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## APP Minimum Required Input Data

### Configuration

- Operating weight empty
- Fuel mass
- Positive g-limit
- Negative g-limit
- Mach-limit table (Mach/Altitude) (Fig.1)

### Aerodynamics

- Reference area
- Zero-lift drag coefficient table (Mach/ $C_{D0}$ ) for selected altitudes (Fig.2)
- Drag polar table ( $C_L/C_{D1}$ ) for selected Mach numbers (not including zero-lift drag) (Fig.3)
- Lift coefficient table (AoA/ $C_L$ ) for selected Mach numbers (Fig.4)
- Maximum lift coefficient table (Mach/ $C_{Lmax}$ ) (Fig.5)

### Propulsion

- Maximum thrust table (Mach/Thrust) for selected altitudes (Fig.6)
- Minimum (flight idle) thrust table (Mach/Thrust) for selected altitudes (Fig.7)
- Fuel flow table (Thrust/Fuel flow) for selected Mach numbers for selected altitudes (Fig.8)

### Comments

- two or more input sets for maximum thrust settings can be defined
- Idle thrust can be assumed to be 0 if unknown.
- All engine data are installed performance

### Preferred Units:

Altitude:     **[m]**,    [ft]  
Area:         **[m<sup>2</sup>]**, [ft<sup>2</sup>]  
AoA:         **[deg]**  
Thrust:       **[N]**,    [KN], [lbf]  
Fuel flow:    **[kg/s]**, [lbs/hr], [t/hr]

	Altitude [m]	Placard Mach [-]
1	0	1.2
2	11000	1.5
3	20000	1.5
4		
5		

**Fig.1: Mach-limit table**

	Mach [-]	CDo [-]
1	0	0.021
2	0.3	0.02
3	0.5	0.0195
4	0.8	0.019
5	0.85	0.019
6	0.9	0.021
7	1	0.039
8	1.05	0.041
9	1.1	0.041
10	1.3	0.04
11	1.4	0.039
12	1.6	0.04

**Fig.2: Zero-lift drag coefficient table**

	CL [-]	CDI [-]
1	0	0
2	0.2	0.00555515
3	0.3	0.0129301
4	0.4	0.0242406
5	0.6	0.056
6	0.8	0.118
7	1	0.215
8	1.1	0.3
9	1.2	0.39
10	1.3	0.520001
11		

**Fig.3: Drag polar table**

	AoA [deg]	CL [-]
1	0	0
2	45	3.15
3		
4		
5		
6		
7		
8		
9		
10		
11		

**Fig.4: Lift coefficient table**

	Mach [-]	CLmax [-]
1	0	1.33
2	0.3	1.33
3	0.5	1.27
4	0.8	1.15
5	0.85	1.17
6	0.9	1.18
7	1	1.125
8	1.05	1.05
9	1.1	0.925
10	1.3	0.72
11	1.4	0.68
12	1.6	0.6
13		

**Fig.5: Maximum lift coefficient table**

	Mach [-]	Max. Thrust [N]
1	0	24990.1
2	0.2	24990.1
3	0.4	25555.9
4	0.6	27677.7
5	0.8	31001.9
6	1	35363.4
7	1.2	39842.8
8	1.4	43756.2
9	1.6	43567.7
10	1.8	38664
11		

**Fig.6: Maximum thrust table**

	Mach [-]	Min. Thrust [N]
1	0	22668.1
2	0.2	22113.9
3	0.4	21218
4	0.6	21123.7
5	0.8	21925.3
6	1	22632.5
7	1.2	20840.8
8	1.4	19000
9	1.6	16732.6
10		

**Fig.7: Minimum thrust table**

	Thrust [N]	Fuel Flow [kg/sec]
1	-1201.02	0.0982783
2	1850.46	0.180832
3	4949.98	0.254869
4	8327.07	0.353802
5	13693.4	0.543807
6	15765.9	0.617188
7	20725.2	0.799331
8	21123.7	0.814626
9	26263.2	1.26708
10	31402.6	1.81917
11	36542.1	2.47073
12		
13		
14		

**Fig.8: Fuel flow table**