

COLOR

PICTURE

TUBE

GLOSSARY

ABRASION - A hand might be scratched by a cat or cut by a knife, but an abrasion or scuff would occur if it were dragged hard across a concrete sidewalk. Similar glass defects on caps which damage a large surface area are called abrasions or scuffs.

ACETONE STAIN - Brown stains on screen due to acetone splash during earlier tube processing.

AGING - The process in the manufacturing of picture tubes that conditions the cathode. Elevated voltages and currents are used to prepare the cathode (electron source) for its role in the operation of the TV set.

ALIGN - In TV tube manufacturing, the term align is used to refer to alignment of a mount, to alignment of the cap, mask and gun, or in some instances to the adjustment of manufacturing equipment such as frit seal lehr fixtures.

ALUMINIZING - A thin layer of aluminum is deposited behind the coating on the back of the faceplate. It serves as a reflector to provide a brighter picture and as an electrical conductor to aid in draining off electrons from the screen when the tube is operating. The operation in which the aluminum is deposited is called Aluminizing.

AMBIENT LIGHT - Ambient refers to the surroundings. The kind and brightness of light in a room is its ambient light level. The slurry operation in color TV is a type of photographic or light-sensitive operation. A special yellow light is used in the Slurry Rooms to permit proper control of the operation. The Testing Area has specific requirements on the permissible amount of ambient light.

ANODE SPRINGS - One or more springs (usually two) are used to connect the mask in color TV tubes to the graphite coating inside the funnel. These provide the path for electric current from the mask and the aluminized coating to discharge through the graphite coating in the funnel to the anode contact (P2 button), and through a wire connected to it back to the power supply.

ANTENNA GETTER - (See getter) The antenna getter gets its name from its appearance. It is a ring of barium alloy contained in a cup which is welded to a spring several inches long. The spring is welded to the mount or electron gun and extends up into the funnel of the tube. This location permits the metallic barium to be deposited over a larger area and, thus, promotes faster and better gas molecule clean-up.

APERTURE - An aperture is a very small opening or hole. In a color TV tube, the mask contains approximately 330,000 small holes called apertures. It is often referred to as an aperture mask. (See Aperture Mask.) The holes in the center of a grid-cup or disc used in an electron gun are also called apertures.

APERTURE MASK - A metal mask or screen containing approximately 330,000 holes is mounted behind the cap which contains approximately 1,000,000 phosphor dots, one-third of which are green, one-third red, and one-third blue. The mount or electron gun in the neck of the tube has three separate guns, one for each color. The aperture mask permits each gun to illuminate only the correct color of dots. The mask is made from CRS in thicknesses of .004" to .006".

AQL - Average Quality Level - This is a statistical term used with a number such as 1.0% to identify the required quality level which must be met in production. Better quality is required to meet a 1.0% AQL than to meet a 4.0% AQL.

- BA - Properly used, BA means "Bulb Allowance", and is used to identify tubes returned to be evaluated to determine whether they may be rebuilt.
- BLA - This term has been used to identify "Blocked Apertures", a type of defect in which one or more apertures in an aperture mask are blocked (mechanically or electrically).
- BSN - (Beam Strikes Neck) - TV picture tubes actually produce only pencil like streams of electrons. (Three for color tubes.) To form a picture in the TV set, these beams must be scanned, electrically moved, back and forth and up and down. This movement is done through the use of a yoke which fits over the outside of the neck in the reference line area. Insufficient beam clearance in the funnel, poor centering of the mount in the neck, etc., may cause the electron beams to "hit" the sidewall of the funnel before the entire screen is excited.
- BT - (Broken Tip) - After a tube has been exhausted, the tubulation is heated to make the glass soft and it is cracked off to seal the tube. It is very delicate and easily broken.
- BU - (Broken Tubulation) - The tubulation is the part of the stem extending away from the stem throat. It is used in evacuating the tube, and is then tipped off.
- BACKGROUND LABEL - A round colored, sometimes striped, paper label about one inch in diameter which is attached to the cap or funnel of a tube to identify its tube type number.
- BASE - Usually refers to the base of 19V 70° color tubes, but is sometimes used to refer to the wafer on other types. In either case, it is the part of the tube at the end of the neck which contains the pins which are to be inserted into a socket.
- BATH MAT - A rectangular plastic piece, rounded at the corners and curved to match the shape of an aperture mask. It is used in the "Q" set operation to set the space between cap and mask. It is sometimes referred to as a "doormat". It fits inside another unit called a "Bathtub".
- BSG - A condition similar to BSN except that the electron beam is shadowed by the antenna getter.
- BATHTUB - This device is placed inside a cap in the "Q" Set operation to center an aperture mask in the cap.
- BEAD - As used in TV tube manufacturing, this term has three distinctly different meanings as follows:
1. Insulating connector used to hold electron gun parts together (a.k.a. Multiform).
 2. The shape of the frit bead at the point where the cap and funnel are welded together.
 3. The bead of glass on a tube neck and a neck flare during the renecking operation in SNG.

BEAM SHIELD - Metal pieces placed around the outer edge of the aperture mask in color picture tubes to prevent the beams of electrons from the electron gun from radiating around the edge of the mask. (a.k.a. electron shields.)

BEAM SHIELD SHADOW - A sharply defined black shadow on the edge of the screen when seen in an operating tube. It will seem to change position slightly when viewed on different color fields. It is usually caused by an improperly folded or slipped electron beam shield. Called BSS (a.k.a. Beam Strikes Shield).

BLEMISH - (1) A defect or fault. (2) Any flaw, as a stain, spot, scar, or imperfection.

BLISTERED ALUMINUM - Sometimes in the aluminizing operation, the aluminum coating fail to properly adhere to the phosphor screen or panel sidewall or is "blasted loose" by the gases liberated during screen bake.

BLOCKED APERTURES - When an object electrostatically or mechanically blocks a hole in an aperture mask, the defect is called a blocked aperture. Glass, metal and graphite particles are the major causes of blocked apertures. When a single aperture is blocked, three dots fail to glow when all three fields are illuminated in a finished tube.

BLOWN SCREEN - A dark, cloudy area in or near the center of the screen. These can be caused by letting air into the bulb too rapidly in the Sealed New Gun (SNG) process, or by removing the cap from the aluminizing cart while it is still under partial vacuum.

BLUE LATERAL SHIFT - To get a perfect blue screen, the electrons from the blue gun must land on the blue dots of the screen. To compensate for any errors in construction, magnets are used to bend or direct the beams to the proper dots. "Blue Lateral Shift" is the measurement or distance the beam must be moved in the up and down direction to get proper dot landing.

BOGIE - As used in the TV Picture Tube Industry, the term "Bogie" refers to the standard value. For example, if a dimension is listed as 0.047 inches \pm 0.005 inches, any dimension from 0.042 through 0.052 inches would be acceptable, but 0.047 inches is the Bogie dimension or target we strive to achieve.

BRAND LABEL - RCA manufactures picture tubes or kinescopes for many other companies as well as for RCA. In many cases, the other companies brand label is attached by us. For example, we might label some tubes with Sylvania Brand Labels.

BULB PREP - A term used both in Black & White, and Color to refer to operations involved in preparing a bulb-assembly prior to pre-lehr.

CAGE (CONVERGENCE) - The top part of the mount that controls convergence (keeps the three beams in control to meet at a point as they pass through the aperture).

CAP - In Color Picture Tube Manufacturing, the cap is the front part of the tube, the thick faceplate. On the back of the cap is the slurry or phosphor coating. In it is the mask. Sometimes called panels.

CAP-BAKE LEHR - Lehr is the word used to identify a particular type of oven. The Cap-Bake Lehr or Oven is used to bake out and set up the coating on the inside of the cap on color product. This coating includes the slurry or phosphor coating and the aluminized coating. During this bake, the film material is completely baked out.

CAP/FUNNEL OFFSET - Jig-fixtures are used at the frit seal lehr for color tubes to hold the funnel and cap in proper alignment during the frit seal operation. Improper loading of jigs, improper jig alignment, and/or incorrect cap or funnel size may cause Cap-Funnel Offset, which results in poor purity or other defects in the finished tube.

CATHODE - Cathode is the name given to that part of an electron gun which when heated emits or gives off electrons (which become the electron beams which cause the screen to glow.) In color tubes there are three guns, each with its separate cathode.

CATHODE-RAY TUBE - There are many types of cathode-ray tubes, but those we are concerned with are triple gun shadow mask cathode ray tubes, or Color Picture Tubes.

CHILL BAR - Some Picture Tubes are repaired by removing the original mount and replacing it. One method of removing the mount involves heating a narrow band of glass in the neck with nichrome wire or one or more gas burners and touching the heated area with a cold metal bar which is called a chill bar. When the chill bar touches the glass, a sharp clean crack occurs which will permit removal of the mount.

COATING SPOT/RUN - Spot - Black graphite internal coating splashed on the screen. Run - Black graphite coating run in neck below specified neat stop line area.

CLOBBER DENT - The expression "Clobber Dent" defines a large dented area in an aperture mask used in a color tube. Sometimes the big indented area has been pushed out leaving a series of creases around its edge. Such a dent is still called a "Clobber Dent" and is cause for rejecting the mask or the finished tube.

COLORAMA - This term refers usually to rebuilt product used in the replacement tube market only. Occasionally, when the supply of rebuilt product is not great enough to meet the demand, new product may be regraded to supply the Colorama requirements. It is never permissible to regrade Colorama product to ship it as Radiotron product.

COLOR IMPLOSION PROOFING (CIP) - When a picture tube breaks, it sometimes collapses inward with a bang scattering glass in all directions. This is called an implosion. Implosion proofing is designed to confine the particles and prevent injury to nearby persons. This is done with a laminated safety window, a Kimcode Band, "T" Band or "Push Thru" Band

COLOR PURITY - Color picture tubes are made with Blue, Green, and Red screens. Purity is a measure as to whether they have uniform Blue, Green, or Red screens. A "Pure" screen or one with "good color purity" is one that has no shades or color changes. (See field purity)

COMET - When a contaminating speck falls onto the wet slurry and the cap is spun after dispense, the speck moves outward toward the edge of the cap leaving a comet shaped area of phosphor breakdown with the tail of the comet pointing away from the center of the cap.

CONTRAST LEVELS - This term is used in classifying screen and faceplate defects. It is measured by using a set of Neutral Density Filters (see this term for definition). A "high" contrast item is one that is readily visible while a "low" contrast defect is less objectionable and harder to see.

CONVERGENCE - Convergence is the ability of three color guns to have their electron beams land on the same spot on the screen. As the guns are spaced in the neck of the tube, they must have a slight tilt to allow the beams to converge or meet at the screen on the proper phosphor dots.

CONVERGENCE SHIELD - A shield (metal part of the mount) that protects the beams from extraneous fields or outside influences that might bend or throw them off and affect their proper landing points on the screen.

CORD - When the molten (melted) glass is poured in manufacturing a cap, sometimes the glass mix is not uniform, and a narrow band of non-uniform glass differing in color and/or refractive index is formed in the glass. Such cords may weaken the glass and when they occur in the viewing area, are unsightly. Accept or reject limits are specified. Surface cords on laminate quality panels are usually eliminated by the laminating process.

CORNER POST - In some corrugated cartons used to ship color picture tubes, a hard thick-walled cardboard tube is placed in certain corners in a box to strengthen the carton particularly when cartons are to be stacked several high. This cardboard tube is called a corner post. Also, triangle shaped corner posts made of wood are used.

CRACK-OFF - The process in which the neck and mount are removed from a picture tube in order to repair it is performed by cracking the glass around the neck. This is sometimes done with a hot wire and sometimes with a gas flame followed by applying a cold metal bar to the heated glass. The operation is called cracking-off the neck or simply crack-off. The resultant mount, base, and partial neck is also called a crack-off.

CRAZED FILM - Film with many cracks in all directions. A result of low temperature baking.

CREASE DENT - When an aperture mask is dented in the aperture area with a dent which has a sharply defined edge. It appears almost as if it had been folded and then straightened. This is called a crease dent.

DEAD PHOSPHOR - Phosphor when struck by the electron beam picks up the energy that is stored in the electrons and converts it to light which we see on the screen. If it is dead phosphor, it does not do its job and no light results. This produces a dark spot or area on the screen.

DEBEADING - In color picture tubes, the cap is attached to the funnel with an opaque glass material called frit which projects out from the sealing line in sealed tubes in a bead shape. In the process of salvaging caps and funnels from defective tubes, this bead is removed by an acid etching operation. This process is called debeading.

DEGAUSSING - Degaussing is the term used for demagnetizing the metal parts of the picture tube. As magnetic fields will influence the travel of the electron beam, we want only those fields which are designed in the tube. All other fields are degaussed out prior to setting red purity.

DEIONIZED WATER - Water with all the mineral impurities removed. We also call this demineralized water. The removal of the ions, minerals, or inorganic materials from the water is necessary so that processing steps will not be contaminated or influenced by their presence. Water softening in the home is a similar process, but it does not remove the minerals, but trades salt ions for calcium ions as the salt suds better.

DELAMINATION - In order to provide implosion protection, some tube types have a safety-window laminated to the cap. When part of the safety window becomes detached this is referred to as delaminating.

DENT - Any irregularity in the proper shape and curvature of the aperture mask used in color tubes is called a dent. Different types of dents are identified by names which describe the dent either by appearance or by cause. These are listed separately in this glossary and include terms such as "pin dent", "crease dent", and several others. Electron gun apertures also can be dented.

DOT - In color picture tubes the screen is made up of about 1,000,000 small spots, one-third of them (about 330,000) being of a phosphor which when illuminated with an electron beam, glows green, another one-third blue and another one-third red. A single one of the spots is called a dot.

DUD - Tubes returned from customers for credit are classified as "duds". Depending upon their quality, they may be salvaged for parts or rebuilt.

DUMET - A metal alloy material whose expansion and contraction with changes in temperature is approximately equal to that of glass. This is used in stem leads to match the leads to the glass stem so when heating and cooling occur, the expansion of the lead will not crack the stem.

EAG - This is a term used to describe a particular type of tube faceplate glass surface appearance used on color picture tubes in Europe. The letters stand for "European Anti-Glare". Where a highly polished surface will reflect light, this finish is only partially polished and tends to not give complete reflection.

EDGE STRAYS - The electron beams are designed to pass through the shadow mask before it hits the phosphor dots. As the shadow mask cannot be made to fill the panel completely - we must have support for the mask and the clips - there are spaces or gaps that must be filled by the beam shield. If the beam shield does not fill these gaps the electron beam can go around the mask and randomly light the phosphor and produce edge strays. Also can be caused by insufficient mask aperture taper.

EINZEL MOUNT - An Einzel lens mount or electron gun is a type of unipotential focus lens named after the German word for "one". It is a one potential lens, where the bi-potential gun uses a focus voltage of 3000-5000 volts matched to the ultor voltage, this gun uses zero volts or ground on the focus electrode.

Bipotential - Focus Voltage (% of Ultor) - Ultor Voltage (Two voltages)
Einzel - Ultor Voltage - Ground Voltage on Focus Grid - Ultor Voltage (only one voltage above ground).

ELECTRON GUN - There is one electron gun in each black and white picture tube; and three assembled together, one for green, one for blue, and one for red, in each color picture tube. In both cases they are often referred to as "Mounts" or "Guns". Their purpose is to generate and direct the beam or beams of electrons used to cause the phosphor on the screen to fluoresce and make the picture.

EMBOSS DENT - On the aperture mask, dents are sometimes made by hitting the edge of the mask against another object. The resulting dent may be very small or quite large, but is usually sharply defined and reason for rejecting the mask. Such dents are called "emboss dents".

EXHAUST - In all vacuum tube manufacturing, the air in the tube must be pumped out and the tube sealed. This operation is called "Exhaust" or "Exhausting". It is at this point that the tube is considered to be under vacuum, evacuated, or "exhausted".

EXHAUST CART (see Exhaust) - An exhaust cart is a device containing a vacuum pump and devices for sealing a picture tube after the air is pumped out.

EXPENSE MATERIALS - Materials normally used in production operations which do not become a part of the product, for example, pencils, scratch pads, gloves, etc.

EYELETS - Umbrella shaped parts which are crimped to stem leads just above the fillets. They shield the stem from metallic evaporation deposits occurring during tube operation. Not currently used on 90° mounts.

FACEPLATE - (1) The front, glass portion of a bulb on which the viewing screen is applied. (2) The safety window used on laminated tubes.

FILLET - STEM - That part of a stem which extends from the stem flare and surrounds each stem lead. There are inside and outside fillets. Their purpose is to support the stem lead, to increase the surface path between leads, and to provide a vacuum tight seal around each lead.

FILM - Liquid or spray applied to the back of the screen which provides a smooth base for the aluminum deposit and which prevents the evaporated aluminum from penetrating into the phosphor screen.

FILM SPOT - A visual imperfection in the screen caused by the filming operation.

FLAT MASK - The aperture mask used in color picture tubes is made from a part of a roll of special sheet iron. Holes are chemically etched into the mask, more than 330,000 of them. The mask is removed from the sheet and exists in a flat form until it is formed into the spherical shape ready to be welded to a mask frame. In its flat form it is called a flat-mask.

FRIT - In color picture tubes it is necessary to attach the funnel to the cap after the cap is screened, aluminized and the aperture-mask has been installed. The attaching medium must provide a vacuum seal. A special low temperature-melting glass mixed in a liquid solution is used to provide the attaching material. After it has melted and cooled, it has structurally changed into a ceramic which will not again melt at low temperatures. This powdered glass is called frit.

FRIT BREAKDOWN - (See Frit) The frit material in the finished tube must be uniformly spread and not be contaminated, because it must provide insulation to very high voltages. When it breaks-down or arcs through while high voltage is applied, this is called frit-breakdown and is cause for rejecting the bulb.

FRIT SEAL LEHR - (See Frit) The Frit Seal Lehr is a large oven used to heat the frit which seals the funnel and cap together.

FRIT SEAL LEHR JIG - A device used to hold cap and funnel in proper position to be frit sealed.

FUNNEL - The back side of a bulb which when sealed to the panel supports the neck and gun at a precise distance from the tube face.

GETTER - When all the air has been pumped out, "exhausted", and the tube has been sealed, some air still remains. A getter, usually of barium metal, attached to the mount, is placed in the tube prior to exhausting it. It is then "flushed" or vaporized by heating and deposits on the inside surface of the funnel giving it a silvery appearance. The getter material "gets" most of the remaining gases in the bulb by combining with them chemically.

GLASS BUBBLE - Air bubbles found in glass caps or in funnels are called Glass Bubbles. Some glass bubbles or combinations of glass bubbles are cause for rejecting the product. The supervisor or the Standardizing Notices should be consulted to determine which ones are rejectable.

GLASS CORD - A glass cord results when glass in the molten state is not thoroughly mixed. When the glass solidifies, the cord gives it a non-uniform, wavy appearance.

GRAPHITE - Graphite is a form of carbon, and is used in coating the inside and outside of picture tubes.

GRID - In early three element tubes (triodes), a flat grid of wires, sometimes in a grid-mesh form was used with a negative voltage applied to vary or regulate current flow through the tube. The term "grid" has continued to be used to identify tube parts located between cathode and anode and used to control current flow. In picture tubes, the grids are of solid stainless steel with one hole in the center through which electrons flow.

GUN - (See Electron Gun)

HRS - (Horizontal Raster Shift) - This is a measure of beam centering. It is the horizontal distance from the geometrical center of the tube at which the electron beam hits the screen.

HANGER RACK TRUCK - A device with several sets of extending rubber covered metal arms, each set intended to hold a funnel, or bulb-assembly, or complete tube. Although some are made as stationary racks, most are on wheels and are used to move tubes or tube parts from one place to another.

HEATER - A coiled tungsten wire coated with alundum is used to heat the cathode to a temperature of about 1075°K. Also known as a filament. Each of the three guns has a filament.

HERRINGBONE STRIATION - Striations are defects found in the resin used in Implosion Proofing. As this resin must be optically perfect since the TV picture is viewed through it, any poor mixing of the components that make up the resin will give "wavy" lines and cause distortion in the picture. "Herringbone" is the pattern in which these defects can appear.

HI-LITE - An RCA color trade name for tubes made with high efficiency phosphors.

HOOK-PLATE - On each rectangular color picture tube mask there are four metal plates, one near the center of each side welded to the mask frame. Spring clips will later be welded to these to hold the mask in place in the cap. These are called hook-plates.

HOUSEKEEPING - A term given to routine cleanup. Usually it refers to picking up and keeping an operation orderly.

ILEM (In-Line Exhaust Machine) - ILEM's are ovens equipped with exhaust carts and used to exhaust or pump air from picture tubes. The tube is sealed in the exhaust machine after being exhausted. While on the ILEM, the gun parts are outgassed by r-f and the cathode coating converted from carbonates to oxides.

IMPLOSION - We are all familiar with explosions such as of dynamite. These occur when internal pressure breaks through the covering which confines it and produces a bang. An implosion occurs when an exhausted device such as a TV picture tube is broken and collapses from external pressure, scattering glass and metal over a large area. Because of the danger involved, employees working in areas where exhausted tubes are located are required to wear safety glasses, and in some areas additional protective devices.

IMPLOSION PROOFING - (See Implosion) - Many different methods are in use, each intended to protect anyone near a tube if it implodes. Sometimes a safety window is laminated over a tube faceplate. Sometimes a metal band is drawn tightly around the periphery of a cap to keep the cap under compression.

IN LINE EXHAUST MACHINE - (see ILEM)

INCOMPLETE FILM - (see Film) - When the phosphor screen is not completely covered by film material.

INITIAL FACTORY TESTS - Tests performed by the factory (production) prior to the holding period, usually three day hold.

INSERTION DENT - The term applies to dents (usually very small) located along the middle of each side of an aperture mask. They are caused by bumping the mask against the studs which project in from the center of each side.

INSIDE GLASS SCUFF - Is an impact area on a glass object where the impact was not great enough to break the object and it struck the object at a low angle of attack. To the unaided eye, it looks like an elongated dull spot. Under low magnification, it is seen as a series of checks running across the scuff.

JIG-FIXTURE - This term is often used to identify a device designed to hold a part or a tube during a production operation. For example, jig-fixtures are used at Frit Seal to hold cap and funnel in correct position to be welded or fritted together.

JARVIS-WEBB - Manufacturer's trade name. Jarvis-Webb manufactures most of the overhead conveyor systems used in the plant.

KIMCODE - A name given to a particular type of implosion proofing system in which a metal band is drawn tightly and fastened over rimbands around the cap of a picture tube.

KNOCKED BULB - Any of several types of glass bruises or chips usually on or around the edge of the faceplate of picture tubes caused by bumping or knocking the tube or cap against a hard surface.

LF49 - LF49 refers to color picture tubes which have had the original electron gun replaced with a different one. This is SNG product.

LABEL - An identifying marking on a picture tube used to identify tube type, or warranty conditions, or sellers brand name.

LAMINATE - Some tubes have a safety-window laminated to the face of the tube with a resin material between the cap-faceplate and the safety window. When two or more layers of material are attached together as in plywood, they are said to be laminated.

LATHE - The word lathe is used to identify devices which hold and rotate an item upon which operations are to be performed. In picture tube manufacturing, the device used to reneck a tube is called a lathe.

LEAD - Refers to a connecting wire which leads from one component to another. The stems we use contain three piece leads with the center section made of Dumet.

LEHR - This is the name given to large ovens used in numerous operations in picture tube production.

LETTING-TO-AIR - In repairing or rebuilding picture tubes, the first thing which must be done is to let air into the tube. This must be done slowly taking care not to let particles of glass into the tube in the process.

LIBRARY - The name is given to any of several holding devices (some stationary and some portable) which are used for temporary storage of aperture-masks, caps, and/or cap-mask assemblies.

LIGHT BOX - A light box is an inspection device which is used to illuminate a mask or panel assembly.

LIGHTHOUSE - A lighthouse is the device on which a cap-mask assembly is "exposed". The cap-mask assembly is placed at a certain distance from a light source. The rays of light from this source penetrate through the aperture mask and expose the phosphor screen. The part of the screen that is not exposed to the light will readily wash off. The exposed portion which remains becomes the phosphor dot.

LIGHT TRANSMISSION - The amount of light that passes through a given object, such as a mask or panel. The light transmission of an aperture mask is 15% on one type. This means 15% of the light on one side of the mask can be seen from the other side. For example, the light transmission of a brick wall is 0%, while the light transmission of a window pane is over 95%.

LIMIT - In all critical production processes limits are established, sometimes the maximum size, sometimes the minimum size, and sometimes both are specified. Anything not within limits is rejectable.

LIMIT PASS SAMPLE - This usually refers to a sample of product selected because it is the limit. Product worse than the limit-pass sample is rejectable.

LINE RETURN - When picture tubes are rejected by TV set manufacturers on their production lines and returned to us, these are called line returns.

LOT SAMPLES - Quality Assurance & Reliability (taking advantage of the fact that in large quantity manufacturing operations a sample of a few parts is usually typical of all production) selects samples of production lots for Quality Testing. If the sample is good, the lot is accepted. If bad, it must be reworked or 100% tested and only the good accepted.

MRO STOCK ROOM - The name given to the stock room which carries items not used in the product being manufactured (example - gloves or tape).

MANDREL - A holding device designed to hold a part centered while production operations are performed is sometimes called a "Mandrel". In picture tube manufacturing, the device designed for holding electron gun parts in place for beading is called a "Mandrel".

MARTEX PEN - A trade name for a special pen in which different colors of inks (red and yellow) resembling lacquers or enamels are used to identify tubes as test runs or Q-set information and Slurry date code which become engineering data.

MASK - The common name for an aperture-mask used in color picture tube manufacturing.

MASK ETCH - In manufacturing aperture masks, the apertures or holes are made by a very critical process involving chemical and photographic methods. The operation is called "Mask Etch".

MASK FRAME - The metal frame on which the formed aperture mask is welded.

MEXICAN HAT - The rubber or plastic bumper-pads used on many face-down conveyor hangers and on other devices designed to hold picture tubes in a face down position are called Mexican Hats because of their shape.

MIRACLOTH - A fibrous type cloth used to wipe coating or other materials from glass surfaces. Used extensively in the SNG area to remove graphite coating and getter flash.

MISSING DOT - When one small dot of phosphor is missing from a cap after the slurry operation is completed, this defect is called a "missing dot".

MOORE AIR GAUGE - This is a trade name for dimensional measuring gauges which are made to indicate by moving a reed which varies the restriction offered to the flow of air. These are used in measuring the shape or contour of masks and caps and in measuring "Q" (the distance between the cap and the mask).

MOTTLED MASK - A mask with a non-uniform, splotchy appearance caused by non-uniform hole size.

MOUNT - (See Electron Gun)

MOUNT ROTATION - The term is used to identify the rotational misalignment of a mount (electron gun) relative to the panel of a tube.

MOUNT SEAL - The operation in which the color mount (electron gun) is glass-welded or sealed in place in the bulb-assembly of a color picture tube.

MMA - Multiple mis-shapen apertures.

MULE - This name has been applied to forklift trucks and clamp-trucks.

NECK SPLICE - When repairing glass funnels it is necessary to weld a neck-flare to the funnel. The weld area is called a neck splice.

NEUTRAL DENSITY FILTER - A neutral gray colored translucent plastic light filter resembling a black & white film negative and consisting of parallel strips of different darknesses each from 1/4" to 1/2" wide. Each strip is numbered to identify its degree of light transmission. These are used to classify the relative contrast level of screen/faceplate defects.

NON-UNIFORM FILM - (see Film) A non-uniform application of the film resulting in a visual imperfection in the screen.

NON-UNIFORM WHITE - When the color tube is set-up to view a white screen, the screen must be uniformly white. A tube that has non-uniform white is one that does not meet our limits for uniformity.

OTM - Other Tube Manufacturers - The term is applied to products that RCA supplies to other tube manufacturers. Such products carry the customer's brand label.

OFFSET CAP - When the cap is not properly aligned on the funnel, it is referred to as an "Offset Cap". The condition comes about when the funnel and cap are not properly loaded or when the fixtures are not properly aligned at the frit seal Lehr.

OPAQUE SPOTS - Spots on the screen that are not transparent, such as coating spots.

OPENS - Refers to an electrical circuit which is "open", that is, does not pass electric current. May occur in the mount, such as open filaments, open G-1, or open G-2.

ORANGE PEEL EFFECT - A surface imperfection of glass, which looks like an orange peel.

OVERSPRAY - When the external part of our tubes are spray painted, certain areas are masked off. Sometimes paint gets deposited in the masked off areas. This is called overspray.

PC - The form used to put into effect either a temporary or permanent change in processes is called a Proposal for Change which is abbreviated "PC".

PVC - (Poly Vinyl Chloride) - Is a plastic material used extensively in operations where certain types of acid must be used.

P-2 BUTTON - The metal "button" on all glass funnels through which a high voltage is applied to the inside of the tube. Also known as "Ultor Contact".

PALLET - A wood or steel platform used to stack caps or tubes in the plant for transportation by forklift truck.

PANEL - Although "cap" is a more descriptive term, the word "panel" is used to identify the front part of a color picture tube.

PARTICLES - In picture tube manufacturing, particles of glass, aluminum, graphite, and other materials are often found in tubes. If conductive, they can short parts of the tube together. They can damage screen and cathode surfaces. In color tubes, they can block apertures. Care must be taken to keep particles out of tubes.

PEELED ALUMINUM - This occurs on the sidewall of the cap, and is the pulling away of the aluminum coating.

PHOSPHOR - The chemical coating on the surface of the back side of the tube which is made to glow by electron beams from an electron gun. This coating is called a phosphor screen or just "screen".

- SECOND ORDER PRINTING** - The light source for printing the screen is displaced twice as far from tube center as the electron gun. This means the aperture used to print a screen will be used with the adjacent trio when it becomes a finished tube.
- SHIFTED MASK** - When an aperture mask in a color picture tube is shifted by vibration or shock, the electron beams are no longer aligned with the phosphor dots as they should. The condition is called "shifted mask". Usual causes are defective spring/clip or clip/frame welds.
- SHORT** - When two or more metal parts of a mount (which should be insulated from each other) are in contact with each other or have a conductive particle connecting them together, they are said to be "shorted".
- SHUTTLE WELDER** - The name given to the welding machine used to weld the formed mask and frame together.
- SINGLE-PACK** - Some customers including the replacement market desire to have picture tubes shipped to them one in a carton. The operation where this job is done is called "Single-Pack".
- SKID** - The wood or metal device, movable by mule or hand truck on which caps or other material is stored is called a skid.
- SLEM** - (Straight Line Exhaust Machine) - Performs same functions as ILEM, but is indexing type machine rather than continuously moving.
- SLURRY** - (1) A term that describes the screening process used in color picture tube manufacturing. (2) A term applied to the homogenous state of phosphor used in the color picture tube screening process.
- SLURRY SAG** - An irregularity in the phosphor screen caused by dirt, lint, hair, or other foreign material. It is usually in the shape of a half moon.
- SMOKED SCREEN** - Dark brown or black appearance on the screen surface. Poor vacuum during aluminum evaporation is the cause.
- SPECKLE** - A screen defect caused by a solid contaminant. It can occur anytime after the phosphor screen is dry, giving a speckled appearance to the contaminated area.
- SPLASH WELD** - In electric spot welding, the weld is made because an electric current is passed through a small area of metal and heats it to a point where it melts. Small particles or globs of molten metal often splash out on nearby surfaces. This is called weld-splash and can be the source of shorts, blocked-apertures, and other defects.
- SPOKES** - Spokes sometimes referred to as "Spoke Pattern" are heavy dark radial lines (lines coming out from the center of the viewing area of the tube). These are sometimes quite easily seen and other times stand out only when viewed under certain conditions. They are caused by thickness variations of the phosphor coating.

- SPOT CUTOFF - The scanning beam current is reduced to the point that it will not excite the phosphor, and no light is emitted. With the scanning turned off, the beam only appears as a small spot in the center of the screen and is used to measure cutoff.
- SPOT KNOCKING - A process for burning off metallic slivers and foreign matter on the gun by the application of high voltage to its parts.
- SPRING-CLIP - Four springs are welded, one to each at four hook-plates in the "Q" Set operation. The spring clips hold the mask in proper position in the cap.
- STABILIZING LEHR - (See Lehr) - Newly "Q" set cap-mask assemblies are sent through the stabilizing lehr to relieve glass and metal stresses which could cause rejected product if the movements involved occurred after Slurry. This would result in mis-registry.
- STAINS - The term may refer to stains in the phosphor coating, stains on the inside or outside surface of the cap, or of the safety window on laminated product. It may also refer to stains in the resin used in laminated product. Stains usually result in discolored areas visible when viewing the screen. Some types are more evident when the tube is operating.
- STEM - The stem is a pressed part consisting of a tubulation and a flare. The flare contains the necessary leads hermetically sealed to the glass to provide electrical access to the gun, which is mounted on the inner leads of the stem. This component is then sealed into the neck of a tube.
- STEM ROTATION - This refers to rotational mis-alignment of the stem to mount in an electron gun assembly.
- STOP WORK ORDER - This is a form usually used by Quality Assurance & Reliability to stop work until a corrective action has been taken to improve product quality.
- STRAY EMISSION - Giving off of electrons from any part in the tube other than the primary electron beam. Also known as Field Emission.
- STREAKS - Uneven mask etch which causes light and dark lines. Poor washing of glass, filming defects are also sources of irregular shaped streaks.
- STRIATION - Areas of cured resin with different light transmitting properties. Cause is improper mixing of the resin components.
- SULFIDE SCREEN - Refers to color screens made prior to 1965 when all phosphors were sulfides. The body color of this screen is a bright yellow color.
- SUNBURST - A rectangle of light weight cardboard with a round hole in the center around which are cut radial slits resembling sun-rays. Used as part of the packing material.
- SWIRL DISTORTION - A glass defect from the vendor which causes a rejectable finished tube.

T-BAND - A system of implosion proofing using a band of Mylar tape around the tube perimeter.

TAPER - In the type of implosion proofing in which a safety window is used, the window is held in place by Mylar tape. The machine which applies the tape is called a taper.

THIN ALUMINUM - Aluminum thickness below specification.

THUMB DENT - Dents in aperture masks sometimes appear to have been made by pressing a thumb against the mask. These are called "Thumb Dents".

TIP - The place at the bottom end of a tube where in the exhausting operation the tubulation is sealed, and the excess removed leaving a glass tip.

TRIO - The term "Trio" is applied to three dots each of a different color phosphor.

TUBE TYPE LABEL - A label to be placed on the appropriate spot on a picture tube to identify the tube type.

TUBULATION - The long glass tube projecting downward from the Stem is called the tubulation.

VANADATE SCREEN - A red phosphor used for tube manufacturing from 1965-1967. It has a white body color.

VENDOR RETURN - An incoming defective part to be returned to the vendor.

VIBRA-THUMPING - A method of vibrating bulb assemblies in an attempt to remove particles which might cause blocked apertures, shorts, or arcs.

VOID - Usually used in laminated tube types, referring to large areas not filled by resin. Could also be a void in the frit.

WADDING - The cushioning type of packing material used to protect the faceplates of tubes during shipment.

WAFER - A plastic part used as the tube base for rectangular color tubes.

WARRANTY CARD - A card shipped with each Single Pack tube covering the tube warranty details and having sections for use in returning defective tubes for adjustment.

WASHOUT - A defective screen to be washed out so the glass can be used for making a new screen.

WATER CRIZZLE - A vendor return item on glass. It has the appearance of tree branches, is usually one inch in diameter or smaller, and is caused by cold liquid hitting hot glass during cap making.

WELD NUGGET - To check the quality of weld, the pieces joined are pulled apart. A good weld will pull material (nugget) from the pieces joined.

WELDER - Any of many different types of devices used to connect metal parts together by metal fusion. In picture tube manufacturing, most welders are spot welders.

WHITE ROOM - A production area in which very special precautions are taken to keep contamination out of the area.

WHITE UNIFORMITY - A color picture tube also gives black and white pictures. To give satisfactory black and white, we must have balanced green, blue, and red colors. A standard specification exists for degree of color shading.

WRONG MASK - Although produced by mass production methods, each color picture tube aperture mask is different. After "Q" Set, a particular cap and mask are mated together as an assembly. Because the mask must be removed and re-inserted so many times, there are chances of getting the wrong mask in a cap. When this occurs, the assembly will produce a rejectable tube.

WRONG PRINT - Phosphor dots printed in the wrong locations as a result of placing cap on lighthouse in an inverted position, improper lighthouse loading, wrong mask, and not pressing the corners after insertion.

ZONE - The viewing area or screen of a picture tube is divided into Zones called Zone A, B, and C. Specific zone boundaries are different for different tube sizes; however, Zone A is the central area of the screen, and Zone B is the outer or peripheral area. Acceptance standards for defects in the "A" Zone are more critical. Zone C is outside the screen area.

PHOSPHOR BREAKDOWN - Contamination of the phosphor screen usually by dust, dirt, airborne particles, or welding particles.

PHOSPHOR CONTAMINATION - (see Phosphor Breakdown)

PIN - The wires on the base of the picture tubes. The parts which plug into the tube socket are called pins.

PIN DENT - Dents in the aperture mask of color picture tubes which appear to have been made by bumping the mask against a pin like object. Also caused by picking open blocked apertures in the mask.

PIN PROTECTOR - To prevent damage to base pins of picture tubes during the manufacturing processes, plastic pin-protectors are put on the tubes after basing.

POLARIMETER - In picture tube manufacturing, a device using polarized light to identify stresses in the glass is called a Polarimeter.

POOR DOT REGISTER - Misplacement of one or more sets of color dots during dot exposure on the lighthouse. Cause is failure to properly insert mask, improper lighthouse loading, or improper lighthouse set-up.

POLE PIECES - Part of the electron gun which provides a low reluctance path for the external magnets.

POOR MASK ETCH - Improper mask etch giving too large variation in aperture size. This results in light and dark streaks on all colors in a tube.

POOR POLISH - Incomplete polishing of the cap often results in distortion of the picture display, and in color product results in a breakup of the colors. Accept and reject limits are specified.

POOR "Q" - "Q" is the distance between the mask and faceplate. Out of specification "Q" gives impure colors and white.

PROBLEM NOTIFICATION - A problem notification or "PN" is used by Quality Assurance and Reliability to inform the supervisor of a problem. Usually this indicates that the product or material used to make the product is beyond the Quality Control limits.

PROCESS CHANGE - (See PC)

POROUS DOTS - Dots which have tiny holes in them giving a porous appearance through a microscope.

PURITY - (See Field Purity)

PURITY SHIFT - The distance the electron beam must be deflected to strike the center of the tube. A specification exists, the cause for rejects include offset cap and misaligned gun.

"Q" - The distance between the mask and cap of the color picture tube is called "Q".

QCI - Quality Control Inspector

"Q" Set - (see "Q") The production operation in which the "Q" distance is set and measured.

QUALITY ACCEPTANCE TESTS - Tests performed by Quality & Reliability Assurance unless otherwise specified.

QUALITY ZONE - A specified area of a picture tube. There are four different zones.

RA - Means return authorization and is used for return of tubes which have failed in the TV set.

RADIOTRON - The tradename used to identify new RCA picture tubes destined for set manufacturers.

RASTER - The pattern of horizontal lines used to make up the picture on a picture tube.

RED FINAL (INSPECTION) - The last inspection performed in Slurry screening.

RE-ENTRANT FRIT - That condition where the frit does not form a bead at the inner or outer edge of the frit seal. This may be the result of excessive gap between the glass parts or can be caused by a frit deficiency.

REGISTER CHECK - Placing the screened cap on a lighthouse to check light beam to phosphor dot register. This is a check of the mask shift and phosphor printing.

RESIN - The plastic used between the rimbands and caps of picture tubes is called resin. Also the plastic between the cap and safety window is called resin.

RESIN GEL PARTICLES - Sometimes pieces of solid resin get mixed with the liquid resin as it is being dispensed. The solid resin is called gel particles.

RESIN RUN - When laminating resin runs out on the surface of the safety window, it is called a resin run.

RESIN VOID - In the process of laminating safety windows to a tube to provide implosion proofing, a resin material is injected between the cap and the safety window. When resin fails to fill a sizable area, the area without resin is called a resin void.

RIBBON - A piece of flat metal used in electron guns to connect parts.

RIMBAND - The two metal pieces that fit around the cap of color picture tube in the Kimcoding process are called rimbands.

ROTATED MASK - It is possible to insert an aperture mask in a color picture tube so that it is rotated one-half revolution from its correct position. The result would be incorrect screen exposure or poor purity (or no purity) if the mask was to be rotated in a finished tube.

RULP FILM - A high solids content film giving a very bright screen. Contains Rhoplex, Unisize, Ludox and Peroxide.

SEPS - Stationary Exhaust Positions - Used in exhausting or pumping air from tubes. Presently used only in Pilot Production.

S.N. - This stands for "Standardizing Notice". This is the name of the forms on which are all production specifications.

SNG - (Seal New Gun) - The term is used to identify all color salvaged products into which a new gun has been sealed. Such product is also called LF49.

SWO - Shop Work Order

SAFETY GLASSES - Eye glasses designed to protect the wearers eyes primarily against glass particles from implosions.

SAFETY WINDOW - A glass window which is laminated on a tube to make it safe to nearby personnel if it implodes while in a receiver.

SCRATCH - The term may refer to scratch type defects in cap, phosphor, aluminum, funnel, neck, cathode coating, etc. In each case there are specified accept and reject criterias or limits.

SCREEN - The name given to the complete phosphor coating applied to the cap of a picture tube.

SCREEN APPLICATION - The process for applying approximately one million phosphor dots to a color cap.

SCREEN DEFECT - A colored stain or a dark area in a finished tube caused by screen contamination.

SCUFF - An abrasion of the glass or screen area.

SEAL LAND - The flat edge on caps and funnels which are attached together by the frit in the frit seal operation is called the seal land.