

Hole Sucking Air: Republic F-84 Thunderjet

In Flight USA

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Republic P-84B; note the small engine air-intake in the nose. (USAF Photo)

Conceived during the closing days of World War II, Republic's F-84 Thunderjet was conceived in response to a U.S. Army Air Force requirement for a new interceptor/escort fighter/fighter-bomber that would be able to fly fast and far. This was a tall order given the fuel-guzzling jet engines of the time.

Initially, Republic's chief designer – Alexander Kartveli – envisioned a jet-powered version of the P-47 Thunderbolt. In order to obtain the highest speeds possible, the P-47 was re-designed (on paper) to have as narrow a cross section as possible. The problem was that the centrifugal-flow jet engines originally intended for use in the new airplane were large in diameter. Even after a narrower axial-flow engine was decided upon, the fuselage had to be fairly wide. The result was an aircraft with a fuselage that was slender at the front (with a relatively small engine air-intake) and “barrel-chested” in the middle, in order to accommodate the engine. Aft of the cockpit, the fuselage tapered to the tail pipe, with the jet exhaust gases exiting underneath the empennage.

In November, 1944, Republic submitted its design proposal to the USAAF. Because Republic's design appeared as though it would perform better than Lockheed's P-80, and because Republic had considerable experience in building fighters, the service accepted the design right away and placed an order for three XP-84 (readers will remember that the Army referred to its fighters as “Pursuit” aircraft) prototypes. Favorably impressed with Republic, the Army placed an order for 25 test aircraft (YF-84As) and 74 actual service aircraft (P-84Bs) in January of 1945. The order was shortly changed, with only 15 YF-84As being built as such; the remainder were to be built as P-84Bs.

Producing roughly 3,750 pounds of thrust, the General Electric J-35 GE-7 powered the XP-84. The new “B” models were equipped with a slightly more powerful version of the same engine, but the engine would now be produced by Allison.

While testing various XP-84 models (“models” as in scaled-down replicas of the real aircraft) in its wind tunnels, the National Advisory Committee for Aeronautics (NACA) found that the

aluminum skin on the horizontal stabilizers was buckling, and that the design was longitudinally unstable. The other problem was that the airplane was getting heavier as the design work progressed. The result of all this was the installation of a more powerful version of the J-35 engine in one of the XP-84s (with this airplane now becoming the XP-84A), the imposition of a design-weight limit of 13,000 pounds, and the return of the XP-84A, an XP-84, and a YP-84A to Republic so that the instability and skin issues could be worked on. With the end of the P-47's production run, the development of a long-range reconnaissance airplane known as the XR-12 Rainbow (the production of which was canceled after two prototypes were built), and the production of the Seabee amphibian (which generated disappointing sales figures), having to spend more time and money modifying the Thunderjet did not bode well for Republic's financial health.

Nevertheless, two XP-84s were flown to Muroc Army Air Base in California after they'd been accepted by the AAF at Republic's Farmingdale, NY plant in October of 1945. As a side note, one of the Army acceptance pilots assigned to Farmingdale at the time, was a young Captain by the name of Charles Yeager.

Lest the reader think that flying the two experimental aircraft from New York to California was a bit risky, it should be noted that the XP-84s were disassembled and carried aboard another "experimental" aircraft: a Boeing XC-97.

Well, the XP-84's first flight took place on February 28, 1946. Only one of the XP-84s could be flown, as GE had not been able to supply an engine for the other one. Allison had not started production of the J-35, yet. In the meantime, the fifteen YP-84As were delivered to Patterson Field (now Wright-Patterson Air Force Base) for testing and were fitted with six .50 caliber machine guns (two in the nose and one in each wing).

1946 saw the Army Air Force order additional P-84Bs; these later "B" models were equipped with retractable under-wing racks for unguided rockets. Newer .50 caliber machine guns were fitted, which could fire 1,200 rounds per minute. The USAAF also planned to order 271 Thunderjets, which were to be powered by the more potent GE J-47 engine. These aircraft would be designated as P-84Cs. Things appeared to be looking up for Republic. There was one big problem, however. Most of the J-47s were earmarked for the F-86 and B-47 aircraft. Consequently Republic had to make do with modified J-35 engines. To make matters worse, the delays caused the USAAF to reduce the order to 191 aircraft. Finally; the transfer of J-35 engine production from GE to Allison was causing engine deliveries to be held up. As a result, flight testing of the aircraft was delayed to the point where new production P-84Bs were coming off the assembly line before the XP and YP-84s had completed their test programs!

Because new aircraft were being built prior to completion of flight tests, Republic voiced its concerns about the unresolved stability problems to the USAAF. The Army informed Republic that the whole program might be canceled, if un-tested "fixes" were incorporated into production aircraft. Clearly, Republic's future looked bleak.