# Analysis <br> of 

## Pai Gow Mania

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## Analysis of Pai Gow Mania

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## Description of Pai Gow Mania:

Pai Gow Mania is a variant of the approved casino game of Pai Gow Poker. In Pai Gow Mania, the Player may make one or both of the optional sidebets. The first, call the Three Card Bonus is based on the first 3 cards the Player is dealt. The second, the Pai Gow Bonus is based on the Player's entire hand. For the purposes of the Pai Gow Bonus, it does NOT matter how the Player set his hand for the showdown against the Dealer. The Player will be paid if his best 5 out of 7cards can achieve one of the hands shown on the paytable - with the exception of the 6-Card Royal and 7-Card Royal, which obviously require 6 or 7 cards, respectively.

Appendix A shows a variant of the paytables in which the Player can also be paid IF the Dealer's hand is of sufficiently low rank.

Pai Gow Mania is played using a 53-card deck, consisting of a Joker plus a standard 52-card deck. The Joker may be used to complete any 5-Card Royal Flush, Straight Flush, Flush or Straight or be used as an Ace. This rule is true for both the base Pai Gow wager and each of the optional sidebets.

The following Three Card Bonus paytables can be used for Pai Gow Mania:

| Hand | PGM3-01 | PGM3-02 | PGM3-03 | PGM3-04 |
| :--- | ---: | ---: | ---: | ---: |
| 3-Card Natural Royal Flush | NA | NA | 100 | 100 |
| 3-Card Natural Straight Flush | 40 | 40 | 40 | 40 |
| Three of a Kind | 30 | 25 | 30 | 25 |
| Straight Flush | 5 | 5 | 5 | 5 |
| Straight | 4 | 4 | 4 | 4 |
| Flush | 3 | 3 | 3 | 3 |
| Pair | 1 | 1 | 1 | 1 |
| Payback | $96.1410 \%$ | $94.9031 \%$ | $97.1655 \%$ | $95.9276 \%$ |
| House Advantage | $3.8590 \%$ | $5.0969 \%$ | $2.8345 \%$ | $4.0724 \%$ |
| Hit Frequency | $27.5164 \%$ | $27.5164 \%$ | $27.5164 \%$ | $27.5164 \%$ |

All payouts are "To 1"

The following Pai Gow Bonus paytables can be used for Pai Gow Mania:

| Hand | PGM-A | PGM-B | PGM-C | PGM-D | PGM-E | PGM-F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 7-Card Natural Royal Flush | NA | NA | NA | \$25,000 | \$25,000 | \$25,000 |
| 6-Card Natural Royal Flush | NA | NA | NA | \$5,000 | \$5,000 | \$5,000 |
| Five Aces | 1000 | 500 | 500 | 1000 | 500 | 500 |
| Royal Flush | 250 | 250 | 200 | 250 | 250 | 200 |
| Straight Flush | 50 | 50 | 40 | 50 | 50 | 40 |
| Four of a Kind | 25 | 25 | 25 | 25 | 25 | 25 |
| Full House | 5 | 5 | 5 | 5 | 5 | 5 |
| Flush | 4 | 4 | 4 | 4 | 4 | 4 |
| Three of a Kind | 3 | 3 | 3 | 3 | 3 | 3 |
| Straight | 2 | 2 | 2 | 2 | 2 | 2 |
| Payback | 93.9991\% | 93.6333\% | 91.5865\% | 94.6304\% | 94.2645\% | 92.2238\% |
| House Advantage | 6.0009\% | 6.3667\% | 8.4135\% | 5.3696\% | 5.7355\% | 7.7762\% |
| Win Frequency | 19.1944\% | 19.1944\% | 19.1944\% | 19.1944\% | 19.1944\% | 19.1944\% |

All payouts are "TO 1" except for 6-Card and 7-Card Natural Royals which are fixed payouts

| Hand | PGM-G | PGM-H | PGM-I | PGM-J |
| :---: | :---: | :---: | :---: | :---: |
| 7-Card Natural Royal Flush | NA | NA | \$25,000 | \$25,000 |
| 6-Card Natural Royal Flush | NA | NA | \$5,000 | \$5,000 |
| Five Aces | 500 | 500 | 500 | 500 |
| Royal Flush | 200 | 200 | 200 | 200 |
| Natural Straight Flush | 50 | 50 | 50 | 50 |
| Joker Straight Flush | 30 | 30 | 30 | 30 |
| Four of a Kind | 25 | 25 | 25 | 25 |
| Full House | 5 | 6 | 5 | 6 |
| Flush | 4 | 4 | 4 | 4 |
| Three of a Kind | 3 | 3 | 3 | 3 |
| Straight | 2 | 2 | 2 | 2 |
| Payback | 90.8899\% | 93.6072\% | 91.5272\% | 94.2445\% |
| House Advantage | 9.1101\% | 6.3928\% | 8.4728\% | 5.7555\% |
| Win Frequency | 19.1944\% | 19.1944\% | 19.1944\% | 19.1944\% |

All payouts are "TO 1" except for 6-Card and 7-Card Natural Royals which are fixed payouts

## Analysis Methodology:

A computer program was created that dealt each of the 154,143,080 unique 7 -card hands that can be dealt from a 53 -card deck (standard 52 card deck plus a Joker). The computer program ranked each hand according to the highest possible 5-card Poker hand that could be created from each.

In the case of a Royal Flush, the program went further to check for a 6-Card or 7-Card Natural Royal Flush for the paytables that utilize these hands.

## Results:

## Three Card Bonus

The frequencies of the winning hands are shown in the table below:

| Three Card Bonus Hands |  |  |
| :--- | ---: | ---: |
| Hand |  | Occurrences |
| Frequency |  |  |
| 3-Card Natural Royal Flush | 4 | $0.0171 \%$ |
| 3-Card Natural Straight Flush | 44 | $0.1878 \%$ |
| Three of a Kind | 58 | $0.2476 \%$ |
| Straight Flush | 100 | $0.4269 \%$ |
| Straight | 1020 | $4.3541 \%$ |
| Flush | 1308 | $5.5835 \%$ |
| Pair | 3912 | $16.6994 \%$ |

The payback of the wager can be calculated by multiplying the frequencies shown above by the payout of each winning hand (including the return of the original wager). These calculations are shown in the tables below:

| Payback Calculation PGM3-01 |  |  |  |
| :--- | ---: | ---: | ---: |
| Hand | Frequency | Pays* | Contribution |
| 3-Card Natural Straight Flush | $0.2049 \%$ | 41 | $8.4009 \%$ |
| Three of a Kind | $0.2476 \%$ | 31 | $7.6752 \%$ |
| Straight Flush | $0.4269 \%$ | 6 | $2.5613 \%$ |
| Straight | $4.3541 \%$ | 5 | $21.7707 \%$ |
| Flush | $5.5835 \%$ | 4 | $22.3342 \%$ |
| Pair | $16.6994 \%$ | 2 | $33.3988 \%$ |
| Total |  |  |  |
| $\mathbf{2 7 . 5 1 6 4 \%}$ |  |  |  |
| House Advantage | $\mathbf{3 . 8 5 9 0 \%}$ |  |  |

* Includes the return of the original wager

| Payback Calculation PGM3-02 |  |  |  |
| :--- | ---: | ---: | ---: |
| Hand | Frequency | Pays* | Contribution |
| 3-Card Natural Straight Flush | $0.2049 \%$ | 41 | $8.4009 \%$ |
| Three of a Kind | $0.2476 \%$ | 26 | $6.4373 \%$ |
| Straight Flush | $0.4269 \%$ | 6 | $2.5613 \%$ |
| Straight | $4.3541 \%$ | 5 | $21.7707 \%$ |
| Flush | $5.5835 \%$ | 4 | $22.3342 \%$ |
| Pair | $16.6994 \%$ | 2 | $33.3988 \%$ |
| Total |  |  | $\mathbf{2 7 . 5 1 6 4 \%}$ |
| $\mathbf{9 4 . 9 0 3 1 \%}$ |  |  |  |
| House Advantage |  |  |  |

* Includes the return of the original wager

| Payback Calculation PGM3-03 |  |  |  |
| :--- | ---: | ---: | ---: |
| Hand | Frequency | Pays* | Contribution |
| 3-Card Natural Royal Flush | $0.0171 \%$ | 101 | $1.7246 \%$ |
| 3-Card Natural Straight Flush | $0.1878 \%$ | 41 | $7.7008 \%$ |
| Three of a Kind | $0.2476 \%$ | 31 | $7.6752 \%$ |
| Straight Flush | $0.4269 \%$ | 6 | $2.5613 \%$ |
| Straight | $4.3541 \%$ | 5 | $21.7707 \%$ |
| Flush | $5.5835 \%$ | 4 | $22.3342 \%$ |
| Pair | $16.6994 \%$ | 2 | $33.3988 \%$ |
|  | $\mathbf{2 7 . 5 1 6 4 \%}$ |  | $\mathbf{9 7 . 1 6 5 5 \%}$ |
| House Advantage |  |  |  |

* Includes the return of the original wager

| Payback Calculation PGM3-04 |  |  |  |
| :--- | ---: | ---: | ---: |
| Hand | Frequency | Pays* | Contribution |
| 3-Card Natural Royal Flush | $0.0171 \%$ | 101 | $1.7246 \%$ |
| 3-Card Natural Straight Flush | $0.1878 \%$ | 41 | $7.7008 \%$ |
| Three of a Kind | $0.2476 \%$ | 26 | $6.4373 \%$ |
| Straight Flush | $0.4269 \%$ | 6 | $2.5613 \%$ |
| Straight | $4.3541 \%$ | 5 | $21.7707 \%$ |
| Flush | $5.5835 \%$ | 4 | $22.3342 \%$ |
| Pair | $16.6994 \%$ | 2 | $33.3988 \%$ |
|  | $\mathbf{2 7 . 5 1 6 4 \%}$ |  | $\mathbf{9 5 . 9 2 7 6 \%}$ |
| House Advantage |  |  |  |

* Includes the return of the original wager


## Pai Gow Bonus

The frequencies of the winning hands are shown in the table below:

| Pai Gow Bonus Hands |  |  |
| :---: | :---: | :---: |
| Hand | Occurrences | Frequency |
| 7-Card Natural Royal Flush | 4 | 0.000003\% |
| 6-Card Natural Royal Flush | 184 | 0.000119\% |
| Five Aces | 1,128 | 0.0007\% |
| Royal Flush | 25,944 | 0.0168\% |
| Natural Straight Flush | 38,728 | 0.0251\% |
| Joker Straight Flush | 146,104 | 0.0948\% |
| Four of a Kind | 307,472 | 0.1995\% |
| Full House | 4,188,528 | 2.7173\% |
| Flush | 6,172,088 | 4.0041\% |
| Three of a Kind | 7,672,500 | 4.9775\% |
| Straight | 11,034,204 | 7.1584\% |

The payback of the wager can be calculated by multiplying the frequencies shown above by the payout of each winning hand (including the return of the original wager). These calculations are shown in the tables below:

This payback calculation for each paytable is shown in the tables below:

| Payback Calculation PGM-A |  |  |  |  |  |  |  |
| :--- | ---: | ---: | ---: | :---: | :---: | :---: | :---: |
| Hand | Frequency | Pays* | Contribution |  |  |  |  |
| Five Aces | $0.0007 \%$ | 1001 | $0.7325 \%$ |  |  |  |  |
| Royal Flush | $0.0170 \%$ | 251 | $4.2552 \%$ |  |  |  |  |
| Straight Flush | $0.1199 \%$ | 51 | $6.1154 \%$ |  |  |  |  |
| Four of a Kind | $0.1995 \%$ | 26 | $5.1863 \%$ |  |  |  |  |
| Full House | $2.7173 \%$ | 6 | $16.3038 \%$ |  |  |  |  |
| Flush | $4.0041 \%$ | 5 | $20.0206 \%$ |  |  |  |  |
| Three of a Kind | $4.9775 \%$ | 4 | $19.9101 \%$ |  |  |  |  |
| Straight | $7.1584 \%$ | 3 | $21.4753 \%$ |  |  |  |  |
| Total |  |  |  |  | $\mathbf{1 9 . 1 9 4 4 \%}$ |  | $\mathbf{9 3 . 9 9 9 1 \%}$ |
| House Advantage |  |  |  |  |  |  |  |

* Includes the return of the original wager

| Payback Calculation PGM-B |  |  |  |
| :--- | ---: | ---: | ---: |
| Hand | Frequency | Pays* | Contribution |
| Five Aces | $0.0007 \%$ | 501 | $0.3666 \%$ |
| Royal Flush | $0.0170 \%$ | 251 | $4.2552 \%$ |
| Straight Flush | $0.1199 \%$ | 51 | $6.1154 \%$ |
| Four of a Kind | $0.1995 \%$ | 26 | $5.1863 \%$ |
| Full House | $2.7173 \%$ | 6 | $16.3038 \%$ |
| Flush | $4.0041 \%$ | 5 | $20.0206 \%$ |
| Three of a Kind | $4.9775 \%$ | 4 | $19.9101 \%$ |
| Straight | $7.1584 \%$ | 3 | $21.4753 \%$ |
| Total |  |  |  |
| House Advantage |  |  |  |

* Includes the return of the original wager

| Payback Calculation PGM-C |  |  |  |
| :--- | ---: | ---: | ---: |
| Hand | Frequency | Pays* | Contribution |
| Five Aces | $0.0007 \%$ | 501 | $0.3666 \%$ |
| Royal Flush | $0.0170 \%$ | 201 | $3.4076 \%$ |
| Straight Flush | $0.1199 \%$ | 41 | $4.9163 \%$ |
| Four of a Kind | $0.1995 \%$ | 26 | $5.1863 \%$ |
| Full House | $2.7173 \%$ | 6 | $16.3038 \%$ |
| Flush | $4.0041 \%$ | 5 | $20.0206 \%$ |
| Three of a Kind | $4.9775 \%$ | 4 | $19.9101 \%$ |
| Straight | $7.1584 \%$ | 3 | $21.4753 \%$ |
| Total |  |  |  |
| $\mathbf{1 9 . 1 9 4 4 \%}$ |  |  |  |
|  |  | $\mathbf{9 1 . 5 8 6 5 \%} \%$ |  |

* Includes the return of the original wager

For paytables PGM-D, PGM-E and PGM-F that pay a fixed amount for a 7-Card Natural Royal and 6-Card Natural Royal, a payout of 25001 and 5001 is used, assuming a minimum wager of $\$ 1$. The impact of larger wagers on the payback will be discussed later in the report.

| Payback Calculation PGM-D |  |  |  |
| :--- | ---: | ---: | ---: |
| Hand | Frequency | Pays* | Contribution |
| 7-Card Natural Royal Flush | $0.000003 \%$ | 25001 | $0.0649 \%$ |
| 6-Card Natural Royal Flush | $0.000119 \%$ | 5001 | $0.5970 \%$ |
| Five Aces | $0.0007 \%$ | 1001 | $0.7325 \%$ |
| Royal Flush | $0.0168 \%$ | 251 | $4.2246 \%$ |
| Straight Flush | $0.1199 \%$ | 51 | $6.1154 \%$ |
| Four of a Kind | $0.1995 \%$ | 26 | $5.1863 \%$ |
| Full House | $2.7173 \%$ | 6 | $16.3038 \%$ |
| Flush | $4.0041 \%$ | 5 | $20.0206 \%$ |
| Three of a Kind | $4.9775 \%$ | 4 | $19.9101 \%$ |
| Straight | $7.1584 \%$ | 3 | $21.4753 \%$ |
|  | $\mathbf{1 9 . 1 9 4 4 \%}$ |  | $\mathbf{9 4 . 6 3 0 4 \%}$ |
| House Advantage |  |  |  |

* Includes the return of the original wager

| Payback Calculation PGM-E |  |  |  |
| :--- | ---: | ---: | ---: |
| Hand | Frequency | Pays* | Contribution |
| 7-Card Natural Royal Flush | $0.000003 \%$ | 25001 | $0.0649 \%$ |
| 6-Card Natural Royal Flush | $0.000119 \%$ | 5001 | $0.5970 \%$ |
| Five Aces | $0.0007 \%$ | 501 | $0.3666 \%$ |
| Royal Flush | $0.0168 \%$ | 251 | $4.2246 \%$ |
| Straight Flush | $0.1199 \%$ | 51 | $6.1154 \%$ |
| Four of a Kind | $0.1995 \%$ | 26 | $5.1863 \%$ |
| Full House | $2.7173 \%$ | 6 | $16.3038 \%$ |
| Flush | $4.0041 \%$ | 5 | $20.0206 \%$ |
| Three of a Kind | $4.9775 \%$ | 4 | $19.9101 \%$ |
| Straight | $7.1584 \%$ | 3 | $21.4753 \%$ |
|  | $\mathbf{1 9 . 1 9 4 4 \%}$ |  | $\mathbf{9 4 . 2 6 4 5 \%}$ |
| House Advantage |  |  |  |

* Includes the return of the original wager

| Payback Calculation PGM-F |  |  |  |
| :---: | :---: | :---: | :---: |
| Hand | Frequency | Pays* | Contribution |
| 7-Card Natural Royal Flush | 0.000003\% | 25001 | 0.0649\% |
| 6-Card Natural Royal Flush | 0.000119\% | 5001 | 0.5970\% |
| Five Aces | 0.0007\% | 501 | 0.3666\% |
| Royal Flush | 0.0168\% | 201 | 3.3831\% |
| Straight Flush | 0.1199\% | 41 | 4.9163\% |
| Four of a Kind | 0.1995\% | 26 | 5.1863\% |
| Full House | 2.7173\% | 6 | 16.3038\% |
| Flush | 4.0041\% | 5 | 20.0206\% |
| Three of a Kind | 4.9775\% | 4 | 19.9101\% |
| Straight | 7.1584\% | 3 | 21.4753\% |
| Total | 19.1944\% |  | 92.2238\% |
| House Advantage |  |  | 7.7762\% |


| Payback Calculation PGM-G |  |  |  |
| :--- | ---: | ---: | ---: |
| Hand | Frequency | Pays* | Contribution |
| Five Aces | $0.0007 \%$ | 501 | $0.3666 \%$ |
| Royal Flush | $0.0170 \%$ | 201 | $3.4076 \%$ |
| Natural Straight Flush | $0.0251 \%$ | 51 | $1.2814 \%$ |
| Joker Straight Flush | $0.0948 \%$ | 31 | $2.9383 \%$ |
| Four of a Kind | $0.1995 \%$ | 26 | $5.1863 \%$ |
| Full House | $2.7173 \%$ | 6 | $16.3038 \%$ |
| Flush | $4.0041 \%$ | 5 | $20.0206 \%$ |
| Three of a Kind | $4.9775 \%$ | 4 | $19.9101 \%$ |
| Straight | $7.1584 \%$ | 3 | $21.4753 \%$ |
| Total |  |  |  |
| $\mathbf{1 9 . 1 9 4 4 \%}$ |  |  |  |
| House Advantage | $\mathbf{9 . 8 8 9 9 \%}$ |  |  |
| * Includes |  |  |  |

* Includes the return of the original wager

| Payback Calculation PGM-H |  |  |  |
| :--- | ---: | ---: | ---: |
| Hand | Frequency | Pays* | Contribution |
| Five Aces | $0.0007 \%$ | 501 | $0.3666 \%$ |
| Royal Flush | $0.0170 \%$ | 201 | $3.4076 \%$ |
| Natural Straight Flush | $0.0251 \%$ | 51 | $1.2814 \%$ |
| Joker Straight Flush | $0.0948 \%$ | 31 | $2.9383 \%$ |
| Four of a Kind | $0.1995 \%$ | 26 | $5.1863 \%$ |
| Full House | $2.7173 \%$ | 7 | $19.0211 \%$ |
| Flush | $4.0041 \%$ | 5 | $20.0206 \%$ |
| Three of a Kind | $4.9775 \%$ | 4 | $19.9101 \%$ |
| Straight | $7.1584 \%$ | 3 | $21.4753 \%$ |
| House Advantage |  |  |  |
| Total |  |  |  |
| $\mathbf{1 9 . 1 9 4 4 \%}$ |  |  |  |
| * Includes the return of the original wager |  |  |  |

For paytables PGM-I and PGM-J that pay a fixed amount for a 7-Card Natural Royal and 6-Card Natural Royal, a payout of 25001 and 5001 is used, assuming a minimum wager of $\$ 1$. The impact of larger wagers on the payback will be discussed later in the report.

| Payback Calculation PGM-I |  |  |  |
| :--- | ---: | ---: | ---: |
| Hand | Frequency | Pays* | Contribution |
| 7-Card Natural Royal Flush | $0.000003 \%$ | 25001 | $0.0649 \%$ |
| 6-Card Natural Royal Flush | $0.000119 \%$ | 5001 | $0.5970 \%$ |
| Five Aces | $0.0007 \%$ | 501 | $0.3666 \%$ |
| Royal Flush | $0.0168 \%$ | 201 | $3.3831 \%$ |
| Natural Straight Flush | $0.0251 \%$ | 51 | $1.2814 \%$ |
| Joker Straight Flush | $0.0948 \%$ | 31 | $2.9383 \%$ |
| Four of a Kind | $0.1995 \%$ | 26 | $5.1863 \%$ |
| Full House | $2.7173 \%$ | 6 | $16.3038 \%$ |
| Flush | $4.0041 \%$ | 5 | $20.0206 \%$ |
| Three of a Kind | $4.9775 \%$ | 4 | $19.9101 \%$ |
| Straight | $7.1584 \%$ | 3 | $21.4753 \%$ |
|  | $\mathbf{1 9 . 1 9 4 4 \%}$ |  | $\mathbf{9 1 . 5 2 7 2 \%}$ |
| House Advantage |  |  |  | $\mathbf{8 . 4 7 2 8 \%}$.

* Includes the return of the original wager

| Payback Calculation PGM-J |  |  |  |
| :--- | ---: | ---: | ---: |
| Hand | Frequency | Pays* | Contribution |
| 7-Card Natural Royal Flush | $0.000003 \%$ | 25001 | $0.0649 \%$ |
| 6-Card Natural Royal Flush | $0.000119 \%$ | 5001 | $0.5970 \%$ |
| Five Aces | $0.0007 \%$ | 501 | $0.3666 \%$ |
| Royal Flush | $0.0168 \%$ | 201 | $3.3831 \%$ |
| Natural Straight Flush | $0.0251 \%$ | 51 | $1.2814 \%$ |
| Joker Straight Flush | $0.0948 \%$ | 31 | $2.9383 \%$ |
| Four of a Kind | $0.1995 \%$ | 26 | $5.1863 \%$ |
| Full House | $2.7173 \%$ | 7 | $19.0211 \%$ |
| Flush | $4.0041 \%$ | 5 | $20.0206 \%$ |
| Three of a Kind | $4.9775 \%$ | 4 | $19.9101 \%$ |
| Straight | $7.1584 \%$ | 3 | $21.4753 \%$ |
|  | $\mathbf{1 9 . 1 9 4 4 \%}$ |  | $\mathbf{9 4 . 2 4 4 5 \%}$ |
| House Advantage |  |  |  | $\mathbf{5 . 7 5 5 5 \%}$.

* Includes the return of the original wager


## The Impact of Larger Wagers

Normally, the size of the wager does not impact the overall payback. However, since a portion of the overall payback is based on a flat dollar amount and not a paytable, larger wagers will reduce the overall payback. In the case of Pai Gow Mania, this applies to the cases where there is a payout for a 7-Card Natural Royal and a 6-Card Natural Royal.

Because these payouts are fixed dollar amounts and not odds payouts, as the wager amount goes up, the equivalent odds payout goes down. Thus if the Player wagers $\$ 1$ and gets a Natural 7Card Royal, he will be paid $\$ 25,000$ or 25,000 to 1 . However, if he wagers $\$ 5$, he will still be paid $\$ 25,000$ but this will equate to 5000 to 1 . This in turn reduces the contribution rate of this hand by $80 \%$ to $1 / 5^{\text {th }}$ of the contribution rate of a $\$ 1$ wager. In the case of Pai Gow Mania, this would reduce the contribution rates of the top two hands to $0.0130 \%$ and $0.1195 \%$, respectively. This reduces the overall payback by $0.5293 \%$. As the wager increases beyond $\$ 5$ the payback will be reduced further. It can NEVER be reduced by more than the $0.6619 \%$ that the two hands contribute to the overall payback with a $\$ 1$ wager.

# Pai Gow Poker Mania Appendix A <br> Alternative Paytables 

Pai Gow Mania can also be offered with a paytable that allows the Player to also be paid if the Banker hand is a 9-High, 10-High or Jack-High hand. This wager will win if either of the following conditions are met:

- The Player can make one of the hands listed in the patyables below. The player may make his hand by using ANY of his 5 cards, regardless of how he sets his Pai Gow hand.
- The Dealer has a Pai Gow hand of a 9 -high, 10 -high or Jack-High. A Pai Gow hand is one that does not contain at least a Pair.

If both conditions are met, then the Player will be paid for BOTH. For example, if the Player has a Four of a Kind and the Dealer has a 10-high hand and paytable IPG-20 is in use, he will be paid 25 to 1 for his Four of a Kind and an additional 20 to 1 for the Dealer's 10-high hand.

Please note, Players bonus payouts on the Dealer / Banker Hand will be based on the Banker or Dealer Hand that the Player's hand is being compared to.

| Additional Paytables |  |  |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: |
| Hand | IPG-20 | IPG-21 | IPG-22 | IPG-23 | IPG-24 | IPG-25 |
| Player Hands |  |  |  |  |  |  |
| Natural 7-Card Royal | $\$ 25000$ | $\$ 25000$ | $\$ 25000$ | $\$ 25000$ | $\$ 25000$ | $\$ 25000$ |
| Natural 6-Card Royal | $\$ 5000$ | $\$ 5000$ | $\$ 5000$ | $\$ 5000$ | $\$ 5000$ | $\$ 5000$ |
| Five Aces | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 5-Card Royal Flush | 200 | 200 | 200 | 200 | 200 | 200 |
| Straight Flush | 50 | 50 | 50 | 50 | 50 | 50 |
| Four of a Kind | 25 | 25 | 25 | 25 | 25 | 25 |
| Full House | 5 | 5 | 5 | 4 | 4 | 5 |
| Flush | 3 | 3 | 3 | 4 | 4 | 4 |
| Three of a Kind | 2 | 2 | 2 | 2 | 2 | 2 |
| Straight | 2 | 2 | 2 | 2 | 2 | 2 |
|  |  |  |  |  |  |  |
| Dealer Hands |  |  |  |  |  |  |
| 9-High | 100 | 100 | 100 | 100 | 100 | 100 |
| 10-High | 20 | 10 | 20 | 20 | 10 | 10 |
| Jack-High | 5 | 5 | 10 | 5 | 5 | 5 |
|  | Payback | $93.8260 \%$ | $92.2130 \%$ | $96.9513 \%$ | $95.1129 \%$ | $93.4998 \%$ |
| House Advantage | $6.1740 \%$ | $7.7870 \%$ | $3.0487 \%$ | $4.8871 \%$ | $6.5002 \%$ | $3.7829 \%$ |
| Win Frequency | $19.8455 \%$ | $19.8455 \%$ | $19.8455 \%$ | $19.8455 \%$ | $19.8455 \%$ | $19.8455 \%$ |

All payouts are 'To 1' except for the 6-Card Royal and 7-Card Royal

## Analysis Methodology:

A computer program was created that dealt each of the 154,143,080 unique 7 -card hands that can be dealt from a 53 -card deck (standard 52 card deck plus a Joker). The computer program ranked each hand according to the highest possible 5-card Poker hand that could be created from each. For any hand that could not make at least a Pair, the highest-ranking card was tabulated to determine the frequency of each of the winning Dealer hands.

A second program was written that simulated 125 million hands dealt (Player AND Dealer) to determine the frequency of when the Player will win for BOTH his own hand AND the Dealer hand. As will be explained in more detail later in this report, this frequency is required to not double count the return of the Player's wager when he wins on both conditions in the same hand.

## Results:

The frequencies of the winning hands are shown in the table below:

| Hand | Occurrences | Frequency |
| :--- | ---: | ---: |
| Player Hands |  |  |
| 7-Card Natural Royal Flush | 4 | $0.000003 \%$ |
| 6-Card Natural Royal Flush | 184 | $0.000119 \%$ |
| Five Aces | 1,128 | $0.0007 \%$ |
| Royal Flush | 25,944 | $0.0168 \%$ |
| Straight Flush | 184,832 | $0.1199 \%$ |
| Four of a Kind | 307,472 | $0.1995 \%$ |
| Full House | $6,188,528$ | $2.7173 \%$ |
| Flush | $7,672,500$ | $4.0041 \%$ |
| Three of a Kind | $11,034,204$ | $4.9775 \%$ |
| Straight |  |  |
|  | $3.1584 \%$ |  |
| Dealer Hands | 248640 | 0.0 |
| 9-High | 963480 | $0.6251 \%$ |
| 10-High |  |  |
| Jack-High |  |  |

As the minimum wager is $\$ 1$, we treat the fixed pays as if they payout at 25000 to 1 and 5000 to 1 respectively. The impact of larger wagers will be described later.

| Payback Calculation IPG-20 |  |  |  |
| :--- | ---: | ---: | ---: |
| Hand | Frequency | Pays | Contribution |
| Player Hands |  |  |  |
| Natural 7-Card Royal | $0.00000259 \%$ | 25001 | $0.0649 \%$ |
| Natural 6-Card Royal | $0.00011937 \%$ | 5001 | $0.5970 \%$ |
| Five Aces | $0.0007 \%$ | 1001 | $0.7325 \%$ |
| 5-Card Royal Flush | $0.0168 \%$ | 201 | $3.3831 \%$ |
| Straight Flush | $0.1199 \%$ | 51 | $6.1154 \%$ |
| Four of a Kind | $0.1995 \%$ | 26 | $5.1863 \%$ |
| Full House | $2.7173 \%$ | 6 | $16.3038 \%$ |
| Flush | $4.0041 \%$ | 4 | $16.0165 \%$ |
| Three of a Kind | $4.9775 \%$ | 3 | $14.9326 \%$ |
| Straight | $7.1584 \%$ | 3 | $21.4753 \%$ |
|  |  |  |  |
| Dealer Hands |  |  |  |
| 9-High | $0.0202 \%$ | 101 | $2.0365 \%$ |
| 10-High | $0.1613 \%$ | 21 | $3.3874 \%$ |
| Jack-High | $0.6251 \%$ | 6 | $3.7503 \%$ |
|  |  |  |  |
| Double Win | $-0.1553 \%$ | 1 | $-0.1553 \%$ |
| $\mathbf{~ H o u s e ~ A d v a n t a g e ~}$ |  |  |  |


| Payback Calculation IPG-21 |  |  |  |
| :---: | :---: | :---: | :---: |
| Hand | Frequency | Pays | Contribution |
| Player Hands |  |  |  |
| Natural 7-Card Royal | 0.00000259\% | 25001 | 0.0649\% |
| Natural 6-Card Royal | 0.00011937\% | 5001 | 0.5970\% |
| Five Aces | 0.0007\% | 1001 | 0.7325\% |
| 5-Card Royal Flush | 0.0168\% | 201 | 3.3831\% |
| Straight Flush | 0.1199\% | 51 | 6.1154\% |
| Four of a Kind | 0.1995\% | 26 | 5.1863\% |
| Full House | 2.7173\% | 6 | 16.3038\% |
| Flush | 4.0041\% | 4 | 16.0165\% |
| Three of a Kind | 4.9775\% | 3 | 14.9326\% |
| Straight | 7.1584\% | 3 | 21.4753\% |
|  |  |  |  |
| Dealer Hands |  |  |  |
| 9-High | 0.0202\% | 101 | 2.0365\% |
| 10-High | 0.1613\% | 11 | 1.7744\% |
| Jack-High | 0.6251\% | 6 | 3.7503\% |
|  |  |  |  |
| Double Win | -0.1553\% | 1 | -0.1553\% |
| Total | 19.8455\% |  | $\mathbf{9 2 . 2 1 3 0 \%}$ |
| House Advantage |  |  | 7.7870\% |


| Payback Calculation IPG-22 |  |  |  |
| :---: | :---: | :---: | :---: |
| Hand | Frequency | Pays | Contribution |
| Player Hands |  |  |  |
| Natural 7-Card Royal | 0.00000259\% | 25001 | 0.0649\% |
| Natural 6-Card Royal | 0.00011937\% | 5001 | 0.5970\% |
| Five Aces | 0.0007\% | 1001 | 0.7325\% |
| 5-Card Royal Flush | 0.0168\% | 201 | 3.3831\% |
| Straight Flush | 0.1199\% | 51 | 6.1154\% |
| Four of a Kind | 0.1995\% | 26 | 5.1863\% |
| Full House | 2.7173\% | 6 | 16.3038\% |
| Flush | 4.0041\% | 4 | 16.0165\% |
| Three of a Kind | 4.9775\% | 3 | 14.9326\% |
| Straight | 7.1584\% | 3 | 21.4753\% |
|  |  |  |  |
| Dealer Hands |  |  |  |
| 9-High | 0.0202\% | 101 | 2.0365\% |
| 10-High | 0.1613\% | 21 | 3.3874\% |
| Jack-High | 0.6251\% | 11 | 6.8756\% |
|  |  |  |  |
| Double Win | -0.1553\% | 1 | -0.1553\% |
| Total | 19.8455\% |  | 96.9513\% |
| House Advantage |  |  | 3.0487\% |


| Payback Calculation IPG-23 |  |  |  |
| :---: | :---: | :---: | :---: |
| Hand | Frequency | Pays | Contribution |
| Player Hands |  |  |  |
| Natural 7-Card Royal | 0.00000259\% | 25001 | 0.0649\% |
| Natural 6-Card Royal | 0.00011937\% | 5001 | 0.5970\% |
| Five Aces | 0.0007\% | 1001 | 0.7325\% |
| 5-Card Royal Flush | 0.0168\% | 201 | 3.3831\% |
| Straight Flush | 0.1199\% | 51 | 6.1154\% |
| Four of a Kind | 0.1995\% | 26 | 5.1863\% |
| Full House | 2.7173\% | 5 | 13.5865\% |
| Flush | 4.0041\% | 5 | 20.0206\% |
| Three of a Kind | 4.9775\% | 3 | 14.9326\% |
| Straight | 7.1584\% | 3 | 21.4753\% |
|  |  |  |  |
| Dealer Hands |  |  |  |
| 9-High | 0.0202\% | 101 | 2.0365\% |
| 10-High | 0.1613\% | 21 | 3.3874\% |
| Jack-High | 0.6251\% | 6 | 3.7503\% |
|  |  |  |  |
| Double Win | -0.1553\% | 1 | -0.1553\% |
| Total | 19.8455\% |  | 95.1129\% |
| House Advantage |  |  | 4.8871\% |


| Payback Calculation IPG-24 |  |  |  |
| :---: | :---: | :---: | :---: |
| Hand | Frequency | Pays | Contribution |
| Player Hands |  |  |  |
| Natural 7-Card Royal | 0.00000259\% | 25001 | 0.0649\% |
| Natural 6-Card Royal | 0.00011937\% | 5001 | 0.5970\% |
| Five Aces | 0.0007\% | 1001 | 0.7325\% |
| 5-Card Royal Flush | 0.0168\% | 201 | 3.3831\% |
| Straight Flush | 0.1199\% | 51 | 6.1154\% |
| Four of a Kind | 0.1995\% | 26 | 5.1863\% |
| Full House | 2.7173\% | 5 | 13.5865\% |
| Flush | 4.0041\% | 5 | 20.0206\% |
| Three of a Kind | 4.9775\% | 3 | 14.9326\% |
| Straight | 7.1584\% | 3 | 21.4753\% |
|  |  |  |  |
| Dealer Hands |  |  |  |
| 9-High | 0.0202\% | 101 | 2.0365\% |
| 10-High | 0.1613\% | 11 | 1.7744\% |
| Jack-High | 0.6251\% | 6 | 3.7503\% |
|  |  |  |  |
| Double Win | -0.1553\% | 1 | -0.1553\% |
| Total | 19.8455\% |  | 93.4998\% |
| House Advantage |  |  | 6.5002\% |


| Payback Calculation IPG-25 |  |  |  |
| :---: | :---: | :---: | :---: |
| Hand | Frequency | Pays | Contribution |
| Player Hands |  |  |  |
| Natural 7-Card Royal | 0.00000259\% | 25001 | 0.0649\% |
| Natural 6-Card Royal | 0.00011937\% | 5001 | 0.5970\% |
| Five Aces | 0.0007\% | 1001 | 0.7325\% |
| 5-Card Royal Flush | 0.0168\% | 201 | 3.3831\% |
| Straight Flush | 0.1199\% | 51 | 6.1154\% |
| Four of a Kind | 0.1995\% | 26 | 5.1863\% |
| Full House | 2.7173\% | 6 | 16.3038\% |
| Flush | 4.0041\% | 5 | 20.0206\% |
| Three of a Kind | 4.9775\% | 3 | 14.9326\% |
| Straight | 7.1584\% | 3 | 21.4753\% |
|  |  |  |  |
| Dealer Hands |  |  |  |
| 9-High | 0.0202\% | 101 | 2.0365\% |
| 10-High | 0.1613\% | 11 | 1.7744\% |
| Jack-High | 0.6251\% | 6 | 3.7503\% |
|  |  |  |  |
| Double Win | -0.1553\% | 1 | -0.1553\% |
| Total | 19.8455\% |  | 96.2171\% |
| House Advantage |  |  | 3.7829\% |

## The Impact of Larger Wagers

Normally, the size of the wager does not impact the overall payback. However, since a portion of the overall payback is based on a flat dollar amount and not a paytable, larger wagers will reduce the overall payback. In the case of Imperial Pai Gow, this applies to the top two paying hands.

Because these payouts are fixed dollar amounts and not odds payouts, as the wager amount goes up, the equivalent odds payout goes down. Thus if the Player wagers $\$ 1$ and gets a Natural 7Card Royal, he will be paid $\$ 25,000$ or 25,000 to 1 . However, if he wagers $\$ 5$, he will still be paid $\$ 25,000$ but this will equate to 5000 to 1 . This in turn reduces the contribution rate of this hand by $80 \%$ to $1 / 5^{\text {th }}$ of the contribution rate of a $\$ 1$ wager. In the case of Imperial Pai Gow, this would reduce the contribution rates of the top two hands to $0.0130 \%$ and $0.1195 \%$, respectively. This reduces the overall payback by $0.5293 \%$. As the wager increases beyond $5 \%$ the payback will be reduced further. It can NEVER be reduced by more than the $0.6619 \%$ that the two hand contribute to the overall payback with a $\$ 1$ wager.

