

Environmental Protection Agency

§ 91.205

model years, or credits obtained through trading.

§ 91.205 Banking.

(a) A manufacturer of a marine SI engine family with an FEL below the applicable emission standard for a given model year may bank credits in that model year for use in averaging and trading in the following three model years. Negative credits must be banked according to the requirements under § 91.207(c). Positive credits not used within the three model years after they are banked are forfeited.

(1) Early banking. (i) For outboard engines in model year (MY) 1997, a manufacturer may bank positive emission credits if the following conditions are met: the manufacturer certifies their entire marine outboard engine product line for MY 1997 under the emission standards applicable to MY 1998, the manufacturer demonstrates compliance with the corporate average standard under § 91.207(b), and the sum of positive and negative credits under § 91.207 generates positive emission credits, when the following formula is used for purposes of the applicable standard in § 91.207(a). The number of credits that may be banked under this paragraph is the number of positive emission credits generated under the provisions of the preceding sentence. Marine engines certified under the provisions of this paragraph are subject to all of the requirements of this part.

**HYDROCARBON PLUS OXIDES OF NITROGEN
EXHAUST EMISSION STANDARDS**
[Grams per kilowatt-hour]

Model year	P<4.3 kW HC+NO _x Emission standard by model year	P>4.3 kW HC+NO _x emission standard by model year
1997 ...	276	$(0.959 \times (151 + 557/P^{0.9}) + 1.22)$

(ii) For personal watercraft engines in model year 1998, a manufacturer may bank positive emission credits if the following conditions are met: The manufacturer certifies their entire marine personal watercraft engine product line for MY 1998 under the emission standards applicable to 1998 model year outboard engine emission standards, the manufacturer demonstrates compliance with the corporate average

standard under § 91.207(b), and the sum of positive and negative credits under § 91.207 generates positive emission credits, when the following formula is used for purposes of the applicable standard § 91.207(a). The number of credits that may be banked under this paragraph is the number of positive emission credits generated under the provisions of the preceding sentence. Marine engines certified under the provisions of this paragraph are subject to all of the requirements of this part.

**HYDROCARBON PLUS OXIDES OF NITROGEN
EXHAUST EMISSION STANDARDS**
[Grams per kilowatt-hour]

Model year	P<4.3 kW HC+NO _x emission standard by model year	P> 4.3 kW HC+NO _x emission standard by model year
1998 ...	276	$(0.959 \times (151 + 557/P^{0.9}) + 1.22)$

(iii) For personal watercraft in model year 1997, a manufacturer may bank positive emission credits if the following conditions are met: the manufacturer certifies their entire marine personal watercraft engine product line for MY 1997 under the emission standards specified in the formula below for PWC, the manufacturer demonstrates compliance with the corporate average standard under § 91.207(b), and the sum of positive and negative credits under § 91.207 generates positive emission credits, when the following formula is used for purposes of the applicable standard in § 91.207(a). The number of credits that may be banked under this paragraph is the number of positive emission credits generated under the provisions of the preceding sentence. Marine engines certified under the provisions of this paragraph are subject to all of the requirements of this part.

**HYDROCARBON PLUS OXIDES OF NITROGEN
EXHAUST EMISSION STANDARDS**
[Grams per kilowatt-hour]

Model year	P<4.3 kW HC+NO _x emission standard by model year	P> 4.3 kW HC+NO _x emission standard by model year
1997 ...	276	$(0.959 \times (151 + 557/P^{0.9}) + 1.22)$

(b) A manufacturer may bank actual credits only after the end of the model

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year and after EPA has reviewed the manufacturer's end-of-year reports. During the model year and before submittal of the end-of-year report, credits originally designated in the certification process for banking will be considered reserved and may be redesignated for trading or averaging in the end-of-year report and final report.

(c) Credits declared for banking from the previous model year that have not been reviewed by EPA may be used in averaging or trading transactions. However, such credits may be revoked at a later time following EPA review of the end-of-year report or any subsequent audit actions.

§91.206 Trading.

(a) A marine SI engine manufacturer may exchange emission credits with other marine SI engine manufacturers in trading. These credits must be used in the same averaging set as generated.

(b) Credits for trading can be obtained from credits banked in the three previous model years or credits generated during the model year of the trading transaction. Traded credits expire if they are not used in averaging within three model years following the

model year in which they were generated.

(c) Traded credits can be used for averaging, banking, or further trading transactions.

(d) In the event of a negative credit balance resulting from a transaction, both the buyer and the seller are liable, except in cases involving fraud. Certificates of all engine families participating in a negative trade may be voided *ab initio* pursuant to §91.123.

§91.207 Credit calculation and manufacturer compliance with emission standards.

(a) For each engine family, certification emission credits (positive or negative) are to be calculated according to the following equation and rounded, in accordance with ASTM E29-93a, to the nearest gram. ASTM E29-93a has been incorporated by reference. See §91.6. Consistent units are to be used throughout the equation. The following equation is used to determine hydrocarbon plus oxides of nitrogen credit status for an engine family, whether generating positive credits or negative credits:

$$\sum_{t=1}^{\text{max actual life}} \frac{S(t) \times \text{sales} \times (\text{std} - \text{fel}) \times \text{Power} \times 0.207 \times \mu_{\text{use}}}{1.03^t}$$

Where:

sales = the number of eligible sales tracked to the point of first retail sale for the given engine family during the model year. Annual production projections are used to project credit availability for initial certification. Actual sales volume is used in determining actual credits for end of-year compliance determination.

t = time in model years

Power = the average power of an engine family in kW (sales weighted). The power of each configuration is the rated output in kilowatts as determined by SAE J1228. This procedure has been incorporated by reference. See §91.6.

max actual life = maximum actual life specific to the power rating and the application; max actual life = $2\mu_{\text{lifc}}$

μ_{lifc} = average actual life in years, specific to the power rating and the application as given below.

Engine type	(μ_{lifc})
Outboard	$41.27 \times \left(\frac{\text{Power}}{0.746}\right)^{-0.204}$
Personal Watercraft	10

Power = as defined above.

μ_{use} = mean use in hours per year. For outboard engines,

$\mu_{\text{use}} = 34.8$ hrs /yr. For personal watercraft, $\mu_{\text{use}} = 77.3$ hrs/yr;

S(t) = cumulative fraction survived at time t;

$S(t) = \exp - (0.906 \times t/\mu_{\text{lifc}})^4$

STD = the current and applicable marine SI engine emission standard in grams per kilowatt hour as determined in §91.104.