



Government of Karnataka

Report of the
Technical
Expert
Committee
on the
Excise
Adhesive
Labels

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Report of the Technical Expert Committee on the Excise Adhesive Labels

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1. INTRODUCTION

Presently the Excise Department of Karnataka is using paper based hologram embedded Excise Adhesive Labels (EAL) with various security features developed over the years. These labels have been devised to be applied on liquor bottles to ensure the collection of excise duty at the distillery level, to assure wholesome liquor and to prevent the sale of illicit liquor. In this regard, Government of Karnataka has constituted a Technical Expert Committee vide GO No. FD 63 EFL 2013, dated 21-8-2014, to study the various possibilities of improving the security features of the EAL and the process of application of the labels on liquor bottles etc.

a) Terms of Reference:

The Terms of Reference of the Committee are the following:

1. To evaluate and recommend an option out of polyester based labels and the paper based EAL or any other material option.
2. To suggest specifications of label including various security marks and features of label.
3. Various terms and conditions for printing EAL including nature of printing and printing facility, printing process and other related issues related to printing and supply of EAL.
4. To formulate tender specifications i.e., technical and financial and prequalification conditions.
5. To examine the possibility of mechanical application of labels on liquor bottles and carton boxes.
6. To examine possibility of computerization of the whole process including track and trace system.

The Excise Adhesive Labels (EAL) are recognized by the government as a highly effective and proven means of protecting and increasing its revenues, offering as they do, a deterrent to counterfeiters. It also serves as an insignia for government officials to undertake a fast and easy verification of genuine liquor bottles. Sales of second quality IML and illicit liquor cause huge revenue loss to the Government. Adulteration by illicit liquor traders can lead

to tragedies of massive impact. Due to this, along with the purpose of preventing second quality liquor and illicit liquor trade, it is immensely important to effectively authenticate each bottle sold in the state, and also to easily identify and make sure that a particular bottle is distributed through authorized government network to ensure revenue inflow. Needless to say, as a high volume product with a relatively high unit value, the labels are vulnerable to forgery. Therefore, the task of distinguishing counterfeit from genuine products become difficult. Hence, the efficacy of this EAL, as an advanced and true tamper evident seal, has great significance.

Therefore, production methods of EALs are required to be of rare, secure and latest technology so that the duplication becomes difficult. It is also necessary that the production method shall not be easy and commonly available. While at the same time, the end product could be easily differentiated from counterfeit products.

Though the limited time acted as a constraint, the committee has managed to convene number of meetings and also undertook field visits to different states and has come out with this Technical Report:

- To improve the existing specifications
- To implement proper procedures for the procurement and distribution of the Excise Adhesive Labels
- To examine the possibilities of mechanization and computerization and other issues.

2. METHODOLOGY ADOPTED

The Committee adopted the following methodology for the study:

- To study the existing system in different states inclusive of the existing security features, method of production, accounting, application, and track and trace system.
- To understand the methods adopted in other states.
- To study the present trend in technology.
- To compare and analyse paper based and polyester based labels.

- To undertake field visits.
- To consult other experts in the field, officials of other states, research organisations like C-DIT of Government of Kerala.
- To study similar reports already submitted by other bodies or experts.

Series of meetings were held on 26-08-2014, 10-09-2014, 11-09-2014, 25-09-2014, 26-09-2014, 01-10-2014, 08-10-2014, 14-10-2014, 16-10-2014, 19-10-2014 to discuss the different issues and exchange views before finalizing the conclusions.

3. EXISTING SYSTEM

Paper based EAL with hologram and totally polyester based Holographic Excise Adhesive Label (HEAL) are the main tools now being used by different governments and Enforcement bodies to authenticate sealed IML and other liquor bottles sold by the states. Recent advancements in digital technology may lead to widespread counterfeiting of excise labels. This, in turn, has resulted in a great demand for high security excise labels. In Karnataka alone, the market for high security EAL is about 33 crores a month and if we take other states too, the overall yearly requirement of high security labels is about 250 to 300 crores. Apart from alcoholic beverages, cigarettes, life saving high value medicines etc., are also poised to apply security stamps to authenticate the product and to ensure tax flow. Presently, in the Indian scenario there are a few private companies that are into the security label industry. However, in the absence of key public sector players, most of the state governments are forced to order high security labels from the above small set of private industries.

In Karnataka, the paper based EALs, with holograms duly stamped on them are being used. The existing security features and their significance are mentioned hereunder.

TABLE - 1

Sl. No.	Security Feature	Significance
1	2-D Barcode	A software generated symbol that contains encoded information (presently only serial number) which can be read by a machine namely optical scanners. This is a easily verifiable feature.
2	Month code	The information from serial number 2 to 6 will mainly help in the segregation of the liquor products into batches. Though the printing of this information is not difficult, it is helpful to verify the product and authenticate.
3	Month and Year	
4	Ten digit serial number	
5	Item code	
6	State Code	
7	Variable Data	While it was possible to duplicate the labels with serial numbers the variable check digit data vary from label to label and is generated by mathematical formula (Random Number Generator). This formula will be changed every month and is confidential information of the department. This check digit helps to identify a fake label easily by verifying the month, year and serial number on the label. If the generated number matches with the number on the label then it is an original valid label, otherwise it is a fake label. After total computerisation, checking of this data in the field is quite easy and instantaneous.
8	Intaglio Guilloche design	Intaglio printing is a sophisticated method where the printed image will be in relief style and stands out from other kinds of printed image. The Guilloche design is a pattern generated by a software which makes the process of scanning and photocopying difficult. This method of printing helps to generate micro lettering, latent image, etc.
9	Micro lettering in Intaglio	Makes scanning and duplication difficult. Micro lettering is scan proof and photo copy proof to a certain extent.

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Sl. No.	Security Feature	Significance
10	Latent image	The intaglio printing makes it possible to get latent image when viewed from an angle. Scanning will not duplicate this feature. Intaglio printing also provides an added feature with its relief nature from the substrate i.e., paper.
11	Intaglio rub mark	Intaglio ink will not fully oxidise and dry up unlike other methods of printing. Therefore, when rubbed against a hard surface it bleeds and this test is simple and can be done anywhere.
12	Security diamond cut	It is mainly introduced to make the label tamper evident. When the label is removed from its applied surface, the diamond shaped strip gets disassociated from the main label and therefore it cannot be reused.
13	Invisible printing	The Commissioner's signature has been printed invisibly. This feature also makes the label scan proof.
14	Hologram	Hologram is a technology by itself, while the high security master is generated by laser technology it is nevertheless produced in large numbers by simple embossing process. 2D holograms used in EALs are embedded with the following features: <ul style="list-style-type: none"> - Multi channel effect - Concealed image - Guilloche pattern - Covert laser readable image - Government logo

The labels are being procured through a private agency after calling for the open tenders. In Karnataka, the labels are being affixed only on IML variety of liquor and not on Beer containers. Nearly 80% of the IML is packed in 180 ml bottles. The remaining quantities of the IML is packed into 750 ml, 375 ml, 90 ml, 60 ml etc.. Separate labels are produced for each volume. In the standard size corrugated box, 48 bottles of 180 ml liquor can be packed. Presently the labels are in the sheet form and each sheet contains 50 labels. Out of the 50 labels, in the case of 180 ml, the first and the last are the Control Labels which help in tracking and tracing. These labels will be affixed on the corrugated box. The

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number of bottles that can be packed in each box varies for other volume bottles and therefore the control labels to be affixed on the boxes are being generated separately and provided.

The private supplier who is presently M/s Manipal Technologies Limited produces the labels in its security unit in Manipal, Udupi district with all the features except the serial number, variable data and 2D barcode. These additional but the most important features are being executed in the premises of M/s. Marketing Consultants & Agencies Limited (M C & A), a state owned company under the supervision of an Excise Department official. The application of these labels on the liquor bottles are done manually in the premises of the distilleries.

Three colours of labels are in use as mentioned hereunder.

1. Liquor manufactured and sold in Karnataka- Green colour
2. Liquor manufactured and sold outside Karnataka- Red colour
3. Liquor procured from outside Karnataka- Blue colour

In Karnataka, EALs are not applied on Beer bottles.

4. FIELD VISITS

The Committee visited the printing facilities where the existing EALs are manufactured (Manipal Technologies Limited, Manipal) on 10-09-2014 and facilities where the printed labels are numbered under the supervision of Excise Officials (M/s. M C & A, Bangalore). It also visited a distillery where the labels are applied on the liquor bottles (M/s. John Distillery) and Warehouse facility (KSBCCL Depot) on 11-09-2014 to understand the accounting and track and trace facility.

The Committee visited Tamil Nadu facilities at Chennai on 25-09-2014 where the totally Polyester Based Holographic Excise Adhesive Labels (HEAL) are being used for liquor labels. In this state, labels are being affixed both on Beer and Indian Made Liquor (IML). Tamil Nadu visit enabled to study the technology adopted in the production of HEAL and also their application on to the bottles. In case of Tamil Nadu, preparation of Holographic Masters and Shims are carried out at facilities of M/s. Holostik India Limited at Noida. Mass production of labels is executed using the shims by embossing etc., in the premises of Excise

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Department by installing their own machinery and manpower by M/s Holostik India Limited. All further operations like gumming, slitting, numbering, bar-coding etc., are also executed in the premises of Excise Department.

Later the Committee visited Kerala facilities at Thiruvananthapuram on 26-09-2014 where the paper based labels with hologram similar to the ones used in Karnataka are being adopted. In Karnataka, the printing on paper base is done by Intaglio method while in Kerala it is by Letter Press method by using the machinery customized by them. In case of Kerala, paper based EALs with hologram is carried out by Center for Development of Imaging Technology (C-DIT), an undertaking of Government of Kerala in their own facility and the labels are supplied to the depot run by Kerala State Beverages Corporation (KSBC).

The Committee also visited the facilities of M/s. United Spirits at Palwal, Haryana on 08-10-2014 to study the auto application of paper based EALs. Here, the labels are similar to the one being used in Karnataka and incidentally being manufactured and supplied by the same supplier namely M/s Manipal Technologies Limited. The labels are being affixed by mechanical application and is working effectively. It was noticed that there was hardly any wastage during actual application.

5. ANALYSIS

The following observations have been derived by the Committee on the usage of EALs with reference to the terms of reference (TOR), which are based on the field visits, literature, survey and discussions with field experts etc.

a) Evaluation and recommendations on the option of the materials for the labels.

Generally, paper or polyester is being used for the production of labels. The polyester based labels are holographic labels. Each of the materials is conducive to certain specific features and the processes of production are different for each material.

The security features required for any product depend on the following parameters.

- Value of the product
- Life of the product
- Distribution of the product

Based on the above parameters, the excise adhesive labels are generally expected to possess four kinds of security features namely:

- Overt(Level-1), which are meant for end user etc., with naked eye.
- Covert(Level-2), which are also meant for end user and retailer with simple gadgets.
- Covert(Level-3), Meant for enforcement agencies who can use special gadgets.
- Forensic(Level-4), Exclusive feature meant for lab level examination.

The features shall be such that it should be of rare technology, difficult to produce, with variability in features etc.

(i) Overt features : Level - 1

The overt features should be easily identifiable with naked eyes without the help of any equipment. These features provide reliable first line authentication by the non-specialist i.e., consumer. This will help the end user to identify the genuine liquor and will act as a deterrent on the illicit liquor. The paper base is most suitable material to incorporate the overt features like Guilloche design, Intaglio printing, Latent Image, Rub test, Thermochromic irreversible printing etc. A Few of the features that can be incorporated in Hologram are – 3D image, Multilevel animation effect, Kinetic and diffractive animated guilloche pattern etc.

(ii) Covert features: Level - 2

These features shall have to be identified with simple gadgets which are easily accessible to the end user and the retailers. These can be incorporated both on paper and the hologram. Level-2 features for paper base are Micro lettering, Invisible ink etc. There are features like 2D-3D Depth Effect, Pearl Effect, Washed Raster Image, Channel Effect, Concealed Laser Viewable Animated Image etc., which can also be incorporated.

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(iii) Covert features : Level -3

The features which can be identified by the enforcement officials in the field with special equipments are categorized under this heading. To name some of them - 2D-Bar Code, Variable Data, Invisible Printing, Covert Laser Readable Image, Nano Taggant etc.

(iv) Forensic features: Level - 4.

Nano Lettering, Nano Taggants etc. which are printable on paper base and Nano Text and Nano Taggant, Dot Size, Dot Shape, Dot Spacing, Internal Structures, Grating Period/Angle, Noise etc., which can be embedded in a Hologram are categorized under this level of security features.

It is obvious from the above that both Paper and Polyester based holographic labels possess their own distinct features.

b) Comparison of the Paper Based Labels and Polyester Based Holographic Labels

Out of the three options viz., Polyester Based EAL, Paper Based EAL & Paper Based EAL with Hologram, the two options viz., Holographic Excise Adhesive Labels (HEAL - which is a complete holographic label) and Paper Based EAL with Hologram are widely used and the third option of using only paper based labels is becoming outdated. Therefore, the Committee has limited the comparison to the widely used two options.

Comparison Chart:

TABLE - 2

Parameters	Holographic Excise Adhesive Labels (HEAL)	Paper Based Excise Label with Hologram (Hybrid)	Comparison
Counterfeit Deterrence	Difficult to copy. However methods such as Mechanical Copying, Contact Printing, Two-Step Copying, Re-Mastering Simulation are being used by the	Difficult to copy. Intaglio printing used in the existing EAL cannot be copied. However, counterfeiters attempt to simulate the effect through embossing. Hologram present is also difficult to	Hybrid is better.

Parameters	Holographic Excise Adhesive Labels (HEAL)	Paper-Based Excise Label with Hologram (Hybrid)	Comparison
	counterfeiters.	be copied despite the limitations explained in HEAL.	
Tamper Evident Facility	HEAL is expected to be 100 % tamper evident. When somebody tries to tamper with the label, print layer get stuck to the bottle.	Present EAL with hologram is not as excellent as the HEAL. However, introduction of appropriate die cuts in the label and by modifying the hologram base, tamper evidence of the existing labels can be improved to make it 100 % fool proof.	HEAL is better.
Easy Identification by Users and Excise Officers	It is possible to embed the features as mentioned in the above paras.	Both paper based as well as hologram based features can be used. Both types of feel (Intaglio feel and rub mark) are present.	Hybrid is better.
Multi Layered Security Feature	Overt, Covert and Forensic features can be incorporated.	Overt, Covert and Forensic features can be incorporated.	Both are acceptable
Variability	Only one base substrate —PET/BOPP (Polyester/ Bi axially oriented Poly Propylene).	Combination of paper and hologram i.e. multi-layered variable structures.	Hybrid is better.
Exposure to Water and Moisture	The polyester based holographic labels do not get affected by water and moisture conditions.	Paper is susceptible to the weather conditions, water and moisture.	HEAL is better.
Auto Application on Bottles	Possible.	Possible.	Both are acceptable

Multi-layered variable structured security products made in a fast, efficient, and cost effective manner are the need of the hour. Therefore, the hybrid labels weigh far better to the entirely polyester based labels as it offers variability (it uses the features of both paper and polyester) and security (both paper based counterfeit deterrence feature like intaglio printing as well as polyester based holographic feature). However, on products like Beer bottles which is required to be stored and served in chilled conditions, polyester based holographic labels can be appropriately applied.

In Karnataka, the EALs are being applied only on IML category and not on Beer bottles. About 30 crores labels per month are required for IML bottles of different volumes while at the present level of sales, the requirement of labels for Beer is estimated to be about 3 crores per month. Beer is being packed in 330 ml, 500 ml and 650 ml and the major quantity is of 650 ml.

It is understood that the EALs are not applied on Beer bottles for the reasons of insufficient adhesion of paper labels. But to have a control over supply chain it is very much essential to introduce EALs for Beer bottles also. Therefore, the Committee recommends to introduce the application of EALs on Beer bottles at the earliest, which practice is being adopted in Kerala, Tamil Nadu, Madhya Pradesh, Uttar Pradesh, Rajasthan, etc. Introduction of EALs on Beer bottles is expected to upstep the monitoring of production and sales of Beer and revenue realization thereof. While polyester based holographic label is recommended for Beer bottles, paper based labels with hologram (Hybrid) is recommended to be applied on IML and Wine bottles.

Therefore, the procurement may be done for both Hybrid labels and Holographic labels separately by providing two schedules of requirement in the tender documents.

c) Recommended Specifications of the EAL

While evaluating the specifications of the existing EALs, the Committee observed the following points:

- Not totally tamper evident
- 2D hologram is not of high resolution
- Not suitable for chilled conditions.
- Not suitable for mechanical application

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The first two shortcomings are being overcome by making the hologram tamper evident by keeping it exposed to the release paper and by incorporating T-cut or zebra cut in the paper portion. Also features like 3-D, animated picture, pearl effect, higher resolution etc., are recommended for the hologram.

In the light of these facts, EAL with a combination of paper and hologram on high quality self-adhesive paper with a touch feel and Karnataka government logo with the following specifications which is also suitable for mechanical application is recommended for IML varieties.

SPECIFICATIONS FOR HYBRID LABELS FOR IML VARIETIES

1. Size of the Label:

15 mm (Width) x 75 mm (Length)

2. Quality of Raw Materials:

(i) Base paper – White map litho of 80 GSM;

(ii) Tear strength of paper – 2 to 2.25 lbs/ inch

(iii) Hot melt adhesive – 20 GSM from reputed make having ISO certification.

(iv) Release paper of silicon coated glassine paper of 60 GSM

(v) Shelf life of at least 1 year without any deformation or deterioration under normal atmospheric condition.

3. Quantity

Quantity required would be around 30 crores labels per month. However, no minimum quantity is guaranteed.

4. Form

Labels should be in roll form or as per the requirement of the Excise Department. Each roll shall contain 10000 EALs.

5. Colour

Adhesive labels are to be printed in 3 different colours i.e. green, red and blue or in such colour as prescribed by the Excise Department. Colour specific and variety (60 ml, 90 ml, 180 ml, 375 ml, 750 ml, 1000 ml, 2000 ml) specific quantity will be indicated by the Excise Department to the successful bidder. Separate colours in hologram and labels are to be adopted for various varieties as deemed necessary by Excise Department. Exact details will be disclosed to the successful bidder.

6. Security Marks and Features on Paper

(i) Invisible printing

Signature of Karnataka Excise Commissioner shall be printed with invisible printing inks in Offset printing process. It shall not be visible to the naked eye but shall be visible through ultra violet light.

(ii) Thermochromic printing

Thermochromic printing produces a colour change effect when exposed to heat and returns to their original colour upon cooling. Verification of authenticity of EALs can be done simply by transfer of heat by placing a finger over the image area.

(iii) Security taggant

It should have a security taggant, which when read through an electronic reader will confirm the authenticity of the EAL. When the detector is held against the printed area, a light must be activated on the detector and high pitched beep/sound must be produced.

(iv) Guilloche design

This design is a drawing composed of multiple laced thin curved lines that cross each other in a complex fashion. The shape of the lines is determined by mathematical formula.

(v) Intaglio

The EAL should have Intaglio printing. This overt security feature must be difficult to counterfeit or simulate and should be easily recognizable as genuine in minimum time and without the need of an additional device. Security design printed using intaglio printing will consist of fine, interlaced line structures that form a perfectly registered harmonic picture. In order to reassure the highest security possible, this pattern has to be the result of the one process in which both the visible as well as the tactile aspect has to be achieved. In order to establish this, the image should be formed by etching or engraving into a metal surface. These engraved areas will transfer ink with a high viscosity under a very high pressure on the substrate, thus forming the raised printing image. This printed feature should not only produce tonal effects by altering line widths and /or dot dimensions but also by altering the height of the print. The printed image will have a height varying from 10µm to 150 µm.

(vi) **Intaglio rub mark**

In order to prevent the fraudulent production of the EAL, the security design should be produced using an oil based ink, thus preventing the complete oxidation of the ink in order to allow a rub mark as a secondary proof of authenticity.

(vii) **Micro lettering:**

The documents will hold microscopic letters (Character height of 15-150 μm) printed by Intaglio printing.

(viii) **Intaglio latent image:**

At least one Latent Image (preferably letter "K") formed as the result of the raised and tactile nature of the Intaglio technique should be included in the EAL. This element, when viewed straight should reveal only the initial design but when viewed at the eye level in a horizontal position against a source of light, a second image should be revealed. It is a security feature based on the optical effect under light produced by a special arrangement of lines printed by intaglio technique. The picture becomes visible only when the printed product is held at the eye level in a horizontal position against a source of light.

(ix) **Security cut**

Security Cuts like T-cut or zebra cut are to be provided to make sure that the label is completely damaged in the event of trying to remove it from its original position.

(x) **Security marks and features on Tamper Evident Hologram:**

Paper based label printed with above security features and marks shall be fused with a hologram which shall not be reproducible by photo mechanical copying systems and shall be deterrent to remaking. Effects used in hologram shall be easily recognizable by the end user. Hologram shall be suitable for printing with ink jet or laser numbering. Layers in the hologram except covert features shall be visible to the naked eyes. Hologram shall not be affected by normal variation in atmospheric conditions.

Other features of hologram that shall be used are given below:

Type of hologram: Hot stamping scratch proof

Size of hologram: 15 mm (Width) x 20 mm (Length)

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Tamper evidence: In the Holographic area, bottom side shall be a holographic base and shall not be paper base such that it shall be tamper evident.

Hologram master type: High security combination Master made on a secure system capable of generating high security masters recombined with (a) Dot matrix holographic structures and 18,000 DPI or more graphical resolution and (b) Classical/ Conventional 2D/3D holographic origination which shall provide

- Four channel effect
- Concealed image
- Kinetic effect and Guilloche pattern
- Covert Laser readable Image
- Micro text
- 2D/3D Depth effect
- Pearl effect with Hidden Micro Text

7. Features that are to be printed in the designated place under the supervision of Excise Department

(i) 2D Bar code

2D data matrix code shall be as per the GS1 specification. The 2D Bar code shall contain resolution of 300x600 DPI for machine reading. It shall contain variable data details of 10 or more digits unique sequential serial numbers. 2D bar code shall be printed using Ink Jet Printing process during numbering. Size of 2D bar code shall be 4mm X 4mm and it shall be capable of storing minimum of 15 numeric digits.

(ii) 10 Digit Serial Number

The EALs should be numbered as specified by the Excise Department, with 10 digits sequential numbers with month and year to be generated through electronic mode.

(iii) Check Digit

Three digit check numbers to be generated out of 10 digits serial numbers of the same label through software by using mathematical formula. These 3 digit check numbers are to be printed on the label by using computerized variable data printing machine.

8. Application of labels

EALs should be suitable for both mechanical and manual application.

9. Packing

Each roll / spool shall contain 10000 labels. The Spool of labels are to be packed in boxes as per requirements of the Excise Department in roll wrapped up in a polythene cover and neatly packed in a corrugated/carton box for easy handling. The printer should repeatedly check each and every label to avoid any defects or mistakes. Bidder shall also supply control labels corresponding to the EALs either in sheet or roll form.

10. Control Labels

The supplier shall provide the control labels with the bar code separately to be affixed on the cases.

11. Design: To be developed by the supplier as per the guidelines of the purchaser.

d) Terms and Conditions for the Production of EAL including nature of Production Processes

- a) The Excise Department, intends to engage reputed/experienced private security printer with Web offset printing, Hologram and Intaglio printing facilities with computer variable data printer who are empanelled by RBI / IBA as Security Printer.
- b) The successful Tenderer shall print and supply Excise Adhesive Labels within 30 days from the date of receipt of acceptance under the specified terms and conditions which shall be executed in the form of an agreement as per the format to be provided.

PRINTING PROCESS:

- Printing of Guilloche design, Intaglio, Intaglio Rub Mark, Intaglio Micro Lettering, Intaglio Latent Image, Excise Commissioner's signature in Invisible Printing, State Government logo, 3 letter prefix, month / year, affixing the hologram have to be carried out on the base material at the printer's premises. Details of activities that need to be done at the printer's premises and the details of activities to be carried out under the supervision of the Excise Department are as given in technical specifications.

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- Machineries should be capable of printing the labels in roll form with matter in single colour or multi colours.
 - 10 digits serial number, 3 digits check numbers, 2D-Barcode and any other codes shall be printed with computerized variable data printing machine under the supervision of Excise officials in the premises designated by the purchaser.
 - The size/location of the security features shall be as per the directions of the purchaser.
 - The security features should be printed in such a manner that duplication of labels should not be easily done and should be economically not feasible.
 - Die punching shall be done to enable the Distilleries to peel out the EALs manually or through auto applicator from the release paper without any difficulty.
 - 2D-Bar Code shall contain the variable data of the same 10 digits serial numbers of the label and/or any other data and it shall be machine readable from the distillery level to the end user level.
 - The Printer shall maintain the highest standard of ethics in the printing and delivery of labels.
 - The Printer shall ensure highest security during the execution of the contract.
 - The Printer shall be responsible for any acts of commissions and omissions done by the staff or the employees and such other persons engaged by the Printer for working in the Security Press.

e) **Tender Specifications-Technical, Financial and Qualification criteria:**

1. The Tenderer should be a security printer having in house facilities of designing, Web Offset printing, Intaglio printing, complete hologram production lines including master making, computerized variable data printing and any other required facilities.
2. The Tenderer should be empanelled by Indian Banks Association (copy of the letter issued by IBA).
3. The Tenderer should have previous experience of the immediately preceding three years in printing and supplying of security items like Excise Adhesive Labels / Bank Cheques / Demand Drafts / Certificate of Deposit / Lottery Tickets (documentary proof should be provided).

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4. The Tenderer should produce a good performance certificate from their clients for whom they have executed similar contracts.
 5. The Tenderer should have executed Printing and Supply of High security documents in one single security printing work order not less than Rs. 5.00 crores with requisite security features during the last 1 year. (Necessary documentary proof should be provided).
 6. The Tenderer should be an ISO certified Company / Unit.
 7. The tenderer should be a manufacturer who must have capability to print and supply 30 crores of Security Labels per month with similar features. The decision of the purchaser with regard to the capacity assessment shall be final.
 8. **Financial standings:**
 - a) Average annual turnover of the tenderer should be more than Rs. 30 crores during the last three years.
 - b) Tenderer should not have suffered any financial loss for more than one year during the last 3 years.
 - c) Net worth of the tenderer should not have eroded more than 30 % during the last 3 years.
 9. The Tenderer should furnish the information on all past supplies and satisfactory performance for both (a) and (b) above, in the prescribed proforma.
 10. The Tenderer firm should not be black listed from any State / Central Government departments / PSUs / Banks during the last 5 years
 11. The Tenderer should have the machineries as per list mentioned in Table 4.
 12. Inspection of the Security Press of the Tenderer may be carried out by the purchaser or the Third Party Agency appointed by the purchaser. The team shall verify and satisfy themselves regarding the availability of required machineries / space etc. at their premises to print the Excise Labels and security as per the terms and conditions stated in the tender document. Furnishing of false information would disqualify the Tenderer.
 13. The Tenderer shall not supply the Excise Adhesive Labels approved by the purchaser to anybody else except to the purchaser. The Tenderer shall not

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have any link with the Distributor or the retail liquor trader in the State of Karnataka. In case of any breach of this condition, the contract shall be liable to be cancelled and further penalty shall be imposed. The Excise Commissioner, Karnataka shall decide the amount of penalty depending on the gravity of breach of terms and conditions of the contract depending on their revenue implications.

14. The Excise Department shall disqualify the Tenderer who fails to meet one or more of the pre-qualification conditions mentioned above. The Financial Bid of the Tenderer who has been disqualified in the technical bid will not be opened. The decision of the purchaser in this regard is final.
15. No conditional Tender shall be accepted.

TABLE - 3
CRITERIA FOR PRE-QUALIFICATION

Sl. No.	Pre-Qualification criteria	Supporting documents
1	The Tenderer shall have appropriate registrations namely-VAT/CST, Factory License.	Copy of the registration certificate
2	The Tenderer should be empanelled by Indian Banks Association (IBA) to print security instruments.	Copy of the letter issued by IBA to be enclosed.
3	Average annual turnover of the tenderer should be more than Rs. 30 crores during the last three years.	Audited Balance Sheet and Profit & Loss Account duly certified by the Company Auditor shall be uploaded.
4	The Tenderer should not have been blacklisted by any Government Department/ Government Body/PSU during the last 5 years	Affidavit to be enclosed
5	The Tenderer should not have suffered any financial loss for more than one year during the last 3 years.	Certificate from Chartered Accountant to be enclosed.

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Sl. No.	Pre-Qualification criteria	Supporting documents
6	Net worth of the Tenderer should not have eroded more than 30% during the last 3 years	Certificate from Chartered Accountant to be enclosed
7	The Tenderer should have infrastructure to produce at least 30 crores Security Labels as per the specifications of the tender. (As per below list).	Supporting Documents should be attached
8	The Tenderer should have executed printing & supply of high security documents in one single work order of not less than Rs.5 crores with requisite security features during the last 1 year	Work order and certificate from client.

TABLE - 4
LIST OF MACHINERIES

Sl. No.	Criteria
	Capability and infrastructure
1	Pre-press facility and Computer to Plate making. Web Offset printing machines,
2	Ink jet printing for check digit, serial numbering and bar-coding machines.
3	Hologram master making, manufacturing facility. Electroforming, embossing, coating, slitting, hot foil stamping.
4	Intaglio printing machines and Intaglio Plate Making facility.
5	Machinery for roll making and inspection

Appropriate documents to prove the ownership and their capacities shall have to be provided by the Tenderer.

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SPECIFICATIONS OF THE HIGH SECURITY HOLOGRAM FOR APPLICATION ON BEER BOTTLES

1. Master origination:

High security master made on a secure system capable of generating high security masters with at least 18000 dpi and which shall provide:-

a) Overt features

- Kinetic and diffracting animated Guilloche pattern
- Gradient effect
- Pearl effect with hidden Micro text
- Four channel effect
- Pure 2D/3D depth and effect
- True type image generated by combination of micro texts
- State logo or emblem as authorized by the purchaser
- Copy void feature
- Multi level animation effect

b) Covert features

- Micro text / Micro images
- Laser viewable concealed animated multiple image
- Washed Raster Image / text
- Special machine readable coding.

The features of hologram shall be produced by recombination of conventional 2D/3D and dot matrix techniques.

2. Non- master Origination Features:

- Sequential laser numbering and inkjet numbering
- U.V. Fluorescent serial numbering
- Check digit code

3. Suggested Art work:

The suggested artwork (minimum 3 options) is to be submitted by the tenderer containing all the above mentioned security features. The actual design would, however be furnished by the department only at the time of

placement of the order. The master may be changed at the discretion of the tendering authority at any time during the currency of the tender. The Tenderer should have in house facilities to produce/originate the master within time frame specified by the Tendering Authority.

TABLE - 5
RECOMMENDED SPECIFICATION OF HEAL

01	Size of the hologram	15 mm (width) x 75 mm (length) (rectangular with round and serrated edge corners) - which can be applied both automatically
02	Colour of the hologram foil	Different colours foil as indicated by the purchaser.
03	Tamper evident	Hologram foil with complete Taggant coating should be tamper Evident. Stamping foil shall be self destructive if an attempt is made to remove the hologram.

TABLE - 6
SPECIFICATION OF THE FOIL

01	Type	Ultra clear grade
02	Thickness	36 microns +/- 5%
03	Metalising	2 micron +/- 5%
04	Polyester grade	Food Grade

TABLE - 7
SPECIFICATION OF THE ADHESIVE

01	Type	Hot Melt Adhesive which can withstand the temperature of 70° c ± 10% suitable for affixation partly on bottle cap and partly on the neck of the glass bottle
02	Thickness	20 gsm ± 10%
03	Grade	Food Grade

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TABLE - 8
SPECIFICATION OF THE RELEASE PAPER

01	Thickness	60 ± 5% gsm
02	Coating	Silicon based solvent less coating

TABLE - 9
SPECIFICATION OF THE DIE CUTTING

01	Cut	(a) Security cuts in form of "t" and serrated should be provided at both the ends of the Hologram for better affixation on the substrate and to make sure that the hologram is completely damaged in the event of trying to remove it from its original position.
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TABLE - 10
OTHER SPECIFICATIONS

01	Form of supply	Spool form with 3.0 ± 0.50 mm gap between two holograms horizontally and 1.5 mm ± 0.50 mm gap vertically suitable for automatic application. The HEAL sample should be in color foil with complete taggant coating with printed text and sequential inkjet numbering visible by naked eye.
02	Inkjet / laser numbering	Each HEAL has to be serially numbered using inkjet and laser numbering to ensure proper accountability of the same.
03	Packaging	The HEALS should be supplied in continuous spool form having 10,000 HEALS on a spool for both manual and automatic application. One or more spools as specified by the Excise Commissioner shall be packed in one carton for proper transit. Each carton shall contain complete details of HEALS packed in that carton with the numbering details as specified by the Excise Commissioner. Requisite Control Labels shall also be supplied along with each spool of the HEALS.
04	Delivery	Delivery of HEALS shall be made at the point fixed by the Excise Commissioner, Bangalore.

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Other Features Of Heals :

- a) Layers in the Hologram except Micro Text, animated covert laser viewable multiple images, raster image etc shall be visible from naked eyes.
- b) It shall not be affected by normal variation in atmospheric conditions.
- c) The shelf life shall be minimum one year without any deformation or deterioration under normal atmospheric condition.
- d) Different - colours of the foil with complete taggant coating shall be used for different variety of liquors.
- e) Shall have serrated edge all around.
- f) Shall be suitable for sequential inkjet numbering visible to naked eye.

Special Feature :

- (a) Pure mirror effect without any colour in which the viewer can see full face clearly. The size of the mirror should be 5 mm to 6 mm diameter.
- (b) UV numbering in addition to laser and inkjet numbering.

Tender Specifications-Technical, Financial and Qualification Criteria:

1. The TENDERER should be a security printer having in house facilities of designing, complete hologram production lines including master making, computerized variable data printing and any other required facilities.
2. The TENDERER should be empanelled by Hologram Manufacturers Association of India HOMAI.
3. The TENDERER should have previous experience of the immediately preceding three years in printing and supplying of polyester based holographic security labels (documentary proof should be provided).
4. The TENDERER should produce a good performance certificate from their clients for whom they have executed similar contracts.
5. The TENDERER should have executed Printing and Supply of High security documents in one single security printing work order not less than Rs. 0.50 crores with requisite security features during the last 1 year. (Necessary document of proof should be provided).
6. The TENDERER should be an ISO certified Company / Unit.

7. The Tenderer should be a manufacturer who must have capability to print and supply 3 crores of Holographic Security Labels per month with similar features. The decision of the Purchaser with regard to the capacity assessment shall be final.
8. Financial standings:
 - a) Average annual turnover of the tenderer should be more than Rs. 3 crores during the last three years.
 - b) Tenderer should not have suffered any financial loss for more than one year during the last 3 years.
 - c) Net worth of the Tenderer should not have eroded more than 30 % during the last 3 years.
9. The Tenderer should furnish the information on all past supplies and satisfactory performance for both (a) and (b) above, in the prescribed proforma.
10. The Tenderer should not have been black listed from any State/Central Government departments/PSUs/ Banks during the last 5 years
11. The Tenderer should have the machineries as per list mentioned in Table 7.
12. Inspection of the production facility of the Tenderer may be carried out by the Purchaser or the Third Party Agency appointed by the Purchaser. The team shall verify and satisfy themselves regarding the availability of required machineries/space etc. at their premises to print the HEALs and security as per the terms and conditions stated in the Tender Document. Furnishing of false information would disqualify the Tenderer.
13. The Tenderer shall not supply the HEALs approved by the purchaser to anybody else except to the purchaser. The Tenderer shall not have any link with the Distributor or the retail Beer trader. In case of any breach of this condition, the contract shall be liable to be cancelled and further penalty shall be imposed. The Excise Commissioner, Karnataka shall decide the amount of penalty depending on the gravity of breach of terms and conditions of the contract depending on their revenue implications.

14. The Excise Department shall disqualify the Tenderer who fails to meet one or more of the pre-qualification conditions mentioned above. The Financial Bid of the Tenderer who has been disqualified in the Technical Bid will not be opened. The decision of the Purchaser in this regard is final.

15. No conditional Tender will be accepted.

TABLE - 6
CRITERIA FOR PRE-QUALIFICATION

Sl.No.	Pre-Qualification criteria	Supporting documents
1	The tenderer shall have appropriate registrations namely-VAT/CST, Factory License.	Copy of the registration certificate
2	The Tenderer should be registered with HOMAI.	Supporting document should be submitted
3	Average annual turnover of the Tenderer should be more than Rs. 3 crores during the last three years.	Audited Balance Sheet and Profit & Loss Account duly certified by the Company Auditor shall be uploaded.
4	The Tenderer should not have been blacklisted by any Government Department/ Government Body/PSU during the last 5 years	Affidavit to be enclosed
5	The Tenderer should not have suffered any financial loss for more than one year during the last 3 years.	Certificate from Chartered Accountant to be enclosed.
6	Net worth of the tenderer should not have eroded more than 30% during the last 3 years	Certificate from Chartered Accountant to be enclosed.
7	The Tenderer should have infrastructure to produce at least 3 crores HEALs as per the specifications of the tender.	Supporting Documents should be attached

Sl.No.	Pre-Qualification criteria	Supporting documents
8	The Tenderer should have executed printing & supply of Holographic security labels in one single work order of not less than Rs. 0.50 crores with requisite security features during the last 1 year	Work order and certificate from client.

TABLE - 7
LIST OF MACHINERIES

Sl.No.	Criteria
	Capability and infrastructure
1	Designing and Pre-press facility
2	Machineries for Hologram master making, Shim making, Electroforming, Embossing, Coating, Slitting, Hot Foil Stamping.
3	Ink jet printing for check digit, serial numbering and bar-coding machines.
4	Machinery for rollmaking and inspection

Appropriate documents to prove the ownership and their capacities shall have to be provided by the Tenderer. No operations shall be outsourced.

Government of Karnataka has issued model tender documents vide GO No. FD 9 PCL 2004(II), dated 6-8-2005 where in the Form No. KG-2 is for procurement of goods and equipment which suits the procurement of the EALs. This model tender document may be adopted with the Schedule of requirements, Technical Specifications and Qualification criteria for the procurement of the Excise Adhesive Labels of Hybrid variety and Polyester based Holographic Labels. Each product may be accommodated in a separate schedule.

f) Possibility of Mechanical Application of labels on liquor bottles and carton boxes

During the visits to the various Distilleries in different states, the Committee observed that a few states have adopted manual application and a few

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states have adopted mechanical application of EALs on the cap of the liquor bottles. Karnataka, at present is adopting manual application of labels.

Manual application involves huge manpower and also it reduces the output of the bottling plant considerably. It was confirmed by the Committee that both Polyester based and Paper based EALs can be applied mechanically. It was also confirmed that there is no additional wastage in labels while carrying out auto application. However, following changes are to be made to the existing EALs to make it compatible mechanical application.

1. Size of the EAL needs to be decreased.
2. EAL should be supplied in roll form.
3. Commonly followed practice in India is to apply EALs mechanically on head and shoulder of the bottle.
4. Minor changes with regard to Control Label concept needs to be brought in. Simpler and economical method will be to generate the Control Labels while printing the EALs and may be supplied along with each roll. This may be adopted until the distilleries equip themselves with full automation.
5. In auto application after applying the labels at the time of packing, all the Barcodes on the caps of the bottles would be scanned and a Master Control label would be generated accordingly. The Master Control Label would contain information of the bottles that have been packed in the carton. This label would have an ID Linear Barcode from which, we can fetch the information on one click showing how many bottles are inside the box and summary of the bottles.
6. Position of 2D barcode in the label should be chosen in such a way that while affixing the label automatically on the liquor bottle, 2D bar code is placed on the cap of the bottle to enable easy scanning.

Considering the advantages of mechanical application, the Committee recommends that the mechanical application of EALs shall be resorted to and accordingly the specifications are drafted to suit this Mechanical application requirement.

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g) To examine the possibility of computerisation of the whole process including Track & Trace system:

The Department of Excise in Karnataka has to regulate the distribution of about 30 crore IML bottles and about 3 crore Beer bottles every month, generating a monthly revenue of over Rs 1,250 crores. Under the present situation of limited workforce and manual operations, the Department obviously has to struggle hard to plug revenue leakage and to ensure the safety of the consumer.

The Department is definitely in need of a well structured, transparent and robust distribution management system to regulate the liquor trade in Karnataka, starting from 'raising the indents of labels by the Distilleries to the labels on the bottle sold at the retail outlet'.

The objective should be to make the system more transparent, efficient, effective and accountable with the help of Information and Communication Technology. This project should cover the following elements of different operations and shall be done online.

- Raising of the indents by the Distilleries.
- Production planning.
- Scrutiny and sanction by the department.
- Issue of the labels to the Distilleries.
- Stocks received, consumed and the balance quantity at Distilleries.
- Track and Trace system.
- Revenue collection, Penalty impositions etc.
- Interlinking the Department, KSBCL, Warehouses, Distilleries and Retail shops.
- Shall be GS1 compliant.

The system should prevent any leakage and should provide real time information to the Excise department. The system should enable the department to track the source of each bottle that is sold at the retail outlets in Karnataka.

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Such Supply Chain Information System shall work on GS1 compliant Barcodes placed at the case and bottle level. These Barcodes can be generated and printed on the case / bottle by the printers / liquor manufacturing Distillery as per the specifications

Ultimately the Supply Chain Information Management System SCIMS is expected to provide following benefits: -

- Better revenue mobilization through reduction in smuggling and brand pushing of liquor.
- Automation of the issue of transport permits, import permits, no objection certificates etc..
- Generation of timely, intelligence reports and comparisons will help managerial control, inventory management, and improved efficiency and enable revenue record reconciliation on daily basis.
- Providing transparency to the department and its business with its clients.
- Assessment of Excise duty to be paid could be done in real time basis.
- Online status tracking and enquiry facility

Generally it is observed that the requirement of printing of Labels and adoption of Track and Trace application should be combined in the Tender. However the Committee opines that there shall be separate tenders for "Printing and supply of labels" and for "Track and Trace applications".

Combining of these two requirements in one tender would restrict and reduce the number of participants as the scope is very broad. Such combination also will result in complex technical evaluation. Therefore, the Committee at present is proposing only for the "Tendering for Printing and Supply of Adhesive Labels and Specifications". The Tender document may be restricted only to the above procurement.

The project of computerisation i.e. SCIMS may be entrusted to solution providers who would make a system study of the existing operations and after obtaining the reports accordingly, Tenders may be invited. Presently the Department of Excise in Delhi (National Capital Territory) has computerized

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their operations and M/s TCS is said to have provided the required solutions. Due to paucity of time, the present working system in Delhi could not be studied by the Committee.

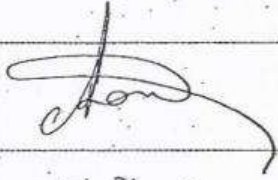
For the time being the system of affixing of Control Label, being affixed on the cases may be continued in order to Track and Trace the Excise Adhesive Labels.

6. SUMMARY OF RECOMMENDATIONS

The Committee after detailed evaluation proposes the following recommendations

- a. Hybrid labels (Paper based label with Hologram) are found to be superior to the Polyester based labels. The former offers variability as it uses the features of both paper and polyester. It also provides security with paper based counterfeit deterrence feature like intaglio printing and polyester based holographic feature. Therefore, the Committee recommends that Paper based EALs with hologram shall be used for IML.
- b. The Committee recommends to introduce the application of EALs on Beer bottles. As Beer bottles are required to be stored and served in chilled conditions, Polyester based holographic labels can be appropriately applied. Therefore the Committee recommends that Polyester Based EALs (HEAL) shall be used for Beer Bottles.
- c. Considering the technological advancements and the necessity to upgrade security features, the Committee recommends to enhance the security features of both paper based and holographic based EALs. Accordingly, technical specifications are recommended for consideration.
- d. Considering the advantages of mechanical application, the Committee recommends that the mechanical application of EALs shall be resorted to. Accordingly, the specifications are drafted to suit the mechanical application requirement.
- e. The Committee is of the view that the computerization is the need of the hour owing to its inherent advantages. Therefore it is recommended to engage a Solution Provider to conduct systems study and furnish a report for the Total Computerization Project.
- f. It is recommended to invite separate Tenders for Printing and supply of "EALs / HEALs" and computerization including Track and Trace System.

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- g. Considering the security requirements and the volume of production, Committee recommends that Production of EALs and HEALs by a Government organization like Government Security Press, in a secure and totally in-house manner should be considered for implementation. //

M. Ravishankar	
S. Srikanth	hileu
Sannabathappa	SY E J
Prof. D. Nagarjuna.	D. Nagarjuna
Dr. B. Kumar	Dr. B. Kumar
Prof. Sajith Vijayaraghavan	Sajith
L. C. Shankar Guru	Shankar Guru L.C
A. S. Vishwaroop	SV
K. C. Haridas	K. C. Haridas

7. ANNEXURES

1. Government order constituting the committee
2. Security features of Tamil Nadu holographic labels
3. Recommended designs
4. Flow charts of the activities in Karnataka, Tamil Nadu and Kerala

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PROCEEDINGS OF GOVERNMENT OF KARNATAKA

Sub: Constitution of Technical Expert Committee to examine the security features of Excise Adhesive Labels (EALs) in Karnataka- reg.

Read: Correspondence ending with letter No: ECD/53/Label/2013-14 dated 26.12.2013 of Excise Commissioner, Karnataka, Bangalore.

Preamble:

Presently the Excise Department is using paper based Excise Adhesive Label (EAL) with various security features developed over the years. These labels have been devised to be applied on liquor bottles to ensure the collection of excise duty at the distillery level and to prevent the sale of illicit. The proposal of improving the security features contained in Excise Adhesive Labels is in active consideration of the government. In this regard, after the wide range of discussions, it is proposed to constitute a Technical Expert Committee consisting of various personalities involved in this field. Hence, the following order.

G.O. No: FD 63 EFL 2013, BANGALORE, DATED: 21st AUGUST 2014

In view of the circumstances explained in the preamble, the government is pleased to constitute the Technical Expert Committee with the following members to study the existing security features contained in Excise Adhesive Labels (EAL) and to suggest means to improve the same.

1	Sri M. Ravi Shankar, Director of Printing, Stationary and Publications, Government Press, Government of Karnataka, Bangalore	Chair Person
2	Sri S. Srikanth, Deputy Manager, Bharatiya Reserve Bank Note Mudran (P) Ltd., Bangalore	Member
3	Sri Sannabathappa, Executive Director, (Operations), KSBCL, Bangalore	Member
4	Prof. Nagarjuna, Retd. HOD Govt Institute of Printing Technology, Flat No.2, Block No.5, Rukmini Devi Colony, West Marradpalli, Telangana-560 026.	Member
5	Dr. B. Kumar, Professor, Department of Printing, Anna University, Guindy, Chennai-600025	Member
6	Prof. Sajith Vijayaraghavan, Managing Director, Kerala State Centre for Advance Printing Technology, Thiruvananthapuram, Kerala-695013.	Member
7	Sri Shankar Guru, Lecturer, Govt Institute of Printing Technology, Palace Road, Bangalore-560 001.	Member
8	Sri A.S.Vishwaroop, Joint Commissioner of Excise-1, Office of the Excise Commissioner, Bangalore.	Member
9	Sri K.C. Haridas, Joint Commissioner of Excise-2, Office of the Excise Commissioner, Bangalore	Member Secretary

The non-official members of the committee shall be entitled to a sitting fees of Rs.2,000/- per sitting and TA & DA as admissible to group-A officer of the state government. Expenditure towards this may be met out of the head of account 2039-00-001-0-01-015 (Non-plan).

The terms of reference of the committee are the following -

- (1) To evaluate and recommend an option out of polyester based labels and the paper based EAL or any other material option.
- (2) To suggest specifications of label including various security marks and features of label.
- (3) Various terms and conditions for printing EAL including nature of printing and printing facility, printing process and other related issues related to printing and supply of EAL.
- (4) To formulate Tender Specifications i.e., technical and financial and prequalification conditions.
- (5) To examine the possibility of mechanical application of labels on liquor bottles and carton boxes.
- (6) To examine possibility of computerization of the whole process including track and trace system.

The committee members may undertake field visits to study the existing system of paper based and polyester based EALs used by various States and also to study the computerization process as stated above. The Technical Expert Committee shall examine the existing tender specifications for printing and supply of EALs and advise the Excise Department on the matter and submit its report to the Government within 15 days.

By order and in the name of the
Governor of Karnataka,

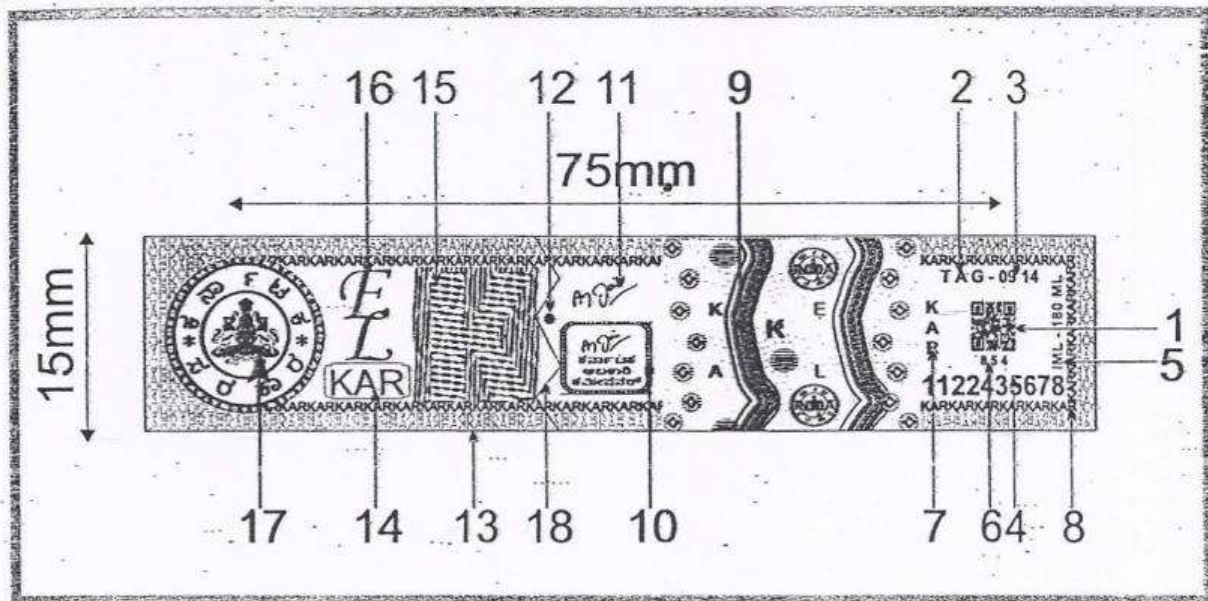
(Signature)
(Venkatesh. G)

Under Secretary to Government,
Finance Department (Excise).

To:

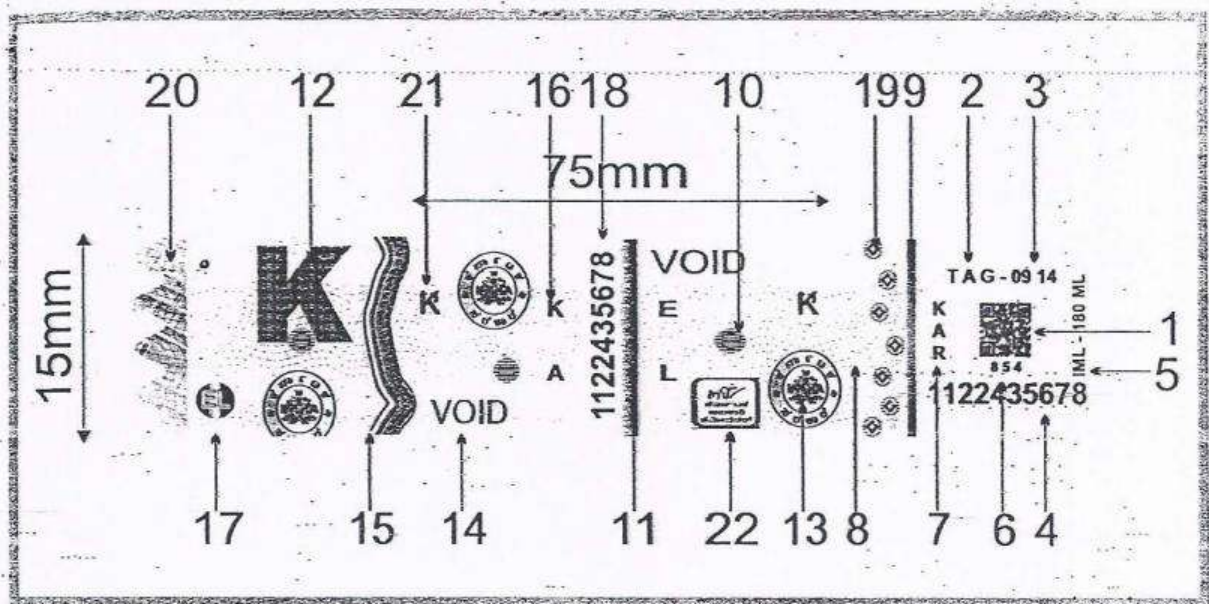
1. The Accountant General (A & E), Karnataka, Bangalore.
2. The Excise Commissioner, Karnataka, Bangalore.
3. All the Members of the Technical Expert Committee.
4. Section guard files/spare copies

Proposed Layout of Hybrid EAL



1. 2D Barcode
2. Month Code
3. Month and Year
4. Ten Digit Serial Number
5. Item Code
6. Check Digit
7. State Code
8. Micro Lettering in Intaglio
9. Karnataka Hologram
 - a. Size : 20 mm X 15 mm
 - b. Dot Matrix Holographic Structure
 - c. Concealed Image
 - d. Kinetic Effect and Guilloche Pattern
 - e. Covert Laser Readable Image
 - f. Micro Lettering
 - g. Four Channel Effect
 - h. Pearl Effect with Hidden Micro Text
 - i. Karnataka Emblem in 2D/3D effect
 - j. Lens and Shaped Lens Effect
10. Intaglio Guilloche Design
11. Commissioner's Signature in Invisible Ink
12. Security Taggents
13. Intaglio Guilloche Design
14. Thermo chromic Irreversible Printing
15. Intaglio Latent Image
16. Interlocking of Text (Offset Printing)
17. Touch Feel and Rub Mark Intaglio Logo
18. Security Cut

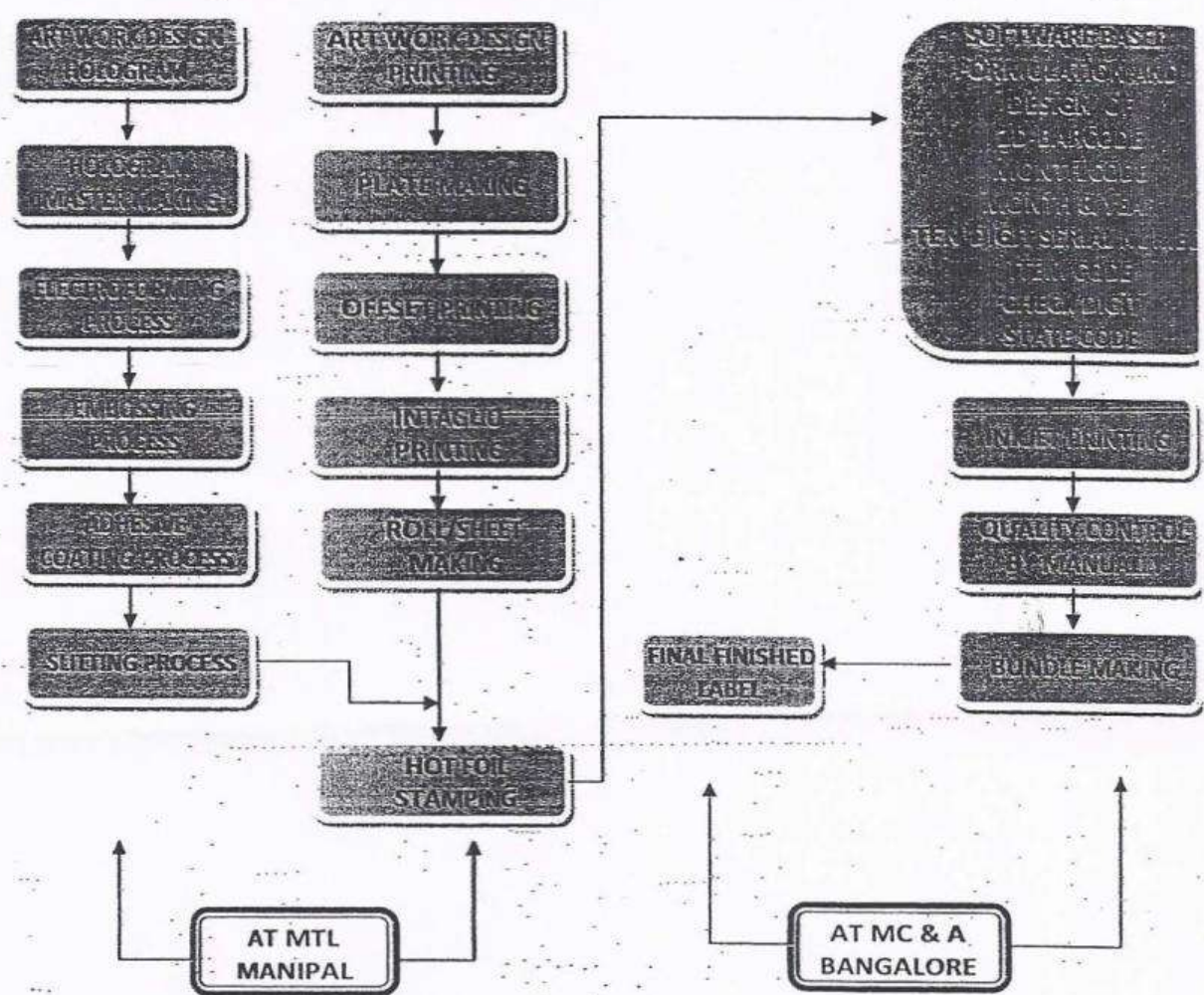
Layout of Polyester HEAL



1. 2D Barcode
2. Month Code
3. Month and Year
4. Ten Digit Serial Number
5. Item Code
6. Check Digit
7. State Code
8. Kinetic and Diffracting Animated Guilloche Pattern
9. Gradient Effect
10. Peral Effect With Hidden Micro Text
11. Pure 2D/3D Depth and Effect
12. True Type Image Generated by Combination of Micro Texts
13. Karnataka Emblem
14. Copy Void Feature
15. Multi Level Animation Effect with Micro text
16. Covert Laser Readable Text
17. Washed Raster Text
18. U.V. Fluorescent Serial Numbering
19. Lens And Shaped Lens Effect
20. Taggant Effect in Dot Matrix
21. Four Channel Effect
22. Laser Printing (Commissioner's Signature and Micro Text with Design)

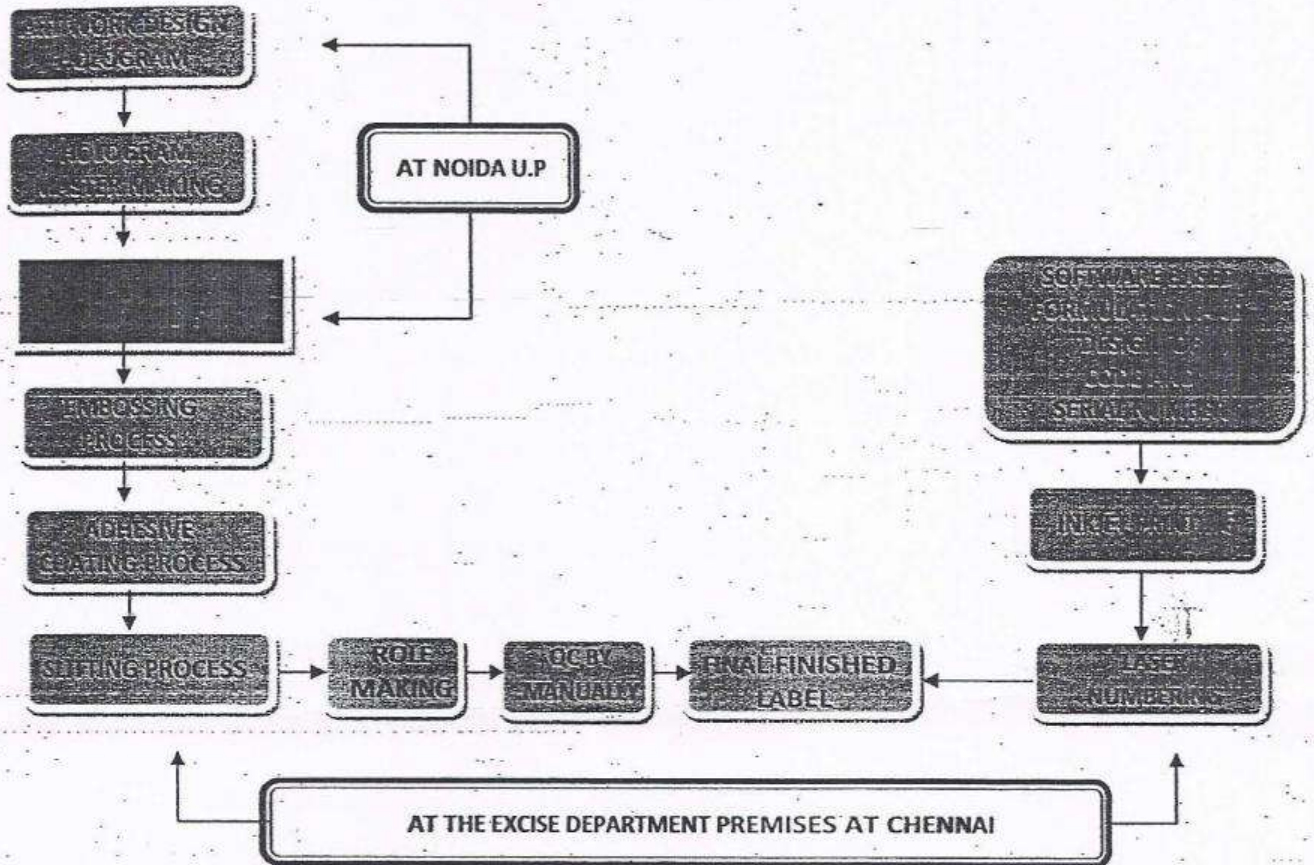
Annexure - 3 (A)

FLOW CHART OF ACTIVITIES IN PRINTING OF KARNATAKA EXCISE LABELS



Annexure - 3 (B)

FLOW CHART OF ACTIVITIES IN PRINTING OF TAMIL NADU EXCISE LABELS



Annexure - 3 (C)

FLOW CHART OF ACTIVITIES IN PRINTING OF KERALA EXCISE LABLES

