



**THE WORKERS' COMPENSATION  
RATING AND INSPECTION BUREAU OF MASSACHUSETTS**

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**CIRCULAR LETTER NO. 1526**

**To All Members and Subscribers of the Bureau:**

Questions and Answers  
All Risk Adjustment Program (ARAP) - Experience Rating

Supplementing Circular Letter No. 1518 dated January 3, 1990, attached are Exhibits and Questions and Answers relative to the new All Risk Adjustment Program (ARAP) which became effective in Massachusetts on January 1, 1990.

Sample Premium Calculation For Risk Subject To ARAP EXHIBIT 1 illustrates the proper method for calculating premium on the Information Page when there is an All Risk Adjustment.

Experience Rating Calculation EXHIBIT 2 shows a sample Interstate rating when there is an ARAP Adjustment.

ARAP Surcharge Rating Example EXHIBIT 3 explains, in detail, the elements and steps used in determining the ARAP Adjustment Factor.

Questions and Answers EXHIBIT 4 responds to inquiries received as the result of the distribution of Circular Letter No. 1518.

Another Circular Letter will follow shortly which answers questions on how ARAP interacts with Retrospective Rating.

**NORMAN R. FONTAINE**  
Vice President

NRF/jd

Attachment

**Sample Premium Calculation For Risk  
Subject To ARAP**

LOCATIONS, CLASSIFICATION AND PAYROLL IN MASSACHUSETTS  
Calculation of Estimated Annual Premium:

Describe by location the duties of employees	Class Code	Number of Employees	Total Payroll	Rate	Premium
Office Machines - Installation	5191	12	264,131	2.71	7,158
Clerical Office Employees NOC	8810	2	33,600	0.39	131
Salesperson, Collectors or Messengers - Outside	8742				
Drivers, NOC	7380				
Employers Liability / /					
Total Premium					7,289
[1] Experience Modification (1.11)					802
Standard Premium					8,091
[2] ARAP Adjustment (1.14)					1,133
[3] Less Premium Discount (if applicable)					340
Expense Constant					155
Total Estimated Annual Premium					9,039
Mass. D.I.A. Assessment (1.2%) of Standard Premium					97
Total of Estimated Annual Premium and Mass. D.I.A. Assessment					9,136

- As issued by this Bureau, or in the case of an interstate rated risk, as issued by the Interstate Rating Dept. - NCCI.
- This Bureau will calculate and issue ARAP Adjustment Factors for both intrastate and interstate rated risks.
- In this example, the Stock Discount (Table 7) was used. Those carriers using the Non-Stock System of Expenses would use Table 8.

It should be noted that premium discount continues to be based on Standard Premium. As shown above, Standard Premium of \$8,091 is subject a discount factor of .042 (\$8,091 x .042 = \$340). The ARAP Adjustment Premium is disregarded in the calculation of premium discount.

- The Mass. D.I.A. Assessment is based on Standard Premium. ARAP Adjustment Premiums should not be considered in calculating the Assessment amount.

BUREAU FILE NO. 999999

**EXPERIENCE RATING CALCULATION**

**PART II - EXHIBIT OF EXPECTED LOSSES**

(1) CLASS CODE	(2) YR	(3) PAYROLL	(2) YR	(3) PAYROLL	(2) YR	(3) PAYROLL	(2) YR	(3) PAYROLL	(4) EXPECTED LOSS RATE PAYROLL LIMITATIONS		(5) EXPECTED LOSSES (3) X (4) --- 100	(6) "D" RATIO	(7) PRIMARY EXPECTED LOSSES (5) X (6)
									UNLIMITED	\$300			
5191	7	214105	6	156436	5	140771			1.34		6852	.28	1919
742	7	414110	6	268942	5	247573			.40		3723	.35	1303
3810	7	233778	6	145559	5	139726			.19		986	.33	325
<b>TOTAL</b>	<b>7</b>	<b>861993</b>	<b>6</b>	<b>570937</b>	<b>5</b>	<b>528070</b>			<b>EXPECTED EXCESS (f)=(d)-(e)</b>		<b>(d) TOTAL EXPECTED LOSSES</b>		<b>(e) TOTAL PRIMARY EXPECTED LOSSES</b>
									8014		11561		3547

**PART I - EXHIBIT OF ACTUAL LOSSES**

(8) YR	(9) CLAIM NUMBER	(10) ACTUAL INCURRED LOSSES	(11) PRIMARY ACTUAL LOSSES	(8) YR	(9) CLAIM NUMBER	(10) ACTUAL INCURRED LOSSES	(11) PRIMARY ACTUAL LOSSES	
6	09329	19167	7055					
<b>TOTAL BY POLICY YEAR OF ALL CASES \$2000 OR UNDER</b>	<b>7</b>	<b>49</b>	<b>49</b>	<b>TOTAL BY POLICY YEAR OF ALL CASES</b>	<b>6</b>	<b>19167</b>	<b>7055</b>	
					<b>7</b>	<b>49</b>	<b>49</b>	
<b>POL # WC123456</b>				<b>01/01/89</b>		<b>ACTUAL EXCESS (c)=(a)-(b)</b>	<b>(a) ACTUAL INCURRED LOSSES</b>	<b>(b) PRIMARY ACTUAL LOSSES</b>
						12112	19216	7104

TO - MAJOR INSURANCE COMPANY

BUREAU FILE NO. 999999

NAME OF RISK

X Y Z Company

INTERSTATE # 999999999

ARAP ADJUSTMENT = 1.14

**PART III - RATING PROCEDURE**

1. PRIMARY ACTUAL AND TOTAL EXPECTED LOSSES	(b) 7104	(d) 11561
2. "B" VALUE	20000	20000
3. RATABLE EXCESS	(w) X (c)	X
w = .00		
4. (1.00-w) = 1.00	(1-w) X (f) 8014	
5. TOTALS	(g) 35118	(h) 31561
EXPERIENCE MODIFICATION (g) (h)	<b>INTERSTATE</b>	

CODE NO.	MANUAL CLASSIFICATION	AUTHORIZED RATE	DATE EFFECTIVE
8742	SALESPERSON, COLLECTOR, MESSENGER - OUTSIDE		JAN. 1, 1990
8810	CLERICAL OFFICE EMPLOYEES NOC		DATE ISSUED
5191	OFFICE MACH INSTALL, INSPCT, ADJST, RPR - NOC		

## ARAP Adjustment Rating Example

Part A: Criteria for ARAP Eligibility

In order for an insured to be eligible for the ARAP adjustment, it must meet the following two conditions:

1. The insured must be eligible for experience rating, either on an Intrastate or Interstate basis.
2. The "R" value for the insured must be greater than 1.0.

Part B: Input Needed to Calculate the "R" Value

To determine whether the "R" value for the insured is greater than 1.0, the following information is needed from the experience rating calculation using Massachusetts data only:

W = The weighting value, calculated on an intrastate basis

A = The actual losses, as limited on a per accident basis

Ap = The actual primary losses

E = The total expected losses

Ep = The expected primary losses

M = The normal experience modification, calculated on an intrastate basis

Based on the information supplied in the example, we have the following values:

W = 0

A = 19,216

Ap = 7,104

E = 11,561

Ep = 3,547

M = 1.11

Part C: Calculation of "R" Value

To determine the "R" value (i.e., the weighted test ratio), we put the numbers from Part B into the formula:

$$R = \frac{((0.5 - 0.5W) \times A_p)}{(M \times E_p)} + \frac{((0.5 + 0.5W) \times A)}{(M \times E)}$$

and get the following calculation:

$$R = \frac{((0.5 - (0.5 \times 0)) \times 7,104)}{(1.11 \times 3,547)}$$

$$+$$

$$\frac{((0.5 + (0.5 \times 0)) \times 19,216)}{(1.11 \times 11,561)}$$

This reduces to:

$$R = \frac{((0.5 - 0) \times 7,104)}{(3,937.17)}$$

$$+$$

$$\frac{((0.5 + 0) \times 19,216)}{(12,832.71)}$$

Thus,

$$R = \left[ \frac{(.50 \times 7,104)}{(3,937.17)} \right] + \left[ \frac{(.50 \times 19,216)}{(12,832.71)} \right]$$

$$R = \frac{3,552}{3,937.17} + \frac{9,608}{12,832.71}$$

$$R = .90 + .75$$

$$R = 1.65$$

Part D: Eligibility

Since R is greater than 1.0, the insured in this example is eligible for the ARAP adjustment. If the R value had been less than or equal to 1.0, the insured would not be eligible for the adjustment factor.

Part E: Calculation of Adjustment Factor

To determine the adjustment factor (called S) we need to use the formula:

$$S = 1 + \left[ \frac{(.08 \times E \times ((R-1)^{1.25}))}{(E + 3)^{0.5}} \right]$$

In this formula R is the value computed in Part C, and E is the expected losses in thousands. However, R may not exceed 2.0 and E may not exceed 40. Thus, for the insured in this example the R value is 1.65 and the E value is 11.56. Remember, that in computing S, E is put in terms of thousands and then limited to 40.

Plugging in the E and R values results in the following calculation:

$$S = 1 + \left[ \frac{(.08 \times 11.56 \times (.65)^{1.25})}{(11.56 + 3)^{0.5}} \right]$$

In this calculation  $.65^{1.25}$  means .65 raised to the 1.25 power. This is equivalent to .65 times the 4th root of .65. The 4th root is the square root of the square root. Similarly,  $(11.56+3)^{0.5}$  means 14.56 to the 0.5 power, which is equivalent to the square root of 14.56. To accomplish these calculations on a calculator use the  $Y^X$  key. Thus we have:

$$.65^{1.25} = .58 \quad \text{where } y = .65 \text{ and } x = 1.25, \text{ and}$$

$$14.56^{0.5} = 3.82 \quad \text{where } y = 14.56 \text{ and } x = 0.5.$$

Now plug the values .58 and 3.82 into the formula above to get

$$S = 1 + \frac{(.08 \times 11.56 \times .58)}{(3.82)}$$

$$S = 1 + \frac{(.92 \times .58)}{(3.82)}$$

After rounding to two decimal places, the final answer is

$$S = 1 + .14$$

$$S = 1.14.$$

The value of 1.14 is now to be applied to the Standard Premium for this insured to produce the adjusted premium.

Note: In order to get the approximate value of S, one can consult the attached table, rather than use the formula in Part E.

ARAP Adjustment Factors  
Expected Losses (\$000)

R	5	10	15	20	25	30	35	40 & +
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.04	1.00	1.00	1.01	1.01	1.01	1.01	1.01	1.01
1.06	1.00	1.01	1.01	1.01	1.01	1.01	1.01	1.01
1.08	1.01	1.01	1.01	1.01	1.01	1.02	1.02	1.02
1.10	1.01	1.01	1.02	1.02	1.02	1.02	1.03	1.03
1.12	1.01	1.02	1.02	1.02	1.02	1.03	1.03	1.03
1.14	1.01	1.02	1.03	1.03	1.03	1.03	1.04	1.04
1.16	1.01	1.02	1.03	1.03	1.03	1.04	1.04	1.05
1.18	1.02	1.03	1.03	1.04	1.04	1.05	1.05	1.06
1.20	1.02	1.03	1.04	1.04	1.04	1.05	1.05	1.06
1.22	1.02	1.03	1.04	1.04	1.05	1.06	1.06	1.07
1.24	1.02	1.04	1.05	1.05	1.06	1.06	1.07	1.08
1.26	1.03	1.04	1.05	1.05	1.06	1.07	1.08	1.09
1.28	1.03	1.04	1.06	1.06	1.07	1.08	1.08	1.09
1.30	1.03	1.05	1.06	1.06	1.07	1.08	1.09	1.10
1.32	1.03	1.05	1.07	1.07	1.08	1.09	1.10	1.11
1.34	1.04	1.06	1.07	1.07	1.08	1.09	1.10	1.11
1.36	1.04	1.06	1.08	1.08	1.09	1.10	1.11	1.12
1.38	1.04	1.07	1.08	1.08	1.10	1.11	1.12	1.13
1.40	1.05	1.07	1.09	1.09	1.11	1.12	1.13	1.14
1.42	1.05	1.08	1.10	1.10	1.11	1.12	1.13	1.14
1.44	1.05	1.08	1.10	1.10	1.12	1.13	1.14	1.15
1.46	1.05	1.08	1.11	1.11	1.13	1.14	1.15	1.16
1.48	1.06	1.09	1.11	1.11	1.13	1.14	1.15	1.16
1.50	1.06	1.09	1.12	1.12	1.14	1.15	1.16	1.17
1.52	1.06	1.10	1.12	1.12	1.15	1.16	1.17	1.18
1.54	1.07	1.10	1.13	1.13	1.15	1.17	1.18	1.19
1.56	1.07	1.11	1.14	1.14	1.16	1.18	1.19	1.20
1.58	1.07	1.11	1.14	1.14	1.17	1.19	1.20	1.21
1.60	1.07	1.12	1.15	1.15	1.18	1.20	1.21	1.22
1.62	1.08	1.12	1.16	1.16	1.18	1.21	1.22	1.23
1.64	1.08	1.13	1.16	1.16	1.19	1.22	1.23	1.24
1.66	1.08	1.13	1.17	1.17	1.20	1.22	1.23	1.24
1.68	1.09	1.14	1.18	1.18	1.21	1.23	1.24	1.25
1.70	1.09	1.14	1.18	1.18	1.21	1.24	1.25	1.26
1.72	1.09	1.15	1.19	1.19	1.22	1.24	1.25	1.26
1.74	1.10	1.15	1.20	1.20	1.23	1.25	1.26	1.27
1.76	1.10	1.16	1.20	1.20	1.24	1.26	1.27	1.28
1.78	1.10	1.16	1.21	1.21	1.24	1.27	1.28	1.29
1.80	1.11	1.17	1.22	1.22	1.25	1.28	1.29	1.30
1.82	1.11	1.17	1.22	1.22	1.26	1.29	1.30	1.31
1.84	1.11	1.18	1.23	1.23	1.27	1.30	1.31	1.32
1.86	1.12	1.18	1.23	1.23	1.28	1.31	1.32	1.33
1.88	1.12	1.19	1.24	1.24	1.28	1.32	1.33	1.34
1.90	1.12	1.20	1.25	1.25	1.29	1.33	1.34	1.35
1.92	1.13	1.20	1.25	1.25	1.30	1.34	1.35	1.36
1.94	1.13	1.21	1.26	1.26	1.31	1.35	1.36	1.37
1.96	1.13	1.21	1.27	1.27	1.32	1.36	1.37	1.38
1.98	1.14	1.22	1.28	1.28	1.33	1.37	1.38	1.39
2.00	1.14	1.22	1.28	1.28	1.33	1.38	1.39	1.40

Note: Actual ARAP adjustments are computed via formula and not from this table. This table was produced by applying the ARAP formula for the specific values listed.



All Risk Adjustment Program (ARAP)  
Questions and Answers

1. Does Standard Premium include the ARAP Adjustment Premium?

No.

2. Is the ARAP Adjustment Premium subject to Premium Discount?

No. Premium Discount is calculated on Standard Premium which does not include the ARAP Adjustment Premium.

3. On voluntary business, do companies keep the ARAP Adjustment Premium as premium?

Yes.

4. On assigned risk business, should the servicing carrier allowance and the producer fee be calculated on the ARAP Adjustment Premium?

No.

5. On voluntary business, should the producer commission be applied to the ARAP Adjustment Premium?

No.

6. Should the Massachusetts D.I.A. Assessment be applied to the ARAP Adjustment Premium?

No. The Massachusetts D.I.A. Assessment is applied to Standard Premium, exclusive of the ARAP Adjustment Premium.

7. Are the following elements included/excluded from determination of the ARAP Adjustment Premium?

a. Loss Constant?

~~Excluded.~~

b. Expense Constant?

Excluded.

c. The policy minimum premium?

Excluded. The ARAP Adjustment Premium is applied to premium prior to comparing to policy minimum premium.

d. The minimum premium for coverage under the Admiralty Law and the Federal Employers' Liability Act?

Excluded.

e. Premium under the National Defense Projects Rating Plan?

Excluded.

f. The seat surcharge premium for Aircraft Operation - Code 7421?

Excluded.

g. Premium under the Atomic Energy classifications - Code 9984 and 9985?

Excluded.

h. Premium developed under Three Year Fixed Rate policies?

Excluded.

i. The non-ratable elements of the manual rates for those classifications enumerated in the Table of Classifications?

Excluded.

j. Employers Liability Increased Limits Premium?

Included.

k. "F" classes premium?

Included.

8. We understand that the ARAP Adjustment Factor is developed on an intrastate basis using Massachusetts experience only.

What is the process when a multi-state risk with Massachusetts exposure subject to the ARAP Adjustment Factor is interstate rated?

Interstate Rating Dept. - NCCI will issue the normal interstate Experience Rating Calculation Sheet to the present carrier with an interstate experience rating modification which includes Massachusetts experience, with no change in current procedures.

The Mass. Bureau will issue a Massachusetts only intrastate Experience Rating Calculation Sheet to the present carrier and identify the ARAP Adjustment Factor as a separate percentage figure. "INTERSTATE" appears in the box where the Experience Modification factor is normally shown. (EXHIBIT 2).

The company will apply the interstate rating modification to the total premium for all states, including Massachusetts, with no change in current procedures. The company will then apply the ARAP Adjustment Factor to the Massachusetts standard premium and issue the policy accordingly.

9. Is the ARAP Adjustment Premium subject to premium tax?

Yes.

10. Is it possible for an ARAP Adjustment Factor to apply to a risk with a credit Experience Modification?

Yes.

Approximately 1% of experience rated risks have an experience rating credit yet also have an ARAP Adjustment. About half of those will have their experience rating credit more than eliminated by an ARAP Adjustment.

Some of these are risks with very small credits which get small ARAP Adjustments. For example, a risk with a .99 experience rating modification could easily get a 1.02 ARAP Adjustment.

11. What is the Statistical Code that applies to the ARAP Adjustment Premium?

0277.

The Mass. Bureau will issue a Statistical Circular shortly illustrating how the ARAP Adjustment Premium is to be shown on the Unit Statistical Card.