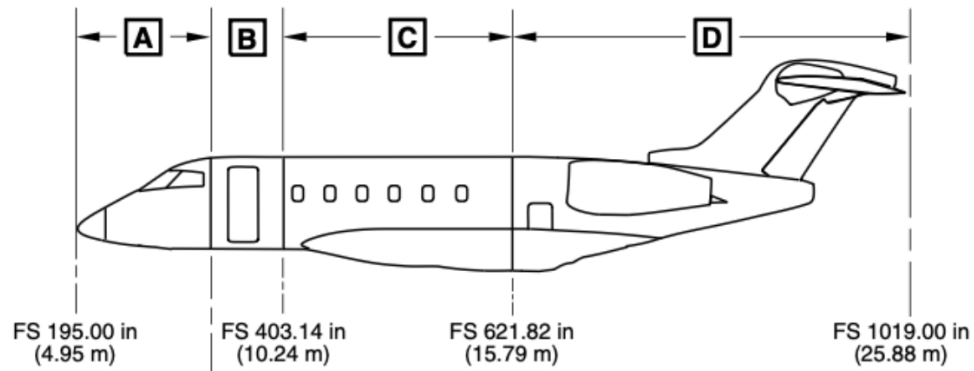


CHALLENGER 350

BD-100-1A10

WEIGHT AND BALANCE



Aircraft Standard Stations – Use the following ARMs for this exercise.

Aircraft & Baggage			
	Weight (lb)	Arm (in)	Moment/100
Basic Empty Weight	23981	607.06	145579.06
Taxi Fuel	200	—	0.00
Crew Carry on Baggage	40	385.00	154.00
Crew Baggage	60	650.00	390.00
Baggage		650.00	0.00

Aircraft Items			
	Weight (lb)	Arm (in)	Moment/100
Flight Manuals	30	320.00	96.00
Galley Supplies	109	366.30	399.27
Aft Potable Water	20	636.00	127.20
Lav Chemicals	20	610.00	122.00
Lav Supplies	5	610.00	30.50
Aft Equip Bay Ladder	9	737.10	66.34

Occupants			
	Weight (lb)	Arm (in)	Moment/100
Pilot		305.20	0.00
Copilot		305.20	0.00
Seat 1		422.70	0.00
Seat 2		422.70	0.00
Seat 3		469.30	0.00
Seat 4		471.30	0.00
Seat 5		518.70	0.00
Seat 6		520.70	0.00
Seat 7		565.30	0.00
Seat 8		568.30	0.00
Seat 9 LAV		613.00	0.00

True Empty Weight (TEW/BEW) - The actual weighed empty weight of the aircraft including all permanently installed equipment, engine oil, unusable fuel, and hydraulic fluid.

For this example, we will use: 23,981 lbs., Arm: 607.06 Arm, Moment: 145577.85,
%Mac: 41

Operating Weight Empty – TEW/BEW plus operating items (crew, crew baggage, flight manuals, and standard cabin equipment). This is the starting point for flight weight calculations.

Add the following:

Item	Weight (lb)	Arm (in)
Flight Manuals	30	320
Crew Baggage	40	385
Flight Crew	398	305.2

OWE CALCULATION FORM							
ITEM	OP	WEIGHT	Xarm	MOMENT 1 000	%MAC	REFERENCE	NOTE
		lb (kg)	in (m)	lb in (kg m)			
TRUE EMPTY WEIGHT (TEW)						LAST WEIGHING RESULT	[1] [2]
OPERATING ITEMS							
FLIGHT COMPARTMENT CREW	+					01-40-10	
CREW BAGGAGE	+					01-40-10	
FLIGHT MANUALS / MAGAZINES	+					01-40-10	
OPERATING WEIGHT EMPTY (OWE)	=						[1]
NOTES: [1] %MAC (imperial) = $[(Xarm - 556.675) / 112.22] \times 100$ %MAC (SI) = $[(Xarm - 14.13) / 2.85] \times 100$ [2] Last weighing result for TEW given in Chapter 2, Aircraft Reports.							

Payload Item Form - Use for the passengers and place the total in the "ADJUSTMENT" line in the ZFW buildup on the next page. Add the following standard items as well:

Item	Weight (lb)	Arm (in)
Galley Supplies	109	366.3
Aft Potable Water	20	636
Lav Chemicals	20	610
Lav Supplies	5	610
Aft Equip Bay Ladder	9	737.1
Passenger – Seat 1	81	422.7
Passenger – Seat 2	81	422.7
Passenger – Seat 3	110	469.30
Passenger – Seat 4	189	469.30

[illegible]

Zero Fuel Weight - OWE plus payload (passengers and baggage). The aircraft weight before fuel is added. "ADJUSTMENT" is from the Payload Item Form.

Item	Weight (lb)	Arm (in)
Check-In Baggage	460	650

WEIGHT BUILD-UP – ZFW CALCULATION FORM							
ITEM	OP	WEIGHT	Xarm	MOMENT 1000	%MAC	REFERENCE	NOTE
		lb (kg)	in (m)	lb in (kg m)			
OPERATING WEIGHT EMPTY (OWE)	=					01-90-10	[1] [2]
PAYLOAD ITEMS							
CHECK-IN BAGGAGE OR CARGO	+					01-60-00	
ADJUSTMENT							
ADJUSTMENT	+					01-40-10	[3]
ZERO FUEL WEIGHT – ZFW (GEAR DOWN)							
ZERO-FUEL-WEIGHT GEAR DOWN (ZFW GEAR DOWN)	=					01-00-50	[2]
GEAR UP	+			-4.6 (-0.053)		01-00-80	
ZERO FUEL WEIGHT – ZFW (GEAR UP)							
ZERO-FUEL-WEIGHT GEAR UP (ZFW GEAR UP)	=					01-00-50	[2]
Notes: [1] Results from previous sum. [2] %MAC (imperial) = $[(Xarm_{CG} - 556.675) / 112.22] \times 100$ %MAC (SI) = $[(Xarm_{CG} - 14.13) / 2.85] \times 100$ [3] To use when necessary.							

Ramp Weight - ZFW plus total fuel load. The weight of the aircraft ready for taxi.

WEIGHT BUILD-UP – RW CALCULATION FORM							
ITEM	OP	WEIGHT	Xarm	MOMENT 1 000	%MAC	REFERENCE	NOTE
		lb (kg)	in (m)	lb in (kg m)			
ZERO FUEL WEIGHT – ZFW (GEAR DOWN)							
ZERO-FUEL-WEIGHT GEAR DOWN (ZFW GEAR DOWN)	=					01-00-50	[1] [2]
FUEL							
FUEL TANK	+					01-20-10	
RAMP WEIGHT – RW (GEAR DOWN)							
RAMP-WEIGHT GEAR DOWN (RW GEAR DOWN)	=					01-00-50	[2]
Notes: [1] Results from previous sum. [2] %MAC (imperial) = $[(Xarm_{CG} - 556.675) / 112.22] \times 100$ %MAC (SI) = $[(Xarm_{CG} - 14.13) / 2.85] \times 100$							

Takeoff Weight - Ramp weight minus taxi fuel burn. The actual weight at brake release.

WEIGHT BUILD-UP – TOW CALCULATION FORM							
ITEM	OP	WEIGHT	Xarm	$\frac{\text{MOMENT}}{1\,000}$	%MAC	REFERENCE	NOTE
		lb (kg)	in (m)	lb in (kg m)			
ZERO FUEL WEIGHT – ZFW (GEAR DOWN)							
ZERO-FUEL-WEIGHT GEAR DOWN (ZFW GEAR DOWN)	=					01-00-50	[1][2]
FUEL							
REMAINING FUEL PRIOR TAKE-OFF	+					01-20-10	
TAKE-OFF WEIGHT – TOW (GEAR DOWN)							
TAKE-OFF-WEIGHT GEAR DOWN (TOW GEAR DOWN)	=					01-00-50	[2]
Notes: [1] Results from previous sum. [2] %MAC (imperial) = $[(X_{\text{arm}_{\text{CG}}} - 556.675) / 112.22] \times 100$ %MAC (SI) = $[(X_{\text{arm}_{\text{CG}}} - 14.13) / 2.85] \times 100$							

Fuel Curve Boundary Points - Critical points on the fuel curve that define the CG path during fuel burn. Essential for verifying the aircraft remains within CG limits throughout flight.

WEIGHT BUILD-UP – FCBP1 CALCULATION FORM							
ITEM	OP	WEIGHT	Xarm	MOMENT 1000	%MAC	REFERENCE	NOTE
		lb (kg)	in (m)	lb in (kg m)			
ZERO FUEL WEIGHT – ZFW (GEAR DOWN)							
ZERO-FUEL-WEIGHT GEAR DOWN (ZFW GEAR DOWN)	=					01-00-50	[1] [2]
FUEL							
FUEL QUANTITY FOR FUEL-CURVE BOUNDARY-POINT	+	11660 (5289)	566.1 (14.38)	6600.7 (76.049)		01-20-10	
FUEL-CURVE BOUNDARY-POINT 1 – FCBP1 (GEAR DOWN)							
FUEL-CURVE BOUNDARY- POINT 1 – FCBP1 (GEAR DOWN)	=						[2]
ADD GEAR RETRACTION MOMENT	+			-4.6 (-0.053)		01-00-80	[3]
FUEL-CURVE BOUNDARY-POINT 1 – FCBP1 (GEAR UP)							
FUEL-CURVE BOUNDARY- POINT 1 – FCBP1 (GEAR UP)	=					01-00-50	[2]
Notes: [1] Results from previous sum. [2] %MAC (imperial) = $[(Xarm_{CG} - 556.675) / 112.22] \times 100$ %MAC (SI) = $[(Xarm_{CG} - 14.13) / 2.85] \times 100$ [3] The total aircraft moment decreases by approximately 4600 lb in (53 kg m) when the landing gears are retracted.							

WEIGHT BUILD-UP – FCBP2 CALCULATION FORM							
ITEM	OP	WEIGHT	Xarm	MOMENT 1000	%MAC	REFERENCE	NOTE
		lb (kg)	in (m)	lb in (kg m)			
ZERO FUEL WEIGHT – ZFW (GEAR DOWN)							
ZERO-FUEL-WEIGHT GEAR DOWN (ZFW GEAR DOWN)	=					01-00-50	[1] [2]
FUEL							
FUEL QUANTITY FOR FUEL-CURVE BOUNDARY-POINT	+	9310 (4223)	562.0 (14.27)	5232.2 (60.282)		01-20-10	
FUEL-CURVE BOUNDARY-POINT 2 – FCBP2 (GEAR DOWN)							
FUEL-CURVE BOUNDARY- POINT 2 – FCBP2 (GEAR DOWN)	=						[2]
ADD GEAR RETRACTION MOMENT	+			-4.6 (-0.053)		01-00-80	[3]
FUEL-CURVE BOUNDARY-POINT 2 – FCBP2 (GEAR UP)							
FUEL-CURVE BOUNDARY- POINT 2 – FCBP2 (GEAR UP)	=					01-00-50	[2]
Notes: [1] Results from previous sum. [2] %MAC (imperial) = $[(Xarm_{CG} - 556.675) / 112.22] \times 100$ %MAC (SI) = $[(Xarm_{CG} - 14.13) / 2.85] \times 100$ [3] The total aircraft moment decreases by approximately 4600 lb in (53 kg m) when the landing gears are retracted.							

Landing Weight - Takeoff weight minus enroute fuel burn. The projected weight at destination.

WEIGHT BUILD-UP – LW CALCULATION FORM							
ITEM	OP	WEIGHT	Xarm	MOMENT 1 000	%MAC	REFERENCE	NOTE
		lb (kg)	in (m)	lb in (kg m)			
ZERO FUEL WEIGHT – ZFW (GEAR DOWN)							
ZERO–FUEL–WEIGHT GEAR DOWN (ZFW GEAR DOWN)	=					01–00–50	[1][2]
FUEL							
REMAINING FUEL AT LANDING	+					01–20–10	
LANDING WEIGHT – LW (GEAR DOWN)							
LANDING–WEIGHT GEAR DOWN (LW GEAR DOWN)	=					01–00–50	[2]
Notes: [1] Results from previous sum. [2] %MAC (imperial) = $[(Xarm_{CG} - 556.675) / 112.22] \times 100$ %MAC (SI) = $[(Xarm_{CG} - 14.13) / 2.85] \times 100$							

