

ATR 42 & 72 specifications

There are six prominent variants of the ATR 42 & 72. Their specifications are examined.

The ATR 42 & 72 comprise one of the few families of turboprop aircraft. They share the same basic design, flightdeck, wing, fuselage, tail and empennage and have a high degree of commonality between their rotatable components and engines. Both have a range of up to 900nm with their respective full passenger loads. The ATR 42 seats 46-50 passengers, depending on interior layout, while the ATR 72 seats 60-72. They have cruise speeds of 265 to 280 knots, and so can operate routes of up to 350nm in a flight time of 90 minutes. They also have extensive pilot commonality.

The initial ATR 42 and 72 models were launched in the mid-1980s, when regional carriers in the US were forming alliances with major airlines. US carriers were also undergoing consolidation. Regional affiliates served as feeders of major hubs on routes to spoke cities that had the lowest traffic volumes. In the early 1980s US regionals developed their networks, and increased aircraft size as traffic volumes grew. The main regional workhorses changed from 19-seaters to 30-seaters and became 40- to 50-seaters as the ATR 42 and 72 were launched.

Regional carriers were also changing from commuter-type operators, using 20- and 30-seat aircraft, to larger airlines operating wider route networks with larger aircraft. The ATR 42 was popular with US airlines, while regional carriers in Europe, with their higher inherent costs, preferred the larger ATR 72. The US and Europe have been their most important markets, but they have also sold well in India and the Asia Pacific.

There are two main variants of the ATR 42, the -300 and -500, and two main variants of the ATR 72, the -200 and -500. There are, however, three ATR 42 passenger variants and three ATR 72 passenger variants (see table, page 5).

ATR 42

The ATR 42 and 72 are based on a four-abreast fuselage with a high-mounted wing, and are powered by two turboprop engines. Their basic take-off thrust rating is 1,800-2,475 shaft horse power (SHP), depending on aircraft variant (see table, page 5).

All ATR 42 variants have a cargo door and compartment at the forward section of the fuselage as standard, with

the passenger cabin behind and door with integral stairs at the rear. The forward cargo compartment has a central passage to allow access to the flightdeck. The compartment can be one or two seat rows deep, so it affects the floor area available for seating, and can vary between two halves each of 63.5 cubic feet up to two halves of 106 cubic feet.

The aircraft also has several interior configurations, depending on the size and type of galley and toilet installed. These all affect seat numbers, which can vary between 42 and 50. These are all with the same galley at the rear of the fuselage and stowage compartment.

Given the ATR 42's prime use as a hub feeder on routes of up to 250nm, the baggage volume available is not of major importance for most operators. This implies that high seat-density variants of 48 and 50 seats are more likely.

The first ATR 42 variant was the -300, with a maximum take-off weight (MTOW) of 36,815lbs, maximum zero fuel weight (MZFW) of 33,510lbs and operating empty weight (OEW) of 22,675lbs (see table, page 5), providing a structural payload of 10,835lbs. The aircraft has a usable fuel capacity of 1,481 US Gallons (USG), which is standard for all ATR 42 variants.

The aircraft is powered by two Pratt & Whitney Canada PW120 engines, rated at 1,800shp, and equipped with a four-blade 14SF-5 propeller with a 13-foot diameter. The ATR 42-200 has a cruise speed of 265 knots (see table, page 5), and a take-off field length of 3,575 feet when operating at sea level and a standard temperature of 15 degrees centigrade (ISA). This rises to 4,265 feet in hot and high conditions of ISA plus 10 degrees and an elevation of 3,000 feet. This is relatively short compared to most commercial airfields. The -200 has a landing distance of 3,392 feet at sea level and maximum landing weight (MLW) (see table, page 5).

The ATR 42-210 with a PW121 engine rated at 1,900shp was launched two years after the ATR42-200. The -210 shares the same basic specifications and performance characteristics as the -200, although it has marginally shorter take-off and landing distances.

The third main civilian version of the ATR 42 is the -500 series, launched in 1993. It included several improvements over the -200/-210, one of the most



The ATR 42-500 and 72-500 are powered by the PW127E/F, utilising a six-bladed propeller. The ATR 42-500 has a 34-38 knot faster cruising speed than its -300/-320 counterpart variants. The six-bladed propeller lowers specific fuel consumption and noise emissions.

important being the use of a PW127E engine rated at 2,160shp and equipped with a six-blade 568F propeller. This gives the -500 a higher MTOW of 41,005lbs and a faster cruising speed of 303 knots, enabling routes of up to 410nm to be operated in 90 minutes. The six-blade prop reduces interior vibration. The -500 has a Stage III noise margin of 31.3EPNdB, and a Stage IV margin of 21.3EPNdB (see table, this page).

The -500 series has the same fuel capacity as the -200/-210 series, but its higher MTOW increases its range capability. The ATR 42-500 has take-off and landing distances of 3,710 feet and 3,592 feet (see table, this page).

The -500 series also differs from the -200/-210 series in that the PW127E engines produce lower gaseous emissions, have a lower specific fuel consumption, and give the aircraft a faster climb and cruise speed. The 500's higher gross weight gives it a longer range capability.

The main commonality features are common maintenance architecture, pilot ratings, engines and rotatable components.

The ATR 42-500 has a common type rating with the ATR 72-500, so a pilot certified to operate one is automatically certified to operate the other. Pilots, however, still have to attend a differences course, and also have to remain current on both types.

The ATR 42-500 also has cross-crew qualification (CCQ) with the ATR 42-300/-320 and the ATR 72-200/-210.

ATR 72

The ATR 72 is a stretch development of the ATR 42. The ATR 72-200 was launched in 1985 and entered service in 1989. It offers a passenger or cargo door at the front of the fuselage. As with the ATR 42, there is a central passage through the cargo compartment for access to the flightdeck. The ATR 72-200/-210, however, have the option of a front passenger door and rear cargo compartment. The ATR 72-500 has the front cargo compartment as standard.

The front cargo compartment varies in size, so the floor space available for seating varies. With a front passenger door, most configurations allow 66 seats with a seat pitch of 31 inches, and 74 seats with a 30-inch seat pitch. With a front cargo door the number of seats will be as low as 60 with a high seat pitch, although 66 are still possible. With a lower pitch seat numbers can rise to 72.

The ATR 72-200 has an MTOW of 47,400lbs, MZFW of 43,430lbs, OEW of 27,337lbs and a structural payload of 16,093lbs. The aircraft has a standard fuel capacity of 1,646USG, giving it a range of 900nm with 66 passengers.

The -200 is powered by the PW124B engine, equipped with a four-blade

ATR 42 & 72 FAMILY SPECIFICATIONS

Aircraft variant	ATR 42 -300	ATR 42 -320	ATR 42 -500
MTOW lbs	36,815	36,815	41,005
MZFW lbs	33,510	33,510	36,817
OEW lbs	22,675	22,685	24,802
Structural payload lbs	10,835	10,825	12,015
Usable fuel USG	1,481	1,481	1,481
Engine	2 X PW120	2 X PW121	2 X PW127E
Cruise speed knots	265	269	303
Seats	46-50	46-50	46-50
Aircraft variant	ATR 72 -200	ATR 72 -210	ATR 72 -500
MTOW lbs	47,400	47,400	48,501
MZFW lbs	43,430	43,430	44,092
OEW lbs	27,337	27,447	28,549
Structural payload lbs	16,093	15,983	15,543
Usable fuel USG	1,646	1,646	1,646
Engine	2 X PW124B	2 X PW127	2 X PW127F
Cruise speed knots	277	278	276
Seats	64-72	64-72	64-72

Hamilton Standard 14SF-5 propeller, and has a cruise speed of 277 knots.

The ATR 72-200 has a take-off field length of 4,626 feet at sea level and ISA conditions, and a landing distance of 3,963 feet. Take-off field length is 5,735 feet at hot and high conditions of 3,000 feet and ISA plus 10 degrees.

The ATR 72-210 entered service in 1992. It has the same weight and fuel capacity specifications as the -200 series, but the -210 uses the more powerful PW127 engine. This is a higher rated variant of the engine used to power the ATR 42-500, which entered service in 1995. The PW127 on the ATR 72-210 is rated at 2,475shp, and has the same propeller as the PW124B powering the -200 series. It gives the -210 more power, so it has a shorter take-off run, and the same cruise speed as the -200 series.

A main benefit of the -210's higher engine power is that its take-off field length is reduced by 700 feet, and its landing distance by 500 feet compared to the -200 series (see table, this page).

The ATR 72-500 was launched shortly after the ATR 42-500. Like the ATR 42-500, the ATR 72-500 provided many improvements over earlier models.

The ATR 72-500 entered service in 1997. It has a high MTOW of 48,501lbs, an MZFW of 44,092lbs, an OEW of 28,549lbs and a structural payload of 15,543lbs (see table, this page).

The ATR 72-500 is powered by two PW127F engines, rated at 2,475shp, the same rating as the PW127 powering the -210. These have a six-blade Hamilton Standard 568F propeller, which results in lower cabin noise. The -500 has a Stage III margin of 26.6EPNdB, and a Stage IV margin of 16.6EPNdB, so it comfortably meets all future noise requirements.

The -500 series has the same standard fuel capacity of 1,646USG as all other ATR 72 variants, which gives it a range of 900nm with 68 passengers. The ATR 72-500 has marginally longer take-off and landing field lengths than the -210, but shorter than the -200 series (see table, this page).

The other main benefits of the ATR 72-500 are a common type rating with the ATR 42-500 and the ATR 72-200/-210. The ATR 72-500 also has CCQ with the ATR 42-300/-320.

There is also a higher gross weight variant of the ATR 72-500, with an MTOW of 49,604lbs, a higher MZFW and structural payload of 16,203lbs.

Freight capacities

The ATR 42 and 72 can also be operated as freighters, and are available as quick change variants. The forward cargo door allows the removal of the aircraft's seats, partition and cargo net of the forward cargo compartment. A ball mat and floor locks are added, to provide space for freight containers.

The aircraft utilise a standard 43-inch deep, 50-inch tall and 83.5 inch wide freight container, giving total capacity of 99 cubic feet. The ATR 42 can hold nine containers, giving a total freight volume of 891 cubic feet. The ATR 72 holds 13 such containers, giving a total freight volume of 1,287 cubic feet (see table, this page). Freight packed at a density of 7lbs per cubic foot gives the ATR42 a net structural payload of 6,237lbs, and the ATR 72 9,009lbs. **AC**

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