

Power-Prep™ System

56-58 Felton Street • Waltham, MA 02453 • USA • Tel (781) 891-6522 • Fax (781) 891-6665

*Power-Prep™ Automated Extraction
& Clean-up System for:*

*Modified by **RIKILT** for the
determination of Dioxins and PCB's*

*Fraction A step 17 contains MO-
Pcb's and indicator Pcb's*

*Fraction B step 23 contains dioxins
and no-pcb's*



Power-Prep™ 10 Sample System

Changing the face of high speed sample analysis

RIKILT Institute for food safety
Wim Traag • Tel 31-317-475587 • e-mail Wim.Traag@wur.nl



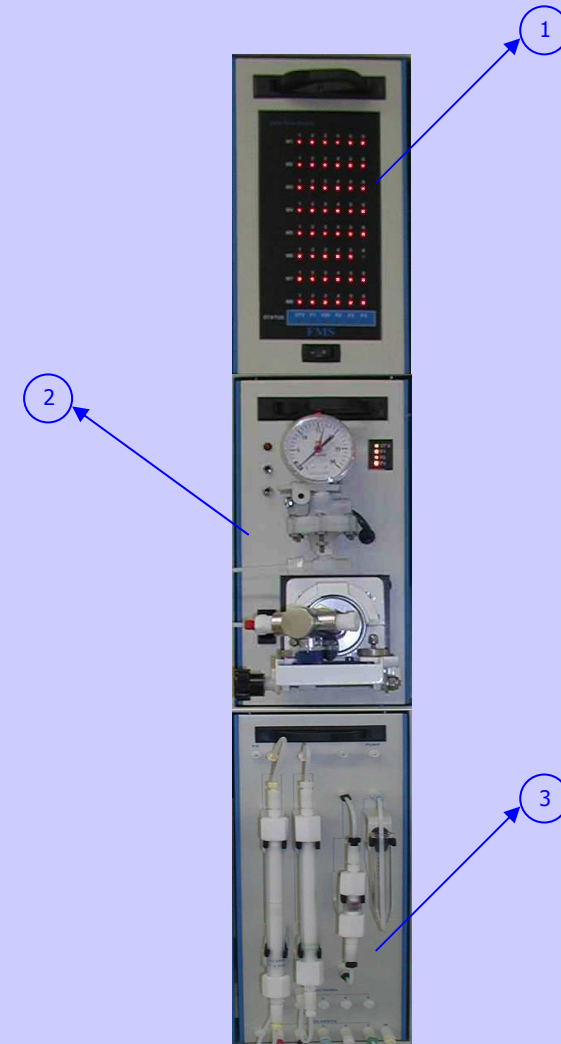
Fluid
Management
Systems, Inc.

Power-Prep™ System One Sample Expansion Modules

A one sample Power-Prep™ System can be expanded to multiple sample configurations. Expansion and module replacement are done via FMS's quick connect modules. This feature reduces system down time and increases laboratory efficiency.

•Modules:

- 1. Valve Drive Module*
- 2. Pump & Pressure Module*
- 3. Sample Processing Module*





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Power-Prep™ System Sample Processing Module

The Sample Processing Module is controlled by the Valve Drive Module and is used for solvent and sample pathway selection needed for specific protocols.

- *Consists of:*

- *Solenoid Valves*
- *Plumbing*

- *Column Types:*

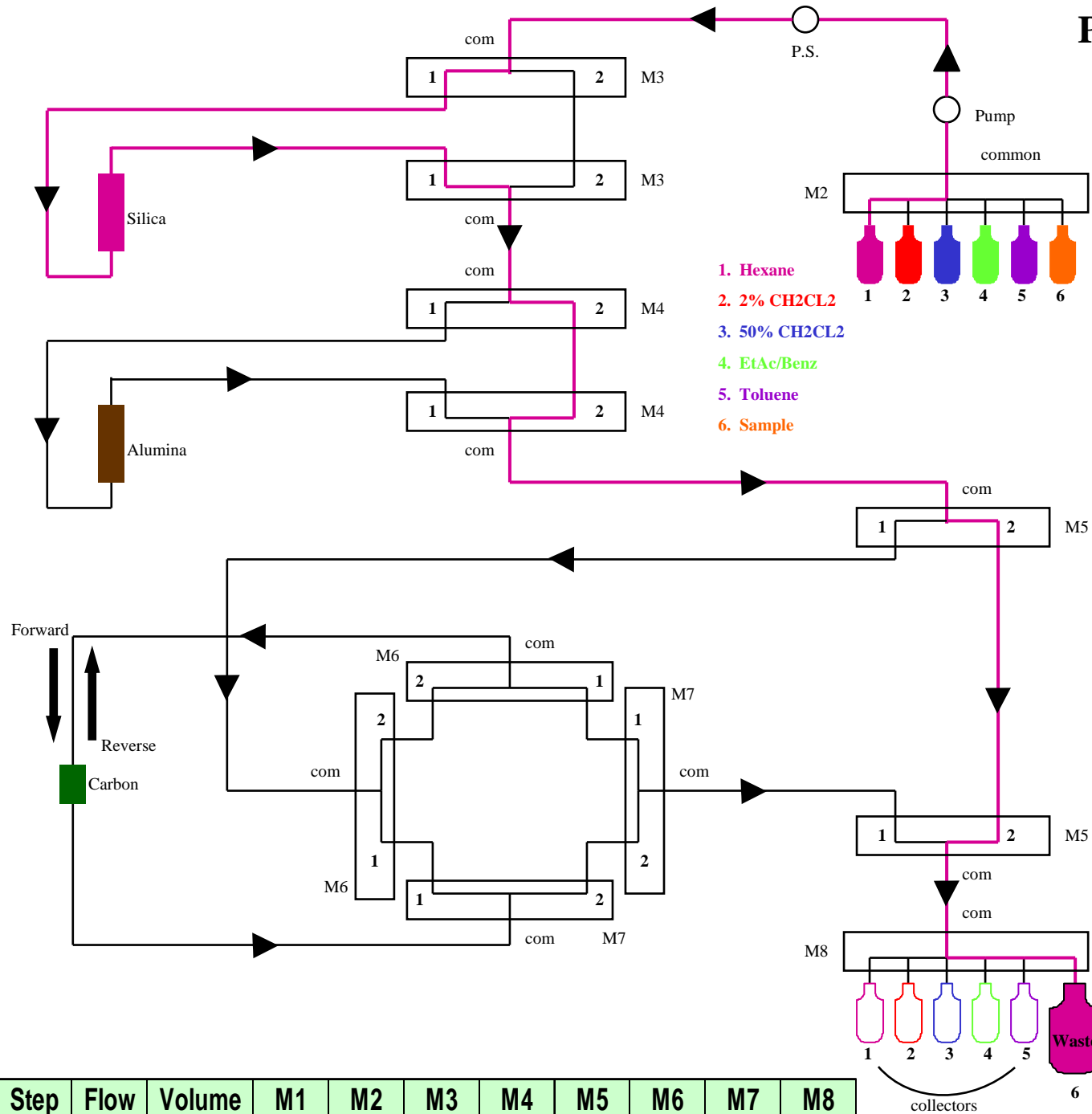
- *HC Silica*
- *Silica*
- *Alumina*
- *Carbon*
- *Florisil*
- *C18*



Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 1: Wet Silica Column



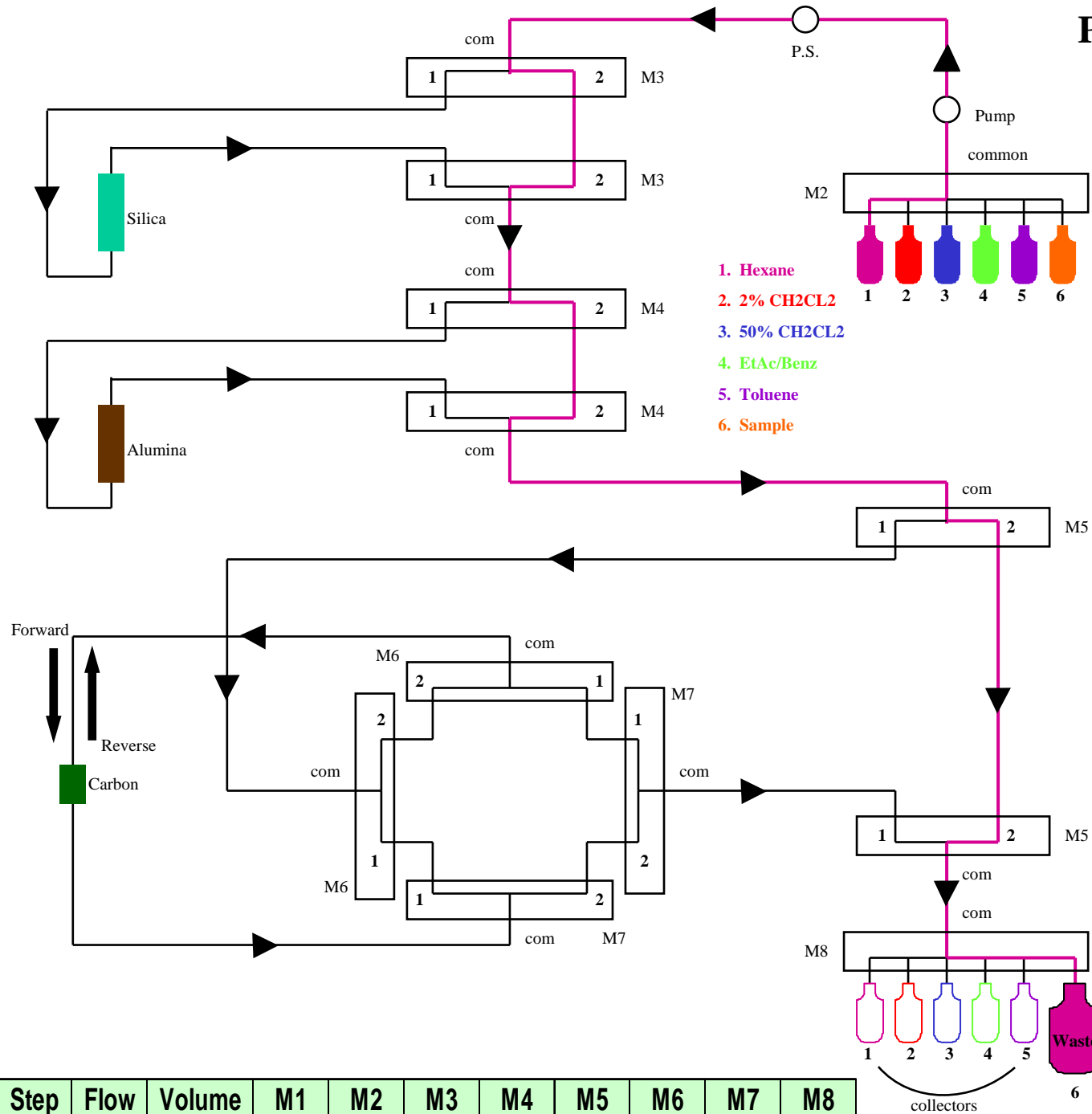
Legend:
M2 and M8: 6 Way Valves
M3 - M7: 2 Way Valves

| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 1 | 10 | 50 | 0 | 1 | 1 | 2 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 2: Flush Bypass



- 1. Hexane
- 2. 2% CH₂CL₂
- 3. 50% CH₂CL₂
- 4. EtAc/Benz
- 5. Toluene
- 6. Sample

- 1. PCDD
- 2. PCB
- 3. Fraction 1
- 4. Fraction 2
- 5. Fraction 3
- 6. Waste

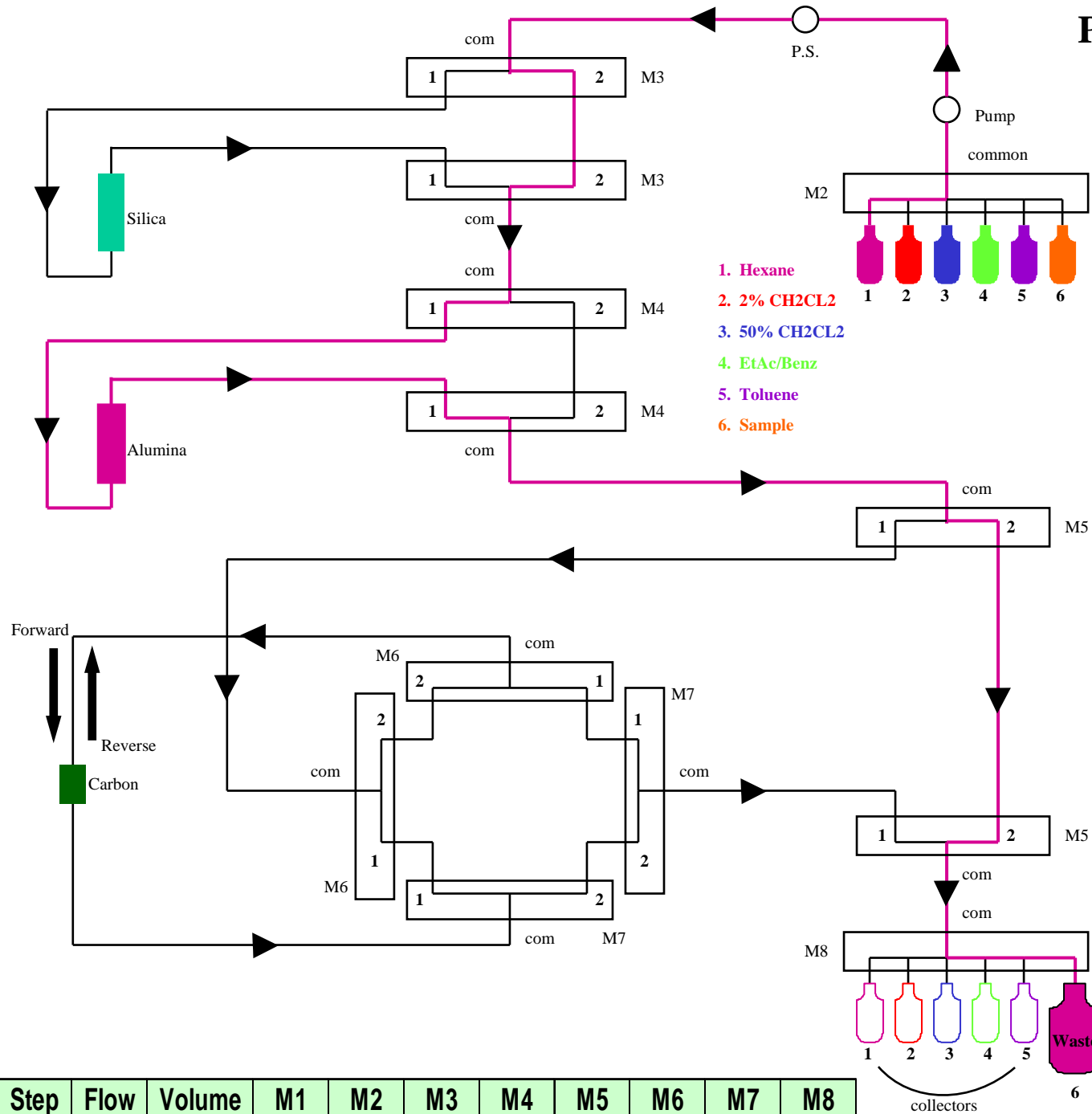
Legend:
M2 and M8: 6 Way Valves
M3 - M7: 2 Way Valves

| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 2 | 10 | 10 | 0 | 1 | 2 | 2 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 3: Wet Alumina Column

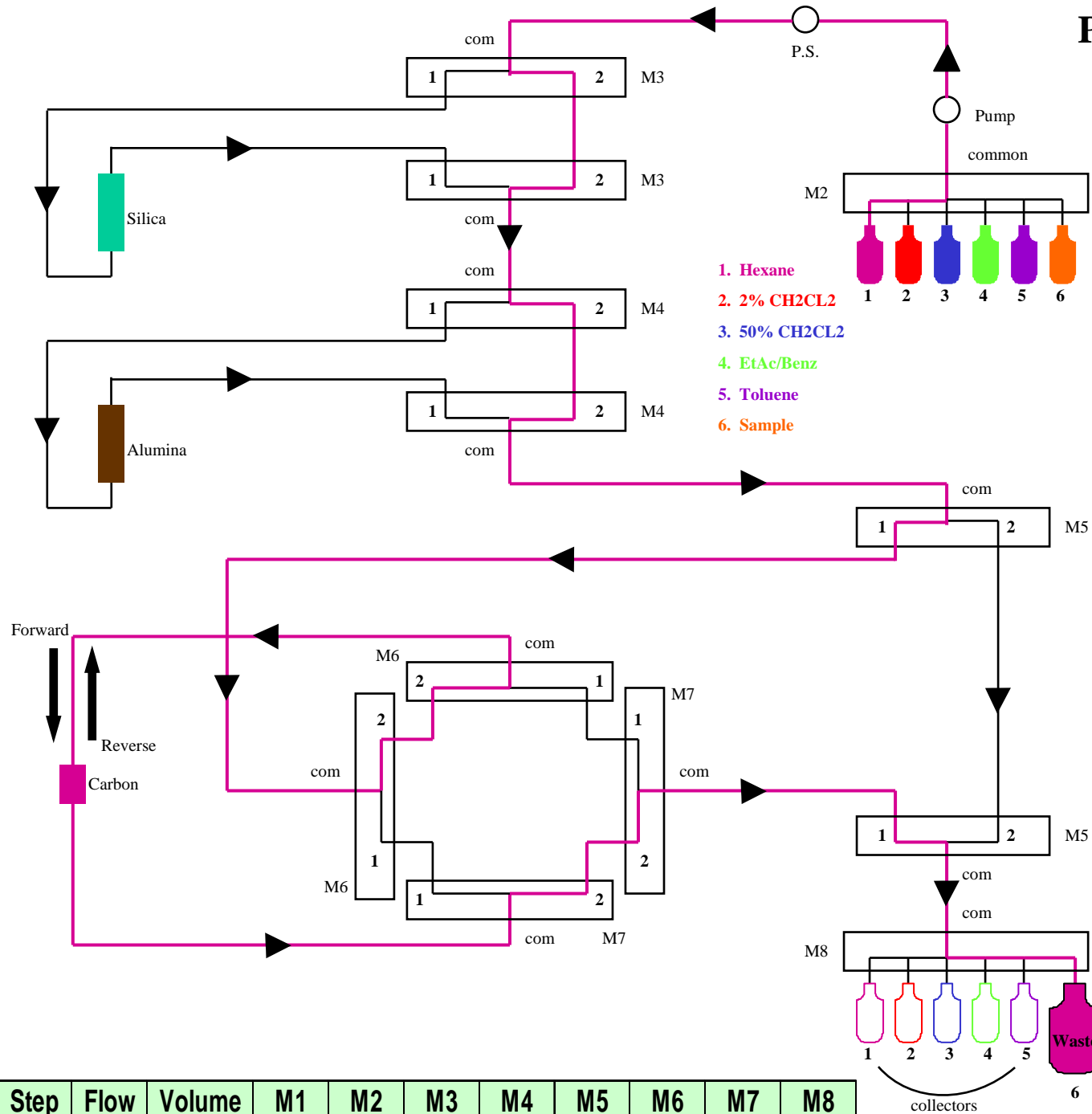


| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 3 | 10 | 30 | 0 | 1 | 2 | 1 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 4: Wet Carbon Column



- 1. Hexane
- 2. 2% CH₂CL₂
- 3. 50% CH₂CL₂
- 4. EtAc/Benz
- 5. Toluene
- 6. Sample

- 1. PCDD
- 2. PCB
- 3. Fraction 1
- 4. Fraction 2
- 5. Fraction 3
- 6. Waste

Legend:
M2 and M8: 6 Way Valves
M3 - M7: 2 Way Valves

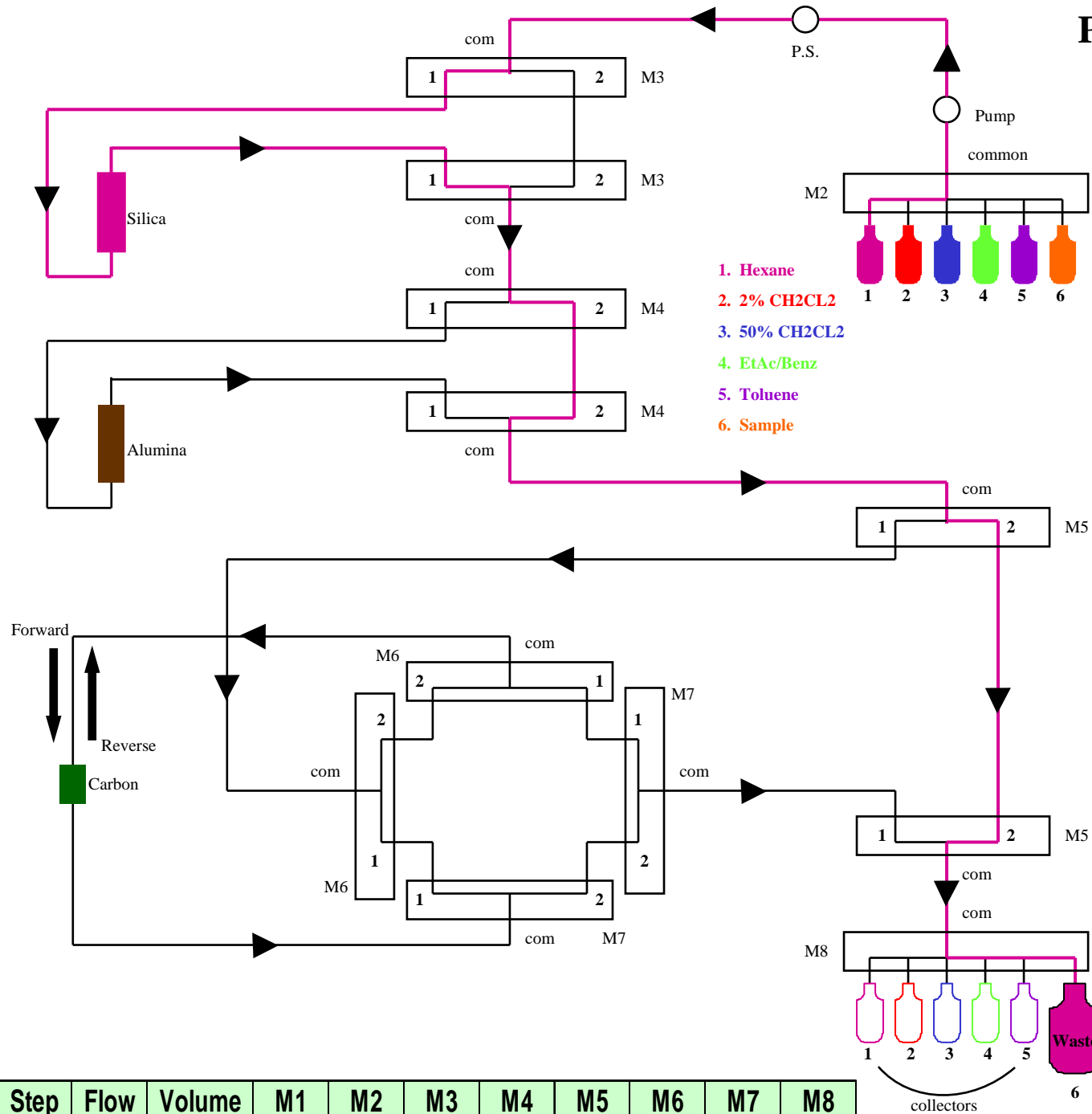
| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 4 | 10 | 20 | 0 | 1 | 2 | 2 | 1 | 2 | 2 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs

Separation Program

Step 5: Condition Silica Column



- 1. Hexane
- 2. 2% CH₂CL₂
- 3. 50% CH₂CL₂
- 4. EtAc/Benz
- 5. Toluene
- 6. Sample

- 1. PCDD
- 2. PCB
- 3. Fraction 1
- 4. Fraction 2
- 5. Fraction 3
- 6. Waste

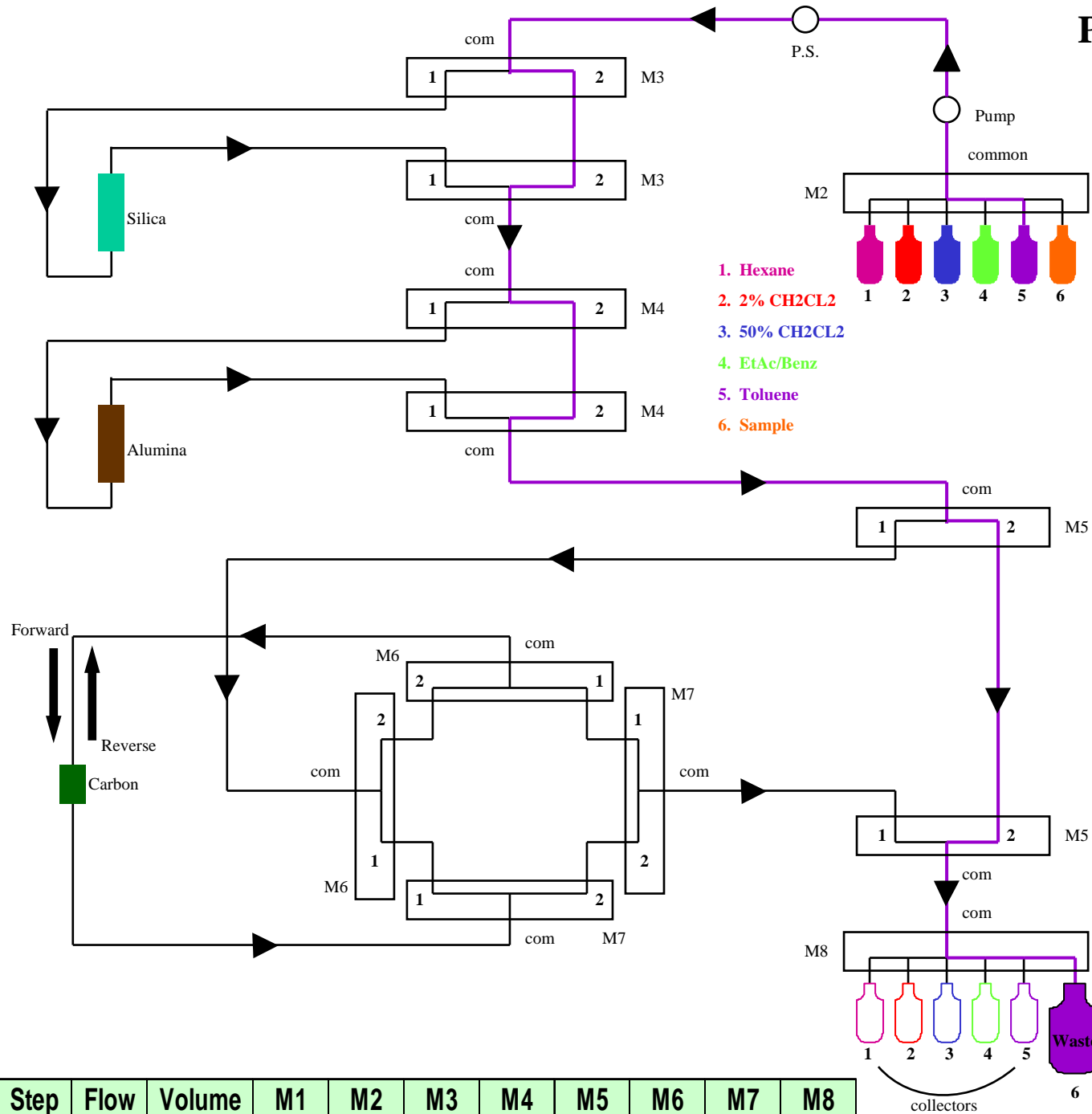
Legend:
 M2 and M8: 6 Way Valves
 M3 - M7: 2 Way Valves

| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 5 | 10 | 250 | 0 | 1 | 1 | 2 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 6: Change to
Toluene

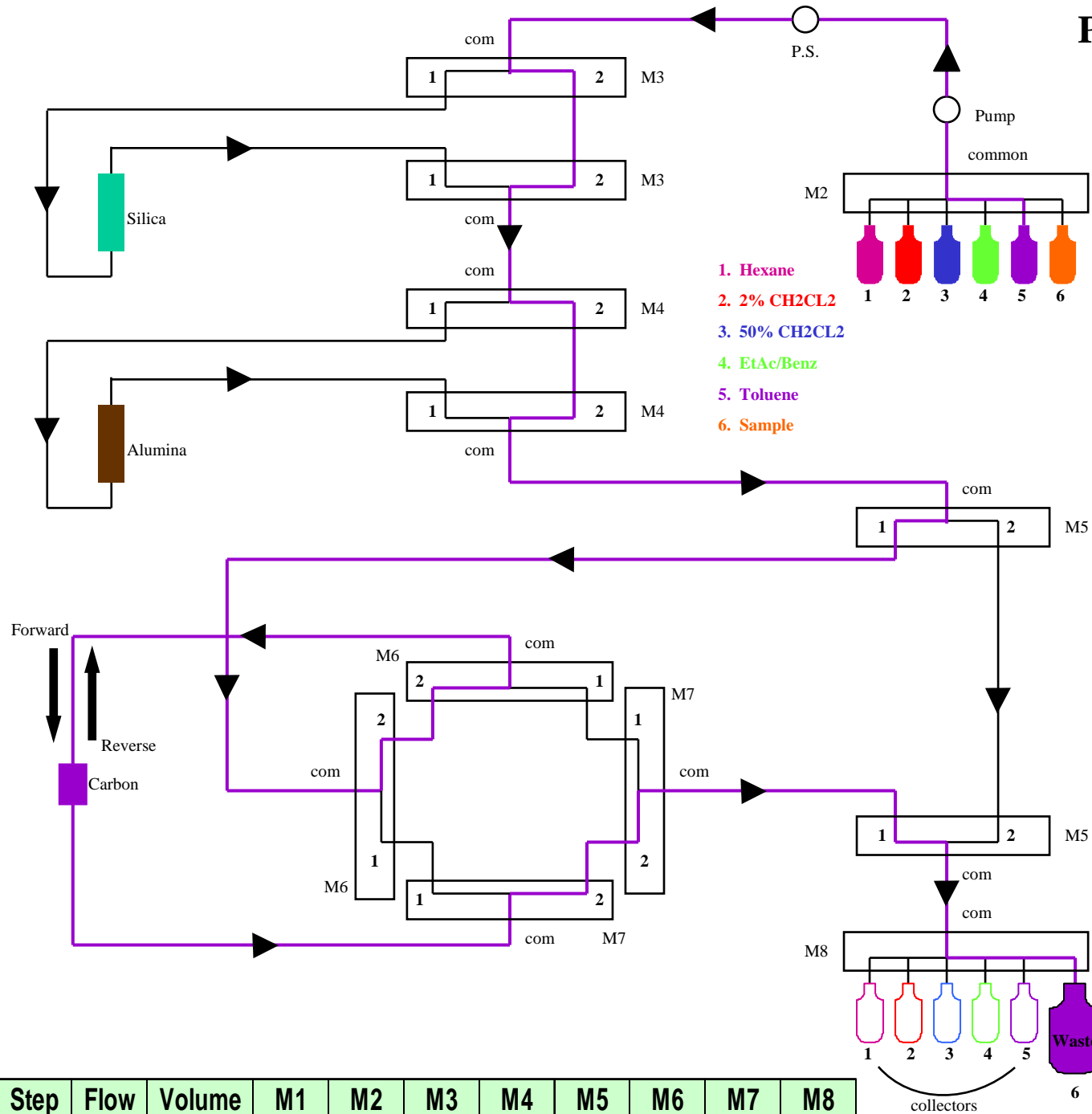


| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 6 | 10 | 12 | 0 | 5 | 2 | 2 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 7: Pre-elute with Toluene



- 1. Hexane
- 2. 2% CH₂CL₂
- 3. 50% CH₂CL₂
- 4. EtAc/Benz
- 5. Toluene
- 6. Sample

- 1. PCDD
- 2. PCB
- 3. Fraction 1
- 4. Fraction 2
- 5. Fraction 3
- 6. Waste

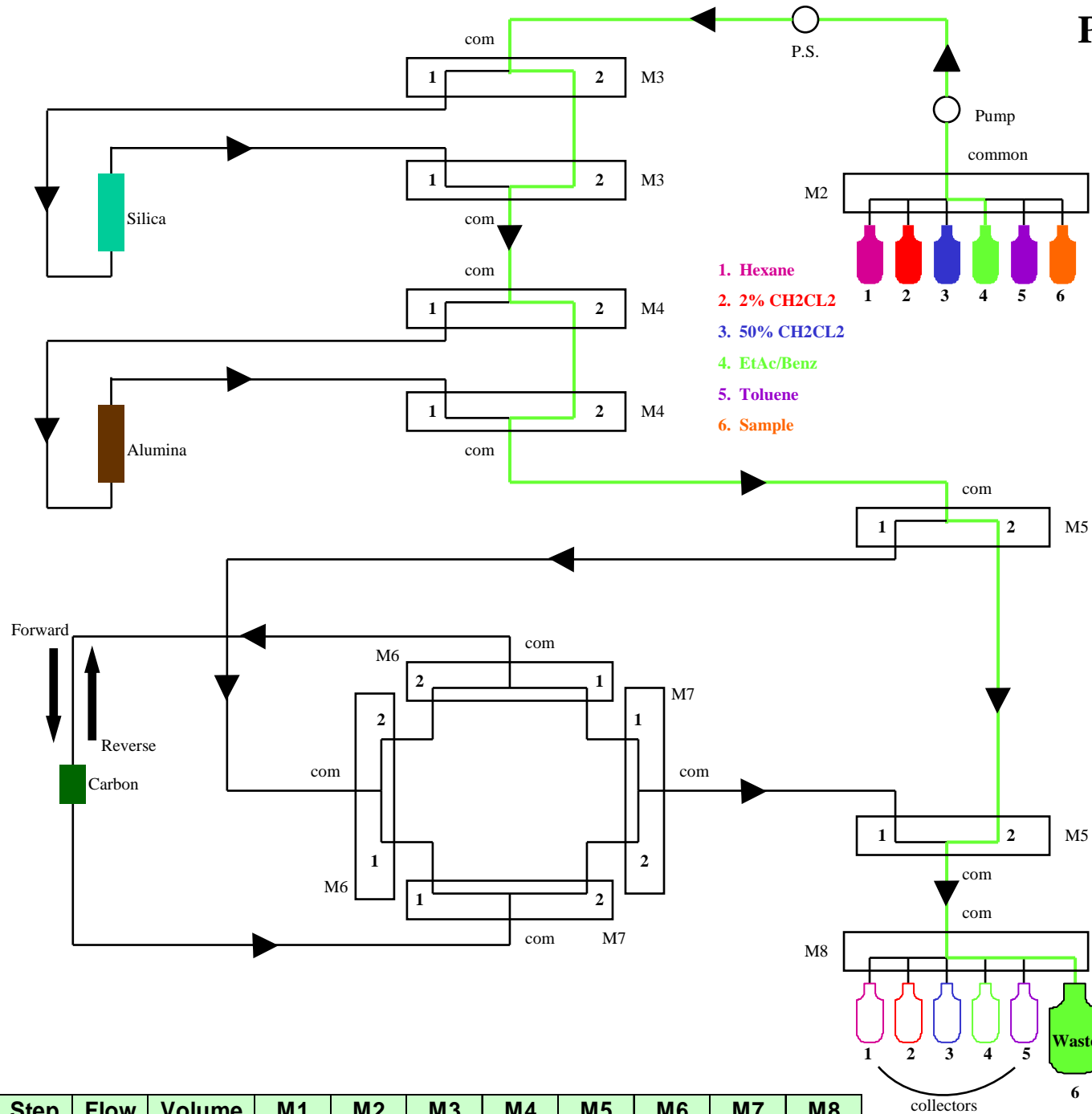
Legend:
M2 and M8: 6 Way Valves
M3 - M7: 2 Way Valves

| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 7 | 10 | 40 | 0 | 5 | 2 | 2 | 1 | 2 | 2 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 8: Change to
ETAC/Tol



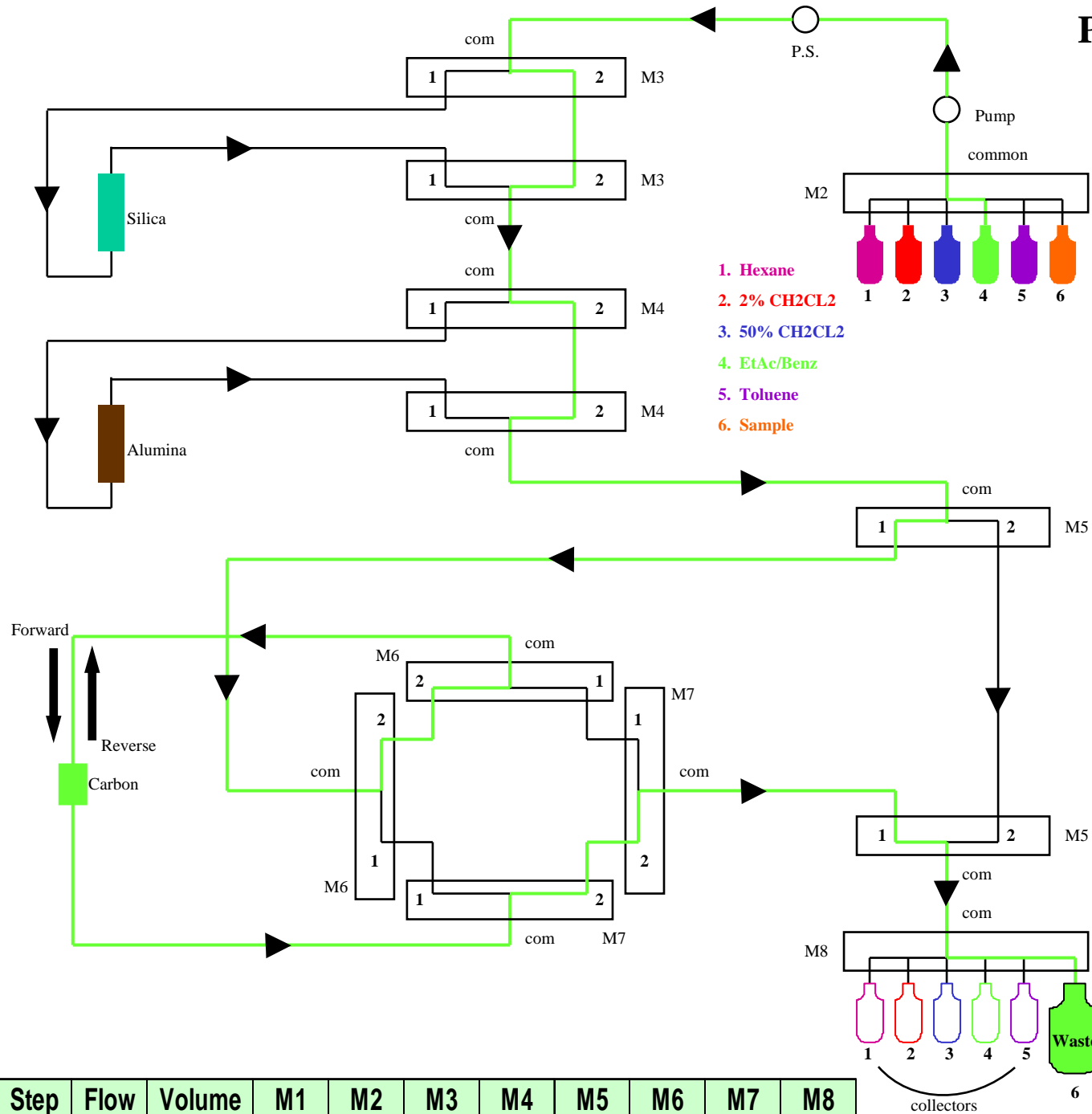
Legend:
M2 and M8: 6 Way Valves
M3 - M7: 2 Way Valves

| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 8 | 10 | 12 | 0 | 4 | 2 | 2 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 9: Pre-elute with ETAC/Tol



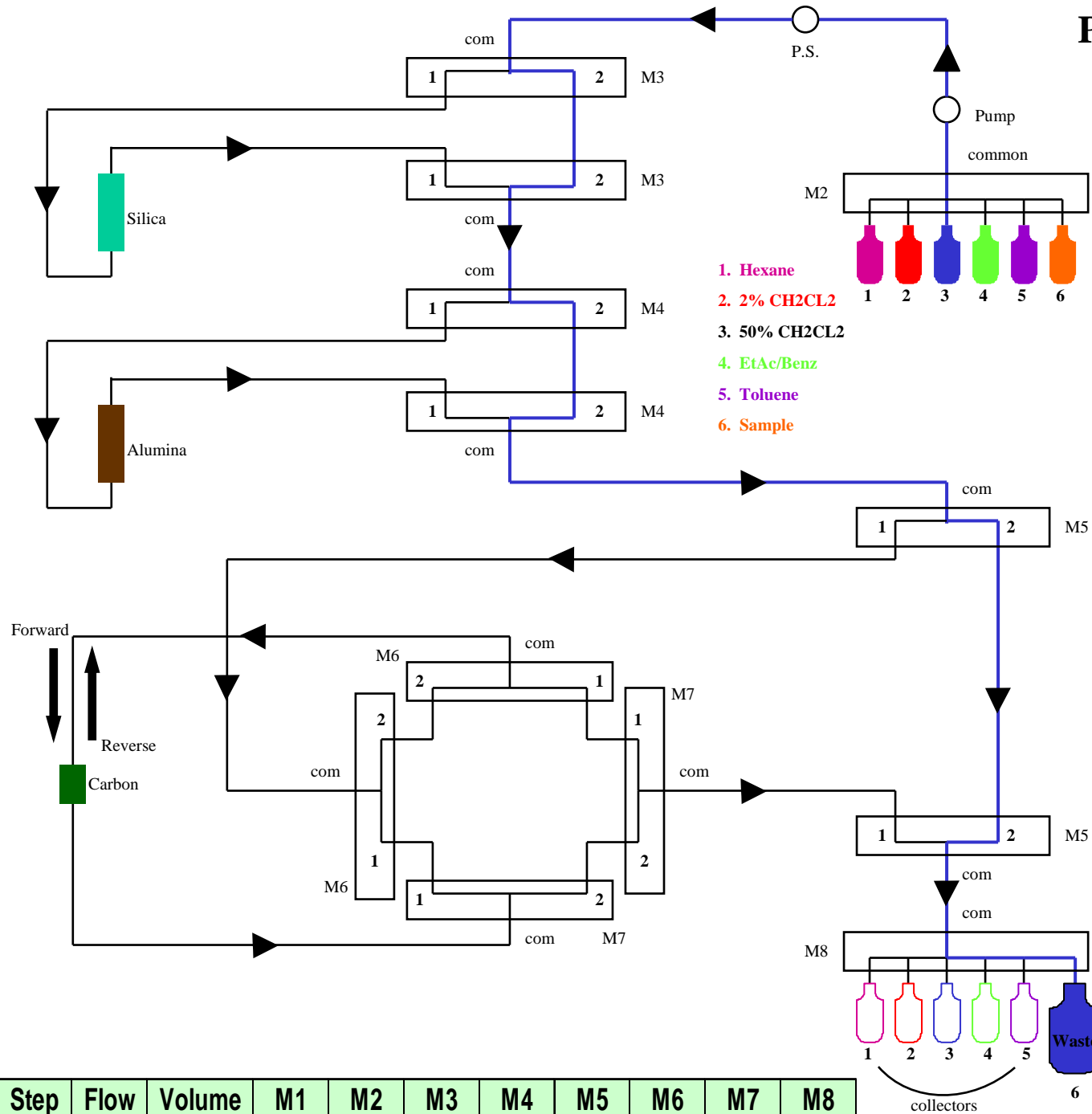
| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 9 | 10 | 10 | 0 | 4 | 2 | 2 | 1 | 2 | 2 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs

Separation Program

Step 10: Change to 50%

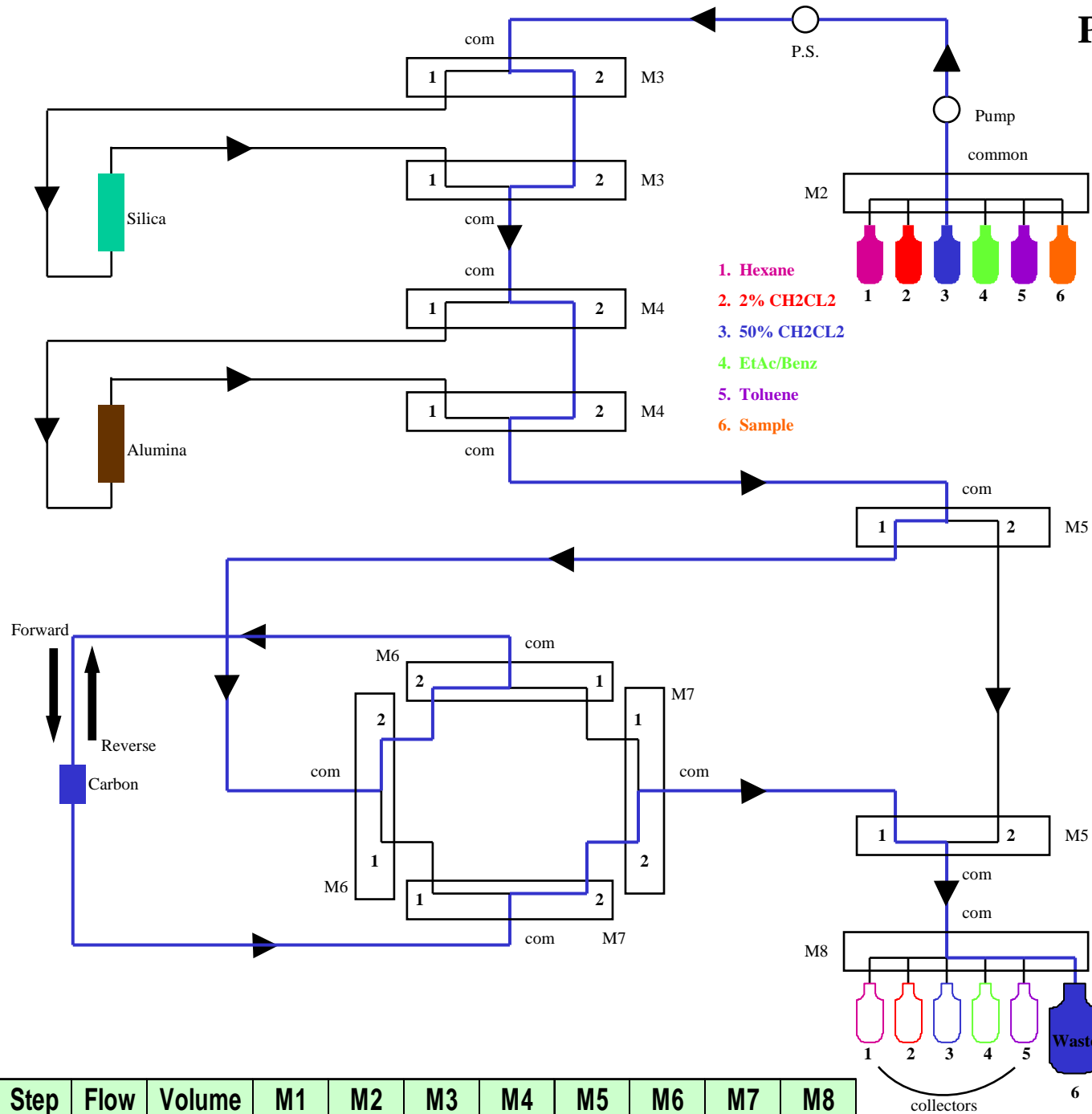


| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 10 | 10 | 12 | 0 | 3 | 2 | 2 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 11: Pre-elute with
50%

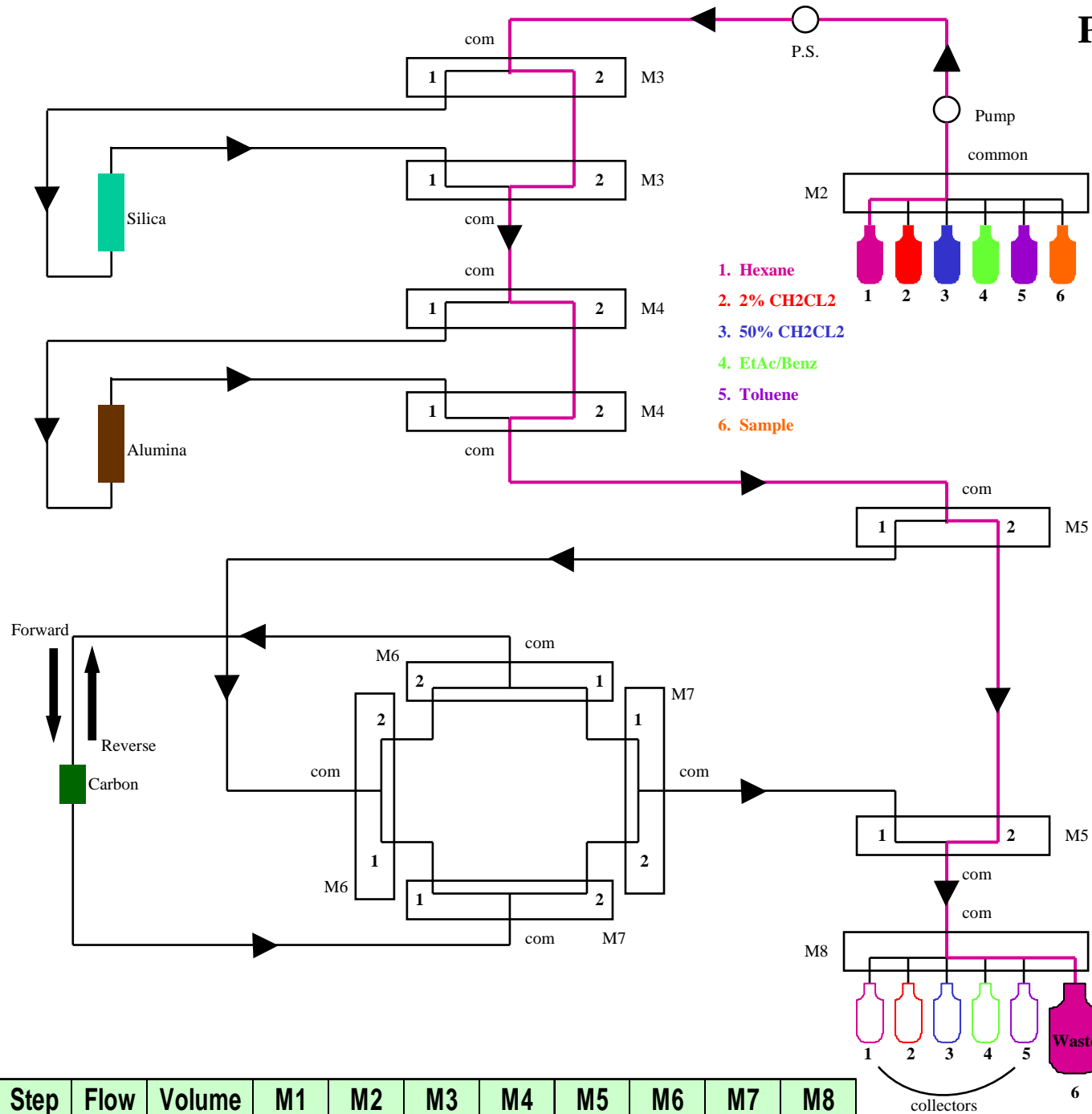


| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 11 | 10 | 20 | 0 | 3 | 2 | 2 | 1 | 2 | 2 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 12: Change to
Hexane

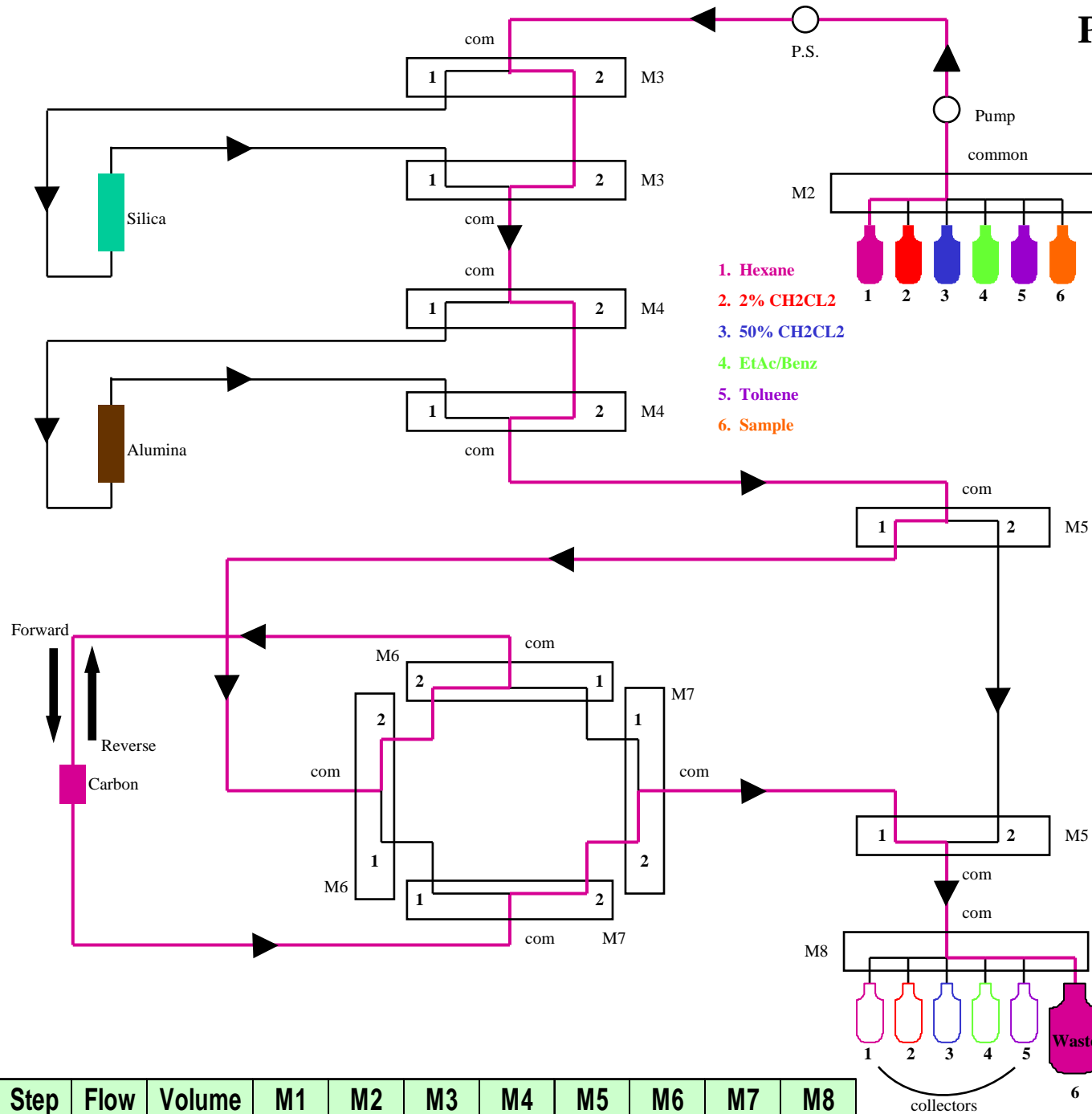


| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 12 | 10 | 12 | 0 | 1 | 2 | 2 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 13: Pre-elute with Hexane



- 1. Hexane
- 2. 2% CH₂CL₂
- 3. 50% CH₂CL₂
- 4. EtAc/Benz
- 5. Toluene
- 6. Sample

- 1. PCDD
- 2. PCB
- 3. Fraction 1
- 4. Fraction 2
- 5. Fraction 3
- 6. Waste

Legend:
M2 and M8: 6 Way Valves
M3 - M7: 2 Way Valves

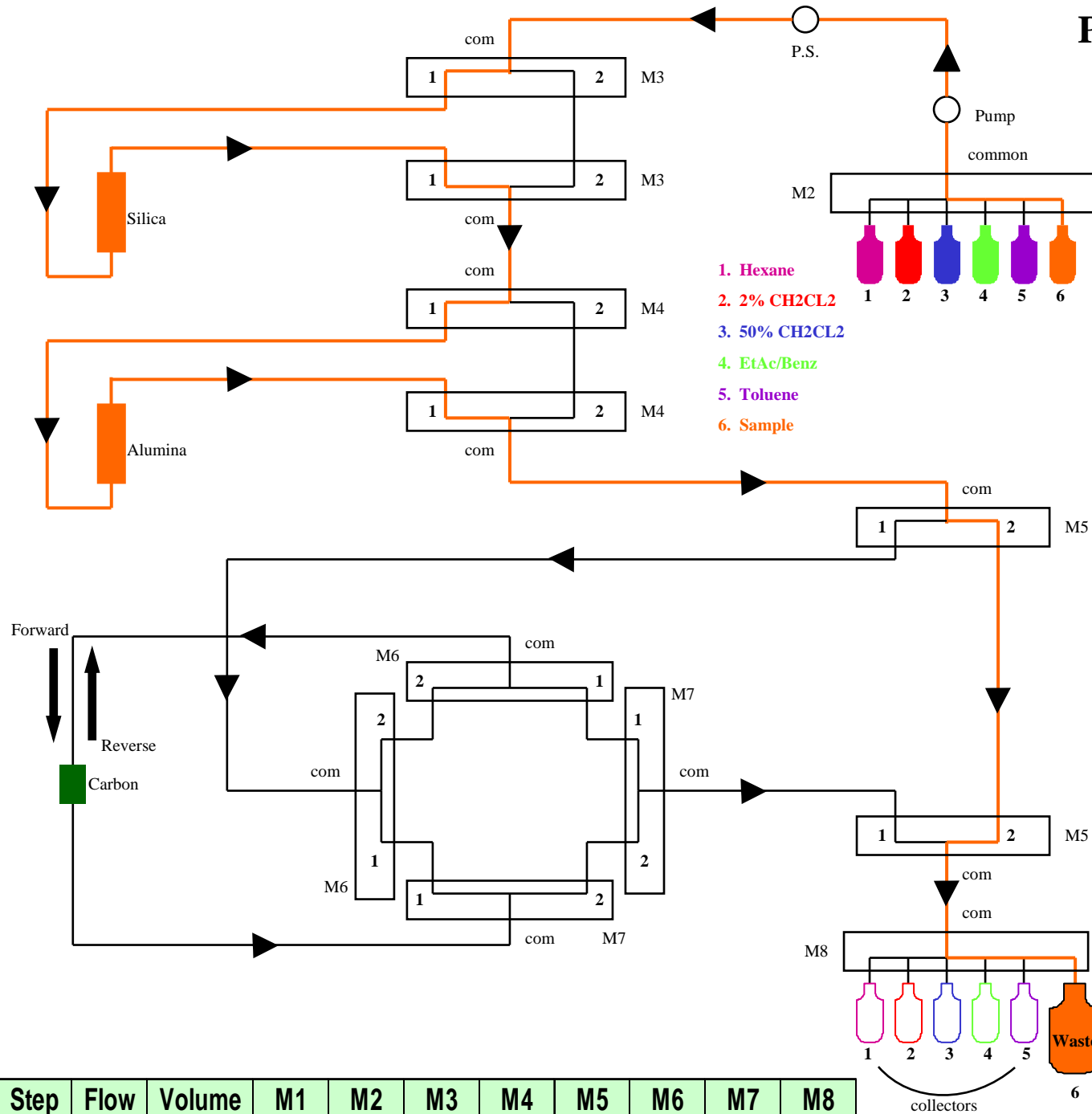
| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 13 | 10 | 30 | 0 | 1 | 2 | 2 | 1 | 2 | 2 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs

Separation Program

Step 14: Add Sample



- 1. Hexane
- 2. 2% CH₂CL₂
- 3. 50% CH₂CL₂
- 4. EtAc/Benz
- 5. Toluene
- 6. Sample

- 1. PCDD
- 2. PCB
- 3. Fraction 1
- 4. Fraction 2
- 5. Fraction 3
- 6. Waste

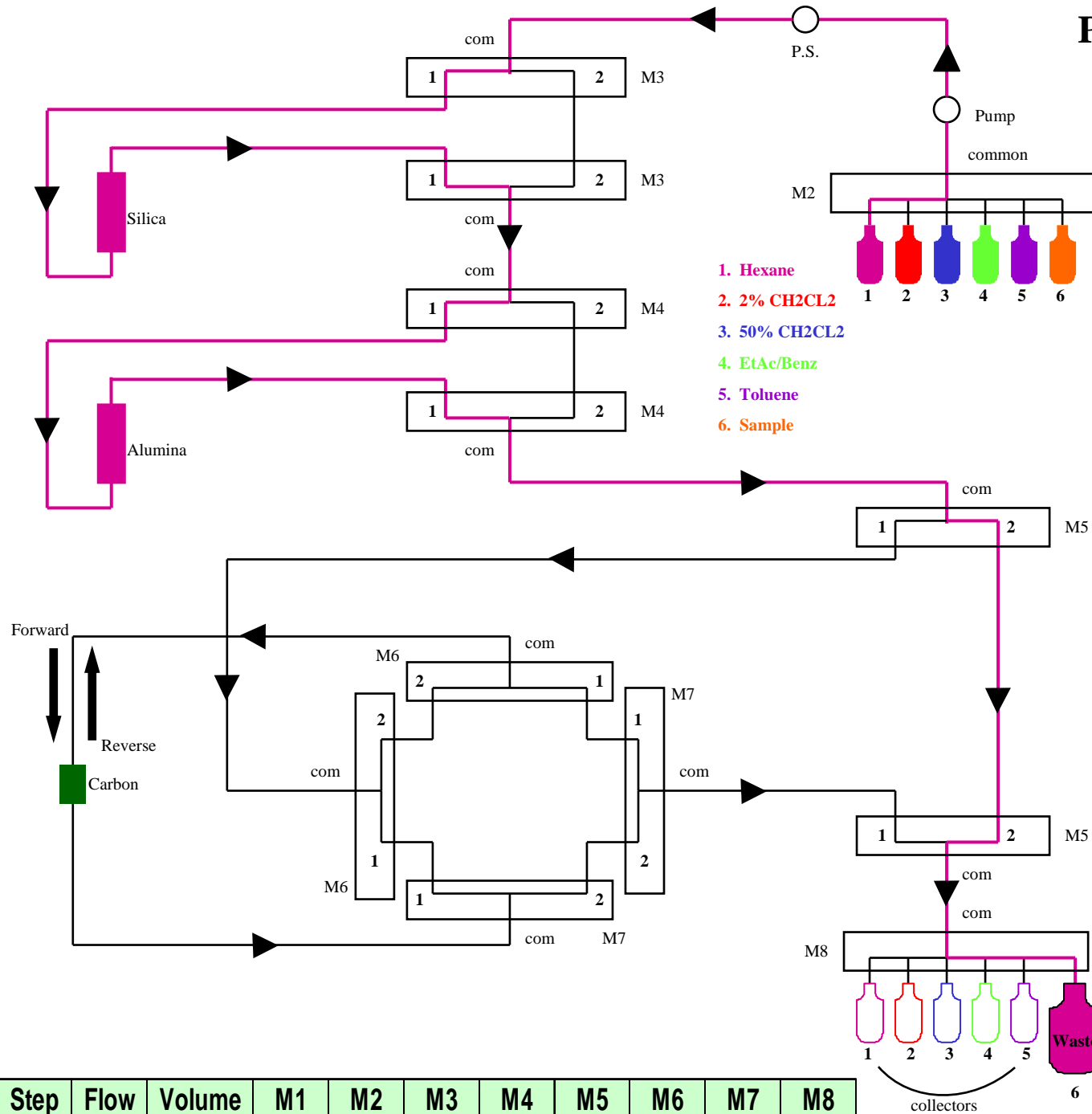
Legend:
 M2 and M8: 6 Way Valves
 M3 - M7: 2 Way Valves

| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 14 | 5 | 37.5 | 0 | 6 | 1 | 1 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 15: Elute Silica

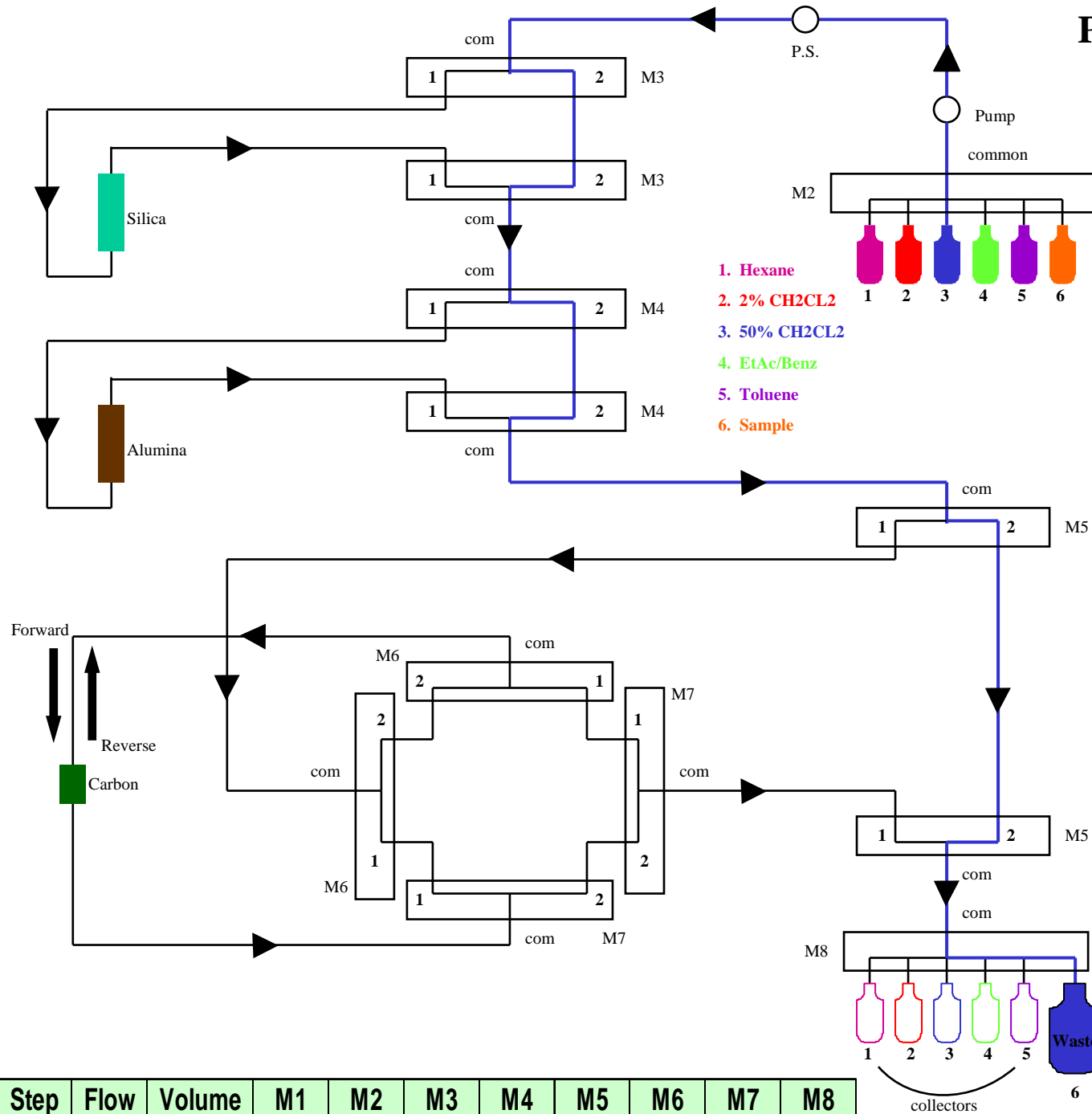


| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 15 | 10 | 200 | 0 | 1 | 1 | 1 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 16: Change to
50%



Legend:
M2 and M8: 6 Way Valves
M3 - M7: 2 Way Valves

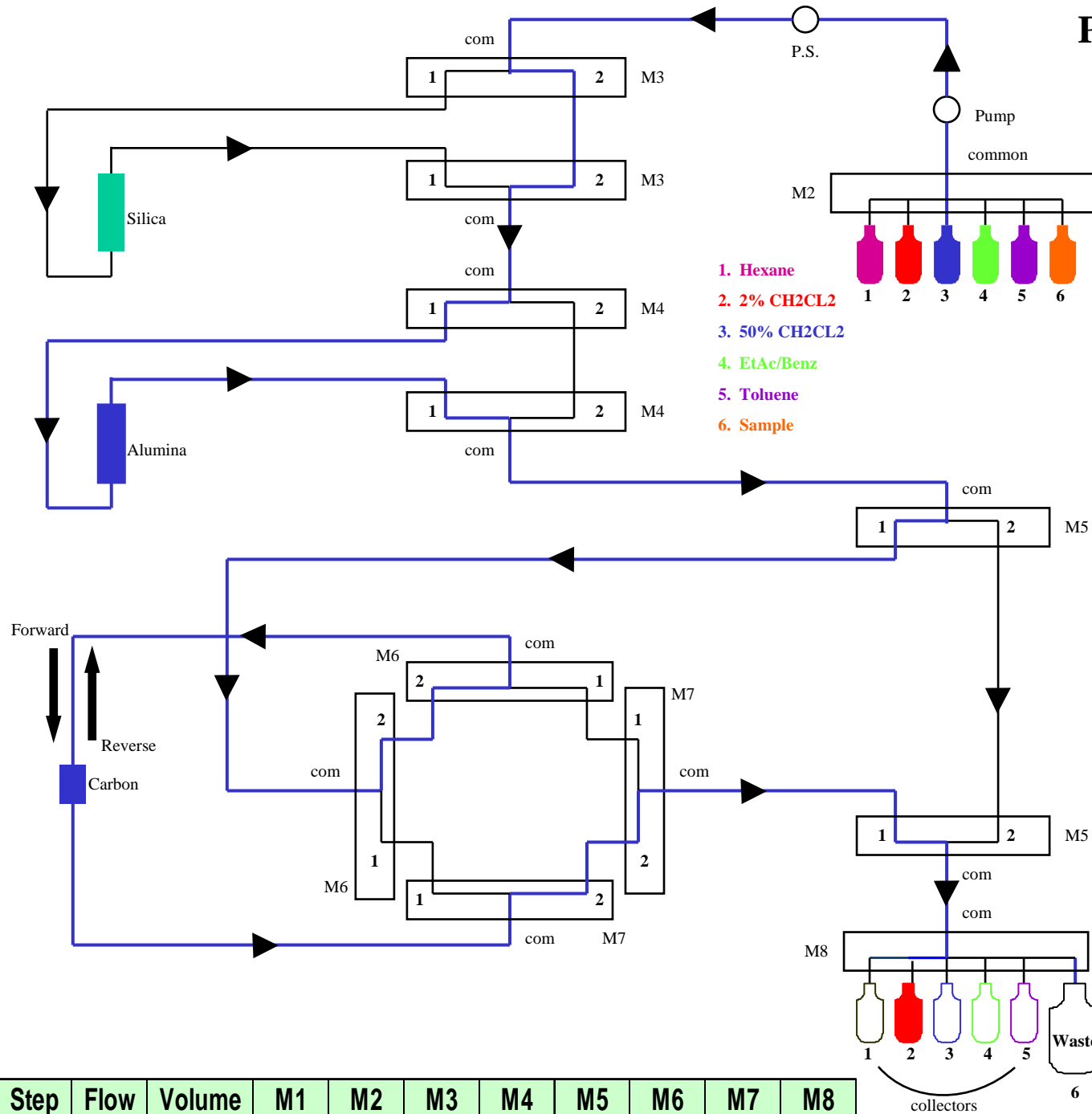
| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 16 | 10 | 12 | 0 | 3 | 2 | 2 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs

Separation Program

Step 17: Elute with 50%
Collect fraction A

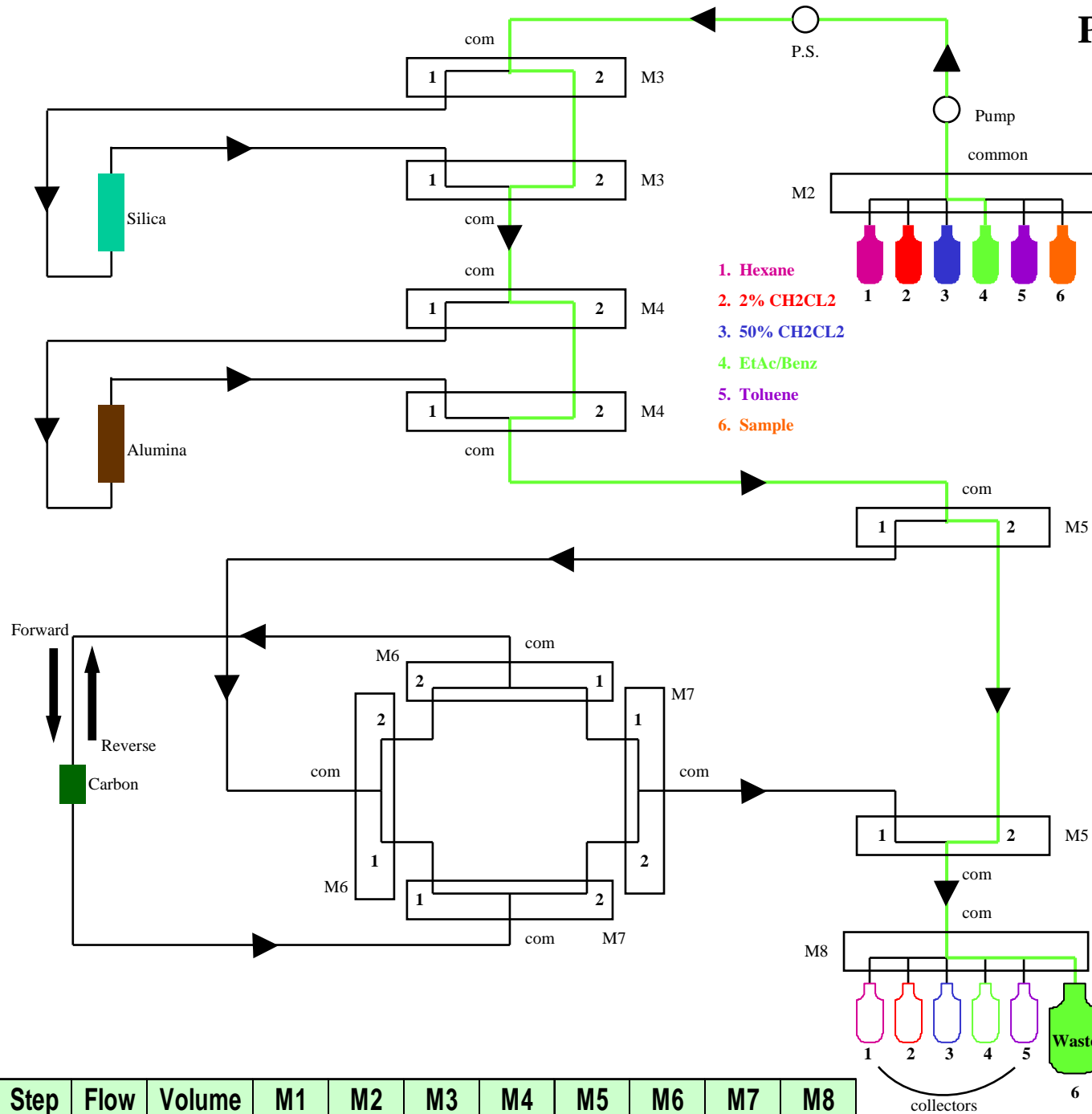


| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 17 | 10 | 120 | 0 | 3 | 2 | 1 | 1 | 2 | 2 | 2 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 18: Change to
ETAC/Tol

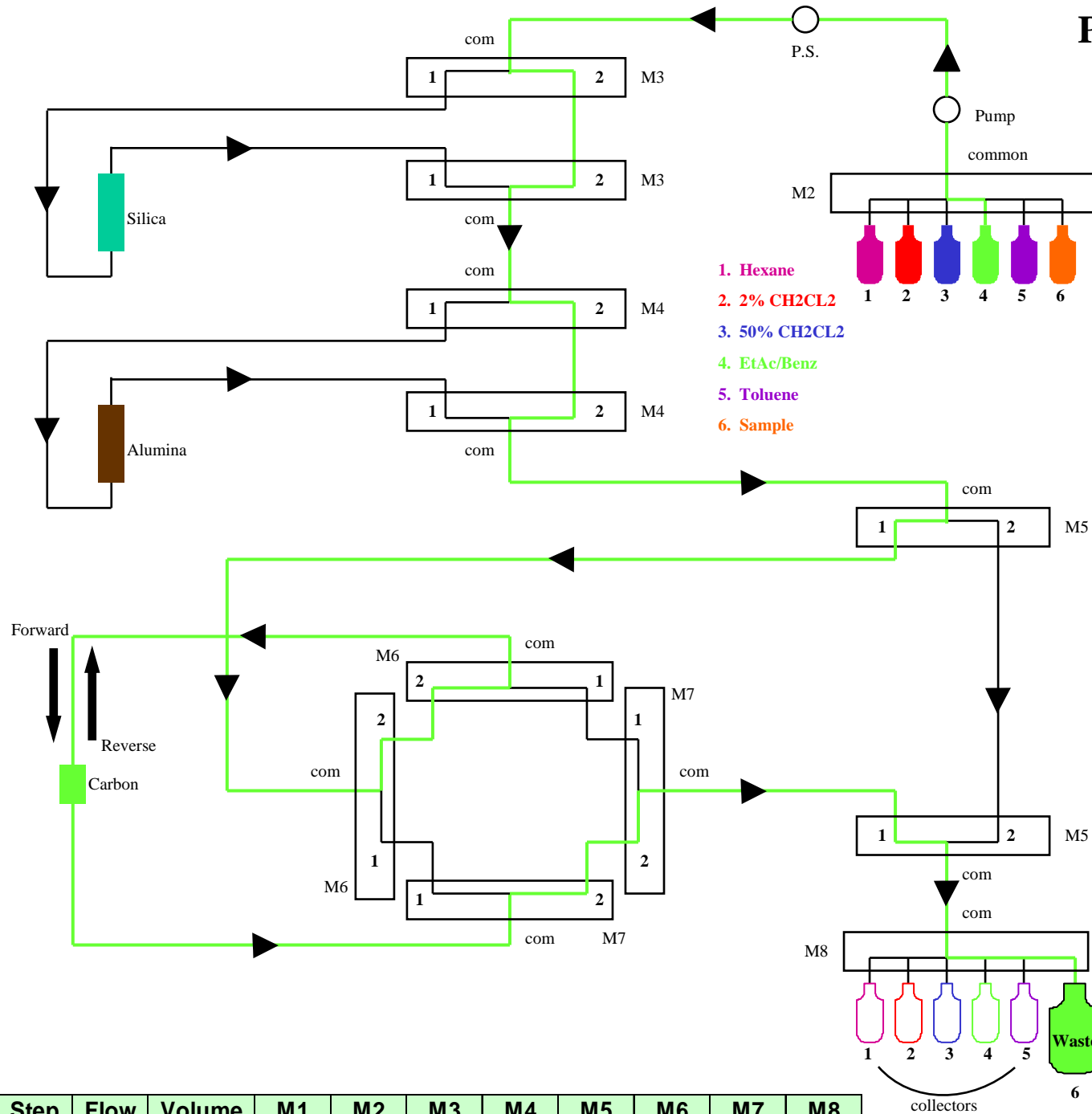


| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 18 | 10 | 12 | 0 | 4 | 2 | 2 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 19: Elute with
ETAC/Tol



- 1. PCDD
- 2. PCB
- 3. Fraction 1
- 4. Fraction 2
- 5. Fraction 3
- 6. Waste

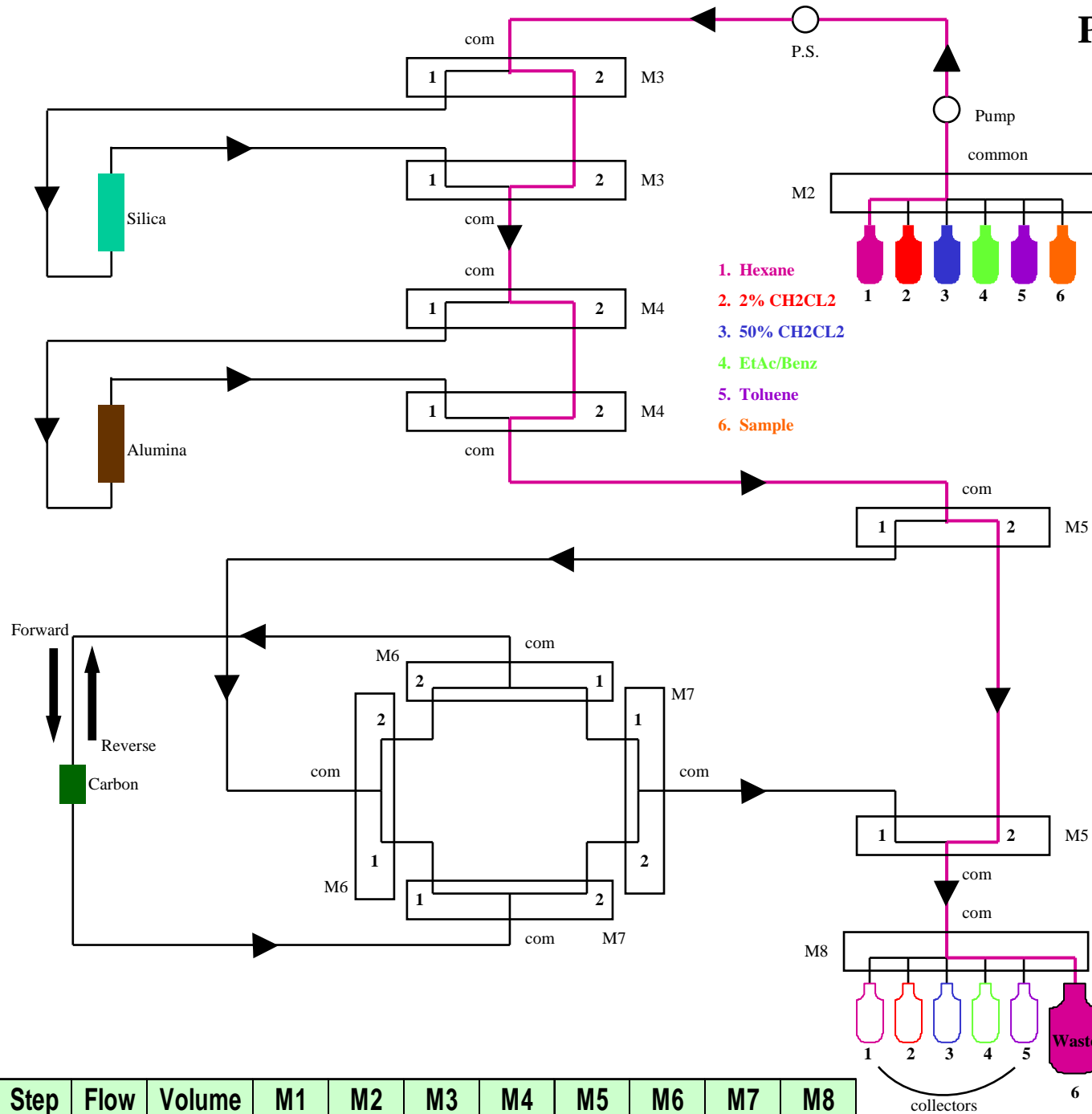
Legend:
M2 and M8: 6 Way Valves
M3 - M7: 2 Way Valves

| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 19 | 10 | 4 | 0 | 4 | 2 | 2 | 1 | 2 | 2 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 20: Change to
Hexane



- 1. PCDD
- 2. PCB
- 3. Fraction 1
- 4. Fraction 2
- 5. Fraction 3
- 6. Waste

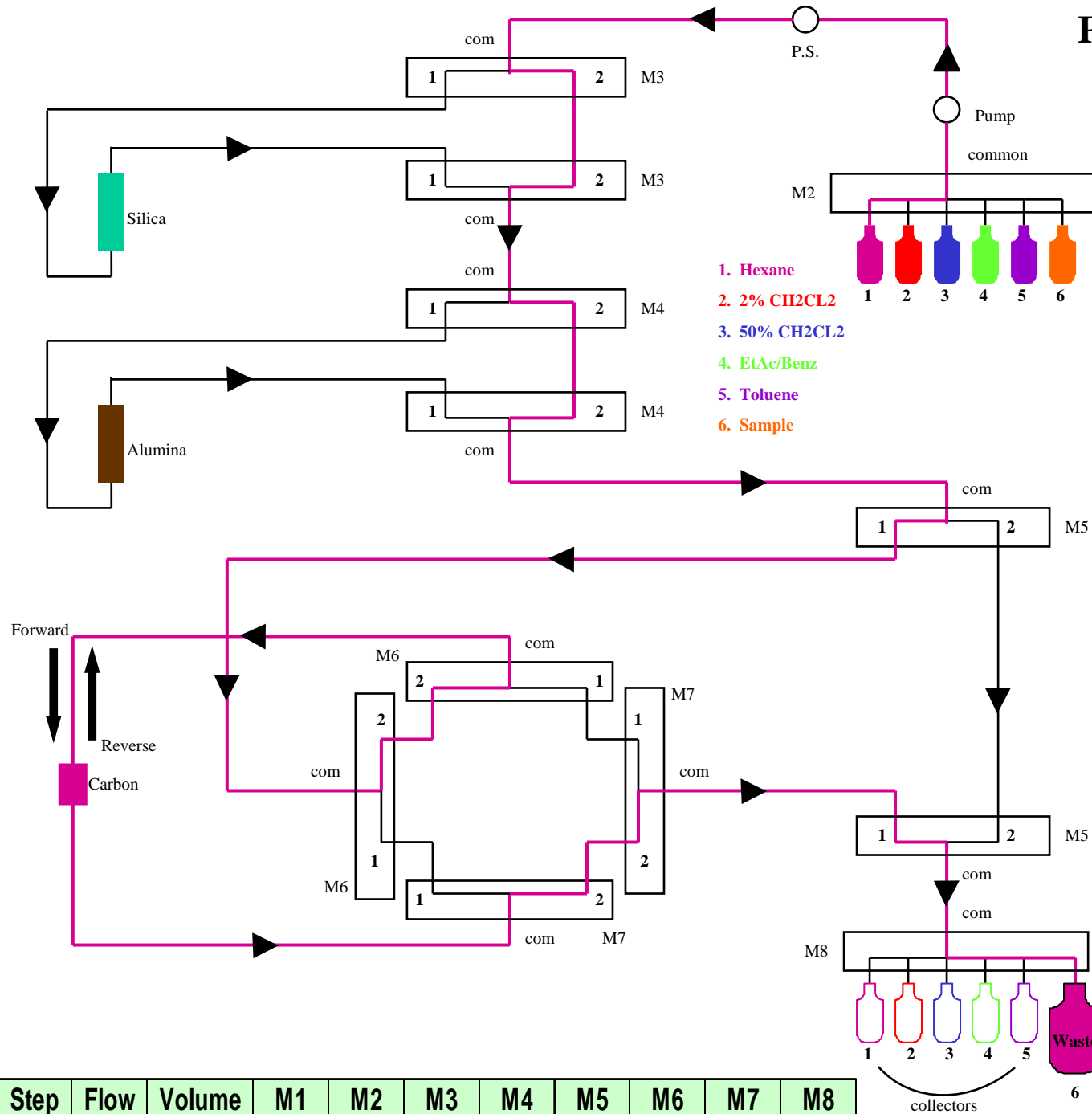
Legend:
M2 and M8: 6 Way Valves
M3 - M7: 2 Way Valves

| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 20 | 10 | 12 | 0 | 1 | 2 | 2 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 21: Flush with
Hexane



- 1. Hexane
- 2. 2% CH₂CL₂
- 3. 50% CH₂CL₂
- 4. EtAc/Benz
- 5. Toluene
- 6. Sample

- 1. PCDD
- 2. PCB
- 3. Fraction 1
- 4. Fraction 2
- 5. Fraction 3
- 6. Waste

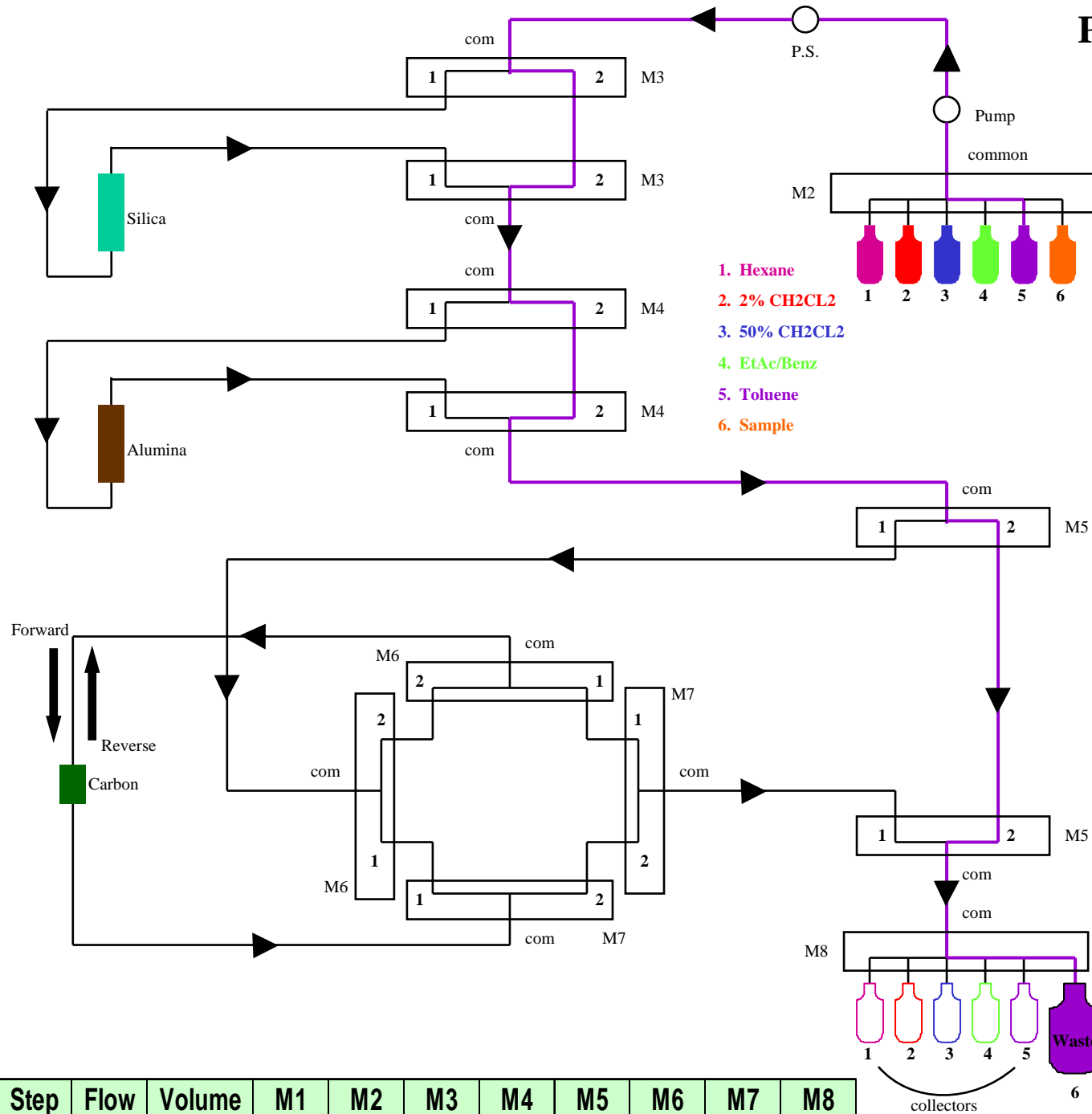
Legend:
M2 and M8: 6 Way Valves
M3 - M7: 2 Way Valves

| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 21 | 10 | 10 | 0 | 1 | 2 | 2 | 1 | 2 | 2 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 22: Change to
Toluene



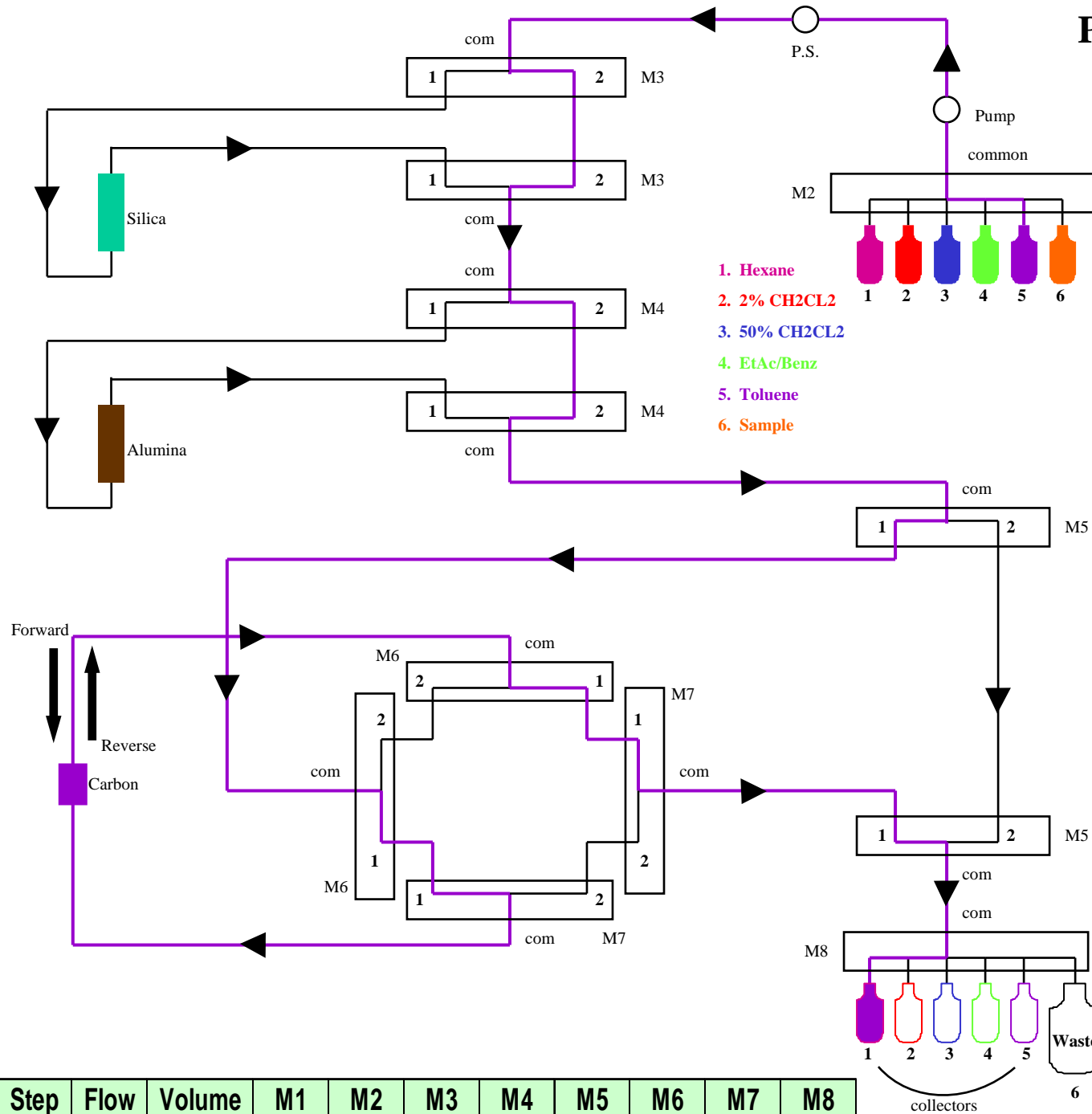
Legend:
M2 and M8: 6 Way Valves
M3 - M7: 2 Way Valves

| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 22 | 10 | 12 | 0 | 5 | 2 | 2 | 2 | 0 | 0 | 6 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 23: Elute
PCDD/PCDF
Collect Fraction B



- 1. Hexane
- 2. 2% CH₂CL₂
- 3. 50% CH₂CL₂
- 4. EtAc/Benz
- 5. Toluene
- 6. Sample

- 1. PCDD
- 2. PCB
- 3. Fraction 1
- 4. Fraction 2
- 5. Fraction 3
- 6. Waste

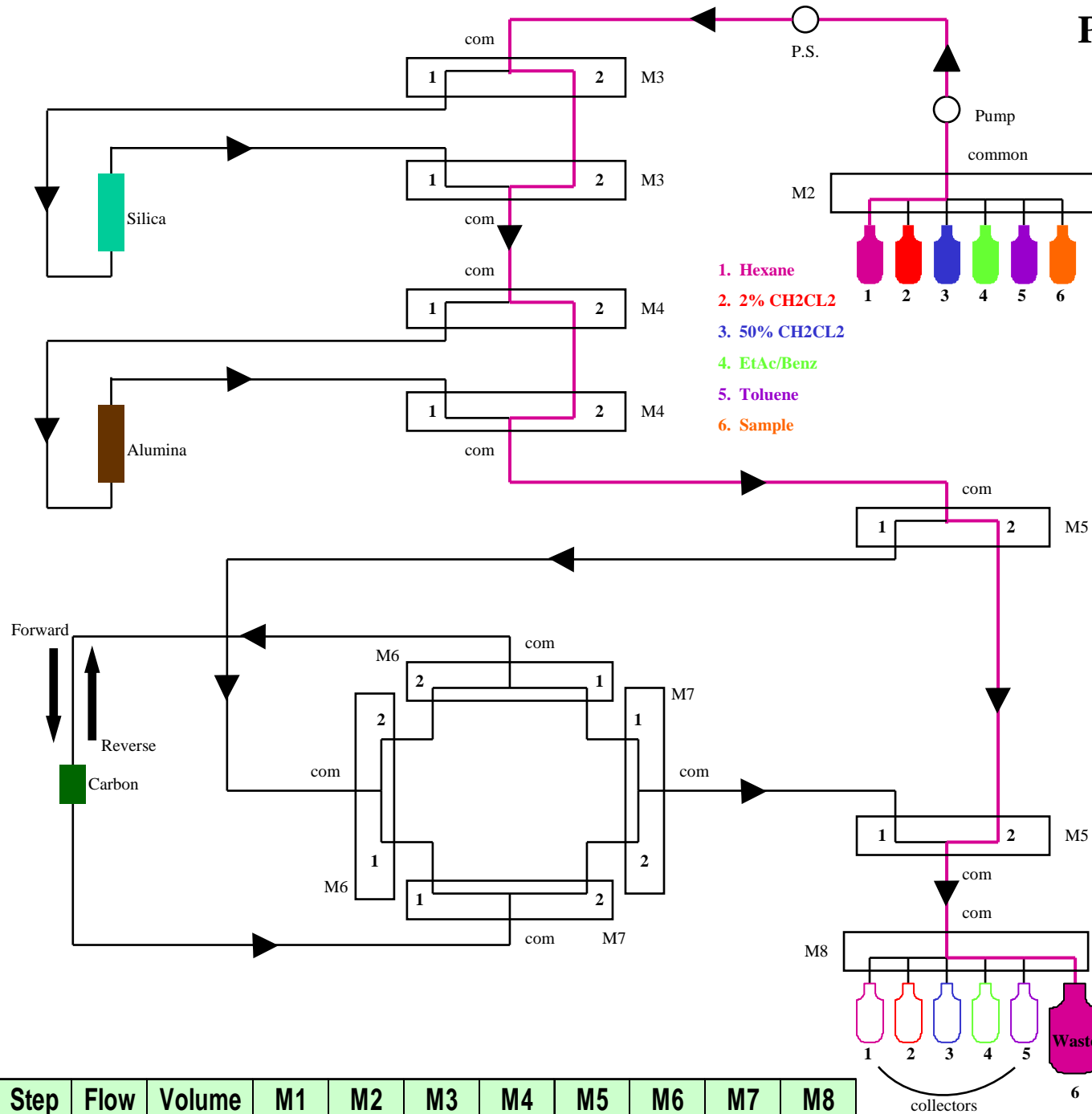
Legend:
M2 and M8: 6 Way Valves
M3 - M7: 2 Way Valves

| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 23 | 5 | 75 | 0 | 5 | 2 | 2 | 1 | 1 | 1 | 1 |

Power-Prep System/Dioxin

PCDDs/ PCDFs
Separation Program

Step 24: Flushing
system and shutting
down



- 1. Hexane
- 2. 2% CH₂CL₂
- 3. 50% CH₂CL₂
- 4. EtAc/Benz
- 5. Toluene
- 6. Sample

- 1. PCDD
- 2. PCB
- 3. Fraction 1
- 4. Fraction 2
- 5. Fraction 3
- 6. Waste

Legend:
M2 and M8: 6 Way Valves
M3 - M7: 2 Way Valves

| Step | Flow | Volume | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|------|------|--------|----|----|----|----|----|----|----|----|
| 24 | 1 | 12 | 0 | 1 | 2 | 2 | 2 | 0 | 0 | 6 |