

Hugo Junkers

A short biography and his technical achievement

- 1859 Hugo Junkers is born in Rheydt, Rhineland, on 3 February as the third of seven children of Heinrich Junkers, the proprietor of a weaving mill and brickworks.
- 1878 School leaving exams at a trade school in Barmen, then studies at the Technical Universities of Berlin-Scharlottenburg, Karlsruhe and Aachen.
- 1883 Junkers takes his exam as a governmental construction leader and works as a designer in different companies.
- 1888 Resignation from his career in the civil service – to work for Wilhelm von Oechelhäuser on the development of large gas engines at the “Continental Gasgesellschaft” in Dessau.
- 1889 Both von Oechelhäuser and Junkers found, as equal partners, a “Versuchsstation für Gasmotoren von Oechelhäuser und Junkers” (experimental institute for gas engines).
- 1892 The first reverse-piston gas engine with a capacity of 100 hp is developed at this experimental institute. Junkers applies for a patent on the calorimeter which he developed to freely determine the calorific value of combustible gases. While experimenting with the calorimeter, he recognized further applications of continuous-flow water heaters, among them “the Junkers gas-fired water heater” which later became known world-wide. The calorimeter is awarded a prize at The World Exhibition in Chicago.
- 1893 Cancellation of the contract with von Oechelhäuser by mutual agreement. Junkers, as a free-lance engineer with his own experimental institute, intends to find solutions to technical problems that require exploration. Further development of the calorimeter and first initial experiments with a reverse-piston two-stroke heavy oil engine.
- 1894 Junkers developed the first standing gas-fired water heater on the basis of his flow calorimeter and applies for a patent using the term of “hydraulic heater”. The patent followed in 1896.
- 1895 Establishment of “Junkers und Co.” („Ico“) an appliance factory in Dessau.
- 1897 Appointment of Hugo Junkers as full Professor of Thermodynamics at the Technical University of Aachen. At the same time he becomes director of the engineering laboratories there. He founds the “Versuchsanstalt Professor Junkers” in Aachen so that his own experimental work can be performed.
- 1897 Marriage to Therese Bennhold from Dessau. 12 children, 5 sons and 7 daughters result from this marriage.
- 1902 Establishment of the “Versuchsanstalt für Ölmotoren” (Experimental Institute for oil engines) in Aachen.

- 1902-1906 Development of the commutator-bar boiler, an optimal solution being achieved by “indirect heating surfaces”. Further constructive improvements, for example the pressurized combustible chamber, make a circuit of several taps possible. Patents are applied for and granted for both boiler and pressure regulators. This further development led to fundamental preparatory work beginning on a cheaper “people’s boiler”. The first automatically registering “Schrank-Kalorimeter” (cabinet calorimeter), the principle of which, with some modifications, is retained to the present day, can be put into practice.
- 1907 A patent is granted on the newly developed “reverse-piston diesel engine” Junkers additionally successfully wins the patent dispute with the company, MAN.
- 1908 Spurred on by attempts to fly performed by Professor Hans Reißner, Junkers’ colleague in Aachen, who additionally made use of the Junkers workshops, Junkers also gets involved in the fields of aerodynamics and aircraft construction.
- 1910 After a series of practical and methodical preliminary examinations in the field of flow engineering. Junkers recognizes the main principles for the design of vertical flow as well as thick wing profile with a rigid design. The cavities could be used for people, loads, plane engines and fuel. Junkers was also granted the first patent for a plane described as “glider with serving cavities including components that do not produce lift”, and erroneously called “wings-only plane patent”.
- 1911-1912 Junkers and Reißner set up the first experimental wind-tunnel in Aachen. There they investigate the aerodynamic principles and dimensions of useful fight profiles and other exterior parts of the plane. At the end of 1912 Junkers gives up his teaching activities at the Technical University of Aachen and devotes himself entirely to his own research work.
- 1913 Tests on the application of sheet iron in plane construction are carried out in the “Apparatefabrik Junkers und Co” in Dessau under the direction of Hugo Junkers.
- 1914 Beginning of the First World War.
- 1915 Junkers finally moves to Dessau and also transfers his experimental laboratory from Aachen, the same being called “Professor Junkers Research Institute”. On the basis of experience gained in Aachen, an improved wind-tunnel is constructed in Dessau at the same time. The worldwide first plane made completely of metal arises while assessing his flow-engineering experiments in addition to the results obtained on the application of sheet iron in aircraft construction. This plane, the Junkers J 1, is a cantilever single-decker of the sheet iron type. With the construction of the Junkers J 1, a revolution in plane construction was initiated. Until then the construction of planes had been mainly on the basis of wood, the wings being taut. By using metal, strength and consistency features as well as aerodynamics could be substantially improved.
- 1917 Under duress from the authorities, “Junkers und Fokker AG” (IFA) is established by Junkers and A. Fokker, the constructor of wooden planes, the latter retiring again in 1919. The company begins with the construction of fighter planes and, in the construction of planes, duraluminium is first used by Junkers in developing the Junkers J 7. The light metal method of construction is thus used by Junkers

for the first time.

- 1918 End of the First World War. Application for two Junkers patents „single-decker plane with self-supporting wings“ and the principle of the low-wing monoplane. Hugo Junkers is awarded the honorary title of Dr. Ing. by the Technical University of Munich.
- 1919 Otto Reuter, the designer, is commissioned by Hugo Junkers to develop a commercial aircraft. Its maiden flight takes off as early as 6 months later on 13 September 1919. This plane, the Junkers F 13, the first commercial aircraft made wholly of metal, sets a world record at an altitude of 6750 m that same month. The Imperial Aviation Authority in Berlin grants the licence to the Junkers factory to commence air-traffic between Dessau and Weimar (the converted Junkers J 10). The “Junkers-Flugzeugwerk AG Dessau” is established that year.
- 1920 The “SCADTA”, the first international air traffic line with Junkers F 13, is inaugurated by the German-Columbian Company. Reuter begins the development of the metal propeller (first utilized in 1916 on a Junkers K 16). The “Kaloriferwerk Hugo Junkers GmbH” is founded in Dessau. The Peace Treaty comes into force and brings with it a ban on the construction of planes in Germany.
- 1921 The Junkers works partly change their production. In addition to the standard programme of gas continuous flow water heaters and calorimeters, metal cupboards, aluminium cases, cutlery and other household appliances are manufactured.
 “A section for air traffic at the Junkers works” and a section for “Junkers aerial pictures” are set up at the Junkers aircraft works. A new cartographical recording technology is developed by aerial picture photography which considerably improves the previous methods of land surveying. The air traffic section is tasked to organize co-operation with international airlines in addition to transporting civilian passengers and air freight. The ban on constructing planes in Germany is lifted by way of the “definition”. Junkers resumes work in the field of aircraft construction, the testing of materials and wind-tunnel sections being fundamentally expanded.
- 1923 The economic relation between Junkers aircraft works and the young Soviet power are extended. Three franchise agreements on aerial picture surveying, aircraft and engine construction, and air traffic are concluded. A branch of the Junkers aircraft works is established in Fili near Moscow.
 The “Junkers Motorenbau GmbH” is set up in Dessau. Tests and the production of heavy oil aircraft engines progress in this concern under the guidance of Professor Otto Mader.
 The Junkers A 20 is developed and mass-produced as a special post and aerial picture plane.
 The Junkers planes become more and more successful in national and international air traffic due to their qualitatively high technical parameters and reliability. The Junkers F 13 becomes the commercial aircraft that is used most.
 “Junkers and Co.” gets the order from the State Bauhaus of Weimar to equip “Am Horn”, the experimental building with hot water appliances.

- 1924 The L 2 engine (265 hp) is mass-produced at the engine works while the Junkers G 23, Junkers' first three-engined commercial aircraft, is developed. The air traffic section is removed from the aircraft works and converted into the independent "Junkers-Luftverkehr AG" (ILAG). A separate "section for steel construction" is developed at the calorifer works where hangars and bridges are produced. Steel segment hangars developed under strict technological and constructive conditions prove to be particularly economical. Hangars of this type were constructed in numerous countries, in Brazil, Italy, Turkey and the Soviet Union, amongst others.
- 1925 Hugo Junkers is awarded the honorary title of Dr. phil. by the University of Gießen. The Bauhaus moves from Weimar to Dessau. Walter Gropius, the founder and director of the Bauhaus, meets Hugo Junkers. A friendship arises between the two which develops into an intellectual exchange between the Bauhaus as a University for Design and the Junkers works. The newly erected Bauhaus building in Dessau is fitted out by "Junkers und Co." with heat engineering equipment (heating and water heaters). The L 5-flight engine developed at the engine works is licensed and its capacity is later increased from 310 hp to 425 hp. This engine is characterized by its high reliability so that it quickly catches on in aircraft construction.
- 1926 On the basis of his work as examinations commissioner at the Technical University of Köthen, Junkers is nominated an honorary senator. "Junkers-Luftverkehr AG" and "Aero-Lloyd" merge to form "Deutsche Lufthansa". The Junkers G 31, the three-engined cabin plane made entirely of metal, and the single-engined Junkers W 33 are constructed at the aircraft works. The new airfield is opened between Dessau-Alten and the Estate, replacing the former airfield at Mosigkau Heide. Junkers founds the "Kalorimeterbau" as an independent section of the calorifer works to manufacture calorimeters. The Junkers aircraft construction branch in Fili near Moscow is given over to the Soviet Union.
- 1927 Hugo Junkers is awarded the golden "Grashof-Denk Münze" by the "Verband Deutscher Ingenieure" (VDI) – Association of German Engineers. 1927 could be described as the most successful year for Junkers aircraft construction with 33 flight world records. A Junkers W 33 sets a new world length and long-distance record with 62 hours and a flying distance of 4460 km. The Junkers F 13 is still regarded as the plane with the highest sales.
- 1928 The 1000th plane, a Junkers G 31, is manufactured at the Junkers aircraft works. The "Bremen", a Junkers W 33, flies for the first time from Europe to North America with the crew of Köhl, von Hünefeld and Fitzmaurice. Hugo Junkers is granted the freedom of the cities of Dessau, Aachen and his native town of Rheydt. A street in Dessau is named after him. The Technical University of Aachen appoints Junkers an honorary senator. The "Junkers-Gasradiator" room heater is developed and put into production. The Weißenhof estate in Stuttgart, designed by well-known architects, is supplied with heating and hot water appliances from the Junkers works. Junkers begins to be intensively occupied with the issue of constructing metal houses.

- 1929 Hugo Junkers becomes a corresponding member of the Prussian Academy of Science in Berlin and honorary senator of the Technical University of Karlsruhe. Rocket tests with a Junkers W 34w are carried out on the Elbe near Dessau. These tests proceed successfully so that development of different liquid engines is introduced in the aircraft works' wind-tunnel within the flow engineering department. The F 04, the first operational Junkers reverse-piston heavy oil engine, passes its flying test with a Junkers F 24. Successful conclusion of the test bed trials of the L 88, the newly developed Junkers engine, with a capacity of 700 hp. On 9 November the four-engined Junkers G 38, the largest land based plane at this time, takes off on its first trial flight.
- 1932 Production begins on the Ju 52/3m at Junkers aircraft works. This aircraft model combines all aeronautical and construction experiences collected at the Junkers works. As a scheduled and large capacity transport plane, it quickly develops into a standard aircraft in international air traffic. After Junkers' exclusion from his works by the Nazis and his later death, this aircraft model is misused for military purposes. A national socialist regional government comes to power in Anhalt. Junkers works run into financial difficulties.
- 1933 Fascism arrives in Germany at power. The rulers of the Third Reich regard Junkers as politically unreliable for the inclusion of his aircraft and engine works into the planned armaments of war. With the threat of a regional trial for treason, he is compelled to vacate his works and is refused further entry to Dessau and his works.
- 1934 Due to the ban on further engaging in the construction of planes, Junkers now devotes himself entirely to the construction of metal buildings. He conducts basic research into the problems of constructing industrially manufactured steel high-rise buildings. By the conscious inclusion of typical and standardised steel construction, he designs a steel high-rise building on the scale of a mega-habitat.
- 1935 On 3 February, his 76th birthday, Hugo Junkers dies in Gauting near Munich. The national socialist regime misused his name in the preparation and execution of the Second World War.