Machine standards category A & B1

June 2012

Revision   2

Contents

Introduction

This standard is applicable to all category A & B1 gaming machines as defined under section 235 of the Gambling Act 2005 (the Act). This standard came into force for all category A & B1 gaming machines supplied or sited within Great Britain from 1 September 2007.

The purpose of the standard is to set out in detail Gambling Commission's (the Commission) requirements with respect to game features, display notices and general machine operation including metering. These have been developed to help ensure the Commission's three licensing objectives are met. Those objectives are to:

- prevent gambling from being a source of crime or disorder, being associated with crime or disorder or being used to support crime;
- ensure that gambling is conducted in a fair and open way; and
- protect children and other vulnerable persons from being harmed or exploited by gambling.

Operators or end users should not rely upon these standards as a measure of reliability, quality or minimal security requirements.

These standards permit equivalence between different types of technology and do not specify proprietary products or technologies. Testing regimes for these standards will permit equivalent international standards (ISO). It is not intended to limit game content and the use of new technological developments provided that the objectives of the standard are met.

Revisions

A list of the revisions to this document are included in section 10.

Other Relevant Gaming Machine Technical Standards

- Technical Standards for Category B2, B3, B3A, B4, C and D Machines
- Technical Standards for Non-Complex Category D Machines
- Technical Standards for Legacy Machines[1] (Categories B3, B4, C and D Machines)
- Technical Standard for Server Networked & Downloadable Gaming Machines (All categories of machine)
- Technical Standard for Wireless Network Systems (All categories of machine)
- Technical Standard for Cashless Systems (All categories of machine)
- Technical Standard for Linked Progressives (All categories of machine)

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[1] Essentially 'legacy machines' are Category B3, B4, C or D machines which were lawfully in use on premises in Great Britain on 31 August 2007 which comply with the regulations made under s240 of the Act and certain details of which have been notified to the Commission.

1.0 Hardware requirements

1.1 Physical security

All reasonable efforts should be made to ensure that a gaming machine is robust enough to withstand forced entry which would not leave behind evidence of the attempted entry. Where any form of attempted or forced entry causes an error condition, the machine must only commence play once the error condition has been cleared. Provided that any security device or sensor (e.g. door open sensor) which has detected an attempted entry no longer indicates there to be a problem the machine may automatically clear the error condition and commence play. Otherwise, operator action shall be required to clear the error condition.

1.2 Machine identification

A gaming machine must have an identification plate of metallic construction or of an equally resilient material permanently affixed to the exterior of the cabinet by the manufacturer. This must not be easily removable, without leaving evidence of tampering. The following information shall be displayed on the identification plate:
   a.   the manufacturer (machine manufacturer or brand name under which it is to be sold);
   b.   a unique serial number;
   c.   the gaming machine model number (which may refer to the cabinet type and not the game); and
   d.   the date of manufacture.

The identification plate shall be mounted on the front or side of the cabinet where it is clearly visible.

1.3 Gaming machine alarm/alert requirements

Gaming machines must be designed to automatically prevent further play and alert the site management in the following situations:
   a.   a player winning an amount or redeeming credits that the machine cannot automatically pay;
   b.   an error condition occurring; or
   c.   a machine fault occurring.

Such a system must be transparent to the player when activated and sufficiently able to attract the attention of the site management.

1.4 Logic area

Any electronic logic components that could significantly influence the operation of the gaming machine shall be housed in an area that can be separately locked (with its own locked door) and should only be able to be accessed with the appropriate key. There may be more than one such logic area in a gaming machine.

Electronic component items that are required to be housed in one or more logic areas are:
   a.   central processing units and other electronic components involved in the operation and calculation of game play (e.g. game controller electronics and components housing the game or system firmware program storage media);
   b.   electronics involved in the operation and calculation of game result determination;
   c.   electronics involved in the calculation of game display, and components housing display program storage medium (other than passive display equipment);
   d.   communication controller electronics, and components housing the communication program storage media may reside outside the gaming machine; and
   e.   alterable storage media that hold control programs.

1.5 Configuration settings

It must not be possible to change a configuration setting in any manner that may obstruct the proper operation of an electronic accounting meter without a critical memory clear. A change to the accounting denomination must be done by a secure means, which includes access to the locked logic area.

All switches and/or jumpers must be fully documented and any hardware system within the machine which may alter the configuration settings such as pay tables, accounting denomination, or payout percentages in the operation of the gaming machine must be housed within a separately locked secure logic area. This includes top award changes (including progressives), selectable Blackjack settings, or any other option that would affect the payout percentage.

1.6 Video monitors/touch screens

All video based games shall meet the following requirements:
    a. touch screens shall be accurate and, once calibrated, shall maintain that accuracy for at least the manufacturer's recommended maintenance period;
    b. a touch screen should be able to be re-calibrated without access to the machine cabinet other than opening the main door;
    c. there shall be no hidden or undocumented buttons/touch points anywhere on the screen that affect game play, except as provided for by the game rules; and
    d. section (1.6 c) does not apply to audit functions and controls which must be documented.

1.7 Mechanical devices used for displaying of game outcomes

If the game has mechanical or electro-mechanical devices, which are used for displaying game outcomes, the following rules shall be observed:
    a. electro-mechanically controlled display devices (e.g. reels or wheels) shall have a sufficiently closed loop of control so as to enable the software to detect a malfunction, or an attempt to interfere with the correct operation of that device. This requirement is designed to ensure that if a reel or wheel is not in the position it is supposed to be in, an error condition will be generated;
    b. mechanical assemblies (e.g. reels or wheels) shall have some mechanism that ensures the correct mounting of reels' artwork;
    c. displays shall be constructed in such a way that winning symbol combinations match up with pay lines or other indicators; and
    d. a mechanical assembly shall be so designed that it is not obstructed by any other components.

1.8 Multi-station games

In any multi-station game each player terminal and any other shared device must comply with the relevant sections of this standard, including its requirements for machine identification and metering.

All game rules shall be transparent to the player at each terminal and any shared device that is used to display information pertaining to the game shall be clearly visible to all players participating.

1.9 Patch Wires

All patch wires and track cuts shall be documented, in an appropriate manner, in the relevant service manual and/or service bulletin. This does not prohibit required repairs in the field.

2.0 Software requirements

2.1 Control program authentication requirements

The control program must utilise an integrity check, suitable for the media, providing at least the level of integrity of CRC 16 (for non alterable storage media) or a secured hashing method such as MD5 or SHA (for alterable storage media) to authenticate that the program and/or support files have not been corrupted or altered prior to use/loading.

Any alterable media must be write protected. For non-alterable storage media it is acceptable to have a test methodology which detects at least 99.99% of all possible failures.

The program residing in the gaming machine or device must be contained in a storage medium, which cannot be altered through use of the circuitry or programming of the machine or device itself. If the program is contained in any other medium, then the following requirements must be met or an alternative method used providing at least this level of integrity:
   a. authentication is required for all critical game files. This authentication shall employ a hashing algorithm which produces a 'Message Digest' (the mathematical results/signature of the hashing algorithm) output of at least 128 bits[2] ;
   b. the Message Digest(s) for all files must reside on a memory device (ROM based or other medium) within the gaming machine or device. Message Digests which reside on any other medium shall be encrypted or digitally signed, using a public/private key algorithm with a minimum of a 512 bit key or an equivalent encryption algorithm with similar security[3];
   c. the gaming machine or device shall authenticate all critical game files against the stored Message Digest(s);
   d. in the event of a failed authentication, after the game has been powered up, the gaming machine or relevant device should immediately enter an error condition and the operator be notified by the device accordingly. The machine should also record the details, including time and date of the error in a log. Clearing of such error condition must require operator intervention. The game must display specific error information and not clear until either the file authenticates properly, following the operator intervention, or the medium is replaced or corrected, and the device's memory cleared, the game restarted, and all files authenticated correctly; and
   e. the device must be capable of displaying the 'Message Digest' of any and all files on demand through the audit mode.

2.2 Alterable storage media devices

Any gaming machine and any procedural requirements must include sufficient security to ensure that any software that can influence the game outcome, including configurable settings that reside on any alterable media, is a true replication of that version of the game, control or other software.

2.3 Program storage medium identification

Any program medium (ROMs, EPROMs, Alterable storage media, DVD and CD-ROM) placed in the field shall be uniquely identified, displaying:
   a. program ID number;
   b. manufacturer or game provider;
   c. version number;

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[2] This requirement will be reviewed periodically as technology advances and new security methods become available
[3] This requirement will be reviewed periodically as technology advances and new security methods become available

d. type and size of medium (unless located on the medium as purchased unused from the supplier); and
e. location of installation in gaming machine or device, if potentially confusing.

The information a) to e) above must be available for inspection on the site operator's premises either on the label of the storage media or via video or display monitor.

For EPROM based games, the identification label shall be placed over the UV window to avoid erasing or alteration of the program.

2.4 Program interruption and resumption

After a program interruption (e.g. power down or power failure), software must be able to recover to the state it was in immediately prior to the interruption occurring. If a gaming machine or device is powered down while in an error condition, and power is later restored, the gaming machine or device must either:
a. detect that the error has been corrected, in which case play may continue; or
b. if the error remains, continue to display the error message and cause the gaming device to remain locked-up.

The program must not be adversely affected by the simultaneous or sequential activation of the various inputs and outputs, such as 'play buttons', which might, whether intentionally or not, cause malfunctions or invalid results.

On program resumption, the following procedures must be performed as a minimum requirement:
a. any communications to an external device must not begin until the program resumption routine, including self-tests, is completed successfully;
b. gaming device control programs shall test themselves for possible corruption due to failure of the program storage media. The authentication may use the checksum; however, it is preferred that the Cyclic Redundancy Check (CRC) calculations are used as a minimum (at least 16 bit). Other test methodologies must be approved by the Commission, its agent or approved test house; and
c. the integrity of all critical memory must be checked.

Where a peripheral device such as a note acceptor (accepting a note) or printer (printing a coupon/credit note) is in operation during a power failure it must, where practicable, on resumption of the power either complete or restart the task successfully or display an error message indicating that a fault has occurred. The error message must remain until the fault has been resolved by either the actions of the device or the operator. In all circumstances the metering or audit controls must be able to identify any accounting anomalies and a record be maintained for dispute resolution purposes.

Microprocessor controlled reels (e.g. stepper motor reels) must re-spin automatically to the last valid play-mode result when the play mode is re-entered, and the reel positions have been altered (e.g. when the main door is closed, power is restored, audit mode is exited, or an error condition cleared).

2.5 Last game recall

Information on at least the last five games must be always retrievable on the operation of a suitable external key-switch, or another secure method not available to the player. Last play information must provide all information required to reconstruct fully the last five (5) plays. All values must be displayed, including the initial credits, credits bet, credits won, and credits paid. If a progressive prize was awarded (see Progressive Standard), it is sufficient to indicate that fact: the value need not be displayed. This information should include the final game outcome, including all player choices and bonus features. In addition, the results of any 'Double-up' or 'Gamble'.

The last five game re-call shall reflect bonus rounds in their entirety. If a bonus round lasts 'x number of events', each with separate outcomes, each of the 'x events' shall be displayed with its corresponding outcome, if the outcome results in an award. The recall shall also reflect position dependent events if the outcome results in an award. For games that may award unlimited free plays, there shall be a minimum of fifty plays recallable.

2.6 Test/diagnostic mode

When a gaming machine or device is in a test mode, any test that involves credits entering or leaving the gaming machine or device (e.g. a hopper test) must be completed prior to resumption of normal operation. In addition, there must not be any test mode that increments any of the electronic meters. Any credits on the gaming machine or device accrued during the test mode must be cleared before the test mode is exited. Test meters are permissible provided the meter indicates that they are such.

The main cabinet door of a gaming machine may automatically place the machine in a service or test mode. Test/diagnostics mode may also be entered, via an appropriate instruction, by an attendant during an audit mode access.

When exiting from test mode, any game in play must return to the original state it was in when the test mode was entered. If the gaming machine or a device is in a game test mode, the machine must clearly indicate that it is in a test mode, not normal play.

2.7 Software verification

All gaming machines must be capable of permitting an independent integrity software check utilising an external device. This can be accomplished by the medium being able to be removed and authenticated by a third-party, or having an interface port for third-party equipment to authenticate the media. The purpose of such an integrity check is to provide a means for field testing the software to identify and validate the program.

3.0 Critical memory requirements

3.1 Contents of critical memory

Critical memory means computer memory used to store all data that is vital to the continued operation of the gaming machine or device. This includes, but is not limited to, memory which records:

    a. the current value of:
- credit and bank (deposited, committed funds and winnings) values; and
- last bank note data.

    b. power up and door open occurrences;
    c. gaming device/game configuration data;
    d. information pertaining to the last five (5) plays with the RNG outcome (including the current game, if incomplete); and
    e. software state (i.e. the last normal state the gaming machine or device software was in before interruption).

The clearing or resetting of such data must require deliberate action by appropriately authorised personnel.

3.2 Maintenance of critical memory

Critical memory storage must be maintained by a methodology that enables errors to be identified and corrected in most circumstances. This methodology may involve signatures, checksums, partial checksums, multiple copies, timestamps and/or effective use of validity codes.

Comprehensive checks of critical memory must be made during each gaming machine or device restart (e.g. power up cycle).

Gaming machine or device control programs (software that operates the machine or device's functions) shall test for possible corruption caused by failure of the program storage medium and all critical game files. Test methodology must endeavour to detect 100 percent of all possible failures.

The control program (software that operates the gaming machine or device's functions) must allow for the machine or device to ensure the integrity of all control program components during execution of said components.

All program storage devices ('PSD') in the executable address space of a main processor shall be validated during the following conditions:

    a. any power up;
    b. the first time the files are loaded for use (even if only partially loaded).

Memory and PSD space that are not critical to machine security (e.g. video or sound ROM) are not required to be validated.

3.3 Program memory, critical memory and non-volatile devices used to store program memory

The following are requirements for critical memory:

    a. a battery back-up (where required), or an equivalent, must be installed on the gaming machine or device for the electronic meters and must be capable of maintaining the accuracy of all information required for thirty days after power is discontinued from the machine. The back-up device must be kept within the locked logic area;
    b. if the rechargeable battery back-up is used as an 'off chip' battery source it shall re-charge itself to its full potential in a maximum of twenty-four hours and have a shelf life of at least five years; and

c. critical memory that uses an off-chip back-up power source to retain its contents when the mains power is switched off must have a detection system which will provide a method for software to interpret and act upon a low battery condition.

3.4 Unrecoverable critical memory

An un-correctable corruption of critical memory must result in an error condition. Critical memory should not be cleared automatically, but must only be cleared by an authorised person.

3.5 Function of critical memory reset

Clearing critical memory must only be capable of being undertaken by accessing the logic area in which it is housed. Following the initiation of a critical memory reset procedure, the game program must execute a routine which initialises each and every bit in memory to the default state. For machines that allow for partial critical memory clears, the methodology for doing so must be accurate and the machine must validate the un-cleared portions of memory.

The default reel position or game display after a critical memory reset must not be the top award on any selectable line. The default game display, upon entering game play mode, must also not be the top award. This applies to the base game only and not to any secondary bonus devices.

4.0 Machine credit and payment requirements

4.1 Coin or token and note acceptors and other methods of inserting money or money's worth into the machine

All coin/token acceptors must meet the following requirements:

a. the coin/token acceptor must be designed to prevent the use of cheating methods such as slugging (counterfeit coins/tokens), stringing (coin pullback), the insertion of foreign objects and other manipulation. The device must be capable of handling rapidly-fed coins/tokens so that the possibility of cheating is minimised. The devices must have suitable detectors for determining the direction and the speed of coin/token travel in the receiver. If a coin/token travelling at too slow a speed or in an invalid direction is detected, the gaming device shall enter an error condition and display an error condition for at least thirty seconds or be cleared by an attendant;

b. other than for diagnostic purposes coins/tokens judged invalid by the acceptor must be rejected to the coin tray and shall not be counted as credits. Acceptance of coins/tokens for crediting to the credit meter must only be possible when the gaming machine is enabled for play. Other states, such as error conditions, including 'door open' and 'audit mode' must disable the coin/token acceptor system. Each coin/token inserted must register the actual monetary value or a number of credits on the player's credit meter for the current game or bet meter. If coins or tokens inserted in a machine are registered directly as credits, the conversion rate must be clearly stated, or be easily ascertainable from a help menu or similar;

c. all acceptance devices must be able to detect the entry of valid notes, coupons, paper tokens, or other approved voucher, and provide a method to enable the gaming device software to interpret and act appropriately upon a valid or invalid input. Acceptance devices must be electronically-based and configured to ensure that they only accept valid banknotes, vouchers or paper tokens, and reject all other notes. The note input system must be constructed in a manner that protects against vandalism, abuse, or fraudulent activity. In addition, note acceptance devices must meet the following requirements:

d. where a stacker is installed credits must only be registered when:
   i. the note or other valid token has passed the point where it is accepted and stacked; and
   ii. the acceptor has sent an 'irrevocably stacked' message to the machine.

e. if note acceptors are designed to be factory set only, it must not be possible to access or conduct maintenance or adjustments to those note acceptors in the field, other than:
   i. the selection of notes, coupons, or paper tokens and their limits;
   ii. changing of EPROMs or downloading of software;
   iii. adjustment of the tolerance level for accepting notes or tokens of varying quality should only be allowed with adequate levels of security in place. This can be accomplished through lock and key, physical switch settings, or other accepted methods approved on a case-by-case basis;
   iv. maintenance, adjustment, and repair per factory approved procedures; or
   v. options that set the direction or orientation of acceptance.

4.2 Tokenisation

For games that may be played using tokens, the gaming machine or relevant device must receive from the acceptor and post to the player's 'bank' the entire amount inserted. If the currency amount is not an even multiple of the token for a game or the credit amount has a fractional component, the system must retain the value for the benefit of the next player.

4.3 Printers

If a gaming machine is equipped with a printer that is used to make payments, the printer must be located in a locked area of the machine (e.g. require opening of the main door to access), but not in the logic area.
Any printed ticket/voucher/hand pay receipt must display the following information:
    a. operator's name or reference;
    b. gaming machine number;
    c. date and time (24-hour format) of issuance;
    d. alpha numeric currency amount;
    e. sequence number;
    f. validation number and/or unique identifier (e.g. bar code);
    g. transaction type (cash out ticket, hand pay receipt.); and
    h. duplicate ticket indicator (e.g. duplicate number 3).

4.4 Ticket validation

Payment by ticket printer as a method of credit redemption is only permissible when:
    a. there is an independent means to validate the printed ticket/voucher/hand pay receipt prior to any credit or other type of redemption; and
    b. such validation system is capable of identifying duplicate tickets to prevent fraud by reprinting and redeeming a ticket previously issued.

To meet this standard, an audit trail of at least one month's data relating to all ticket transactions must be maintained for dispute resolution purposes.

5.0 Specific game requirements

5.1 General requirement

Where the outcome results in a player winning a prize, it must be determined randomly and in particular no compensator or regulator may be used to determine any stage of the game.

The machine must clearly display to the player either at all times when it is in operation, or at the point a game is selected for play, the following statement:

THIS MACHINE IS RANDOM

5.2 Random number generator (RNG) requirements

Each possible permutation or combination of game elements that produces winning or losing game outcomes shall be available for random selection at the initiation of each play, unless otherwise clearly stated.

A gaming machine or device must use appropriate communication protocols to protect the RNG and random selection process from influence by associated equipment which may be communicating with the machine or device. The RNG must be protected from external influences, such as electromagnetic and electrostatic interference and radio waves. (Compliance with the Electromagnetic Regulations would satisfy these requirements.)

A machine or device must not present a losing game result which indicates a 'Near Miss', e.g. where the odds of the top award symbol landing on the pay line are limited it must not frequently appear above or below the pay line.

The selection process must:
a. be distributed over the entire output range and pass appropriate statistical tests;
b. ensure the output is unpredictable; and
c. not reproduce the same output stream, nor must two instances of an RNG produce the same stream as each other. Where seeding is required to achieve this seeding should not introduce predictability.

If a gaming machine offers a game which is recognisable (e.g. Poker, Blackjack, Roulette) and is described as such by title or visual presentation and the chances of winning differ from an equivalent real game then this must be made plain to the player either via the artwork or help menus. In any event the rules of the simulated game must be evident and transparent to the player. In the case of other games (such as spinning reel games or video spinning reel games); the mathematical probability of each possible stage of the game outcome shall be constant.

5.3 Mechanical based RNG games

Mechanical based RNG games are games that use the laws of physics to generate the outcome of the game. All mechanical based RNG games must meet the requirements of this standard with the exception of requirements in s5.2 that are clearly applicable only to electronic RNGs. In addition, mechanical based RNG games must meet the following requirements:
a. the mechanical pieces must be constructed of materials to prevent decomposition of any component over time (e.g. a ball shall not disintegrate);
b. the properties of physical items used to choose the selection shall not be altered; and
c. the player must not be able to interact with, come into physical contact with, or manipulate the mechanics of the game.

The above is not intended to prohibit mechanically based skill and chance features used for entertainment purposes which may form a part of an otherwise electronic game.

5.4 Scaling algorithms

If a random number with a range shorter than that provided by the RNG is required for some purpose within a game, the method of re-scaling, (i.e. converting the number to the lower range), is to be designed in such a way that all numbers within the lower range are equally probable.

5.5 Single game requirements

The stakes for every gambling opportunity within a game selected by the player must be deducted from the credit or play meter prior to the outcome of any gambling opportunity being displayed to the player.

Before credit(s) for play in a game can be taken, the previous game must first have been completed in full and the result shown to the player.
This section does not preclude the use of multi lines, multi stake and multi reel games provided that the total stake and prize do not exceed the statutory maximum for the single game.

5.6 Initiating the next game (auto start/play)

Except where an 'auto play' or 'auto start' feature is permissible[4] it must always be necessary to release and then depress the machine's real or virtual 'start button' to start a game cycle.

5.7 Game speed of play

Each game cycle must last at least 2.5 seconds.

A game cycle starts when a player using a gaming machine once[5] has paid for each gamble selected and depresses the 'start button' or takes equivalent action to initiate the game and ends when all money or money's worth staked or won during the game has been either lost or delivered to, or made available for collection by the player and the start button or equivalent becomes available to initiate the next game.

Where auto play or auto start is permitted then a game cycle is measured from the point at which the game is initiated by the system (equivalent to the player depressing the start button) to the point at which it is able to automatically start the next game.

5.8 Not applicable to these categories of machine.

5.9 Live jackpots

Except for a live jackpot, no gaming machine shall offer prizes which increase or appear to increase from one game to the next. A live jackpot shall not be linked to any other gaming machine and must comply with the following rules:
   a. for an electronically displayed live jackpot the true value (the prize value which may be won within the game) must be displayed to the player at all times and must be available in every game. It may only be won as a result of either:
      i. a random outcome within the game; or
      ii. the proportion of total money contributed to the jackpot reaching a randomly pre-determined trigger limit;
   b. it is permissible to use physical coins in place of an electronically displayed equivalent provided that the value of prize which may be won by the player is transparent (the player must be able to reasonably assess the total prize value on offer);

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4   See Regulation 2, Gaming Machine (Circumstances of Use) Regulations 2007
5   within the meaning of the Category of Gaming Machine Regulations 2007

c. the live jackpot must be incremented in proportion to the money staked and by no more than the statutory maximum stake in any single game. For category A machines it shall not be increased by more than the value of the stake used to play the game in which it is incremented. It is not a requirement for the live jackpot and reserve (where used) to be incremented in unison or at the same rate;

d. the prize awarded may be comprised of a fixed value (which must be transparent to the player at all times) together with the live jackpot provided that the total (including any other prize won in the game) does not exceed the statutory maximum;

e. if an alternative prize option is selected, the live jackpot prize must remain unaffected. Once, however, the live jackpot option is selected, the live jackpot prize must be delivered and the live jackpot reduced to zero or its seeded value, regardless of whether the live jackpot is delivered directly or is subject to some intervening gamble or skill feature; and

f. the value of the live jackpot or its reserve shall not influence the chance of achieving a win within the game or be used to imply that a win is more likely.

In this section, a 'reserve meter' is a second meter or display which is used to hold any value which may be raised at the same time as the live jackpot, or which holds any overspill once the live jackpot has reached the maximum level for that category of machine.

5.10 Double-up

Any Double-up or Gamble options must have a theoretical return to the player of that displayed or suggested by the game graphic.

5.11 Bonus games

If a game cycle contains a 'bonus feature' including a game within a game, the following rules must be met:
a. it must be transparent to the player which game rules apply to the current game state;

b. if the bonus game does not occur randomly, the machine must display to the player sufficient information to indicate the current status towards the triggering of the next bonus game (e.g. if the game requires the player to obtain several events/symbols to enter a bonus game, the number of events/symbols needed to enter the bonus game shall be indicated along with the number of events/symbols collected at that point);

c. the game must not adjust the likelihood of a bonus occurring, based on the history of prizes obtained in previous games;

d. if a game's bonus is triggered after accruing a certain number of events/symbols or combination of events/symbols of a different kind, the probability of obtaining like events/symbols must not deteriorate as the game progresses (e.g., for identical events/symbols it is not permissible that the last few events/symbols needed should be more difficult to obtain than the previous events/symbols of that kind); and

e. it must be transparent to the player that the game is in a bonus mode.

5.12 Additional credit(s) staked during the game

A machine must not permit players to stake any additional credit(s) during a game cycle unless the game complies with the following requirements:
a. that the outcome of the game is not decided prior to any additional credit(s) being staked;

b. that the outcome of the game following any additional credit(s) being staked is random and that all possible combinations associated with an equivalent real game under the same circumstances are available to the player;

c. that the game does not modify the chance of achieving a win or the combinations available to the player associated with an equivalent real game as a result of their decision not to stake, or to stake additional credits within that game; and

d. the player must not be deliberately misled or given a false impression that they have an enhanced chance of winning as a result of staking additional credits within the game.

Category A only
    e. That the total stake wagered within the game does not exceed 3 times (3x) the original stake wagered to start the game.

Category B1 only
    f. That the total stake wagered within the game does not exceed the relevant statutory maximum.

This section does not preclude the use of multi stake, multi line and multi reel game configurations provided that the player sets their total stake prior to the start of the game cycle.

5.13 Pre-gamble

Where the player is given the opportunity at the start of the game to enter into a 'pre-gamble', and the prizes available or the odds of achieving those prizes in the game are linked to the odds of a successful outcome of the pre-gamble, the following rules shall be complied with:
    a. the player must always be given the option at the start of the game whether or not to use the pre-gamble feature;
    b. there must not be a difference of more than10% between the lowest percentage return to player (%RTP) offered to the player opting to use the pre-gamble feature and a player who does not opt to do so;
    c. the prize awards related to each pre-gamble option must be transparent to the player in that they must be fully aware of what they are playing for (or pre-gambling for);
    d. pre-gambles must be transparent in that they must be at natural odds, the player must get what he sees, and there must be no form of compensation or payment or retention of winnings in the event that a short or long series of game outcomes falls outside that which might be normally expected; and
    e. following a 20 second period in which there is no game played, and there is insufficient credit to play a game, any set gamble level is to be reset to 'no gamble'.

5.14 Game links

A 'game link' is where an element, feature or outcome from one game is either held over or made reference to (recreated) in the next game (e.g. reel band holds). Game links, with the exception of the live jackpot, are not permissible unless they comply with the following rules:
    a. any reference or link made to any previous game must occur randomly;
    b. linkages to a game are only permissible from the immediately preceding completed game;
    c. the chance of being awarded a link to the next game must be no better than even;
    d. the player must not be aware as to whether a link will be given or have the opportunity to use it before there is sufficient credit available on the credit or play meter to play the game at least once by means of the machine;
    e. no subsequent game link is permissible to the current game where a prize has been awarded, and delivered to the player. It is not permissible to force or create a series of wins (enriched periods) using any link feature(s).

5.15 Multiple games on a gaming machine

    a. The methodology used to select and discard a particular game for play on a multi-game machine shall be transparent to the player.
    b. All applicable rules and/or the pay tables should be transparent and available to view for each game prior to any commitment to play.
    c. It must at all times be made transparent to the player which game has been selected for play or is being played.
    d. Committing to play a game must involve the player in at least two actions. Having selected a game, the player must be able to return to the main menu without playing.
    e. It should not be possible to start a new game before the current play is completed and all relevant meters have been updated (including features, gamble and other options of the game).

f. The set of games offered to the player for selection, or the pay table, must be capable of being changed only by a secure method. This includes turning on and off games available for play through a suitable interface. The rules at section 1.5 of these standards shall govern the critical memory clear control requirements for these types of selections. However, for games that keep the previous pay tables (the pay table just turned off) data in memory, a critical memory clear is not required. Alternatively to a critical memory clear, a gaming system may record the data that is stored in critical memory on separately allocated memory exclusive to the game provided there are adequate safeguards to ensure critical memory integrity.

g. No changes to the set of games offered to the player for selection (or to the pay table) are permitted while there are credits on the player's credit or bank meter or while a game is in progress unless there is evidence of game manipulation or fraud as a result of a security weakness.

h. Where changes to the sets of games offered to the player for selection (or to the pay table) are performed outside of the site operator's opening hours it is permissible to do so while credits remain on the player's credit meter provided that there are adequate measures to ensure the machine is not accessible to players and that any credits are retained for the benefit of the next player following such a procedure.

6.0 Specific error conditions and alert requirements

6.1 General alert conditions

Gaming machines and devices must be capable of detecting, displaying and alerting the operator to the error conditions listed below. These must be cleared either by an attendant or upon initiation of a new play sequence and where any on-line monitoring and control system is networked to the machine details of the error should be communicated to it:

a. coin-in jam (where the coin acceptor disables itself under such circumstances it is not a requirement that it display an error message);
b. coin-out jam;
c. hopper empty or timed out;
d. hopper runaway or extra coin paid out;
e. critical memory error (including an indication of battery failure or low battery power source);
f. note acceptor-in jam;
g. program error or authentication mismatch;
h. door open (including note acceptor);
i. reverse coin-in (coin travelling the wrong way through acceptor);
j. reel spin errors, including a miss-index condition for rotating reels, that affect the outcome of the game:
    i. the specific reel number must be identified in the error code;
    ii. in the final positioning of the reel, if the position error exceeds one-half of the width of the smallest symbol excluding blanks on the reel strip; and
    iii. microprocessor controlled reels must be monitored to detect malfunctions such as a reel which is jammed, or is not spinning freely, or any attempt to manipulate their final resting position.
k. power reset; and
l. logic cage open (where applicable).

NOTE: This rule also applies to 'Note Acceptor Error Conditions' as to which see 6.3 below.

For machines or devices or individual games that use error codes, a description of such codes and their meanings shall be affixed inside the machine or device. This does not apply to video-based games; however, video based games shall display meaningful text to describe the relevant error condition.

6.2 Printer error conditions

A printer shall have mechanisms to allow software to interpret and act upon the following conditions:

a. out of paper or paper low;
b. presentation error (TITO only);
c. printer jam/failure; and
d. printer disconnected which may only be detected when the software tries to print.

These conditions shall trigger an error condition to indicate the error has occurred.

6.3 Note acceptor error conditions

Each gaming machine or device (including note acceptors) must have the capability of detecting and displaying (for note acceptors, it is acceptable to disable or flash a light or lights) the following error conditions:

a. Stacker Full (where installed) – a note acceptor should disable itself to accept no more notes. The game should not generate an error message when the stacker is full;
b. Note Jams – it is acceptable for the note acceptor to indicate there is a note jam by disabling itself to accept no more notes or by some other method;

c. Note Acceptor Door Open – where a note acceptor door is the glass door, a door open signal is sufficient; and
d. Stacker Door Open (where installed) or Stacker Removed.

A note acceptor must perform a self-test at each power up. In the event of a self-test failure, the note acceptor must automatically disable itself (i.e. enter note reject state) until the error state has been cleared.

7.0 Meter requirements

7.1 Credit/play meter

Credits used to initiate a new game (see section 5.6) must come from a single meter which may be described as a credit or play meter. The player shall have the option to view any funds held in such a meter as a monetary value.

7.2 Accounting and occurrence meters

The machine must have at least one primary metering system which is independent of the main control system. All reasonable efforts should be made to ensure that data held by the primary metering system is true and accurate and impervious to tampering or unauthorised modification.

Accounting meters shall be at least eight (8) digits in length. If the meter is being used in Pounds (£) and Pence, at least seven (7) digits must be used for the Pound (£) amount. The meter must roll over to zero upon the next occurrence, any time the meter is eight (8) digits or higher and after 99,999,999 has been reached or any other value that is logical. Occurrence meters shall be at least three (3) digits in length and roll over to zero upon the next occurrence, any time the meter is higher than the maximum number of digits for that meter. The primary metering system as a minimum requirement shall be capable of recording the following data (accounting meters are designated with an asterisk '*'):

a. the coins-in* (OR cash in) meter shall cumulatively count the total amounts staked during game play, except credits that are won during a game that are subsequently risked in a double up mode;
b. the coins-out* (OR credit out) meter must cumulatively count all amounts won by the player at the end of the game, that were not paid out by an attendant, including amounts paid by a ticket printer. This meter must not increment for notes inserted and cashed out (i.e. when the device is used as a change machine);
c. the drop* meter must maintain a cumulative count of the number of coins that have been diverted into a drop bucket and credit value of all notes and tickets/coupons inserted into the note acceptor for play. It is acceptable to have separate 'drop' meters for coins, notes, tickets and coupons;
d. the hand pays* meter shall reflect the cumulative amounts paid by an attendant for progressive and non-progressive hand pays;
e. the games-played meter must display the cumulative number of games played since the last critical memory clear.
f. a cabinet door meter must display the number of times the front cabinet door was opened since the last critical memory clear;
g. the drop door meter must display the number of times the drop door or the note acceptor door was opened since the last critical memory clear; and
h. the progressive occurrence meter must count the number of times each progressive meter is activated. Note: there is a separate standard applicable to progressives.

In all cases the data held on the metering system must be such that the percentage return to player can be accurately calculated and available for inspection. In instances where a gaming machine or device is able to offer multiple games such information must be available for each game and game variant.

7.3 Metering of note acceptor events

A gaming machine or device's primary metering system must also maintain and be able to report the following:

a. total monetary value of all items accepted;
b. total number of all items accepted; and

    c. a break down of the notes accepted:
        i. for banknotes, the device must report the number accepted for each denomination;
        ii. for all other notes (non legal tender), the device must have a separate meter that reports the number accepted; and
        iii. denomination of the last five banknotes inserted.

7.4 Multi-game, game specific meters

In addition to the Accounting Meters required above, each individual game available for play shall have at least a separate 'Credits Bet' and 'Credits Won' meter designated in either credits or pounds (£).

Even if a 'Double up or Gamble' game is lost, the initial win amount/credits bet amount shall be recorded in the game specific meters. Alternatively, there may be separate meters that account for the Double-up or Gamble information. In either event the method of metering must be transparent.

7.5 Door open/close metering

The gambling machine or device shall be able to detect and meter access to the following doors or secure areas:
    a. all external doors;
    b. drop box door; and
    c. bill acceptor door.

8.0 Artwork and game display requirements

8.1 Information to be displayed

A gaming machine or relevant device shall display, on the machine itself or on screen, information to enable players to keep track of their gambling. As a minimum, the following information must be available to the player at all times the machine is available for play:
   a. the player's current bank balance (where relevant);
   b. number of plays available or current credit balance (monetary value);
   c. the current stake;
   d. all possible winning outcomes, or a link to where this information may be viewed for, e.g. on a help menu;
   e. win amounts or odds given for each possible winning outcome, or a link to where this information may be viewed, e.g. on a help menu. The win amount may be displayed as a multiple of the bet or may be shown indirectly by describing the method by which wins are awarded;
   f. the amount won for the last completed game; and
   g. the player options selected (e.g. total stake, lines played) for the last completed game (until the next game starts or a new selection is made).

Mystery wins are permissible provided it is transparent to the player as to how such a prize may be achieved.

It is not permissible to state or imply that a prize greater than the statutory maximum for a single game may be won by means of the machine nor to indicate that the machine is in a state which could be beneficial to the player (such as by way of a Cash Full Lamp).

8.2 Multi-line games

   a. Each individual line to be played shall be clearly indicated by the gaming machine or device so that the player is in no doubt as to which lines are being staked upon.
   b. The winning play line(s) shall be clearly discernible to the player (e.g. on a video game it may be accomplished by drawing a line over the symbols on the play line(s) and/or the flashing of winning symbols and line selection box. Where there are wins on multiple lines, each winning play line may be indicated in turn. This would not apply to reel based games).

8.3 Display notice requirements

   a. If any display in respect of a game offered by a gaming machine (including reels) is capable of being taken to indicate odds which do not reflect the true odds in the game the following statement must be included on the face of the machine or at the time the game is selected where more than one game is offered to the player, clearly visible to the player:

   THE OUTCOME OF ANY GAME OR FEATURE IS NOT NECESSARILY THAT SHOWN BY THE ODDS DISPLAYED

   b. The following statement must be displayed on the face of the machine or at the time the game is selected where more than one game is offered to the player, clearly visible to the player:

   NO PRIZE GREATER IN VALUE THAN [JACKPOT] POUNDS CAN BE WON FROM THIS MACHINE IN ANY ONE GAME

c. The theoretical target percentage return to player (for betting products this equates to 1 less the calculated hold) must be clearly displayed to the player on the machine in the appropriate alternative format below:

i) in cases in which the percentage return to player does not depend upon the strategy used by the player

THIS MACHINE HAS AN AVERAGE PERCENTAGE PAYOUT OF AT LEAST (VALUE) %

Where there is a range (a lower and upper percentage return to player available within the same game) it must be the lower value that is displayed.

ii) in cases in which the percentage return to player can vary depending upon the strategy used by the player

THE RETURN TO PLAYER BASED ON BEST STRATEGY IS (VALUE) %

In either case the percentage return to player should be calculated in the following manner:

Percentage return to player equals the value of total wins awarded divided by total value of play shown as a percentage

d. Either of the following statements must be displayed on the machine, clearly visible to the player:

i. MACHINE MALFUNCTION VOIDS GAME

Or

ii. MALFUNCTION VOIDS PAYS AND PLAYS

For the purposes of this standard both statements mean that that a machine malfunction voids the game within which the malfunction occurs and does not affect the position of the player prior to that specific game including win and credit meters.

e. Where the machine is designed such that the deposited sum cannot be delivered by the machine for any reason then the following statement must be clearly displayed on the machine:

THIS MACHINE PAYS (£ minimum value payable) ONLY ANY LESSER AMOUNTS WILL BE RETAINED FOR FUTURE USE

9.0 Definitions

Address Space	A range of discrete addresses, each of which may correspond to a physical or virtual memory register, a network host, peripheral device, disk sector or other logical or physical entity.
Change	Money paid out which was inserted by the player that has neither been played nor committed to play.
Critical Game Files	All files that may affect the outcome of a game, including executables, data, and operating system files.
Critical Memory	Has the meaning ascribed to it in paragraph 3.1.
Critical Memory Clear	The process to reset the critical memory of a gaming machine, which configures the gaming machine into the 'as new' state.
Device	Any component of a gaming machine and, where the context requires, includes computer software used in a gaming machine.
Double-Up	Feature whereby the player is offered a gamble in which some or all of the winnings may be wagered at a 100% player return.
Enriched Periods	Where the machine deliberately forces winning outcomes over a series of games by use of any compensation or other controller mechanism.
Error Condition	A detectable event outside of the gaming machine's normal operating parameters.
Firmware	The embedded program memory of the gaming machine.
Gamble	A single act of staking on an outcome within a game.
Game	Any gambling opportunity offered to the user of a gaming machine whether it amounts to gaming, betting or participating in a lottery as those terms are defined in the Act.
Game Cycle	Has the meaning ascribed to it in paragraph 5.7.
Game Update	Any change to game configuration, pay table or any other software that may affect the gambling.
Gaming Machine	Has the meaning ascribed to it by section 235 of the Act.
Hashing Algorithm	Reproducible method of turning some kind of data into a (relatively) small number that may serve as a digital 'fingerprint' of the data.
Idle state	Where there are insufficient credits on a machine to enable a game to be played.
Live Jackpot Feature	A feature played on a single gaming machine which has a prize that may be increased from a pre-set or seeded value from game to game as contributions are made to it from monies staked.
Machine Malfunction	Any hardware and/or software fault that temporarily results in an unforeseen game outcome, or corruption and/or renders the machine unserviceable. Deliberate player actions to trigger a machine fault are not considered be a machine malfunction.
MD5 or SHA	Message-Digest Algorithm 5 and Secure Hash Algorithm respectively.
Multi-Station Game	A gaming machine which incorporates a number of player terminals which share a common device required for the game such as a random number generator.
Non-volatile computer memory	Memory that can retain the stored information even when not powered. eg. read-only memory, flash, hard disk, floppy disk, magnetic tape and optical disc drives.
Normal Mode	Where a gaming machine is in a configuration designed for play (not in test or other non-play mode) and in a serviceable condition with no errors detected.
'Off chip' Battery Source	Battery source independent of a data storage chip used for data refresh purposes (recharges state of data bytes when mains power is disconnected).

Passive Display Equipment	Devices only associated with viewing game outcome and not with player interaction such as touch screen displays.
Patch Wires and Track Cuts	Modifications to a circuit board, post manufacture, including soldering additional wires to bridge the electrical conductor paths or the addition of a component (patch wires) or to change the circuit path by cutting the copper conductor (track cut).
Program Storage Devices ('PSD')	Means any device used to store software code in read only or read write format as required by the gaming machine in its normal operation.
Raking Periods	Where a machine deliberately forces a series of losing games by use of any compensation or other controller mechanism.
ROM	Read only memory.
Seeding	Means an integer used to set the starting point for generating a series of random numbers.
Theoretical Target Percentage Return to Player	In the case of games in which the chances of winning are distributed randomly, the calculated probable percentage return to player at a 95% confidence level. In other cases, the target percentage return to player as determined by any controlling mechanism.
TITO	Ticket in, ticket out system.
Updates	Any software modification that may affect the outcome of the game.
Value of Total Play (VTP)	The aggregate of all charges for use paid in respect of the machine.

10.0 List of revisions

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Revision 1: Gaming Machine Standards Supplement 1 published. July 2008

Revision 2: Supplement 1 incorporated into original document.
Reference to Implementation Annex removed from Introduction. June 2012

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Keeping gambling fair and safe for all

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