

Artificial Body Fluids

# SWEAT THE SMALL STUFF

For vital product testing  
applications where  
reliability is critical.







## ARTIFICIAL SKIN SURFACE FILMS

Perspiration is on everything we touch with our fingers or that comes into contact with our bodies. Sweat can react with materials and trigger allergies, or it can shorten product service life via corrosion or discoloration. Natural human perspiration has a complex composition that depends on the type of sweat gland, the person's metabolism and hydration level. Pickering Laboratories' human mimic artificial perspiration solutions are formulated based on published data for human sweat and provide the closest match to the "real thing" available on the market. These solutions are perfect for testing a variety of consumer products and medical devices as well as for forensics applications and as blanks for medical testing protocols.



## Artificial Eccrine Perspiration

The Artificial Eccrine Perspiration we offer is a ready-to-use solution and is the closest mimic to true human eccrine sweat. It consists of nineteen amino acids, the seven most abundant minerals, and the four most abundant metabolites at a pH of 4.5. All concentrations closely match experimentally determined values for adult human eccrine sweat.

The stabilized solution is preserved with a fungicide and bactericide and can be stored at room temperature, while the non-stabilized product is stored frozen. Custom formulations at varying pH (2-9) can be made as either the stabilized or non-stabilized solutions.

### Artificial Eccrine Perspiration List of Ingredients

Metabolites	Uric acid	Urea	
	Lactic acid	Ammonia	
Minerals	Sodium	Iron	Nitrate
	Calcium	Copper	Sulfate
	Magnesium	Potassium	
	Zinc	Chloride	
Amino Acids	L-Glycine	L-Histidine	L-Serine
	L-Alanine	L-Isoleucine	L-Threonine
	L-Arginine	L-Leucine	L-Tyrosine
	L-Asparagine	L-Lysine	L-Valine
	L-Aspartic acid	L-Methionine	L-Taurine
	L-Citrulline	L-Ornithine	
	L-Glutamic acid	L-Phenylalanine	

### Artificial Eccrine Perspiration

Catalog No.	Description	Qty
1700-0022	Artificial Eccrine Perspiration	200 mL
1700-0020	Artificial Eccrine Perspiration - Stabilized	200 mL
1700-0024	Artificial Eccrine Perspiration - Stabilized	5 mL
1700-0531	Artificial Eccrine Perspiration - Stabilized	950 mL
1700-0023	Artificial Eccrine Perspiration, Custom pH	200 mL
1700-0021	Artificial Eccrine Perspiration, Custom pH - Stabilized	200 mL
1700-0535	Artificial Eccrine Perspiration, Custom Formulation - Stabilized	950 mL
1700-0536	Artificial Eccrine Perspiration, Custom pH - Stabilized	950 mL
1700-0559	Artificial Eccrine Perspiration, Custom Formulation (Minimum Order Qty 5)	200 mL

## Artificial Sebum

Sebum is an oily secretion produced by sebaceous glands, which spreads over the hair and skin for water-proofing purposes. This solution is formulated according to ASTM designation D4265-14 or D4265-98. It is ready-to-use and provides the reliability, reproducibility and convenience needed for testing. This formulation can be used according to AATCC Standard Test Method 130-2010 for evaluating the efficacy of home laundry products and conditions to remove stains from fabric.

### D4265-14 Artificial Sebum

Catalog No.	Description	Qty
1700-0700	Artificial Sebum	25 g
1700-0702	Artificial Sebum	200 g
1700-0704	Artificial Sebum, (Minimum order Qty of 5)	500 g

## Artificial Apocrine Perspiration

Apocrine sweat is secreted by apocrine glands located in the areas of the body with an abundance of hair follicles such as the scalp, armpits and groins. Apocrine sweat is initially sterile and odorless but when acted upon by bacteria it forms odorous compounds. Artificial Apocrine Perspiration was developed to mimic the composition of human apocrine sweat and contains several volatile fatty acids that are responsible for the unpleasant odor associated with it.

The ready-to-use solution is stored in a refrigerator and could be used for testing that requires the presence of malodor. It also could be used to culture bacteria that are commonly present on human skin.

### Artificial Apocrine Perspiration List Of Ingredients

Metabolites	Urea	Citric acid	Butyric acid
	Ammonia	2-hydroxybutyric acid	i-Valeric acid
	Lactic acid	3-hydroxybutyric acid	
	Formic acid	a-hydroxy-isobutyric acid	
Sugars	Glucose		
	Alanine	Aspartic acid	Citrulline
Amino Acids	Glutamic acid	Glutamine	Glycine
	Isoleucine	Leucine	Lysine mono-hydrochloride
	Phenylalanine	Proline	Serine
	Threonine	Tryptophan	Tyrosine
	Valine	Creatine	

### Sebum

### Artificial Apocrine Perspiration

Catalog No.	Description	Qty
1700-0556	Artificial Apocrine Perspiration	250 mL

## Eccrine Perspiration-Sebum Emulsion

Inspired by the ASTM D4265-98 method for staining, the emulsion uses 5% Artificial Sebum in Eccrine Perspiration. Oleic acid is added as an emulsifier. Prepared without dust/dirt for a more universal application, this emulsion mimics non-exercise induced skin surface film (SSFL). As SSFL, it can be used to test any topical use product or the stability of any article that will come in contact with human sweat. This product requires refrigeration to remain in solution and prevent rancidity.

### Eccrine Perspiration-Sebum Emulsion

Catalog No.	Description	Qty
1700-0547	Artificial Eccrine Sweat-Sebum Emulsion	250 mL
1700-0549	Artificial Eccrine Sweat-Sebum Emulsion	950 mL



## CORROSION TESTING

Accelerated testing methods are a popular way of testing durability, by subjecting products to controlled conditions that are much more aggressive than normal conditions. For wearables that are in prolonged contact with human sweat, the main areas of concern are corrosion and colorfastness.

Corrosion can lead to altering of the appearance or leaching of sensitizing chemicals, such as nickel and chromium, that cause allergic reactions. Salt, the main component in human sweat, increases water's ability to speed up the corrosion process. Other factors that facilitate corrosion are the pH of the solution and presence of certain organic compounds such as lactic acid and sulfur-containing amino acids.

Metals and alloys are not the only surfaces to be affected by corrosion. Organic coated surfaces, colored plastics or self-adhesive films in automotive interiors, spectacle frames and shoe leather are just a few of the multitude of surfaces also affected. Tarnishing, loss of gloss, shrinkage, cracking and discoloration could all be attributed to the corrosive effects of sweat on products and materials.

## BS EN 1811:2011 Artificial Perspiration

### For Release of Nickel

This pH 6.5 formulation is used to stimulate the release of Nickel from all post assemblies which are inserted into pierced ears and other pierced parts of the human body, and for articles intended to come into direct and prolonged contact with the skin. Spectacle frames and sunglasses are excluded from the scope of this European Standard. (Custom pH and stabilized versions available)

#### BS EN 1811:2011 Artificial Perspiration

Catalog No.	Description	Qty
1700-0009	BS EN 1811:2011 Artificial Perspiration	200 mL
1700-0506	BS EN 1811:2011 Artificial Perspiration - Stabilized	200 mL
1700-0521	BS EN 1811:2011 Artificial Perspiration, Custom pH	200 mL
1700-0515	BS EN 1811:2011 Artificial Perspiration, Custom pH - Stabilized	200 mL
1700-0566	BS EN 1811:2011 Artificial Perspiration - Stabilized	Carboy 19.8 L





**ISO 3160 Artificial Perspiration**  
**Corrosion Resistance for Gold Alloy**

This formulation is used to determine corrosion (tarnishing, oxidation and surface penetration) resistance for gold alloy coverings on watch cases and accessories, including bracelets when they are permanently attached to the case. The solution is at pH 4.7 per ISO 3160 specifications. (Custom pH and stabilized versions available)

ISO 3160 Artificial Perspiration		
Catalog No.	Description	Qty
1700-0026	ISO 3160 Artificial Perspiration	200 mL
1700-0511	ISO 3160 Artificial Perspiration - Stabilized	200 mL
1700-0520	ISO 3160 Artificial Perspiration, Custom pH	200 mL
1700-0526	ISO 3160 Artificial Perspiration, Custom pH - Stabilized	200 mL
1700-0532	ISO 3160 Artificial Perspiration - Stabilized	950 mL
1700-0537	ISO 3160 Artificial Perspiration with Added Pyruvic acid, Buffered - Stabilized	950 mL
1700-0545	ISO 3160 Artificial Perspiration, Custom pH - Stabilized	950 mL
1700-0557	ISO 3160 Artificial Perspiration - Stabilized	Carboy 19.8 L
1700-0560	ISO 3160 Artificial Perspiration with added Pyruvic acid, buffered, Custom pH - Stabilized	950 mL

**ANSI-BHMA A156.18 Artificial Perspiration**  
**For Testing Builders Hardware and Finishes**

This artificial perspiration formulation is used to test finishes on various base materials as per the builder's hardware association. This formulation is not offered in a stabilized format. (Custom pH available)

ANSI-BHMA A156.18 Artificial Perspiration		
Catalog No.	Description	Qty
1700-0504	ANSI-BHMA A156.18 Artificial Perspiration	200 mL
1700-0512	ANSI-BHMA A156.18 Artificial Perspiration, Custom pH	200 mL



## GMW14334 Artificial Perspiration

### Chemical resistance of automotive trim materials and components.

Acid and alkaline perspiration solutions are formulated according to test procedure GMW14334 and they are designed to test chemical resistance of automotive trim materials and components.

#### GMW 14334 Artificial Perspiration

Catalog No.	Description	Qty
1700-0533	GMW 14334 – Acidic	200 mL
1700-0534	GMW 14334 – 2-Part Alkaline	200 mL

## DIN EN 60068-2-70 & IEC 60068-2-70 Artificial Perspiration

### Abrasion Resistance of Markings and Letterings Caused by Rubbing of Fingers and Hands

This formulation is used to determine the resistance of markings and letterings on flat or curved surfaces against abrasion as it may occur by manually operating actuators and keyboards. This formulation can also be used to determine resistance against fluid contamination as it may occur under normal use.

#### DIN EN 60068-2-70 & IEC 60068-2-70 Artificial Perspiration

Catalog No.	Description	Qty
1700-0542	DIN-EN/IEC60068-2-70 Sweat	200 mL
1700-0543	DIN-EN/IEC60068-2-70 Sweat - Stabilized	200 mL
1700-0583	Artificial Perspiration, DIN-EN/IEC60068-2-70 Sweat, Custom pH, Stabilized	200 mL
1700-0593	Artificial Perspiration, DIN-EN/IEC60068-2-70 Sweat, Custom pH, Not Stabilized.	200 mL

## ISO 12870 Artificial Perspiration

### Ophthalmic Optics – Spectacle Frames

This solution is used to determine the resistance to perspiration of unglazed spectacle frames designed for use with all prescription lenses and also to rimless mounts, semi-rimless mounts and folding spectacle frames. This is also applicable to frames made from natural organic materials, but not to custom-made spectacle frames or to products designed specifically to provide personal eye protection.

#### ISO 12870 Artificial Perspiration

Catalog No.	Description	Qty
1700-0014	ISO 12870 Artificial Perspiration	200 mL
1700-0510	ISO 12870 Artificial Perspiration - Stabilized	200 mL
1700-0519	ISO 12870 Artificial Perspiration, Custom pH	200 mL
1700-0525	ISO 12870 Artificial Perspiration, Custom pH - Stabilized	200 mL

## ASTM Method D2322-00 Artificial Perspiration

ASTM method D2322-00 determines the resistance to grain cracking, area loss, and flexibility of shoe upper leather to artificial perspiration. (Custom pH and stabilized versions available)

#### ASTM D2322-00 Artificial Perspiration

Catalog No.	Description	Qty
1700-0548	ASTM D2322-00 Artificial Perspiration	200 mL
1700-0550	ASTM D2322-00 Artificial Perspiration - Stabilized	200 mL



## BUFFERED SWEAT

The pH of the solution is an important consideration in product testing, affecting corrosion rate, level of color degradation and leaching of metals and organic components from wearable products. Many procedures require a tight pH range during testing. To accommodate these pH requirements and to improve pH stability over time, Pickering Laboratories is offering buffered versions of industry-specific artificial perspiration formulations. By adding a Phosphate buffer to the original formulation, the pH stability of the solution is greatly improved while its effect on corrosion and colorfastness remains unaffected.

## Buffered DIN 53160, BS EN 1811:2011 Artificial Perspiration

Method DIN 53160-2:2010-10 specifies an artificial perspiration solution that is used to determine the colorfastness of articles for common use. This test establishes whether coloring on materials can migrate from the daily use articles to the skin. The test method is applicable to all articles of daily use, independent of the coloring procedure applied (dyeing, staining or coating). Method BS EN 1811:2011 is used for the testing of nickel release from jewelries and other products that come with prolonged contact with skin. The primary perspiration components and pH described by methods BS EN 1811:2011 and DIN 53160-2:2010-10 are the same, now Pickering Laboratories is offering a buffered version of the original formulations. Phosphate ions do not affect color migration rates nor the rate of nickel release, so these modified formulations can be used for the same tests. The buffered formulation is offered at pH 6.5, specified by DIN 53160 and BS EN 1811:2011 methods, as well as at custom pH by customer request. Stabilized formulations contain a preservative to prevent bacteria growth and can be stored at room temperature.

### Artificial Perspiration DIN 53160, BS EN 1811:2011

Catalog No.	Description	Qty
1700-0567	Artificial Perspiration DIN 53160, BS EN 1811:2011, Buffered	200 mL
1700-0568	Artificial Perspiration DIN 53160, BS EN 1811:2011, Buffered - Stabilized	200 mL
1700-0569	Artificial Perspiration DIN 53160, BS EN 1811:2011, Buffered, Custom pH	200 mL
1700-0570	Artificial Perspiration DIN 53160, BS EN 1811:2011, Buffered, Custom pH - Stabilized	200 mL



## COLORFASTNESS TESTING

Colorfastness is one of the most important concerns in the textile industry. Discoloration of fabric can be due to perspiration, light, rubbing or a combination of all three. Salt, urea and lactic acid present in sweat can disrupt the bonding that dyes form with the fabric fibers, causing fading of the color. In addition, amino acids in sweat can attach to fabric to produce "protein stains".

Use of nanotechnology to endow new properties to textiles, such as antibacterial or UV protection, water repellency or flame retardancy, together with incorporating sensors and other digital components, creates the need to consider the effects of sweat on nanoparticles leaching and corrosion of integrated circuits as well.

## AATCC Test Method 15 and Test Method 125 Artificial Perspiration

### Colorfastness of Fabric to Perspiration or to a Combination of Light and Perspiration

This solution is used to determine the colorfastness of textiles to the effects of acid perspiration according to Test Method 15. The same formulation is also used to determine colorfastness to a combination of light and perspiration according to Test Method 125. It is applicable to dyed, printed or otherwise colored textile fibers, yarns and fabrics of all kinds.

#### AATCC Test Method 15 Artificial Perspiration

Catalog No.	Description	Qty
1700-0012	AATCC Test Method 15 Artificial Perspiration	200 mL
1700-0015	AATCC Test Method 15 Artificial Perspiration - Stabilized	200 mL
1700-0527	AATCC Test Method 15 Artificial Perspiration, Custom pH	200 mL
1700-0528	AATCC Test Method 15 Artificial Perspiration, Custom pH - Stabilized	200 mL
1700-0541	AATCC Test Method 15 Artificial Perspiration - Stabilized	4x950 mL
1700-0555	AATCC Test Method 15 - Stabilized	Carboy 19.8 L
1700-0565	AATCC Test Method 15 Artificial Perspiration	Carboy 19.8 L

## ISO 105-B07 and ISO 105-E04 Artificial Perspiration

### Colorfastness of Textiles to Either a Combination of Light and Perspiration or Just Perspiration

These test solutions are for all kinds of textiles and textiles in all forms. Textiles are wetted with either the acidic or alkaline solution to test the combined effect of perspiration solution and exposure to light according to ISO 105-B07, and to perspiration only according to ISO 105-E04. The pH of the acidic solution is 5.5 and that of the alkaline solution is 8.0.

#### ISO 105-B07 and ISO 105-E04 Artificial Perspiration

Catalog No.	Description	Qty
1700-0010	ISO 105-B07 / ISO 105-E04 Artificial Perspiration, pH 5.5	200 mL
1700-0507	ISO 105-B07 / ISO 105-E04 Artificial Perspiration, pH 5.5 - Stabilized	200 mL
1700-0544	ISO 105-B07/ISO 105-E04 Artificial Perspiration, pH 5.5 - Stabilized	950 mL
1700-0516	ISO 105-B07 / ISO 105-E04 Artificial Perspiration, Acidic Custom pH	200 mL
1700-0522	ISO 105-B07 / ISO 105-E04 Artificial Perspiration, Acidic Custom pH - Stabilized	200 mL
1700-0011	ISO 105-B07 / ISO 105-E04 Artificial Perspiration, pH 8.0	200 mL
1700-0508	ISO 105-B07 / ISO 105-E04 Artificial Perspiration, pH 8.0 - Stabilized	200 mL
1700-0517	ISO 105-B07 / ISO 105-E04 Artificial Perspiration, Alkaline Custom pH	200 mL
1700-0523	ISO 105-B07 / ISO 105-E04 Artificial Perspiration, Alkaline Custom pH - Stabilized	200 mL

## ISO 11641 Artificial Perspiration

This formulation determines colorfastness to perspiration of leather at all stages of processing, particularly to gloving, clothing and lining leathers, and uppers of unlined shoes. This alkaline perspiration has a greater effect on the color of leather and is used to simulate the most demanding conditions.

#### ISO 11641 Artificial Perspiration

Catalog No.	Description	Qty
1700-0013	ISO 11641 Artificial Perspiration	200 mL
1700-0509	ISO 11641 Artificial Perspiration - Stabilized	200 mL
1700-0518	ISO 11641 Artificial Perspiration, Custom pH	200 mL
1700-0524	ISO 11641 Artificial Perspiration, Custom pH - Stabilized	200 mL



## STAINING MATERIALS

Staining materials are widely used to check performance of fabrics, cleaning agents, and protective coatings. To evaluate relative performance of different products the staining material should be appropriate for a specific test and reproducible. We offer several staining materials that represent soiling happening from exposure to the environment as well as from contact with human skin.

## Synthetic Soil

Synthetic soil is used as the soiling option for evaluations of stain and soiling related to pile yarn floor coverings. The official methods that are used for these evaluations are AATCC TM122, AATCC TM123 and ASTM D6540. The procedure to apply the test soil is being improved to make it reproducible, and this has changed the status of some of the methods.

Regardless, the synthetic soil used to soil or stain the floor covering has remained the same. The ingredients used and the procedure for formulating the synthetic soil is now available as AATCC LP4-2023. The Pickering Laboratories Synthetic soil (1700-0706) follows this procedure, sieved using 200 mesh sieve and is available in 25 g quantities. This formulation can also be used in other product testing procedures that require the use of synthetic soil.

### Synthetic Soil

Catalog No.	Description	Qty
1700-0706	Synthetic Soil, AATCC LP4-2023	25 g

## Dusty Sweat/Sebum Emulsion

Inspired by the ASTM D4265 method for testing laundry detergents this emulsion contains 5% of artificial sebum and 1.2% of Synthetic Soil in solution of AATCC Method 15 Artificial Perspiration. The use of artificial perspiration allows to account for effects of salts, amino acids, and lactic acid on staining. Use of Synthetic Soil instead of air filter dust improves batch to batch reproducibility of the product and eliminates extraction solvents use for more environmentally friendly manufacturing process.

### Dusty Sweat/Sebum Emulsion

Catalog No.	Description	Qty
1700-0707	Dusty Sweat/Sebum Emulsion	250 mL

## ARTIFICIAL CERUMEN

Cerumen, also known as ear wax, is a waxy substance secreted by ceruminous and sebaceous glands in the ear canal. It protects and lubricates the ear canal and assists in cleaning by trapping dirt and dead skin cells. Pickering Laboratories' artificial cerumen product is similar in properties to the secretion itself and doesn't contain keratin or other proteins.

## Artificial Cerumen

Pickering Laboratories offers artificial ear wax that can be used for testing of hearing aids, ear buds and other electronic devices meant to be used in the ears. It contains lanolin, long chain fatty acids and paraffin oil.

### Artificial Cerumen

Catalog No.	Description	Qty
1700-0701	Artificial Cerumen	50 g
1700-0711	Artificial Cerumen	200 g



## ARTIFICIAL SALIVA

Pickering Laboratories manufactures a variety of artificial saliva formulations designed for product testing and research. Several artificial saliva products follow official testing methods that are globally accepted for testing corrosion or colorfastness of consumer products and dental devices. In addition, we offer a range of formulations based on published scientific data. To increase the stability of some products during storage, several artificial saliva formulations come in two parts that are mixed just before use.

Custom formulations to accommodate specific pH or ingredient requirements are also available upon customer request.

## Artificial Saliva ASTM E2720-16/ ASTM E2721-16 with Mucin

This artificial saliva formulation is prepared according to official methods ASTM E2720-16 and ASTM E2721-16, which specify for the evaluation of decontamination procedures for surfaces and materials contaminated with human pathogenic viruses. The formulation has a mineral composition and pH close to human saliva and contains Mucin to increase the viscosity and lubricating ability of the solution. This artificial saliva can also be used for dental, drug delivery or pharmaceutical studies. The stabilized solution is pre-mixed and has a preservative added to prevent bacterial growth; it is stored at room temperature. The two-part non-stabilized formulation comes with dry pre-weighed mucin powder to be mixed in before use. Non-stabilized solution should be stored refrigerated. The pH of the formulation is 7.

### Artificial Saliva With Mucin

Catalog No.	Description	Qty
1700-0316	Artificial Saliva With Mucin - Stabilized	200 mL
1700-0317	Artificial Saliva With Mucin 2-Part	200 mL
1700-0318	Artificial Saliva With Mucin Custom pH - Stabilized	200 mL
1700-0319	Artificial Saliva With Mucin, Custom pH, 2-Part	200 mL
1700-0324	Artificial Saliva With Mucin - Stabilized	950 mL

## $\alpha$ -Amylase

Amylase is the main enzyme in human saliva and is needed for starch digestion. As some applications require studying the effect of enzymes in saliva, Pickering Laboratories offers an easy way to add biological activity to your chosen artificial saliva product. Once added to the 200 mL bottle of artificial saliva, our Amylase product will provide 80 U/mL of enzyme activity.

### Amylase

Catalog No.	Description	Qty
1700-0320	$\alpha$ -Amylase From <i>Aspergillus Oryzae</i>	16 KU





## Artificial Saliva for Pharmaceutical Research

Artificial Saliva is formulated according to literature for pharmaceutical research such as studies of drug dissolution and drug delivery through oral mucosa. This is a ready to use formulation that should be stored refrigerated. The pH of the solution is 6.8.

### Artificial Saliva for Pharmaceutical Research

Catalog No.	Description	Qty
1700-0304	Artificial Saliva for Pharmaceutical Research	200 mL
1700-0308	Artificial Saliva for Pharmaceutical Research, Custom pH	200 mL
1700-0355	Artificial Saliva for Pharmaceutical Research	Carboy 19.8 L

## Artificial Saliva for Medical and Dental Research

This Artificial Saliva is formulated according to literature references for medical and dental research. This formulation has similar composition to commercially available products used to treat dry mouth and other conditions. This ready-to-use solution contains Sodium carboxymethyl cellulose to increase viscosity of the solution and make it behave similar to natural human saliva. This formulation contains a preservative and can be stored at room temperature and has pH of 6.8. This solution is only intended for product testing and research, and not for medical use.

### Artificial Saliva for Medical and Dental Research

Catalog No.	Description	Qty
1700-0305	Artificial Saliva for Medical and Dental Research - Stabilized	200 mL
1700-0395	Artificial Saliva for Medical and Dental Research - Stabilized	4x950 mL



## Artificial Saliva DIN 53160-1:200, SN/T 1058.1-2013, GB/T 18886-2019

### To Determine Colorfastness of Products Intended to be Taken into Mouth

Artificial saliva is prepared according to specifications of DIN 53160-1:200, SN/T 1058.1-2013 and GB/T 18886-2019 official methods. The formulation consists of two parts that are mixed right before use. This minimizes changes in the solution during storage and allows for a longer shelf life. The solution should be kept frozen for long-term storage. The pH of the solution after mixing is 6.8. A made-to-order pre-mixed formulation is available for customers who intend to use the artificial saliva within one month.

#### DIN 53160-1:200, SN/T 1058.1-2013, GB/T 18886-2019 Artificial Saliva

Catalog No.	Description	Qty
1700-0303	Artificial Saliva DIN 53160-1:200, SN/T 1058.1-2013, GB/T 18886-2019	200 mL
1700-0323	Artificial Saliva DIN 53160-1:200, SN/T 1058.1-2013, Gb/T 18886-2019, Premixed, 1-Month Shelf Life	950 mL
1700-0310	Artificial Saliva DIN 53160, Custom pH	200 mL

## ISO 10271-2011 Artificial Saliva

### Corrosion Testing for Metallic Material in Dental Devices

This Artificial Saliva is formulated according to ISO 10271-2011 standard procedure. ISO 10271-2011 specifies the method for corrosion testing for metallic material in dental devices. The solution should be stored in the refrigerator. The pH of the solution is 2.3.

#### ISO 10271-2011 Artificial Saliva

Catalog No.	Description	Qty
1700-0313	ISO 10271-2011 Artificial Saliva	200 mL





## AFNOR NF S91-141 Artificial Saliva

### For Testing Biodegradability of Dental Metal Alloys

Artificial Saliva is prepared according to AFNOR NF S91-141 standard procedure and is intended for testing biodegradability of dental metal alloys. The formulation consists of two parts that are mixed right before use. This minimizes changes in the solution during storage and allows for a longer shelf life. The pH of the solution after mixing is 7.8. The Artificial Saliva should be stored refrigerated both before and after mixing. Premixed, ready-to-use solution is available upon request.

#### AFNOR NF S91-141 Artificial Saliva

Catalog No.	Description	Qty
1700-0302	AFNOR NF S91-141 Artificial Saliva	200 mL

## Fusayama/Meyer Artificial Saliva

### For Testing of Products for Corrosion, Colorfastness and Discoloration

This ready-to-use solution closely resembles the mineral composition of natural saliva and can be used for testing a wide variety of products, including dental metal alloys. This formulation is at pH 4.9 and should be stored refrigerated.

#### Artificial Saliva

Catalog No.	Description	Qty
1700-0301	Fusayama / Meyer Artificial Saliva	200 mL
1700-0309	Fusayama / Meyer Artificial Saliva - Stabilized	200 mL
1700-0307	Fusayama / Meyer Artificial Saliva Custom pH	200 mL
1700-0306	Fusayama / Meyer Artificial Saliva Custom pH - Stabilized	200 mL

## Modified Fusayama/Meyer, Custom pH

This variation of classic Fusayama/Meyer formulation contains Potassium thiocyanate that is present in natural saliva and has been shown to be elevated in smokers. This formulation is manufactured according to customer's pH specifications in the range of pH 3.0-6.5. The formulation contains a preservative to prevent bacteria growth and can be stored at room temperature.

#### Artificial Saliva

Catalog No.	Description	Qty
1700-0314	Artificial Saliva, Modified Fusayama/Meyer, Custom pH up to 6.5 - Stabilized	200 mL
1700-0315	Artificial Saliva, Modified Fusayama/Meyer, Custom pH up to 6.5	200 mL



## ARTIFICIAL URINE

For more than 10 years, Pickering Laboratories has been supplying companies with artificial body fluids designed to test an array of materials, components and finished products. Our artificial urine solutions are formulated both according to official testing methods as well as published research on the use of artificial urine for corrosion testing, medical studies and related applications. The products do not come sterile but could be sterilized before customer use using filtration.

### Artificial Urine for Corrosion Testing of Urological Implants, Stabilized

This artificial urine is designed for testing metallic biomaterials used to produce urological implants and catheters. This convenient product is a ready-to-use solution. The formulation contains non-toxic preservative to avoid bacteria growth and can be stored at room temperature. The pH of the final solution is 6.0.

#### Artificial Urine for Corrosion Testing of Urological Implants

Catalog No.	Description	Qty
1700-0016	Artificial Urine for Corrosion Testing of Urological Implants - Stabilized	200 mL

### DIN EN 1616:1999 Artificial Urine for Testing Sterile Urethral Catheters

Artificial Urine is prepared according to DIN EN 1616:1999 standard procedure. DIN EN 1616 specifies the method to test sterile urethral catheters. This ready-to-use solution should be stored frozen to avoid bacteria growth. The pH of the solution is 6.6.

#### DIN EN 1616:1999 Artificial Urine for Testing Sterile Urethral Catheters

Catalog No.	Description	Qty
1700-0017	DIN EN 1616:1999 Artificial Urine	200 mL
1700-0558	DIN EN 1616:1999 Artificial Urine - Stabilized	200 mL
1700-0603	DIN EN 1616:1999 Artificial Urine	Carboy 19.8 L

### Artificial Urine Medium for Growing Urological Pathogens

This ready-to-use solution closely resembles composition of human urine and can be used for clinical studies as well as for product testing. This formulation supports growth of wide range of urinary pathogens and it is also capable of forming crystals similar to these found in natural urinary tract infections. It can be used as negative controls in laboratory testing. pH of the Artificial Urine Medium is 6.5. This product is stored frozen.

#### Artificial Urine Medium for Growing Urological Pathogens

Catalog No.	Description	Qty
1700-0018	Artificial Urine Medium for Growing Urological Pathogens	200 mL

### Artificial Urine Stabilized

This ready-to-use solution has the same composition as Artificial Urine Medium and closely resembles human urine. This formulation contains non-toxic preservative to avoid bacteria growth and can be stored at room temperature. The pH of Artificial Urine Stabilized is 6.5.

#### Artificial Urine

Catalog No.	Description	Qty
1700-0600	Artificial Urine - Stabilized	200 mL
1700-0602	Artificial Urine - Stabilized	950 mL



## SIMULATED LUNG FLUID

Respiratory tract fluid is a complex, still not well-characterized mixture containing salts, locally secreted proteins, lipids, surfactants and other compounds. Respiratory fluid is also not homogeneous and has unique regional characteristics. The simplest simulated lung fluid, called Gamble's solution, is a physiological salt solution that has been used to study drug dissolution as well as the solubility and bioavailability of toxic compounds found in inhaled particles.

## Simulated Lung Fluid

Gamble's solution represents the interstitial fluid deep within the lung and is used to simulate different lung conditions. It is used in pulmonary drug delivery studies as well as in studies of particles inhalation effects. Citrate is used in Gamble's solution instead of proteins to avoid foaming and acetate instead of organic acids. Gamble's solution has a pH of 7.4. Inquire about other simulated lung fluid formulations.

### Simulated Lung Fluid

Catalog No.	Description	Qty
1700-0800	Simulated Lung Fluid - Gamble's Formulation	200 mL
1700-0808	Simulated Lung Fluid, Stabilized - Gamble's Formulation	200 mL

## Simulated Lung Fluid with Surfactant

Dipalmitoylphosphatidylcholine (DPPC) is a phospholipid and one of the main pulmonary surfactants found in lung fluid. The main function of DPPC is to reduce the surface tension of liquid in the lungs and to help adsorption of oxygen into the air-liquid interface. It is known to be a difficult process to bring DPPC into solution. With that in mind, we offer a synthetic lung fluid with DPPC dissolved and pre-mixed for your convenience.

### Simulated Lung Fluid

Catalog No.	Description	Qty
1700-0818	Simulated Lung Fluid with DPPC Surfactant	200 mL



## SYNTHETIC BLOOD

This solution is made according to ASTM and ISO methods intended for testing the effectiveness of PPE and protective clothing, as well as other applications. Each lot is tested to ensure the viscosity and surface tension are consistent. These solutions are NOT suitable for medical research. \*\*We can customize the viscosity of this product upon request\*\*

## Synthetic Blood

Pickering Laboratories' synthetic blood formulations are prepared according to official methods ASTM F1819, ASTM F1670, ASTM F1862, ASTM F2100 and ISO 16603. They are intended for product testing and have the surface tension close to human blood. Additionally, the color of the solution is intended to mimic the appearance of genuine human blood. ISO 16603 formulation also contains sodium and potassium salts that buffer the solution at pH 7.3 to meet the method requirements.

The formulations can be used to evaluate the effectiveness of materials used in protective clothing. They can also be used to evaluate absorption capacity of materials that are in contact with human skin for prolonged periods.

The formulations are not suitable for medical research. These products can be stored at room temperature and have a shelf life of one year from date of manufacture.

### Synthetic Blood

Catalog No.	Description	Qty
1700-0729	Synthetic Blood According to ASTM F1819-19	4x950 mL
1700-0720	Synthetic Blood According to ASTM F1819-19	200 mL
1700-0921	Synthetic Blood According to ASTM F1862/F1862M-17 and F1670M-17a	4x950 mL
1700-0821	Synthetic Blood According to ASTM F1862/F1862M-17 and F1670M-17a	200 mL
1700-0939	Synthetic Blood According to ISO 16603-2004	4x950 mL
1700-0839	Synthetic Blood According to ISO 16603-2004	200 mL



## INTESTINAL/GASTRIC FLUID

Imitation of gastrointestinal conditions is necessary for dissolution and pharmacokinetic studies of drug formulations. Dissolution is a routine part of Quality Control testing for most medications and dissolution methods, including required medium, are specified by Pharmacopeia monographs. The use of appropriate dissolution media during drug development stage also helps answer questions on bio-availability of the pharmaceuticals. Simulated gastric and intestinal fluids are also used to study the safety profile of products that carry risks of unintended use like accidental ingestion.

## Simulated Intestinal Fluid

Simulated Intestinal Fluid is prepared according to USP specifications. Our 2-part formulation comes with dry pre-weighted pancreatin powder to be mixed in before use. This allows for longer shelf life of the product and predictable activity of the enzyme in solution. The liquid part of the formulation, containing Monobasic Potassium Phosphate and Sodium Hydroxide at pH 6.8, could also be used for testing of pharmaceuticals that are required by USP to be tested in Simulated Intestinal Fluid without enzyme.

### Intestinal Fluid

Catalog No.	Description	Qty
1700-0903	USP Simulated Intestinal Fluid, 2-part	950 mL

## Simulated Gastric Fluid

US Pharmacopeia methods require dissolution studies using Simulated Gastric Fluid with and without Pepsin. To accommodate these requirements, we offer two formulations of Simulated Gastric Fluid test solution. Simulated Gastric fluid without enzyme is made according to USP specifications and contains Sodium Chloride and Hydrochloric Acid. Simulated Gastric fluid with enzyme comes in two parts – a solution containing Sodium Chloride and Hydrochloric Acid as well as pre-weighted Pepsin powder that should be added to the solution right before use. Once mixed the final solution will match USP specifications for pepsin activity. The 2-part formulation allows for longer shelf life of the product and for more reproducible enzyme activity.

### Gastric Fluid

Catalog No.	Description	Qty
1700-0900	USP Simulated Gastric Fluid without enzyme,	950 mL
1700-0902	USP Simulated Gastric Fluid with enzyme, 2-part	950 mL



## SIMULATED WATERS

To address environmental product testing applications, Pickering Laboratories also offers Substitute Ocean Water, prepared according to ASTM D1141-98 official method, and Simulated Sea Water for permeation testing according to Test Operations Procedure 08-2-501A.

### Substitute Ocean Water ASTM D1141-98 (2003)

Substitute ocean water is prepared according to official ASTM method D1141-98. This product could be successfully used in a wide variety of tests where solution simulating sea water is required, such as oil contamination testing, detergent evaluation and corrosion testing. The pH of the solution is 8.2.

The solution is ready to use and is stored at room temperature. Inquire about different sizes.

#### Substitute Ocean Water

Catalog No.	Description	Qty
1700-0801	Substitute Ocean Water ASTM D1141-98 (2003)	4x950 mL
1700-0802	Substitute Ocean Water ASTM D1141-98 (2003), - Stabilized	4x950 mL
1700-0803	Substitute Ocean Water ASTM D1141-98 (2003), - Stabilized	200 mL

### Permeation Testing

This solution was formulated according to Test Operations Procedure 08-2-501A that describes permeation testing of materials with chemical agents or simulants (Swatch Testing).

#### Simulated Sea Water for Permeation Testing

Catalog No.	Description	Qty
1700-0807	Simulated Sea Water for Permeation Testing	950 mL



## CUSTOM PROJECTS

You may not find exactly what you are looking for in our stock product offering, but do not fear: we are also highly-skilled at custom solution manufacturing! Our Tech Support team will consult with you on the intricacies of your proposed solution, lending expertise on stability, compatibility and long-term storage. We offer fast turnaround on these custom manufacturing projects and do not require a large minimum order amount. From sweat to saliva, and all body fluids in-between, we can offer our knowledge to manufacture your exact mix. If interested, please start the conversation with an email to: [sales@pickeringlabs.com](mailto:sales@pickeringlabs.com)

## PROPRIETARY SOLUTIONS

Your Intellectual Property is as important to you as our "Guaranteed Chemistry" is to us. If you have a solution that you'd like us to manufacture under strict confidentiality, we are here to help. Our 15+ years of artificial body fluid manufacturing has taught us that each customer has their own needs, and goals, for their projects. We can manufacture your internal solution in our labs, eliminating both time and error from your analysis. If interested, please start the conversation with an email to: [sales@pickeringlabs.com](mailto:sales@pickeringlabs.com)

## Contact Us

For Customer Service and Technical Support, contact:

[support@pickeringlabs.com](mailto:support@pickeringlabs.com)  
800-654-3330 / 650-694-6700

## Place an Order

Please contact us directly for all domestic US orders:

[orders@pickeringlabs.com](mailto:orders@pickeringlabs.com)  
800-654-3330 / 650-694-6700

Contact your local distributor for all international orders:

[www.pickeringtestsolutions.com](http://www.pickeringtestsolutions.com)

## Product Returns

- Products can be returned if unopened and 3 months of shelf life remaining.
- Approval for the return can be obtained by contacting Customer Service ([orders@pickeringlabs.com](mailto:orders@pickeringlabs.com)).
- A Return Goods Authorization (RGA) number will be given with instructions for the return.
- A restocking fee of 15% will be applied and deducted from amount refunded. Customer responsible for freight charges on return shipment.
- Custom formulations, including custom pH, cannot be returned.



## PICKERING LABORATORIES TEST SOLUTIONS

The devil is in the details. That's why we put the required effort into creating a family of testing solutions that mimic true-to-life substances, from sweat and ear-wax to ocean water.

So whether you're testing the effects of perspiration on first responder's gear or saliva on dental equipment, the results will be repeatable and reliable. After all, the safety of your products are critical to the safety of those who use them.



**PICKERING**  
LABORATORIES

PRODUCT TESTING SOLUTIONS

**Pickering Laboratories, Inc.**

1280 Space Park Way / Mountain View, CA 94043

[www.pickeringtestsolutions.com](http://www.pickeringtestsolutions.com) / [sales@pickeringlabs.com](mailto:sales@pickeringlabs.com) / [support@pickeringlabs.com](mailto:support@pickeringlabs.com)

800-654-3330 / 650-694-6700

Version 01/24 Qty-XXX