

DESCRIPTION	IPA	SAMPA	HTK	ISIZULU	ISIXHOSA	SISWATI	ISINDEBELE	SEPEDI	SETSWANA	SESOTHO	XITSONGA	TSHIVENDA	AFRIKAANS	ENGLISH	COMMENTS
<b>Affricates</b>															
Voiceless alveo-labial affricate	tʰ	tp\	tp_b			intfutfu									
Ejective alveolar lateral affricate	tʰʼ	tK_>	tK_>		intlahla		ltlawana								
Voiceless aspirated alveolar lateral affricate	tʰʰ	tK_h	tK_h				tlhaga								
Voiced alveolar lateral affricate	dʰ	dK	dK								diala ndihazi				
Voiced aspirated alveolar lateral affricate	dʰʰ	dK\	dK_b												
Post-alveolar affricate	tʃ	tS	tS												
Ejective post-alveolar affricate	tʃʼ	tS_>	tS_>	tshe	intsha		utjani	tʃaka	ntʃa	tjô'tja					*In Afrikaans dictionary tS currently modelled as 't 5'
Aspirated post-alveolar affricate	tʃʰ	tS_h	tS_h		tshisa		itjhatjha	tʃhaba	setʃhaba	tjhaba					
Ejective alveolar affricate	tsʼ	ts_>	ts_>	tsatsaza	intsimi		itsikiri	tsela	tsela	tsela					
Aspirated alveolar affricate	tsʰ	ts_h	ts_h			intsaba tsatsa	tshanya	tshadi	tshaba	tshéha					
Ejective velar affricate	kxʼ	kx_>	kx_>			ikrele									
Voiceless velar affricate	kx	kx	kx				kghupula*	kgama	kgama	kgama					
Voiceless velo-alveolar lateral affricate	kʃ	kK_>	kK_>	kleza		kleza									*isiNdebele kx typically aspirated. (Can be modelled as separate kx_h but no kʃ/kx_h minimal pairs.)
Voiceless labio-alveolar ejective affricate	psʼ	ps_>	ps_>					psila							
Aspirated labio-alveolar affricate	psʰ	ps_h	ps_h					pshio							
Aspirated labio-palatal affricate	pʃʰ	pS_h	pS_h					pshatla							
Voiceless labio-palatal ejective affricate	pʃʼ	pS_>	pS_>					pjatla							
Voiced post-alveolar affricate	dʒ	d_0Z	d_0Z	inja*	inja	inja	jabula	ja	ja	ja				gin	* Depending on speaker, the isiZulu d_0Z can be realised as either d_0Z or Z
Voiced alveolar affricate	dʒ	dʒ	dʒ	zalo		indzaba	idzila								
Voiced alveo-labial affricate	dʒβ	dʒB	dʒB			indvodza									
Voiced retroflex affricate	dʒ	dʒʼ	dʒ_a												
Voiced aspirated retroflex affricate	dʒʰ	dʒʼ_h\	dʒ_a_h_b								dzwi, dzaha ndzhaku njhani				
Voiced aspirated palatal affricate	dʒʰ	dʒʰ	dʒʰ												
<b>Fricatives</b>															
Voiceless labiodental fricative	f	f	f	fa	fa	fa	funa	fofa	fofa	fofa	famba	fana	fel,vel	fin	
Voiced labiodental fricative	v	v	v	vala	vala	vala	vula				vhilwa	vili	wat	vim	
Voiceless dental fricative	θ	T	T											thin	
Voiced dental fricative	ð	D	D											this	
Voiceless alveolar fricative	s	s	s	sala	sala	sala	susa	sesadi	sesadi	sesadi	sila	sala	sous	sin	
Voiced alveolar fricative	z	z	z	zama	zama	liza	Zala				muzumbi	zazamela	zulu	zing	
Voiceless post-alveolar fricative	ʃ	S	S	sha	shushu	sha		ʃala	ʃapa	shapa	xava	shavha	sjampoe	shin	
Voiced post-alveolar fricative	ʒ	Z	Z									zhaka	genre	measure	
Voiceless velar fricative	x	x	x				rhonona		gana	gafa		xa	gat	loch	
Voiceless glottal fricative	h	h	h	ihhashi	huhuza	lihhashi	ihongo	héma	héma						
Voiced glottal fricative	ɦ	ɦ\	ɦ_b	hamba		hamba		lehodu		hana		hana	hand	hit*	*English h includes voiced and unvoiced variations
Voiceless alveolar lateral fricative	ɬ	K	K	hlala	hlala	hlala	hlala	hlaba	hlaba		huma	hlamula			
Voiced alveolar lateral fricative	ɮ	K\	K_b	dlala	dlala	dlala	dlala								
Voiced velar fricative	ɣ	G	G		igronya			gôga							
Voiced bilabial fricative	β	B	B					baba					vona	vhavha	
Voiceless bilabial fricative	ɸ	p\	p_b										sweka	fhala	
Voiceless retroflex fricative	ʂ	sʼ	s_a												
Voiceless labialised alveolar fricative	sw	sw	sw											swara	
Voiced retroflex fricative	ʐ	zw	zw											zwifha	
Bilabial alveolar fricative	ɸs	pʼs	p_bʼs					lefsifsi							
Voiceless bilabial postalveolar fricative	ɸʒ	pʼʒ	p_bʼʒ					Bofsa							
Voiced bilabial postalveolar fricative	βʒ	Bʒ	Bʒ					bjala		bjaratsa				lefshwa	
Labiodental-postalveolar fricative	ɮʒ	fʒ	fʒ												
<b>Clicks</b>															
Dental click	ǀ	ǁ	ǁ_b	cinga	caca	cinga	cima								
Voiced dental click	ǀʱ	ǁg_0	ǁ_bʱ	gcina	cangci		gcina								
Aspirated dental click	ǀʰ	ǁh	ǁ_bʰ	chita	chachambo		chacha								
Alveolar lateral click	ǁ	ǁ\	ǁ_b\	xoxo	xoxa										
Voiced alveolar lateral click	ǁg	ǁg_0	ǁ_b\g	gxumeke	gxabeka										
Aspirated alveolar lateral click	ǁʰ	ǁh\	ǁ_b\h	xhaka	isixhosa										
Palatal click	ǀ	ǁ	ǁ_b	qumba	qala	qumba	qina			qaqa					
Voiced palatal click	ǀʱ	ǁg_0	ǁ_bʱ	qgiba	iwagqiba		umqgomu								
Aspirated palatal click	ǀʰ	ǁh	ǁ_bʰ	qhuba	qhele		qhula								
<b>Stops</b>															
Voiceless bilabial plosive	p	p	p			impi							pap	pin*	*English p includes aspirated and un-aspirated versions
Aspirated bilabial plosive	pʰ	p_h	p_h	pha	pha	pha	iphaphu	phela	phela	phela	phanga	phala			
Ejective bilabial plosive	pʼ	p_>	p_>	impi	pasa		iposo	pela	pela	pela		panda			
Voiceless palatalised bilabial ejective	pjʼ	pj_>	pj_>												
Voiceless aspirated palatalised bilabial plosive	pjʰ	pj_h	pj_h												
Voiced bilabial plosive	b	b	b	imbuzi,ibhasi	imbuzi, bhala	imbuti/bhala	khamba, bhala		baba	baba		bako	bas	bin*	* English b includes aspirated and un-aspirated versions
Voiceless bilabial implosive	ɓ	b_<	b_<	bona,ubaba	bona		bona								
Voiced palatalised bilabial plosive	bj	bj	bj												
Voiceless alveolar plosive	t	t	t											tot	tin
Aspirated alveolar plosive	tʰ	t_h	t_h	thata	theta	thandaza	thuta	thapo	thopa	thopa	thula				
Ejective alveolar plosive	tʼ	t_>	t_>	taka	itakane	emanti	itafula	tôpa	tona	tôpa	thula	hula	tafuna/takala		
Voiceless palatalised alveolar plosive	tj	tj	tj												
Voiceless aspirated palatalised alveolar plosive	tjʰ	tj_h	tj_h												
Voiced alveolar plosive	d	d	d	indoda	indoda	indishi	idada		dira	duma				dag	din
Voiceless palatalised alveolar plosive	dj	dj	dj												
Voiced aspirated alveolar plosive	dh	dh\	dh_b												
Ejective palatal plosive	cʼ	c_>	c_>			ukutya									
Aspirated palatal plosive	cʰ	c_h	c_h			ityhefu									
Voiced palatal plosive	ɟ	j\	j_b			indyebo									
Voiceless velar plosive	k	k	k	ukuhamba		inkomo	kela							kyk	kin
Voiceless aspirated velar plosive	kʰ	k_h	k_h	khokha	khoka	khokha	khamba	Khudu	khudu	sekhôna	khoma	khuhu			
Ejective velar plosive	kʼ	k_>	k_>			inkomo	inkomo								
Voiced velar plosive	g	g	g	ngena	ngena	ngena	igama						gholf	give	

Voiced aspirated velar plosive	gh	gh̥	gh_b					tla	tla	tla	nghena			
Voiceless alveolar lateral ejective	tʰ	tʰ_>	tʰ_>					tʰabó	tʰabó	tʰako	tianga			
Voiceless aspirated alveolar lateral plosive	tʰ̥	tʰ̥_h	tʰ̥_h								tlhari			
<b>Nasals</b>														
Bilabial nasal	m	m	m	mema	mema	mema	mina	éma	éma	éma	kuma	ima	man	mock
Alveolar nasal	n	n	n	nona	nona	nona	nina	nama	nama	nama	manana	nona/ nama	net	knock
Palatal nasal	ɲ	ɲ	ɲ	inyama, intsha	ntshe	inyama	inyama	nyaka	nyala	nyala	nyoka	nyamalala		
Velar nasal	ŋ	N	N	ingwe	inkomo	ingungu	nghala	ngwana	ngwana, nku	ngwana	ngulube	n'an'a	bang	thing
Retroflex nasal	ɳ	n'	n_a											
Voiced aspirated bilabial nasal	mʰ	m_h	m_h		mhumha									
Voiced aspirated alveolar nasal	nh	n_h	n_h		isinhanha									
Labiodental nasal	ɱ	m_j	m_j					myemyela						
Voiced aspirated palatal nasal	ɲʰ	ɲ_h	ɲ_h		inyholoba									
<b>Vowels</b>														
Unrounded high front vowel	i	i	i	vimba	vimba	vimba	lima	dira	dira	pitsa	ribye	lisa	sien	happy, into
Unrounded high front vowel with duration	i:	i:	i:											ease
Rounded high front vowel	y	y	y											
Rounded high back vowel	u	u	u	vula	vula	vula	thunga	Pula	pula	pula	huma	luma	nuwe	soek
Rounded high back vowel with duration	u:	u:	u:											lose
Unrounded near-high near-front vowel	ɪ	ɪ	ɪ					tsela	tsela	tsela				
Rounded mid-high front vowel with duration	ø:	2:	eu:											
Unrounded mid-low front vowel	ɛ	E	E:	senga	senga	senga	sela	rêma	rêma	rema	hela	rema	museum	pet*
Rounded mid-low central vowel with duration	ɜ:	3:	E:										pen	furs
Rounded mid-low back vowel	ɔ	O	O:	bola	bola	bola	bona	pôô	pôô	poho	songa	mboho	pol	cause
Rounded mid-low back vowel with duration	ɔ:	O:	O:											cut*
Unrounded low front vowel	a	a	a	thanda	thanda	tsandza	lala	rata	rata	rata	aka	rafha	pas	stars
Unrounded low back vowel with duration	ɑ:	A:	A:										maar	another
Central vowel (schwa)	ə	@	@										pit	pat
Unrounded mid-low front vowel	æ	{	{										hek	into, put
Rounded near-high near-back vowel	ɔ	U	U					motho	motho	motho				
Rounded mid-low front vowel	œ	9	u_										put	
Rounded low back vowel	ɒ	Q	Q											pot
<b>Diphthongs</b>														
	əi	@i	@i										peil/pyl	raise
	œy	9y	u_y										uit	
	ai	ai	ai											rise
	ɔi	Oi	Oi											noise
	au	@u	@u										oud	nose
	au	au	au											rouse
	iə	i@	i@										meet	fears
	uə	u@	u@										oor	stairs
	eə	e@	e@											cures
	uə	u@	u@											
<b>Trills and Flaps</b>														
Alveolar trill	r	r	r	uMarija	uMariya	uMariya	rara	rata	rata	rata	raha	ranga	raar	
Aspirated alveolar trill	rʰ	rʰ	rʰ_b								rhama			
<b>Approximants</b>														
Alveolar lateral approximant	l	l	l	lala	lala	lala	lila	lala	lala	lala	lomba	lifhata, lala	lol	long
Alveolar approximant	ɹ	r̥	r_b											wrong
Palatal approximant	j	j	j	ukuya	ukuya	leniyenta	yena	ya	ya	ya	yima	ya	jaar	yacht
Voiced labio-velar approximant	w	w	w	wa	wa	wa	wona	wa	wa	wa	wa	wa	twee	wasp
Retroflex lateral approximant	ɭ	l'	l_a					dira*						

\*English E also realised as e in SAE

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

Note that the standard tense/lax distinction was not made for diphthongs in SAE

In audio phone set, small portion of @ accompanies approximants where necessary in order to make them clearly audible

\*The Sepedi 'l' only occurs before an 'i' or 'u' (except in a few exceptional cases, specifically words of foreign origin and words containing 'll') and can therefore be seen as a contextual variant of l. Here modelled as a separate phoneme.

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Revision	Language	Changes
1.1	All	First version released
1.2	Afrikaans	changed e: to i@, moved to diphthongs
1.2	Afrikaans	changed h to h\
1.2	Afrikaans	changed o: to u@, moved to diphthongs
1.2	English	changed e to E (e removed)
1.2	English	changed h to h\
1.2	English	changed r to r\
1.2	English	changed u to U (put/into)
1.2	IsiNdebele	changed kx_h to kx
1.2	isiZulu	changed sample words for h and h\
1.2	isiZulu	removed r (words of foreign origin only)
1.2	Sepedi	changed kx_h to kx
1.2	Sepedi	changed o to U
1.2	Sepedi	replaced e with I (capital i)
1.2	Sesotho	changed h to h\
1.2	Sesotho	changed kx_h to kx
1.2	Sesotho	changed o to U
1.2	Sesotho	replaced e with I (capital i)
1.2	Setswana	changed kx_h to kx
1.2	Setswana	changed o to U
1.2	Setswana	replaced e with I (capital i)
1.2	Siswati	changed x to h
1.2	Siswati	changed sample words for h and h\
1.2	Siswati	removed tS_> (words of foreign origin only)
1.2	Xitsonga	changed dZh\ to dZh
1.2	Xitsonga	moved dK and dK\ to affricates