala	kuma manana nyoka	ima nona/ nama nyamalala	man net	mock knock
nghala	ngwana myemyela	ngwana, nku	ngwana	ngulube ndzhaku mhaka nhamu	n'an'a	bang	thing
lima	dira	dira	pitsa	ribye	lisa	sien	happy, into ease
thunga	Pula tsela	pula tsela	pula tsela	huma	luma	nuwe soek meet museum	into, put lose pet
sela	rêma	rêma	rema	hela	rema	pen	furs
bona	pôô	pôô	poho	songa	mboho	pol	cause
lala	rata	rata	rata	aka	rafha	pas maar pit	cut* stars another

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	motho	motho	motho			hek oor put	pat pot
						peil/pyl uit oud	raise rise noise nose rouse fears stairs cures
rara	rata	rata	rata	raha rhama	ranga	raar	wrong
lila yena wona	lala ya wa dira*	lala ya wa	lala ya wa	lomba yima wa	lifhata, lala ya wa	lol jaar twee	long yacht wasp

COMMENTS (to distribute with phone set)

*In Afr dictionary tS currently modelled as "t S"

separate kx_h but no kx/kx_h minimal pairs.)

*English h includes voiced and unvoiced variations

be modelled as 'N |g_0'.

*English p includes un-aspirated and aspirated versions

* English b includes aspirated and un-aspirated versions

*English E also realised as e in SAE

*English a includes both a and V variants (found in SAE)

diphthongs in SAE

audible

phoneme.