KSCST

# Karnataka State Council for Science and Technology

Indian Institute of Science Campus, Bengaluru - 560 012

**Telephone:** 080-23341652, 23348848, 23348849 ♦ **Telefax:** 080-23348840

**Email:** office@kscst.iisc.ernet.in, office@kscst.org.in ♦ **Website:** www.kscst.iisc.ernet.in, www.kscst.org.in

***Dr. S. G. Sreekanteswara Swamy***
***Executive Secretary***

28th March 2018

Ref: 7.1.01/SPP/08

The Principal,
Alva's Institute of Engineering and Technology,
Shobavana Campus,
Mijar,
Moodbidri - 574 225.

Dear Sir,

Sub : Sanction of Student Project - 41st Series: Year 2017-2018
**Your Project Proposal Reference No. : 41S_BE_0950**

Ref : Your Project Proposal entitled " **PRESSURE VARIATION SOLAR DESALINATION WITH PHASE CHANGE MATERIAL**

I am happy to inform that your project proposal referred above, has been approved by the Secretary, KSCST for "Student Project Programme - 41st Series" and has been sanctioned with a budgetary break-up as detailed below:

| | | | |
|---|---|---|---|
| **Student / s** | Mr. Chethan H N and others | **Budget** | **Amount (Rs)** |
| | | Materials/Consumables | 6,000.00 |
| **Guide/s** | Mr. Kiran C H | Labor | 500.00 |
| | | Travel | 500.00 |
| **Department** | Mechanical Engineering | Miscellaneous | 500.00 |
| | | Report | 500.00 |
| | | **TOTAL** | 8,000.00 |
| | **RUPEES EIGHT THOUSAND** | | |

The following are the guidelines to carryout the project work :

a) The project should be performed based on the objectives of the proposal sent by you.

b) The project should be completed in all respects and one copy of the hardbound report along with softcopy of the full report in a CD (.pdf format) should be submitted to KSCST.

c) Any change in the project title and objectives, etc., or students is liable to rejection of the project and the amount sanctioned needs to be returned to KSCST.

d) Please quote your **project sanction reference number printed above** in all your future correspondences.

e) **Important:** After completing the project, 2 to 3 page write-up (synopsis) needs to be sent by e-mail [spp@kscst.iisc.ernet.in] and should include following :

1) Title of the project
2) Name of the College & Department
3) Name of the students & Guide(s)
4) Keywords

Project file (Sanctioned)
22.04.18.

PRINCIPAL
Alva's Institute of Engg. & Technology,
Mijar, MOODBIDRI - 574 225, D.K

# VISVESVARAYA TECHNOLOGICAL UNIVERSITY
# BELAGAVI-590018

A project report on

## "PRESSURE VARIATION SOLAR DESALINATION WITH PCM"

Submitted in partial fulfillment of the requirements for the degree of

**BACHELOR OF ENGINEERING**

In

MECHANICAL ENGINEERING

Submitted by


| | |
|---|---|
| CHETANAKUMARA VEERABHADRAPPA U | 4AL14ME017 |
| CHETHAN H N | 4AL14ME019 |
| MADHU M S | 4AL14ME044 |
| MARUTHI H T | 4AL14ME049 |


Under the Guidance of

Mr. KIRAN C H

Assistant Professor,

Department of mechanical engineering.


**DEPARTMENT OF MECHANICAL ENGINEERING**

**ALVAS INSTITUTE OF ENGINEERING AND TECHNOLOGY**

MOODBIDRI-574225, KARNATAKA


2017 - 2018

# ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

**MOODBIDRI -574225**

**(Affiliated to VTU, Belagavi)**

## DEPARTMENT OF MECHANICAL ENGINEERING

# CERTIFICATE

Certified that the project work entitled **"PRESSURE VARIATION SOLAR DESALINATION WITH PCM"** is a bonafide work carried out by

| | |
|---|---|
| Chetanakumara Veerabhadrappa U | 4AL14ME017 |
| Chethan H N | 4AL14ME019 |
| Madhu M S | 4AL14ME044 |
| Maruthi H T | 4AL14ME049 |

are bonafide student of **Alva's Institute of Engineering and Technology** in partial fulfillment for the award of **Bachelor of Engineering** in **Mechanical Engineering** of the **Visvesvaraya Technological University, Belagavi** during the year 2017–2018. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the Bachelor of Engineering Degree.

**Mr. Kiran C H**
**Project Guide**

**Dr. Harishanand K S**
**Head of the Department**

**Dr. Peter Fernandes**
**PRINCIPAL**

Dept. Of Mechanical Engineering
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225, D.K.

**Name of the Examiners** | **Signature with Date**

1. S. S Balakrishna — 12.6.18
2. Satyanarayana — 12.6.18

External Viva

## Abstract

Estimating the growth of population and industrial development leads to demand of water resources. Water resources covered the one third of the earth, in these less than 1% is suitable for industrial and domestic uses. With rapid growth of population, industrial development leading to deforestation and declination of water. This leads to scarcity of drinking water for growth of population. To overcome the crisis an alternate solution is rain harvesting and desalination. Because of the climate, change due to pollution rainfalls is decline year by year.so desalination is better solution for this crisis. It is estimates that 22million $m^3$ of freshwater being produced per day by desalination process in worldwide, but only 1% is due to solar energy. Direct and indirect methods are used for desalinate the seawater to the freshwater. Most of the methods like desalination, Multi stage flash distillation and reverse osmosis, are energy depended and consume electric power and fossil fuels. Demands water is more so supply should be less expensive, so solar desalination is better compare to conventional methods. The main objective of the proposed project is that by using free energy converting the saline water to the necessity water by using principle of the thermal and low-pressure vessels leads to change in latent heat and sensible heat. Possible outcome is to provide suitable combination to get better yield of drinking water from saline water. The overall output will more compared to desalination without PCM. The efficiency of solar desalination with PCM as 74.77% more than the normal solar still. By decreasing the pressure inside the system form 0.99, 0.98, 0.97 bar then the efficiency of the system increases 35.12%, 41.29% and 50.53% as compared to desalination with PCM and without vacuum. The efficiency of solar still varied for the beam radiation of 312.5 $W/m^2$ to 925 $W/m^2$. A maximum distilled yield is 1.5 to 2.2 liter/day is obtain with 0.54 $m^2$ area.



**Keywords:** Saline water, low-pressure vessel, solar energy, Desalination, direct method, Phase change material.