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Testing Machine of Metal Can Coating By Using Arm7 Processor

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Abstract: **- A specialized machine device is designed which checks the coating of metal cans. The metal cans are made up of aluminum metal. It is highly reactive, so coated with paint to check coat is uniform or not. This machine will test metal cans i.e. uncoated areas are present in the metal cans or not. Metal cans are coated by using sprays. So sometimes some small areas on the internal side of metal can remain uncoated, they get reacted with internally stored sprays. This will affects the quality of the product. So we are designing this machine to improve quality of the product. It will test metal can is properly coated or not. It will display porosity value on LCD. It uses the principle of electrolysis. Electrolysis means the process of by which current will pass from one electrode to another through the ionized solution. Metal Can under test is provided with the anode and cathode assembly. If there is no current flow, it indicates metal can is ok. If current flow occurs, then indicate metal can is not ok.**

***Index Terms*— ARMLPC2148,Electrode, LCD, and LED..**

I. INTRODUCTION

The system is designed using ARM LPC2148 microcontroller. The Production of company are cans. They are used for storing perfumes, scents. These cans are made up of Aluminum metal. As it is highly reactive metal, cans are provided with internal and external coating. Paint are applied on can surface by using sprays. External side porosity of cans is easy to test. It is difficult to test internal side porosity. If coating is not proper and uniform, the open aluminum metal gets react with content stored in metal can with scents and perfumes stored inside can. It affects quality of products. So, one machine is designed in this paper which is use for testing lacquer porosity inside the metal cans. Lacquer means coating provided on metal. Porosity indicates number of pours means number of uncoated area remains inside the can internal side. The internal side is coated with paints to avoid reactions of metal with stored content. This machine will check porosity and check cans are faulty or uniformly poured. It works on the "Electrolysis principle". Electrolysis is electrochemical process by which current will pass from one electrode to another through ionized solution.Can under test is provided with anode and cathode assembly. If there is no current flow, it indicate can is ok. If current flow occurs, then indicate can is not ok that is if current flow occurs, then indicate can is faulty. In addition visual indication is provided by deposition of copper if coating is not continuous. The equipment is capable of giving reading direct on LED display.

The equipment provides the required information quickly and reliably and is particularly suitable for quality control application. The equipment is suitable for 230VAC 50Hzs. It is designed in low cost as compared to its market prize.

II. BLOCK DIAGRAM:

The figure 1 shows the block diagram of testing machine for metal can coating using ARM processor.

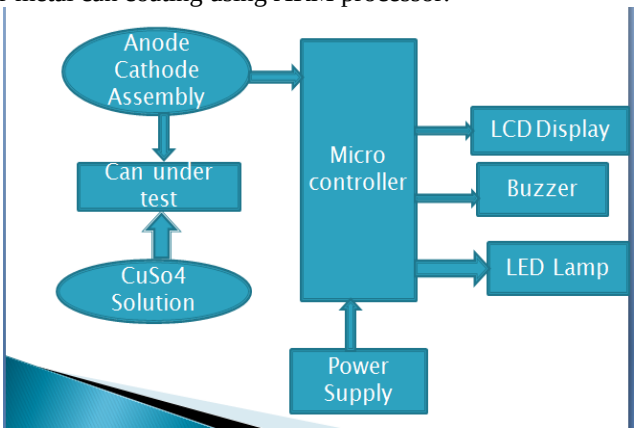

Figure 1.Block diagram of testing machine for metal can coating using ARM processor

Working Principal:

Can under test is filled with CuSo4 solution. Then it is provided with anode cathode assembly. Anode used here is copper electrode. It is connected to positive supply of

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battery. Copper electrode is immersed into the CuSo4 solution. Cathode is connected to negative terminal of battery. Cathode is copper base provided at bottom side of can. If can is not properly coated, it is faulty, then as battery is on due to uncoated metal areas electrolysis action takes place. It will causes current flow from positive side of electrode to negative side copper base.Electrolysis is electrochemical process by which current will pass from one electrode to another through ionized solution. This current value is given to ADC in microcontroller. So it will display porosity value on LCD.LED lamp gets turn ON. Buzzer will beep. If can is ok, there is no current flow, LCD will display ok lamp and buzzer are off.

Microcontroller:

LPC2148 is the widely used IC from ARM-7 family. It is manufactured by Philips and it is pre-loaded with many inbuilt peripherals making it more efficient and a reliable option for the beginners as well as high end application developer. It has 8 to 40 kb of on-chip static RAM and 32 to 512 kb of on-chip flash program memory.128 bit wide interface/accelerator enables high speed 60 MHz operation. In-System/In-Application Programming (ISP/IAP) via on-chip boot-loader software. Single flash sector or full chip erase in 400 ms and programming of 256 bytes in 1ms. Embedded ICE RT and Embedded Trace interfaces offer real-time debugging with the on-chip Real Monitor software and high speed tracing of instruction execution. USB 2.0 Full Speed compliant Device Controller with 2KB of endpoint RAM. In addition, the LPC2146/8 provides 8 KB of on-chip RAM accessible to USB by DMA. One or two (LPC2141/2 vs. LPC2144/6/8) 10-bit A/D converters provide a total of 6/14analog inputs, with conversion times as low as 2.44 us per channel.

Single 10-bit D/A converter provide variable analog output.

Two 32-bit timers/external event counters (with four capture and four compare channels each), PWM unit (six outputs) and watchdog.

Low power real-time clock with independent power and dedicated 32 kHz clock input.

Multiple serial interfaces including two UARTs (16C550), two Fast I2C-bus (400 Kbit/s), SPI and SSP with buffering and variable data length capabilities.

Vectored interrupt controller with configurable priorities and vector addresses.

Up to nine edge or level sensitive external interrupt pins available.

On-chip integrated oscillator operates with an external crystal in range from 1 MHz to 30 MHz and with an external oscillator up to 50 MHZ.

Power saving modes include idle and Power-down. Individual enable or disable of peripheral functions as well as peripheral clock scaling for additional power optimization. Processor woke-up from Power-down mode via external interrupt, USB, Brown-Out Detect (BOD) or Real-Time Clock (RTC).

Liquid Crystal Display:

LCD is used in a project to visualize the output of the application. The 16x2 LCD displayed indicates 16 columns and 2 rows. Thus LCD plays a vital role in a project to see the output and to debug the system module wise in case of system failure in order to rectify the problem.

MAX232-

RS 232 IC is a driver IC to convert the µC TTL logic (0-5) to the RS 232 logic (+-9v).Many device today work on RS 232 logic such as PC, GSM modem , GPS etc. so in order to communicate with such devices we have to bring the logic levels to the 232 logic (+/-9v).

Anode cathode assembly:

Anode used in this project is copper electrode immersed into CuSo4 solution. It is connected to positive terminal of battery. Cathode is copper base provided at bottom side of can. It is connected to negative terminal of battery. When battery supply is applied, it operates on Electrolysis principle.

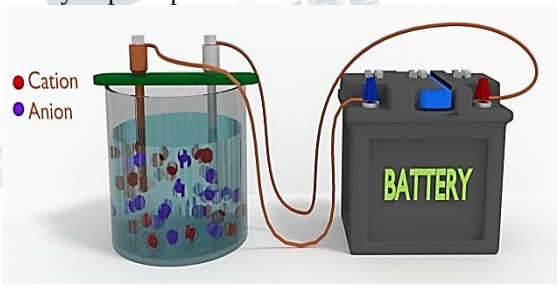

Figure 2 Anode cathode assembly

Electrolysis is an electrochemical process by which current passes from one electrode to another in an ionized solution that is an electrolyte .In this process, positive ions comes to the negative electrode or negative ions come to the positive electrode. Two rods are immersed into the electrolytic solution. Electric potential difference is applied between these rods. These partly immersed rods are referred as electrode. The electrode connected to positive terminal is anode and negative terminal is cathode. The freely moving positively charged ions gets attracted by cathode and negatively charged ions are attracted by anode. This will produces current flow. We are using copper as anode and cathode. Electrolytic solution is CuSo4. CuSo4 solution gets splitter into positive and negative ions.

CuSo4 = Cu++ + So4—

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Cu++ gets deposited on cathode and So4—gets deposited on anode. It will for continuous loop of current. In this way, electrolysis action takes place.

SOFTWARE IMPLEMENTATIONS:

The proposed system implementation deals in programming the microcontroller so that it can control the operation of the IC's used in the implementation. The Keil µv4 software development tool used to write and compile the source code, which has been written in the C language. The Flash magic programmer has been used to write this compile code into the microcontroller.

ALGORITHM:

1.When power supply for the system is ON the microcontroller retains its initial condition.
2,Its check pre requisite porosity value available.
3.If the value is available it display the value if not it will display message for setting the reference value.
4.To set reference value insert reference CAN and make SAVE I/P high.
5.The system display the reference value
Whenever the read I/P is high controller compares the I/P from the electrodes to reference value and decides whether its OK .

FLOWCHART:

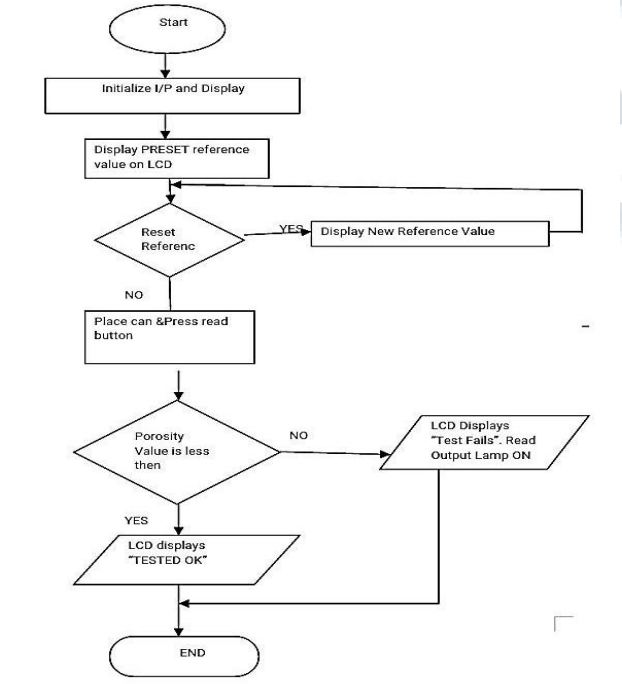

Figure 3.Flowchart

RESULT:

The results of the system are compared with results of standard device for the same metal cans. In general to assess the company are using electrolysis process. The results of the system are compared with sensor base system. The result of the proposed system is display in voltage and metal can faulty or ok as follows:

Metal Can No.	Voltage Result	Existing System	Proposed system	fault/ OK
1	5 V	4	3.9	**OK**
2	5 V	5.5	5.3	**OK**
3	5 V	4.5	4.3	**OK**

III. FUTURE SCOPE

Developed prototype serves as an impetus to drive future research, geared towards developing a more robust and embedded real-time system for lacquer porosity testing with many other advanced features. Machine can be design with facility of testing of multiple cans at a time. Also through use of RS232 possible to modify and make changes in functioning. We can add many advanced features in prototype model.

IV. CONCLUSION

Developed system will ensures that cans are properly coated. It will improve the quality of production. It will check can's lacquer porosity and we pass only uniformly coated cans for use. It is very useful for industries and available with low cost than its market prize.

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