Engineering Software

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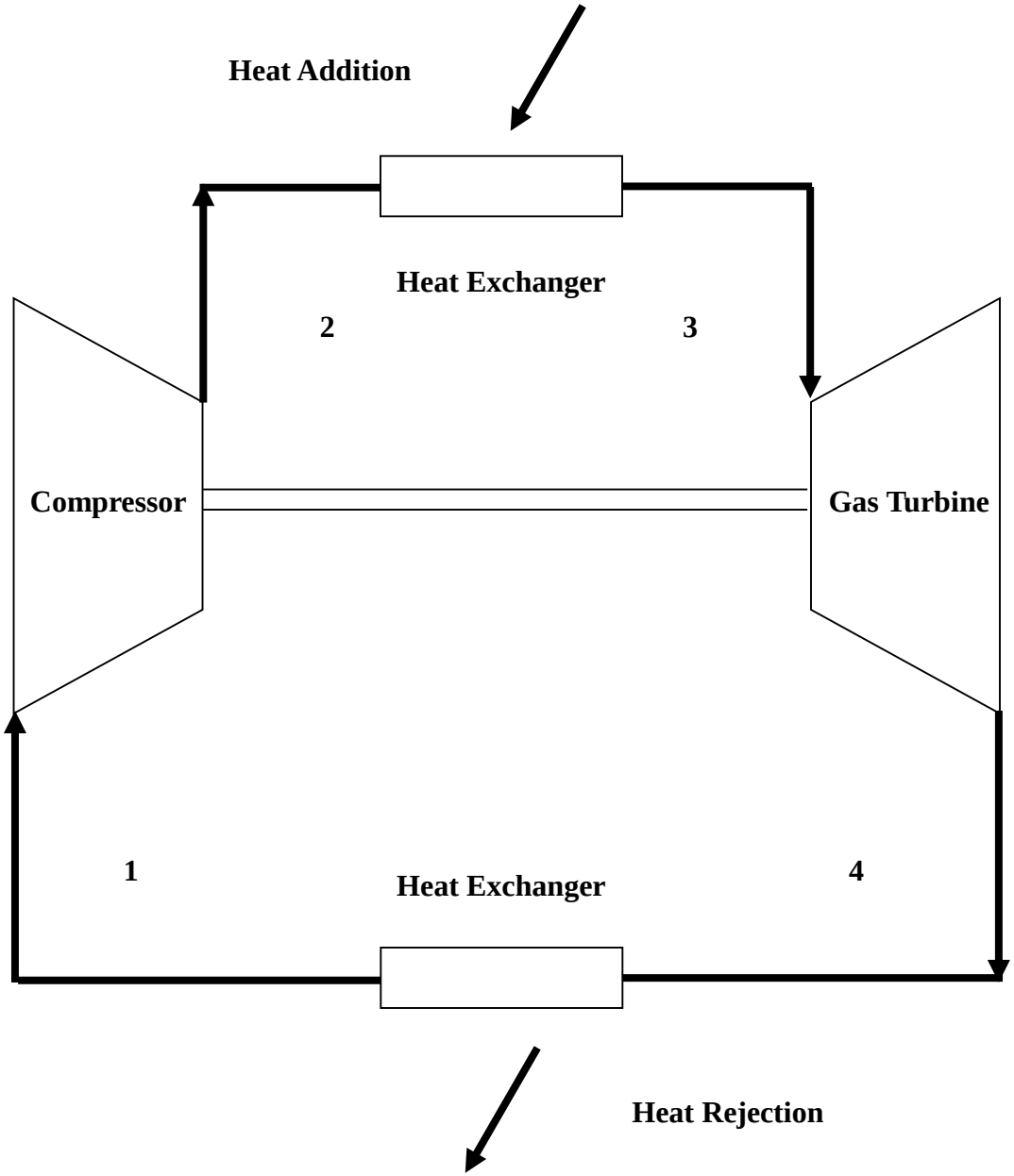
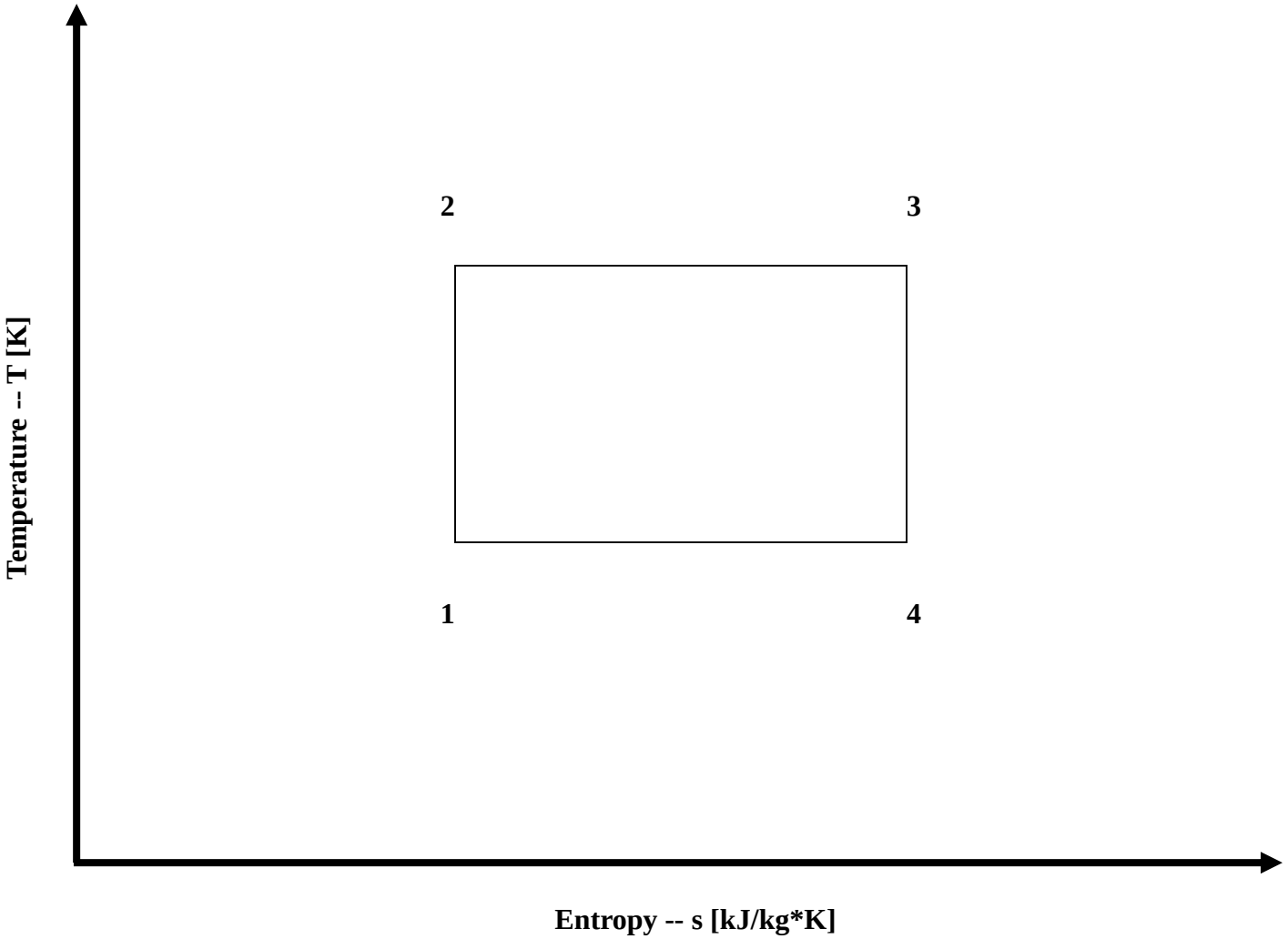
Carnot Cycle Analysis

Here are some of the basic Carnot Cycle data tables and plots.

Carnot Cycle Schematic Layout





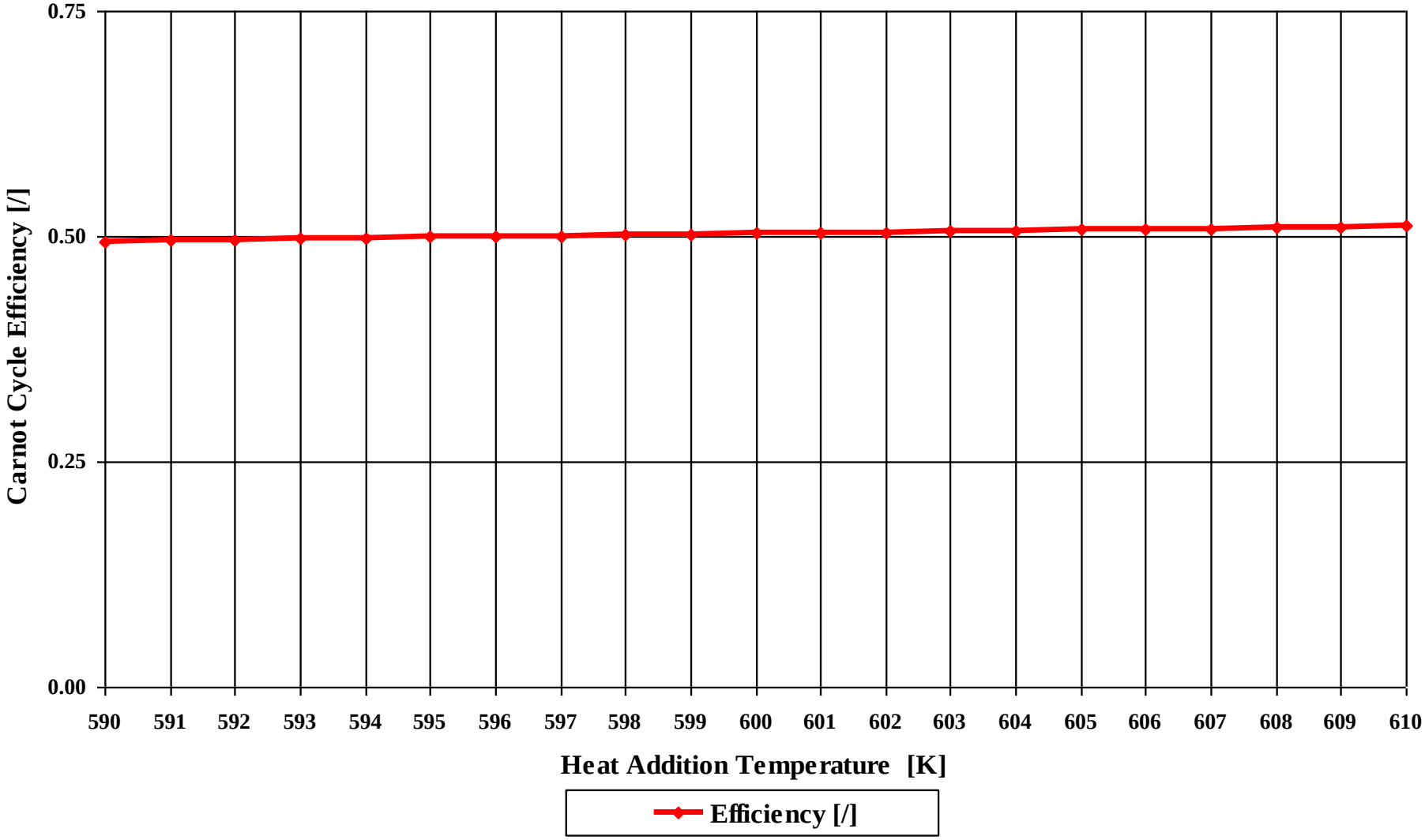
Carnot Cycle T - s Diagram

Input and Output Data

```
Heat addition temperature [K]: 600
Heat rejection temperature [K]: 298
Delta temperature step [K]: 1
Delta temperature range [K]: 10
```

Step [/]	Tin [K]	Tout [K]	Efficiency [/]
1	590	298	0.494915
2	591	298	0.49577
3	592	298	0.496622
4	593	298	0.49747
5	594	298	0.498317
6	595	298	0.49916
7	596	298	0.5
8	597	298	0.500838
9	598	298	0.501672
10	599	298	0.502504
11	600	298	0.503333
12	601	298	0.50416
13	602	298	0.504983
14	603	298	0.505804
15	604	298	0.506623
16	605	298	0.507438
17	606	298	0.508251
18	607	298	0.509061
19	608	298	0.509868
20	609	298	0.510673
21	610	298	0.511475

Carnot Cycle Effciency



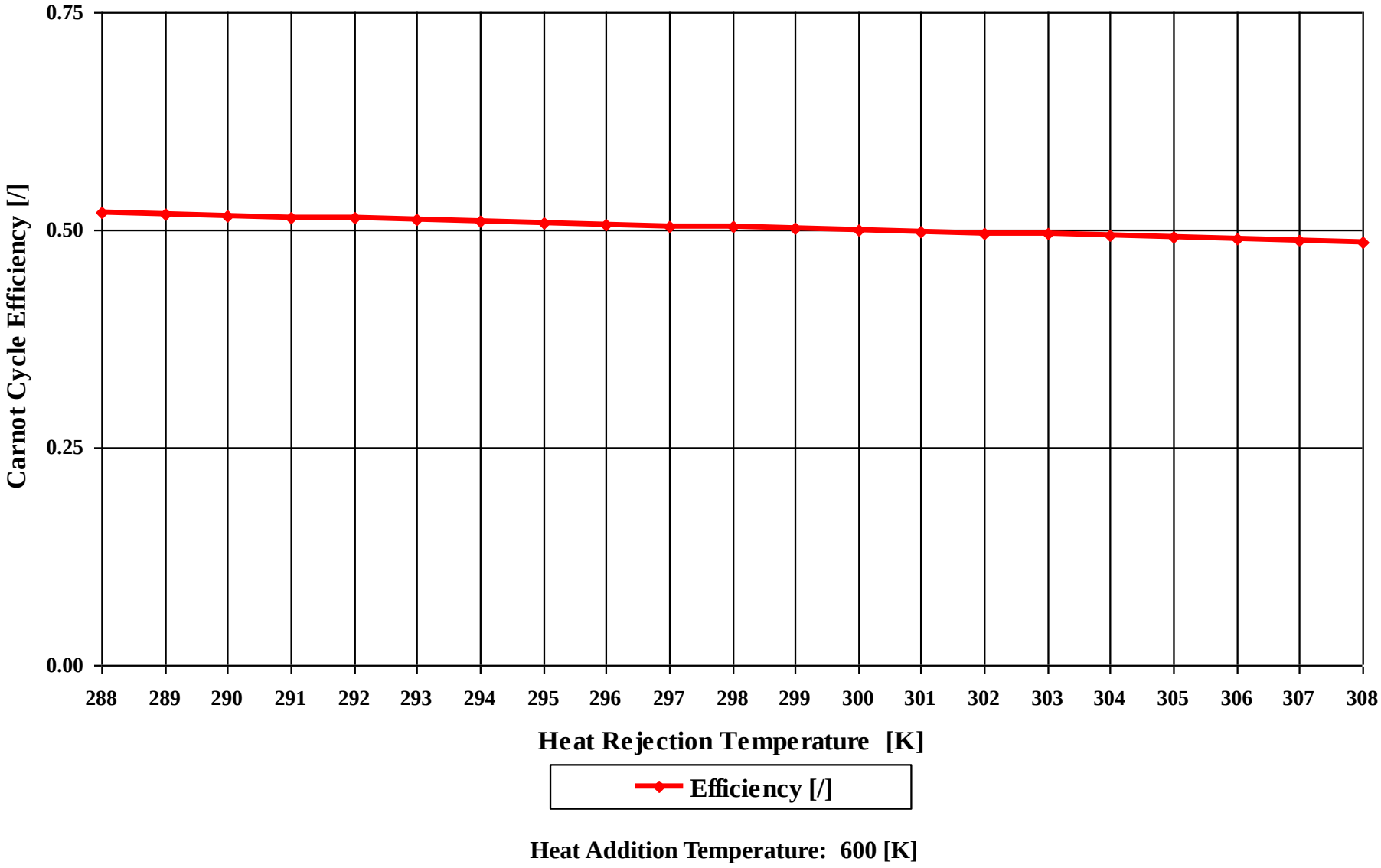
Heat Rejection Temperature: 298 [K]

Input and Output Data

```
Heat addition temperature [K]: 600
Heat rejection temperature [K]: 298
Delta temperature step [K]: 1
Delta temperature range [K]: 10
```

Step [/]	Tin [K]	Tout [K]	Efficiency [/]
1	600	288	0.52
2	600	289	0.518333
3	600	290	0.516667
4	600	291	0.515
5	600	292	0.513333
6	600	293	0.511667
7	600	294	0.51
8	600	295	0.508333
9	600	296	0.506667
10	600	297	0.505
11	600	298	0.503333
12	600	299	0.501667
13	600	300	0.5
14	600	301	0.498333
15	600	302	0.496667
16	600	303	0.495
17	600	304	0.493333
18	600	305	0.491667
19	600	306	0.49
20	600	307	0.488333
21	600	308	0.486667

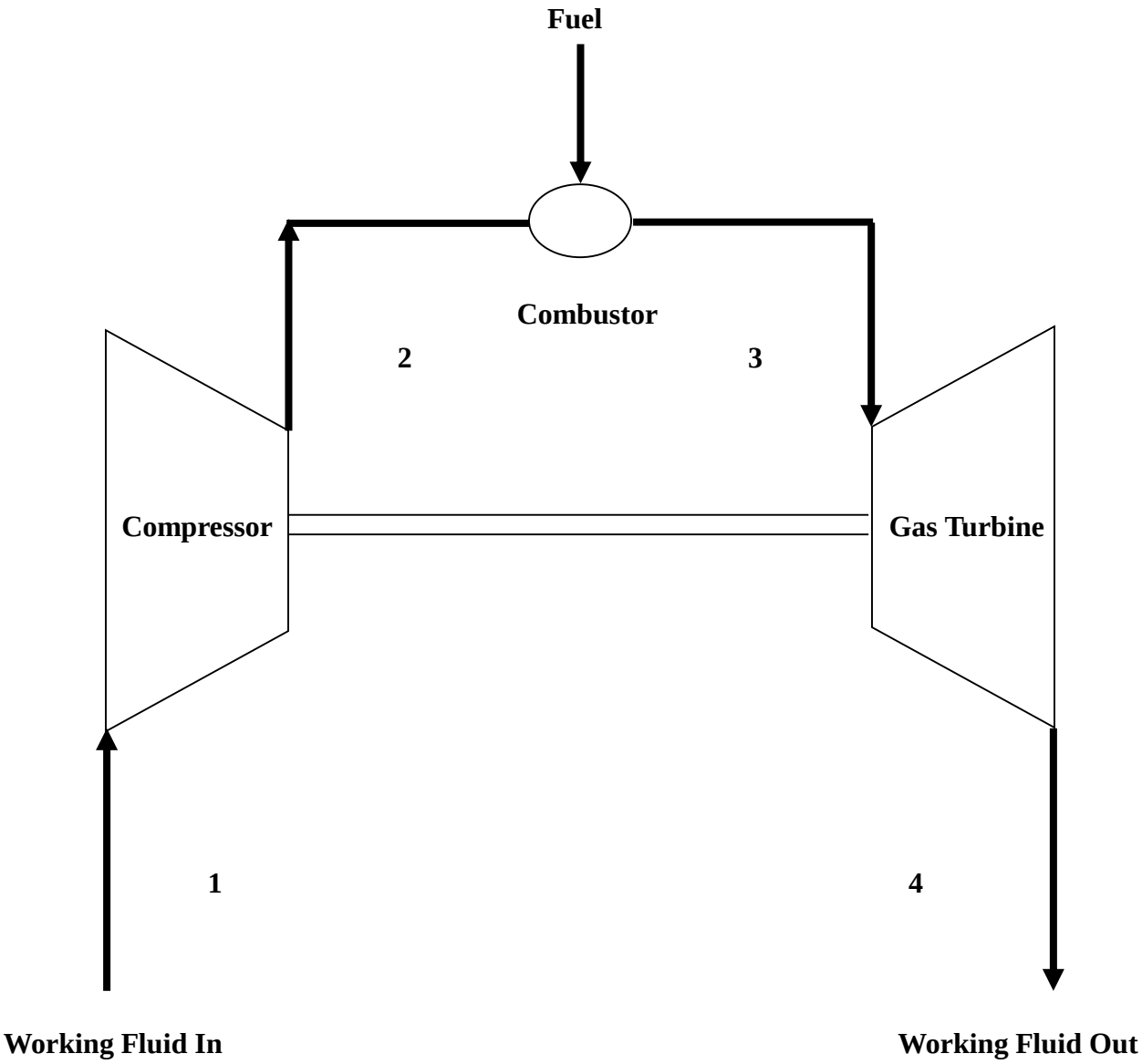
Carnot Cycle Effciency



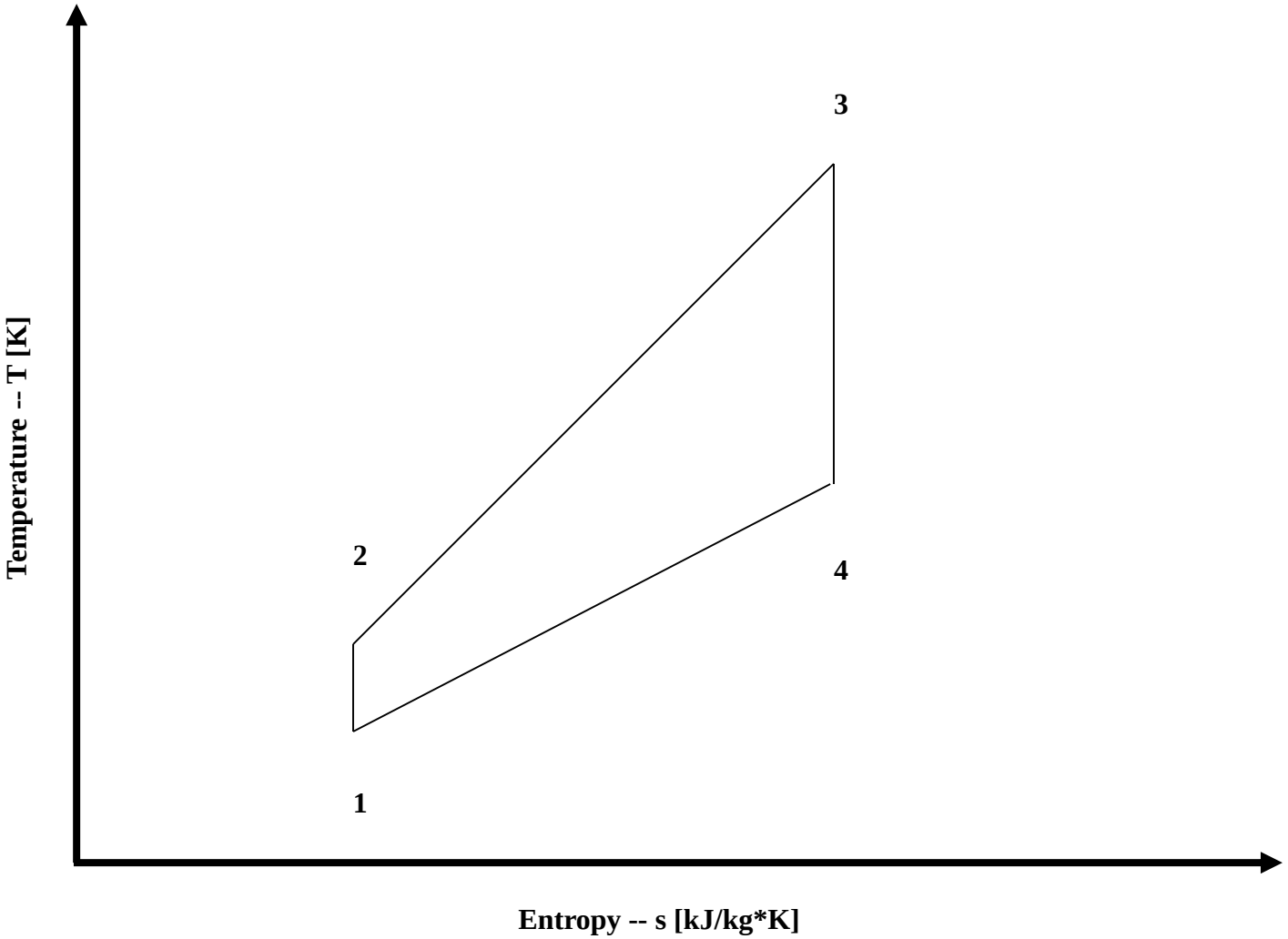
Heat Addition Temperature: 600 [K]

Brayton Cycle (Gas Turbine) Analysis

Here are some of the basic Brayton Cycle (Gas Turbine) data tables and plots for power applications.



Brayton Cycle (Gas Turbine) Schematic Layout



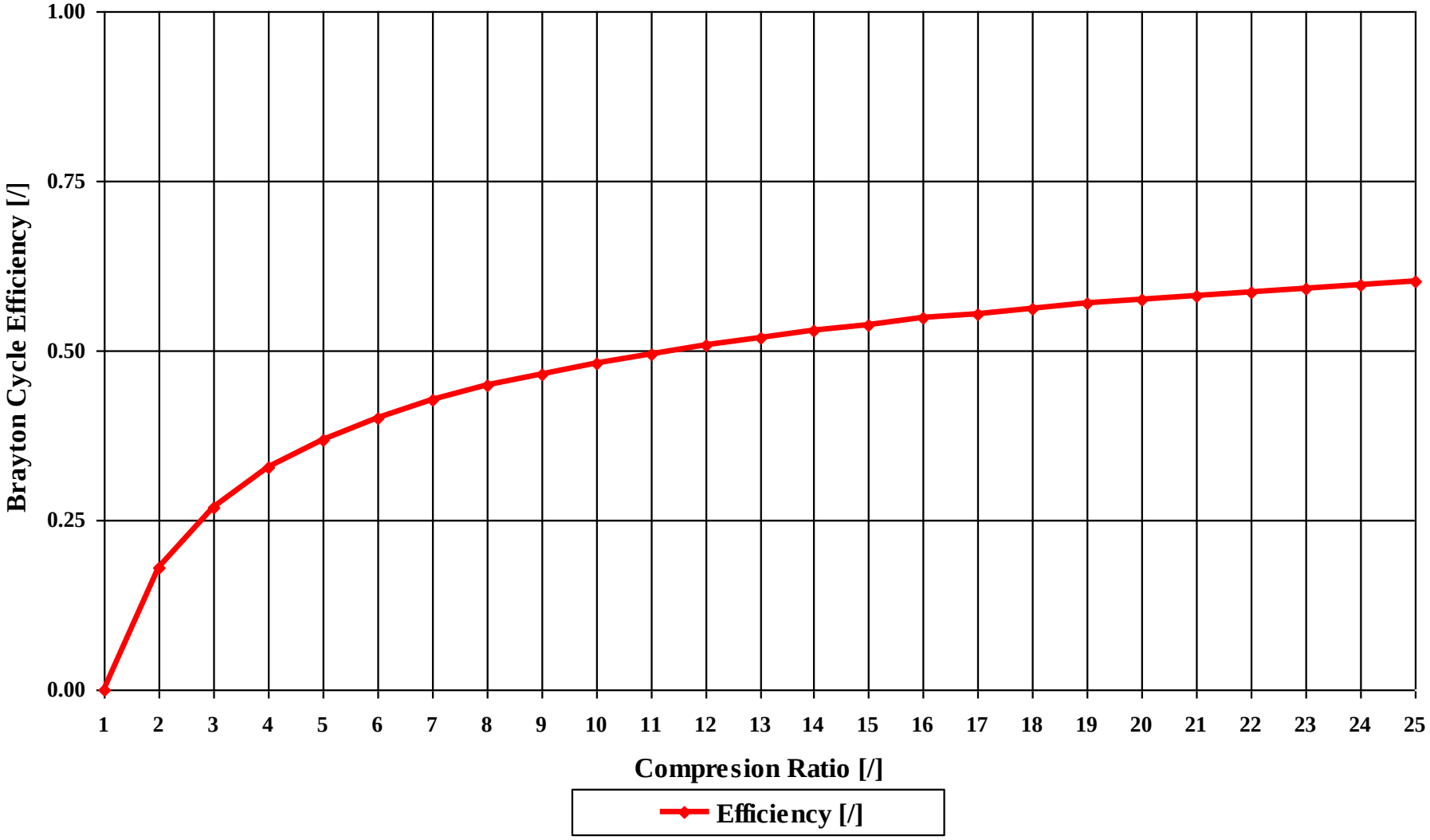
Brayton Cycle (Gas Turbine) T - s Diagram

Input and Output Data

```
Compression initial inlet pressure [atm]: 1
Compression final outlet pressure [atm]: 25
Working fluid kappa [/]: 1.4
```

Step [/]	pin [atm]	pout [atm]	Efficiency [/]
1	1	1	0
2	1	2	0.179665
3	1	3	0.2694
4	1	4	0.32705
5	1	5	0.368615
6	1	6	0.400663
7	1	7	0.426487
8	1	8	0.447955
9	1	9	0.466224
10	1	10	0.482053
11	1	11	0.495967
12	1	12	0.508343
13	1	13	0.519459
14	1	14	0.529527
15	1	15	0.53871
16	1	16	0.547138
17	1	17	0.554915
18	1	18	0.562124
19	1	19	0.568837
20	1	20	0.575109
21	1	21	0.580991
22	1	22	0.586524
23	1	23	0.591742
24	1	24	0.596676
25	1	25	0.601353

Brayton Cycle Efficiency

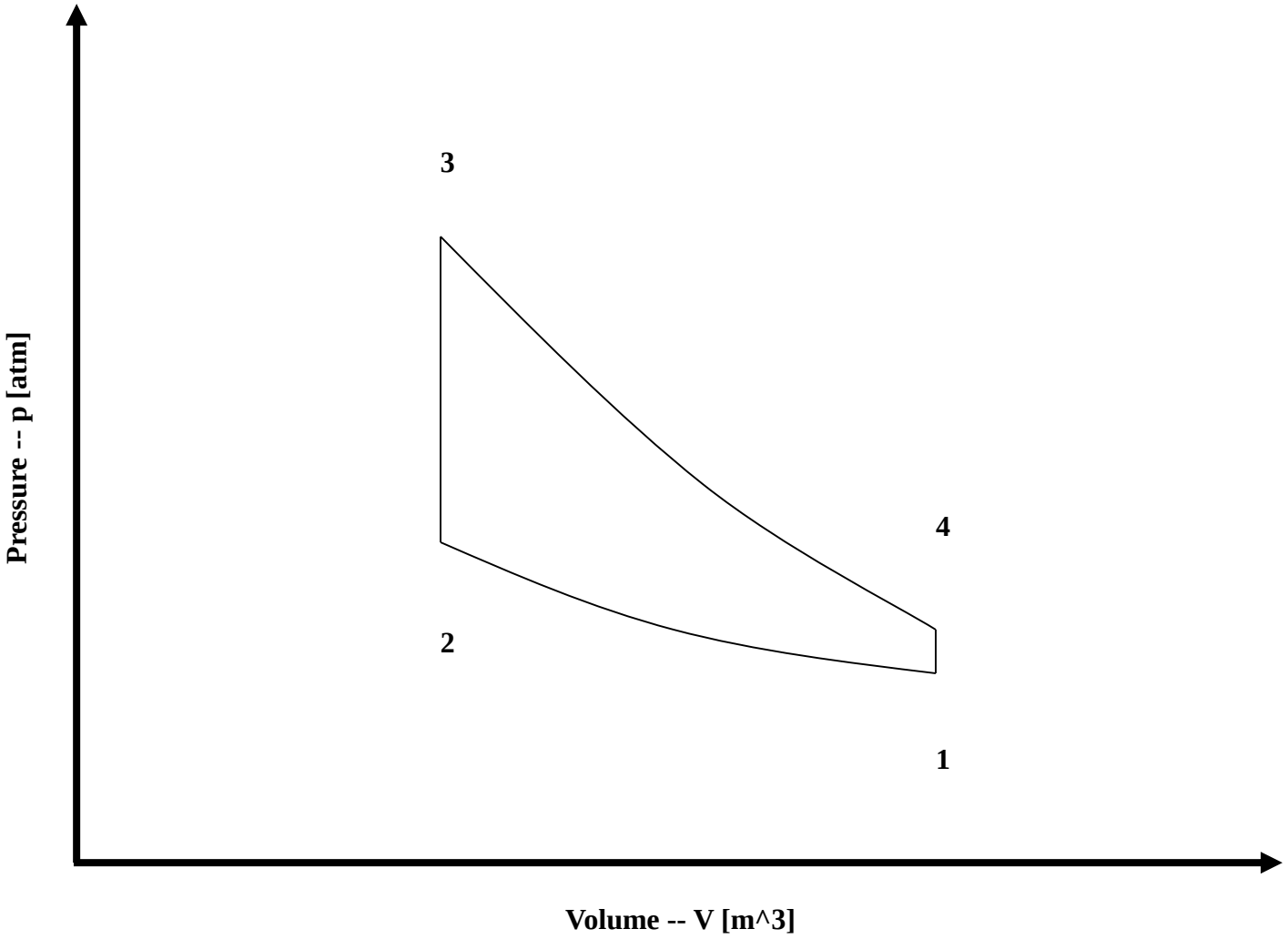


Working Fluid: Air

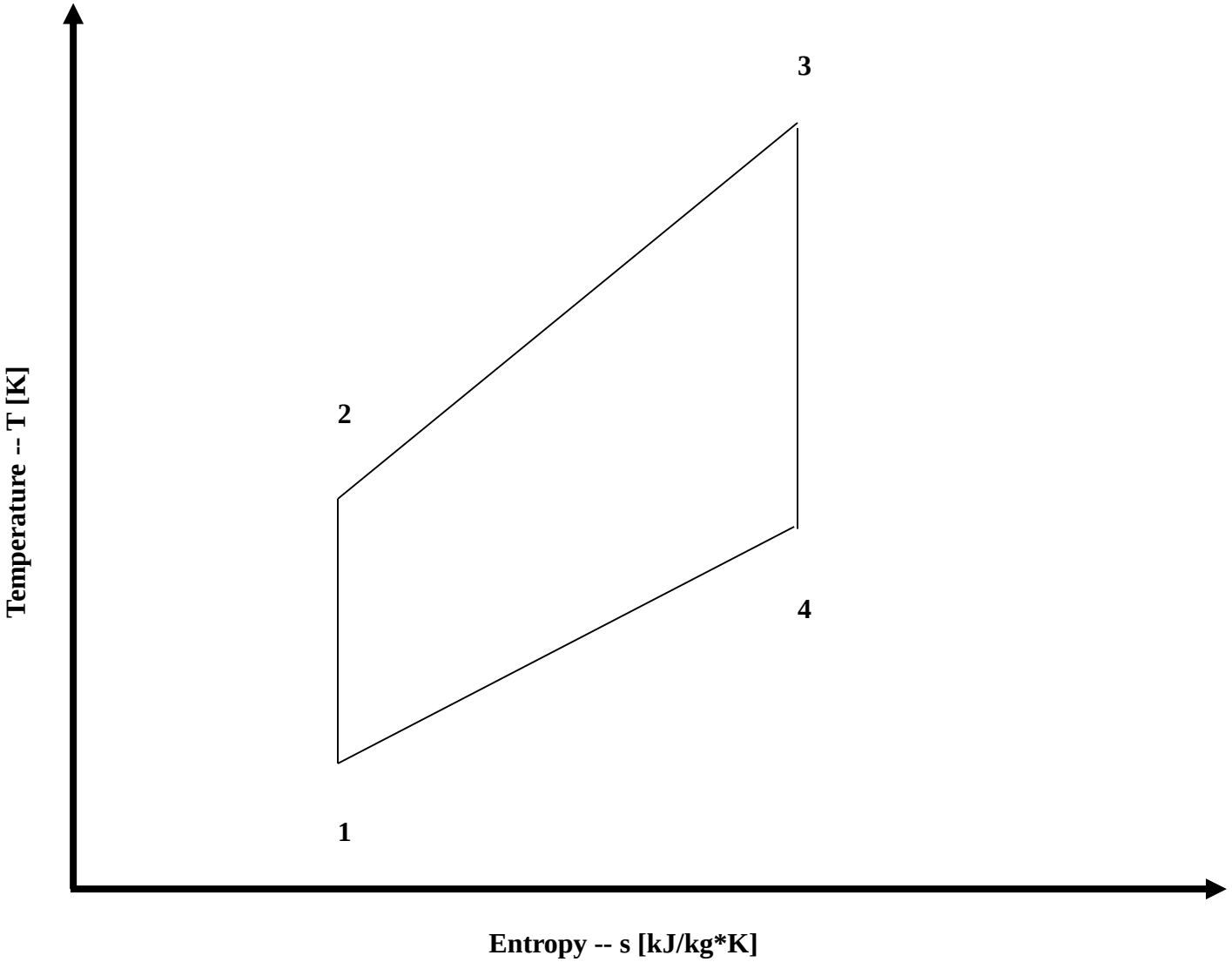
Compression Inlet Temperature: 298 [K] and Pressure: 1 [atm]

Otto Cycle Analysis

Here are some of the basic Otto Cycle data tables and plots.



Otto Cycle p - V Diagram



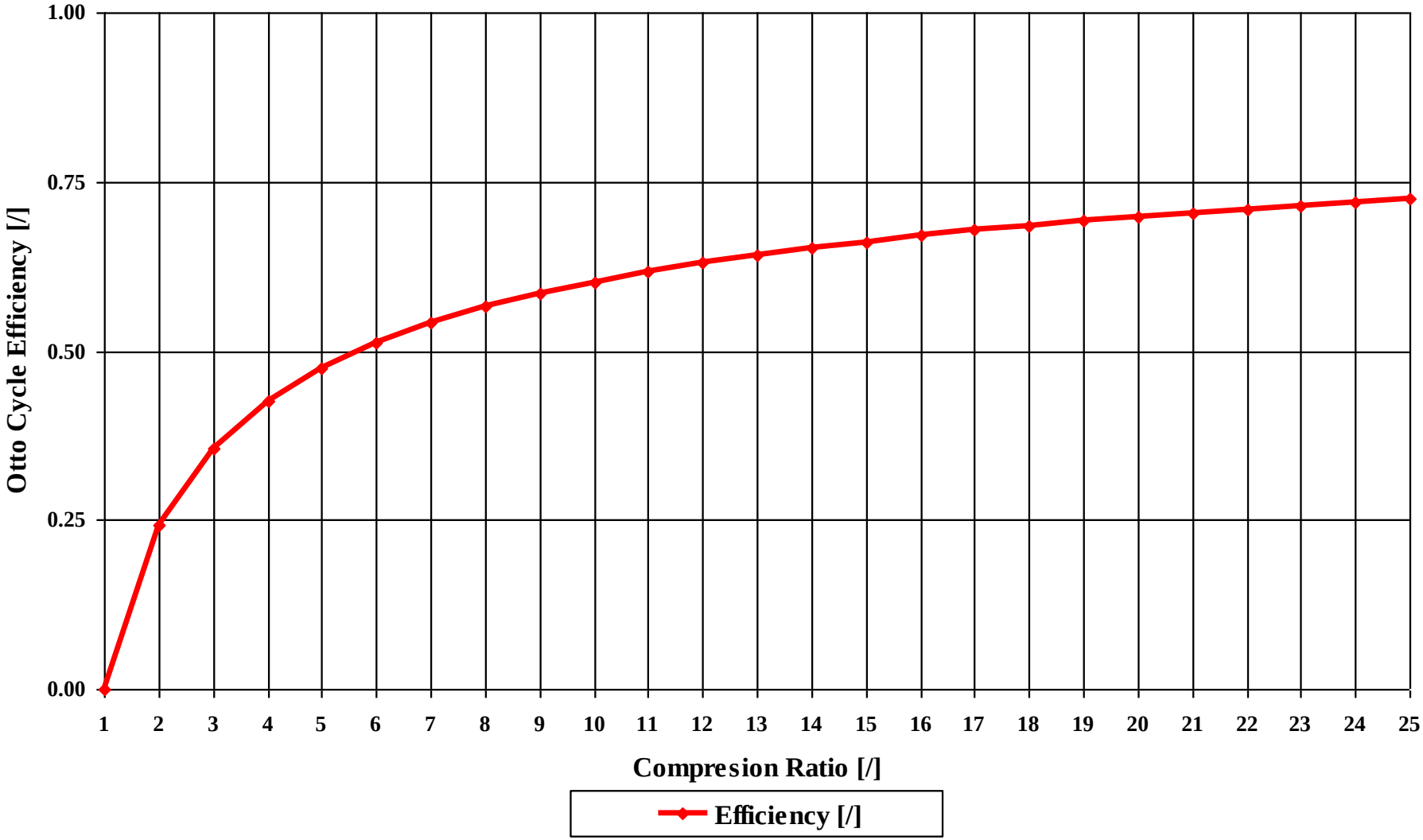
Otto Cycle T - s Diagram

Input and Output Data

```
Compression final volume [m^3]: 1
Compression initial volume [m^3]: 25
Compression delta volume step [m^3]: 1
Working fluid kappa [/]: 1.4
```

Step [/]	Vfinal [m^3]	Vinitial [m^3]	Efficiency [/]
1	1	1	0
2	1	2	0.242142
3	1	3	0.355606
4	1	4	0.425651
5	1	5	0.474694
6	1	6	0.511641
7	1	7	0.540843
8	1	8	0.564725
9	1	9	0.584756
10	1	10	0.601893
11	1	11	0.616785
12	1	12	0.629893
13	1	13	0.641555
14	1	14	0.652024
15	1	15	0.661496
16	1	16	0.670123
17	1	17	0.678026
18	1	18	0.685304
19	1	19	0.692037
20	1	20	0.698291
21	1	21	0.704122
22	1	22	0.709577
23	1	23	0.714695
24	1	24	0.719511
25	1	25	0.724054

Otto Cycle Efficiency

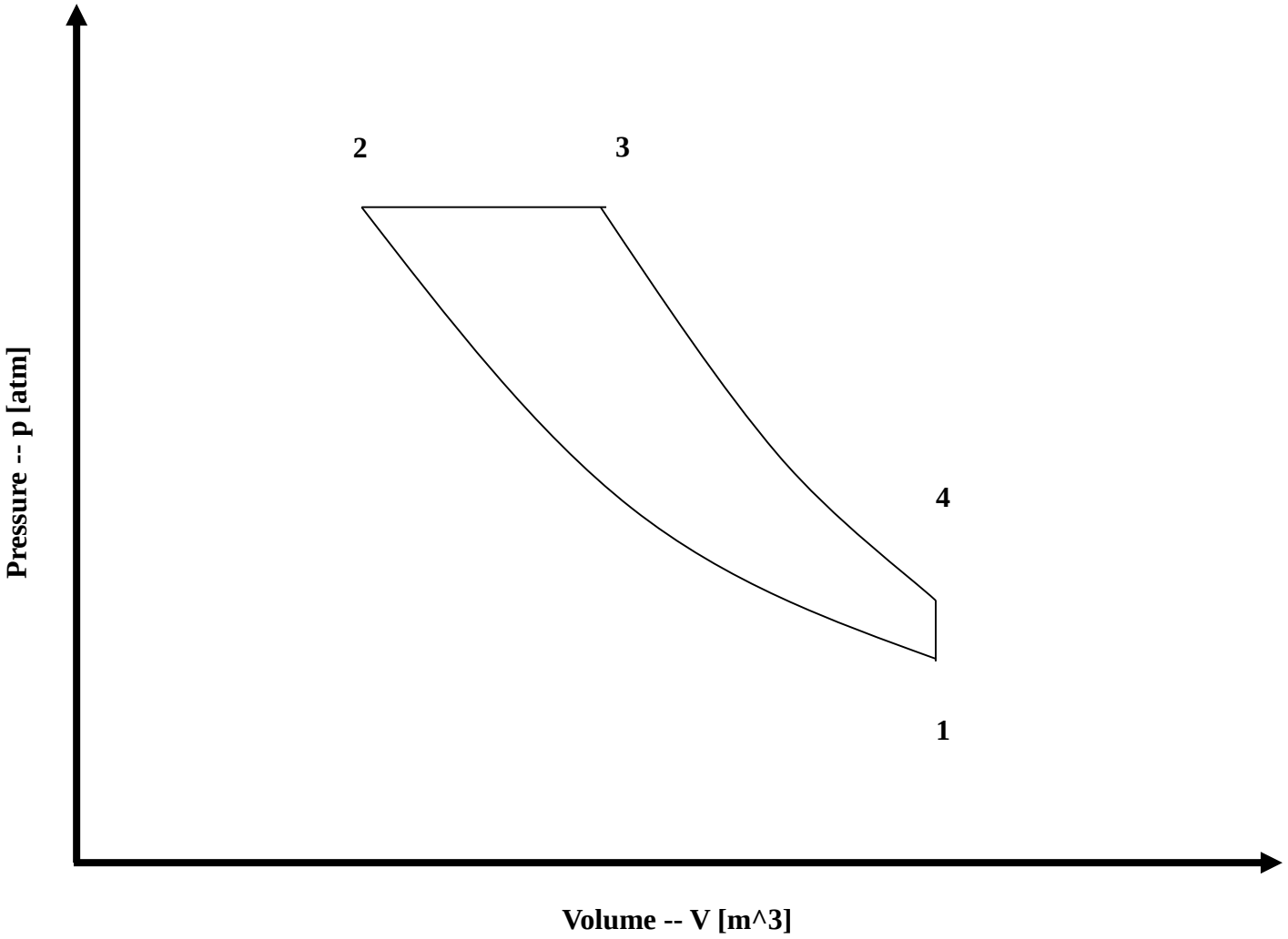


Working Fluid: Air

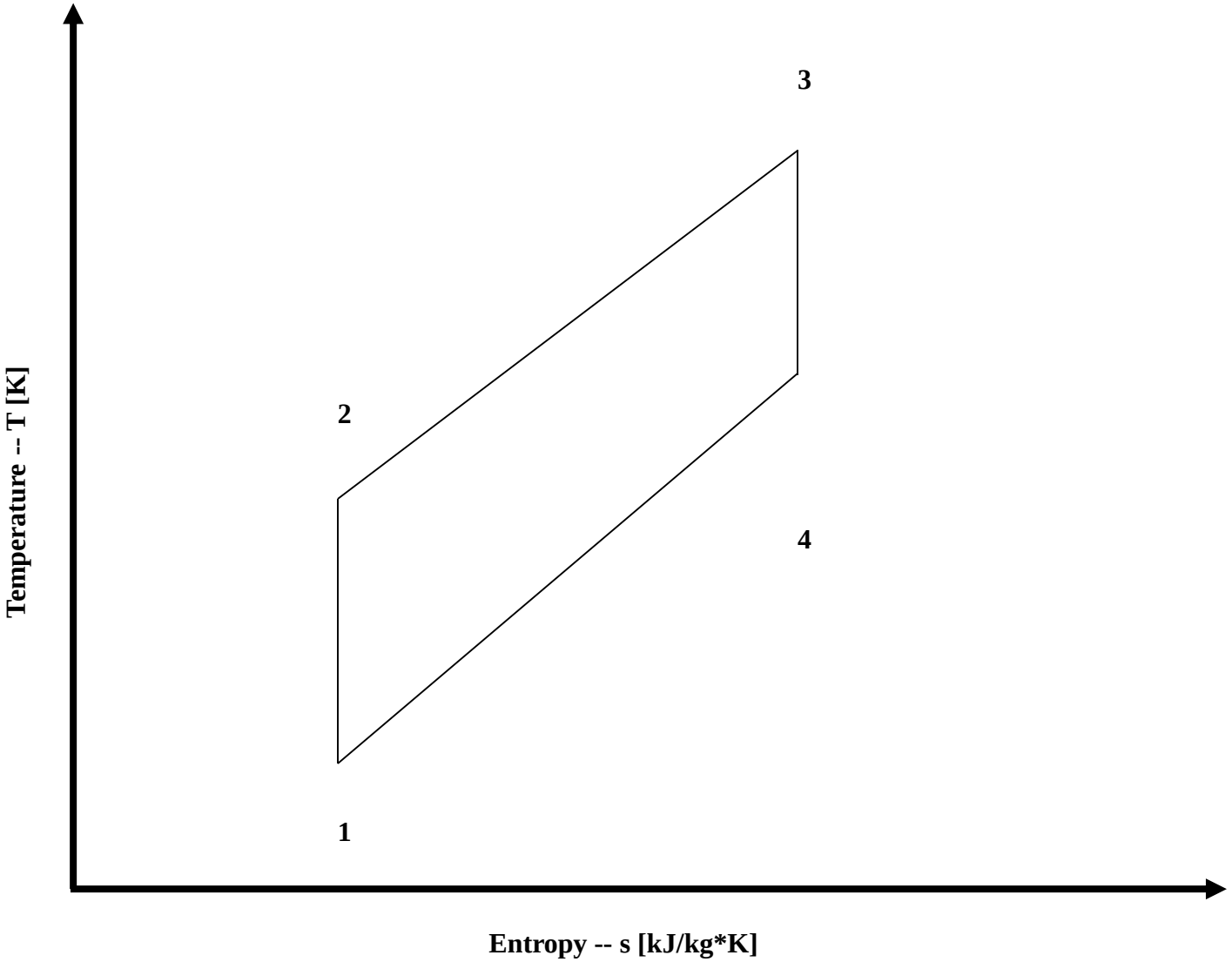
Compression Inlet Temperature: 298 [K] and Pressure: 1 [atm]

Diesel Cycle Analysis

Here are some of the basic Diesel Cycle data tables and plots.



Diesel Cycle p - V Diagram



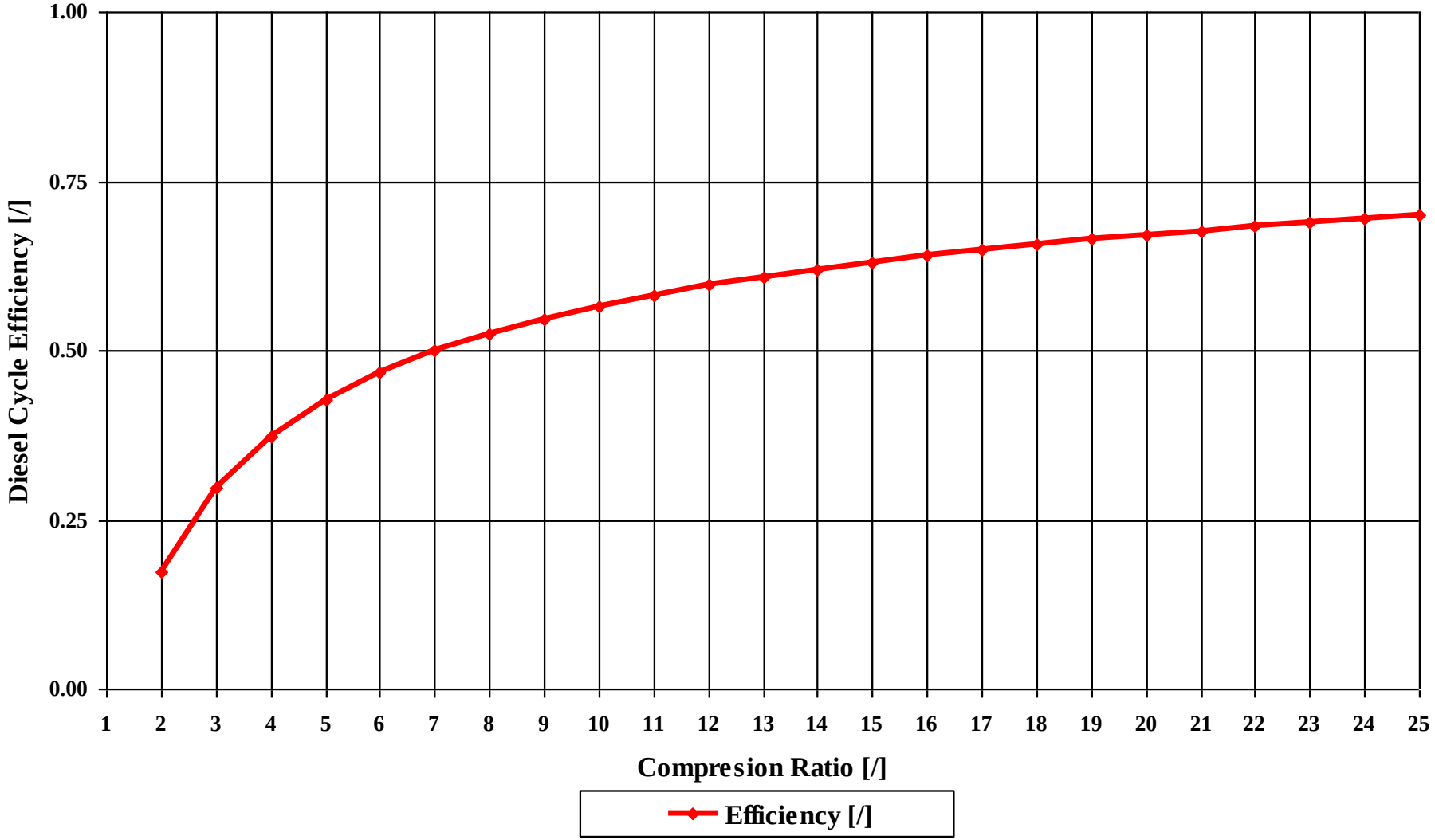
Diesel Cycle T - s Diagram

Input and Output Data

```
Compression final volume [m^3]: 1
Compression initial volume [m^3]: 25
Compression cutoff volume [m^3]: 1.5
Compression delta volume step [m^3]: 1
Working fluid kappa [/]: 1.4
```

Step [/]	Vfinal [m^3]	Vcutoff [m^3]	Vinitial [m^3]	Efficiency [/]
1				
2	1	1.5	2	0.172723
3	1	1.5	3	0.296581
4	1	1.5	4	0.373042
5	1	1.5	5	0.426578
6	1	1.5	6	0.466908
7	1	1.5	7	0.498786
8	1	1.5	8	0.524854
9	1	1.5	9	0.546721
10	1	1.5	10	0.565427
11	1	1.5	11	0.581683
12	1	1.5	12	0.595992
13	1	1.5	13	0.608722
14	1	1.5	14	0.620151
15	1	1.5	15	0.63049
16	1	1.5	16	0.639907
17	1	1.5	17	0.648534
18	1	1.5	18	0.656479
19	1	1.5	19	0.663828
20	1	1.5	20	0.670655
21	1	1.5	21	0.67702
22	1	1.5	22	0.682975
23	1	1.5	23	0.688562
24	1	1.5	24	0.693819
25	1	1.5	25	0.698778

Diesel Cycle Efficiency



Working Fluid: Air

Compression Inlet Temperature: 298 [K] and Pressure: 1 [atm] – Cutoff Volume Ratio: 1.5 [/]