

Precision Conversions achieves 80,000lbs payload for 757-200PCF

The Precision Conversions freighter modification for the 757-200 has leaped ahead of others with an 8,000lbs payload increase.

Precision Conversions LLC has achieved a gross structural payload of 80,000lbs for the 757-200PCF by increasing the maximum zero fuel weight (MZFW).

The 757-200PCF, which is the 757-200 modified to freighter by Precision Conversions, has four basic weight and gross structural payload versions (see table, this page). The operating empty weight (OEW) and resulting structural payload of these aircraft vary between the two main engine types powering the 757-200: the RB211-535 and PW2000. The OEW of PW2000-equipped aircraft is a few hundred pounds lighter than that of RB211-powered aircraft, with the result that the PW2000-equipped aircraft have a higher structural payload of the same magnitude.

There are several options for containers and pallets that can be loaded on the aircraft, but a standard container

type is the 125-inch high X 88-inch deep X 79-inch tall maindeck unit load devices (ULDs). These have a tare weight of 476lbs and internal volume of 440 cubic feet. Precision Conversions' modification allows 15 of these ULDs to be loaded on the aircraft's maindeck, resulting in a tare weight of 7,140lbs and a volume of 6,600 cubic feet. The 757-200PCF also has 1,790 cubic feet of underfloor space, giving the aircraft a total freight volume capacity of 8,390 cubic feet.

There are 934 active 757-200s, of which about 50 have been converted to freighter. Another 446 RB211-equipped and 357 PW2000-powered active aircraft are still in operation, making a total of 803 passenger-configured aircraft.

The first of the four payload versions is for early-production aircraft up to line number 210. These aircraft were built from 1982 to early 1989, and have maximum take-off weights (MTOWs) of

220,000lbs and 230,000lbs and an MZFW of 184,000lbs (see table, this page). The OEW of RB211-equipped aircraft is 116,500lbs, giving them a gross structural payload of 67,500lbs.

The PW2000-equipped aircraft have an OEW of 116,150lbs, and so a gross structural payload of 67,850lbs. This gives them a 350lbs advantage over the RB211-equipped aircraft.

The RB211-equipped aircraft have a net structural payload of 60,360lbs once the tare weight of containers is deducted from the gross structural payload (see table, this page). This results in a maximum packing density of 7.19lbs per cubic foot. The PW2000-equipped aircraft have a net structural payload of 67,850lbs.

The second basic choice is only available for aircraft from line number 210 onwards. These have an MZFW of 184,000lbs. Aircraft from line number 210 onwards have a standard OEW of 116,000lbs for RB211-equipped aircraft, giving it a gross structural payload of 68,000lbs (see table, this page). This is 500lbs less than aircraft lower than line number 210, and gives aircraft higher than line number 210 a 500lbs higher payload.

PW2000-powered aircraft, higher than line number 210, have a marginally lighter OEW of 115,650lbs, and so a gross structural payload of 68,350lbs.

The RB211-equipped aircraft have a net structural payload of 60,860lbs, while the PW2000-equipped aircraft have a 260lbs higher capacity (see table, this page). Their maximum packing densities are 7.25lbs and 7.30lbs per cubic foot.

PAYLOAD SPECIFICATIONS OF PRECISION CONVERSIONS' 757-200 PASSENGER-TO-FREIGHTER MODIFICATION

Aircraft type	757-200PCF RR/PW	757-200PCF RR/PW	757-200PCF RR/PW	757-200PCF RR/PW*
MZFW lbs	184,000	184,000	188,000/186,000	196,000/196,000*
OEW lbs	116,500/116,150	116,000/115,650	116,000/115,650	116,000/115,650*
Gross structural payload lbs	67,500/67,850	68,000/68,350	72,000/70,350	80,000/80,350*
Maindeck containers:	15 X 88/125	15 X 88/125	15 X 88/125	15 X 88/125
Maindeck volume-cu ft:	6,600	6,600	6,600	6,600
Lowerdeck bulk volume-cu ft	1,790	1,790	1,790	1,790
Total volume-cu ft	8,390	8,390	8,390	8,390
Container tare weight-lbs	7,140	7,140	7,140	7,140
Net structural payload-lbs	60,360/60,710	60,860/61,210	64,860/63,210	72,860/73,210*
Maximum packing density lbs/cu ft	7.19/7.24	7.25/7.30	7.73/7.53	8.68/8.73*
Volumetric payload @ 7lbs/cu ft	58,730	58,730	58,730	58,730

* Subject to certification of MZFW upgrade to target of 196,000lbs



There are 400 RB211-equipped and 285 PW2000-equipped 757-200s in passenger configuration that are potentially available for conversion to freighter, of which 670 are above line number 210. These could have the second, third and fourth payload options.

The third basic payload option is only available for aircraft from line number 210 onwards, and involves a Boeing upgrade to the MZFW of 4,000lbs from 184,000lbs to 188,000lbs for RB211-equipped aircraft. This therefore increases the gross structural payload by the same amount to 72,000lbs for RB211-equipped aircraft. The Boeing upgrade increases the MZFW to 186,000lbs for PW2000-powered aircraft, and consequently the gross structural payload to 70,350lbs (see table, page 62).

The two variants have net structural payloads of 64,860lbs and 63,210lbs, and maximum packing densities of 7.73lbs and 7.53lbs per cubic foot.

The fourth option is the MZFW upgrade recently certified by Precision Conversions. This has so far only been given for RB211-powered aircraft, but certification for PW2000-equipped aircraft is expected to be achieved before the end of 2008.

The MZFW upgrade is for an increase of 8,000lbs, and so raises it from 188,000lbs to 196,000lbs. This takes gross structural payload up by the same amount to 80,000lbs (see table, page 62). This is 12,000lbs higher than the standard gross structural payload for aircraft higher than line number 210.

The net structural payload of RB211-equipped aircraft is 72,860lbs (see table, page 58), and this variant has a maximum packing density of 8.68lbs per cubic foot.

This MZFW upgrade is partly the result of Precision Conversions' intense analysis in 2005 during the process of getting its original supplemental type certificate for its passenger-to-freighter modification. This surgically evaluated the aircraft's structure. There are therefore no physical changes or structural modifications required for the aircraft. The MZFW upgrade to 196,000lbs can only be applied to aircraft from line number 210 onwards that have already had Precision Conversions' modification, Boeing's MZFW upgrade to 188,000lbs, and a maximum landing weight (MLW) increase from 198,000lbs to 210,000lbs. Then only a paper change and the issue of a new flight manual and new weight and balance supplement are necessary. The upgrade costs \$32 per additional lb of MZFW, and so the full upgrade of 8,000lbs costs \$256,000lbs. This is small in relation to the additional payload and revenue-generating capacity that the aircraft will have for the remainder of its working life.

The objective for PW2000-equipped aircraft will also be to have an MZFW of 196,000lbs. In this case the aircraft will have a gross structural payload of 80,350lbs, since these aircraft have an OEW of 115,650lbs (see table, page 62). It will therefore have a net structural payload of 73,210lbs, the highest of all 757-200PCF variants. This is dependent, however, on the MZFW upgrade receiving certification at 196,000lbs.

A320F & A321F launch

Lessor AerCap Holdings has launched the A320F/A321F with an order to convert 30 of its aircraft. The first will be modified in 2011. Conversion of all 30 is

Precision Conversions has achieved an 8,000lbs increase in structural payload from an equal increase in maximum zero fuel weight. This has been achieved through a paper change. This can only be applied to aircraft line number 210 and above, that have had Precision Conversions's modification, Boeing's MZFW upgrade, and an increase in MLW.

scheduled from 2012 to 2015.

The A320F and A321F are new entrants to the narrowbody freighter market. The ageing DC-8 and 727 are being phased out by many operators, and the 737 and 757 are replacing some of the older types. There are no direct replacements, however, for the 727-200. This carries 12 88-inch X 125-inch containers on its maindeck. The 737-400 can carry 10 of these containers, while the 757-200 can accommodate 15.

The A320 also has capacity for 10 of the same containers, but also carries seven LD-3 containers in its underfloor space. This gives the aircraft a total containerised volume of 5,289 cubic feet and net structural payload of 41,945lbs.

The A321F has two basic models of the -100F and -200F. These have different MZFWs that result in gross structural payloads differing by about 6,000lbs. The A321F can also accommodate 13 88-inch X 125-inch containers and 10 LD-3 containers in its underfloor space. This gives the aircraft a total containerised volume of 6,990 cubic feet. The two variants have net structural payloads of 45,000lbs and 51,620lbs. This provides them with greater volume and structural payload than the 727-200F. It also provides an aircraft with capacity between the 737-400F and 757-200PCF/SF.

The economics of operating the A320F and A321F largely depend on the aircraft's lease rates or the total cost of their acquisition and conversion. While market values of 737-300s are close to the level that makes conversion to freighter economic and attractive, they are still generally high for the 757, A320 and A321. AerCap and other lessors, however, are able to convert their own aircraft following 15-17 years' usage in passenger mode, and offer them on lease to freight operators at an attractive market rate. AerCap has 76 A320s and A321s in its portfolio, which were built in the period from 1991 to 2007. Lease rates of A320Fs and A321Fs would have to be in the region of \$150,000 and \$170,000 respectively per month to make them economically acceptable compared to the 737-300F/-400F and 757-200PCF/SF. [AC](#)

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