

TECHNOTES

NO. 05 | April 2026

Fitness for use calculation of
70% Alcohol Solution Products
(Ethanol, Isopropyl Alcohol)
after opening their packaging





At the request of product users, Texwipe is proposing a method to determine a fit-for-use (expiry) open time for products containing a 70% Alcohol / 30% DIW by volume solution due to the varying environments where the opened product is being used.

Environmental conditions which affect evaporation rate include temperature, air flow rate, humidity, and end-user behavior. To reduce the wetting solution's evaporation, the container needs to remain closed as much as possible between each wiper removal event. If accidentally left open, an unsealed container allows the 70% alcohol solution to continue to evaporate. The open expiry time can be calculated, though with difficulty, in the following discussion. This TechNote focuses on wipers, but these calculations can also apply to solutions, including denatured ethanol solution as presented in the Addendum.

The open expiry time can be determined by the amount of weight lost during the product's use. By determining the amount of weight loss that still keeps the remaining solution within the acceptable concentration range, the open expiry time can be established for any given use environment. This technique applies to the open expiry time of any alcohol solution in a peel and reseal bag, a slider bag, a bottle of an alcohol solution, or an open container of solution such as an open bucket or pumping dispenser. The situation is the same: any opening will allow alcohol vapors to escape, lowering the level of alcohol in a container. If the product is sterile, this document does not speak to maintaining sterility of the product.

Although this calculation method will work with any alcohol solution, e.g., denatured ethanol, this method will focus on the more commonly used solution, a 70% IPA solution.

USP Official Monograph Definition

For reference, the USP Official Monograph definition for a 70% isopropyl alcohol solution is, "Isopropyl Rubbing Alcohol contains not less than 68.0 percent and not more than 72.0 percent of isopropyl alcohol, by volume, the remainder consisting of water, with or without suitable stabilizers, perfume oils, and color additives certified by the FDA for use in drugs." (Ref. 1) This definition indicates 70% IPA solutions are 70% alcohol by volume, not by weight.

The following example provides a simple way to determine the "by volume" solution. To an empty and clean 100-milliliter graduated cylinder add 70 milliliters of 100% isopropyl alcohol. Add water and mix to bring the solution to a volume of 100 milliliters. Note: The alcohol must be added to the graduated cylinder first. If the solution is started with 30 milliliters of water in the graduated cylinder, the solution is different due to a mixing volume difference, a property of alcohol-water mixtures, that is 70 milliliters of IPA plus 30 milliliters of water ends up with less than 100 milliliters of solution.

The calculations in the TechNote will use the values of 70 volume percent (% v/v) isopropyl alcohol solution (mid-range) to 68% v/v isopropyl alcohol solution, defined as the low end of the USP Official Monograph specification range. These calculations may be adapted to other concentration ranges, if needed, by using different parts of the supplied data tables and making the corresponding adjustments to the calculations.

Beginning Assumptions

These calculations provide a suggested internal experiment that will need to be performed to determine the length of time a bag of product can be used in an area. An experiment to consider would be to open a weighed bag (initial weight) and intermittently weigh the opened bag until it loses the weight value calculated below.

These calculations are based on ideal conditions: the product being in equilibrium within itself and the environment. If the evaporation rate is too fast from the wiper surface, an IPA concentration gradient through the wiper stack can form with the top wiper having a lower concentration of IPA compared to the bottom wiper in the stack, lowering the evaporation rate and influencing the open expiry time.

There is variability allowed in the manufacturing process. For example, a common allowable fill volume is 2.5%. The fill solution in pre-wetted products can vary within the full range of 68% v/v to 72% v/v. For these calculations to work, the target fill volume for the product in question will need to be known.

As a word of caution, the amount of IPA solution calculated to change the IPA solution concentration from 70% v/v to 68% v/v is significant, approximately 10 percent of the package solution fill weight. This reduction in fill level in the wiper product may impact how the product performs in the process, since the liquid film that trails the wiper during the wiping process will be reduced and may dry faster. The drying rate of the solution left on the surface being wiped is simply impacted by the amount of solution applied to the surface, not the change in concentration of the solution, which is relatively small. This implies that the wiping and cleaning characteristics may be another consideration as part of the experiment in determining the open expiry time.

Calculations

The calculations will follow the previously listed steps.

1. Determine the weight percent values from the corresponding volume percent values

The change of units from volume percent to weight percent are performed at a constant density. The data (Ref. 5), which contains the 20°C solution density for a percent IPA solution by weight percent and volume percent, is compiled in **Table 1**. As an example, a 70% IPA solution has a 20°C density value of 0.8584 for a 70% weight percent IPA solution and a value of 0.87563 for a 70% volume percent IPA solution. Link: [IPA Weight-Volume Percent Density Data](#).

The path to arrive at the final, acceptable weight loss value is complex.

The steps are:

1. Determine the weight percent values for the corresponding volume percent values,
2. Calculate the mole fraction (Ref. 2) values using the weight percent values to use the IPA-Water Vapor-Liquid Equilibrium data and chart,
3. Using the mole fraction values, determine the mole fraction of the IPA in the vapor phase (Ref. 2) of the solution evaporating (Ref. 3) using IPA-Water Vapor-Liquid Equilibrium data, converting this value to a weight percent value,
4. Perform an IPA mass balance (Ref. 4) using the IPA concentration in the wiper (liquid phase, 70% v/v), the evaporated solution (vapor phase), and the final solution (68% v/v), using the weight percent values for each solution,
5. From the above result, determine the percent evaporation of the original solution that form the final solution (68% v/v), and
6. Apply the new percent value to the fill volume of the product, which determines the maximum weight loss to keep the final solution IPA concentration above 68% v/v.

Note 1: The data for the IPA solution concentration densities and the IPA-Water Vapor-Liquid Equilibrium Data used for these calculations are from internet sources, and the link to the data is included for each data set.

Table 1

Isopropyl Alcohol in Water Solution Density at 20°C by Weight Percent and Volume Percent

% Isopropyl Alcohol	Density for % Weight	Density for % Volume	% Isopropyl Alcohol	Density for % Weight	Density for % Volume	% Isopropyl Alcohol	Density for % Weight	Density for % Volume	% Isopropyl Alcohol	Density for % Weight	Density for % Volume
0	0.9982	0.9982	26	0.9597	0.96865	51	0.9044	0.92294	76	0.8439	0.85985
1	0.9962	0.99662	27	0.9577	0.96704	52	0.902	0.92063	77	0.8415	0.85705
2	0.9944	0.99516	28	0.9558	0.9655	53	0.8996	0.91823	78	0.8391	0.85438
3	0.9926	0.99373	29	0.954	0.96403	54	0.8971	0.91575	79	0.8366	0.85165
4	0.9909	0.99232	30	0.952	0.96249	55	0.8946	0.9134	80	0.8342	0.84885
5	0.9893	0.99096	31	0.95	0.96089	56	0.8921	0.91103	81	0.8317	0.84588
6	0.9877	0.98968	32	0.9481	0.9593	57	0.8896	0.90866	82	0.8292	0.84293
7	0.9862	0.9884	33	0.946	0.95757	58	0.8874	0.90623	83	0.8268	0.84006
8	0.9847	0.98715	34	0.944	0.95592	59	0.885	0.90374	84	0.8243	0.83706
9	0.9833	0.98595	35	0.9419	0.95435	60	0.8825	0.90132	85	0.8219	0.83411
10	0.982	0.98474	36	0.9399	0.95264	61	0.88	0.89885	86	0.8194	0.831
11	0.9808	0.9836	37	0.9377	0.95088	62	0.8776	0.89627	87	0.8169	0.82792
12	0.9797	0.98253	38	0.9355	0.94916	63	0.8751	0.89368	88	0.8145	0.82481
13	0.9786	0.98152	39	0.9333	0.9474	64	0.8727	0.89107	89	0.812	0.82174
14	0.9776	0.98056	40	0.931	0.94555	65	0.8702	0.88861	90	0.8096	0.8185
15	0.9765	0.97967	41	0.9287	0.94375	66	0.8679	0.88622	91	0.8072	0.81531
16	0.9754	0.97878	42	0.9264	0.94185	67	0.8656	0.88362	92	0.8047	0.81205
17	0.9743	0.97795	43	0.9239	0.94005	68	0.8632	0.88093	93	0.8023	0.80888
18	0.9731	0.97708	44	0.9215	0.93805	69	0.8609	0.87832	94	0.7998	0.80559
19	0.9717	0.97618	45	0.9191	0.93603	70	0.8584	0.87563	95	0.7973	0.8023
20	0.9703	0.97528	46	0.9165	0.934	71	0.856	0.873	96	0.7949	0.79883
21	0.9688	0.97438	47	0.9141	0.93189	72	0.8537	0.87025	97	0.7925	0.79544
22	0.9669	0.9734	48	0.9117	0.92974	73	0.8513	0.86773	98	0.7901	0.79208
23	0.9651	0.97229	49	0.9093	0.92757	74	0.8489	0.86517	99	0.7877	0.78869
24	0.9634	0.97113	50	0.9069	0.9253	75	0.8464	0.86252	100	0.7854	0.7854
25	0.9615	0.96993									

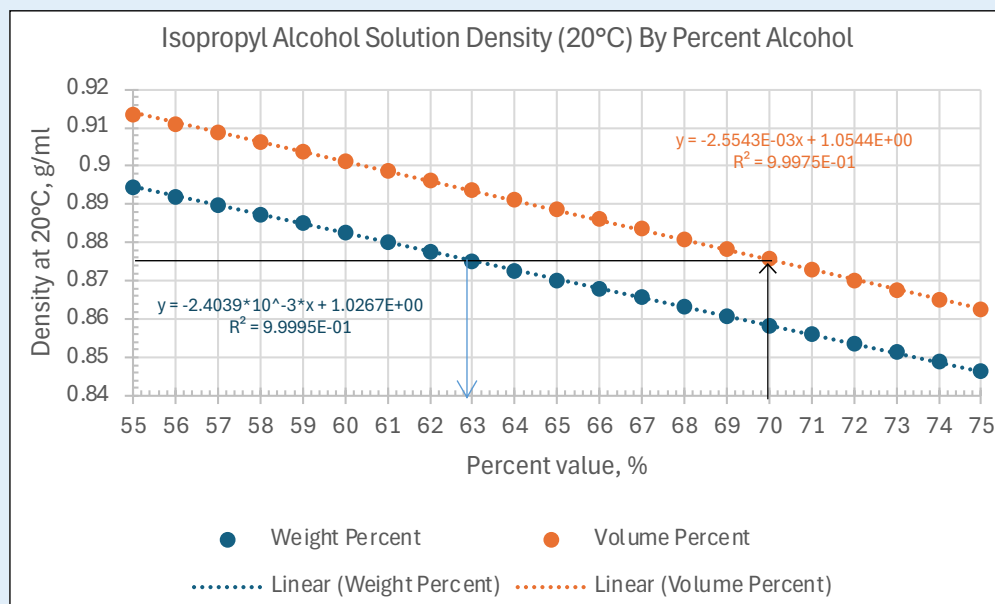
The shaded portion of the data is used for the conversion from volume percent to weight percent and demonstrated in Figure 1.

The chart in **Figure 1** shows the relationship between the IPA solution density at 20°C for volume percent (Orange) and weight percent (Blue) solutions for the data highlighted (excerpt) in **Table 1**. These data are plotted on the same chart to show that the same IPA solution (constant density, black line) has different weight percent (vertical blue arrow) and volume percent (vertical orange arrow) values even though it is the same solution. This chart ranges from 55% isopropyl alcohol to 75% isopropyl alcohol to allow a linear curve fitting process.

A linear fit (Ref. 6) is shown for each set of data (Density at 20°C versus Weight Percent and Volume Percent) with the corresponding R² value, indicating how well the data are fit with a simple line. The horizontal black line represents a constant solution density value between the weight and volume percent curves, allowing for the conversion of a 70% v/v solution to its corresponding weight percent value. The fit equation for weight percent will be used to calculate the weight percent values. The lines and arrows are included in the chart to guide the eye for what is happening in the calculation for a 70% v/v solution.

Figure 1

This chart represents the data excerpt from Table 1 that will be used to show how to convert volume percent data to weight percent data at a constant density.



The data was fit with a linear equation in the form of $y = a * x + b$, where y is the density, x is the weight percent value, and b is the density axis intercept. **Equation 1** below shows the result of solving for x in the curve fit equation, inserting the corresponding values, and the resulting final weight percent value for a 70% v/v IPA solution. For the 70% v/v solution,

Equation 1

$$\frac{y - b}{a} = x = \frac{(0.87563 - 1.0267)}{-2.4039 * 10^{(-3)}} = 62.844 \text{ weight percent}$$

Similarly, the same equation is used for 68% v/v to determine the weight percent (% w/w) value, using the 68% v/v density value of 0.88093 from **Table 1**. A 68% v/v solution is equivalent to a 60.639% w/w solution. The fit parameters were obtained using Microsoft Excel's chart data fitting module.

2. Calculate the mole fraction values using the weight percent values to use the IPA-Water Vapor-Liquid Equilibrium data and chart

The mole fraction value steps are:

- Since we are now working using weight percent values, assume 100 grams solution for the calculation, not 100 milliliters that would be used for a volume percent calculation.
- For the 70% v/v solution, 100 grams solution contains 62.844 grams of IPA and 37.156 grams of water. The grams values are converted to the corresponding moles (mol) using the molecular weight of 60.096 grams per mole for IPA and 18.015 grams per mole for water, a division process. The results are 1.046 moles (62.844 grams IPA ÷ 60.096 g IPA/mole) for IPA and 2.062 moles for water. The important mole fraction is for the IPA component. This value is determined by dividing the moles of IPA by the total moles in the solution. The values are inserted in **Equation 2** below for the 70% v/v solution. The same steps are used for the other solutions.

Equation 2

$$\frac{\text{moles IPA}}{\text{moles IPA} + \text{moles Water}} = \text{mole fraction of IPA} = \frac{1.046 \text{ mol}}{1.046 \text{ mol} + 2.062 \text{ mol}} = 0.3364$$

The results for 70% v/v, 68% v/v, and "85%" v/v (vapor phase concentration) solutions are compiled in Table 2. The "85" data is determined later at the end of Step 3.

Table 2

Data compilation from converting volume percent to mole fraction IPA using the corresponding weight percent for the three listed percent volumes on a 100-gram basis.

Solution Volume Percent, %	70	68	"85"
Grams of solution, g	100	100	100
Wt.% IPA, %	62.844	60.639	80.320
Wt.% H ₂ O, %	37.156	39.361	19.680
Grams IPA, g	62.844	60.639	80.320
Grams Water, g	37.156	39.361	19.680
MW IPA, g/mol	60.096	60.096	60.096
MW H ₂ O, g/mol	18.015	18.015	18.015
Moles IPA, mole	1.046	1.009	1.337
Moles H ₂ O, mole	2.062	2.185	1.092
Total moles, mole	3.108	3.194	2.429
Mole fraction IPA	0.3364	0.3159	0.5503
Mole fraction H ₂ O	0.6636	0.6841	0.4497

Note: MW is molecular weight

3. Using the mole fraction values, determine the mole fraction of the IPA in the vapor phase (the solution that is evaporating) using IPA-Water Vapor-Liquid Equilibrium data, converting this value to a weight percent value.

The vapor-liquid equilibrium data allows the determination of the mole fraction of a substance in the vapor phase knowing the mole fraction of a substance in the liquid phase, in this case IPA. The data is represented in the units of mole fraction for IPA. This data (Ref. 7) for IPA and water is compiled in **Table 3**. It is sourced from this website: [IPA-Water Vapor-Liquid Equilibrium Data](#). This data is charted in **Figure 2**. **Figure 3** is a chart of an excerpt of the data highlighted in **Table 3** used for curve fitting to determine the vapor phase IPA concentration over a range that includes the 70% v/v IPA mole fraction (0.5503).

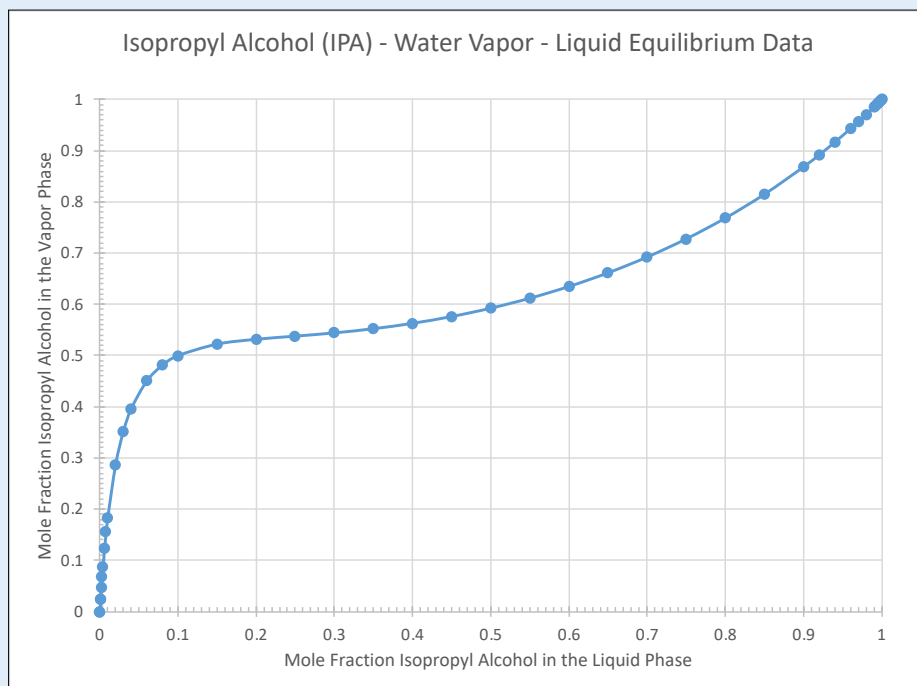
Table 3

IPA-Water
Vapor-Liquid
Equilibrium Data

Liquid	Vapor	Liquid	Vapor
Mole Fraction IPA		Mole Fraction IPA	
0	0	0.5	0.592513
0.001	0.0244473	0.55	0.611974
0.002	0.0471688	0.6	0.63489
0.003	0.0683374	0.65	0.661568
0.004	0.0881038	0.7	0.692388
0.006	0.123941	0.75	0.727821
0.008	0.155556	0.8	0.768451
0.01	0.183634	0.85	0.814996
0.02	0.286808	0.9	0.868339
0.03	0.351921	0.92	0.891815
0.04	0.396053	0.94	0.916629
0.06	0.450484	0.96	0.942867
0.08	0.481205	0.97	0.956549
0.1	0.499814	0.98	0.970623
0.15	0.522348	0.99	0.985102
0.2	0.53173	0.992	0.988048
0.25	0.537869	0.994	0.99101
0.3	0.544291	0.996	0.99399
0.35	0.552442	0.997	0.995486
0.4	0.56298	0.998	0.996986
0.45	0.576257	0.999	0.998491
		1	1

Figure 2

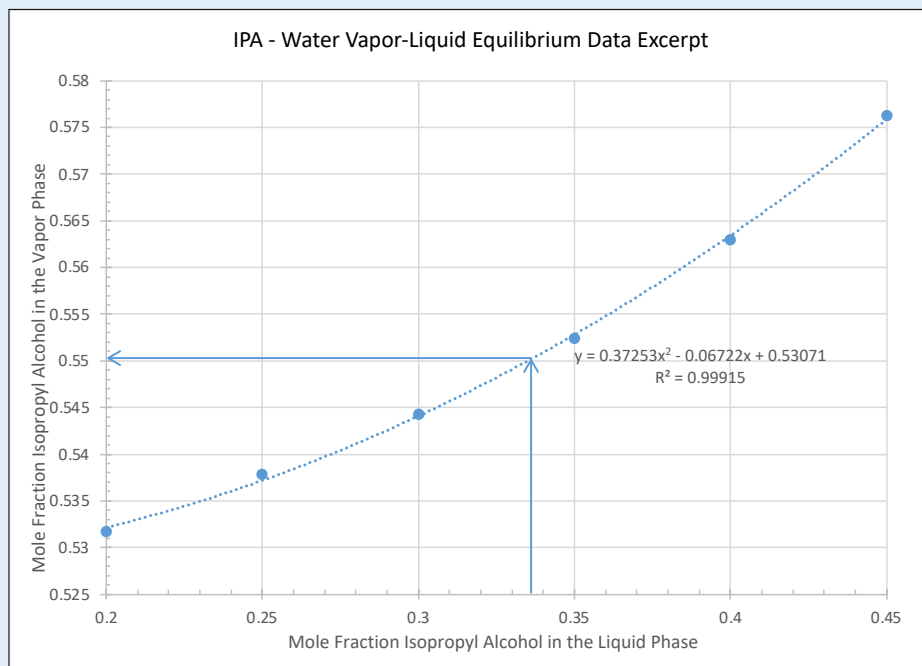
**Isopropyl Alcohol (IPA)-Water
Vapor-Liquid Equilibrium Chart
of the Table 3 Data**



In **Figure 3**, the liquid phase IPA mole fraction ranges from 0.2 to 0.45, which allows three points on either side of the target value for curve fitting. The vertical and horizontal lines have been added to guide the eye showing that a mole fraction of IPA at 0.3364 in the liquid phase solution will have an equilibrium vapor phase mole fraction of IPA at 0.550255. The equation on the chart is the fit curve for the data points shown. The arrows are included to guide the eye for what is happening in the calculations.

Figure 3

**Isopropyl Alcohol (IPA) - Water
Liquid Vapor Equilibrium Excerpt
which contains the data highlighted
in Table 3.**



Using the IPA mole fraction in vapor phase value, the weight percent IPA in the vapor phase can be determined by an iterative process: enter a weight percent value and monitor what the calculated IPA mole fraction is until the value is 0.550255. This value corresponds to a value of 80.3201% w/w (approximately 85% v/v, "85").

4. Perform an IPA mass balance using the IPA concentration in the wiper (liquid phase, 70% v/v), the evaporated solution (vapor phase), and the final solution (68% v/v), using the weight percent values for each solution

A mass balance can be performed on the amount of IPA originally in the wiper solution (70% v/v), the amount that leaves the wiper in the vapor phase, and the amount of IPA remaining in the wiper in the liquid phase. From the calculations above, the weight percents for each part are known. The unknown is the weight of vapor that leaves the wiper. The mass balance equation to determine this weight is as shown mathematically in **Equation 3a**.

Equation 3a

$$(\% \text{ w/w IPA}_{\text{Initial}} \cdot \text{Initial Mass in Wiper}) - (\% \text{ w/w IPA}_{\text{Vapor}} \cdot \text{Mass of Vapor}) = (\% \text{ w/w}_{\text{Final}} \cdot \text{Final Mass in Wiper})$$

Equation 3a simplified verbally in **Equation 3b**.

Equation 3b

$$(\text{The initial amount of IPA in the wiper}) - (\text{The amount of IPA leaving as Vapor}) = (\text{The remaining IPA in the wiper})$$

The following are the definitions for the symbols used in **Equation 3a**.

- % w/w IPA Initial (x) is the weight percent corresponding to the 70% v/v solution in the wiper, 62.844% w/w
- Initial Mass in Wiper (L) is the weight of liquid in the wiper, assumed to be 100 grams
- % w/w IPA Vapor (y) is the weight percent IPA in the vapor phase, 80.3201% w/w
- Mass of Vapor (V) is the weight of the solution changing into vapor phase, to be calculated
- % w/w Final (z) is the weight percent corresponding to the 68% v/v solution remaining in the wiper, 60.639% w/w
- Final Mass in Wipe (100 - V) is also unknown but is 100 grams minus the mass of the IPA solution vapor

Equation 3a shown symbolically (variables defined above) as **Equation 4**,

Equation 4

$$x * L - y * V = z * (100 - V)$$

Solving for V and entering values in **Equation 5**,

Equation 5

$$V = \frac{100z - xL}{z - y} = \frac{100 * 60.639 - 62.844 * 100}{60.639 - 80.3201} = 11.20 \text{ grams}$$

5. From the above result, determine the percent evaporation from the original solution that forms the final solution (68% v/v IPA)

Since the basis of the calculation is 100 grams of solution, the percentage is the ratio of the evaporation weight divided by the starting weight multiplied by 100% as shown in **Equation 6**:

Equation 6

$$\frac{11.20 \text{ grams evaporated}}{100 \text{ grams of initial solution}} * 100\% = 11.20\% \text{ w/w}$$

6. Apply the new percent value to the fill volume of the product, which determines the maximum weight loss that is acceptable to maintain the wetting solution for the wiper within the acceptable range, i.e., above 68% v/v.

As an example, if the fill volume of each pack of product is 825 milliliters of a 70% v/v IPA solution, which when multiplied by the solution density results in 722.39 grams of solution. When multiplied by the percentage evaporation, 11.20% w/w, the result is 80.91 grams. The amount, 80.91 grams, is the maximum amount of IPA solution weight loss and still be within the USP Monograph lower specification limit, 68% v/v.

Summary

Using the calculations above, a bag of product with an initial fill volume of 825 milliliters can lose up to 80.91 grams of IPA fill solution and remain above the USP Monograph lower specification (68% v/v IPA) under the assumptions used in the calculations. Please be advised, the possible change in wiping characteristics may impact how the product is used in your process since the liquid film that trails the wiper during the wiping process will be reduced and may dry faster.

ADDENDUM

1. Extension of the calculations to denatured ethanol

This general calculation method for a 70% v/v IPA solution will extend to denatured ethanol solutions with some changes. These changes are:

- Denatured ethanol is not pure ethanol as Texwipe's formulation contains 4.76% v/v as defined by 27 CFR 21.37(a), to every 100 gallons of alcohol (ethanol) add five gallons of isopropyl alcohol. This paragraph is the Specially Denatured Alcohol (SDA) Formula 3-C. This formula was chosen for its minimal impact to toxicity (for example, another formulation uses methanol), IPA has been used throughout the life science industry, IPA's physical properties are well understood, and the general life science uses allowed by the denaturing regulation found in 27 CFR 21.37(b)(1) Authorized uses as a solvent. Examples of these uses included but not limited to, processing antibiotics and vaccines, cleaning solutions, and miscellaneous drug processing (including manufacture of pills).
- Because of how Texwipe chose to formulate the 70% v/v denatured ethanol solution, the solution is 70% v/v ethanol, 3.5% v/v IPA, and the balance water.
- Since there is no readily available data, e.g., density, for an ethanol/IPA/water system, Texwipe recommends treating the alcohol component as only ethanol, recognizing all calculations will have some errors.
 - The data in Table 1 for the density of weight percent and volume percent solutions will change to that of ethanol and water from isopropyl alcohol and water. This will impact the entries for y, a, and b in Equation 1.
 - The volume percent alcohol is now 73.5% v/v alcohol (70% v/v ethanol and 3.5% v/v IPA) not 70% v/v IPA. This will affect the starting point where the data is fit, shifting the data fit around the value of 73.5% v/v alcohol and not 70% v/v IPA.
- The molecular weight of ethanol is 46.069 grams per mole, not 62.844 grams per mole for IPA. This will affect the calculation of the moles of ethanol and potentially the result in Equation 2.
- The vapor-liquid equilibrium data in Table 3 will change to ethanol/water, not IPA/water. This change affects the mole fraction of ethanol in the vapor phase, changing the fit equation shown in Figure 3.
- The mass balance is around ethanol, not IPA, slightly affecting Equations 3a and 3b, and affects the values for the symbols used in Equation 3a and Equation 5. The result derived in Equation 5 will likely change.
- The symbolic mass balance equation, Equation 4, will not change since it generally applies to any system where evaporation occurs.
- Because the result in Equation 5 most likely changes, the final allowed percent evaporation result in Equation 6 may be affected.

Again, the calculation method for denatured ethanol is the same as the one used for IPA except for the values being different due to the properties of a different alcohol. The data search, compilation, and calculations are left to the reader. However, the same websites indicated in the References can be used with ethanol as the component of interest instead of IPA.

2. Open Package of Sterile TechniSat® TX3214 Experiment

Introduction

No theoretical paper is complete without some experimental work. For this experiment, a peel and reseal package of irradiated TX3214 was placed in an ISO Class 5 laminar air flow hood in an air-conditioned non-classified laboratory at 72°F. The configuration of the open package was that the peel and reseal flap was adjusted such that the opening for removing wipers was completely uncovered, as shown in [Figure 4](#).

Figure 4. The configuration of the TX3214 peel and reseal flap is adjusted such that the opening for wiper removal is completely exposed. The package is approximately six inches from the HEPA filter in the back of the hood during the experiment. The experiment did not remove any wipers from the package to remove the variable of the wiper weight. The weight loss is representative of the solution loss only.

In this experiment, the package was weighed periodically. The data collected is compiled in [Table 4](#). This data is charted in [Figure 5](#).



Figure 4

Table 4

The bag weight data collected during the open package experiment

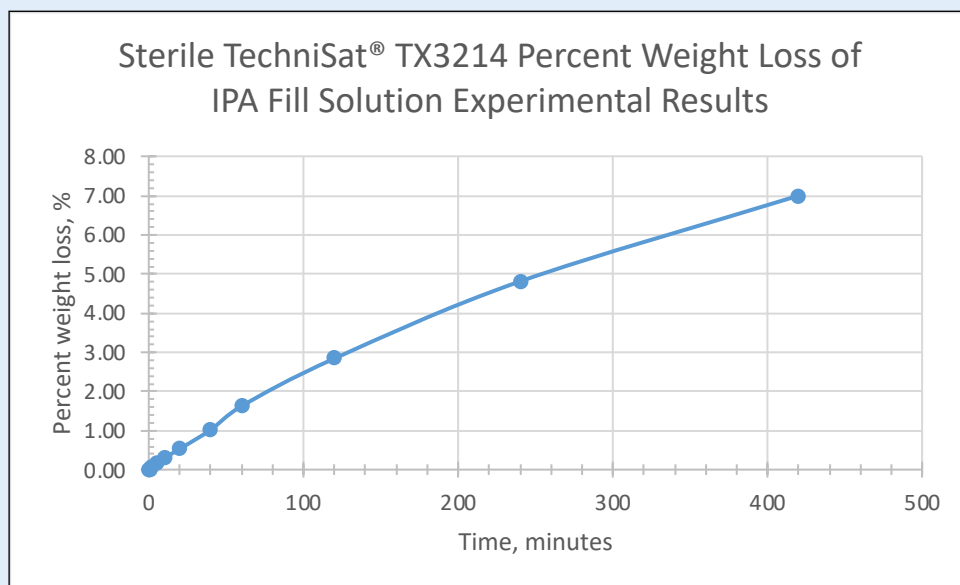
Time, minutes	Bag weight, grams	Weight loss, g	Weight loss, %
0	764.54	0	0.00
1	764.42	0.12	0.02
2	764.10	0.44	0.08
5	763.65	0.89	0.16
10	762.81	1.73	0.32
20	761.55	2.99	0.55
40	758.91	5.63	1.04
60	755.65	8.89	1.65
120	749.11	15.43	2.86
240	738.50	26.04	4.82
420	726.70	37.84	7.00

Calculations

Each package of Sterile TechniSat® TX3214 contains 50 – 9" x 11" nonwoven wipers consisting of a 45% polyester/55% cellulose tissue blend filled with 617 milliliters (540.26 grams (g), density = 0.87563 g/ml at 20°C) of a 70% v/v IPA solution. As the experiment progressed, the package weight dropped as shown in the Bag weight column. The values in the Weight loss, g column were calculated by subtracting the Bag weight at a given time from the initial Bag weight at zero time (764.54 g). The values in the Weight loss percent column were calculated by dividing the Weight loss value by the total fill weight. As an example, at the ten-minute data point, the bag weighed 762.81 g after starting at 764.54 g. The weight loss was 1.73 g (764.54 g – 762.81 g = 1.73 g). The 0.32% value for Weight loss % was calculated by dividing the 1.73 g weight loss by the 540.26 g fill weight and multiplying by 100% (1.73 g / 540.26 g x 100% = 0.32%). To form the chart in [Figure 5](#), the Weight loss, % values were plotted against the time in minutes.

Figure 5

The percentage weight loss of IPA solution versus time for a completely opened package of TX3214. After 420 minutes, only seven percent of the fill weight (37.84 g) had evaporated. The time to get to 11.2% solution evaporation will be difficult to determine since the drying rate is slowing.



Wiping Characteristic Test

Earlier, a concern regarding the wiping characteristics was mentioned. As part of the experiment, a wiping test was performed. After seven hours of the TX3214 peel-and-reseal bag being completely open, the top wiper was removed from the bag and wiped on a surface. The wiping characteristics were normal. The residual solution on the surface from the experimental package dried at approximately the same rate as a non-experimental package.

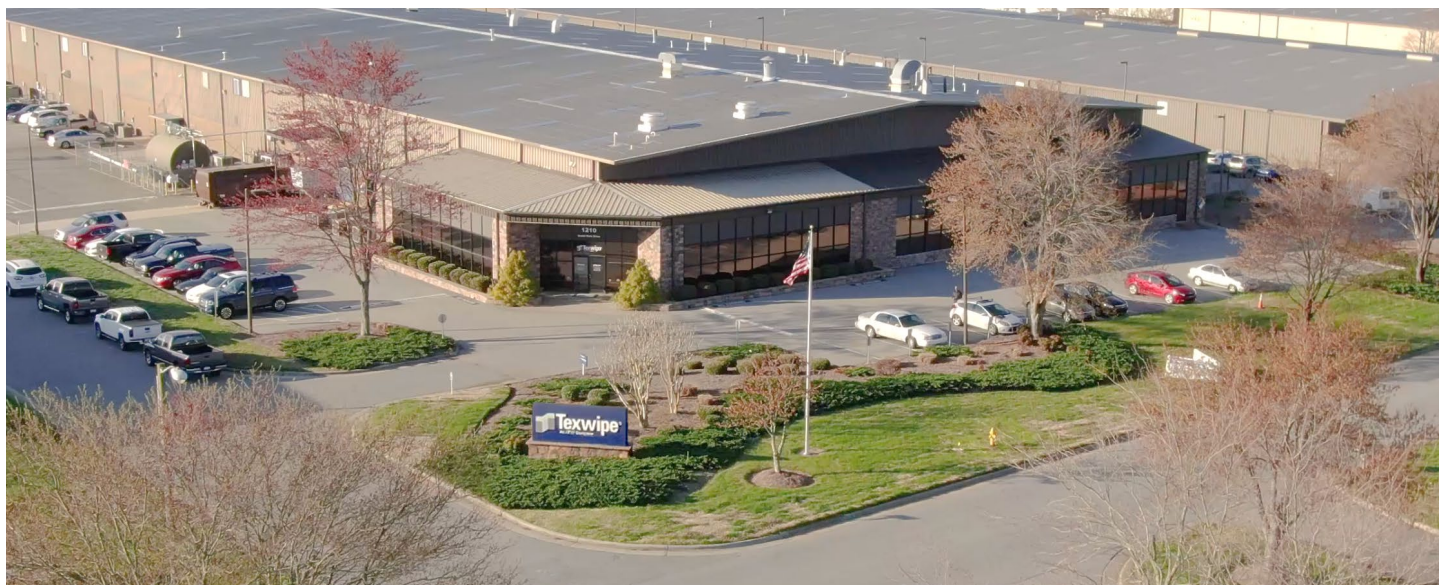
Addendum Summary

The modifications to this calculation method, when another common alcohol, denatured ethanol, is used, were compiled to show the needed data requirements and impact to the equations used in this method.

A package of TX3214, containing 50 nonwoven wiper pre-wetted with a 70% IPA solution was opened in a laboratory hood to demonstrate the experiment to be performed, as mentioned earlier, for any use case. This result was for a package that was opened continuously and fully in a laboratory hood, not in a sterile ISO Class 5 cleanroom or containment device environment with different operating conditions and more reasonable product use, e.g., the package is opened and closed during use.



TECHNOTES



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