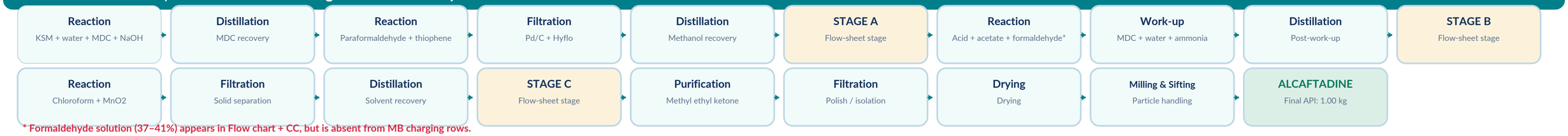
ALCAFTADINE

API MASS BALANCE | FIVE-SHEET WORKBOOK REVIEW

Source-driven, single-page technical illustration • no assumed process values

MB GROSS INPUT	MB GROSS OUTPUT	FINAL API
324.79 kg	324.79 kg	1.00 kg

01 PROCESS ROUTE | Flow chart sheet • stage identifiers and operations



* Formaldehyde solution (37–41%) appears in Flow chart + CC, but is absent from MB charging rows.

02 RAW MATERIALS & MOLAR / CONSUMPTION DATA | CC + Raw materials + Moles

No.	Raw material (same 15 items in CC + Raw materials)	CC (kg)	MW	Moles	Ratio	Proposed MT/day
01	**KSM-01: imidazobenzazepine fumarate***	10.00	278.68	35.88	1	0.166
02	Methylene dichloride	80.00	—	—	—	1.333
03	Sodium Hydroxide	2.20	40	55	1.53	0.037
04	Paraformaldehyde	2.03	30	67.66	1.89	0.034
05	thiophene	0.16	84.14	1.9	0.053	0.003
06	methanol	50.00	—	—	—	0.833
07	Palladium carbon	1.96	—	—	—	0.033
08	Formaldehyde solution (37-41%)	15.00	—	—	—	0.249
09	Acetic Acid	1.90	60.05	31.64	0.882	0.032
10	Sodium acetate	2.64	82.03	32.18	0.869	0.044
11	Ammonia	3.50	—	—	—	0.058
12	Chloroform	50.00	—	—	—	0.833
13	Manganese dioxide	15.00	86.94	172.53	4.808	0.249
14	Methyl ethyl ketone	15.00	—	—	—	0.249
15	Hyflo	2.00	—	—	—	0.034

CC CHARGE TOTAL **251.39 kg**

* **Full KSM source name:** 6,11-dihydro-11-(4-piperidinyl)-5H-imidazo-[2,1-b][3]benzazepine (e)-2-butenedioate(1:2)

Moles sheet: “Moles” and “Molar Ratio” are reproduced as entered; blanks are shown as —.

03 MB OUTPUT LEDGER & WASTE STREAMS

OUTPUT STREAM / SOURCE DESCRIPTION	kg
Aqueous layers → ETP 58.60 + 45.00	103.60
Distillates — MDC 45.00	45.00
Distillates — methanol 42.00	42.00
Distillates — other 25.00 + 45.00	70.00
Evaporation losses See MB line items: eight evaporation entries	36.83
Solid waste 3.96	3.96
Filtrates / intermediates 8.00 + 6.00	14.00
Stage-A transfer 6.00	6.00
Stage-B transfer 2.40	2.40
Alcaftadine final API 1.00	1.00
MASS BALANCE SHEET TOTAL	**324.79 kg**

Source MB “Waste” rows (kg):

Effluent to ETP	Solid waste	Fugitive emissions
103.60 kg	3.96 kg	36.00 kg

04 WORKBOOK CROSS-CHECK | key reconciliation, yields and verification notes

CHARGE SHEET ↔ MB RECONCILIATION

CC total		+ Water (MB only)		– Formaldehyde (CC / flow only)		+ Stage-A / Stage-B internal transfers		= MB input gross total
251.39	→	+ 80.00	→	– 15.00	→	+ 8.40	→	324.79 kg

MB includes 6.00 kg Stage-A + 2.40 kg Stage-B on both input and output sides; avoid treating gross totals as independent fresh charges.

SOURCE-REPORTED RESULTS & ITEMS TO VERIFY

Reported yield: 16%; theoretical yield: 0.61 (unit / basis not stated).
CC / Flow chart list formaldehyde solution 15 kg; MB charging omits it.
Waste table fugitive emissions: 36.00 kg; MB evaporation entries: 36.83 kg.
Flow chart identifies Stage-C; MB lists only Stage-A and Stage-B masses.
Reported 324.79 kg / 324.79 kg is arithmetic book closure, not independently validated.

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