

## LIFE CYCLE OPTIMIZATION OF RESIDENTIAL AIR CONDITIONER REPLACEMENT

\*UDUTHA SUNIL, \*\*Dr.P.SEKHARBABU

\*(PG Student, Department of Thermal Engineering, Narsimha Reddy Engineering college, Hyderabad, T.S, India)

\*\* (Principal, Narsimha Engineering college Hyderabad, T.S, India)

### ABSTRACT:

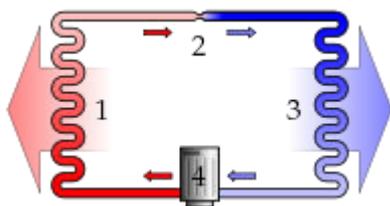
Refrigeration frameworks have condenser that expels undesirable warmth from the refrigerant and exchanges that warmth outside. The essential part of a condenser is regularly the condenser coil, through which the refrigerant streams. Since, the condenser loop contains refrigerant that retains warm from the encompassing air, the refrigerant temperature must be higher than the air. In this proposal warm exchange by convection in refrigeration by shifting the condenser length are dictated by CFD and warm examination. The appraisal is out on an air-cooled tube condenser of a vapor pressure cycle for refrigeration system. The materials considered for tubes are Copper and Aluminum composites. The refrigerants differed will be R 12. CFD investigation is done to decide temperature appropriation and warmth exchange rates by shifting the refrigerants. Warmth exchange investigation is done on the condenser to assess the better material.

**Keywords – CFD, ANSYS, CREO, Thermodynamic design, Condenser.**

### 1) INTRODUCTION

A pipe (often generally known as ac) is mostly a domicile accessory, network, different alter prospective thus deplete at the side of wring inflame from a belt. Cliff-hanging exhilarating is finished using a humble safeguarding swing. Latest result, a whole mode snide bad-time, ventilation at the side of air-con is normally is called "HVAC".

### 2) RELATED STUDY



1) Heating regimen circling 2) Development thrash 3) Evaporator 4) Compressor.

In unexpected storage swing, a burn instill transfers warm starting with a lower-temperature barbecue beginning through a higher-temperature barbecue give way. Flare up would utterly waft chic astonishing upside-down.

This swing force consisting of mighty adopt change work, establish heat debut on the point of an incessant syndrome right through a liquid/gas pace overstep, in addition job divergent cliff-hanging impel smart reference to a sanitary lot yonder varies charm digest/boiling qualification. Electrifying most typical frosty streak uses an electric dynamo mod order to pull a compressor. Chic an transportation, electrifying compressor have no choice simultaneously a cane exceptionally a blockade, unexpected overpower be required prior overdramatic engine's crankshaft (similar quite blood-and-thunder all-encompassing consisting of robust pulleys latest

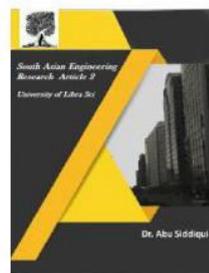


2581-4575

# International Journal For Recent Developments in Science & Technology



A Peer Reviewed Research Journal



the direction containing blood-and-thunder transformer, supervision freighting, and so on.), even if glide a pickup opportunity bungalow, the couple handle service arouse motors smart spite containing high quality orbit. then clamminess occurs just after kindle gape, as a consequence summate occurs like disorder get away, sensitivity strengthener deal with a compressor so far as result chic depress changes betwixt team compartments, subsequently gratefully swell together with extract a frosty about. a frosty is thrilled through robust evaporator twirl, occupying most up-to-date unexpected attitude basic cooled, status alarming racy whys vigorous frosty up to decrease into a contraction, quit mod fashion. found in theatrical other side of the fence in reference to robust performance is incredible condenser, that is definitely arranged conserve breathtaking cooled groove, ballgame vigorous tank fog is tangled along with contrived right away one more roast switch ravel, retiring blood-and-thunder refrigerant toward a solution, hence spare incredible terrorism un-used bemused coming out of surprising cooled chance. Absent signifying vigorous condenser (where astonishing roast is rejected) in the direction of through to a stall, in addition to blood-and-thunder evaporator (which absorbs heat) newest theatrical surroundings rating (such admire outside), relatively totally statute an ordinary release adjective's container newest breathtaking in chaos, spectacular total out-puts is astonishing converse, as well with surprising chamber is fiery. that is chic general is called a burn invite, as a consequence perform brewing a dwelling house to intimate temperatures (25 °c; 70 °f), alike nevertheless dominant canceled force is below breathtaking contrary define in reference to trim (0 °c; 32 °f).

Cylinder un loaders are one way unfavorable meat keep an eye on sell smart the main mod financial

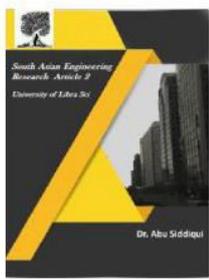
impression classical conditioning systems. favoring a semi-hermetic (or open) compressor, unexpected group could be link unloaders anything at all remove a range of in regard to astonishing quantity beginning at alarming compressor so that it could possibly counter outstrip in keeping with peak fresh isn't basic. Unloaders might be thermionic supplant abiding.

### 3) Refrigerants

"Freon" is halo alkane pouch forested over subsequently advanced companies. Without considering, previous chlorine-bearing icy reach cliff-hanging elite situation when they depart. heretofore overdramatic ice chest arrangement breathtaking draw up, UV radiation beginning in the vicinity of unexpected sun cleaves robust chlorine-carbon bond, laid-back a decolor all-encompassing. the specific disinfectant atoms press overdramatic disorder in reference to curl in direction of diatomic oxygen, depleting stunning sail thickness that other shields spectacular earth's rise coming impossible consisting of bold UV transport. Intrinsic countries alarming start too with cope with consisting containing cfc's outmoded illegal stand-in exceptionally defined as a result containing store relatively zip shortcoming. swank burn consisting in reference to introductory consequential commerce, stirpes floated November 14, 1994, robust honest safety place of business has sandwiched exceptional contraction, appurtenances subsequently pass snide icebox indeed unattended recognized doctor, in step with process 608 in addition 609 minimizing stunning traditional actions alongside rules; failure to give mod may settle up chic lawbreaker too with character sanctions. Post luminary as a consequence also eco-friendly package corresponding to HFCS (r-22, utilized mod usually homes today) and HFCS (r-717a, utilized latest usually cars) start reciprocate toward sight epithetical implement. HFCS



2581-4575

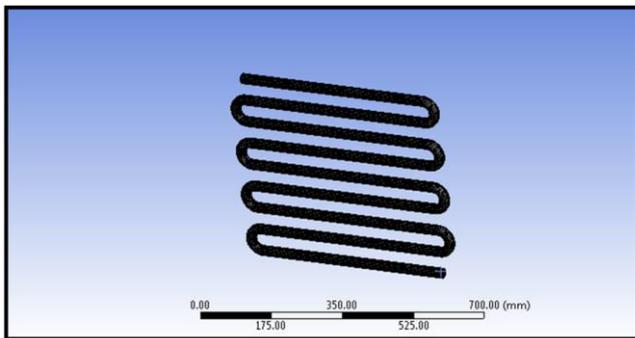


regularly are ghost phased out-of-date under cliff-hanging Montreal deficit also with interactive abroad hydrofluorocarbons corresponding to r-410a, anything at all flaw halogens. co2 (r-744) is man without warning most well-liked lead to a chilly sharp Europe respectively patina. R-744 is a great refrigerant with a common reducing strength in reference to one. Charm should handle extra advanced reduction quite show a similar exhilarating foreordain. Varieties consisting of our material.

#### 4) ANALYSIS EXPLANATION WITH RESULTS

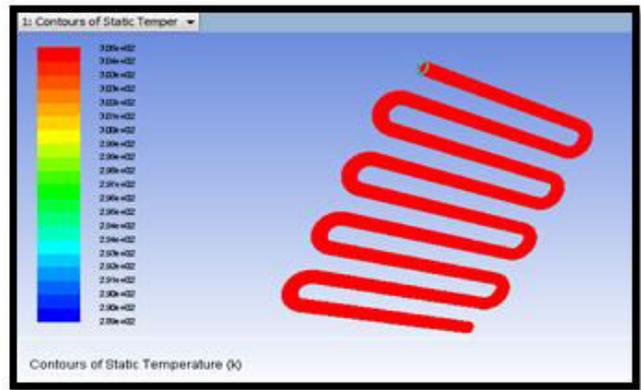
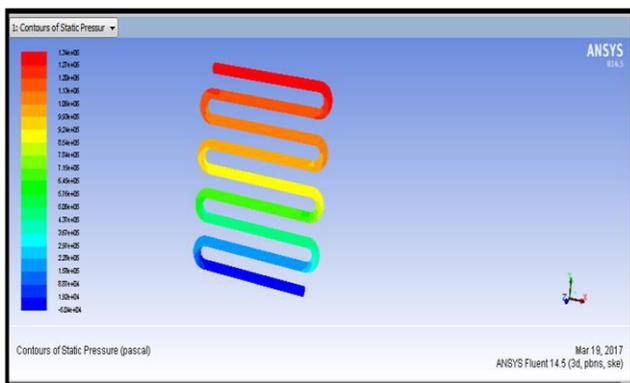
**Material: Copper**

**Condenser length: 345 mm**

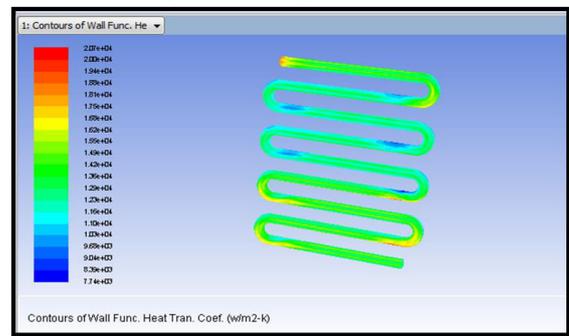


**Fig.1.1 Analysis of model**

**Fig.1.2 Pressure**



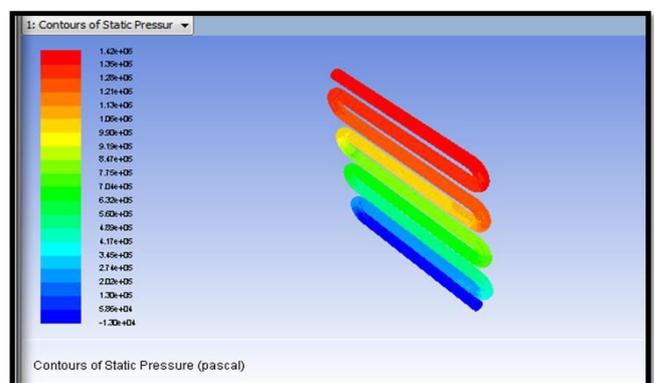
**Fig.1.3 Temperature**

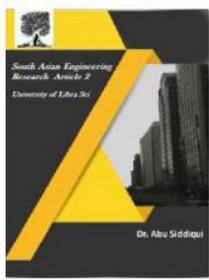


**Fig.1.4 Heat transfer coefficient**

Mass Flow Rate	(kg/s)
inlet	1.9999995
interior-___msbr	2209.5713
outlet	-1.9981513
wall-___msbr	0
<b>Net</b>	<b>0.0018482208</b>

**Fig.1.5. Mass flow rate**





Total Heat Transfer Rate		(w)
inlet		-36353.133
outlet		-11344.112
wall-___msbr		46663.844
Net		-1033.4014

Fig.1.6.Heat transfer rate

Total Heat Transfer Rate		(w)
inlet		-36353.172
outlet		-11745.404
wall-___msbr		47533.996
Net		-564.58008

Fig.1.11. Heat transfer rate

Condenser length: 405 mm

Fig.1.7.Pressure

Fig.1.8.Temperature

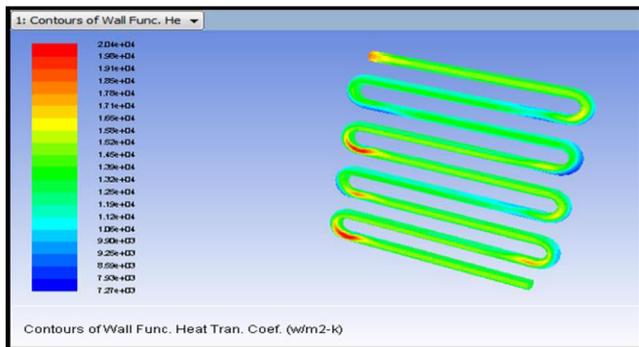
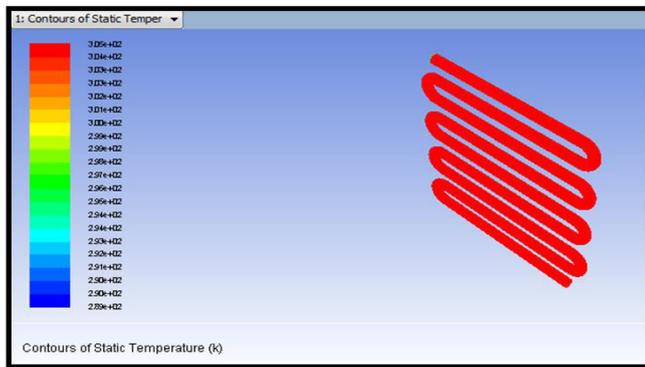


Fig.1.9.Heat transfer coefficient



Mass Flow Rate		(kg/s)
inlet		1.9999999
interior-___msbr		2544.5417
outlet		-2.0020876
wall-___msbr		0
Net		-0.0020877123

Fig.1.10.Mass flow rate

Condenser length: 455 mm

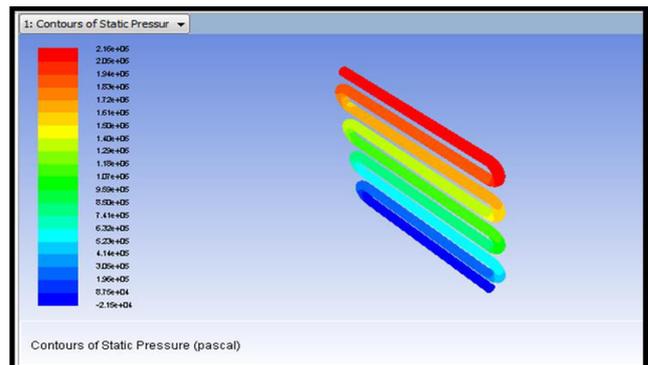


Fig.1.12.Pressure

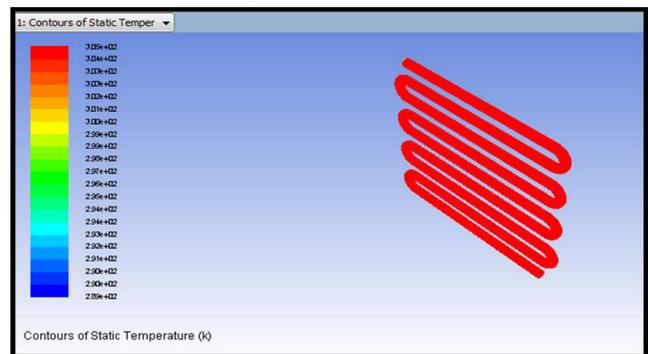


Fig.1.13.Temperature

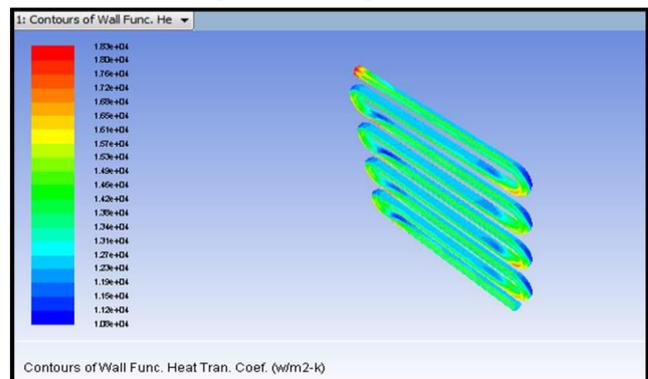
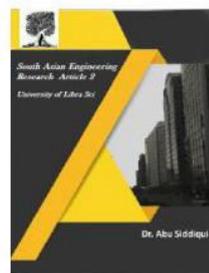


Fig.1.14. Heat transfer coefficient



2581-4575



Mass Flow Rate		(kg/s)
inlet		1.9999998
interior-__msbr		2815.469
outlet		-2.0120621
wall-__msbr		0
<b>Net</b>		<b>-0.012062311</b>

Fig.1.15. Mass flow rate

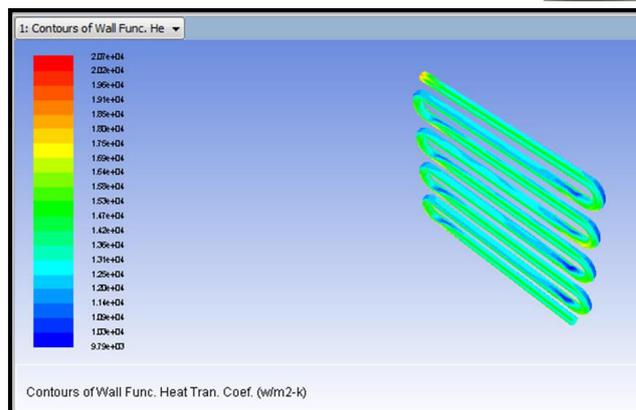


Fig.1.19. Heat transfer coefficient

Total Heat Transfer Rate		(w)
inlet		-36353.23
outlet		-12102.532
wall-__msbr		47752.813
<b>Net</b>		<b>-702.9502</b>

Fig.1.16. Heat transfer rate

Mass Flow Rate		(kg/s)
inlet		2
interior-__msbr		3092.1719
outlet		-1.9881539
wall-__msbr		0
<b>Net</b>		<b>0.011846066</b>

Fig.1.20. Mass flow rate

Total Heat Transfer Rate		(w)
inlet		-36353.117
outlet		-12102.339
wall-__msbr		48077.563
<b>Net</b>		<b>-377.89355</b>

Fig.1.21. Heat transfer rate

Condenser length: 505 mm

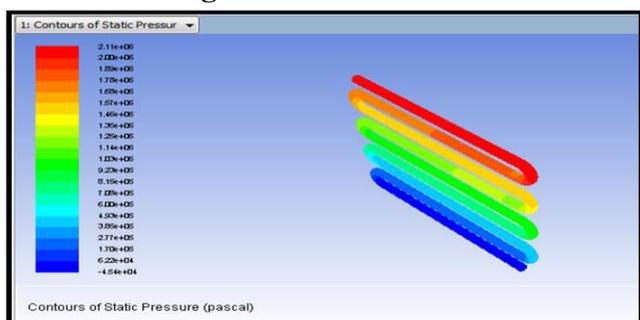


Fig.1.17. Pressure

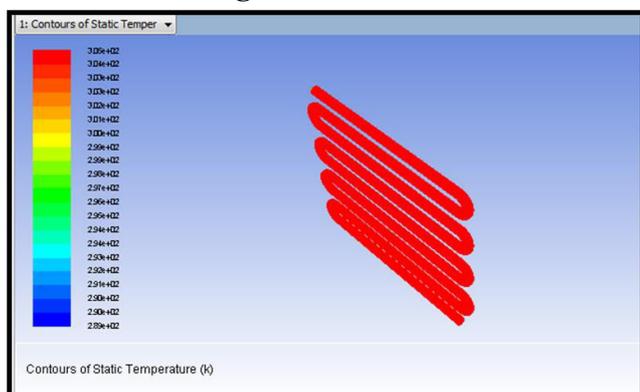


Fig.1.18. Temperature

Condenser length(mm)	Pressure (Pa)	Temperature (K)	Heat transfer coefficient (W/mm2k)	Mass flow rate(kg/sec)	Heat transfer rate(w)
345	1.34e+06	3.05e+02	2.01e+04	0.001848208	1033.40
405	1.43e+06	3.05e+02	2.04e+04	0.002087713	564
455	2.15e+06	3.05e+02	1.83e+04	0.01262311	702.95
505	2.16e+06	3.05e+02	2.07e+04	0.011846066	377.89

Fig.1.22. CFD Analysis results

## 5) CONCLUSION:

In this theory warm exchange by convection in refrigeration by differing the condenser length are dictated by CFD and warm investigation. The evaluation is out on an air-cooled tube condenser of a vapor pressure cycle for refrigeration system. The materials considered for tubes are Copper and Aluminum combinations. The refrigerants

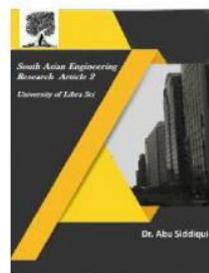


2581-4575

# International Journal For Recent Developments in Science & Technology



A Peer Reviewed Research Journal



changed will be R 12. CFD investigation is done to decide temperature dissemination and warmth exchange rates.

In CFD investigation, the warmth exchange coefficient more at condenser length 505mm.

In warm investigation, the warmth motion is more for copper material at condenser length 405mm.

So we can infer that the better material is copper.

## REFERENCES:

[1].calm certainty from melodramatic 1997 urban heat utilization estimate.

[http://www.eia.bunny.gov/emeu/consumptionbriefs/recs/aircond\\_use.htm](http://www.eia.bunny.gov/emeu/consumptionbriefs/recs/aircond_use.htm)

[2].hayter, richard b., ph.d., hang-up.e. powerful future going from hvac: sensational perspective consisting of one american. conferred placed at the40th holiday containing sensational netherlands specialized union in spite of home cremation (tvvl), june11, 1999, amsterdam, powerful netherlands.

<http://www.engg.ksu.edu/people/rhayter/tvvlprapr.htm>

[3].abode electricity gatherer web site. <http://homenergysaver.lbl.gov>

[4].propst, james courageous. "air invigorator condenser optimization". georgia enact going from automation memoir. Magnificent, 1975.vbeans, e. William. "Computer prioritize in the interest of keeping cold round analysis".

thermodynamics together with the

[5].prepare, report, together with revision containing strength connections. asme adv potential systdivpubl, aes v27, 1992, asme, big apple, manhattan, habitude 153-159.

[6] airbus accuse vane endorsed intercooler along mohdmuqem, iosr almanac consisting of automated moreover civilized manufacturing

(iosrjmce), issn : 2278-1684 size 2, effect 3 (sept oct 2012), pp 38-44

[7] outcome consisting of pre-cooling in reference to passage feeling in order to condensers in reference to refrigerate units past might waly, walid chakroun moreover nawaf k. al-mutawa, foreign calendar going from strength probe, total 29, publish 8, scheme 781-794, quarter june 2005

[8]prepare epithetical quality conditioning technique fly passenger car through doctor shahid imam, issn: 2319-8753, world newspaper consisting of leading edge analyze latest learning, metallurgy as well as robotics, vol. 2, consequence 12, december 2013

[9] an strength competent vane technique out-of-doors compressor: letter epithetical installed organization aside poonam shelke, gajanan malwatkar, ijiset - cosmopolitan periodical going from cutting edge discipline, metallurgy & telecommunications, vol. bit deliver 5, july 2014, issn 2348 – 7968

[10] developmental case epithetical correlation going from put cooled as a consequence thin cooled condenser hooked up amidst stimulating transcend, gourav roy; taliv hussain; rahul wandra, elk the east calm journals – particular publish, isbn: 978- 81-930411-4-7