TESTING LABORATORY FOR EMERGENCY AND PARACHUTE EQUIPMENT

L 1220

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TEST REPORT

Flight test by airdropping - GBS 10/150 rescue system tests

Protocol number: ZL 1220/LZ-1/2015/GBS

Location, where the tests have been done, if it differs from ZL address:

LK Jihlava, LK Kbely

Customer name and address

VUT Brno, Technická 2896/2, 616 69 Brno,
Galaxy GRS s.r.o. 1. Máje 66/24a, 460 01 Liberec 3 460 01,
Order No. 3551303736 from 10 September 2015.

Signature, conditions and test item (items) identification

Flight tests – GBS 10/150 rescue system tests.

Date of test item (items) acceptance and date of test realization

Parachutes No. 27, 28, 31, 32, 33, 37 and 2 pcs of container with Program and methodology of company flight tests of GBS 10/150 rescue system were undertaken in 19 August, 2015. Tests passed in 9 September, 2015 and 22 October, 2015.

Identification of used method – working procedure – testing

The test has been carried out according the "Program and methodology of company flight tests of GBS 10/150 rescue system delivered by manufacturer – Galaxy GRS s.r.o., encl. No. 1 to order No. 3551303736 and PP-027/12/7, PP-028/12/7, PP-029/12/7, PP-035/12/7 working procedures.

All data about deviations, appendixes or exceptions

After parachute functional check at construction strength tests the other flight tests by parachute airdropping with load from the airplane have been made with respect to safety at test performance.

After MBV check the GBS was activated up on height 13 m with consequent height reading after parachute development.

Test conditions (order No.: 3551303736)

TEST NAME	GBS 10/150 rescue system tests
Standard	Program and methodology of company flight tests of the GBS 10/150 rescue system
Procedure	PP-027/12/7, PP-028/12/7, PP-029/12/7, PP-035/12/7
Parachute type **Serial No.**	GBS 10/150 27, 28, 33, 31, 32, 37
Tested item name **Serial No.:**	-
Load category and weight [kg]	Load 6.6 kg, 11.1 kg, 14.6 kg Parachute 0.225 kg, recorder 0.170 kg
Gross weight [kg]	7 kg, 11.5 kg, 15 kg
Airplane type	L-60S
Airdrop height [mT],[ft]	70 – 100 mT (b. 3.1, 3.2, 3.4) 13 mT (b. 3.3)
Airplane speed at airdrop [km.h^{-1}], [kt]	90 km· h^{-1} (b. 3.1, 3.2) and 96 km· h^{-1} (b. 3.4)
Parachute, tested object, preparation method	Fold the parachute in accordance with GBC 10/150 UAV ballistic rescue system user manual. 1) Activation at airdrop from airplane by VL-020 static line , 2) Remotely activation at MBV test, parachute with load placed in about13 m height
Free drop/stabilization time [s]	-
Number of airdrops	3 + 9 + 3
Comment – test specification	Stated tests do not realize: at poor visibility, in the rain, at wind speed near the ground bigger than 3 m.s^{-1}, in case of safety menace or inaccuracy and misinterpretation of test results. Make a test video record.
Airdrop record No.	1-15, "Tests record" table

Test results

GBS 10/150 Rescue system company flight tests

September 9, 2015, LK Jihlava, temperature 14°C - 17°C, wind speed 1 - 3 m·s^{-1}, humidity 85%, pressure 1021 hP, airplane L-60S OK-MTI, pilot Jiří Halama, cameraman: Karel Kuba, Jan Šturc ml.

Parachute No.	Item	Test	Gross load	Required output	Test sequence	Activation height	Drop speed	Descending speed (m·s^{-1})	Test result
27	3.1. + 3.2.	VRK + ST	7 kg	descending/swing to 15°	5	90 - 100 m	90 km·h^{-1}	3.7	complied
27	3.1. + 3.2.	VRK + ST	7 kg	descending/swing to 15°	6	90 - 100 m	90 km·h^{-1}	2.6	complied
27	3.1. + 3.2.	VRK + ST	7 kg	descending/swing to 15°	8	90 - 100 m	90 km·h^{-1}	2.7	complied
28	3.1.	VRK	11.5 kg	descending 3.7 - 6,6 m/s	4	90 - 100 m	90 km·h^{-1}	5.3	complied
28	3.1.	VRK	11.5 kg	descending 3.7 - 6,6 m/s	7	90 - 100 m	90 km·h^{-1}	5.1	complied
28	3.1.	VRK	11.5 kg	descending 3.7 - 6,6 m/s	9	90 - 100 m	90 km·h^{-1}	4.9	complied
33	3.1.	VRK	15 kg	descending 3.7 - 6,6 m/s	10	90 - 100 m	90 km·h^{-1}	6.1	complied
33	3.1.	VRK	15 kg	descending 3.7 - 6,6 m/s	11	90 - 100 m	90 km·h^{-1}	6.5	complied
33	3.1.	VRK	15 kg	descending 3.7 - 6,6 m/s	12	90 - 100 m	90 km·h^{-1}	6.3	complied
31	3.4.	Strength	15 kg	compliance	1	70 - 100 m	96 km·h^{-1}	without failure	complied
32	3.4.	Strength	15 kg	compliance	2	70 - 100 m	96 km·h^{-1}	without failure	complied
37	3.4.	Strength	15 kg	compliance	3	70 - 100 m	96 km·h^{-1}	without failure	complied
October 22, 2015, LK Kbely, teperature 11°C, wind speed 3 m·s^{-1}, humidity 63%, pressure 1016,4 Pa									
33	3.3.	MBV	11.5 kg	compliance	13	13 m	0 km·h^{-1}	< 5 m	complied
28	3.3.	MBV	15 kg	compliance	14	13 m	0 km·h^{-1}	< 5 m	complied
27	3.3.	MBV	7 kg	compliance	15	13 m	0 km·h^{-1}	< 5 m	complied

"Tests record" table

Measurement uncertainty

Undetermined

Test classification

At test No. 6 and 8 the descending speed was less than required min. 3.7 $m \cdot s^{-1}$. This speed of descending has neither negative influence on parachute function nor on the whole system.
At test No. 13, 14, and 15 the parachute was developed on the trajectory to 5 m.
At test No. 5, 6, and 8 were fluctuations to 15° from vertical line.
The parachutes fulfilled their function at all tests and are convenient to required parameters.

Recommendation

Company test results take over to the type tests.

Additional information

The loud came into descending at the same time as the parachute was activated at the function test at the minimum safety height.

Cloth containers with sand were used as the load.

Video record was not realized at test No. 13, due to video camera malfunction.

Test results and identified imperfections regard only tested items.

This protocol must not be reproduced unlike than complete without written approval of ZL No. 1220.

Tested in the Testing laboratory for emergency and parachute equipment, which is accredited by ČIA and registered under No. 1220.

Date: 23 October, 2015

Test laboratory head
Jan ŠTURC

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Signature

---END OF PROTOCOL---