

Gaming Machine Technical Standards

Consultation paper, June 2006

Introduction

1. The Gambling Act 2005 gives the Gambling Commission, as part of its statutory role, the responsibility to license operators that manufacture, supply, install, adapt, maintain or repair gaming machines. The Commission has the power to set standards for gaming machines and provide for their enforcement by way of licence conditions. The Act enables the Commission to require licensees and applicants for licences to submit to machine testing, including testing by external bodies.
2. In March 2006 the Commission published a consultation document, *Licence Conditions and Codes of Practice*. That document contains our approach to setting the conditions and codes that will apply to each of the sectors we will regulate once the Gambling Act is fully implemented. The document explained that it would be a condition of gaming machine technical operating licences that they comply with the Commission's technical standards. It also clarified that (further to the requirement to submit to tests, set out in the Act) it will be a licence condition to comply with Commission procedures for those tests. More generally, the document explained our broad approach to setting standards to support our licensing objectives – to keep crime out of gambling, to ensure that gambling is fair and open, and to protect children and the vulnerable from being harmed or exploited by gambling.
3. This document contains further information about the standards we intend to apply to each category of gaming machine, and invites comments. It will be of interest to those who wish to be licensed by the Commission as gaming machine technical operators, to gambling operators who wish to have gaming machines on their premises, and to all those who have an interest in ensuring that technical standards help to secure the licensing objectives. The document has necessarily been targeted at those with technical knowledge of gaming machines, although we have included brief summaries of our aims for the various provisions we propose. Information about how to respond is available at paragraph 59.

Background and context

4. The Commission currently agrees guidelines for gaming machines with BACTA (British Amusement Catering Trade Association) that set out in detail the requirements for game features such as holds and nudges, and for payment methods where these issues are not sufficiently covered by the Gaming Act 1968. Although these guidelines are widely adopted, they are not legally enforceable.

5. The Commission's future standards will take account of the requirements for gaming machines set out in the Gambling Act 2005, and those which will be made under regulations under that Act. In particular, regulations under Section 236 and Sections 240 will be relevant. The Department for Culture, Media and Sport (DCMS) is preparing to consult separately on regulations required under Part 10 of the Act, and details will be available in due course on its website, www.culture.gov.uk. Our standards will be amended if necessary once the content of those regulations has been finalised. DCMS will be consulting on a number of options in some key areas, and the standards will be amended to reflect the option that is chosen at the end of their consultation.
6. The standards set out in this document have some gaps where further discussion is needed with all interested parties to establish the appropriate standards. The Commission will work closely with the industry and others to consult on these areas during July and August 2006.
7. The Act provides for four categories of gaming machine, and DCMS has stated its intention to set the stakes and prizes for those categories and sub-categories as follows:

Machine Category	Maximum Stake	Maximum Prize
A	Unlimited	Unlimited
B1	£2	£4,000
B2	Maximum multiple stake £100 per game	£500
B3	£1	£500
B4	£1	£250
C	50p	£25
D	10p if money prize is available 30p if non-monetary prize is available	£5 money prize £8 non-monetary prize

8. The Commission will issue a consultation document on the standards that will apply to casino and bingo equipment used in licensed premises. This document will be available on our website at www.gamblingcommission.gov.uk.
9. One of the reasons that the technical detail of the requirements for gaming machines will be left to technical standards rather than included in regulations is that this allows complex detail to be addressed, using technical vocabulary where necessary. This will give greater flexibility to take account of developments in technology and innovation in game design - both by allowing such developments to take place, but also ensuring that the principles set out in the standards continue to be met. It also means that the standards can be made a licence condition specifically for those manufacturing, supplying or maintaining machines rather than all those who site machines on their premises for example.
10. The Commission will as a result of both these gaming machine standards and those for casino and bingo equipment identify the appropriate tests that should be carried out - particularly on new machine types. It is our intention to accredit a number of test houses who will be authorised to carry out tests to the Commission's standards. Licensed machine manufacturers and suppliers would be responsible for submitting products to one of the independent test houses and meeting the costs of tests directly. We do not intend to limit the number of test houses that may become accredited, and hope that this will enable operators to have products tested without unreasonable delay, especially since they will have a choice of test house. The test houses will be accredited to ensure their independence and their capability to carry out the relevant tests. The Commission will monitor the output from external tests, including seeing test reports, as part of its regulatory

function, before authorising a new or altered product, and when undertaking decisions on licensing. We will be consulting further on test processes later this year.

The Commission's broad approach

11. As stated in our earlier consultation document, *Licence Conditions and Codes of Practice*, we have reviewed the current gaming machine guidelines and standards operated in other jurisdictions and have considered not only the licensing objectives but also, subject to those objectives, the need to avoid unnecessary restrictions on the development of games or the way in which they are provided.
12. As a result of our review we have now developed machine standards which are similar in nature to those operated in the US and Australia, which we consider to be the most suitable model on which to base our own requirements. It is important to note that the 'model' which is referred to here relates only to the machines standards from these countries, which are rigorous and detailed. The Act sets out a different approach in general to the location and operation of gaming machines. The proposed standards have been developed by examining and addressing the possible risks associated with each category of machine. For example, in the case of category D machines - which may be played by children - the standards have more restrictions on the types of gambling or game features permitted, but will be less onerous in terms of the software and hardware requirements when compared to higher categories of machine.
13. The Act ensures that there is no licensing requirement relating to nationality or location: the Commission will accept applications for licences from companies based in any other jurisdiction, so long as they have an address in Britain at which notices can be served. The regime will ensure that machines can be imported, where there is equivalence between standards in place here and the standards of the machine to be imported.
14. We expect to accredit a number of test houses which may have their main location anywhere in the world. It is likely that operators will be able to submit a product to the test house of their choice and have that product tested to the standards set by a number of jurisdictions at the same time.
15. This document sets out our proposals for technical standards, and is broken down into the following sections.
 - Section 1: Hardware requirements
 - Section 2: Software requirements
 - Section 3: Critical memory requirements
 - Section 4: Payment to the machine and to the game
 - Section 5: Game requirements
 - Section 6: Error requirements
 - Section 7: Meter requirements
 - Section 8: Display requirements
 - Section 9: Progressive gaming devices in casinos
16. Although not included in this document, we will also be considering the requirements for smart card/ loyalty card or other payment systems, for wireless communication between back-office systems, and for downloadable games systems, and will consult separately on these issues.

17. In this document, we present proposed technical standard provisions in boxes. Compliance with technical standards will be a condition of a gaming machine technical operating licence, and therefore it is the text within boxes that will have the effect of a licence condition. The text outside of the boxes is explanatory material.
18. We have included a short explanation of the aims of each of Sections 1-9 and the approach we have taken. However, it will be particularly important for manufacturers and suppliers to consider the draft requirements themselves, rather than rely on our short explanation.
19. In this document, the term 'game' is intended to encompass all forms of gambling as set out in the Act (including virtual betting) as specifically provided for in the section 235 definition of 'gaming machine'. The term 'game' is kept merely for convenience.

Section 1: Hardware requirements

20. Section 1 of the standards (Hardware requirements) is predominantly a requirement for the machine to be physically secure (1.1), ensuring that the logic components critical to the game function (1.4) and configuration settings (1.5) are adequately protected from the risk of tampering. All categories of machine will be required to locate critical components within a locked cabinet area. In addition, category A and B1 machines will be required to have a separately locked logic area. The components that will be required to be housed in this separately locked logic area (for category A and B1 machines) are often in the form of flash cards which are designed to be removed and replaced easily for the purposes of upgrades and changes. For that reason, we believe that it should require a separate key to access the logic area. Finally, to prevent confusion or misunderstandings, postproduction hardware modifications such as track cuts (changes to conductor paths on circuit boards) and patch wires (additional conductor paths) should be documented (1.9), though it is not intended that this should prevent field repairs.
21. A further requirement will be for a machine identification badge to be fitted (1.2). This is intended to help with machine tracking in the field and will assist the Gambling Commission and other enforcement officers, for example when assessing whether a machine is legally sited and compliant. We have also included requirements on video (1.6) and reel band (1.7) displays to ensure fairness and transparency and also to ensure that machines can attract the attention of the operator in the event that an error condition or external payment call is initiated (1.3). In order to minimise security risk, we have also required video monitor systems to be calibrated without need to access the critical components of the machine.
22. It is important to note that we have not stated how the operator and/or manufacturer should configure their devices to meet these requirements, as we wish to allow flexibility to take account of different venues and circumstances.
23. We have also included requirements (1.8) to ensure that the system in its entirety complies with our requirements, where more than one gaming machine uses a shared random number generator.

TECHNICAL STANDARD PROVISION

All categories of gaming machine

1.0 Hardware requirements

1.1 Physical security

A gaming device shall be robust enough to withstand forced illegal entry which would not leave behind evidence of the attempted entry. Where any form of (attempted) forced entry causes an error code, the machine shall only commence play once the error code has been cleared. It is acceptable for the machine to clear such an error code and commence play provided that no critical game components have been or could be compromised, and that the device is still able to withstand a forced illegal entry. Otherwise, an operator action shall be required to clear the error code.

1.2 Machine identification

A gaming device shall have an identification badge permanently affixed to the exterior of the cabinet by the manufacturer which shall not be easily removable, without leaving evidence of tampering. The following information shall be displayed:

- a) the manufacturer;
- b) a unique serial number;
- c) the gaming device model number; and
- d) the date of manufacture.

1.3 Gaming device alarm/alert requirements

The gaming device shall be designed such that it is able to automatically alert the operator to situations, such as:

- a) a player winning an amount or redeeming credits that the machine cannot automatically pay;
- b) an error condition occurring; or
- c) a 'call attendant' being initiated.

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

Logic area (requirement for categories A and B1 only)

Any electronic logic components that could significantly influence the operation of the gaming device 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 device.

Electronic component items that are required to be housed in one or more logic areas are:

- a) CPUs and other electronic components involved in the operation and calculation of game play (eg, 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 (passive display equipment exempted);
- d) communication controller electronics, and components housing the communication program storage media may reside outside the gaming device; and
- e) all flash memory devices that affect the game play function of the gaming device.

(requirement for categories B2, B3, B4, C and D)

Any electronic logic components that have the potential to significantly influence the operation of the gaming device shall be sufficiently protected to prevent illegal tampering.

There is no requirement for a separately locked logic area(s) provided that access to any data ports (excluding communication ports used for normal game operation), configuration switches or other critical components is prohibited (surrounded by metal cage for instance) without the appropriate key. There may be more than one such logic area in a gaming device.

Electronic component items that are required to be housed in one or more logic areas are:

- a) CPUs and other electronic components involved in the operation and calculation of game play (eg, 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 (passive display equipment exempted);
- d) communication controller electronics, and components housing the communication program storage media or, the communication board for the on-line system may reside outside the gaming device; and
- e) all flash memory devices that affect the game play function of the gaming device.

1.5 Configuration settings

It shall not be possible to change a configuration setting that causes an obstruction to the electronic accounting meters without a RAM clear. A change to the denomination must be done by a secure means, which includes access to the locked logic area or other approved procedure. Monitoring of denomination changes would assist in preventing note validation fraud.

All switches and/or jumpers shall be fully documented and any hardware system which may alter the configuration settings such as pay tables, game denomination, or payout percentages in the operation of the gaming device must be housed within a 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 games shall meet the following rules:

- 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 by venue staff 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, except as provided for by the game rules that affect game play.

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 (eg 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 (eg, 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

A multi-station game is a gaming device that incorporates more than one player terminal, and only has one random number generator, which is controlled by the master terminal. The master terminal, containing the games CPU, will house the game display, which is shared among the player terminals. Each station must meet the technical standards outlined throughout this document, including machine identification and metering.

There must be a method for each player to know when the next game will begin.

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.

Section 2: Software requirements

24. This section sets out the requirements that the Commission proposes relating to the security of the software within a gaming machine. Although it is likely that the Commission will require that software is tested before it is approved for use in gaming machines, the Commission also has an interest in ensuring that the software is not corrupted or altered inappropriately once the software is in use.

Identification and verification of software

25. The standards we propose would require that any program medium is uniquely identified, including in this case information about the version number of the software (provision 2.3). This is in addition to the requirement for the machine casing, which is outlined above. To ensure that this information can be verified in the field, the software must be capable of undergoing an independent check from an outside source. The most appropriate methods to ensure compliance for each category will be discussed as part of the consultation process. This will also ensure that Commission or other enforcement staff can verify that the correct software is in use in a machine (provision 2.7). In addition, the machine itself should complete an integrity check on start-up (provision 2.1) in order to test that the program has not been corrupted or altered.

Interruption and resumption

26. In our earlier consultation on licence conditions and codes of practice, we stated that we would consider the standards needed to ensure that gambling remains fair and open where a gaming machine is interrupted during play.
27. Where a gambling device is interrupted (eg power supply failure) part way through a game, there is currently no requirement either within statute or the machine guidelines requiring that the game be resumed to the state prior to the problem occurring. Many standards operated in other jurisdictions and in particular Australia and Nevada require that gambling devices are resilient to game data loss as a result of power fluctuations. The GLI standard for example requires that games are reinstated following any interruption, including power loss, to that state immediately prior to the problem occurring.
28. For categories A, B1 and B2 the proposed standard will require that in the event of an interruption to a game in progress, the game shall be able to recover to the state it was in immediately prior to the interruption occurring, although it is recognised there will be circumstances where this will not be possible due to technological limitations.
29. After a program interruption (eg power down), the software shall be able to recover to the state it was in immediately prior to the interruption occurring. If a gaming device is powered down while in an error condition, and power is later restored, the gaming device will either:
- detect that the error has been corrected, in which case play may continue; or
 - if the error remains, the error message shall continue to be displayed when and the gaming device shall remain locked.
30. This section of the standard for categories A, B1 and B2 does not apply to catastrophic failures which may result in game data loss, in which case the game should be voided and

the player's stake returned for all categories of machine. 'Catastrophic failures' covers situations which are unpredictable and outside the control of the licensee, such as fire, flood, electrical overload or discharge. This would not apply to situations where poor service or maintenance has resulted or contributed to the fault.

31. The Commission recognises that the technology currently adopted for the majority of machine categories B3, B4, C and D limits their ability to restore games following interruptions and that the risk to the player is relatively low, so we do not intend to extend this requirement to those categories of machine.
32. However, as technology improves, and the cost of improving the functionality of new machines is reduced, all gambling devices should be designed so that they can restore games when they are interrupted. Therefore, we will keep this area under review. In the meantime, we are considering whether the Commission should set a requirement for those machines unable to return to the pre-interruption state, that the game should be voided and the player's stake returned.

TECHNICAL STANDARD PROVISION

All categories of gaming machine

2.0 Software requirements

2.1 Control program authentication requirements

The control program shall utilise an integrity check, preferably a secured hashing method such as MD5 or SHA, to authenticate that the program and/or support files have not been corrupted or altered prior to use/loading.

In the case of a hard disk, a write protected drive shall be used. SCSI devices are preferred, as they provide a write protect jumper which can be sealed. However, an equally secure alternative method of write protection will be permitted.

The program residing in the gaming device shall be contained in a storage medium, which cannot be altered through use of the circuitry or programming of the gaming device itself. If the program is contained in any other medium, the following rules shall be met:

- a) Authentication is required for all critical game files including, but not limited to, executables, data, and operating system files and other files, which may affect the game outcome or operation, which reside on the medium. 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 (to be reviewed periodically based on technology advancements and new security methods available).
- b) The Message Digest(s) for all files as defined in (a) shall reside on a memory device (ROM based or other medium) within the gaming device. Message Digests which reside on any other medium shall be encrypted, using a public/private key algorithm with a minimum of a 512 bit key (to be reviewed periodically based on technology advancements and new security methods available), or an equivalent encryption algorithm with similar security.
- c) The gaming device shall authenticate all critical files against the stored Message Digest(s).
- d) In the event of a failed authentication, after the game has been powered up, the gaming 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. This error shall require operator intervention. The game shall display

specific error information and shall not clear until either the file authenticates properly, following the operator intervention, or the medium is replaced or corrected, and the device's memory is cleared, the game is restarted, and all files authenticate correctly.

- e) The device shall be capable of displaying the 'Message Digest' of any and all files on demand through the audit mode.

2.2 Flash memory devices

Flash memory devices that contain the control program are allowed provided that the ability to 're-write' or 'flash' the device, whilst installed in the logic board, is physically disabled (ie, write line cut on the logic board). Each use of flash memory devices will be assessed.

An equally secure alternative method of write protection will be permitted.

2.3 Program storage medium identification

Any program medium (ROMs, EPROMs, FLASH ROMs, DVD and CD-ROM) placed in the field shall be uniquely identified, displaying:

- a) program ID number;
- b) manufacturer;
- c) version number;
- d) type and size of medium (unless located on the medium as purchased unused from the supplier);
- e) location of installation in gaming device, if potentially confusing; and
- f) issue/installation date.

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

2.4 Program interruption and resumption (categories A, B1, B2)

After a program interruption (eg, power down), the software shall be able to recover to the state it was in immediately prior to the interruption occurring. If a gaming device is powered down while in an error condition, and power is later restored, the gaming device will either:

- a) detect that the error has been corrected, in which case play may continue; or
- b) if the error remains, the error message shall continue to be displayed when and the gaming device shall remain locked-up.

The program shall 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 shall be performed as a minimum requirement:

- a) Any communications to an external device shall 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 shall be of a certified type.

- c) The integrity of all critical memory shall 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 shall, where practicable, on resumption of the power, either complete or restart the task successfully or display an error message indicating that such a fault has occurred. The error message shall remain until the fault has been resolved by either the actions of the machine or the operator. In all circumstances the metering or audit controls shall be able to identify any accounting anomalies for dispute purposes.

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

2.5 Last game recall (all categories of machine)

Information on at least the last five (5) games is to be always retrievable on the operation of a suitable external key-switch, or another secure method that is not available to the player. Last play information shall provide all information required to fully reconstruct the last five (5) plays. All values shall be displayed, including the initial credits, credits bet, credits won, and credits paid. If a progressive prize was awarded (see section 9 of these standards), 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 Double-up or Gamble (if applicable).

The five (5) game recall 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 have infinite free games, there shall be a minimum of fifty (50) games recallable.

2.6 Test/diagnostic mode (all categories of machine)

If in a test mode, any test that incorporates credits entering or leaving the gaming device (eg, a hopper test) shall be completed on resumption of normal operation. In addition, there shall not be any test mode that increments any of the electronic meters. Any credits on the gaming device that were accrued during the test mode shall be cleared before the test mode is exited. Test meters are permissible provided the meter indicates as such.

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

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

2.7 Software verification (categories A, B1, B2)

The device shall have the ability to allow for an independent integrity check of the device's software from an outside source. This can be accomplished by the medium being able to be removed and authenticated by a third-party device, or having an interface port for a third-party

device to authenticate the media. This integrity check will provide a means for field testing the software to identify and validate the program. The test laboratory, prior to device approval, shall approve the integrity check method.

(categories B3, B4, C and D)

At a minimum, the device shall have the ability to allow a visual inspection of the game software and operating system version using either an available matrix or video display.

Section 3: Critical memory requirements

33. Section 3 is a requirement for the gaming machine to protect critical data - in particular, the contents of the player's credits (whether in one or more meters), so that in the event of a power or other non-catastrophic failure, the game can either be restored or the last known state can be assessed for dispute purposes.
34. The specific requirements for critical memory are only intended to be a requirement for category A and B1 machines – ie the requirement for error detection during power up, memory battery back up and RAM error handling (as described in sections 3.1 – 3.4). We intend to discuss with the industry what minimum requirements should be set for lower categories of machine.
35. Section 3.5 specifies that it must be necessary to access the separately locked logic area (in the case of category A and B1), or the locked cabinet (in the case of all other categories of machine) to carry out a RAM clear. Data cleared in this way would be needed for disputes or to investigate a breach. We therefore believe that the decision to clear this data should be carried out only when authorised by the relevant person in the organisation and not at the discretion of all staff.

TECHNICAL STANDARD PROVISION

Category A and B1 machines only

3.0 Critical memory requirements

3.1 Contents of critical memory

Critical memory is used to store all data that is considered vital to the continued operation of the gaming device. This includes, but is not limited to:

- a) all electronic meters required in Electronic Metering within the machine, including last bill data and power up and door open metering;
- b) current value of any meters - credits and bank values;
- 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 (the last normal state the gaming device software was in before interruption).

3.2 Maintenance of critical memory

Critical memory storage shall 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 shall be made during each gaming device restart (eg, power up cycle). Gaming device control programs (software that operates the gaming device's functions) shall test for possible corruption caused by failure of the program storage medium and all critical game functions. Test methodology shall detect 99.99 percent of all possible failures.

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

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

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

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

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

The following are requirements for RAM:

- a) A battery back-up, or an equivalent, shall be installed on the game for the electronic meters and shall be capable of maintaining the accuracy of all information required for thirty (30) days after power is discontinued from the machine. The back-up device shall be kept within the locked logic area.
- b) If the 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 (24) hours. The shelf life shall be at least five (5) years.
- c) Random access memory that uses an off-chip back-up power source to retain its contents when the main's power is switched off shall 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 RAM shall result in a RAM error. The RAM should not be cleared automatically, but shall require a full RAM clear performed by an authorised person.

3.5 Function of RAM reset

Clearing non-volatile memory shall only be able to be undertaken by accessing the logic area in which it is housed. Following the initiation of a RAM reset procedure (utilising a certified RAM clear method), the game program shall execute a routine, which initialises each and every bit in RAM to the default state. For games that allow for partial RAM clears, the methodology for doing so must be accurate and the game must validate the un-cleared portions of RAM.

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

Section 4: Payment to the machine

36. DCMS regulations will cover the means in which coins, notes and other forms of payment may be credited to the machine, including the amounts that be deposited by one single action by the customer. The regulations will also cover the amounts that may be committed to play by the customer in one single action. This section will not include the effect of those requirements on the standards until the content of the regulations had been finalised.
37. Therefore, the following section relates only to the physical acceptance of coins, notes, tokens and other forms of payment. The requirements are partly aimed at minimising the risk of cheating which is also an aim of the manufacturers and operators. Cheating can be unfair on other customers and the Commission considers it important to set some minimum standards about the physical acceptance of coins etc.

TECHNICAL STANDARD PROVISION

All categories of gaming machine

4.0 Machine credit and payment requirements

4.1 Coin or token and note acceptors and other methods of inserting value into the machine

Acceptors shall meet the following rules:

- a) The coin/token acceptor shall 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 gaming device shall be capable of handling rapidly-fed coins/tokens or piggy backed coins/tokens so that the possibility of cheating is minimised. The gaming devices shall 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 of a speed or improper direction is detected, the gaming device shall enter an error condition and display an error condition for at least thirty (30) seconds or be cleared by an attendant.
- b) Coins/tokens judged invalid by the acceptor shall be rejected to the coin tray and shall not be counted as credits. Acceptance of coins/tokens for crediting to the credit meter shall only be possible when the gaming device is enabled for play. Other states, such as error conditions, including door opens and audit mode shall disable the coin/token acceptor system. Each coin/token inserted shall register the actual monetary value or a number of credits on the player's credit meter for the current game or bet meter. If registered directly as credits, the conversion rate shall be clearly stated, or be easily ascertainable from the gaming device.
- c) All note acceptance devices shall be able to detect the entry of valid notes, coupons, paper tokens, or other approved notes, if applicable, and provide a method to enable the gaming device software to interpret and act appropriately upon a valid or invalid input. The acceptance device(s) shall be electronically-based and be configured to ensure that they only accept valid notes of legal tender. Note acceptors may also accept coupons, paper tokens, or other approved notes and must reject all others accurately. The note input system shall be constructed in a manner that protects against vandalism, abuse, or fraudulent activity. In addition, note acceptance device(s) shall meet the following rules for all acceptable types of medium:

- d) Credits shall only be registered when:
 - the note or other valid token has passed the point where it is accepted and stacked; and
 - the acceptor has sent the 'irrevocably stacked' message to the machine.
- e) If note acceptors are designed to be factory set only, it shall not be possible to access or conduct maintenance or adjustments to those note acceptors in the field, other than:
 - the selection of notes, coupons, paper tokens, or other approved notes and their limits;
 - changing of EPROMs or downloading of software;
 - 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;
 - maintenance, adjustment, and repair per approved factory procedures; or
 - options that set the direction or orientation of acceptance.

4.2 Tokenisation

For games that allow tokenisation, the game shall receive from the bill acceptor and post to the player the entire amount inserted. If the current local currency amount is not an even multiple of the tokenisation factor for a game or the credit amount has a fractional component, the system will retain the value for the benefit of the next player.

4.3 Printers

If a gaming device is equipped with a printer that is used to make payments, it shall be located in a locked area of the gaming device (eg, require opening of the main door to access), but not in the logic area. This requirement ensures that changing the paper does not require access to the logic areas.

The printed ticket/voucher/hand pay receipt shall display the following information:

- a) operators name, city;
- b) gaming device number;
- c) date and time (24-hour format) of issuance;
- d) alpha numeric currency amount;
- e) sequence number;
- f) validation number;
- g) unique identifier (eg bar code); and
- h) transaction type (cash out ticket, hand pay receipt).

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. The validation system must be able to identify duplicate tickets to prevent fraud by reprinting and redeeming a ticket that was previously issued by the gaming device.
- b) The system has the ability to display the following information, though not necessarily on the ticket:

- total money's worth inserted since last zero credit (including TITO shown separately to cash in); and
- total number of games completed since last zero credit.

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

Section 5: Game requirements

- 38. This section sets out the requirements on the way in which the outcome of a game is determined, the game features that are permitted and the speed of a game.
- 39. We are aware that, in order to make machines successful as products and to meet customer demand, they must be entertaining and offer certain features to keep the interest of customers. We do not wish therefore to restrict game features unless we have concerns that the features are an attempt to bypass stake and prize limits or that the features might breach the licensing objectives. In this section, we have therefore put in place restrictions such as increasing a stake during a game, linking games and 'bonus games'.

Determining the outcome of the game

- 40. The proposed standards require that categories A, B1 and B2 machines determine the result of the game in a random manner, without use of compensators or regulators. Category B3, B4, C and D machines will be permitted to be random or compensated. For both types of machine (random and compensated) we have set a requirement for the game to be random in terms of the prize distribution. For compensated machines, we require that the types of games offered are fair, non-predictable and transparent to players.
- 41. In the interests of fairness and openness, customers should be able to identify whether they are playing a random or compensated machine. Although it is difficult to explain the nature of a gaming machine on a small sign in a meaningful way, we believe it is important to do so. We recognise that this information will be most relevant to regular players. This requirement will be set out in the section of the standards relating to display requirements.

Game cycle speed

- 42. The Commission (and DCMS) is concerned with the development of machines which have a very short game duration or where more than one game is played simultaneously. We have therefore chosen to define what constitutes a single game (see standard 5.6), specify that only one game may be played at once and with the exception of category B2 devices set a minimum speed for each game of no less than 2.5 seconds (see standard 5.7). This is similar to the speed of play which is in place internationally. We intend to consult the industry further regarding the minimum game speed requirements for category B2 and the associated single game definition.
- 43. As drafted, the standards would place some restrictions on the feature of autoplay, where a customer starts the machine and the machine plays until some action is taken by the customer to halt play, or until all the credits that have been committed to play are exhausted. We understand that in its forthcoming consultation on section 240 regulations, DCMS intends to consult on alternative measures or restrictions that would apply to autoplay in various types of machines. We will amend this section once DCMS has received responses to that consultation and confirmed the content of the 240 regulations.

Other game features

44. The restrictions on other game features are set out at section 5.9 – 5.15 of the draft standards below.
45. Staking additional credits once the game has commenced will be prohibited (5.12), though we do not intend to prevent games that offer a variable stake prior to commencement such as multi-line type reel games, so long as total stake is within the maximum stake limit for the relevant category of machine. There may be circumstances in which exceptions to this rule should be made – for example a machine which offers a game of blackjack, in which, as in current machines, the customer is offered the chance to spilt (double) the stake. We would welcome representations on the types of games where an exception might be made. The rules with regards pre-gambles, a feature currently in operation in the market, have been carried over into section 5.13 of these standards, though in future, they will be considered to be part of the single game and will therefore have to comply with section 5.7 of these standards (speed of play).
46. Games that carry over features or elements from one game to another, also known as game links, are frequently used as a way of increasing enjoyment of the game. Such a feature can be adapted to combine a series of prizes so that the total breaches the maximum prize level for a single game, or to imply to the customer that a higher prize is available. For this reason, we have introduced an additional requirement that game links cannot be used to automatically repeat a win or other feature (see section 5.14 of these standards)

TECHNICAL STANDARD PROVISION

All categories of gaming machine

5.0 Specific game requirements

5.1 General requirement (random machines only – categories A, B1 and B2 must be random)

A gaming device at a minimum will contain embodiment of randomness in determination of prizes, contain some form of activation to initiate the selection process, and contain a methodology for delivery of the determined outcome. The use of compensators or regulators to determine any stage of the game outcome is not permitted in any form.

5.2 General requirement (compensated machines only – categories B3, B4, C and D may be random or compensated)

A gaming device at a minimum will contain embodiment of randomness in determination of prizes, contain some form of activation to initiate the selection process, and contain a methodology for delivery of the determined outcome.

5.3 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 denoted by the game.

A gaming device shall use appropriate communication protocols to protect the random number generator and random selection process from influence by associated equipment, which may be communicating with the gaming device. The RNG shall be protected from external influences, such as from electromagnetic and electrostatic interference and radio waves.

The game shall not substitute a particular type of loser to show to the player. This would eliminate the possibility of simulating a 'Near Miss' scenario where the odds of the top award symbol landing on the pay line are limited but frequently appear above or below the pay line.

The selection process:

- a) shall be uniformly distributed over the entire output range and pass appropriate statistical tests;
- b) must be unpredictable in output ie it must be computationally infeasible to predict what the next number will be, given complete knowledge of the algorithm or hardware generating the sequence, and all previously generated numbers; and
- c) must 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.

Unless otherwise denoted on the screen or machine, where the gaming device plays a game that is recognisable such as Poker, Blackjack, Roulette, and is described as such by title or visually, the same probabilities and rules associated with the live game shall be evident in the simulated game. For other gaming devices (such as spinning reel games or video spinning reel games), the mathematical probability of a symbol appearing in a position in any game outcome shall be constant.

5.4 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 document with the exception of requirements dedicated only to electronic random number generators. In addition, mechanical based RNG games must meet the following rules:

- a) The mechanical pieces must be constructed of materials to prevent decomposition of any component over time (eg, a ball shall not disintegrate).
- b) The properties of physical items used to choose the selection shall not be altered.
- c) The player shall not have the ability to physically interact or come into physical contact or manipulate the machine physically with the mechanical portion of the game.

5.5 Scaling algorithms

If a random number with a range shorter than that provided by the RNG is required for some purpose within the gaming device, the method of re-scaling, (ie, 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.

If a particular random number selected is outside the range of equal distribution of re-scaling values, it is permissible to discard that random number and select the next in sequence for the purpose of re-scaling.

5.6 The single game definition and rules

A 'game' commences when credit(s) for play is deducted from the player's credit or play meter and as a result they are able or offered the opportunity to gamble. The outcome of any gambling opportunity offered within the game must not be known to the player prior to the stake being taken or committed to play. The stake must be deducted from the credit or play meter prior to the outcome of any gambling opportunity being displayed to the player.

The total prize value that may be awarded within the single game, including that won as a result of any bonus or other feature - such as free games - shall not exceed the statutory maximum.

A game is considered complete when all money or money's worth (initially staked or won within the same game) is either lost or has been delivered in full and is available for collection by the player and that there are no further opportunities to gamble until the next game is initiated.

Only one game may be credited up to the maximum statutory limit at any given time. Before credit(s) for play can be taken in the current game, the previous game must have first been completed in full and the result shown to the player. This section does not preclude the use of multi-line, multi-stake games provided that the total stake and prize do not exceed the statutory maximum for the single game.

5.7 Game speed of play (categories A, B1, B3, B4, C, D)

Each game must take no less than 2.5 seconds to complete.

5.8 Use of compensators and/or regulators (metamorphic games) (for compensated machines only, and only permitted for categories B3, B4, C and D)

The use of compensators or regulators to determine any stage of the game outcome, with the exception of pre-gambles, is permitted provided that the following is complied with;

- a) Each possible permutation or combination of game elements that produces winning or losing game outcomes shall be available for selection at the initiation of each play.
- b) The outcome of any gamble must not be predictable to the player.
- c) Cyclic periods of play are not deliberately introduced and due care is exercised to prevent their inadvertent occurrence.
- d) The chance of winning a prize must not be so adversely affected so as to deliberately create a series of losing (raking periods) or winning games (enriched periods).
- e) The prize distribution should not differ significantly from that which would be expected from a random device with a similar game characteristic.

The game shall not substitute a particular type of loser to show to the player. This would eliminate the simulation of a 'Near Miss' scenario where the odds of the top award symbol landing on the pay line are limited but frequently appear above or below the pay line.

5.9 Live jackpots

Except for a single live jackpot feature, no stand alone machine shall offer prizes which increase or appear to increase from one game to the next other than on a random 50% basis. The live jackpot shall not be linked to any other gaming device and must comply with the following rules:

- a) The true value of the live jackpot (the prize value which may be won within the game) and any reserve used shall be displayed to the player at all times and must be available in every game. It may only be won by means of a random outcome within the game.
- b) The live jackpot and its reserve must start off from zero (except after a win when the live jackpot has been immediately replenished by the value in the reserve) and be incremented in proportion to the number of games played. It is not a requirement for the live jackpot and reserve to be incremented in unison or at the same rate.
- c) The prize award 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 single game) cannot exceed the statutory maximum.
- d) If an alternative prize option (other than a prize of no value) 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, regardless of whether the live jackpot is delivered directly or is subject to some intervening gamble or skill feature.

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 (random machines only)

The Double up or Gamble options shall have a theoretical return to the player of that displayed or implied.

5.11 Bonus games

If a game cycle contains a 'bonus feature' including a game within a game, the following rules shall be met:

- a) It shall 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 shall display to the player sufficient information to indicate the current status towards the triggering of the next bonus game (eg 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 any point).
- c) The game shall not adjust the likelihood of a bonus occurring, based on the history of prizes obtained in previous games, unless denoted otherwise as in the case of compensated devices.
- 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 shall not deteriorate as the game progresses (eg, for identical events/symbols it is not permitted that the last few events/symbols needed are more difficult to obtain than the previous events/symbols of that kind), unless denoted otherwise as in the case of compensated devices.
- e) It shall be transparent to the player that the game is in a bonus mode.

5.12 Additional credit(s) staked during the game

Machines must not permit players to stake any additional credits in a game once play has started (ie the point at which a stake(s) has been deducted from the player's credit or play meter and they are able or offered the opportunity to gamble). This does not prevent the use of multi-stake, multi-

line game configurations where the player is able to alter the value of the stake per line prior to the game starting.

5.13 Pre-gamble

Where the player is given the opportunity at the start of the game to enter into a gamble (pre-gamble), and the prizes available or the odds of achieving those prizes is linked to the odds of a successful outcome of the pre-gamble, the following shall be complied with:

- a) The player must always be given the option at the start of the game to use the pre-gamble or not (and must always be given the option not to do so).
- b) The odds of achieving a prize when not using the pre-gamble should not be so adversely affected so as to unduly influence the player 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 natural odds, player get what he sees, and there can 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 normally expected.
- e) Following a 10 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 a previous game is either held over or made reference to (recreated) in the current game (eg reel band holds). Links between games are not permissible unless they comply with the following:

- a) Any reference or link made to any previous game must occur randomly.
- b) The percentage chance of being awarded a link to the previous game shall be 50% or less.
- c) The player must not be aware of whether a link will be given or have the opportunity to use it before he commits himself to the game.
- d) 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 the gaming device

- a) The methodology used to select and discard a particular game for play on a multi-game device 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 shall 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, can be changed only by a secure method, agreed with the Commission and/or its agent, which 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 RAM clear control requirements for these types of

selections. However, for games that keep the previous pay table's (the pay table just turned off) data in memory, a RAM clear is not required.

- 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.

Section 6: Error requirements

47. In common with other jurisdictions, and in particular the US and Australia, we will require that a gaming machine be able to detect when an error has occurred that could potentially affect game play, in which case it must be capable of alerting the operator to the situation (see also section 1.3 of these standards - Gaming device alarm/alert requirements).
48. The specific conditions that will require the operator to be alerted when a fault occurs are set out in sections 6.1, 6.2, and 6.3 of these standards for general conditions, printer and note acceptors respectively.

TECHNICAL STANDARD PROVISION

All categories of gaming machine

6.0 Specific error conditions and alert requirements

6.1 General alert conditions

The devices shall be capable of detecting, displaying and alerting the operator to the error conditions listed below. They shall be cleared either by an attendant or upon initiation of a new play sequence and where applicable be communicated to an on-line monitoring and control system:

- a) coin-in jam;
- b) coin-out jam;
- c) hopper empty or timed out;
- d) hopper runaway or extra coin paid out;
- e) RAM error;
- f) low RAM battery, for batteries external to the RAM itself or low power source;
- g) currency-in jam;
- h) program error or authentication mismatch;
- i) door open (including note acceptor);
- j) reverse coin-in (coin travelling the wrong way through acceptor);
- k) reel spin errors, including a miss-index condition for rotating reels, that affect the outcome of the game:
 - the specific reel number shall be identified in the error code;
 - 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
 - microprocessor controlled reels shall 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; and
- l) power reset.

NOTE: This rule also applies to the 'Note Acceptor Error Conditions'.

For games that use error codes, a description of gaming device error codes and their meanings shall be affixed inside the gaming device. This does not apply to video based games; however, video based games shall display meaningful text as to the error conditions.

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/paper low;
- b) presentation error;
- 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 device and/or note acceptor shall 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 – the note acceptor should disable itself to accept no more bills. 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;
- d) stacker door open or stacker removed.

The note acceptor device shall perform a self-test at each power up. In the event of a self-test failure, the note acceptor shall automatically disable itself (ie enter note reject state) until the error state has been cleared.

Section 7: Meter requirements

49. DCMS is preparing a formal consultation on the proposals for regulations under section 240 of the Act. In that consultation it intends to set out proposals for the way in which money may be deposited to the machine, committed to play and winnings re-staked. We will amend this section of the standards once the position for section 240 regulations has been settled.
50. In the meantime, this section sets out the requirements for internal metering of the stakes, game action, prizes won, and access to the machine.
51. Section 7.2 sets out the intended requirements for electronic accounting and meters for categories A and B1. We consider that some or all of requirements will be appropriate for categories B2, B3, B4, C and D, but we wish to discuss during this consultation the appropriate metering requirements for each individual category. We will wish to take account of proposals for compliance and enforcement and the different operational environment for different types of venue.

TECHNICAL STANDARD PROVISION

All categories of gaming machine

7.0 Meter requirements

7.1 Credits used to initiate a new game

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. It is not permissible to do so from any other source. The player shall have the option to view any funds held in such a meter as a monetary value.

The above section will be reviewed once the content of regulations under section 240 of the Act has been settled.

7.2 Electronic accounting and occurrence meters (categories A and B1)

Electronic accounting meters shall be at least eight (8) digits in length. If the meter is being used in pounds (£) and pence, at least eight (8) 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 required electronic meters are as follows (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 the game that are subsequently risked in a double up mode.
- b) The coins-out* (OR credit out) meter shall cumulatively count all amounts won by the player at the end of the game, that were not paid by an attendant, including amounts paid by a

ticket printer. This meter must not increment for bills inserted and cashed out (ie when the device is used as a change machine).

- c) The drop* meter shall maintain a cumulative count of the number of coins that have been diverted into a drop bucket and credit value of all bills and tickets/coupons inserted into the bill acceptor for play. It is acceptable to have separate 'drop' meters for coins, bills, 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 shall display the cumulative number of games played since the last RAM clear.
- f) A cabinet door meter shall display the number of times the front cabinet door was opened since the last RAM clear.
- g) The drop door meter shall display the number of times the drop door or the bill acceptor door was opened since the last RAM clear.
- h) The progressive occurrence meter shall count the number of times each progressive meter (see section 9 of this document for requirements relating to progressives) is activated.

7.3 Metering of note acceptor events

A gaming device, which contains a note acceptor device, shall maintain sufficient electronic metering to 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:
 - for notes, the game shall report the number accepted for each denomination;
 - for all other notes (non legal tender), the game shall have a separate meter that reports the number of accepted;
 - denomination of the last five (5) notes inserted.

7.4 Multi-game, game specific meters

In addition to the electronic accounting meters required above, each individual game available for play shall have at least 'Credits Bet' and 'Credits Won' meters 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 can be separate meters that accounts for the double-up or gamble information, either way, the method of metering must be transparent.

7.5 Door open/close metering

The gambling 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.

Section 8: Display requirements

52. It is intended that this section on display requirements will work closely with regulations set by DCMS. For categories A, B1, B2, B3, B4 and C, it will be a requirement to display at a minimum:
- information on where to get help for problem gambling;
 - a statement on the nature of the machine – ie whether it is random or compensated;
 - information on the percentage return to player; and
 - a notice identifying the machine as suitable for 18s and over.
53. We recognise that all of these issues are difficult to explain, especially within a limited display space and in an environment where customers will only be willing to read short and succinct messages. Therefore, we are gathering views on what the exact content of the display notices should be - we would welcome responses on this issue as part of this consultation.
54. We are also considering what information a category D machine should display, and again would welcome views on this issue as part of this consultation.

TECHNICAL STANDARD PROVISION

All categories of gaming machine

8.0 Artwork and game display requirements

8.1 Terminal/ pay glass/ video display

This section will set out the display requirements. Please see paragraph 51 above which sets out some of the requirements we are considering and some issues on which we would welcome views as part of the responses to the consultation.

8.2 Information to be displayed

A gaming device shall display, or shall have displayed on the machine or screen, information to enable the player to keep track of their gambling. As a minimum, the following information shall be available to the player at all times the machine is available for player input:

- a) the player's current bank balance (where relevant);
- b) number of plays available or current credit balance;
- c) the current stake;
- d) all possible winning outcomes, or be available as a menu item or on the help menu;
- e) win amounts for each possible winning outcome, or be available as a menu or help screen item;
- f) the amount won for the last completed game; and
- g) the player options selected (eg total stake, lines played) for the last completed game (until the next game starts or a new selection is made).

8.3 Multi-line games

- a) Each individual line to be played shall be clearly indicated by the gaming 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 discernable to the player. (For example, 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.)

Section 9: Progressives in casinos

55. This section sets out the rules for linked machines used in casinos to provide play affording progressive jackpots. The standards used here have been extracted from standards which are set in various American states, and will form a basis for discussions with the industry and others about the form of progressives that will be appropriate in British casinos.

TECHNICAL STANDARD PROVISION

All categories of gaming machine

9.1 General statement

A linked progressive gaming device means a *gaming device that has an increasing jackpot, based on a proportion of the credits staked and is linked to more than one gaming machine.*

9.2 Software requirement: program storage medium identification

Any program medium (ROMs, EPROMs, FLASH ROMs, DVD and CD-ROM) used in a progressive gaming device shall be uniquely identified, displaying:

- a) program ID number;
- b) manufacturer;
- c) version number;
- d) type and size of medium (unless located on the medium as purchased unused from the supplier);
- e) a unique signature (for medium other than EPROM, a hashing algorithm shall be used); and
- f) issue/installation date.

9.3 Progressive displays

A display meter(s) shall be visible to all players who are playing a device which may potentially win the progressive amount if the appropriate combination appears. It shall be transparent to the player that he or she is playing a progressive device.

The progressive meter shall display the current total of the progressive jackpot in the monetary value. It is appreciated that the polling cycle causes some delay so that the jackpot meter will not reflect precisely the actual monies in the progressive pool at each instance, but they should be designed to maximise the frequency at which it will be updated.

Where multiple items of information are displayed on a progressive meter, it is sufficient to have the information displayed in an alternating fashion provided that the monetary value that is available to win is transparent to the player.

Any device that has a feature that doubles or triples, etc any win shall have a sign that states the progressive award will not be doubled or tripled if won during the feature, if this is the intention.

9.4 Types of updating displays

The use of odometer and other 'paced' updating displays are allowed. The progressive meter shall display the winning value within 30 seconds of the jackpot being recognised by the central system. In the case of the use of paced updating displays, the system jackpot meter shall display the winning value after the jackpot broadcast is received from the central system.

9.5 Progressive display digital limitations

If the progressive meter(s) progresses to its maximum display amount, the meter shall freeze and remain at the maximum value until awarded to a player. This can be avoided by setting the jackpot limit in accordance with the digital limitations of the sign (expected trigger amount should be less than the maximum display value). The Gambling Commission may set the order of magnitude that the display meter has to be greater than the expected trigger amount.

9.6 Progressive controller requirement

A progressive controller is all of the hardware and software:

- a) that controls all communications between progressive gaming devices and gaming machines;
- b) that calculates the value of the progressive prizes;
- c) that displays the value of those prizes appropriately; and
- d) associated progressive metering.

9.7 Setting the jackpot amount

The method by which system jackpot parameter values are modified or entered is to be secure. All progressive gaming devices or any approved progressive system component shall display, upon request, the following information for each progressive prize offered (if applicable):

- a) current value: current prize amount;
- b) overflow: amount exceeding limit;
- c) hits: number of times this progressive was won;
- d) wins: total value of wins for this progressive or a history of the last 25 progressive hits;
- e) base: starting value;
- f) limit: jackpot limit value (if the jackpot is capped at a maximum limit, it is not required to add the overflow amounts to the next starting value);
- g) increment: percentage increment rate;
- h) secondary increment: percentage increment rate after limit is reached;
- i) hidden increment: percentage increment rate for the reserve pool (the next base amount shall be computed or posted to advise the player of this contribution);
- j) reset value: the amount the progressive resets to after the progressive is won; and
- k) the participating gaming devices.

9.8 Progressive controller program interruption

After a program interruption (eg power down), the software shall be able to recover to the state it was in immediately prior to the interruption occurring.

9.9 Progressive resumption

On program resumption, the following procedures shall be performed as a minimum requirement:

- a) Any communications to an external device shall not begin until the program resumption routine, including self-tests, is completed successfully.
- b) Progressive system 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 shall be acceptable if at a comparable level of integrity.
- c) The integrity of all critical memory shall be checked.

9.10 Communication requirements for signalling of a jackpot

There shall be a secure, two-way communication protocol between the progressive controller and any gambling device that is able to participate in the link.

9.11 Monitoring of credits staked

During the 'normal mode' of progressive gaming devices, the progressive controller shall continuously monitor each device on the link for credits staked and shall multiply the same by the rate of progression and denomination in order to determine the correct amounts to apply to the progressive jackpot.

9.12 Access to the progressive controller

Each progressive controller used with a progressive gaming device shall be housed in a secure environment allowing only authorised accessibility.

9.13 Progressive controller required meters

The progressive controller or other approved progressive system component shall keep the following information in non-volatile memory, which shall be displayed on demand:

- a) the number of progressive jackpots won on each progressive level if the progressive display has more than one winning amount;
- b) the cumulative amounts paid on each progressive level if the progressive display has more than one winning amount;
- c) the maximum amount of the progressive payout for each level displayed;
- d) the minimum amount of the progressive payout for each level displayed; and
- e) the rate of progression for each level displayed.

9.14 Controller and display functions during progressive jackpot win

When a progressive jackpot win is recorded on a gambling device, which is linked to the progressive controller, the progressive controller shall allow for the following to occur on the device and/or progressive display:

- a) display of the winning amount;
- b) display of the electronic gaming device identification that caused the progressive meter to activate;
- c) the progressive controller shall automatically reset to the reset amount and continue normal play; and
- d) display the new progressive values.

9.15 Progressive controller error conditions

When a progressive controller error occurs, it is preferred that it alternates the displays, or equivalent, between the current amount and an appropriate error message that is visible to all players, or can alert the casino to the error condition. The game in progress is to be disabled, and an error shall be displayed that is transparent to all players who may participate in a game linked to the progressive prize if the following events occur:

- a) during a communication failure;
- b) when there have been multiple communication errors;
- c) when a controller checksum or signature has failure;
- d) when a controller's RAM or PSD (program storage device) mismatch or failure occurs;
- e) when the current amount is larger than the limit, see also 'jackpot limits, below';
- f) when the jackpot configuration is lost or is not set;
- g) if there has been an unfeasible amount of credits staked (as defined by the parameters of the progressive set-up based on the number of machines to the amount staked ratio); and
- h) if the gaming machine and the controller's meters do not reconcile.

9.16 Transferring of progressive jackpot

The progressive controller shall have a secure means of transferring a progressive jackpot win to the appropriate device.

9.17 Jackpot limits

Where limits on jackpots are imposed via the configuration of the progressive gaming device those limits shall be made transparent to the player prior to play.

9.18 Time limits

A progressive controller may have the ability to limit the time during which a progressive jackpot is available. The rules applying to such time limits shall be made transparent to the player prior to play.

9.19 Swapping progressive levels

When a winning combination may be evaluated as more than one of the available pay table combinations, the player must be paid the highest possible progressive value.

9.20 Gaming device requirements when any progressive is awarded

When a progressive prize has been awarded, the gaming device or other appropriate device shall perform the following:

- a) an appropriate message shall be displayed;
- b) unless the prize is transferred to the player's gaming machine, the software and game shall lockup until the award has been paid by the attendant; and
- c) all progressive related meters must be updated.

9.21 Progressive gaming device metering requirements

Progressive wins may be transferred to the player's machine in a manner that is transparent, and all applicable metering must be updated accordingly.

Next steps

- 56. As stated in the introduction, there are some areas of machine technical standards where further discussion is needed before the content can be finalised. We intend to carry out these discussions during June and July 2006.
- 57. We will also be working further on the testing processes that will apply to various categories of machine and will issue a separate consultation on those processes later in the year.
- 58. It is intended that compliance with the Commission's technical standards will be a requirement from 1 September 2007. Working with DCMS, the Commission will consider the arrangements that should apply to machines which are already in the market and whether any aspects of the standards cannot or should not be applied to those machines. We would welcome your views on this issue as part of your response.

Responses to this document and further information

- 59. For more information on the Commission, including on licence conditions and codes of practice, please visit www.gamblingcommission.gov.uk
- 60. The consultation period will close on 15 August.

Please send your comments to **consultation@gamblingcommission.gov.uk**, or by post to:

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