APICAL INDUSTRIES, INC.

REPORT NUMBER AI332-6

INTERMIX INFLATION TEST PLAN AND REPORT

APICAL INFLATABLE EMERGENCY

HELICOPTER FLOAT KIT

EUROCOPTER AS332C, L and L1

FAA PROJECT NUMBER ST8539LA-R

PREPARED BY Mike Lonnecker 02Mar14
Date

CHECKED BY _____
Date

REPORT APPROVED BY _____
Date

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Log of Revisions

Date	Rev.	Page No.	Description	Approval
02Mar14	N/C	All	Initial Release	D.V. Hitzfield
02Apr02	A			
		1.1	Revised Scope 1.0	D.V. Hitzfield
		2.1	Revised Introduction 2.0, 3rd para.	
		4.1	Revised #3	
		4.2	Revised Fig. 1	
		4.4	Deleted 9-14	
		4.5	Deleted 15-16	
		4.7	Revised Test Data for 1-2 Deleted # 3	
		4.8	Deleted Test #4 Revised Test Data for 5 & 6	
		4.9	Revised Test Data for 7-8	
02Jul23	B	1.1	Item 1.0 change P/N 158562 to 962006 and added last sentence	M. Gonzalez
		2.1	Item 2.0 # 1 and 2 Change P/N 202458 to 200-477-0 # 5 and 6 changed P/N 158562 to 962006	
		4.1	Item # 3 and 4 Change P/N 202458 to 200-477-0 #4 change P/N 158562 to 962006	
		4.2	Figure 1 Change P/N 202458 to 200-477-0	
		4.3	Figure 2 Change Cylinder P/N 158562 to 962006	
		4.4	Item 4.2 # 2 and 6 Change P/N 202458 to 200-477-0, # 2 and 6 changed cylinder pressure from 4500 Psi to 3393 Psi. Added # 9 thru 14.	
		4.5	Added # 15 and 16. #18 and 22 Change Aerazur to Apical and P/N 158562 to 20330 and charge pressure to 3074 PSI, Delete #'s 25 thru 28.	
		4.6	Deleted #29 thru 32	
		4.7	Item 4.3 Change P/N 202458 to 200-477-0 on Test 1 and 2	
		4.8	Test # 5 and 6 changed cylinder P/N 158562 to 962006.	
02SEP26	C	4.7	Add Test Results	D.V. Hitzfield
		4.8	Add Test Results	
		4.9	Add Test Results	
		5.1	Add Conclusions	

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References

1. Apical Dwg 20729 & 20730
2. Apical Document II332-1 Installation Instructions
3. Aerazur Maintenance Manual Document No. 25.69.18.
4. FAR Part 29

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1.0 Scope

The purpose of supplying this Intermix Inflation Test Plan and Report is to obtain an FAA Supplement Type Certificate for Apical Industries, Inc.'s (Apical) replacement inflatable emergency helicopter floats and inflation cylinders. The Apical replacement inflatable emergency floats, Nose Float P/N 20729-100 and Main Floats P/N 20730-100and -200, are direct replacements for Aerazur's Fwd Float P/N 158820 and Aft Floats P/N 158565 and 158566 for the Eurocopter AS332. The Apical replacement emergency floats are dimensionally and functionally identical to the Aerazur floats as demonstrated in test report AI332-5 Inflation Test Plan and Report and AI332-3 Float Buoyancy Substantiation Report. The Apical Floats are installed exactly as the Aerazur floats per Aerazur Maintenance Manual Document No. 25.69.18. The Apical inflation cylinder P/N 20330 is identical to the Aerazur inflation cylinder P/N 962006, as shown in AI332-4 Inflation Cylinder Substantiation Report, and are installed in exactly the same manner. Aerazur cylinder P/N 200-477-0 will be used for the forward float inflations.

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2.0 Introduction

The test will establish that the floats, Aerazur or Apical, inflate to a pressure of 1.00 psi minimum and in approximately the same time period no matter their mixture of placement or manufacture. This will show that there is no degradation of the emergency float system when Apical floats are used to replace one, two or all of the Aerazur floats. This test will also establish that the inflation cylinders, Aerazur or Apical, will inflate the floats to a pressure of 1.0 minimum no matter the mix of floats and cylinders.

The Emergency Float System for the Eurocopter 332 is symmetrical right to left. It is therefore only necessary to test one half of the system. The nose float is symmetrical right to left and uses one inflation cylinder to inflate each side. The test will use one cylinder and inflate one half of the nose float. There are two mirror imaged main floats each with its own inflation cylinder. The test will use one main float and one cylinder. In order to prove the floats and cylinders are interchangeable, inflations will be performed in the following configurations:

Test

1) Aerazure nose inflation cylinder P/N 200-477-0 inflating 1/2 Aerazure nose float P/N 158820
2) Aerazure nose inflation cylinder P/N 200-477-0 inflating 1/2 Apical nose float P/N 20729-100
3) Deleted
4) Deleted
5) Aerazure main inflation cylinder P/N 962006 inflating Aerazure main float P/N 158565 or 158566
6) Aerazure main inflation cylinder P/N 962006 inflating Apical main float P/N 20730-100 or -200
7) Apical main inflation cylinder P/N 20330 inflating Aerazure main float P/N 158565 or 158566
8) Apical main inflation cylinder P/N 20330 inflating Apical main float P/N 20730-100 or -200

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3.0 Method of Showing Compliance

3.1	FAR 29.1301	Function and Installation	Apical will demonstrate by test that the Apical and Aerazur floats inflate to a pressure of 1.0 minimum and in approximately the same period of time when inflated by an Aerazur or Apical cylinder. This demonstration will show that the floats and inflation cylinders can be installed in any combination of Aerazur and Apical components without degradation to the emergency float system and can be installed without restriction.

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4.0 Test

4.1 Test Equipment and Set Up

The Eurocopter 332 Emergency Float System consists of a nose float and two mirror imaged main floats. There is an inflation cylinder for each half of the nose float and an inflation cylinder for each main float. The float and cylinder installations are symmetrical right to left. The test will, therefore, utilize one side of the system and the corresponding inflation cylinder to simulate the system. The valves used by Aerazur are of the squib type and not readily rebuildable. The inflation valves for the test will be an Apical 7/16 valve for the nose inflation cylinder and an Apical 3/4 inch valve for the main inflation cylinder. The hoses will be of Apical manufacture and will simulate the diameter and the length of the Aerazur hoses. The test equipment will consist of the following:

1. Apical nose float P/N 20729-100 and main float P/N 20730-100 or -200
2. Aerazur nose float P/N 158820 and main float P/N 158565 or 158566
3. Aerazur nose inflation cylinder P/N 200-477-0 and Apical main inflation cylinder P/N 20330
4. Aerazur nose inflation cylinder P/N 200-477-0 and main inflation cylinder P/N 962006
5. Apical valves
6. Hoses

The float containers are an integral part of the 332 helicopter. Therefore, the floats will be deflated and fired flat on the floor.

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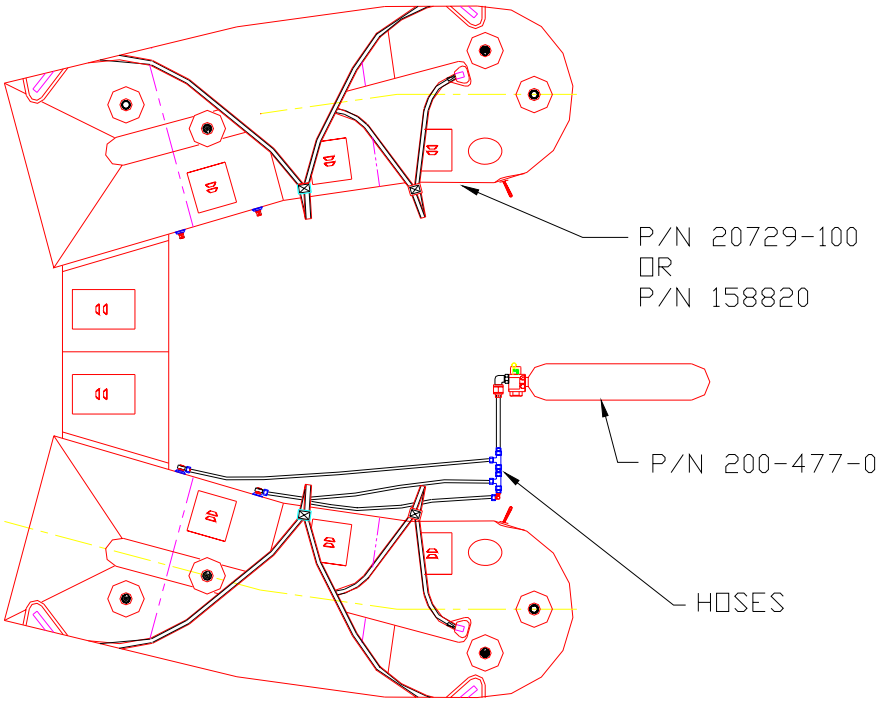

Figure 1

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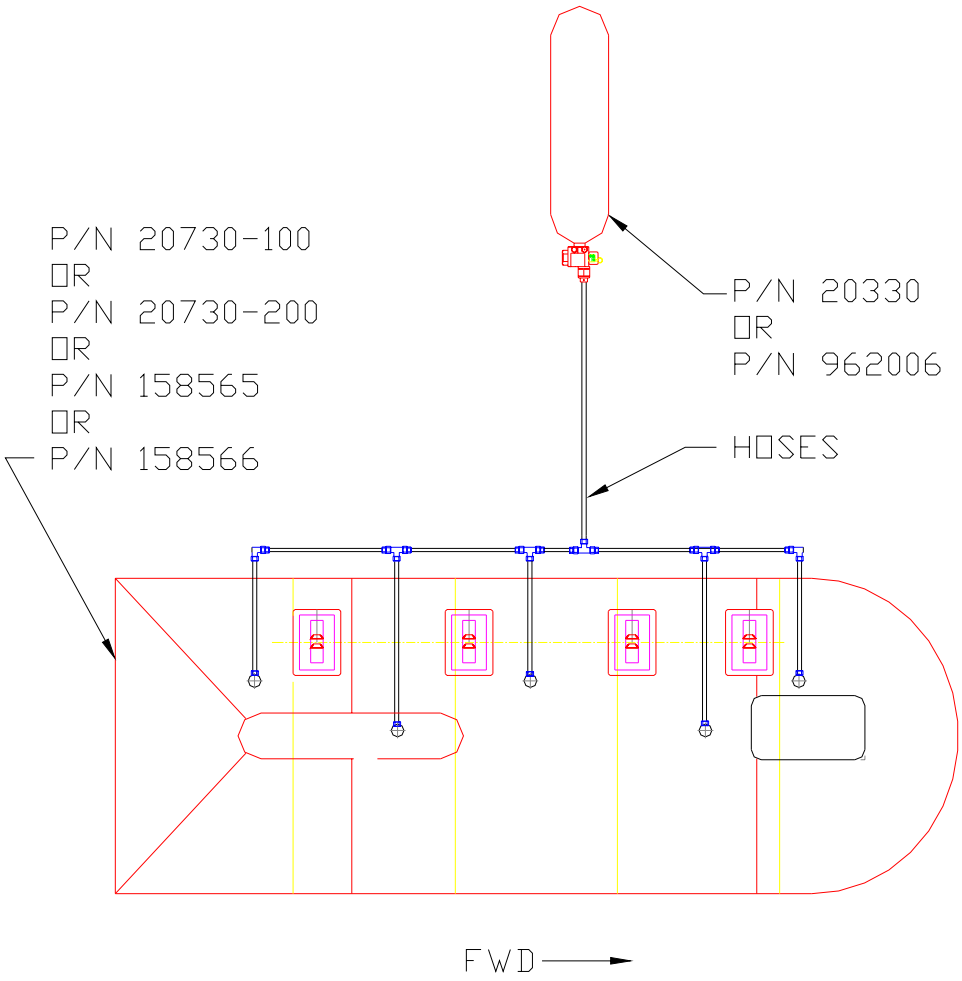

Figure 2

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4.2 Test Procedure

1. Deflate and vacuum flat Aerazur nose float P/N 158820.

2. Charge the Aerazur nose inflation cylinder P/N200-477-0 with helium to a pressure of 3393 psi.

3. Connect hoses from floats to inflation cylinder.

4. Clear the area around the floats and actuate the inflation system. Record the inflation time and the pressure in each chamber of the float. Inflation time is from initiation of inflation to round out of float.

5. Replace Aerazur nose float P/N 158820 with Apical float P/N 20729-100. Deflate and vacuum flat.

6. Charge the Aerazur nose inflation cylinder P/N200-477-0 with helium to a pressure of 3393 psi.

7. Connect hoses from floats to inflation cylinder.

8. Clear the area around the floats and actuate the inflation system. Record the inflation time and the pressure in each chamber of the float. Inflation time is from initiation of inflation to round out of float.

9. Deflate and vacuum flat Aerazur main float P/N 158565 or 158566.

10. Charge the Aerazur main inflation cylinder P/N 962006 with helium to a pressure of 3074 psi

11. Connect hoses from floats to inflation cylinder.

12. Clear the area around the floats and actuate the inflation system. Record the inflation time and the pressure in each chamber of the float. Inflation time is from initiation of inflation to round out of float.

13. Replace Aerazur main float P/N 158565 or 158566 with Apical float P/N 20730-100 or -200. Deflate and vacuum flat.

14. Charge the Aerazur main inflation cylinder P/N 962006 with helium to a pressure of 3074 psi.

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15. Connect hoses from floats to inflation cylinder.

16. Clear the area around the floats and actuate the inflation system. Record the inflation time and the pressure in each chamber of the float. Inflation time is from initiation of inflation to round out of float.

17. Deflate and vacuum flat Aerazur main float P/N 158565 or 158566.

18. Charge the Apical main inflation cylinder P/N 20330 with helium to a pressure of 3074 psi.

19. Connect hoses from floats to inflation cylinder.

20. Clear the area around the floats and actuate the inflation system. Record the inflation time and the pressure in each chamber of the float. Inflation time is from initiation of inflation to round out of float.

21. Replace Aerazur main float P/N 158565 or 158566 with Apical float P/N 20730-100 or -200. Deflate and vacuum flat.

22. Charge the Apical main inflation cylinder P/N 20330 with helium to a pressure of 3074 psi.

23. Connect hoses from floats to inflation cylinder.

24. Clear the area around the floats and actuate the inflation system. Record the inflation time and the pressure in each chamber of the float. Inflation time is from initiation of inflation to round out of float.

25. Delete

26. Delete

27. Delete

28. Delete

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29. Deleted

30. Deleted

31. Deleted

32. Deleted

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4.3 Test Data

Test 1 – Aerazur nose float and cylinder

Float P/N 158820 S/N 268

Cylinder P/N 200-477-0 S/N 5681360

Inflation time: .71 Sec

Inflation pressure: Nose Float Chamber 1 1.47 psi
Chamber 2 3.24 psi
Chamber 3 3.45 psi

Test 2 - Apical nose float and Aerazur Inflation cylinder

Float P/N 20729-100 S/N 0001

Cylinder P/N 200-477-0 S/N 5681360

Inflation time: .40 Sec

Inflation pressure: Nose Float Chamber 1 3.23 psi
Chamber 2 4.96 psi
Chamber 3 5.18 psi

Test 3 - Deleted

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Test 4 - Deleted

Test 5 – Aerazur main float and cylinder

Float P/N 158565/6 S/N 219

Cylinder P/N 962006 S/N 7487

Inflation time: .45 Sec

Inflation pressure:		
Main Float Chamber 1	3.00	psi
Chamber 2	3.02	psi
Chamber 3	2.96	psi
Chamber 4	2.98	psi
Chamber 5	3.01	psi

Test 6 - Apical main float and Aerazur inflation cylinder

Float P/N 20730-100/-200 S/N 0001

Cylinder P/N 962006 S/N 7487

Inflation time: .35 Sec

Inflation pressure:		
Main Float Chamber 1	4.54	psi
Chamber 2	4.54	psi
Chamber 3	4.51	psi
Chamber 4	4.52	psi
Chamber 5	4.45	psi

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Test 7 - Aerazur main float and Apical inflation cylinder

Float P/N 158565/6 S/N 219

Cylinder P/N 20330 S/N KN009

Inflation time: .50 Sec

Inflation pressure:		
Main Float Chamber 1	3.30	psi
Chamber 2	3.37	psi
Chamber 3	3.48	psi
Chamber 4	3.60	psi
Chamber 5	3.80	psi

Test 8 - Apical main float and cylinder

Float P/N 20730-100/-200 S/N 0001

Cylinder P/N 20330 S/N KN009

Inflation time: .50 Sec

Inflation pressure:		
Main Float Chamber 1	5.19	psi
Chamber 2	5.20	psi
Chamber 3	4.90	psi
Chamber 4	4.98	psi
Chamber 5	5.1	psi

Witnessed by _____Date_____

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5.0 Conclusions

All tests were performed satisfactorily and within tolerance, with no noticeable difference between the Apical Floats and the Aerazur Floats and System.

Approval: _____Date: _____

Note: All test articles have been verified and conformed. The test was preformed successfully but was inadvertently preformed prior to FAA approval of the Intermix Inflation Test Plan, Report No. AI332-6, Rev B. However, after discussion during a meeting with FAA team Members on October 3, 21002, it was agreed that this test report will be acceptable, and testing does not have to be redone.

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