


## Brief Biodata

**Name: Bhikham Singh**

<b>Designation:</b>	<b>Principal Technical Officer</b>	
<b>DP No. and Name:</b>	<b>4.04, Solar Energy Complex</b>	
<b>DU No. and Name:</b>	<b>4.0, Advance Materials &amp; Devices Metrology (AMDM)</b>	
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<b>Date of Joining CSIR-NPL:</b>	<b>26-04-1990</b>	
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<b>Mobile (optional)</b>	<b>-</b>	

### Research Area/ Interest

Establishment, Maintain & Up-gradation of National Humidity Standards Operation & Maintenance of Solar Energy Clean Room Complex (SECRC)

### Educational Qualifications

*(Please write latest qualification first)*

<b>Degree</b>	<b>Subject</b>	<b>University/ Institute</b>	<b>Year</b>
Post Diploma in Applied Electronics & Microwave Technology	App. Electronics, Circuit Theory, Microwave etc.	BTE, Delhi	1995
4 Years Diploma in Electrical Engg. (PT)	Electrical Engg.	BTE, Delhi	1988
ITI in Electrical Trade	Electrical	Pusa, ITI	1982

### Academic / Research Experience

<b>Grade / Post</b>	<b>Institute</b>	<b>Duration</b>		<b>Research Field</b>
		<b>From</b>	<b>To</b>	
STA	CSIR-NPL	1990	1995	Automation Group Temp. & Humidity
Technical Officer	CSIR-NPL	1995	2000	Temp. Humidity Standards
Sr. Technical Officer-1	CSIR-NPL	2000	2005	Temp. Humidity Standards
Sr. Technical Officer-2	CSIR-NPL	2005	2010	Temp. Humidity Standards
Sr. Technical Officer-3	CSIR-NPL	2010	2015	Temp. Humidity Standards & SECRC
Pr. Technical officer	CSIR-NPL	2015	2022	Solar Energy Clean Room Complex (SECRC)

## No. of Publications 38

No. of Publications in SCI Journals	No. of Publications in non-SCI Journals	No. of Publications in Conference Proceedings	Books	Total
18	09	11	Nil	38

## Selected Publications

1. Microstructure Dependent Humidity Sensitivity of Porous  $MgFe_2O_4-CeO_2$   
Jyoti Shah, R.K. Kotnala, **Bhikham Singh**, Hari Kishan  
Published in Journal of Sensors & Actuators: B-Chemical, Volume: 128, Issue: 1  
Pages: 306-311, 2007
2. Humidity response of Li-substituted magnesium ferrite  
R.K. Kotnala, Jyoti Shah, **Bhikham Singh**, Hari Kishan, Sukhvir Singh. S.K.  
Dhawan, A Sengupta  
Published in Journal of Sensors & Actuators: B-Chemical, Volume: 129, Issue: 2 Page  
909-914, 2007
3. Mixed flow Relative Humidity generator  
Hari Kishan and **Bhikham Singh**.  
MAPAN – Journal of Metrology Society of India, Vol. 23, No.1, 2008; pp. 21-24
4. Calibration of Special Relative Humidity & Temperature (RHT) Sensor and  
Evaluation & Expression of Uncertainty in the Measurement.  
**Bhikham Singh**, Hari Kishan & Y.P. Singh.  
MAPAN–Journal of Metrology Society of India, Vol. 23, No.2, 2008; pp. 115-121
5. Synthesis of  $Mn_{0.2}Zn_{0.8}Fe_2O_4$  particles by high energy ball milling and their  
applications  
Nitu Kumar, Vinod Kumar, Manju Arora, , Monika Sharma, **Bhikham Singh** & R.P.  
Pant  
Indian Journal of Engineering and Material Science, Vol. 16, December 2009, pp.  
410-414
6. Preparation and Characterization of  $Gd^{3+}$  Substituted Nano-Structured Cobalt Ferrites  
for Humidity Sensor  
Rana Anu, Thakur O.P., Kumar Vinod, Pant R.P., **Singh Bhikham**  
**Sensor Letters**, American Scientific Publishers, volume 12, Number 9, September  
2014,  
pp.1378-1382(5) (reprint attached)

## Patents 05 Nos.

- ❖ The title of the invention is “ **Mixed Flow Relative Humidity Generator**” vide NPL/IPR/Pat/2010-11 dated July 1, 2010 & vide CSIR Patent Ref No. 0043NF2011 Dated 2011, **filed in India**  
Hari Kishan, **Bhikham Singh**, Ashok Kumar and Shiv Dutt Sharma
- ❖ The title of the invention is “ **A Low Cost Compact Mixed Flow Relative Humidity Generator**” vide NPL/IPR/Pat/2011-12 dated Jan. 06, 2012 & NF No. 0080NF2012, Dated 13-Apr-2012, **filed in India**.  
Ashok Kumar, Hari Kishan and **Bhikham Singh**
- ❖ The title of the invention is “**Resistive type Porous Magnesium Ferrite Humidity Sensor**” vide NPL/IPR/Pat/2011-12 dated March 23, 2012, NF No. 0138NF2012, **filed in India and Abroad (USA & Japan)**.  
R.K. Kotnala, Jyoti Shah, Hari Kishan , **Bhikham Singh**
- ❖ Patent/invention granted on “**A Portable Humidity Generator and A Process to Generate Relative Humidity There from**”. Vide Indian Patent No. 233222.  
Kishan Hari; **Singh Bhikham**; Sharma S.D; Arora O.P. (The patent Office Journal dated 27/03/2009)
- ❖ Patent invention granted on “**A Compact Dew Point Generator**” by Hari Kishan, S.K. Aggarwal, R.B. Saxena, **Bhikham Singh** and S.D. Sharma, Vide Indian Patent No.195191 dated 23-06-2009.
- ❖ **Technology Know-How Transferred to M/s Belz Instruments Pvt. Ltd., Faridabad (Haryana) on Portable Relative Humidity (RH) Generator** dated 20<sup>th</sup> July, 2009 Technology Charges ₹ **2.0 Lakhs (Rupees Two Lakh only)**  
*Developed by: Hari Kishan, **Bhikham Singh** and Shiv Dutt Sharma*

## Current Activities

(Not more than 100 words)

- **Operation & Maintenance of Solar Energy Clean Room Complex (SECRC)** since 2013
- Overall responsibility & management as **Facility Manager** of day to day clean room affairs for smooth functioning and running of SECRC for maintaining the clean room conditions (Class 100, 1000, 10000). Operation and maintenance of HT & LT panels, Transformer of capacity 1250KVA, Rotary UPS of capacity 1100 KVA & related electrical appliances of clean room, electrical supply to AHUs & its condensing units, power to various equipment's. As well as coordination with main electrical sub-station for smooth functioning of SECRC continuously. Responsibility of operation & maintenance of utility items i.e Nitrogen plant 99.99 Purity, DI/RO water plant, Gas cabinets, gas lines, gas leak detection system, sprinkler & fire Suppression system, Fire Safety & Alarm System, Biometric Machine, CCTV Cameras with Recording and Display in TV, Air Showers, Air Curtain, Return Air Risers, DDC Panel (Direct Digital Control) etc.. Responsible of monitoring & maintaining the records of panels installed in control room for Air Handling Units, air conditioning equipment filters etc. Operation & maintenance of AHUs, and responsible for access control in clean room complex.
- Maintaining the Protocol of the Clean Room i.e. Cleanliness SOP as per ISO-05, 06, 07 and ISO 14644-1 (2015) Clean Rooms and Associated Controlled Environments. Time to time Validation of following parameters for class 100, 1000 & 10000 Clean

Rooms i.e particle count etc..

- We saved the CSIR-NPL Notional Money of more than Rs. **2.0 Crore** of Clean Room operation & maintenance charges without any outsourcing/annual comprehensive maintenance with or without component contract (AMC/CAMC) after defect liability period over in December 2015.

### **Honour(s)/Award(s)/ Fellowship(s)**

- ❖ Gold Award Winner on 27<sup>th</sup> November 2010 was given by DGSIR, CSIR Technofest IITF 2010, Science & Innovation for Transforming India, Theme Pavilion on Ecology & Environment 14-28 November, 2010.
- ❖ Award Certificate along with Samriti Chinh from Vighan Bharti was provided me on 23<sup>rd</sup> Nov. 2010 at NPL in the National Science Congress in Indian Languages 22-23 Nov. 2010 for Successful Management in various capacity of the Conference.
- ❖ Team Award comprising of the Certificate of appreciation and Cash Prize For Rs. 5000/- for the transfer of technology entitled “ Portable Relative Humidity (RH) Generator to M/s Belz Instruments Pvt. Ltd., Faridabad (Haryana) by by Dr.Hari Kishan, **Sri Bhikham Singh**,and Sri Shiv Dutt Sharma on 20-5-2010 the World Metrology Day & National Technology Day Function.
- ❖ Team Award comprising of the Certificates and Cash Prize For Rs. 2500/- for the invention granted on “A Compact Dew Point Generator” by Dr. Hari Kishan, Dr. S.K. Aggarwal, Mr. R.B. Saxena, **Mr. Bhikham Singh** and Mr. S.D. Sharma, Vide Indian Patent No.195191 on 20-5-2010 the World Metrology Day & National Technology Day Function.
- ❖ **NPL Outstanding Performance Award** 2008-09 For Outstanding Technical Work Individual (SH. BHIKHAM SINGH) with the Cash Prize of Rupees 10,000/- On 26<sup>th</sup> Sep., 2009.
- ❖ Team Award comprising of the Certificates and Cash Prize For Rs. 2500/- for the invention granted on “A Portable Humidity Generator and A Process to generate Relative Humidity Therefrom.” by Hari Kishan, **Bhikham Singh**, Shiv Dutt Sharma, Mr. O.P. Arora, Vide Indian Patent No. 233222 on 20-05-2009 the World Metrology Day & National Technology Day Function.
- ❖ **Akashvani Annual Awards** Two Nos. for **Technical Excellence** for the years 1988 and 1989 for Best Import Substitution and Best Research Work.
- ❖ **Qualified NABL**, Laboratory Assessors Course as per ISO/IEC 17025:2005 in 2007.
- ❖ Five Hindi Pakhwara awards in the years 2005,2006, 2007, 2008 & 2011, 2<sup>nd</sup> and 3<sup>rd</sup> with cash Rs.600/- & 400/-

### **Membership of Professional Societies/ Institutions**

- |   |                       |
|---|-----------------------|
| 1. Instrument Society of India                              | (Life Member, 1996)   |
| 2. Metrology Society of India                               | (Fellow Member, 2011) |
| 3. Swadeshi Science Movement of India (Vigyan Bharti,Delhi) | (Life Member, 2006)   |
| 4. Indian Red Cross Society                                 | (Life Member, 2010)   |
| 5. Ultra Sonic Society of India                             | (Life Member,2011)    |

## **Any other Information**

*(Not more than 100 words)*

### **Outstanding R&D achievements**

➤ **National Humidity Standards:- Since 1995 to 2013**

To maintain & establishment of the National Humidity Standard for RH measurements (Reference Standards an Aspirated Psychrometer using two matched ,precise, digital, quartz thermometers) for calibrating the RH instruments/hygrometers in the range 15 to 95 % RH, uncertainty  $\pm 1\%$  RH.

Evaluated and calculation of uncertainty of measurements in Ref. RH Standard using the latest technique (type A & B) and found the maximum uncertainty in RH measurements to be  $< \pm 1\%$  RH as per GUM document. **ECF earned Rs. More than 1.0 Crore**

Prepared all documents related to Quality Management System as well as Technical Management System, Reference Humidity, Traceability, Standards Control charts, calibration procedures and various other measurements registers/ files maintained update for the Implementation of Quality System as per ISO/IEC 17025:2005 and International Peer review of temperature & humidity laboratory on 2-4<sup>th</sup> Aug. 2005. Laboratory was peer reviewed successfully by the International Technical expert Dr. Joachim Fischer, from PTB, Germany and Quality expert Mr. B. Basvaiah.

The Temperature & Humidity Standards of NPL, New Delhi has been peer reviewed by the International Technical Expert Dr. Georges Bonnier, Former Deputy Director from BNM-INM France, in the field of temperature and humidity parameter and the Quality Expert Mr.S.K.Kimothi. The peer review was held on 2 – 4 March, 2010. One CMC claim was audited in the area of relative humidity parameter during the peer review. Successfully peer reviewed and the results of CMCs shall be published in the BIPM document/website in Apendix-C

➤ Designed and developed of a “ **A Low Cost Compact Mixed Flow Relative Humidity Generator**” to be used in the relative Humidity range of 5 % to 95% RH. It has capacity to generate very low level of relative humidity of high precision and stability at low cost along with its easy portability would be enormously useful for the calibration of hygrometers employed for industrial and R&D environments. ( **Patent Filed**)

➤ Development of **09 Nos.(Nine) “Portable Relative Humidity (RH) Generator”** based on two pressure technique, which can be used as a traveling/mobile humidity standard among various calibration laboratories and finds immense use in the calibrations of hygrometers/RH sensors in the range of 10 to 95 % RH,  $\pm 1\%$  RH stability, and granted Indian Patent No. 195191.

This device has been purchased by the following firms: M/s Sushma Industries & Calibration Centre (Bangalore), Electro Meter Corporation(Kolkatta), ICL Calibration testing Pvt.

Ltd.(Panchkula, HR), Labin Scientific Instruments & Calibration Pvt. Ltd. (Delhi), Emm Tech Calibration (Faridabad, HR), Precision Calibration Laboratory (Bhubneshwar, Orissa), Adcon Industries Pvt. Ltd. (Gurgaon, HR), Gatrada Engineering Corpn. (Ahmedabad) & M/s Belz Instruments Pvt. Ltd., Faridabad (Haryana). Sold for Rs. 4.6 Lakhs (Rupees Four Lakhs Sixty Thousand). And two days training were provided for two personnel of each Industry on selling this device.

➤ **Preservation of the Constitution of India: since 1995 to 2013 Re-sealing of Receptacles containing Original two bound Calligraphic Volumes (English & Hindi) by NPL make Mixed-Flow Relative Humidity Generator.**

➤ **Security Section**

Took an additional charge of security as an Officer in Charge security vide O.M. No. 27/1/2003/E-II dated 26.04.2011, DNPL had given me this assignment in addition to my existing responsibilities without any additional remuneration. The following significant work has been done during the period from 26.04.2011 to 31.10.2012. Handing over the charge to newly joined Security Officer (Maj. Ajmer Singh) in presence of COA, all items including arms 5 Nos., one pistol, 2 guns, 2 rifles ammunition, licenses and files etc.