Typical design parameters for commonly used activated-sludge processes[a]

Process Name	Type of Reactor	SRT, days	F:M kg BOD/kg MLVSS-d	Volumetric Loading		MLSS, mg/L	Hydraulic detention time, hrs	RAS % of Influent[e]
				lb BOD/1000 ft^3-d	kg BOD/m^3-d			
High-rate aeration	Plug flow	0.5 - 2	1.5 - 2.0	75 - 150	1.2 - 2.4	200 - 1000	1.5 - 3	100 - 150
Contact stabilization	Plug flow	5 - 10	0.2 - 0.6	60 - 75	1.0 - 1.3	1000 - 3000[b]	0.5 - 1[b]	50 - 150
						6000 - 10000[c]	2 - 4[c]	
High-purity oxygen	Plug flow	1 - 4	0.5 - 1.0	80 - 200	1.3 - 3.2	2000 - 5000	1 - 3	25 - 50
Conventional plug flow	Plug flow	3 - 15	0.2 - 0.4	20 - 40	0.3 - 0.7	1000 - 3000	4 - 8	25 - 75[f]
Step feed	Plug flow	3 - 15	0.2 - 0.4	40 - 60	0.7 - 1.0	1500 - 4000	3 - 5	25 - 75
Complete mix	CMAS	3 - 15	0.2 - 0.6	20 - 100	0.3 - 1.6	1500 - 4000	3 - 5	25 - 100[f]
Extended aeration	Plug flow	20 -40	0.04 - 0.10	5 - 15	0.1 - 0.3	2000 - 5000	20 - 30	50 -150
Oxidation ditch	Plug flow	15 - 30	0.04 - 0.10	5 - 15	0.1 - 0.3	3000 - 5000	15 - 30	75 - 150
Batch decant	Batch	12 - 25	0.04 - 0.10	5 - 15	0.1 - 0.3	2000 - 5000[d]	20 - 40	NA
Sequencing batch reactor	Batch	10 - 30	0.04 - 0.10	5 - 15	0.1 - 0.3	2000 - 5000[d]	15 - 40	NA
Countercurrent aeration system (CCAS)	Plug flow	10 - 30	0.04 - 0.10	5 - 10	0.1 - 0.3	2000 - 4000	15 - 40	25 - 75[f]

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[a] Adapted from WEF (1998); Crites and Tchobanoglous (1998)

[b] MLSS and detention time in contact basin

[c] MLSS and detention time in stabilization basin

[d] Also used at intermediate SRTs

[e] Based on average flow

[f] For nitrification, rates may be increased by 25 to 50%

NA = not applicable

Source: Wastewater Engineering: Treatment and Reuse, 4th Edition, Metcalf & Eddy, pg. 747.