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Journal Name:	<u>British Journal of Applied Science & Technology</u>
Manuscript Number:	Ms_BJAST_19147
Title of the Manuscript:	Useful Working Fluids for Feasible Super Efficient Trilateral Cycles
Type of the Article	Original Research Article

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This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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PART 1: Review Comments

	Reviewer's comment	Author's comment <i>(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</i>
Compulsory REVISION comments	1. I am so wondering that your solution process to find optimum working fluid for your thermal cycle. - I could not catch why you tried many different fluids - What is the selection procedure?	1.- According to the title of the paper, the main objective is to detect the potential working fluids to operate a Trilateral Cycle undergoing the contribution described in reference [9]. In order to fulfil such objectivem we have tried some different fluids subjected to application criteria among a vast amount of chemical products based on the data provided by the reference [10] The selection procedure is based on the idea of fulfilling several criteria. In fact, we look for potential working fluids whose critical pressure, critical temperatures and the maximum operating temperature of each fluid are into the range of practical applications including high thermal efficiency and acceptable specific work. For instance, the critical temperature must be greater than the ambient temperature in order to reject heat to the heat sink at ambient temperature. Also is important for instance, - Available heat source temperatures and heat sink temperatures. - The operating temperatures and pressures of our cycle. - The range of temperatures between the maximum allowable temperature and the critical temperature. Consequently, all fluids fulfilling some of mentioned criteria are validated for potential applicability. Table 1 and 2 show the fluids that satisfy some of the cited criteria, such as critical temperature, critical pressure, and the maximum allowable operating temperature,



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		while according to the information provided by Table 3, if we select Ethane as working fluid, then we must operate with a power source capable to provide a top temperature greater than 340 K, we must operate with a heat sink capable to cool the fluid bellow 310 K and must support a pressure over 74 bar.																																												
	- Do you have to do all working fluids to test?	Yes all working fluids that exhibit a critical temperature into the range (280K - 700 K) have been checked.																																												
	- Is there any idea to check possible working fluids for your system based on thermo physical properties?	Yes. The critical temperature, critical pressure, maximum allowable operating temperature are some thermo physical properties very useful to check potential candidates to select a working fluid. Although with respect to the performance criteria, efficiency and specific work are important criteria to select working fluids from all checked candidates.																																												
	2. My guess based on reference [9], If you have other results with different working fluids, please analyze your results and find the optimum working fluid for your cycle.	2.- According to the fluids selected by means of Table 1, including if desired, those fluids considered as potential fluids selected in Table 2, the corresponding cycle analysis has been carried out for each fluid. Therefore, in Table A1 of the Appendix A, there are shown an approach to the best results for each studied working fluid, where the relevant data such the operating temperatures are depicted. However, taking as performance criteria the thermal efficiency as well as the specific work, Table 4 shows the desired results according the some performance criteria such as thermal efficiency, specific work, top operating temperature and top operating pressure. According to the results shown in Table 4, The best working fluid is water, since provides the greatest thermal efficiency and specific work. However this working fluid need a power source capable to provide heat at more that 675 K., and must support a pressure over 275 bar. In the table shown above, there is shown a study of water as working fluid.																																												
		<table><tr><td>H₂O</td><td>T(K)</td><td>u(kJ/kg)</td><td>s(kJ/kg-K)</td><td>P(bar)</td><td>v(m³/kg)</td><td>Cv(kJ/kg-K)</td><td>Cp(kJ/kg-K)</td><td>η(%)</td><td>W(kJ/kg)</td><td>CF(%)</td></tr><tr><td>1</td><td>650</td><td>2221.6</td><td>4.7753</td><td>225</td><td>0.0045813</td><td>4.2412</td><td>65.272</td><td>67.17</td><td>2036.4</td><td>27.78</td></tr><tr><td>2</td><td>900</td><td>2909.3</td><td>5.6827</td><td>670.4</td><td>0.0045813</td><td>2.3205</td><td>4.393</td><td></td><td></td><td></td></tr><tr><td>3</td><td>900</td><td>3216.8</td><td>6.5186</td><td>225</td><td>0.016694</td><td>1.9584</td><td>2.7953</td><td></td><td></td><td></td></tr></table>	H ₂ O	T(K)	u(kJ/kg)	s(kJ/kg-K)	P(bar)	v(m³/kg)	Cv(kJ/kg-K)	Cp(kJ/kg-K)	η(%)	W(kJ/kg)	CF(%)	1	650	2221.6	4.7753	225	0.0045813	4.2412	65.272	67.17	2036.4	27.78	2	900	2909.3	5.6827	670.4	0.0045813	2.3205	4.393				3	900	3216.8	6.5186	225	0.016694	1.9584	2.7953			
H ₂ O	T(K)	u(kJ/kg)	s(kJ/kg-K)	P(bar)	v(m³/kg)	Cv(kJ/kg-K)	Cp(kJ/kg-K)	η(%)	W(kJ/kg)	CF(%)																																				
1	650	2221.6	4.7753	225	0.0045813	4.2412	65.272	67.17	2036.4	27.78																																				
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		1	650	2221.6	4.7753	225	0.0045813	4.2412	65.272	73.89	2165.33	18.75
		2	800	2668.8	5.3991	500.3	0.0045813	2.52	5.9071			
		3	800	2986.6	6.1675	225	0.013695	2.0574	3.2473			
		1	650	2221.6	4.7753	225	0.0045813	4.2412	65.272	78.29	2271.98	13.33
		2	750	2726.9	5.2306	411.67	0.0045813	2.7171	7.7315			
		3	750	2851.6	5.9409	225	0.011899	2.2046	3.8495			
		1	650	2221.6	4.7753	225	0.0045813	4.2412	65.272	83.70	2342.42	7.14
		2	700	2394.6	5.0322	320.2	0.0045813	3.0682	12.552			
		3	700	2677.7	5.6289	225	0.0096137	2.5422	5.5112			
		1	650	2221.6	4.7753	225	0.0045813	4.2412	65.272	86.96	2180.04	3.70
		2	675	2314.3	4.9154	273.3	0.0045813	3.3843	19.992			
		3	675	2548.4	5.3885	225	0.0080085	2.9018	8.199			
		1	650	2221.6	4.7753	225	0.0045813	4.2412	65.272	88.90	1625.27	1.52
		2	660	2261.3	4.8358	244.57	0.0045813	3.7407	33.267			
		3	660	2424.5	5.1544	225	0.0065808	3.3155	13.966			
		1	650	2221.6	4.7753	225	0.0045813	4.2412	65.272	89.18	1115.68	0.76
		2	655	2242	4.8066	234.85	0.0045813	3.943	43.697			
		3	655	2357	5.0273	225	0.0058644	3.5722	20.568			
		All considered fluids have been studies in the same way. The part of the table in red indicates the most satisfactory conditions for our trilateral cycle, whose results are depicted in the Table 4 of the paper. However, as function of the user preferences, it could be selected other different operating points. Consequently the optimal operating conditions for a user can be the worst operating conditions for any other user. In Appendix A, the desired operating conditions for any selected fluid are depicted. However, the selected operating conditions cannot by optimum since it depend on the needs and preferences of the users.										



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	3. Figures exceed the blank area(Fig. 3). 4. You present Fig. 4-6 of CO₂, how about try to present other example of another working fluid. (Almost same figures in Ref [9]) 5. Please try to improve your paper, check with Ref [9] such as equations, figures etc.	3.- Fig. 3, adjusted to the permitted edition area 4.- Figs. 4 to 7 have been updated for water as working fluid 5.- The paper has been revised and improved as much as possible
<u>Minor</u> REVISION comments		
<u>Optional/General</u> comments		