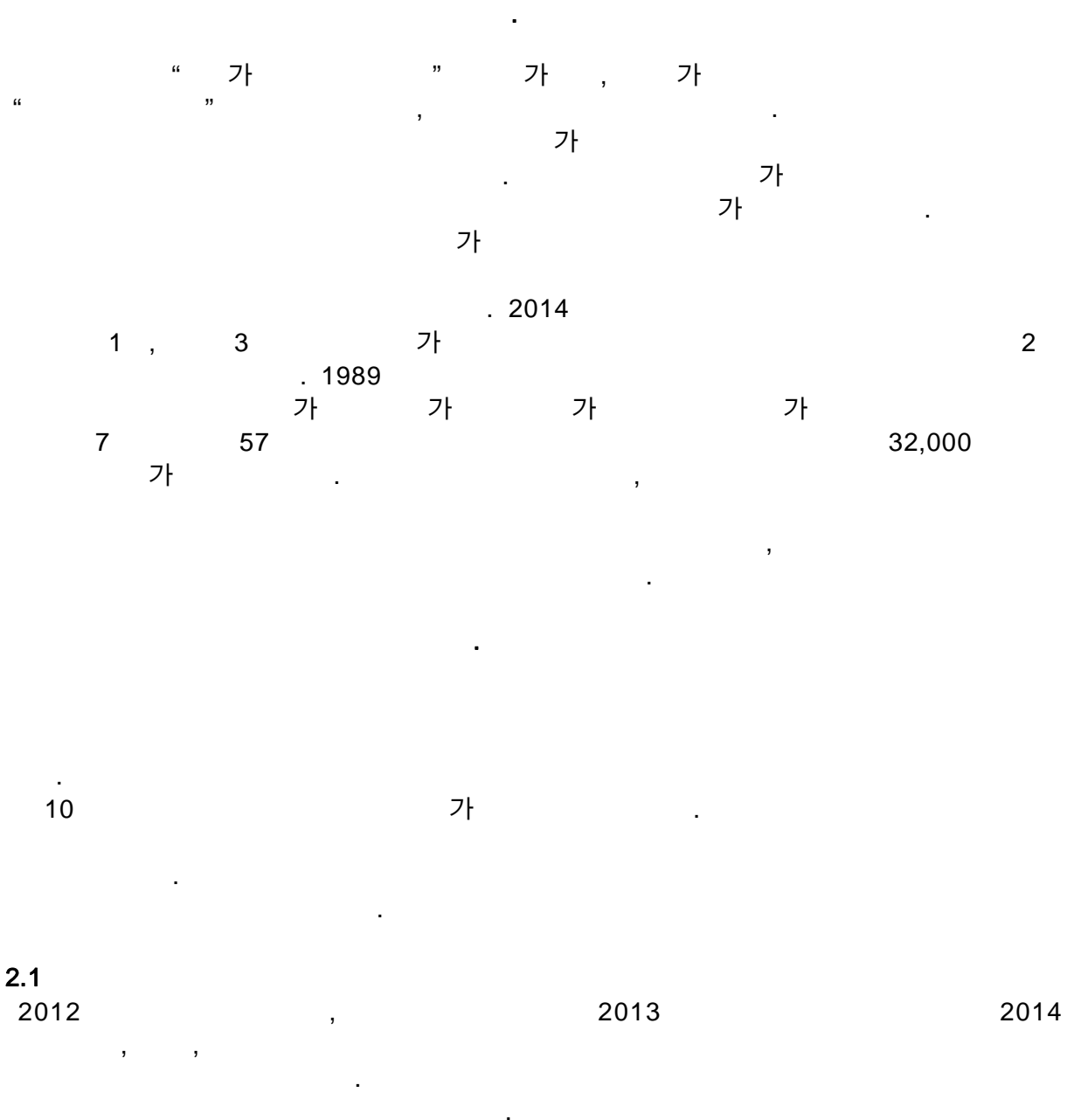


**Recommended Evacuation Distance for Ammonia Leak Scenarios in a Refrigeration System**

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**2.1**  
 2012, 2013, 2014

**Table 1.** (2012 2014)

2012. 7. 18.	,	,	2	,	10	:	2
2013. 8. 17.			11				
2014. 2. 13.	,		1	,	3	:	1
2014. 7. 12.							
2014. 9. 10.							

2.2

가 15~25% , 가 가 가 .  
 가 가

2.3

가  
 Table 2 .

2.4

50%, 가 50% 1.5m/s F, 25 ,

2.5

가 가  
 가  
 Table 3 .

Table 2.

( )	(atm)
-33.33	0
-17	1.09
0	3.27
15.68	6.33

Table 3.

	R - 22	R - 404A
<= 100 RT	122	495
<= 500 RT	218	70
> 1000 RT	3	0
<= 1000 RT	21	9

\* RT: , 0 1ton 24 0

\* : “ , , 2014. ”

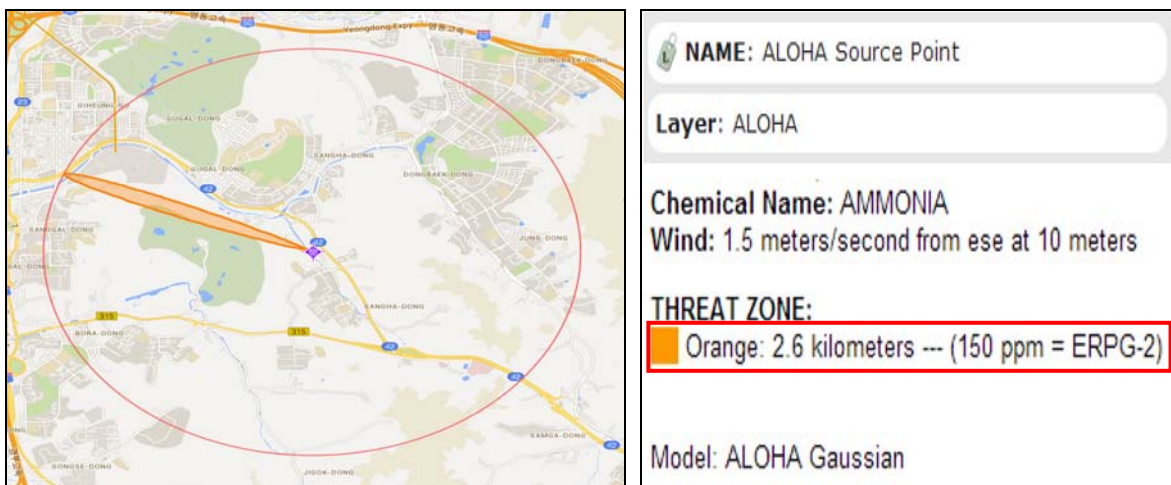
가 가  
 ERPG -2  
 EPA(Environmental Protection Agency) ALOHA(Areal Locations of Hazardous Atmospheres)

3.1 가 (ALOHA: , 1psi / )  
 10  
 100 ~ 1,000 kg/min (1psi )  
 가 ERPG-2가 Table 4.  
 Fig 1. LOHA / MARPLOT ERPG-2 68 kg/min 가 A

Table 4. 1 psi, ERPG-2 (ALOHA)

(kg/min)	100	200	300	400	500	600	700	800	900	1000
(kg)	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
1 psi (m)	131	186	229	266	302	332	360	386	410	434
ERPG -2 (150ppm)	3,100	4,200	5,100	5,800	6,500	7,100	7,600	8,100	8,600	9,100

Fig 1. ALOHA / MARPLOT  
 (Mapping Application for Response, Planning, and Local Operational Tasks).  
 ( A / F 1.5m/s 68 kg/min)



가  
가  
ERPG -2  
ERPG -2  
가  
가  
가  
가  
ERPG -2

[1-10]

1. - 10-1 : - 가 . - KS C IEC 60079-10-1.
- 2.
3. *Modeling and Scenarios in ALOHA*. EPA.
4. *Technical Guidance for Hazard Analysis*. EPA, 1987.
5. Andersson, B.O. *Lithuanian ammonia accident, March 20th 1989*. in *Inst Chem Eng Symp Ser*. 1991.
6. Cavender, F., S. Phillips, and M. Holland, *Development of emergency response planning guidelines (ERPGs)*. *Journal of Medical Toxicology*, 2008. **4**(2): p. 127-131.
7. Guarnaccia, J. and T. Hoppe, *Off-site toxic consequence assessment: A simplified modeling procedure and case study*. *Journal of hazardous materials*, 2008. **159**(1): p. 177-184.
8. Marx, J.D. and J.B. Cornwell. *DEFINING WORST-CASE RELEASES FOR THE EPA'S RISK MANAGEMENT PROGRAM*. 1996. PennWell Conferences & Exhibitions, Houston, TX (United States).
9. , ( ) , 2014.2.17.
10. , , 2014. **43**(7): p. 32-38.