



New Schuebeler HST-propulsion-systems

With the DS-94-DIA HST Schuebeler Composite launches a completely new jet propulsion system based on a new 12-blade axial compressor wheel which is driven by the all new Schuebeler electronic commutated motor.

The 128 mm axial compressor generates a surpassing compression ratio and can therefore be integrated much more efficiently in huge jet models than classic ducted fans. The rotational speed level is only 26.500 rpm at an impressive exhaust speed of 95 m/s and a thrust of 10 kg. This high thrust impulse is therefore generated by a high exhaust speed and a high inner efficiency of the axial fan stage. In figures that means you can integrate this fan in jets up to 11 kg and an exhaust diameter of just 105 mm. The design of the 12-blade axial compressor wheel is based on speed ratios which are similar to the ratios of a full scale turbofan. That results besides a high efficiency in a perfect optical scale appearance and a sound which can only be compared to full scale jet engines. A silent whispering and fizzling of the axial compressor at idle rpm is predominated by an impressive jetstream noise coming from the exhaust at full throttle.

An extraordinary challenge was the development of an electronic commuted DC motor that perfectly fits to the axial fan. The 12-blade compressor demands an impressive torque of 2.2 Nm at 26,500 rpm which can only be generated by a high torque motor of high diameter and shorter length. Consequently the new DSM 6740 Schuebeler motor has a diameter of 67 mm and a magnet length of 40 mm. This motor is fully integrated in the axial fan to assign a huge area for the main airflow. In addition to that the motor is perfectly cooled and needs no efficiency decreasing internal ventilator. The motor is based on a two pole design to allow a flexible fit of the motor characteristics to the needs of the axial fan.

Nevertheless the windings sit in a 12 slot stator to increase the torque and to avoid any winding deformation at high temperatures. The magnet is attached to a sheeted magnet holder and reinforced by a bandage made of IMS carbon fiber which allows a high rpm tolerance. The whole motor design was optimized in respect of excessive heat tolerance and of course a high efficiency even at high currents. The mechanical design of the Schuebeler DSM 6740 motor is based on established mechanical engineering and distinguishes itself by a shaft mount consisting of a fixed bearing and a pre-stressed floating bearing. Front- and endbell are fixed by 8 countersunk head screws, all surfaces are protected by hard anodizing. The result is a very high durability in combination with a low mechanical soundscape which allows the whispering of the axial fan to predominate even at idle rpm.

The conjunction between motor and axial fan is made by 4 handmade carbon stators which also guide the 3 motor phases through the UHM carbon sandwich shroud. The conversion of shaftpower to streampower is accomplished by 12 handmade carbon rotor blades which sit form-closed in precision aluminum swivels.

The DS-94-DIA HST propulsion system is 100 % made in Germany.



Technical data DS-94-DIA HST with DSM 6740-600 (preliminary):

Inner shroud diameter: 128 mm
Fan swept area: 94 cm²
Weight incl. wires, connectors, Secure Fan Fix and DSM 6740: 1380 g
Thrust range: 86 - 98 N
Exhaust speed range: 88 - 95 m/s
RPM range: 24,000 – 26,000 rpm
Input power: 5.8 – 7.0 KW (up to 7.5 KW in narrow ducting)
Allowed battery: 13 - 14S 6100 HDHE or 7600 HDHE, max. 8 Ah
Overall efficiency: 66 - 67 %

Technical data DS-77-DIA HST with 6740-650 (preliminary):

Inner shroud diameter: 120 mm
Fan swept area: 77 cm²
Weight incl. wires, connectors, Secure Fan Fix and DSM 6740: 1360 g
Thrust range: 80 - 92 N
Exhaust speed range: 93 - 100 m/s
RPM range: 25,650 – 27,600 rpm
Input power: 5.6 – 6.9 KW (up to 7.5 KW in narrow ducting)
Allowed battery: 13 - 14S 6100 HDHE or 7600 HDHE, max. 8 Ah
Overall efficiency: 66 - 67 %