

A340-200 & -300 specifications

The A340-200 and -300 family have a complex system of specification weights and fuel tank capacities, plus three main engine variants.

The A340 is the four-engined, long-range, widebody sister to the twin-engined A330. Powered by the CFM56-5C, the A340 is available in two fuselage lengths, with the shorter A340-200 capable of flying up to 8,000nm. The longer variant -300 has a range of up to 7,200nm.

The flightdeck design was finalised in 1988 and is virtually identical to that of the A320 family, with a six-screen electronic flight instrument system (EFIS) and side-stick controllers. Like the A320 family, the A330/340 has a digital fly-by-wire flight control system. This allows the two aircraft to benefit from a common type rating and cross-crew-qualification (CCQ). The A330 and A340 flightdecks differ only in the number of engine throttles and engine-related displays.

There are three variants each of the A340-200 series and of the A340-300 series: the A340-211/-311, A340-212/-312; and A340-213/-313. The final digit on the variant suffix refers to the installed engine thrust rating, not to maximum take-off weight (MTOW) capability. The MTOW capability of each variant is described in more detail (see *A340 modification programmes*, page 13).

The A340-200/-300 family has complex weight specifications. There are first 'basic' variants, high gross weight models and a large number of different weight specification variants in between. There is an Airbus modification number and weight variant code for each weight specification version (see *first table*, page 10). The overall weight specifications are summarised (see *table*, page 8).

According to Airbus, the basic -200 series can carry its standard 263 passengers up to 7,350nm (566,588lbs MTOW), while the high gross weight (HGW) version (606,271lbs MTOW) with two auxiliary centre tanks (ACTs) has a range of 8,000nm with 239 passengers in three classes. The HGW variant is known as the A340-2000.

The -300 series can carry its standard 295 passengers over 6,650nm with an MTOW of 566,588lbs, and over 6,700nm with the intermediate 573,202lbs MTOW variant. The HGW version with 597,500lbs MTOW (referred to as the A340-300E) has a range of 7,100nm, or 7,200nm with one ACT.

Airbus states that the A340-300's typical operating empty weight (OEW) is

287,000lbs. A survey of airlines' basic empty weights (BEW) and their aircraft prepared for service (APS) weights reveals that BEWs are 277,500-286,000lbs and APS weights are 290,000-293,000lbs. APS comprises the BEW plus the weight of crew and their baggage, galleys loaded with food, drink and all other catering items, newspapers, magazines, blankets, pillows and water. The APS weight therefore excludes any payload or fuel.

Powerplant options

The A340-200/-300 is powered by three thrust variants of the CFM56-5C. The lowest thrust rating is 31,200lbs provided by the CFM56-5C2 for the A340-211/-311. The intermediate thrust rating is 32,500lbs provided by the CFM56-5C3 for the -212/-312, which became available in March 1994. The highest thrust rating is 34,000lbs provided by the -5C4 for the A340-213/-313, which became available from 1995.

The original -5C2/-5C3 design specified a maximum exhaust gas temperature (EGT) of 950°C. The more powerful -5C4 entered service with Kuwait Airways and Air Canada, and has a higher EGT of 975°C. Compared with the original -5C2 and -5C3, the -5C4 uses improved fan-blade and booster inlet guide vane (IGV) airfoils which allow an increase in the N1 fan speed limit, as well as a fuel pump for 34,000lbs thrust rating.

Since the -5C4 model entered service, CFMI has offered progressive upgrades to allow existing -5C2s and -5C3s to operate with improved EGTs (965°C and 975°C) and thus improve time on wing. Engines with these two respective modifications were denoted with /F and /G suffixes. Specifically, the /F build-standard incorporates improved materials in the low pressure turbine (LPT) to enable it to operate at a take-off EGT redline of 965°C, compared to the original 950°C redline (for a limited time during the take-off phase only) and with a maximum continuous EGT raised from 915°C to 930°C. It is estimated that, depending on specific airline operation parameters, the /F could provide an additional two to three years on-wing time before the engine's first overhaul.

The /G build standard became available from 1995. This incorporates additional high pressure turbine (HPT) improvements over the /F, offers the same



The A340-200 and -300 have a complex system of a matrix of MTOW, MLW and MZFW specification weights. There are up to 22 specification weight permutations.

A340-200/-300 FAMILY SPECIFICATIONS

Variant	A340-200	A340-300
MTOW lbs	558,872-606,271	558,872-609,578
MLW lbs	399,037-407,855	410,060-423,288
MZFW lbs	372,581-381,400	383,604-403,446
OEW lbs (no tare)	282,400-286,000	287,000-291,300
Basic empty weight lbs (approx)	272,000-276,000	277,500-286,000
Typical gross structural payload lbs	57,420	64,900
Fuel capacity USG	36,489-40,782	37,39,138
Seats (3 class)	261	295
Range nm	7,350-8,000	6,650-7,200
Belly freight cu ft	4,813	5,751

975°C take-off EGT redline of the higher thrust -5C4, and a maximum continuous EGT rising from 915°C to 940°C.

Furthermore, from 1996, CFMI manufactured -5C2 and -5C3 engines with /F or /G modifications incorporated on the production line as standard. The engines were also built with components that allow them to operate at the -5C4's thrust rating of 34,000lbs, and given a /4 suffix to denote that they have the full -5C4 hardware, including the higher-speed fan components, and so are capable of a

rating of 34,000lbs thrust. The -5C2/4 and -5C3/4 engines are de-rated at 31,200lbs and 32,000lbs thrust, but both can have their ratings increased to 34,000lbs by purchasing the correct engine control unit (ECU) software from CFMI. Conversely, if an operator needs to de-rate a CFM56-5C4 to a -5C3 or -5C2 thrust rating for operation on the -211/-311 or -212/-312, or for an 'intermix' situation, the resultant engine designation becomes the -5C3/4 or -5C2/4.

The final version of the engine is the -5C4/P variant. This incorporates all prior improvements to the /G variant, while adding further ones. Available from 2003, the CFM56-5C4/P adds 3D-aero-turbomachinery for further improved EGT and time-on-wing performance. It has been ordered by Swiss, South African Airways, Air Mauritius and, more recently, by Finnair. A modification kit is also available to take -5C4, -5C3/G4 and -5C2/G4 engines to -5C4/P standard (see *A340-200/-300 modification programmes, page 13*).

Fuel capacities

Unlike the A330-300, the A340-200 and -300 both feature a centre section fuel tank holding 73,136lbs (10,916US Gallons; USG) usable fuel as standard.

The standard fuel capacities of the A340-211, -212 and -213 are 36,489USG and 36,520USG for aircraft configuration numbers 001 and 002. Standard fuel capacity for aircraft configuration number 021 is 36,992USG (see *second table, page 10*).

In addition, aircraft configuration number 021 can carry extra fuel in optional 1,900USG ACT fuel tanks. Two can be installed on the -200 series, providing another 3,800USG in the rear



cargo hold, taking the total fuel capacity for this specification up to 38,887USG with one ACT, and 40,782USG with two ACTs (see second table, page 10).

There are three standard fuel configurations for the A340-311, -312 and -313. The standard fuel configuration depends on the configuration number of the aircraft (see second table, page 10).

There are three standard fuel capacities for the A340-311, -312 and -313: 36,489USG, 37,243USG and 37,016USG (see second table, page 10).

Aircraft weight specification variant 020 can also have an ACT fitted, taking total fuel capacity up to 39,138USG (see second table, page 10).

Alan Pardoe, head of A330/340 product marketing at Airbus, points out that in practice, however, very few A340-300s were actually delivered with provision for an ACT, and most A340-300s fly without one.

Accommodation & interior

Airbus's standard long-range seating configuration for the A340-300 series is 295 passengers, with 12 in first class (62-inch pitch), 42 in business (40-inch pitch) and 241 in economy (32-inch pitch). The -300 has a standard configuration of 335 passengers in a two-class layout: 30 in

business class (40-inch pitch), and 305 in economy (32-inch pitch).

Actual airline configurations have fewer seats. For example, Virgin Atlantic's 240-seat, three-class interior comprises 34 first-, 35 business-, and 171 economy-class seats.

Air France has fitted some of its -300s with 291 seats in two classes: 30 seats in business and 261 in economy. Its other -300s have 285 or 272 seats.

Cathay Pacific has a variety of configurations. Most have 287 seats in two classes, but some have only 243 in three classes. Lufthansa has a mix of two-class configurations of 221, 241, 247 and 266 seats. Air Canada uses 286 seats in two classes, and Emirates' -300s have 267 seats in three classes. Meanwhile, Swiss flies all its A340-300Es with just 228 seats in three classes. Finnair, however, is taking delivery of its new A340-313s each with 310 seats in two classes. The three-class configurations average a total of 244 seats, and the two-class configurations 271.

The smaller -200 has a standard configuration of 261 seats. This comprises 12 first- (62-inch pitch), 36 business- (40 inch pitch), and 213 economy-class (32-inch pitch) seats.

Another option is a 262-seat three-class arrangement, with 18 seats in first

class at 60-inch pitch, 74 in business at 36-inch pitch and 170 in economy at 34-inch pitch.

In two classes, Airbus says the -200 can seat 300 passengers: 30 in business class (40-inch pitch), and 270 in economy (32-inch pitch).

The actual configurations used by airlines operating the -200 series are interesting. Although the -200 has a shorter fuselage than the -300 series, typical seating configurations in the -200s often provide as many seats as the -300s. For example, EgyptAir has 260 seats, Aerolineas Argentinas' aircraft has 249 seats, and Royal Jordanian has 254 seats in their -200s in a two-class arrangement.

The -200's higher average seating density is due to the fact that for the same MTOW and fuel capacity, the shorter -200 has a smaller airframe and lower OEW than the -300. As a result, the -200 can carry a higher payload and fuel load than the -300 on the same mission. The larger -300 is also payload-limited on long ranges, since it cannot carry its maximum structural payload when its tanks are filled to capacity and the aircraft is at MTOW at departure.

Interestingly, the A340-200's and -300's type certification data sheet specifies a maximum exit-limited capacity of 420 seats and 440 seats respectively when



IF YOU STOP EVOLVING YOU STOP FLYING.

These are testing times. Only the leanest and fittest survive. More than ever, an airline's future depends on the cost-effectiveness of its operations. Your engines are an important part of that equation. That's why CFM™ invests extensively in a long-term program of innovations to improve performance. Our Tech Insertion program, for example, offers airlines a reduction in operating costs of up to 20%, whilst reducing emissions and increasing EGT margin. To find out more about the engines that are constantly evolving, fly to www.cfm56.com

A340-200 & -300 FAMILY WEIGHT VARIANT CODES

Airbus mod number	MTOW lbs	MLW lbs	MZFW lbs	A340-211	A340-212	A340-213	A340-311	A340-312	A340-313
A340-200 'basic'	558,872	399,872	372,581	Basic	Basic	Basic			
A340-300 'basic'	558,872	410,060	383,604				Basic	Basic	Basic
41302	556,588	399,037	372,581	001	001	001			
41302	566,588	410,060	383,604				001	001	001
44102	566,588	414,469	392,423				003	003	003
44229	573,202	399,037	372,581	002	002	002			
44228	573,202	410,060	383,604				002	002	002
44230	573,202	414,469	392,423				004	004	004
53243	573,202	414,469	392,423					029	
44791	573,220	418,8778	392,423						025
44625	577,611	418,878	392,423						023
43500	597,453	418,878	392,423						020
46650	597,453	423,288	392,423						027
44281	606,271	407,855	391,400			021			
44135	606,271	418,878	392,423						021
45738	606,271	423,288	396,832						024
51808	606,271	423,288	396,832						050
46613	606,271	423,288	399,037						026
51809	606,271	423,288	399,037						051
55677	606,271	423,288	403,446						054
51810	609,578	423,288	399,037						052
55566	609,578	423,288	403,446						053

A340-200/-300 USABLE FUEL CAPACITIES

Fuel configuration	Config 1	Config 2	Config 3	Config 4	Config 5
Aircraft variant	A340-211/-212/-213 Basic, 001, 002	A340-211/-212/-213 021	A340-311/-312/-313	A340-313 020	A340-313
Standard fuel capacity-USG	36,489 36,520	36,992	36,489	37,243	37,016
Total with 1 ACT		38,887		39,138	
Total with 2 ACT		40,782			

four type-A doors are fitted.

Several optional facilities are offered for the A340 interior, some of which may also apply to the A330. A two-crew rest area can be installed. One option comprises a flightcrew area located behind the flightdeck, featuring two bunks, folding tables, coats and baggage stowage, reading lights, and fresh air nozzles. Another option features an underfloor crew rest area, created using a modified cargo container fitted with bunks, TV screens and video, dressing rooms and refrigerator, with access by way of stairs to the main deck. The optional ventilation of the lower cargo deck is available for carriage of livestock.

Belly cargo capacities

The A340-200 series' belly hold accommodates a maximum of 27 LD3s

or nine 96-inch pallets. Its forward hold has structural provision for a maximum load of 40,801lbs (subject to weight and balance considerations), and can take 14 LD3s, equal to 2,212 ft³.

The aft hold can support up to 33,601lbs plus up to 7,646lbs in additional rear bulk area (again, subject to weight and balance considerations) and its capacities are: 12 LD3s equating to 1,896 ft³, plus another 695 ft³ in the aft bulk hold; 13 LD3s with one in the bulk hold area, with a reduced bulk volume of 486 ft³; or 632 ft³ with two ACTs, a crew rest module, four LD3s, and another 695 ft³ in the bulk hold.

The maximum total belly hold capacity of the A340-200 is therefore 4,803 ft³ when configured with 26 LD3s plus bulk volume. This could typically be used for high-capacity missions over medium ranges. Over longer ranges,

however, the A340-200's total lower hold volume reduces to 3,539 ft³, with lower passenger seating density, and therefore lower underfloor baggage volume, two ACTs, a crew-rest-module, four LD3s, and bulk volume at the rear. With a standard passenger load on the maindeck, Airbus says that the A340-200's total structural (gross) underfloor cargo payload is 28,660lbs.

The longer A340-300 series' belly hold accommodates a maximum of 33 LD3 unit load devices (ULDs), or eleven 96-inch pallets. Its forward hold can structurally support up to 50,400lbs, with floorspace for 18 LD3s. This equates to 2,844 ft³ of volumetric capacity.

The aft hold supports up to 40,801lbs and up to 7,646lbs in additional rear bulk area. Its capacities are: 14 LD3s, equating to 2,212 ft³, plus another 695 ft³ as bulk; 15 LD3s with one in the bulk hold area reducing the bulk volume to 486 ft³; or 1,896 ft³ plus 695 ft³ bulk, with the optional crew rest module which then leaves room for 12 LD-3s.

The maximum total belly hold capacity of the A340-300 is 5,751 ft³ when configured with 32 LD-3s plus bulk. However, with the two optional ACTs, crew rest module, four LD-3s, plus bulk, the total cargo volume falls to 5,435 ft³. With a standard passenger load on the maindeck, total structural (gross) underfloor cargo payload for the A340-300E is 31,305lbs (13.9 tons). **AC**

To download 100s of articles like this, visit: www.aircraft-commerce.com