



INVITATION

EXPRESSION OF INTEREST FOR THE TECHNOLOGY OF A MICROWAVE BASED BRIX/CONCENTRATION METER FOR SUGAR INDUSTRY

REF. NO. : SMR/MSD/EOI/2023-24/01

DUE ON : 24-08-2023

Pre Bid Meeting Date : 08-08-2023 at 11.00 AM
AT SAMEER, MUMBAI

*Society for Applied Microwave Electronics Engineering &
Research IIT Campus, Powai, Mumbai 400 076*

Objective

Society for Applied Microwave Electronics Engineering & Research - (SAMEER hereinafter referred as ‘Authority’) invites applications for “Expression of Interest for the Technology of Microwave Based Compact Cost Effective Brix Meter for Sugar Industry” from reputed organization/public sector units with relevant experience.

1. INTRODUCTION

Society for Applied Microwave Electronics Engineering and Research (SAMEER) is an autonomous R & D institution under the Ministry of Electronics and Information Technology (MEITY), Government of India. SAMEER pursues application-oriented research and development activities in the areas of Medical Electronics, RF and Microwave systems, Photonics, EMI/EMC Engineering, Antenna, and Electromagnetic, Communications, Thermal Engineering, radar- based Atmospheric Instrumentation, and related software. SAMEER with a focus on application- oriented R & D, undertakes projects, customized product development, and design consultancy in these specialized areas.

SAMEER has successfully completed and demonstrated the Proof of Concept for “Design and Development of a Compact Cost effective Brix Meter for sugar industry”. In continuation with the same, MeitY sponsored the project “Design and Development of a Microwave Based Compact Cost effective Brix meter for Sugar Industry” for production of a cost-effective and maintenance free sensor for the measurement of Brix in syrup during the sugar boiling process in the sugar industry. This project was aimed at designing and developing a compact and cost effective microwave based Brix meter for the sugar industry.

Under the project, SAMEER has developed cost effective Brix meter. The Technological outcomes of this project are:

- A compact, mechanically suitable and sustainable microwave based Brix measurement Insertion probe for vacuum sugar boiling pan
- A compact microwave trans-receiver system for Brix measurement of sugar syrup with data processing and data logging system.

In sugar plants, the quality of sugar as determined by International Council for Unified Methods of Sugar Analysis (ICUMSA) greatly depends on the degree of super saturation of syrup when seeding is attempted. Seeding has to be carried out within a narrow band of syrup super saturation. Concentration of sucrose in sugar solution is expressed in °Brix. If it is too low, the crystallization rate suffers and above the maximum limit, spontaneous nucleation takes place, both of which results in poor quality and low recovery of sugar from syrup. Hence it is most desirable to know the syrup concentration at all times during the sugar boiling process so that its super saturation may be held within certain limit

Several measuring techniques have been used in the past for judging the syrup oversaturation.

One, still widely used, is the electrical conductivity of boiling syrups and massecuites. This will give a rough but not specific estimation, since conductivity is affected by crystal crop, soluble electrolyte content of the syrup etc. Another method which has been greatly accepted uses the Refractive index of boiling syrups. Though reliable results were obtained with this method, it presents mechanical maintenance difficulties and is a slow measurement process due to the time required to change the viscous syrup film adjacent to measuring prisms.

However, the technology developed by SAMEER is microwave based technology which gives reliable results and can be deployed online in-situ condition. Brix measurement by this method is reasonably good as concluded in the earlier Proof of Concept (POC) level project in comparison to Boiling Point Elevation (BPE) and other methods as described above

2. Scope of work & Facilities under this EOI:

2.1 Extent of work

The EOI document is for batch fabrication of the Microwave based compact cost effective Brix/Concentration meter for sugar industry with the scope of work as listed below:

- (a) To manufacture the Brix meter and its accessories.
- (b) To install and commission the Brix meter system and its accessories at the sugar industry/facility.
- (c) To maintain the systems at the industry/facility.
- (d) To market the systems in India.

2.2 Documentation:

- SAMEER will provide its design documentation for the Brix meter and all subsystems as per the scope of work.
- The technical support document will be provided in the form of a Bill of material, subsystem mechanical drawings of all the parts and assemblies, Electrical wiring diagram, Electronic circuit diagram, Subsystem and System-level procedures, Acceptance tests, Service, and Maintenance manuals.

3.0. EXPRESSION OF INTEREST (EOI)

- 3.1** SAMEER invites Indian companies to submit their “Expression of Interest” in the format given in Annexure ‘A’.

The industries will be shortlisted based on the information furnished in Annexure–A and assessment of the manufacturing facilities, sales & marketing, service & maintenance network, financial capability, and general company profile by the TOT/Expert committee.

3.2 Expression of Interest to the extent of

Manufacturing of the Brix meter and accessories including sales/ marketing and after-sales

- 3.3** The submission of the EOI document shall include all such documents that are specified herein to prove the authenticity of their offer and any claim made therein. The burden of proving such claims shall lie with the bidder.

- 3.4** All cost and expenses associated with submission of EOI document shall be borne by the company while submitting the EOI document and SAMEER shall have no liability, in any manner in this regard, or if it decides to terminate the process of shortlisting for any reason whatsoever.

- 3.5 Cost of TOT - This includes charges for documentation, training and hand holding of vendor for technology of sub system modules as given in the Commercial Terms and Conditions and for total technology.**

3.6 Instructions to the Bidders

Society for Applied Microwave Electronics Engineering & Research - (SAMEER hereinafter referred as ‘Authority’) invites applications for “Transfer of Technology for systems developed under the project Microwave based compact cost effective Brix meter for sugar industry” from reputed organization/public sector units/company/SME/Startups with relevant experience.

1. The information to be furnished for transfer of technology is given in Annexure –A. Interested parties can submit the EOI document along with Annexure-A duly filled in with all relevant supporting documents and those mentioned in Annexure C (C-9) of EOI document.

2. Meeting with the Bidders may be held in SAMEER, IIT Campus, Powai, Mumbai with the prior appointment. The purpose of this meeting will be to clarify the requirements as envisaged by the Authority and also to address the queries from the respective bidders, if any.
3. The EOI document submitted should be sealed properly and marked “EOI document for the technology transfer of Microwave based Brix/Concentration meter project” to reach the following address within stipulated time period from the date of issue of the EOI document by SAMEER.

**The Purchase Officer,
SAMEER,
IIT campus, Powai
Mumbai-400076**

SAMEER may at its discretion – extend this deadline for the submission of EOI by amending the EOI documents, in which case all rights and obligations of Institution and bidders previously subject to the deadline will thereafter be subjected to the deadline as extended.

4. To assist in the examination, evaluation, and comparison of EOI document, SAMEER at its discretion can ask the bidder for the clarification of its EOI bid. The request for clarification and the response shall be in writing. However, no post submission of EOI document, clarification at the initiative of the bidder shall be entertained. Authority reserves the right to visit the facilities of the bidders if required.
5. Bidders if they choose may visit SAMEER with prior appointment before submitting their Expression of Interest.
6. Bidders may be called for making a presentation before the committee.
7. Authorities may visit the bidder’s facilities for the assessment.
8. SAMEER will issue tender documents to short-listed bidders for the submission of financial bids.
9. Authority will issue ToT Package Document to the final short listed bidders which will include the detailed technical specifications of the system, a draft of the ToT agreement to be signed indicating the applicable ToT fees and terms & conditions to the short-listed bidders for the submission of acceptance by the bidder.

10. At any time before the submission of EOI document, the Authority may carry out amendment(s) to this EOI document and/or the schedule. The amendment will be made available on our website (www.sameer.gov.in) and will be binding on them. The Authority may at its discretion extend the deadline for the submission of proposals.
11. The Authority reserves the right to accept or reject any application without assigning any reason thereof.
12. Bids that are incomplete in any respect or those that are not consistent with the requirements as specified in this document or those that do not adhere to formats, wherever specified may be considered non-responsive and may be liable for rejection and no further correspondence will be entertained with such bidders.
13. Canvassing in any form would disqualify the applicant.
14. For any clarifications on the Expression of Interest document, the following person may be contacted.

Tapas K Bhuiya (Medical System Division)
Scientist – ‘E’
S.A.M.E.E.R.
I.I.T. Campus, Powai
Mumbai 400076.
Email: *tapas@sameer.gov.in*
Tel. no. 022-25727211

Director General

SAMEER

Note: Please refer to Annexure: C1 “Request for Clarifications” for pre-bid queries format.

ANNEXURE- A

The following details should be submitted along with EOI document.

A.	Company Profile
1	Name of the Organization: Website:
2	Name of the Contact Person: Name: Address: Telephone: Fax: E-Mail:
3	Year of Incorporation:
4	Type of Organization (Public Sector/Limited/Private Limited / Partnership / Proprietary /Society / Any Other):
5	Address of the Registered Office:
6	Number of Offices with addresses (Excluding Registered Office): India Abroad
7	Certificate of registration as a manufacturing unit
8	Permanent Account Number
9	GSTN
10	Status of ISO9001 / IS013485 Certification

B.	ESSENTIAL REQUIREMENTS/INFORMATION	Compliance Y/N	Remarks and Supporting Document
1	The organization must be a reputed firm/Company/SME/Startups incorporated in India with standing of at least two years of existence.		
2	The company should indicate the annual turnover. The turnover is to be supported by financial statements of accounts/Annual reports duly certified by a Chartered accountant/ Balance sheets of last 3 years/Income tax returns for the last 3 years period. The annual turnover should be as per government of India Guidelines. However MSME to submit a copy of MSME certification along with the bid. Startups will be provided with a discount as per government norms or 25% whichever is higher on the ToT cost. MSME will be provided with an discount of 10 % All as per government norms		
3	Company profile, giving details of current activities and management/ personnel structure including evidence of incorporation. The company should be registered and preferably ISO 9001/ ISO13485 or equivalent certified.		
4	Details of absorption of technology for a product/ knowhow that has been taken up on a production scale in the past may also be given.		
5	The industry should have adequate manpower to undertake this work The manpower strength (Technical: Mechanical, Electrical, Electronics, Software & Non-Technical) at various levels to be furnished Technical: a. B.E. / B.TECH. b. DIPLOMA c. SKILLED TECHNICIANS d. UNSKILLED Non Technical:		

6	The Industry should have manufacturing facilities for part and subassembly fabrication related to this work. The list of machine tools and equipment available to be furnished.		
7	The in-house technological expertise available to be furnished		
8	The industry should have adequate inspection and quality control facilities for this work. The list of equipment available to be furnished.		
9	The industry should have adequate space for undertaking this work. Available space – Covered & Open to be furnished.		
10.	List of products manufactured as a regular activity in the last five years. Give the list of products with general specifications and the customers.		
11	List of PSUs / Govt. customers if any- with contact details (Address, Tel no., Contact Person) Details of this to be furnished.		
12	The industry should have service engineers to attend service calls for this unit. The service network to be furnished.		
13	The industry should have a sales and marketing network. The details of this are to be furnished.		
14	The list of technical collaborators if any for various ongoing products may be furnished		
15	Sub-contractor/Sub-vendors: Sub-contracting for manufacturing of certain parts is permitted. However, the whole technology or manufacturing of the entire sub-module cannot be subcontracted. ToT is applicable only to the eligible company on NON EXCLUSIVE basis and further selling of technology is not permitted to any third party.		
16	Pre-Qualification bid format mentioned in C9 should also be submitted.		

C.	Other terms and Condition		
1.	Upon development of the sub-systems by successful bidders, the bidders can put the entire system or subsystem on the GeM portal.		
2.	SAMEER will support the bidder for only the first year from the date of signing the MoU as indicated in the commercial terms and condition		
D	Expression of Interest:		
1	Manufacturing of the Microwave based Brix meter including sales/marketing and after-sales support		
2	The Transfer of technology will be of NON EXCLUSIVE nature. There is no limit on the number of the bidders to whom the technology will be transferred.		

I hereby declare that the above information is true to the best of my knowledge.

Signature with Name & Seal:

Place:

Date

ANNEXURE – B

Main Specifications with Photographs of all the models

Technology developed under Design and Development of Microwave Based Compact Brix/Concentration meter for Sugar Industry project

- 1. RF Transceiver System with Variable TX Power and RX Gain**
- 2. Insertion Probe**
- 3. Data Acquisition System**
- 4. HMI Display**
- 5. Temperature Measurement**
- 6. Automatic Flushing Arrangement**

Microwave Based Brix Meter Specifications:

Sr. No	Parameter	Value
1.	Operating Frequency	5.8 GHz
2.	Transmission Power	-6 dBm to +17dBm
3.	Measured Parameter	Attenuation and Phase Shift
4.	Measurement Method	Microwave Transmission Based
5.	Range of Brix measurement	0 °Brix to 100 °Brix
6.	Accuracy	± 0.2 °Brix*
7.	Output	4-20 mA isolated current signals for Brix and Temperature data
8.	Data Interface	RS232/Ethernet/USB
9.	User Interface	Touch panel display/PC
10.	Temperature sensor for compensation	Pt-100
11.	Probe cleaning means(Flushing)	Hot water
12.	Intervals	every 30 mins, Programmable
13.	Duration	12s, Programmable
14.	Package standard	IP65

*Subject to multi point calibration and accurate determination of Brix value by lab method or any other method

1. Microwave Transceiver System with Variable TX Power and RX Gain



Technical Specifications

1.A Microwave Transmitter Module

Sr. No.	Parameter	Targeted Value
1	Operating Frequency	5.8 GHz
2	Bandwidth	500 MHz (typical)
3	Output Power (Variable)	0.25 mW/50 mW (-6 dBm to +17 dBm)
4	Harmonics	Better than -30 dBc
5	Phase Noise	-87 dBc/Hz at 100 Hz

1.B Microwave Receiver Module

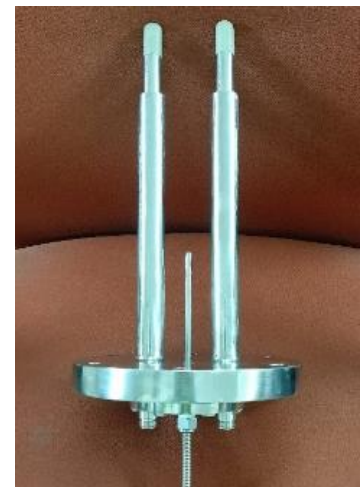
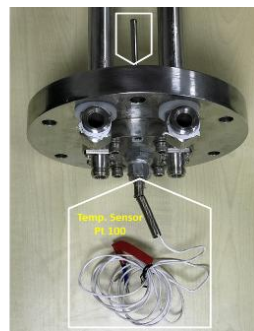
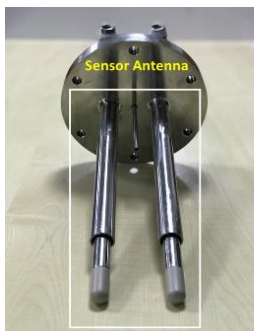
Sr. No.	Parameters	Targeted Value
1	Receiver type	Homodyne
2	Frequency	5.8 GHz
3	Bandwidth	500 MHz (typical)
4	Noise Figure	<3 dB
5	Receiver Sensitivity	better than -75 dBm
6	Variable Receiver Gain	40 dB-70 dB
7	Dynamic Range	>70 dB
8	Measurement Parameters	Amplitude(A) and Phase(I&Q)

2. Insertion Probe

Technical Specifications

The proposed insertion probe design consists of following:

1. **Probe Antennas**
2. **Temperature sensors**
3. **Flashing with hot water arrangements**



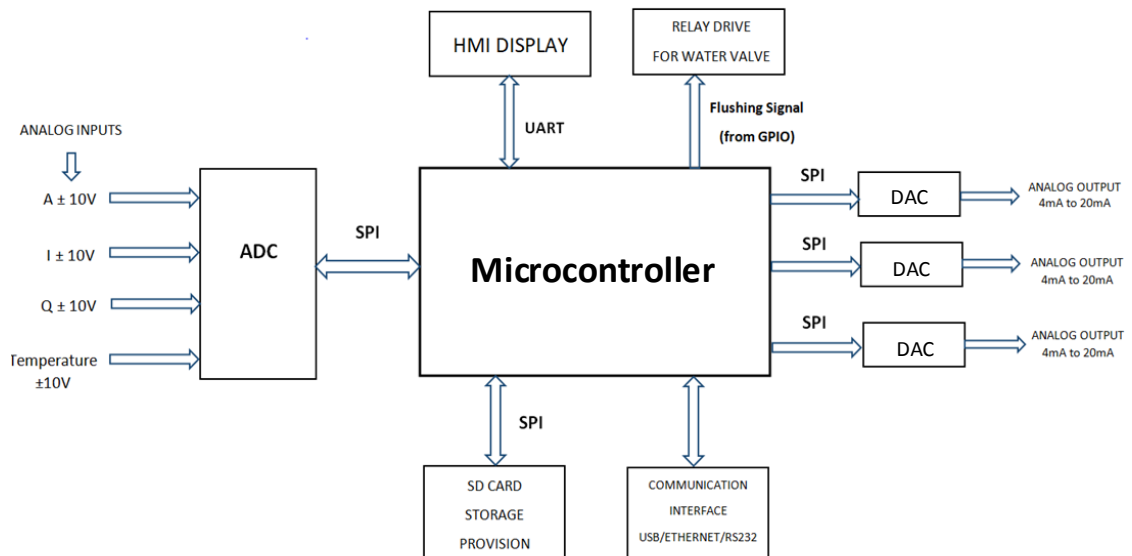
Sr. No	Parameter	Achieved
1	Material	Stainless Steel and PEEK material
2	Operating temperature of the probe	20 °C to 130 °C
3	Vacuum level inside the boiling pan	800 mbar
4	Approximate Weight	7.5 Kg
5	Cleaning in Place(CIP)	Devised with hot water supply
6	In-situ material temperature monitoring	Temperature sensor

3. Data Acquisition System

Technical Specifications

It consists of following:

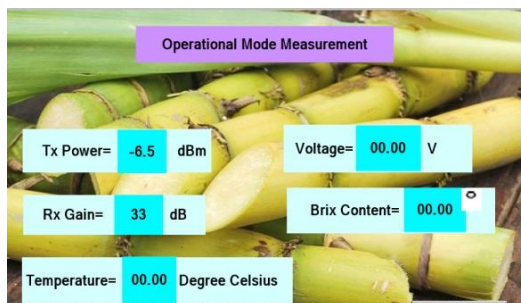
- 1] Microcontroller Board
- 2] ADC application circuit with 7 Analog Inputs including temperature sensor
- 3] Programmable Tx power and Rx gain with Digital Attenuation
- 4] Flushing mechanism control with Relay
- 5] Current looping circuit with DAC



4. HMI Display

Technical Specifications

- 7" HMI Capacitive Touch Display
- 128 MB of Flash memory
- 1024 Byte EEPROM
- XH2.54 4 Pins (+5V, TX, RX, GND) TTL serial interface
- 1.25T-2-2A Audio port for external speaker connection
- Built-in RTC support



5. Temperature Measurement

Technical Specifications

PT100 3 wire probe sensor

Calibration Based Measurement

Testing mode Temperature Range: -50 to 300°C



PT100 CONVERSION CIRCUIT

- PT100 gives output in terms of resistance so a basic voltage divider circuit can be used for conversion of resistance to voltage
- Here R1 is 110 ohm fixed. And R2 should be open and proper connector must be used so that PT100 can be connected across it with supply of 5V.
- Output of above circuit will be given to ADC input.

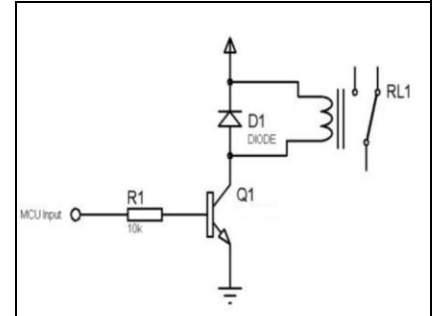
6. Automatic Flushing Arrangement

Technical Specifications

Any GPIO pin can be used for relay control provided GPIO pin should not conflict with other pins, connections and peripherals.

Relay is connected to water valve which is toggle between normally closed and normally open when we receive high signal on PB7 which is the control signal.

The signal send through HMI Display to microcontroller via press button as “Ready to Flush”.



Commercial Terms and Conditions

1. If the bidder wishes to see the physical system, then the bidder has to visit SAMEER, Mumbai with prior appointment
2. SAMEER will provide the necessary technical support to the bidder for all subsystems as per the scope of work. SAMEER will share the complete technical document in the form of a bill of material, mechanical drawings of all the parts and assemblies, electrical wiring diagrams, electronic circuit detailing, subsystem operation and handling procedures, acceptance tests, service, and maintenance manuals.
3. SAMEER will provide 10 days free training/consultancy during first year of TOT agreement
4. Royalty amount to be paid each year based on the sales invoice certified by a chartered accountant. Royalty percentage to be decided and informed to the shortlisted bidders in the subsequent stage after opening of financial bids

Note: Startups & MSMEs will be provided with an additional discount as per government norms.

Consultancy Charges

1. The TOT document will be provided in the form of a Bill of material, Mechanical drawings of all the parts and assemblies, Electrical wiring diagram, Electrical and Electronic circuit diagram, Subsystem and System-level procedures, Acceptance tests, Service, and Maintenance manuals.
2. If the company requires extra special training then SAMEER staff will provide the **online/offline system training/consultation** at a nominal extra cost to be intimated in the subsequent stages.
3. If the company or bidder requires in-person visit of SAMEER staff to his place for training/consultation then the travel and logistic cost to be borne by bidder
4. In future, if the company wants to change any subsystem design they may do it only after prior permission from SAMEER.

ANNEXURE – C

Bid Formats

C1 Request for Clarifications

Bidders requiring specific points of clarification may communicate with SAMEER during the specified period using the following format:

Bidder's Request for Clarification			
Name of the Organization			
Representative Name			
Position / Designation			
Email Address			
Contact Details		Mob:	Landline:
Clarifications Requested			
S. No.	EoI Page No– Section– Sub-section-	Content of the EoI	Points of Clarification
1			
2			
3			

Yours faithfully,
Designated Contact Person
Company name

C2 *Authorization Letter*

Duly authorized to sign the EoI Response for and on behalf of:

(Name and Address of Company) (Seal/Stamp of bidder)

Witness Signature:

Witness Name:

Witness Address:

CERTIFICATE AS TO AUTHORIZED SIGNATORIES

I, <representative *name*>, the Company Secretary of <*name of the organization*>, certify that <*Representative name*> who signed the above Bid is authorized to do so and bind the company by authority of its board/ governing body.

Date:

Company Secretary Name:

Designation:

Signature: (Company Seal)

Date:

Authorized Person Name:

Designation:

Signature: (Company Seal)

C3 *Litigation Impact Statement*

<Company letter head>

<Date>

<Address>

Ref: TECHNOLOGY OF A MICROWAVE BASED BRIX/CONCENTRATION METER FOR SUGAR INDUSTRY

Dear Sir,

We have read and understood the contents of the Expression of Interest and pursuant to this hereby confirm that we continue to satisfy the eligibility criteria laid out at the time of short-listing us to participate in the bidding process to EoI for **TECHNOLOGY OF A MICROWAVE BASED BRIX/CONCENTRATION METER FOR SUGAR INDUSTRY**

There are no pending litigations/proceedings (or notices/orders issued or any process initiated against us) in any court of law, regulatory authority or quasi-judicial authority, which are likely to have a materially adverse impact on our ability to deliver under this project, or to pay our debts as they fall due or on our ability to enter into any of the transactions contained in or contemplated in respect of the manufacturing of Brix meter and its accessories technology.

<Signature>

<Name & Designation>

Duly authorized to sign the EoI Response for and on behalf of:

Sincerely,

Company Seal

Name

Designation

Date

Seal/Stamp of the Company

<Name and Address of Company>

C4 Bid Cover Letter

<Company letter head><Date><Address>

Dear Sir,

Ref: EOI FOR THE TECHNOLOGY OF A MICROWAVE BASED BRIX/CONCENTRATION METER FOR SUGAR INDUSTRY

Having examined the EoI, the receipt of which is hereby duly acknowledged, we, the undersigned, offer to provide the professional services as required and outlined in the EOI for **TECHNOLOGY OF A MICROWAVE BASED BRIX/CONCENTRATION METER FOR SUGAR INDUSTRY**

We attach hereto the response as required by the EoI, which constitutes our proposal.

We confirm that the information contained in this response or any part thereof, including its exhibits, and other documents and instruments delivered or to be delivered to SAMEER is/are true, accurate, verifiable and complete. This response includes all information necessary to ensure that the statements therein do not in whole or in part mislead SAMEER in its short-listing process. Further, we declare that there are no conflict of interest situations that are or may affect this EoI and the subsequent actions that flow from it.

We fully understand and agree to comply that on verification, if any of the information provided here is found to be misleading the short listing process, we are liable to be dismissed from the selection process or termination of the agreement during the project, if selected to do so.

We agree for unconditional acceptance of all the terms and conditions set out in the EoI document and also agree to abide by this bid response from the date fixed for bid opening.

We agree that SAMEER is not bound to accept any bid response that they may receive. We also agree that SAMEER reserves the right in absolute sense to reject all or any of the products/ services specified in the bid response.

It is hereby confirmed that I/We are entitled to act on behalf of our company/ corporation/ firm/ organization and empowered to sign this document as well as such other documents, which may be required in this connection.

The following persons will be the authorized representatives of the company for all the future correspondence till the completion of the bidding process, between SAMEER and our organization.

Details	Primary Contact	Secondary
Name		
Designation		
Address		
Landline No.		
Mobile No.		
Fax No.		
Email Address		

We understand that it will be the responsibility of our organization to keep SAMEER informed of any changes in this list of authorized persons and we fully understand that SAMEER shall not be responsible for non-receipt or non-delivery of any communication and/or any missing communication in the event reasonable prior notice of any change in the authorized person(s) of the company is not provided to SAMEER.

Dated this Day of 2023

Sincerely,
Company Seal
Name
Designation
Signature
Date

<Name and Address of Company>

C5 Conflict of Interest

<Company letter
head>

<Date><Address>

Sir,

Sub: Undertaking on Conflict of Interest regarding EoI FOR TECHNOLOGY OF A MICROWAVE BASED BRIX/CONCENTRATION METER FOR SUGAR INDUSTRY

I/We do hereby undertake that there is absence of, actual or potential conflict of interest on the part of the bidder or any prospective subcontractor due to prior, current, or proposed contracts, engagements, or affiliations with SAMEER.

I/We also confirm that there are no potential elements (time-frame for service delivery, resource, financial or other) that would adversely impact our ability to complete the requirements as given in the EoI.

We undertake and agree to indemnify and hold SAMEER harmless against all claims, losses, damages, costs, expenses, litigations, proceedings, fees of legal advisors (on a reimbursement basis) and fees of other professionals incurred (in the case of legal fees and fees of professionals) by SAMEER and/or its representatives, if due to any such conflict any loss or damage is suffered by SAMEER.

Sincerely,

Date

<Signature>

<Designation>

Duly authorized to sign the EoI Response for and on behalf of:

Company Seal

C6 Details of bidder Organization

<Company Letter Head>

Details of the bidder Organization	
Name	
Nature of the legal status in India	
Nature of business in India	
Date of Incorporation	
Date of Commencement of Business	
ROC Reference No	
Address of the Headquarters	
Address of the Registered Office in India	
Address of offices in India	
Other Relevant Information Name of contact person: Address: Telephone: Fax: E-mail: Permanent Account Number: GSTN The Bidder profile. Giving details of current activities and management/personnel structure including evidence of incorporation. The in-house technological expertise available form the following to be furnished	
Supporting Documents: a. Certificate of Incorporation from Registrar Of Companies (ROC) b. Copy of Memorandum of Association of the company c. Certification on commencement of business	

<Authorize Signature>

<Company Seal>

Name

Designation

Name and Address of Company

C7 *Undertaking of not being Black Listed*

(To be submitted on the Letterhead of the bidder)

<Date>

<Address>

Dear Sir,

We confirm that our company is not blacklisted in any manner whatsoever by MeitY, any State Government, Central Government or any other Public sector undertaking or a Corporation or any other Autonomous organization of Central or State Government or the Registrar of Companies/ Firms as on Bid submission date.

Further we confirm that, our company is not convicted of an offense (a) under the Prevention of Corruption Act, 1988; or (b) the Indian Penal Code or any other law for the time being in force, for causing any loss of life or property or causing a threat to public health as part of execution of a public procurement contract, during last 3 years from date of submission of this bid.

It is hereby confirmed that I/We are entitled to act on behalf of our company/ corporation/ firm/ organization and empowered to sign this document as well as such other documents, which may be required in this connection.

Sincerely,

<Signature>

<Company Seal>

Name

Designation

Name and Address of Company

C8 Financial Information of the bidder

To be filled separately by consortium members

<Date>

Financial Information		
2020-21	2021-22	2022-23
Turnover (in INR crores)		
Profit Before Tax (in INR crores)		
Net Worth (in INR crores)		
Other Relevant Information		
Mandatory Supporting Documents: a. Externally Audited financial statements for each of the three (3) financial years as mentioned above (Please include only the sections on P&L, revenue and the assets, not the entire balance sheet.) b. Certification by the company auditors supporting the revenue break-up		

<Signature>

<Company Seal>

Name:

Designation

Name and Address of Auditor

C9 *Pre-Qualification Bid Format*

S. No.	Section Heading	Details
1	Bid Cover Letter	Annexure C.4
2	Authorization Letter	Annexure C.2
3	Conflict of Interest	Annexure C.5
4	Litigation Impact Statement	Annexure C.3
5	Details Of Bidder Organization	Annexure C.6
6	Undertaking Of Not Being Black Listed	Annexure C.7
7	Financial Information Of The Bidder	Annexure C.8
8	Pre-Qualification Criteria	Annexure A

-----END OF D O C U M E N T -----

Product Brochure

SCORE

Sugar Content measurement

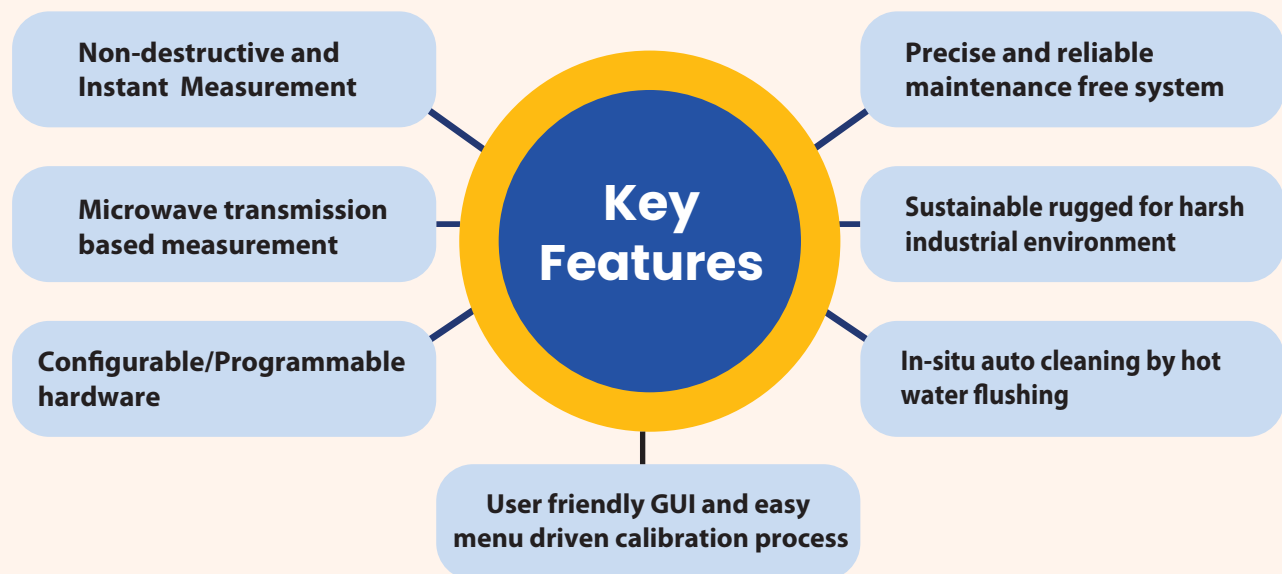
Microwave based Brix/Concentration measurement system for sugar industries



Introduction

Automation of the sugar industry enables high production yields and good quality sugar. Brix/Concentration measurement of the sugar syrup in the entire sugar production process plays an important role in process automation of the sugar industry.

SAMEER has successfully developed the microwave based non-destructive instant Brix/Concentration measurement system for the sugar industry. The system has been installed, calibrated and conducted trials in the sugar factory. The technology has been demonstrated to sugar industry people and it is now ready for technology transfer.



Brix Hardware



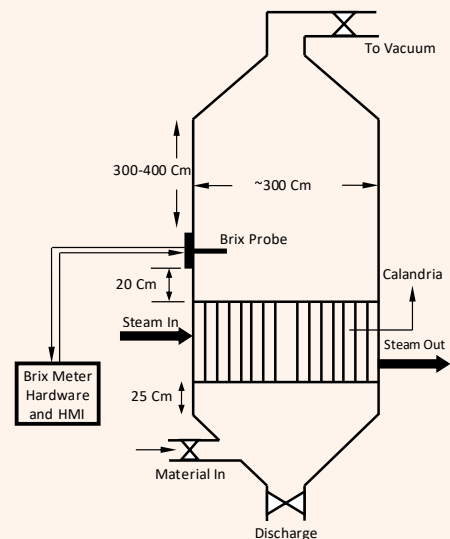
Brix Microwave Transceiver



Brix Insertion Probe

Working Principle

The system works on the principle of microwave signal transmission through the materials and accounting the change in phase and amplitude of the signal. Prerequisite is that the material being measured shows some dielectric properties which vary with its compositions (i.e. percentage of water and solid contents). Thus the dielectric property of the sugar syrup changes with its Brix (sugar concentration) value. As a result, microwave signal undergoes certain changes mainly in amplitude and phase when it passes through the syrup. The amount of changes in amplitude and phase depend on the Brix value of the material. The Brix parameter can therefore be determined by measuring the amplitude and phase of the signal and correlating with the calibrated/reference data.



Schematic diagram of Insertion probe installation in the boiler

System Specifications

Operating frequency	: 5.8 GHz
Transmission power (Variable)	: -6 dBm to +17dBm
Bandwidth	: 500MHz
Phase Noise	: -87dBc/Hz at 100 Hz
Harmonics	: Better than -30dBc
Gain of the Antenna	: 3-4 dB
Receiver sensitivity	: better than -75dBm
Programmable receiver gain	: 40dB to 70dB
Dynamic range	: > 70dB
Measured parameter	: Attenuation and Phase shift
Range of Brix measurement	: 0 to 100°Brix
Accuracy	: +/-0.2° *
Output	: 4-20m A isolated for Brix & Temp para

*Subject to multi point calibration and accurate determination of Brix value by lab method or any other method

Applications

Typical applications in the sugar cane and food industry for the followings:

- Brix value during sugar crystallization process
- Dry substance of thin and thick juice
- Concentration of milk of lime
- Total solids (TS) measurement in liquid food industry
- In-situ instant density and concentration measurement for quality control and process productivity and efficiency improvement,

Suger Industry



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